

JUMO variTRON 500 touch

Automation system

Central Processing Unit 705004



Operating Manual



70500400T90Z001K000

V3.00/EN/00778143/2025-03-25

Further information and downloads



qr-705004-en.jumo.info

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1.1 Safety information

General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated.

Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

Warning symbols



WARNING!

This symbol in connection with the signal word indicates that **personal injury** may occur if the respective precautionary measures are not carried out.



CAUTION!

This symbol in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.



CAUTION!

This symbol indicates that **components could be destroyed** by electrostatic discharge (ESD = Electro Static Discharge) if the respective cautionary measures are not taken.

Only use the ESD packages intended for this purpose to return device inserts, assembly groups, or assembly components.



READ THE DOCUMENTATION!

This symbol, which is attached to the device, indicates that the associated **documentation for the device** must be **observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

Note symbols



NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.



REFERENCE!

This symbol refers to **additional information** in other sections, chapters, or other manuals.



FURTHER INFORMATION!

This symbol is used in tables and indicates that **further information** is provided after the table.



DISPOSAL!

At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

1 Introduction

1.2 Trademark information

All trademarks and trade and company names used are the property of their rightful owners or authors.

1.3 Intended use

The device is designed for use in an industrial environment as specified in the technical data. Other uses beyond those defined are not viewed as intended uses.

The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, only use the device:

- For the intended use
- When in good order and condition
- When taking the technical documentation provided into account

Risks resulting from the application may arise, e.g. as the result of missing safety provisions or wrong settings, even when the device is used properly and as intended.

1.4 Qualification of personnel

This document contains the necessary information for the intended use of the device to which it relates. It is intended for staff with technical qualifications who have been specially trained and have the appropriate knowledge in the field of automation technology.

The appropriate level of knowledge and the technically fault-free implementation of the safety information and warnings contained in the technical documentation provided are prerequisites for risk-free mounting, installation, and startup as well as for ensuring safety when operating the described modules. Only qualified personnel have the required specialist knowledge to correctly interpret and implement the safety information and warnings contained in this document in specific situations.

1.5 Acceptance of goods, storage, and transport

1.5.1 Checking the delivery

- Ensure that the packaging and its contents are undamaged.
- Check the delivery for completeness against the packing slip and order details.
- Inform the supplier immediately if there is any damage.
- Store damaged parts until clarification is received from the supplier.

1.5.2 Important information about storage and transport

- Store the device in a dry, clean environment. Observe the admissible ambient conditions (see "Technical data")
- Protect the device from shock during transport
- The original packaging provides optimum protection for storage and transport

1.5.3 Returning goods

If repairs are needed, return the complete device in clean condition.

Use the original packaging to return goods.

Accompanying letter for repair

Please include the completed accompanying letter for repair when returning goods.

Do not forget to state the following:

- Description of the application and
- Description of the error that has occurred

The accompanying letter for repair (supplementary sheet for product returns) can be downloaded online from the manufacturer's website:

<http://productreturn.jumo.info>

Protection against electrostatic discharge (ESD)

(ESD = electrostatic discharge)

To prevent damage due to ESD, electronic modules or components must be handled, packaged, and stored in an ESD-protected environment. Measures that protect against electrostatic discharge and electric fields are described in DIN EN 61340-5-1 and DIN EN 61340-5-2 "Protection of electronic devices from electrostatic phenomena".

When sending back electronic modules or components, please note the following:

- Pack sensitive components only in an environment providing protection against ESD. Workspaces such as this divert electrostatic charges to ground in a controlled manner and prevent static charges due to friction.
- Use only packaging intended specifically for ESD-sensitive modules/components. These must consist of conductive plastics.

No liability can be assumed for damage caused by ESD.



CAUTION!

Electrostatic charges occur in non-ESD-protected environments.

Electrostatic discharges can damage modules or components.

- ▶ For transport purposes, use only the ESD packaging provided.
-

1 Introduction

1.5.4 Disposal

Disposing of the packaging material

The entire packaging material (cardboard packaging, inserts, plastic film, and plastic bags) is fully recyclable.

The country-specific laws and regulations for waste treatment and disposal must be observed.

Disposing of the device



DISPOSAL!

Devices and/or replaced parts (including batteries) should not be placed in the refuse bin at the end of their service life, but must be disposed of properly and in an environmentally friendly manner.

The device consists of materials that can be recycled by specialist recycling plants.

The country-specific laws and regulations for waste treatment and disposal must be observed.

1.6 Identifying the device version

1.6.1 Nameplate

Position

The nameplate is affixed to the housing.

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The nameplate contains important information. This includes:

Description	Designation on the nameplate	Example
Device type	Type	705004/2221-0-00-00-36/224,290
Part no.	TN	00123456
Fabrication number	F-Nr.	0070033801123200006
Voltage supply	-	DC 24 V, +25/-20 %

Device type (type)

Compare the specifications on the nameplate with the order.

Identify the supplied device version using the order details (order code).

Part no. (P/N)

The part no. uniquely identifies an article in the catalog. It is important for communication between the customer and the sales department.

Fabrication number (F-Nr.)

The fabrication number indicates, among other things, the date of manufacture (year/week).

Example: F-Nr = 00700338011**2320**0006

The characters in question are digits 12, 13, 14, and 15 (from the left).

The device was therefore produced in the 20th week of 2023.

1 Introduction

1.6.2 Order details

(1) Basic type	
705004	Central processing unit, type 705004, integrated in the operating panel (capacitive touchscreen, 2 × Ethernet, 2 × USB host, RS485), program generator, Node-RED, math and logic module ^a , communication protocols (PROFINET IO-Controller/Device 1-Port, Modbus RTU / TCP Master/Slave, OPC UA Server, EtherCAT Master, BACnet/IP) ^c
(2) Basic type extension 1	
0	7" variant
1	7" variant with stainless steel front
2	10.1" variant
3	10.1" variant with stainless steel front
(3) Basic type extension 2	
2	Quad core CPU
(4) Basic type extension 3	
2	RAM 1024 MB
(5) Basic type extension 4	
1	eMMC 8 GB ^b
(6) Basic type extension 5	
0	without UPS (upon request)
1	with UPS
(7) Version	
0	Standard with default settings
(8) Interface LAN3	
00	Not used
08	Ethernet (RJ45)
(9) Wireless interface	
00	Not used
10	Wtrans 868.4 MHz (Europe)
20	Wtrans 915 MHz (USA, Australia, Canada, New Zealand, etc.)
(10) Voltage supply	
36	DC 24 V +25/-20 %, SELV
(11) Extra codes	
001	Program generator incl. JUMO smartWARE Program (701850; as of system version 8.2) ^{c, d}
224	PLC according to IEC 61131-3 (CODESYS V3.5; necessary to operate the device as a PLC) ^e
280	CODESYS Remote TargetVisu ^{c, e}
281	CODESYS WebVisu ^{c, e}
290	CODESYS Remote TargetVisu (required for visualization with the integrated touch panel) ^{c, e}

^a Activation for all connected controller modules.

^b Flexible allocation between system data and application data.

^c Only in conjunction with extra code 224.

^d Only in conjunction with extra code 281 or 290.

^e This function can be used free of charge for 30 minutes in demo mode.

Order code:

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (11)
 705004 / 2 2 1 - 0 - - 36 / 224 , 290 , ^a

^a List further extra codes in sequence, separated by commas.

Order example:

705004 / 2 2 2 1 1 - 0 - 00 - 00 - 36 / 224 , 290

1.6.3 Scope of delivery

1 central processing unit, type 705004, in the ordered version
1 lambda/4-antenna (only for device with wireless interface)
1 installation instructions
Mounting elements Type 705004/0: 8 pieces (only 6 are needed) Type 705004/1: 8 pieces Type 705004/2: 8 pieces Type 705004/3: 16 pieces

1.6.4 Accessories

Designation	Part no.
Extra codes (activations):	
Program generator incl. JUMO smartWARE Program (701850; as of system version 8.2)	00771090
PLC according to IEC 61131-3 (CODESYS V3.5; necessary to operate the device as a PLC)	00724988
Remote TargetVisu	00724990
CODESYS WebVisu	00724991
CODESYS Remote TargetVisu (required for visualization with the integrated touch panel)	30049496
USB to Ethernet converter ^a :	
TP-Link UE300 USB to Gigabit LAN Converter ^b	30047695
Network cable ^a :	
RJ45 patch cable SF/UTP, length 0.3 m	00747472
RJ45 patch cable S/FTP, Cat. 6A, length 1.5 m	00666324
RJ45 patch cable S/FTP, Cat. 6A, length 3 m	00666326
RJ45 patch cable S/FTP, Cat. 6A, length 5 m	00665966
RJ45 patch cable S/FTP, Cat. 6A, length 10 m	00666327
Accessories for wireless interface ^a :	
Antenna cable, length 1 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 85 °C	00710813
Antenna cable, length 3 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 85 °C	00482646
Antenna cable, length 5 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 85 °C	00490066

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Designation	Part no.
Antenna cable, length 5 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 125 °C	00660378
Antenna cable, length 10 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 85 °C	00490068
Antenna cable, length 10 m, impedance 50 ohm with preconfigured screw-type connection, T _{max.} 125 °C	00511870
Antenna holder for wall mounting with antipole for lambda/4 antenna	00482648
Lambda/4 antenna with waterproof, permanently connected cable, length 10 m, T _{max.} 125 °C	00757047
Lambda/4-antenna, impedance 50 ohm, T _{max.} 125 °C	00757039
Amplifier ZX60-0916LN, packaged (ambient temperature -25 to +125 °C)	00715285
Accessories for module mounting on the back cover of the central processing unit ^a :	
DIN rail incl. fastening material and terminal block for functional ground	30047694
Cover for system bus	30049495
Screw-on end clamp for DIN rail (2 pieces are required)	00528648
Starter kits ^c :	
variTRON 500 touch starter kit, 7" variant	
variTRON 500 touch starter kit, 10.1" variant	

^a The accessories are not part of the device approvals.

^b This USB to Ethernet converter with RTL8153 chipset has been tested by the manufacturer. Other USB to Ethernet converters with the same chipset should also be usable, as well as converters with the following chipsets: Realtek RTL8150, RTL8152, RTL8153ASIX AX88xxx based, AX88179, AX-88178ASMSC LAN95XX based.

^c Ordering is only possible via the contact person at the manufacturer.

1.7 Module overview

1.7.1 Central processing unit

The JUMO variTRON 500 touch is a central processing unit with integrated TFT color screen for operation and visualization using CODESYS TargetVisu. Along with the proven input and output modules (incl. controller module), a complete automation system can be realized.

The central processing unit manages all configuration and parameter data of the complete system and makes a PLC acc. to IEC 61131-3 (CODESYS V3.5) available (extra code). The PLC can be activated in different versions:

- CODESYS runtime system incl. TargetVisu
- CODESYS runtime system incl. Remote TargetVisu
- CODESYS runtime system incl. WebVisu
- CODESYS runtime system incl. Remote TargetVisu and WebVisu

For visualization, commercially available panels that support the CODESYS Remote TargetVisu or WebVisu functionality can be used in addition. The visualization is also possible via web browser. Visualizations have to be implemented with CODESYS resources.

A convenient setup program is used for configuration. JUMO standard functions for CODESYS are provided in libraries and can be individually integrated into the customer application.

Module designation	Data sheet	Features
JUMO variTRON 500 touch Central processing unit	705004	<ul style="list-style-type: none">• Process mapping for all connected input/output modules (including controller module)• 2 USB host interfaces• OPC UA Server (in conjunction with PLC)• Wireless interface for Wtrans transmitters• PROFINET IO controller (in conjunction with PLC)• Plug and Play when replacing input/output modules• Battery-buffered SRAM (synchronization of retain data in CODESYS application)• Battery-buffered real-time clock• Data evaluation with JUMO smartWARE Evaluation• Customer-specific boot logo

1.7.2 Modules

The proven controller, input and output modules are available as module variants. These include: the analog input module with universal inputs for thermocouples, RTD temperature probes, and voltage or current standard signals. As a result the same hardware can be used to precisely acquire and digitize a highly diverse range of process variables.

JUMO variTRON 500 touch enables simultaneous operation of more than 120 control loops so that it can also be used for sophisticated processes. Through expansion slots the inputs and outputs of each controller module can be individually expanded and adapted. The control loops here operate fully independently, which means they do not require resources from the central processing unit.

Thyristor power controllers can also be connected via EtherCAT or PROFINET.

In addition, JUMO digiLine sensors for liquid analysis can be connected to the central processing unit.

1 Introduction

Wireless measured value transmission

The central processing unit JUMO variTRON 500 touch is also available with a wireless interface that enables wireless transmission of measured values. The transmitters of the JUMO Wtrans series are available as measuring probes (Wtrans T, Wtrans B, Wtrans p, Wtrans E01). A maximum of 32 transmitters can be operated on the central processing unit.

During startup, the display of the RSSI value (Received Signal Strength Indicator) in the Web Cockpit is helpful as an indicator of the signal strength of a received radio telegram.

Input/output modules

Module designation	Data sheet	Features
Multichannel controller module	705010	<ul style="list-style-type: none"> Up to 4 independently configurable PID control loops with a fast cycle time and proven control algorithms Independent operation Math and logic functions Counter input up to 10 kHz
Relay module 4-channel	705015	<ul style="list-style-type: none"> 4 relay outputs controlled via the system bus by digital signals Changeover contact in each case (230 V / 3 A) Switching statuses are displayed with LEDs
Analog input module 4-channel	705020	<ul style="list-style-type: none"> 4 high-quality, configurable analog inputs for RTD temperature probes, resistance transmitters, thermocouples, current 0(4) to 20 mA, voltage 0(2) to 10 V All inputs are galvanically isolated from each other Customer-specific linearization possible Limit value monitoring Additional digital input
Analog input module 8-channel	705021	<ul style="list-style-type: none"> 8 high-quality analog inputs for RTD temperature probes Pt100, Pt500, Pt1000 in two-wire circuit Limit value monitoring Additional digital input
Analog output module 4-channel	705025	<ul style="list-style-type: none"> 4 configurable analog outputs 0(4) to 20 mA or 0(2) to 10 V Adjustable output behavior in case of malfunction
Digital input/output module 12-channel	705030	<ul style="list-style-type: none"> 12 digital inputs or outputs Each channel can be individually configured as an input DC 0/24 V or output DC 24 V Load capacity per output: 500 mA Switching states are visualized by LED
Digital input/output module 32-channel (as of system version 3)	705031	<ul style="list-style-type: none"> 17 digital outputs up to 15 additional digital inputs or outputs Load capacity per output: 500 mA Switching states are visualized by LED

1 Introduction

Module designation	Data sheet	Features
Thyristor power controller Type 70906x (as of system version 3)	709061, 709062, 709063	<ul style="list-style-type: none">• For one-phase and three-phase operation• Continuous load current up to 250 A, load voltage up to 500 V• Different circuit variants, load types and operating modes can be realized

Special modules

Module designation	Data sheet	Features
Router module 2-port (as of system version 3)	705041	<ul style="list-style-type: none">• Mounting behind another module (or the CPU) on DIN rail (side system bus input and output)• Is used exclusively for system bus expansion via RJ45 sockets on the front (2 x Bus Out)
Router module 3-port (as of system version 3)	705042	<ul style="list-style-type: none">• Use as first module on an additional DIN rail to connect further modules (system bus input via RJ45 socket; system bus output on the side)• Is used additionally for system bus expansion or increasing the system bus range, via RJ45 sockets on the front (1 x Bus In, 2 x Bus Out)
Router module 1-port (as of system version 4)	705043	<ul style="list-style-type: none">• Use together with a central processing unit variTRON 300 or variTRON 500 touch to connect the modules (system bus input via RJ45 socket; system bus output on the side)• Is used additionally for system bus expansion

Panels

Module designation	Data sheet	Features
JUMO variTRON Web panels	705070	<ul style="list-style-type: none">• Versions for different requirements (e.g. standard, Foot & Beverage)• Screen diagonals from 10.9 cm (4.3") to 54.6 cm (21.5")• TFT- touchscreen, capacitive or resistive

Power supply units

Module designation	Data sheet	Features
Power supply unit 705090/03-33	705090	<ul style="list-style-type: none">• AC 100 to 240 V wide-range input• Output: DC 24 V / 3.4 A
Power supply unit 705090/05-33	705090	<ul style="list-style-type: none">• AC 100 to 240 V wide-range input• Output: DC 24 V / 5 A
Power supply unit 705090/10-33	705090	<ul style="list-style-type: none">• AC 100 to 240 V wide-range input• Output: DC 24 V / 10 A

1 Introduction

1.8 Available technical documentation

The documentation for the automation system is addressed to plant manufacturers and users with specialist training and consists of the following documents (previous document number in brackets).

1.8.1 Central processing unit

Product	Document	No.	Printed	PDF file
variTRON 500 touch	Data sheet	70500400T10...	-	X
	Operating manual	70500400T90...	-	X
Central processing unit	Installation Instructions	70500400T94...	X	X
Process Technology (as of system version x)	Operating manual	70185000T90...	-	X

1.8.2 Input/output modules

Product	Document	No.	Printed	PDF file
Multichannel controller module	Data sheet	70501000T10...	-	X
	Operating manual	70501000T90... (B 705010.0)	-	X
	Installation instructions	70501000T94... (B 705010.4)	X	X
Relay module 4-channel	Data sheet	70501500T10...	-	X
	Operating manual	70501500T90... (B 705015.0)	-	X
	Installation instructions	70501500T94... (B 705015.4)	X	X
Analog input module 4-channel	Data sheet	70502000T10...	-	X
	Operating manual	70502000T90... (B 705020.0)	-	X
	Installation instructions	70502000T94... (B 705020.4)	X	X
Analog input module 8-channel	Data sheet	70502100T10...	-	X
	Operating manual	70502100T90... (B 705021.0)	-	X
	Installation instructions	70502100T94... (B 705021.4)	X	X
Analog output module 4-channel	Data sheet	70502500T10...	-	X
	Operating manual	70502500T90...	-	X
	Installation instructions	70502500T94...	X	X
Digital input/output module 12-channel	Data sheet	70503000T10...	-	X
	Operating manual	70503000T90... (B 705030.0)	-	X
	Installation instructions	70503000T94... (B 705030.4)	X	X

Digital input/output module 32-channel (as of system version 3)	Data sheet	70503100T10...	-	X
	Operating manual	70503100T90...	-	X
	Installation instructions	70503100T94...	X	X
Thyristor power controller type 70906x (as of system version 3)	Operating manual (integration in the automation system)	70500153T90...	-	X

1.8.3 Special modules

Product	Document	No.	Printed	PDF file
Router module 2-port (as of system version 3)	Data sheet	70504100T10...	-	X
	Installation instructions	70504100T94...	X	X
Router module 3-port (as of system version 3)	Data sheet	70504200T10...	-	X
	Installation instructions	70504200T94...	X	X
Router module 1-port (as of system version 4)	Data sheet	70504300T10...	-	X
	Installation instructions	70504300T94...	X	X

1.8.4 Panels

Product	Document	No.	Printed	PDF file
JUMO variTRON Web panels	Data sheet	70507000T10...	-	X

1.8.5 Power supply units

Product	Document	No.	Printed	PDF file
24 V power supply units	Data sheet	70509000T10...	-	X
	Operating instructions QS3.241		X	-
	Operating instructions QS5.241		X	-
	Operating instructions QS10.241		X	-

1 Introduction

1.9 System version

The system version of the automation system is determined by the software version of the central processing unit.

Example composition of a version number for the central processing unit 705004: 446.x.y.z.b

446 = basic number

x = major version (= system version)

y = minor version

z = patch version

b = build number

In this document, functions which depend on the system version are marked accordingly (e.g. "as of system version x").

1.10 Declaration of conformity



NOTE!

Hereby JUMO GmbH & Co. KG declares that the radio equipment type JUMO variTRON 500 touch is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following Internet address: qr-705004-en.jumo.info



2.1 General information on installation/dismounting



WARNING!

The device is not designed for use in potentially explosive areas.

Explosion hazard.

- ▶ Only deploy the device outside of potentially explosive areas.

Mounting site

The device is designed for installation in a panel cut-out. The front of the device and housing have different protection types (see technical data).

Climatic conditions

The ambient temperature and the relative humidity at the mounting site must correspond to the technical data. Aggressive gases and vapors have a negative effect on the operating life of the device. The mounting site must be free from dust, powder, and other suspended solids.

Mounting the input/output modules

When mounting the modules on the rear of the device (DIN rail available as an accessory), the installation instructions or operating manuals of the modules must be observed in addition to this document.

⇒ chapter 1.8 "Available technical documentation", Page 18

Only modules of type 7050xx (router module, multichannel controller module, input and output modules) are allowed to be mounted on the rear side of the device.

2.2 Dimensions

Panel cut-outs

See technical data

Close mounting

Distance between panel cut-outs	Horizontal	Vertical
Minimum clearance	30 mm	30 mm
Recommended distance (easier mounting of mounting elements)	50 mm	50 mm

The distances to other devices must be selected in a way that the maximum admissible ambient temperature of this device is not exceeded.



NOTE!

Up to system version 8.1: The device must be installed with the screen aligned horizontally (landscape format, electrical connection from below).

As of system version 8.2: The screen orientation can be set in the configuration (0°, 90°, 270°). The device can therefore also be installed in portrait format (electrical connection from the side).

Installation in landscape format with connection elements at the top (180° rotation) is not permitted!

Housing depth



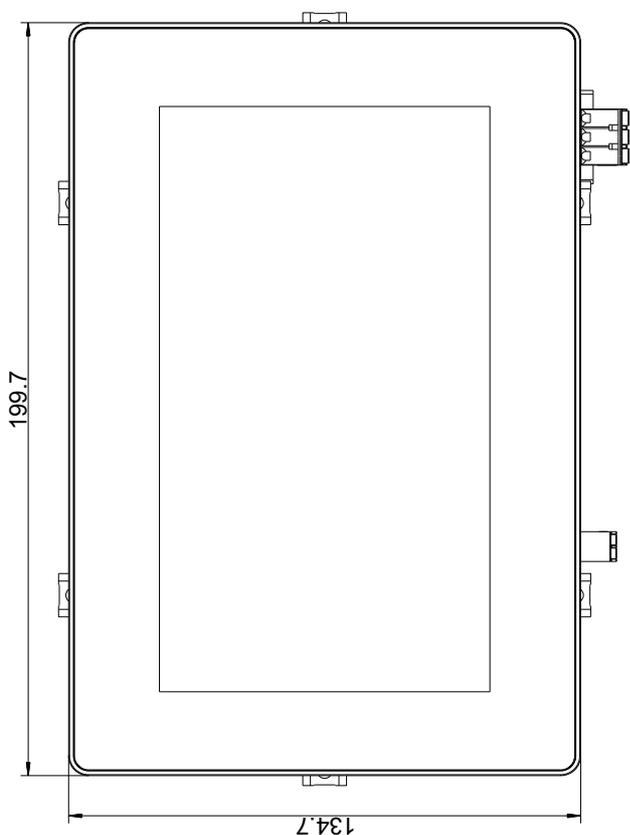
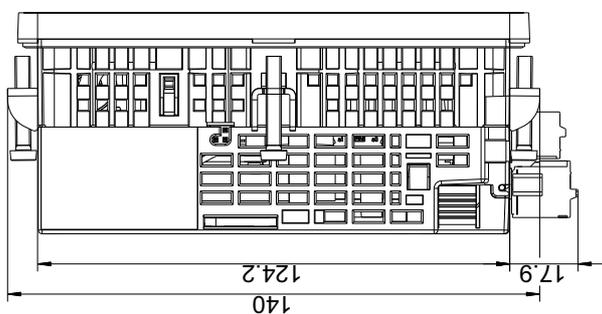
NOTE!

As of system version 8.4, an additional housing construction depth for UPS integration has been added. The hardware versions tile and the information on the power supply unit can be used to determine which housing construction depth the device is equipped with.

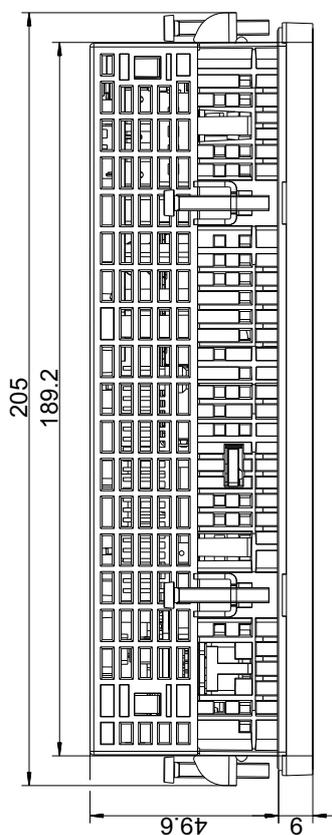
2 Mounting

⇒ chapter 4.4.1 "Device information", Page 70

Hardware version	Power supply unit	Housing type
7050040100200001	without UPS	shallower housing
7050040100800001	with UPS	deeper housing
7050040100800002	without UPS	deeper housing

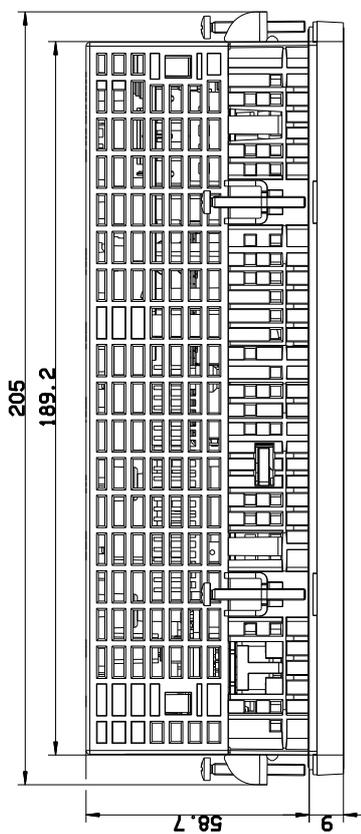
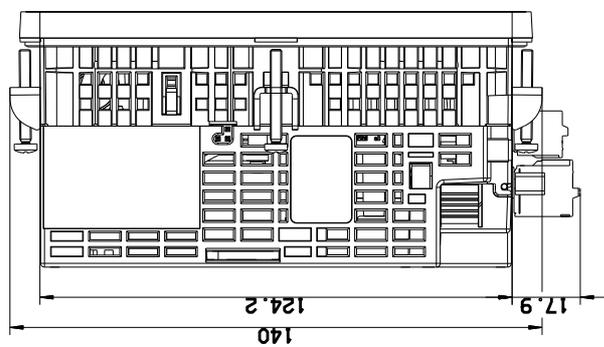
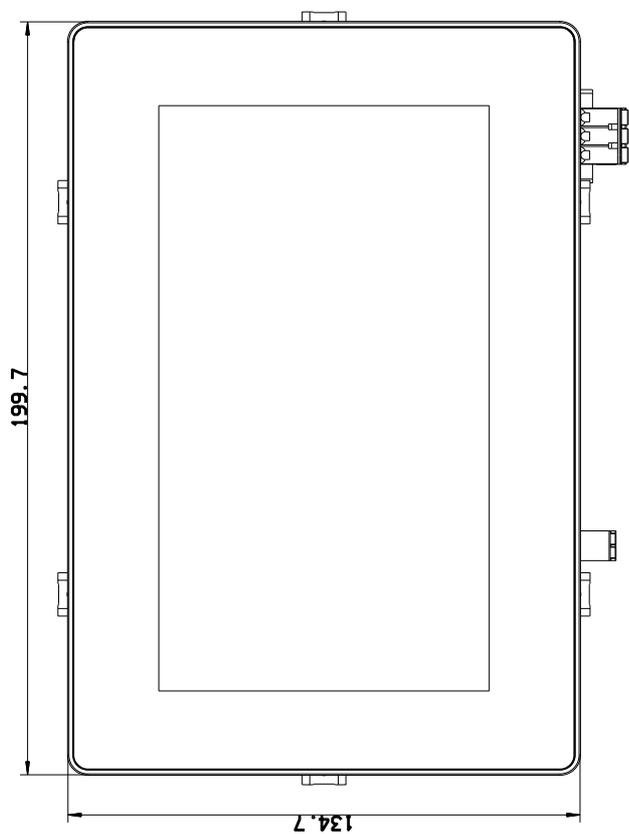


705004/0 (shallower housing)

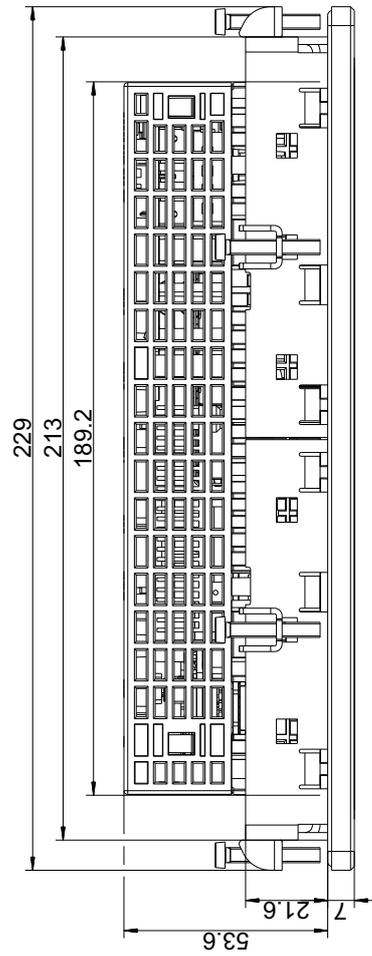
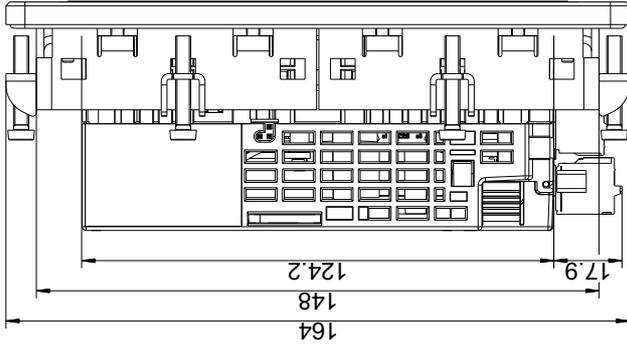
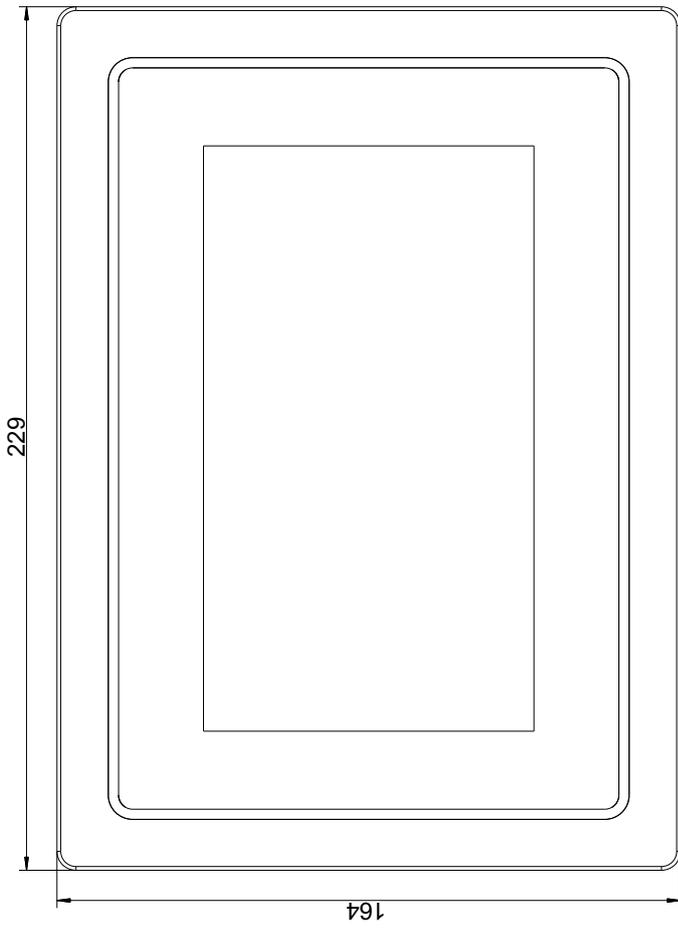


2 Mounting

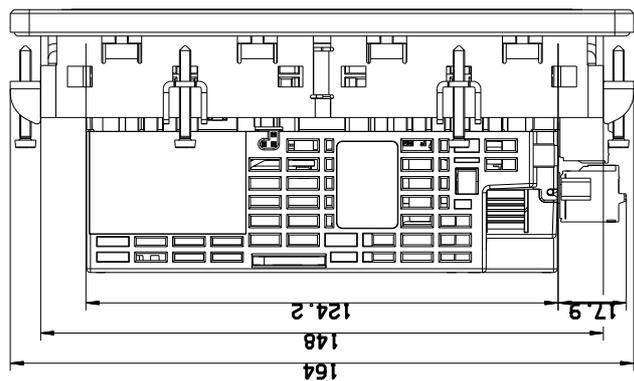
705004/0 (deeper housing)



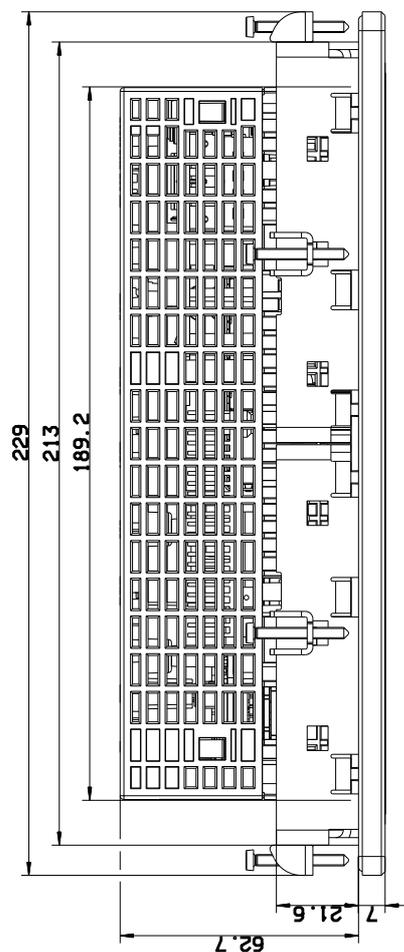
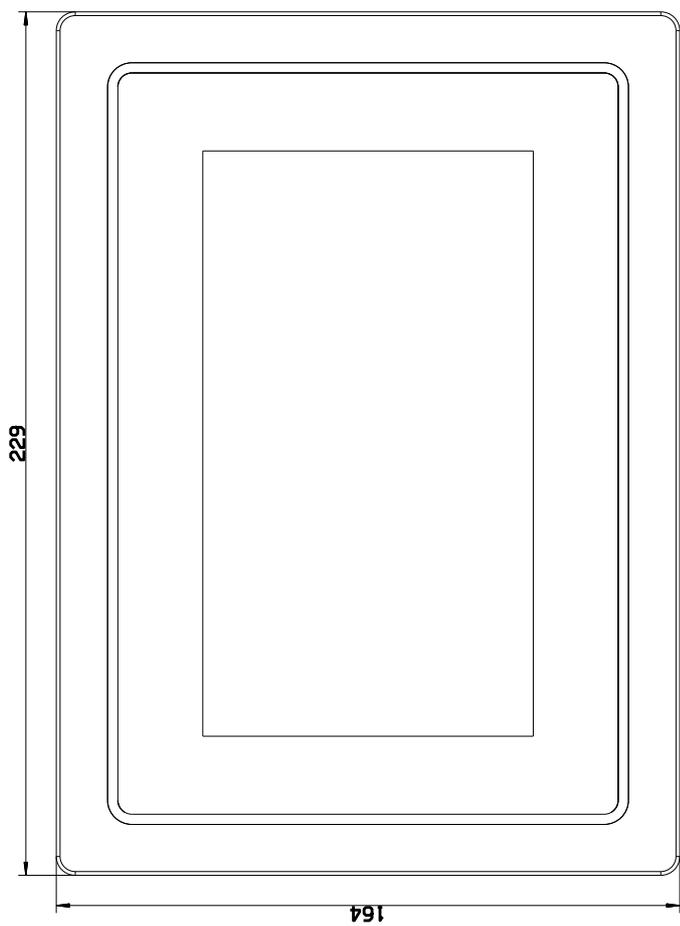
705004/1 (shallower housing)



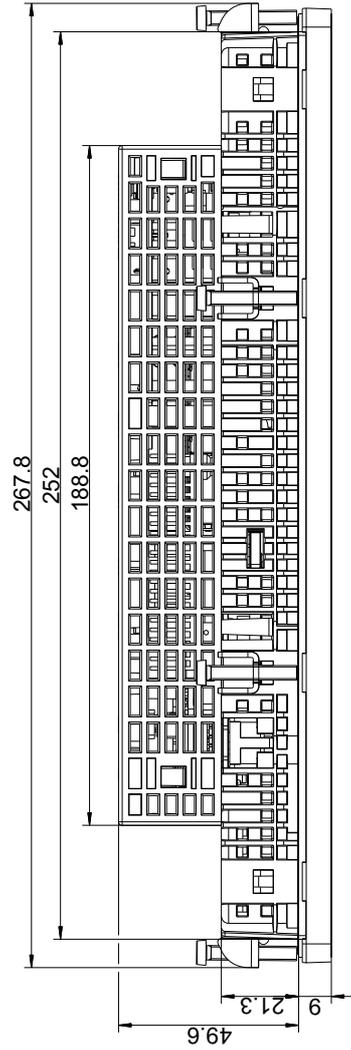
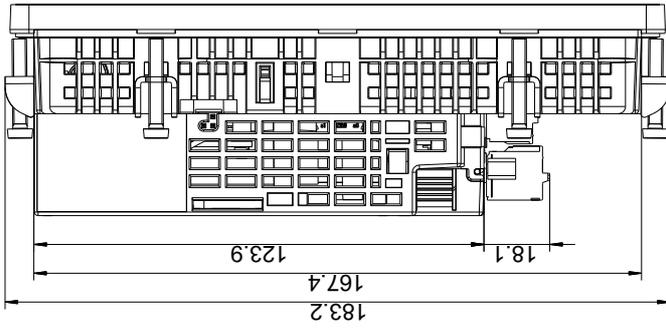
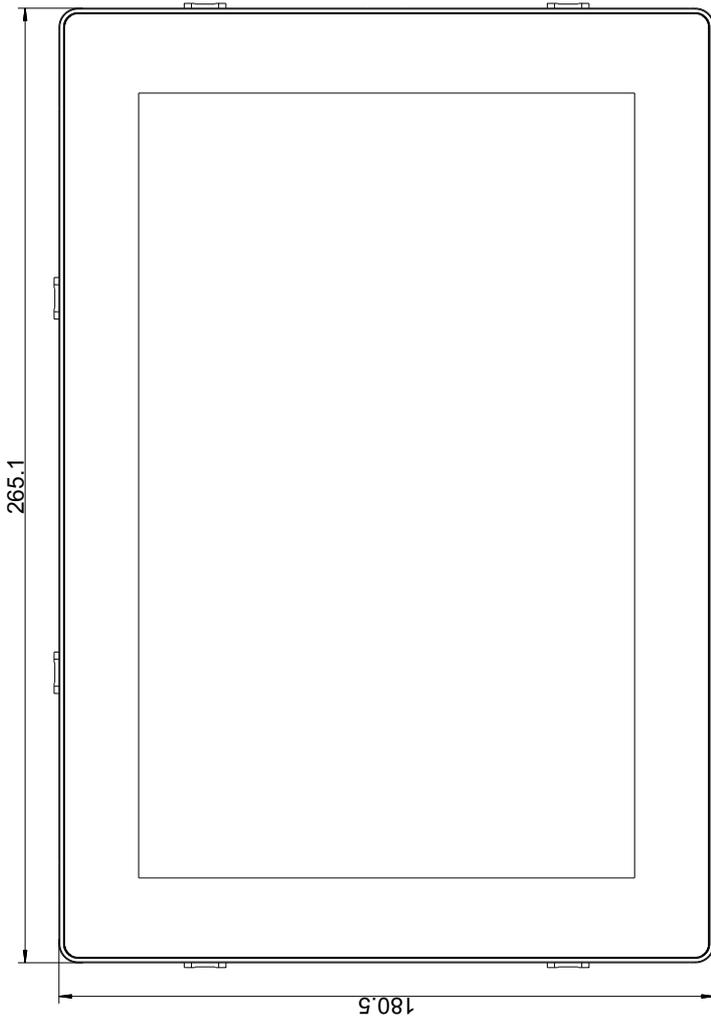
2 Mounting



705004/1 (deeper housing)

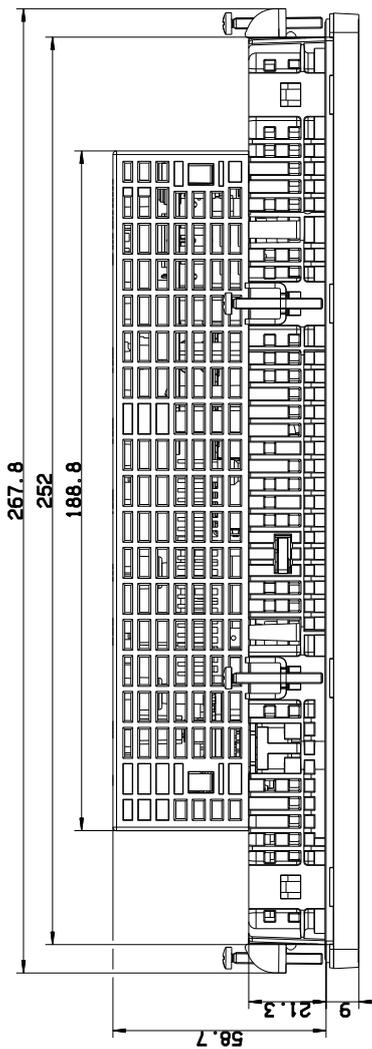
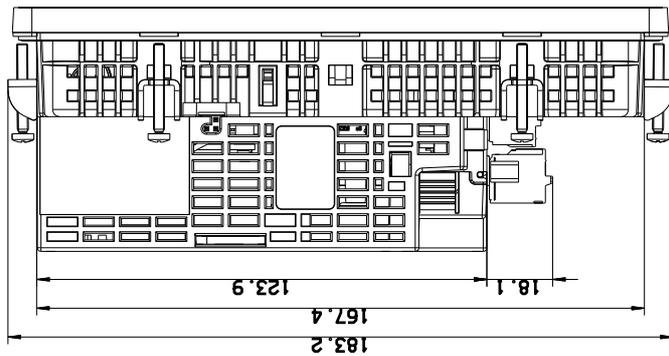
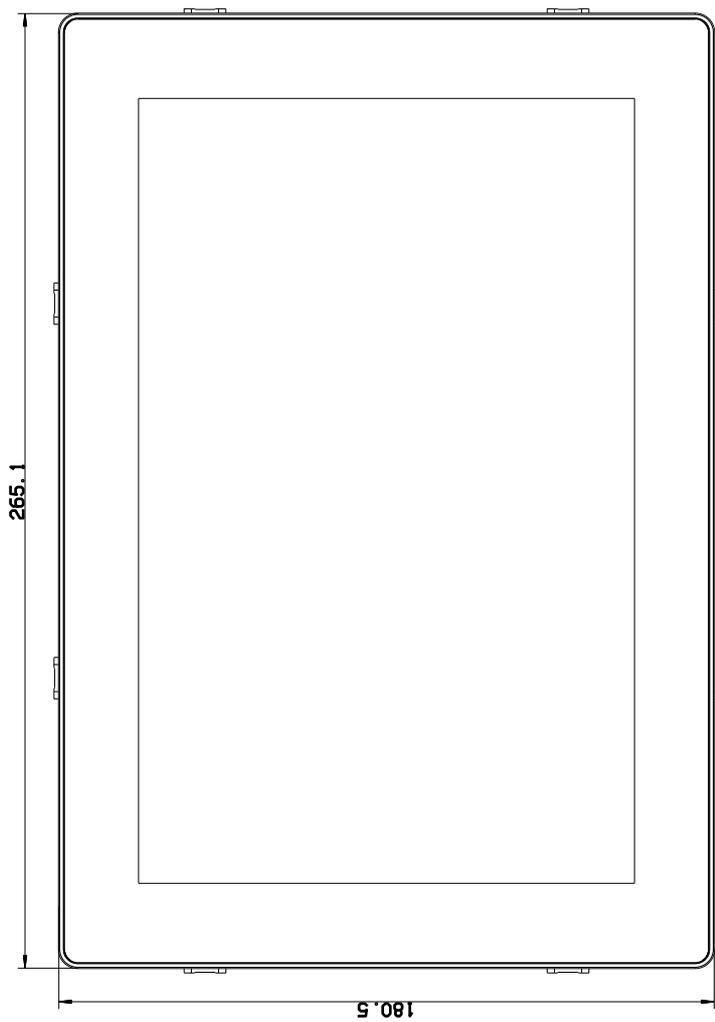


705004/2 (shallower housing)

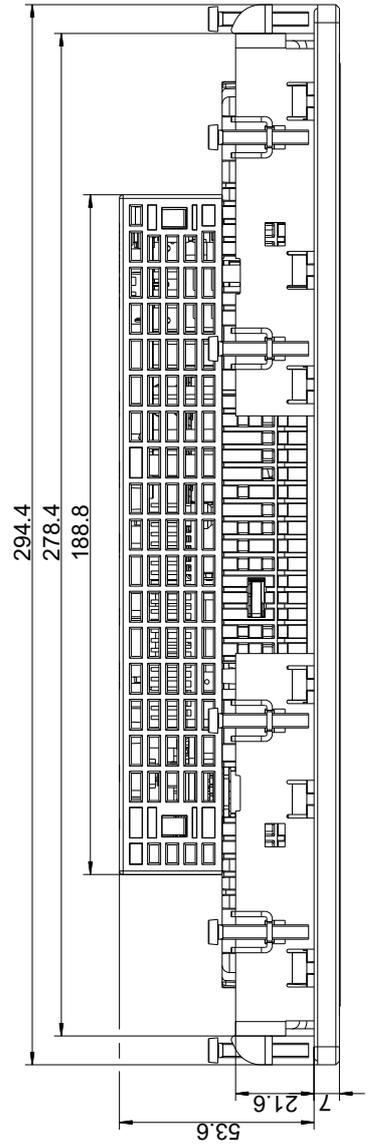
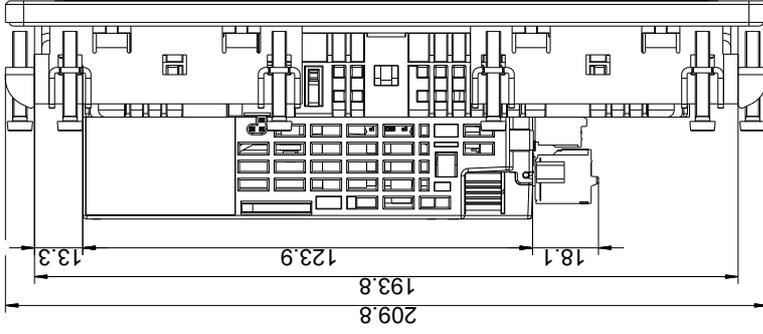
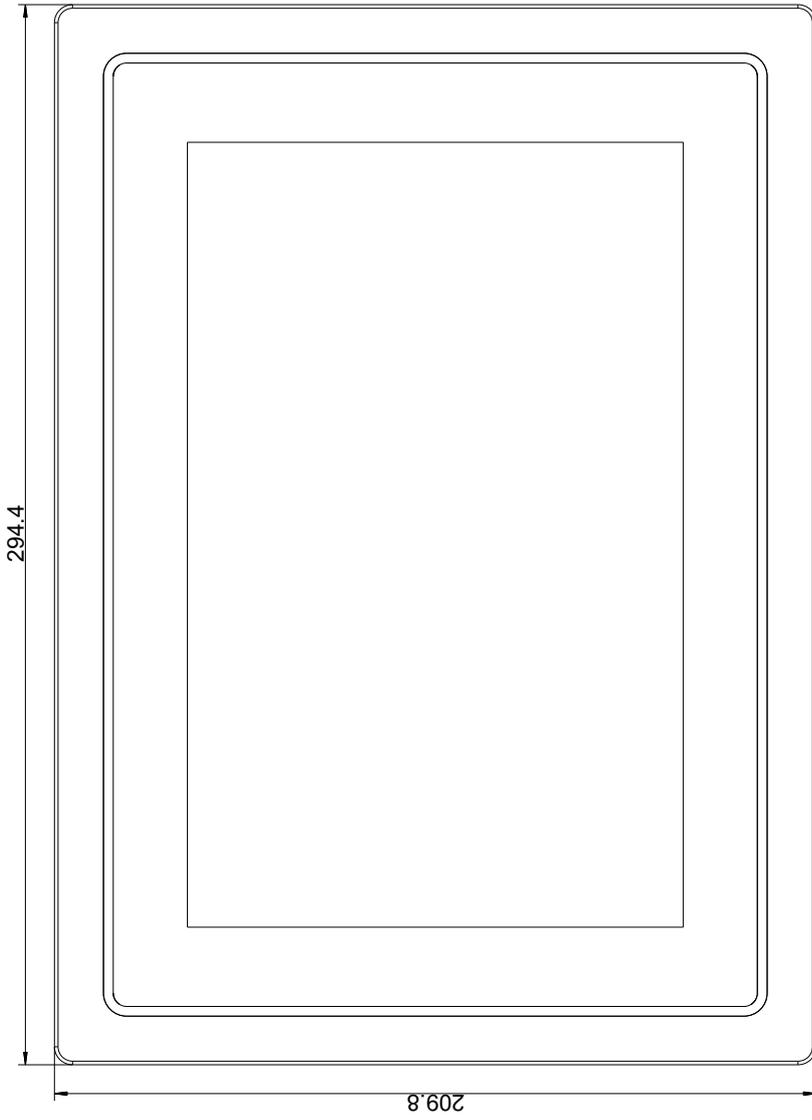


2 Mounting

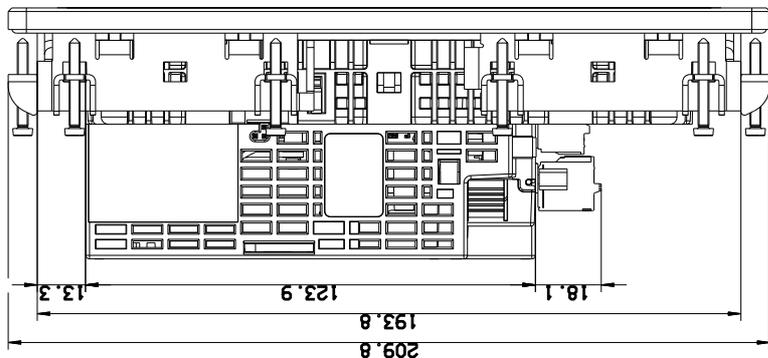
705004/2 (deeper housing)



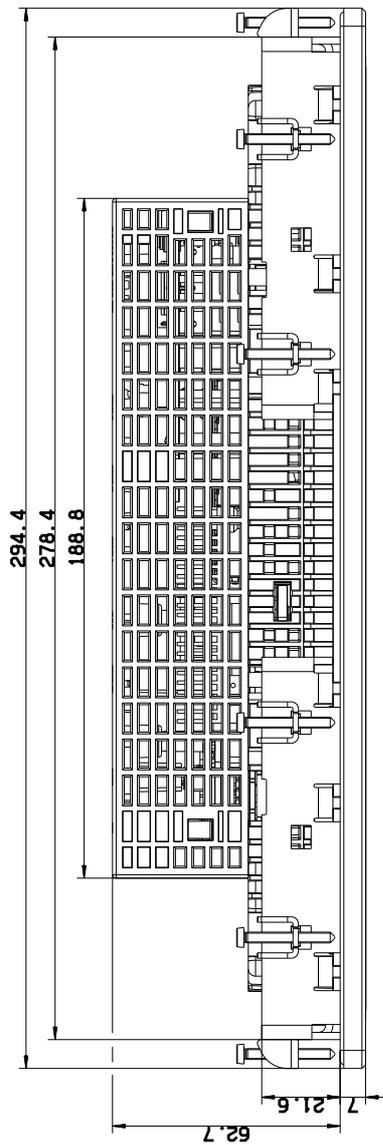
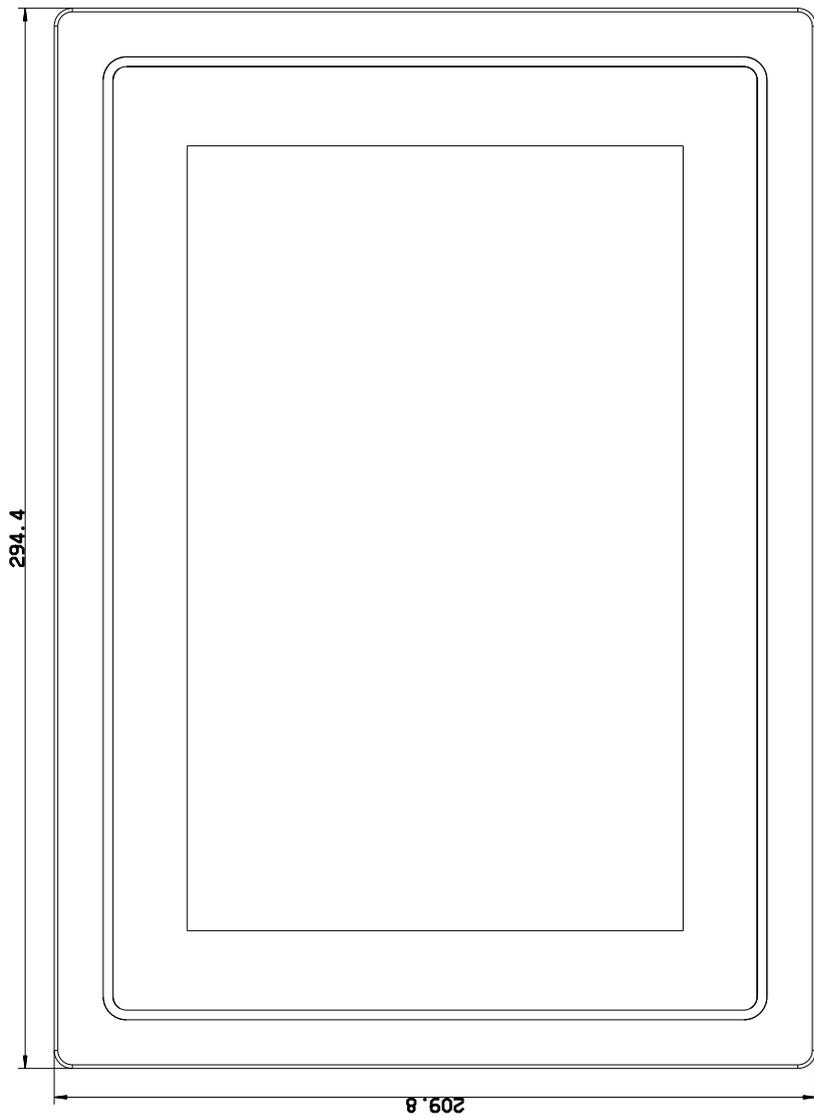
705004/3 (shallower housing)



2 Mounting



705004/3 (deeper housing)



2.3 Panel mounting

Number of mounting elements required

Type (variant)	Number
705004/0 (7", plastic front)	6 (8 pieces are included in the scope of delivery)
705004/1 (7", stainless steel front)	8
705004/2 (10.1", plastic front)	8
705004/3 (10.1", stainless steel front)	16



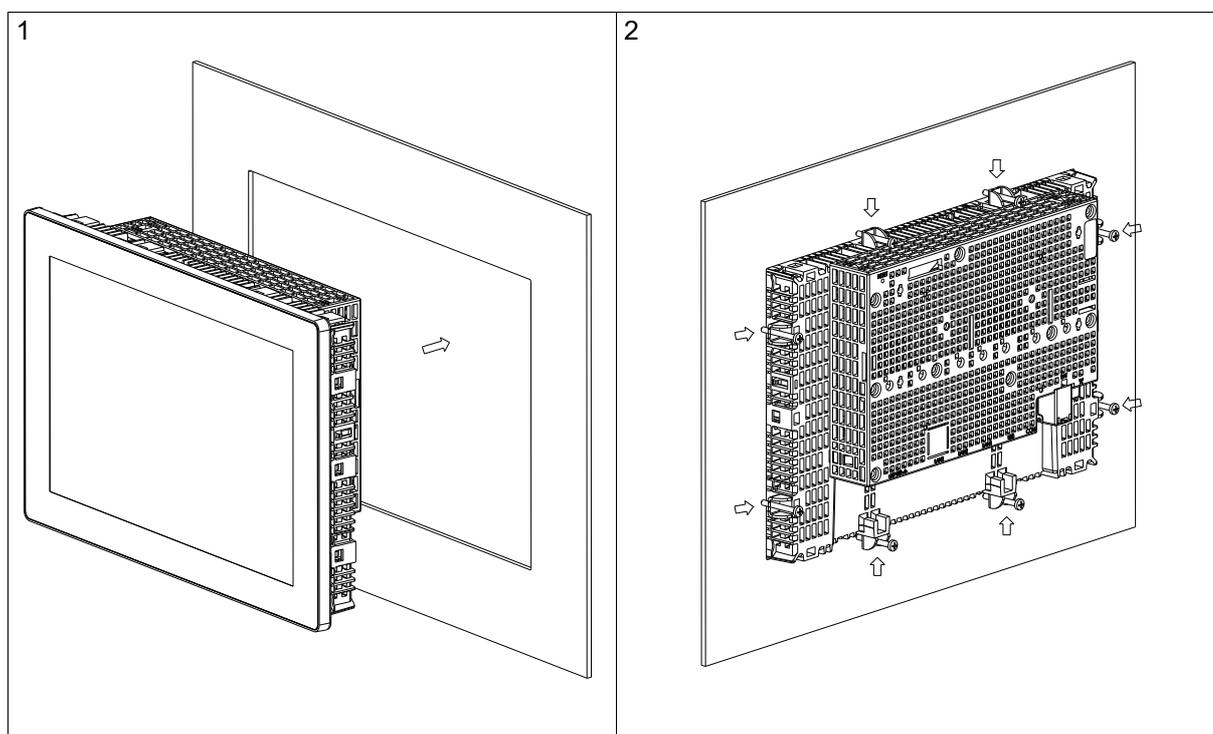
CAUTION!

The front of the device and housing have different protection types!

The protection type on the front side is only guaranteed if the seal is flush and even.

- ▶ The mounting elements provided must all be used and must be distributed evenly as shown in the figure.

Install the device into the panel



Step	Action
1	Insert the device into the panel cut-out from the front until the seal is flush against the panel.
2	Insert the fastening elements into the recesses of the housing (the number depends on the device) and use a screwdriver to evenly clamp them against the rear side of the panel (tightening torque 0.4 Nm).

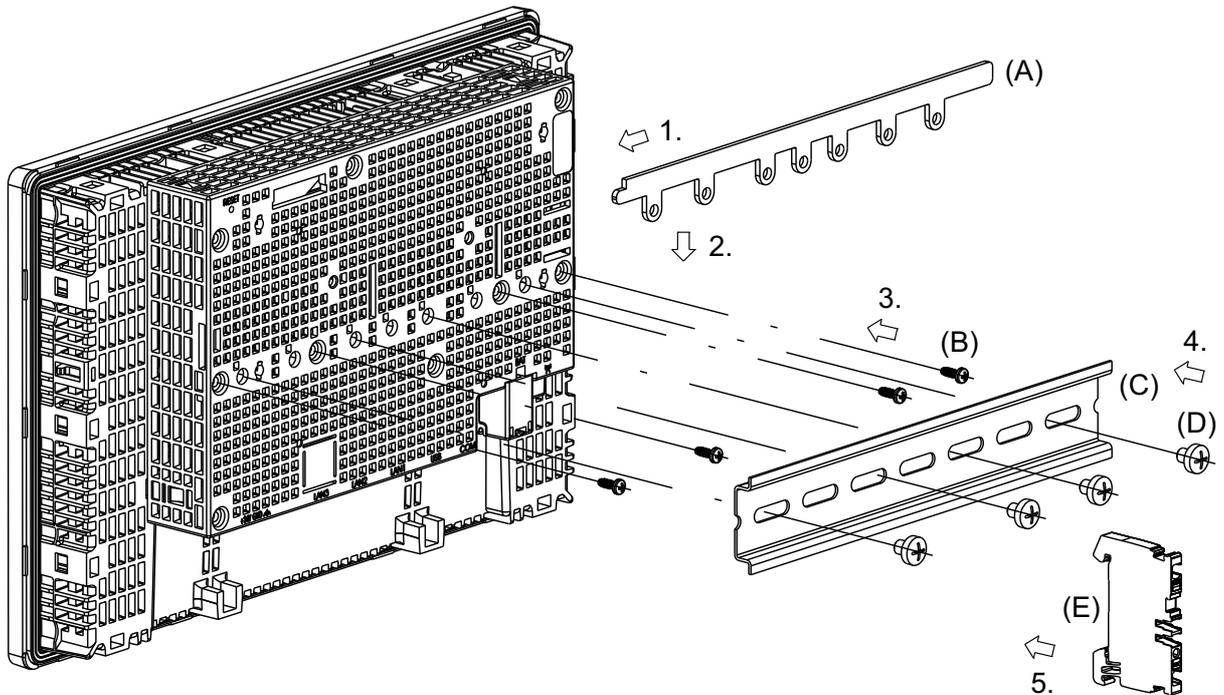
2 Mounting

2.4 Mounting of the DIN rail

The DIN rail is mounted on the rear of the 705004 central processing unit and is used to accommodate modules of type 7050xx (router module, multichannel controller module, input and output modules).

Mount the DIN rail

The mounting is shown here using the example of a central processing unit in variant 705004/2. The procedure is identical for all variants.



1. Push the threaded plate (A) from the right into the lateral housing slot until it comes to a limit stop.
2. Press the threaded plate (A) down until it comes to a limit stop.
3. Screw 4 screws 3 × 8 (B) into the plastic housing of the device (tightening torque 1 Nm).
4. Fasten the DIN rail (C) to the device with 4 threaded screws M5 × 6 (D) (tightening torque 2 Nm).
5. If necessary, mount the terminal block for functional ground (E) on the DIN rail.

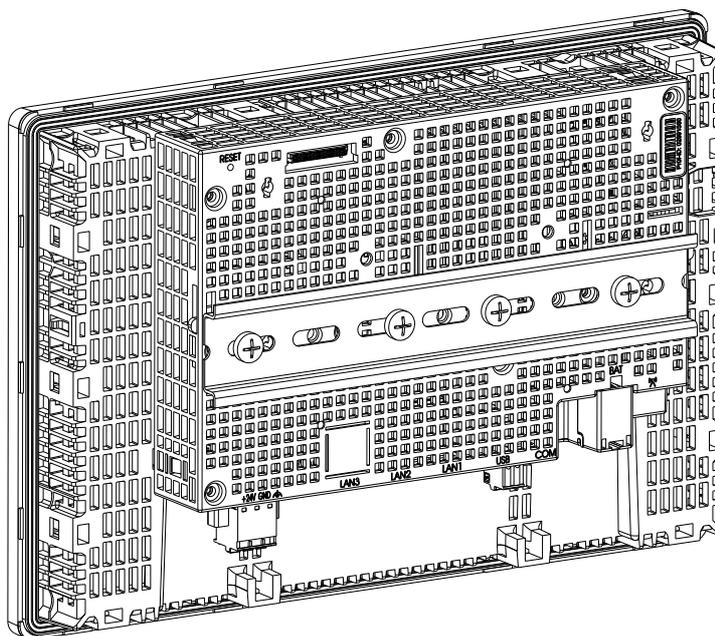
NOTE!

The terminal block is required to connect the modules on the DIN rail with functional ground.



Central processing unit with mounted DIN rail

The following example shows the central processing unit with mounted DIN rail (without terminal block).



Permissible total weight of the modules

The total weight of the mounted modules (including router module, terminal block and 2 end clamps) must not exceed 870 g.

Number of modules

Number of modules that can be mounted on the DIN rail (in addition to router module, terminal block, and 2 end clamps):

- 6 narrow modules (705015, 705020, 705021, 705025, 705030) or
- 3 wide modules (705010, 705031) or
- a combination of these modules.

2 Mounting

3.1 Installation notes



NOTE!

These installation notes apply for the entire automation system and, on some occasions, are only applicable for a specific module. The respective connection diagram shows the context.

Requirements for personnel

- Work on the modules must only be carried out to the extent described and, like the electrical connection, only by qualified personnel.
- Before plugging and unplugging connecting cables, it must be ensured that the acting person is electrostatically discharged (e.g. by touching grounded metallic parts).

Cables, shielding, and grounding

- When selecting the cable material, when installing, and when performing the electrical connection of the module, the regulations of DIN VDE 0100 "Erection of low voltage installations" or the respective national regulations (e.g. on the basis of IEC 60364) are to be observed.
- At maximum load, certain cables must be heat resistant up to at least 80 °C. The corresponding notes in the connection diagram of the affected modules must be observed.
- Route input, output, and supply lines separately and not parallel to one another.
- Only use shielded and twisted probe and interface cables. Do not route the lines close to current-carrying components or cables.
- For temperature probes, ground the shielding on one side in the control cabinet.
- Do not perform loophroughs on the grounding cables, but instead route the cables individually to a shared grounding point in the control cabinet. In doing so, ensure that the cables are as short as possible.

Ensure that the potential equalization is correct.

Electrical safety

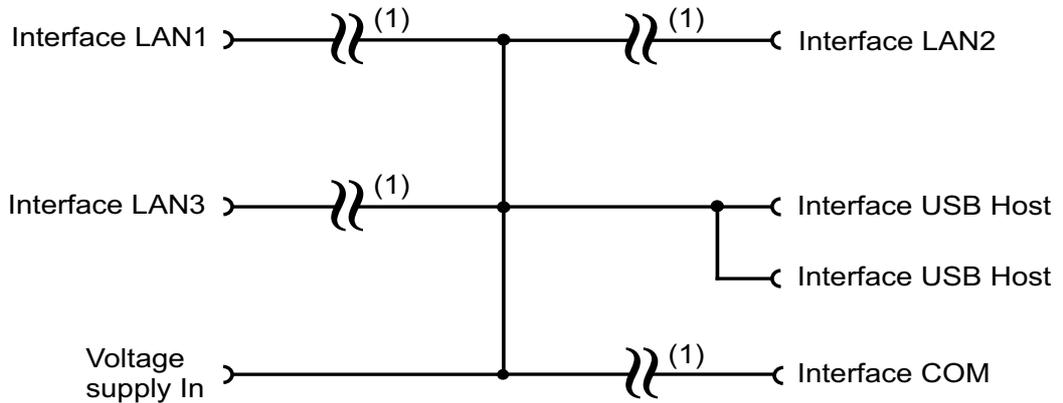
- Isolate power supply units from the voltage supply on the primary side if there is a risk of touching parts with dangerous electrical voltage (e.g. 230 V) during active use.
- The fuse rating of the power supply units on the primary side should not exceed a value of 10 A (inert).
- With modules that have relay or solid state relay outputs, the load circuits can be operated with a dangerous electrical voltage (e.g. 230 V). Disconnect load circuits from the voltage supply during installation/dismounting and electrical connection.
- In order to prevent the destruction of the relay or solid state relay outputs in the event of an external short circuit in the load circuit, the load circuit should be fuse-protected to the maximum admissible output current.
- The modules are not suitable for installation in potentially explosive areas.
- In addition to a faulty installation, incorrectly set values on the module could also impair the correct function of the following process. Therefore, ensure that safety devices independent of the module (e.g. overpressure valves or temperature limiters/monitors) are available and that it is only possible for qualified personnel to define settings. Please observe the corresponding safety regulations in this context.

References to other information

- The electromagnetic compatibility meets the standards and regulations cited in the technical data.
- Sometimes USB interface and power supply are not electrically isolated. In general, please observe the device-specific information on galvanic isolation.

3 Electrical connection

3.2 Electrical isolation



1 Functional galvanic isolation for connection of SELV or PELV electrical circuits.

3.3 Connection diagram



CAUTION!

At maximum load, the temperature may exceed 60 °C at the terminals "+24 V" and "GND" (voltage supply In).

As a result the insulation of the cable may be damaged.

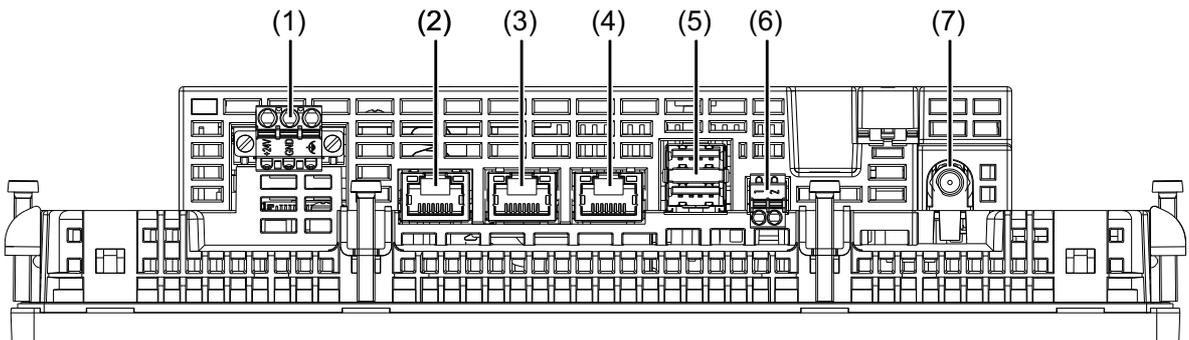
► The cable must be heat resistant up to at least 80 °C.



NOTE!

Only copper conductors are allowed to be connected to the terminals.

3.3.1 Connection elements



- 1 Voltage supply and functional ground
- 2 Interface LAN3 (Ethernet), optional
- 3 Interface LAN2 (Ethernet)
- 4 Interface LAN1 (Ethernet/JUMO system bus)
- 5 2 USB host interfaces
- 6 Interface COM (RS485)
- 7 Antenna connector for wireless interface, optional

3 Electrical connection

3.3.2 Voltage supply

Connection	Product name	Number	Symbol and terminal designation
Voltage supply In	+24 V and GND	(1)	
Functional ground			



NOTE!

The 705004 central processing unit can be equipped with a DIN rail at the rear (accessory), on which modules of type 7050xx (router module, multichannel controller, input and output modules) are operated. These modules must be connected to functional ground. For this purpose, use the terminal block that is included in the scope of delivery of the DIN rail (see Mounting of the DIN rail).

3.3.3 Interfaces

Connection	Product name	Number	Connection element	Assignment
USB host (2 ×)	USB	(5)	USB socket type A (2 ×)	
Ethernet	LAN1	(4)		1 TX+ Transmission data +
	LAN2	(3)		2 TX- Transmission data -
	LAN3 (optional)	(2)		3 RX+ Received data +
Serial interface RS485	COM	(6)	Terminal strip 2-pole	6 RX- Received data -
				1 TxD+/RxD+ Transmission/received data +
Antenna		(7)	SMA socket	2 TxD-/RxD- Transmission/received data -



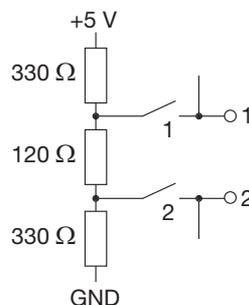
NOTE!

Only SELV or PELV circuits may be connected to the interfaces.

The connection cables of the Ethernet interfaces may only run inside the building.

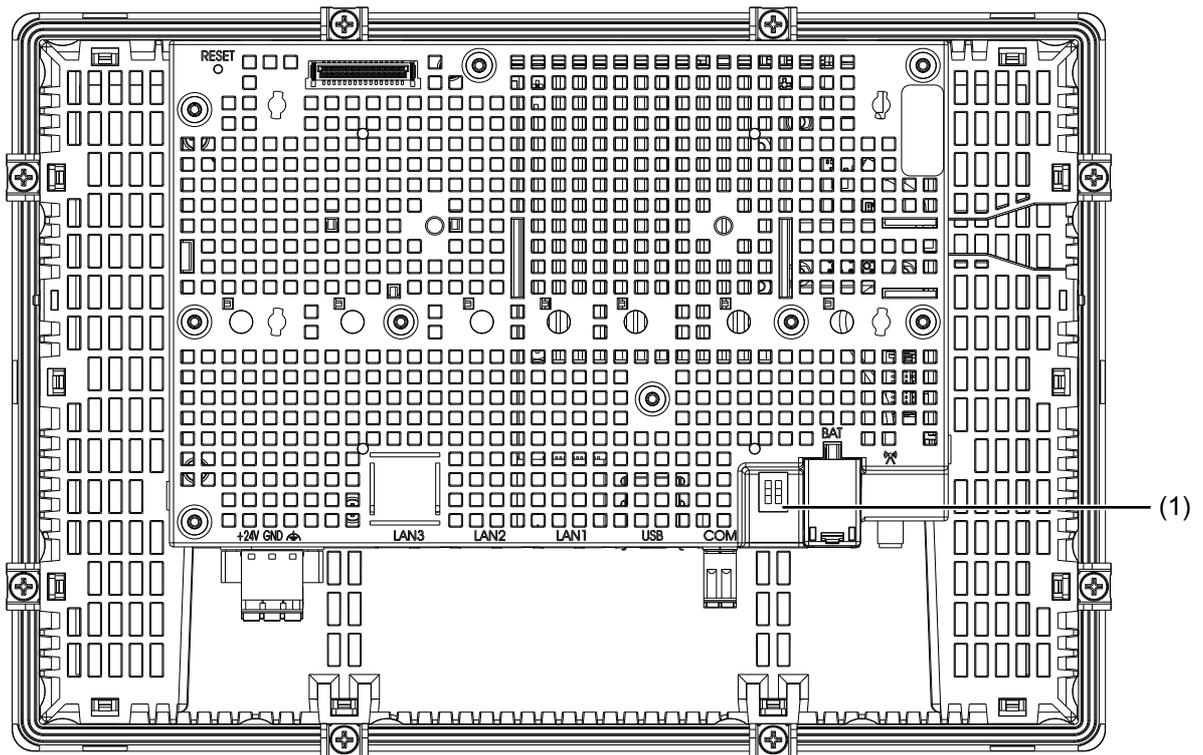
3.3.4 Terminating resistors

The terminating resistors of the RS485 interface are deactivated per default. To activate them, switches 1 and 2 must be closed.



The switches are located on the back of the device:

3 Electrical connection



1 Switches for terminating resistors (RS485)

Switch position: down = open, up = closed



NOTE!

To ensure fault-free operation, terminating resistors are required at the beginning and end of an RS485 transmission path.

4.1 General information

The following options are available to operate the device:

- Operation on the device
- Use of the setup program
- Use of the "JUMO Web Cockpit" web application using a web browser

The various options for operating the device differ in terms of the scope of the functions they support.

IP address

In order to access the device using the setup program or a web browser, the IP address of the device is required. The IP address of the Ethernet interface concerned can be found using the **device menu** (Device info > Ethernet > LANx). A user does not need to be logged on to do this (dependent on rights).

The Ethernet settings may need to be changed beforehand using the device menu (Configuration > Ethernet > LANx). A user does not need to be logged on to do this (as of system version 8; dependent on rights).

The default setting is that DHCP is active.

User log-on

Please use the following details to log on for startup purposes:

- User name: Master
- Password: 9200

The password should be changed by the end of startup at the latest.

The password must be entered again each time the user logs on.

Hardware configuration

In order to start up a system (which comprises the device (CPU) and other system components (modules)), the system's hardware configuration needs to be created using the **setup program**. This cannot be done using the device menu or the web application.

If the hardware is incorrectly configured, a bus error will be displayed.

Startup

Procedure during startup:

⇒ chapter 6 "Startup", Page 105

4 Operation

4.2 Device

4.2.1 Display and control elements

Front

The device is equipped with a capacitive touchscreen. Basically, visualization and operation must be realized by the user in CODESYS.

During the boot process, the so-called boot logo (static or animated graphic) appears for a few seconds. The default boot logo (animated graphic "POWERED BY JUMO JUPITER") can be replaced by the user with an individual boot logo (configuration with the setup program).



NOTE!

The touchscreen must not be touched during the boot process. Otherwise, an incorrect calibration may occur, which in turn will cause malfunctions in the operation.

The start screen that appears after the boot process is complete depends on the CODESYS application. If no CODESYS application is present, the following factory default start screen is used:



The current time is displayed at the top right. The "+" button can be used to expand the display (date, time, logged-on user).

Additional control elements (buttons) of the default visualization:

	Opens the device menu (main menu).
	Exits from the menu level.
	Saves the settings and closes the settings window (leads back to the menu). Confirms a message text.
	Closes the settings window without saving any changes (leads back to the menu).

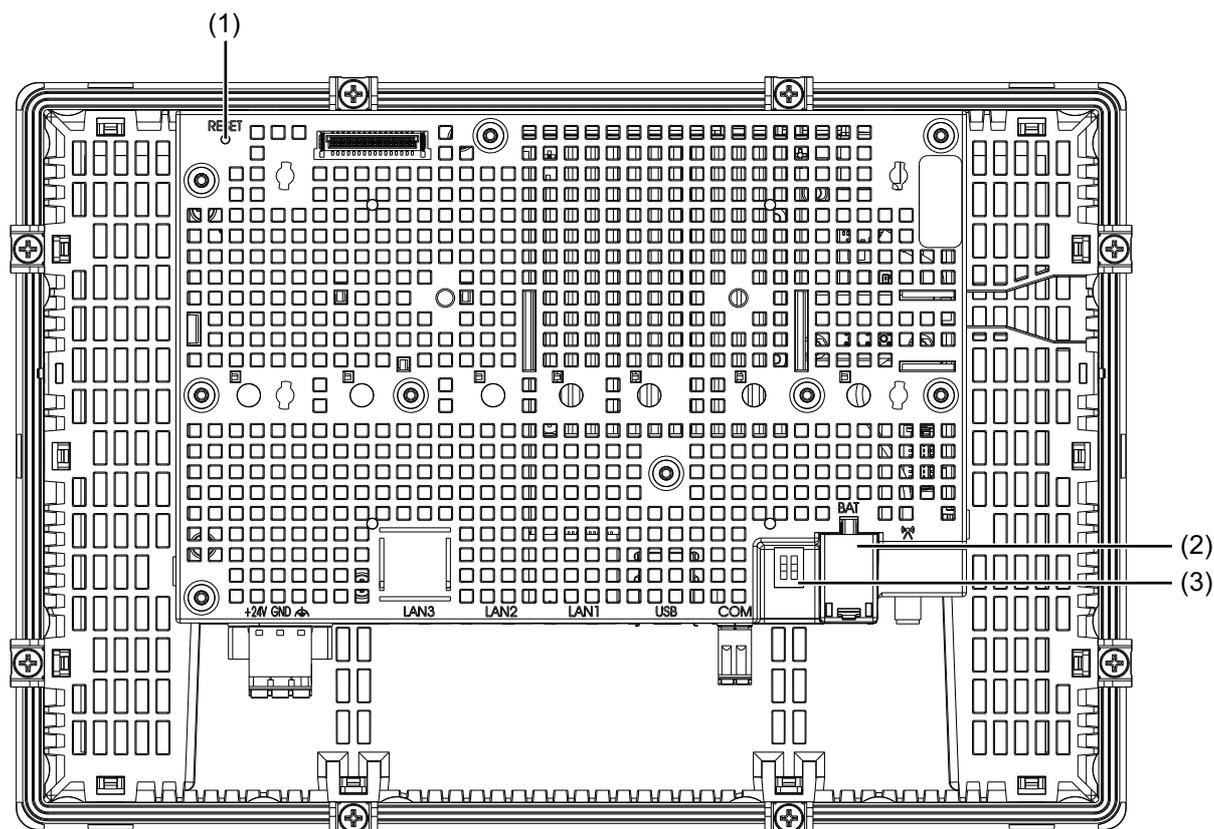
The specific control elements of individual functions are not shown here.



NOTE!

The default start screen is also displayed if the user-specific visualization (CODESYS application) is no longer available due to an error.

Back cover



- 1 Reset push-button (resetting to default settings)
- 2 Battery compartment (buffer battery)
- 3 Switches for terminating resistors (RS485)

4 Operation

4.2.2 Device menu

To get to the device menu from the start screen, the "Main menu" button must be pressed.

The following overview shows the menu levels of the main menu and is intended only for orientation. The respective cross-references lead to the corresponding sections within the "JUMO Web Cockpit" chapter. The individual functions are briefly described there.

Functions that differ from those in the Web Cockpit or that are missing there are listed here.

User administration

⇒ chapter 4.2.3 "User log-on", Page 43

System status

⇒ chapter 4.4.1 "Device information", Page 70

Configuration

⇒ chapter 4.4.4 "Configuration", Page 72

Device info

⇒ chapter 4.4.1 "Device information", Page 70

Service

- Debug data: Display of log entries and internal version information
- Device manager: Enable/disable debug interface
After activation, an automatically generated SSH password is entered into the event list (valid until power off).
- Certificate administration: Remove certificates (selection)
- E-mail: Enter recipient, subject and text of the e-mail, send e-mail



CAUTION!

The SSH password gives the user unrestricted access to the operating system (root privileges).

Changes at the operating system level can result in the device functions developed and tested by JUMO being inadmissibly changed. JUMO accepts no liability for this.

▶ The user is responsible for all changes he makes at the operating system level.

Removable media

This menu item is provided if a USB flash drive has been connected.

- Safely remove hardware: Required before removing the USB flash drive!
- Import configuration (if the USB flash drive contains a configuration file)
- Export configuration
- Firmware update (if the USB flash drive contains a firmware file)
- Export debug data
- Export license request: Functions (extra codes) that can be enabled.
A separate request file (license request) must be exported for each function.
- Import license file (if the USB flash drive contains a license file): If several functions are available, they must be enabled one after the other.
A separate response file (license file) is required for each function.

4.2.3 User log-on

Log on

- 1) Open the device menu.
- 2) Switch to the submenu "User administration > Logon".
- 3) Select user from the list.
- 4) Enter password (if necessary, switch keypad to enter digits).

Log out

- 1) Open the device menu.
- 2) Switch to the "User administration" submenu and tap "Logoff".

4.2.4 Reset to factory settings

To perform a factory reset, the device must be switched off (disconnect the device from the voltage supply). Then press the reset button on the back of the device with a suitable object and simultaneously switch on the device (establish voltage supply).



CAUTION!

Reset to default settings

All data will be deleted. All settings will be reset to the default settings (JUMO), including the user administration settings (user "Master", password "9200").

- ▶ Back up the hardware configuration and settings beforehand using the setup program.
-



NOTE!

Resetting to factory settings also removes the extra codes (chargeable functions). For this reason, the files for enabling the extra codes (also referred to as license files or FeatureResponse files) should be stored after initial receipt in such a way that they are available again for transfer to the device after a factory reset (see JUMO Web Cockpit > Service).

4 Operation

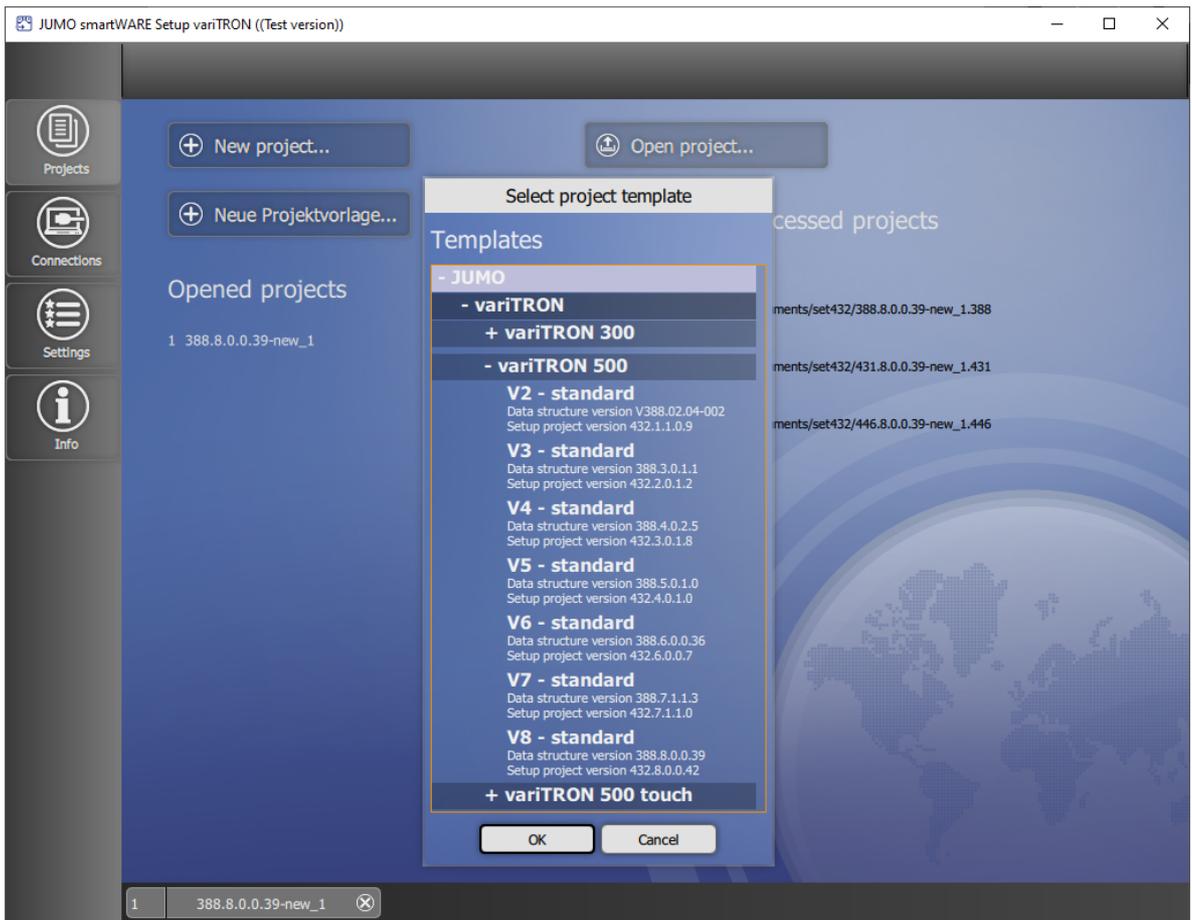
4.3 Setup program

4.3.1 Start page

The setup program is used to create new projects and edit existing projects.

The "Projects" window contains corresponding buttons. If applicable, the most recently edited and opened projects are also shown. These are likewise provided in the form of buttons for opening the respective project or switching to a project that is already open.

When creating a new project, a project template must be selected that depends on the device type and version of the device software. If necessary, the version of the setup program must also be taken into account.



Functions provided in the left-hand bar (also known as the "application bar"):

- **Projects:** Create new project, import new project template (as of system version 8), open existing project
- **Connections:** Configure and manage connections to devices
- **Settings:** Select the language of the setup program
- **Info:** Display information about the setup program

The bar at the bottom also displays opened projects (in the form of "project maps").

**NOTE!**

Before a device (or system) can be put into operation, the setup program must be used to create a project and transfer it to the device. The first step is to define the hardware configuration for the device (type and arrangement of hardware modules). The connection to the device must also first be configured before the project can be transferred.

4 Operation

4.3.2 Project map

Create project using individual functions

The functions are combined in a project folder known as a project map.



The following functions are available within a project:

- Project management: Display the name and path of the project file, enter the designation and description of the project
- Hardware assistant for system bus: Define the hardware configuration for the entire system
- Wtrans hardware assistant (only for variTRON 300 and variTRON 500 touch): Select Wtrans transmitters (wireless transmission of measured values)
- Configuration: Configure the device (CPU) and modules and determine their parameters
- PLC application: Determine the start parameters for the CODESYS PLC programming system, start the PLC configuration process (CODESYS)
- PLC parameter definition (function is provided if the CPVE is installed): Determine the start parameters for the CPV Editor (CPVE), start the CPVE
- Languages: Select the project language and device languages, export and import languages (texts)
- Data transfer: Establish a connection to a device, data transfer to/from the device, import and export the configuration
- Messages (as of system version 6): Display and act on project messages (acknowledge; further actions may be required)

You can access these functions using the tiles in the window and using the functions in the bar at the top (also known as the "project bar"). Selecting the "Project map" function takes the user back to the overview of functions.

4.3.3 Project management

Display project information, enter the designation and description of the project, convert the project



Parameters/functions:

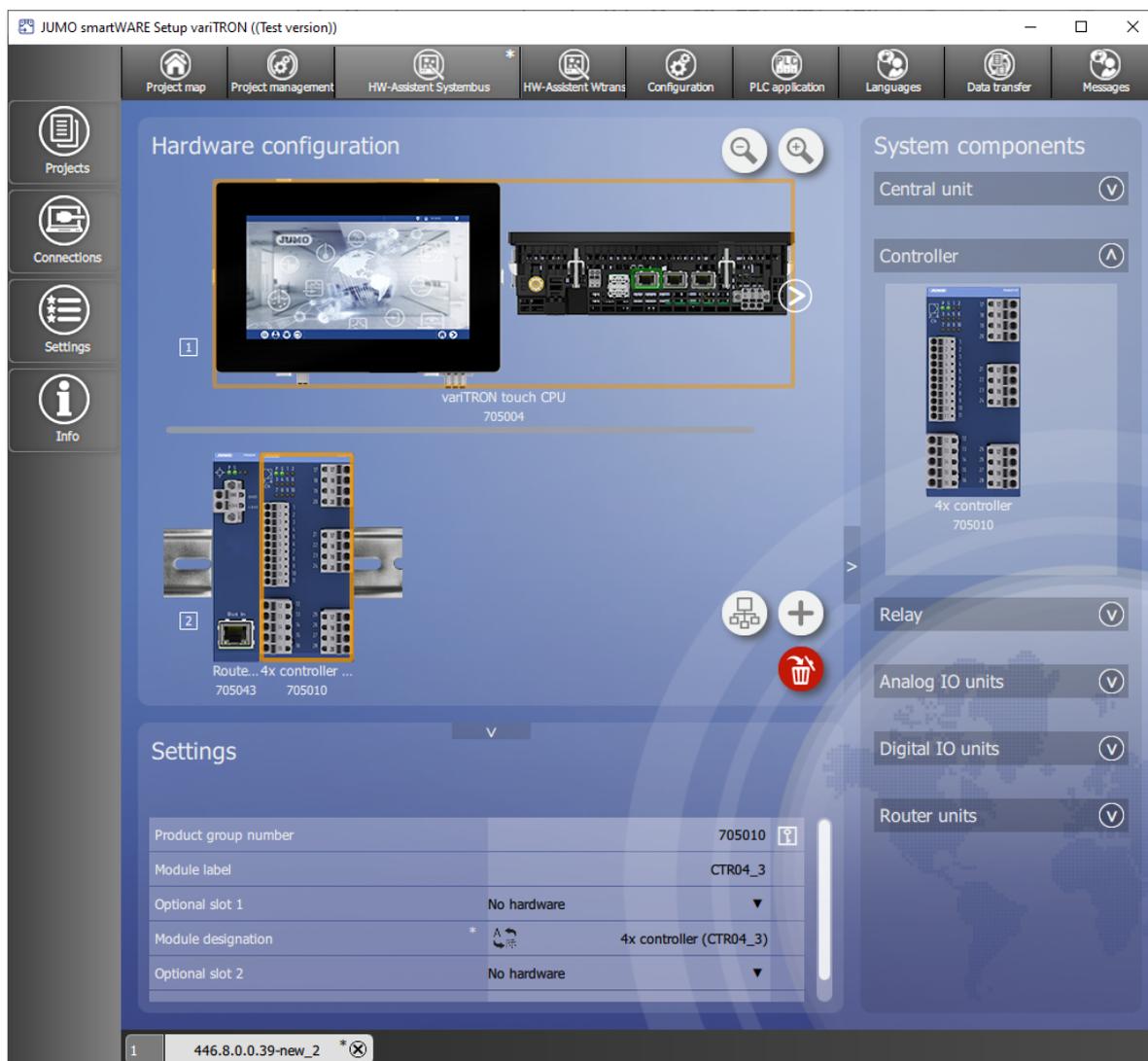
- Filename (non-editable): Project file name, which was automatically assigned when creating the project.
- Path (non-editable): Path under which the project file has been saved.
- Project version (non-editable): Version of the setup project
- Device version (non-editable): Version of the device software
- Project name (button): Opens a window for entering a designation for the project (in several languages).
- Description: Input field for providing a more detailed description of the project (in one language)
- Convert project (button): Convert project to the same or to a higher system version (select project template); pay attention to messages!
- Validate project (button): Pay attention to messages!

To change the file name and, if applicable, the file path, select the "Save as..." button.

4 Operation

4.3.4 System bus HW assistant

Define the hardware configuration for the entire system



The window is separated into three areas:

- Hardware configuration
- System components
- Settings

To increase the size of the "Hardware configuration" area, the "System components" and "Settings" areas can be hidden by clicking the relevant button (right arrow/downward arrow).

Hardware configuration

The "Hardware configuration" area shows the device (in this case the variTRON 500 touch CPU) and, if applicable, all previously added system components (modules). The view can be enlarged or reduced using the zoom function ("+" and "-" magnifying glass icons).

The variTRON 500 touch central processing unit offers the option of mounting a DIN rail on the back (shown here as a separate DIN rail) on which the modules are placed. The first module required is a router module (primary: router module 1-port), to which the other modules are attached.

In the setup program, the connection between the router module and the central processing unit is established in the same way as the connection between router modules (see the following description). In the real system, a commercially available network cable is used (min. CAT5, S/FTP; connection to the LAN1 socket of the central processing unit).

The position of a module on the DIN rail can be changed by dragging and dropping the module accordingly.

Once selected, a module can be removed using the "Recycle bin" button or by pressing the Delete key on the keyboard (you can select the module by clicking on it; you can also navigate using the left/right arrow keys on the keyboard).

With the "+" button, the first DIN rail is taken over into the configuration. If necessary, additional DIN rails can be added (scroll down in the window to make the DIN rail visible). You can switch between the DIN rails using the Up/Down arrow keys on the keyboard. Empty DIN rails can be removed again using the "X" button.

The "Bus Scan" button is used to scan the system bus of the connected device and read the hardware configuration into the setup project.

System components

The "System components" area lists all available system components (open the drop-down menu by clicking on it). A distinction is made here between the CPU and the modules (controller, relay, analog IO units, digital IO units, router units). A module can be added to the hardware configuration by dragging and dropping it or by double-clicking on the module (the CPU is specified by the setup program when creating a new project).



NOTE!

A maximum of 30 modules can be connected (router modules do not count).

Settings

The "Settings" area displays information on the system component that is currently selected and enables certain settings to be configured:

- Product group number (non-editable)
- Designation (button): Opens a window for entering a designation for the system component (in several languages)
- Module label: Tag name for the system component (editable; can no longer be changed once the hardware configuration has been applied)
- Expansion slot (dependent on the module): For selecting the option (open the drop-down menu by clicking on it)
- Optional module (alias device address): ⇒ chapter 4.3.5 "Optional module (alias device address)", Page 50



NOTE!

If the hardware configuration is created with the "Bus scan" function, the setting of the rotary coding switches in the setup project must be checked in the case of a router module 3-port (705042). If necessary, the setting must be changed before the configuration is sent to the device.

Router units

If the hardware configuration contains additional router units (router modules), these units must be connected with one another. To do so, proceed as follows:

4 Operation

1. Click on a router module.
The free RJ45 sockets are depicted by a green border.
2. Double-click on a free socket (or on the "Start connection" connector icon on the right next to the socket).
*On the router module on the other DIN rail, suitable free sockets are depicted by a flashing green border. A distinction is automatically made here between inputs (Bus In) and outputs (Bus Out).
Please note: To cancel, click on the "Delete connection" x icon on the right next to the socket.*
3. Click on a free socket on the other router module (or on the "Close connection" connector icon on the right next to the socket).
*The connection between the two sockets is established (color change).
Please note: To delete the connection, click on the "Delete connection" x icon on the right next to one of the two sockets (or remove a router module)*
4. If necessary, establish connections to other router modules (connections are depicted by different colors for the relevant RJ45 sockets).

4.3.5 Optional module (alias device address)

Basic differences between the mandatory module and optional module

Mandatory module:

- The module must be available.
- The position of the module must correspond to the hardware arrangement in the setup program.

Optional module:

- Only router modules can be configured as the head module of an HC group (hot connect group or optional module group) (assignment of an alias device address).
- The router module and the components of its HC group (optional modules) need not be available.
- All input/output modules connected to it are also optional modules.
- Router modules connected to it are optional modules.
- Due to the alias device address, a router module is always uniquely identifiable within the system.
- The router module can be defined in the setup program with a fixed or a variable position on the system bus.

Differences at system start and during operation

System start:

- If a mandatory module causes a problem (module defective or not available, wrong position), the system will not start.
- The HC group must be completely available or completely missing. If only part of the HC group is available, the system will not start.

During operation:

- If a mandatory module fails or is removed, the entire system goes into the "Stop" state.
- If an optional module is used, the system continues to run.
- The HC group can be removed from the system and also connected again (hot connect functionality). If a part of the HC group is removed, the remaining modules of this HC group continue to run.

Configuration of optional modules

When creating a project with the setup program (hardware arrangement), all modules are initially mandatory modules. To form a line with optional modules (HC group), the relevant (upstream) router module must be configured as an optional module:

- Router module 2-port (705041)

The "Optional" parameter must be set to TRUE (red) in the setup program.

The alias device address is fixed (0x200). Within a system, only a single router module 2-port can be configured as an optional module.

Connected router modules are then also automatically optional modules (they do not have to be configured as optional modules themselves).

- Router module 3-port (705042)

The rotary coding switches on the module must be used to set an alias device address (address not equal to 0). The same address must be set in the setup program using the parameters with the same name (rotary coding switch 10x, rotary coding switch 1x). If the settings do not match, the router module is not recognized on the system bus.

Note: if the alias device address 0 is set in the setup program, the address set on the router module is irrelevant (the addresses are not compared). The router module is then a mandatory module.

The alias device address is freely selectable, but must be unique within the system.

All input/output modules connected to the router module and any additional router modules are then also optional modules.

The router module as an optional module can also be operated at a system bus output that is not defined in the hardware arrangement. To prevent this possibility, the parameter "Fixed position" must be set to TRUE (red). Then the connection is only possible at the specific RJ45 socket of the specific router module as it corresponds to the hardware arrangement.

- Router module 1-port (705043)

The "Optional" parameter must be set to TRUE (red) in the setup program.

The alias device address is fixed (0x100). Within a system, only a single router module 1-port can be configured as an optional module.

All input/output modules connected to the router module are then also optional modules.

The router module as an optional module can also be operated at a system bus output that is not defined in the hardware arrangement. To prevent this possibility, the parameter "Fixed position" must be set to TRUE (red). Then the connection is only possible at the specific RJ45 socket of the specific router module as it corresponds to the hardware arrangement.

4 Operation

4.3.6 Wtrans HW assistant

Select Wtrans transmitters (wireless measured value transmission)



The window is separated into three areas:

- Transmitter configuration
- System components
- Settings

To increase the size of the "Transmitter configuration" area, the "System components" and "Settings" areas can be hidden by clicking the relevant button (right arrow/downward arrow).

Transmitter configuration

The "Transmitter configuration" area shows all previously added system components (Wtrans transmitters). The transmitters can be placed next to each other and under each other (self-expanding grid, scroll function horizontal and vertical). The view can be enlarged or reduced using the zoom function ("+" and "-" magnifying glass icons).

The position of a transmitter can be changed by dragging and dropping the module accordingly.

Once selected, a transmitter can be removed using the "Recycle bin" button or by pressing the Delete key on the keyboard (you can select the transmitter by clicking on it; you can also navigate using the left/right arrow keys on the keyboard).

System components

The "System components" area lists all available transmitters (open the drop-down menu by clicking on it). A transmitter can be added to the transmitter configuration by dragging and dropping it or by double-clicking on the transmitter.

Settings

The "Settings" area displays information on the system component that is currently selected and enables certain settings to be configured:

- Product group number (non-editable)
- Module label: Tag name for the system component (editable; can no longer be changed once the hardware configuration has been applied)
- Module designation (button): Opens a window for entering a designation for the system component (in several languages)

4 Operation

4.3.7 Configuration

Configure the device (CPU) and modules and determine their parameters



The "Configuration" area comprises the following areas (device-specific example shown):

- Device manager: Device settings (device language, start-up behavior, partition change), device designations, time zone/NTP, date and time, customer-specific linearization (as of system version 5)
- System bus: Master (settings relating to the system bus; see below), module... (module-specific configuration parameters; see below)
- Data carrier management (as of system version 7): Use of network drives
- Ethernet: Configuration of the LAN interface concerned (e.g., IP address, DNS server)
- Web server: Activation, HTTP or HTTPS, port numbers
- Email: Settings for sending emails
- PLC configuration: Units for absolute and relative temperature values (for the PLC application), configuration of program generators, analog and digital variables (as of system version 5)
- PLC parameters: Display of the configuration structures that were created using the CPV Editor (CPVE)
- Programs: Creation of programs using the program editor (setpoint values, operating contacts)
- System status UI: screensaver (activation and waiting period)
- Real-time processing (as of system version 6): Configuration of data recording
- Datastore gateway (as of system version 6): Configuration of the connection to the database
- Cloud gateway: Configuration of the connection to JUMO Cloud (as of system version 4)
- Wtrans gateway (only for variTRON 300 and variTRON 500 touch): Settings for using the JUMO Wtrans transmitters (as of system version 5)
- Node-RED (as of system version 4): Activation of programming tool Node-RED
- Batches (as of system version 6): Configuration of batch reporting

Details can be found in the "Configuration" chapter.

⇒ chapter 5 "Configuration", Page 77



NOTE!

The settings configured under "Bus > Master" influence the transfer of data via the system bus. Sub-optimal settings here will disrupt or even interrupt the communication within the system. For this reason, these parameters are only permitted to be modified by a service engineer from the device manufacturer (or by someone acting on their instructions).

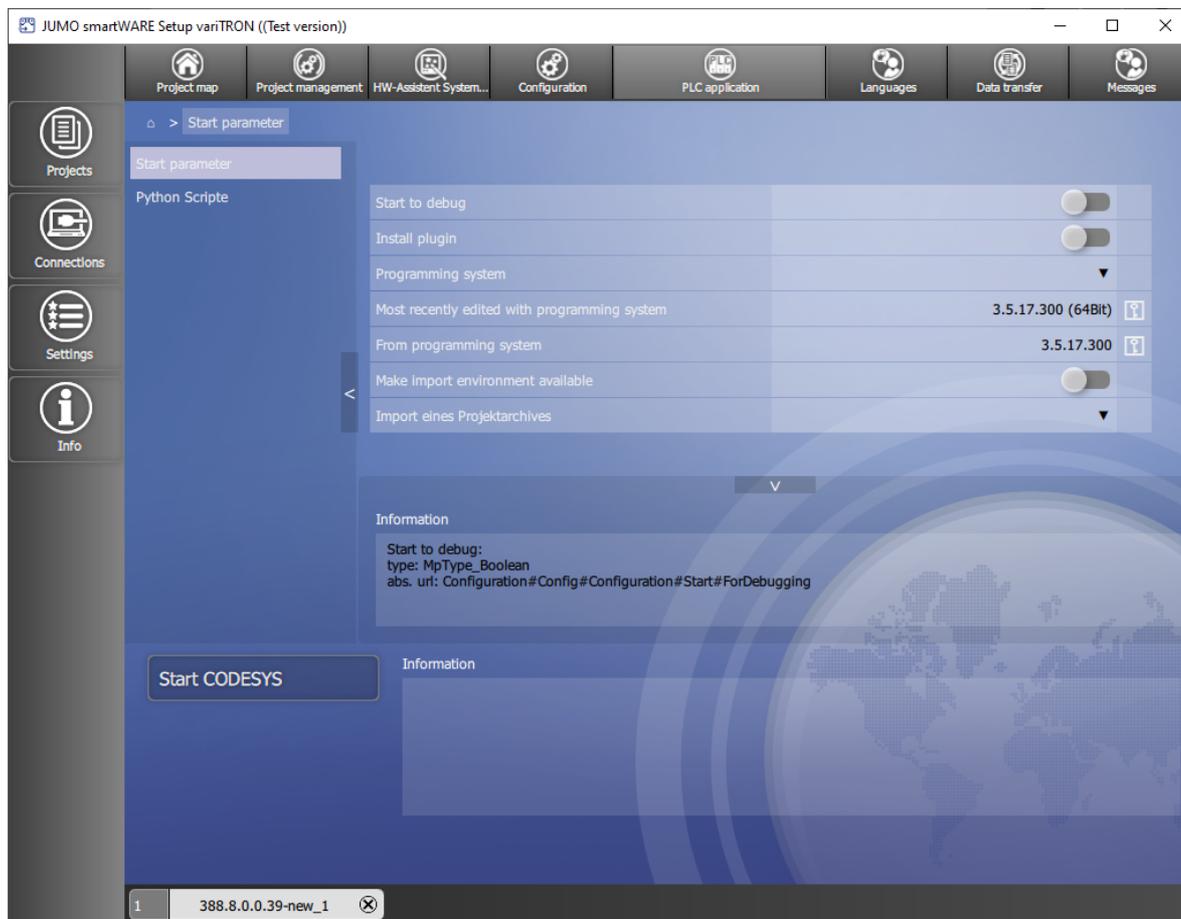
The process of configuring the modules (controller, relay, analog IO units, digital IO units) is described in the operating manual for the respective module.

⇒ chapter 1.8 "Available technical documentation", Page 18

4 Operation

4.3.8 PLC application

Determine the start parameters for the CODESYS PLC programming system, start CODESYS



Parameters/functions:

- Start to debug: Start CODESYS without a newly created device description (the compilation process is not run again before logon, the program is not stopped when logging on to the target system)
- Install plugin: Newly initialize the CODESYS plug-in (e.g., after uninstalling and reinstalling CODESYS)
- Programming system: Select the CODESYS version (drop-down menu)
- Most recently edited with programming system (display only): Most recently used CODESYS version
- As of programming system (display only): Version of the CODESYS runtime system in the device during the last execution
- Provide import environment: Provide texts from the "PLC Parameter" configuration area for import (after starting the PLC configuration)
- Import of a project archive (as of system version 8): Select CODESYS file of type ".projectarchive" for import.

To start the programming system, click the "Start CODESYS" button.

4.3.9 PLC parameter definition

Determine the start parameters for the CPV Editor (CPVE), start the CPVE

This function is only available if the CPV Editor has been installed.



NOTE!

The CPV Editor is used to create customer-specific configuration and process data.

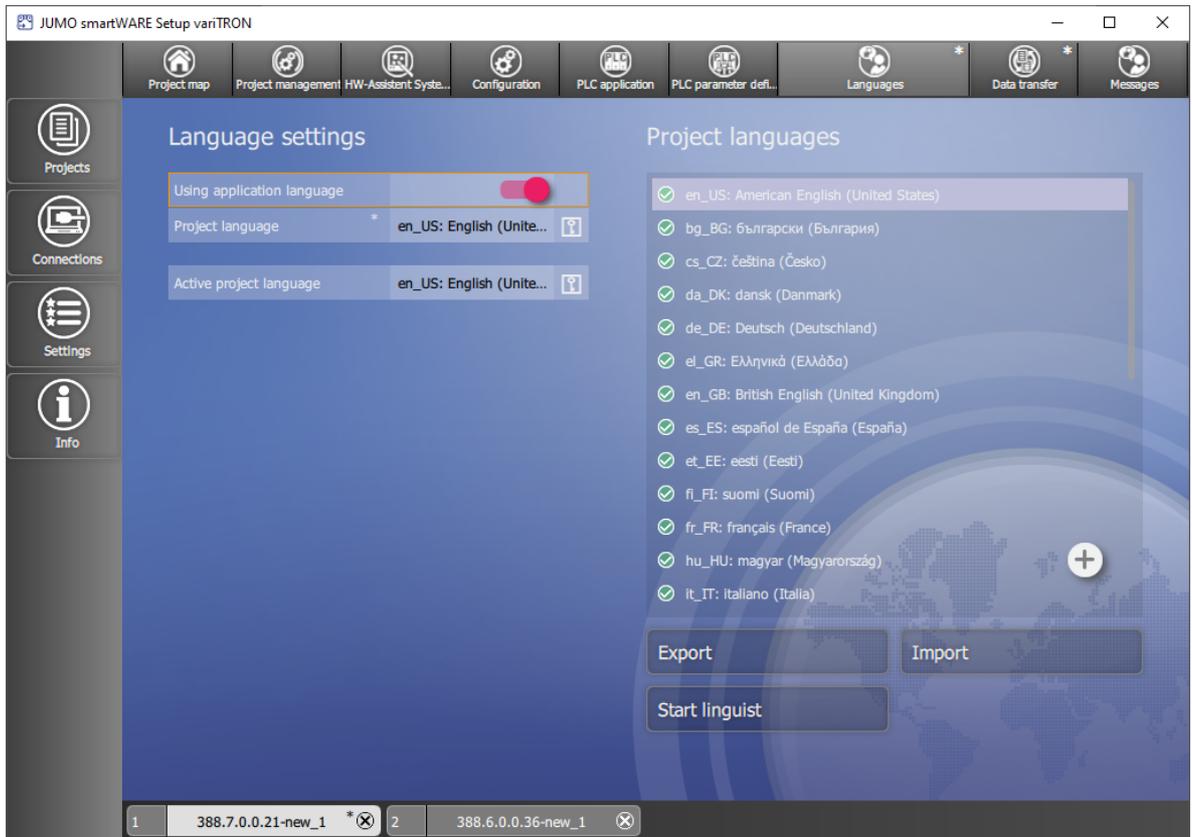
The CPV Editor requires specific knowledge and is intended for use by the manufacturer only (service that is subject to a fee).

A description of the CPV Editor is not included in this operating manual.

4 Operation

4.3.10 Languages

Select the project language and device languages, export and import languages (texts), edit languages



Language settings

Parameters/functions:

- Use application language: Use the language of the setup program as the project language
- Project language (button; not active if the application language is being used): Select the project language from the list (drop-down menu)
- Active project language (cannot be set here): Displays the current project language

Project languages

Parameters/functions:

- List: Project languages which are available for selection as the device language
 - Language selected (ticked): Language can be selected in the device
 - "+" button: Add another language to the list of project languages
 - Delete a project language: Click on the "x" icon after the highlighted language
- Export: Export texts from a language to a language file (*.ts) for translation
 - Select the source language for the translation (the language "Standard" exports all default texts of the so-called development language)
 - Select the target language (if necessary, add your desired target language to the list of project languages beforehand)
- Import: Import translated texts (source language > target language) from a language file (*.ts)
 - Open a language file: Select the language file from the file directory (the source language, target language, and number of texts are displayed)
 - Load a language file: Import texts (the number of texts before and after the import is displayed)
- Start linguist: Edit language files with the Qt Linguist editor
 - File > Open: Select, open and edit language file from file directory

4 Operation

4.3.11 Data transfer

Establish a connection to a device, data transfer to/from the device, import and export the configuration



Connection

Parameters/functions:

- Current connection (button): Displays the current connection; if necessary, select a different connection from the list
- Description (cannot be edited here): Description of the current connection
- Host (cannot be edited here): IP address of the device
- User (cannot be edited here): User name for logging on to the device
- Version (cannot be edited here): Device software version of the connected device
- Connect...: Establish a connection to the device
- Disconnect: Break the connection
- Load from device: Load a configuration from the device into the setup program
- Send to device: Send a configuration from the setup program to the device
- Import: Select a configuration file (.jcf) from the file directory on the PC and import it into the setup program
- Export: Save a configuration as a file (.jcf) in the file directory on the PC

In order for a connection to be available for selection here, it must first be configured using the "Connections" function (application bar).

Transfer settings

Parameters/functions:

- System state after configuration transfer (as of system version 5):
 - Unchanged: After the transfer, the device returns to the system state it had before the transfer.
 - STOP: The device remains in the "Stop" system state after transmission.
- Complete configuration: All data packets are transferred.
- Selective configuration: Only the selected data packets (or parts thereof) are transferred.
 In order to send a data packet (send it to the device) or export it (to a file), select the data packet concerned using the button (= red).
 In order to extract a data packet (load it from the device) or import it (from a file), select the relevant option from the drop-down menu:
 - Do not transfer: The data packet concerned is not transferred.
 - Only visible values of known parameters: Only the values of existing parameters are applied in the setup project. The structure is not modified.
 - Structure and values (only for "Bus" and "PLC Parameter"): In the case of the PLC parameters, by selecting this option you can apply a PLC parameter structure that is already in the device in the setup project.
Caution! The PLC parameter structure that is already in the project will therefore be lost.
 - Only values of known parameters (only for "PLC Parameter"): The structure of the PLC parameters is not modified in the setup project. However, known parameters in the project structure are applied from the device structure.
 - Only modify structure (only for "PLC Parameter"): The structure in the setup project is adjusted to the structure of the device. However, existing parameters are not modified.
- Complete configuration including device-specific data (as of system version 3): In addition, device-specific data is transmitted, for example device ID, IP address, password, activation of options.
- Selective configuration including device-specific data (as of system version 3): In addition, device-specific data is transmitted (see above).



NOTE!

The default settings are suitable for most application scenarios and should only be modified by experienced users.



CAUTION!

While the configuration is being sent to the device, it goes into the "Stop" system state.

This interrupts the processing of the PLC application.

- ▶ The user must ensure that this does not have any negative effects on the ongoing operation of the plant.

Default settings (as of system version 7):

Transfer type for sending or export: Selective configuration

Transfer type for extraction or import: Selective configuration

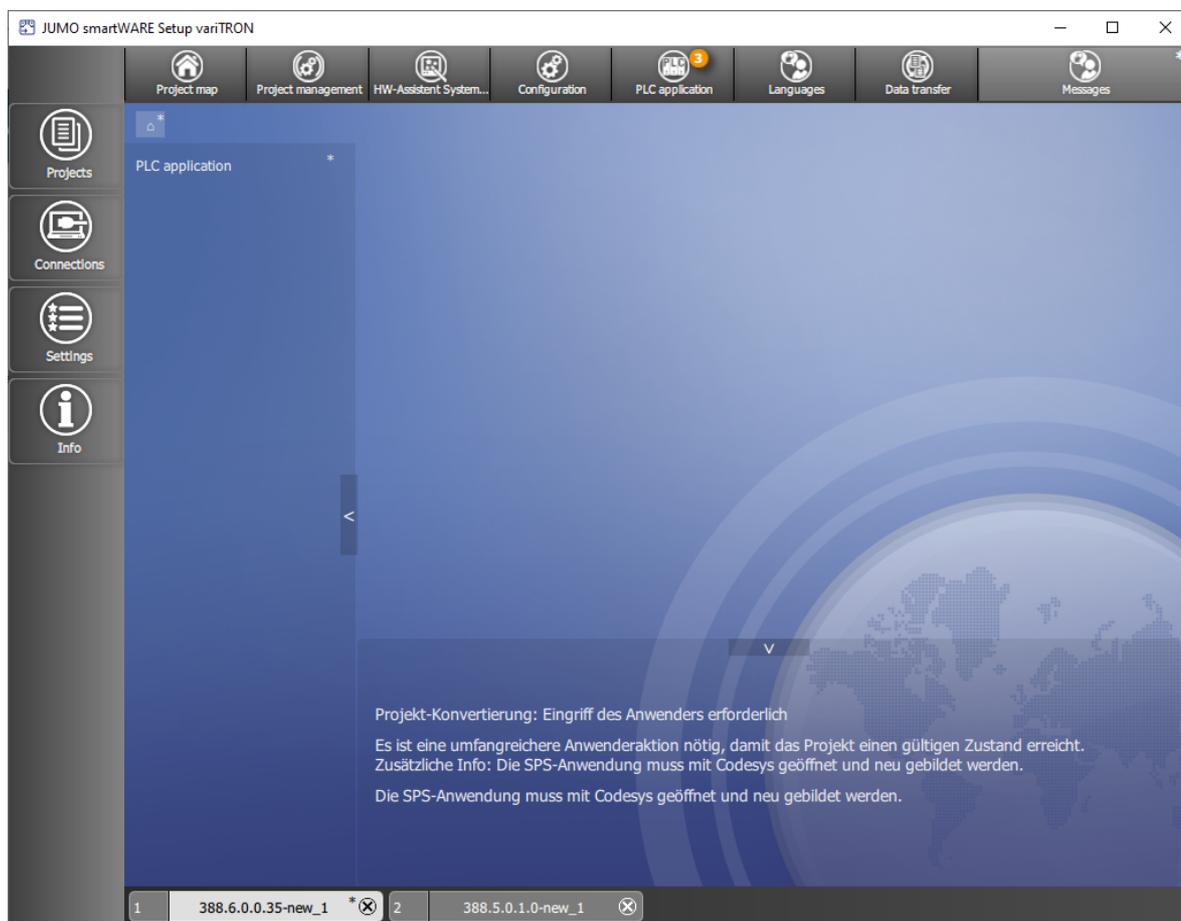
Data packet	Send/Export	Extract/import
User management (AccessControlManager)	No (= gray)	Do not transfer
Device manager	Yes (= red)	Only values of known parameters
System bus	Yes (= red)	Only values of known parameters
Data carrier management (as of system version 7)	No (= gray)	Do not transfer

4 Operation

Data packet	Send/Export	Extract/import
Port configuration (as of system version 8)	Yes (= red)	Only values of known parameters
Ethernet	Yes (= red)	Only values of known parameters
System user interface (only for variTRON 500 touch)	Yes (= red)	Only values of known parameters
Web server	Yes (= red)	Do not transfer
Email	Yes (= red)	Only values of known parameters
PLC configuration	Yes (= red)	Only values of known parameters
CODESYS Configura- tion	Yes (= red)	Do not transfer
PLC parameters	Yes (= red)	Only values of known parameters
PLC parameters 2 to PLC parameters 4 (as of system version 7)	Yes (= red)	Only values of known parameters
Programs	Yes (= red)	Only values of known parameters
System status UI (only for variTRON 300, variTRON 500)	Yes (= red)	Only values of known parameters
Real-time processing (as of system version 6)	Yes (= red)	Only values of known parameters
Datastore gateway (as of system version 6)	Yes (= red)	Only values of known parameters
Cloud Gateway (as of system version 4)	Yes (= red)	Only values of known parameters
Wtrans Gateway (only for variTRON 300, variTRON 500 touch)	Yes (= red)	Only values of known parameters
Node-RED (as of system version 3)	No (= gray)	Do not transfer
Batches (as of system version 6)	Yes (= red)	Only values of known parameters

4.3.12 Messages

Display and act on project messages



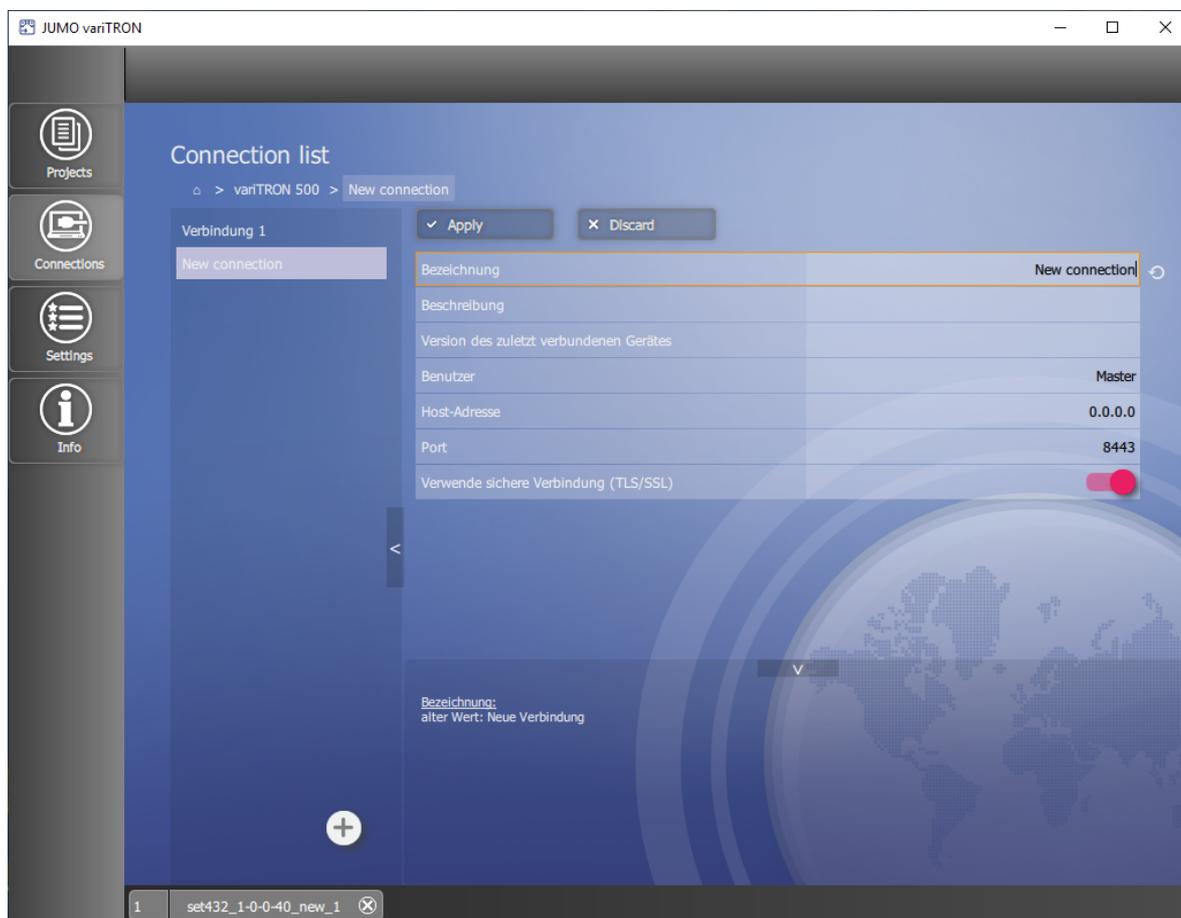
Project messages that require user action (acknowledge message, perform further actions if necessary) are displayed here.

4 Operation

4.3.13 Connections

Connection list

Configure a connection to a device; overview of all configured connections



Parameters/functions:

- Designation (editable): Freely selectable designation for the connection
- Description (editable): Text for a more detailed description of the connection
- Version of most recently connected device: Version number of the device software
- User (editable): User name for logging on to the device
- Host address (editable): IP address of the device
- Port (editable; default setting is 8443): Port number for the connection using the setup program
- Use secure connection (TLS/SSL): FALSE (gray = no), TRUE (red = yes, default setting)
This setting affects the port numbers for the connection (see above). The following port numbers have been assigned per default: 8090 for FALSE (HTTP), 8443 for TRUE (HTTPS).
⇒ chapter 5.8 "Web server", Page 85
If a port number is changed in the configuration, it must also be changed here under "Port".
- Discard: Discard all data entries made
- Apply: Save all values

The left-hand side of this window lists all configured connections along with their designation. You can add another connection using the "+" button. To remove a connection, click the "x" in the area with the designation (this is activated when the cursor is on the area).

If applicable, the old value of the parameter that has just been changed is shown at the bottom of this window. Clicking the "Back" button (circular arrow) after the line containing the changed parameter (above) discards your data entry.

Both areas can be hidden by clicking the relevant button (arrow).

4 Operation

4.4 JUMO Web Cockpit

JUMO Web Cockpit is a web application that enables you to access the device using a web browser. The following web browsers are supported: Mozilla Firefox, Google Chrome, Microsoft Edge, Opera

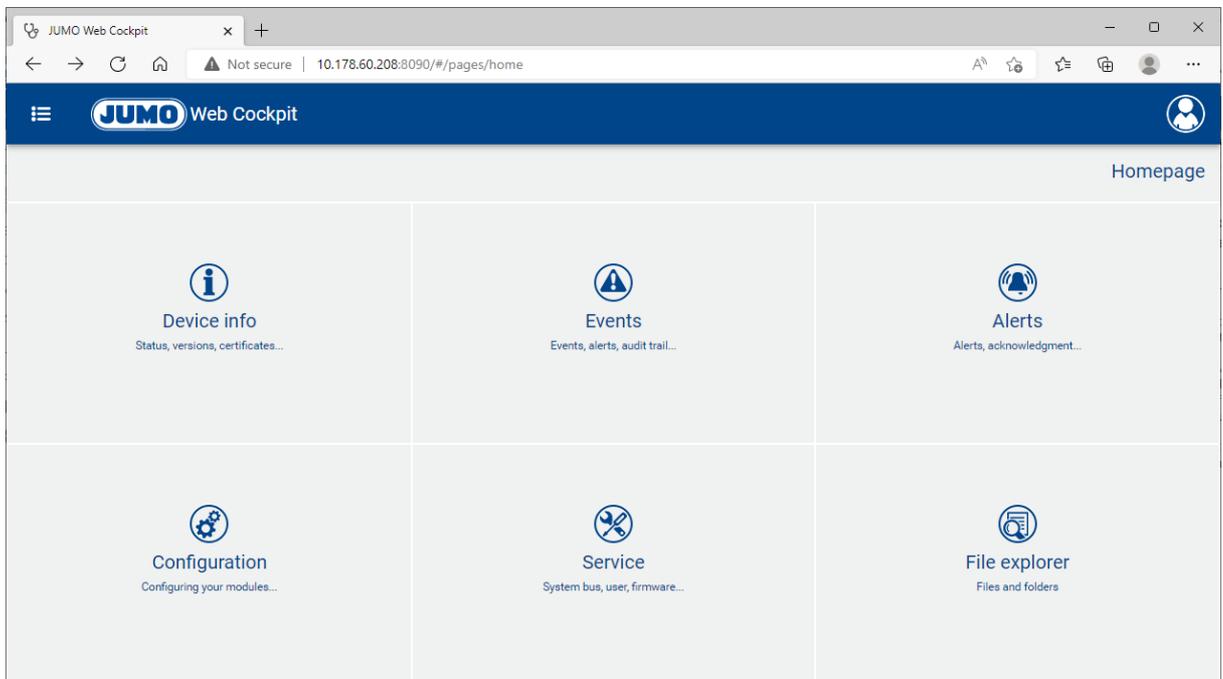


NOTE!

JUMO has successfully tested the aforementioned web browsers using Microsoft Windows 10. If you use a different web browser or another operating system, JUMO cannot guarantee that the application will work correctly.

To start the web application, enter the IP address of the device and the port number 8443 for HTTPS or 8090 for HTTP (default settings) into the address bar of your web browser (for example: 10.178.59.209:8090). You will need your user name and password to log on to the device. Once you have successfully logged on, the homepage of the web application is shown.

Homepage



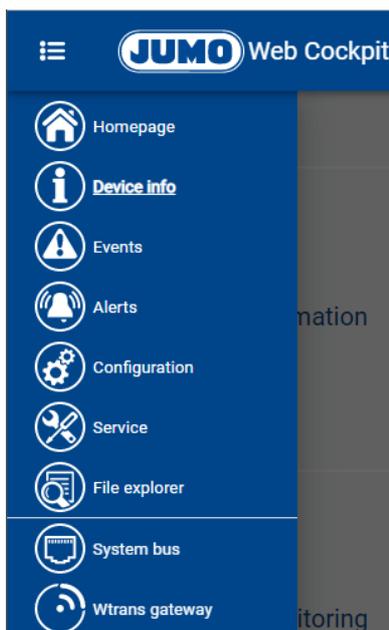
Designation	Description
Device info	Status, versions, certificates, etc. <ul style="list-style-type: none">• Display device information• Display and change the system status (Run, Stop, etc.)• Display Ethernet parameters• System monitoring (battery, memory, temperatures, voltage values)• Certificate management (display certificates)• PLC runtime environment (display information)• PLC application (display information)• License management (display extra codes)• Real-time processing (display information on data recording)• Datastore gateway (export status, version)• Cloud gateway (status, version)• Only for variTRON 300 and variTRON 500 touch: Wtrans gateway (version, radio frequency, Wtrans transmitters)

Designation	Description
Events	Events, alarms, audit trail, etc. <ul style="list-style-type: none">• Messages shown in a list• Filter by message type• Filter by keyword• Plain-text search• Delete messages
Alerts	Alarms, acknowledgement, etc. <ul style="list-style-type: none">• Messages shown in a list• Filter by message type• Filter by keyword• Full-text search• Acknowledge alarms
Configuration	Configure modules, etc. <ul style="list-style-type: none">• Configure device• Configure connected modules (system bus)
Service	System bus, users, firmware <ul style="list-style-type: none">• EtherCAT (system bus): Display information on the master and slaves (modules); perform actions• Only for variTRON 300 and variTRON 500 touch: Wtrans gateway (status of transmitters)• User management: Create users, assign roles• Import configuration: Transfer configuration file (.jcf) to the device• Extract configuration: Extract configuration from the device and save it as a file (.jcf)• Function activation: Activate extra codes• Firmware: Update the device firmware• Log list: Extract log entries from the device• Debug: Extract debug data from the device and create a debug file (.jdf)
File explorer (as of system version 7)	Files and folders <ul style="list-style-type: none">• Files in the "Shared Folder"

"Menu" button

The functions on the homepage can also be accessed using the "Menu" button:

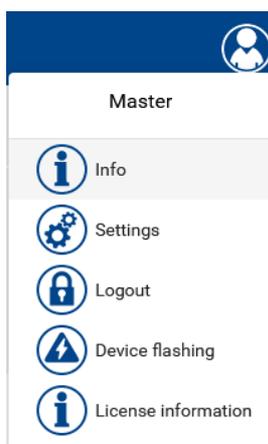
4 Operation



Selecting the menu item "System bus" accesses the function "Service > System bus" directly.

Only for variTRON 300 and variTRON 500 touch: Selecting the menu item "Wtrans gateway" accesses the function "Service > Wtrans gateway" directly.

"User" button



Designation	Description
Master	The user name of the logged-on user is displayed here.
Info	Displays information about the web application
Settings	Change the password
Logout	Log off user
Device flashing	The display of the device flashes (for identification).
License information	Display license information

"Web applications" and "Info" buttons

New buttons are available as of system version 8.2.



Info and license information can now be accessed via the new "Info" button (middle).

The user can switch to other active web applications (e.g. "CODESYS WebVisu") via the new "Web applications" button (left).

The previous functions are available via the "User" button (right) (except Info and License information).

4 Operation

4.4.1 Device information

Device information

Device-specific numbers and version numbers for hardware and software components in the device are displayed here.

Information on the connected modules is not displayed here. This information can be accessed using the function "Service > System bus".

System status

The current system status is displayed here.

Corresponding functions are available to change the system status:

- REBOOT SYSTEM (as of system version 5)
 - Restart of the central processing unit.
- ORIGIN RESET
 - An "Origin" reset resets the system bus (master restarts, data of the modules on the bus is loaded again) and deletes the bus configuration.
 - The PLC performs a full reset, which means that the PLC program and the retain area¹ are deleted (see CODESYS documentation on origin (full reset) of PLC).
 - An event message is issued (origin reset).
- COLD RESET
 - The PLC performs a cold start, which means that the retain area¹ is deleted (see CODESYS documentation on cold start of PLC).
 - An event message is issued (cold start reset).
- RESET
 - The PLC performs a warm start, which means that the retain area¹ is retained (see CODESYS documentation on warm start of PLC).
 - An event message is issued (warm start reset).
- STOP
- RUN

Ethernet

Information on the Ethernet interface LAN1 and, if applicable, other Ethernet interfaces (LANx) is displayed here.

System monitoring

Information on the system battery status, memory usage, CPU temperature, and system voltages (only with variTRON 500) is displayed here.

System voltages: The "Reset drag indicator" function can be used to reset the resettable minimum and maximum values.

Certificate administration

If applicable, information on certificates is displayed here.

PLC runtime environment

Information on the PLC runtime system is displayed here.

¹ variTRON 300: Retain handling only possible via sync in CODESYS (JUMO Library available as of system version 6).

variTRON 500 touch: Retain handling only possible via sync in CODESYS (JUMO Library available as of system version 6) and with basic type extension 5 = "without UPS".

PLC application

If applicable, information from the PLC application is displayed here (PLC library "CmpDeviceInfo").

License management

Extra codes and their status are displayed here (active = extra code is active and can be used).

Real-time processing

Information on the applicable function (e.g. data recording) is displayed here (thread runtime, cycle counter, timeout counter, wakeup deviation).

Datastore gateway

Information on data recording is displayed here (version, export status of the recorded data, filling level of the database).

New function as of system version 8: Manual export of the recorded data (for example for backing up before a firmware update). The date of the last export is displayed.

Cloud gateway

Information on the cloud gateway is displayed here (status, memory usage, version).

The following functions are available:

- DELETE CONFIG. (as of system version 8.1)
 - Deletes the configuration received from the server (signals and data connections).
- CLEAR BUFFER (as of system version 8.1)
 - Deletes the buffered data.
- DELETE ALL (CLEAR)
 - Deletes the buffered data and the configuration received from the server.
- REBOOT
 - Restarts the cloud gateway.

Wtrans gateway (only with variTRON 300 and variTRON 500 touch)

Information on the Wtrans gateway is displayed here (version, radio frequency; Wtrans transmitter: e.g. transmitter ID, battery state, RSSI value; measured value, transmission interval).

4.4.2 Events

Event messages are extracted from the device and listed in chronological order here.

The information shown can be filtered by message type (alarm, audit trail, malfunction, event). It is also possible to search for specific keywords and run a full-text search.

The "Refresh" function (button) refreshes the list.

The "Delete" function (button) deletes all entries from the list in the device.



NOTE!

The different types of event messages are organized in a common ring buffer. In the event that old entries are overwritten, it is usually ensured that audit trail messages remain stored for at least 14 days.

4.4.3 Alarms

Alarm messages are extracted from the device and listed in chronological order here.

The information shown can be filtered by message type (alarm, malfunction). It is also possible to search for specific keywords and run a full-text search.

The "Refresh" function (button) refreshes the list.

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The "Confirm" function (button) acknowledges an alarm. For this purpose, the relevant alarm must be selected (ticked) beforehand.

4.4.4 Configuration

The following sections are merely intended to provide an overview of the functions which are configured under the respective tile.

The process of configuring the individual functions in the CPU (master) is described in detail in the "Configuration" chapter in this document.

⇒ chapter 5 "Configuration", Page 77

The process of configuring the modules (controller, relay, analog IO units, digital IO units) is described in the operating manual for the respective module.

⇒ chapter 1.8 "Available technical documentation", Page 18

Device manager

Here, device settings are configured (device language, start-up behavior, partition change), device designations are assigned, the time zone and time server are selected, and the date and time are manually set. In addition, the customer-specific linearization is configured here (as of system version 5).

Unit settings (only for variTRON 500 touch)

The function is not yet supported (intended for future use).

System bus

The "Master" tile is where settings relating to the transfer of data via the system bus are configured.



NOTE!

The settings configured under "Master" influence the transfer of data via the system bus. Sub-optimal settings here will disrupt or even interrupt the communication within the system. For this reason, these parameters are only permitted to be modified by a service engineer from the device manufacturer (or by someone acting on their instructions).

The modules connected via the system bus are each depicted by a separate tile, which takes the user to the module configuration.

Data carrier management

Settings for the use of network drives are made here (available as of system version 7).

Ethernet

The Ethernet interface LAN1 and, if applicable, other Ethernet interfaces (LANx) are configured here.

Port configuration

Here an Ethernet port (LANx) is selected which is to be used as a PROFINET port (available as of system version 8).

System user interface (only for variTRON 500 touch)

The integrated TFT screen (touch panel) is configured here. Furthermore the graphic file of the boot logo is displayed here (configuration only in the setup program).

Web server

The web server function is configured here.

Email

The settings for sending emails are configured here.

PLC configuration

Here, the units for absolute and relative temperature values are determined (for the PLC application), the program generators are configured, and settings for the analog and digital variables (as of system version 5) are made.

PLC parameters

If applicable, PLC parameters are defined here.

Programs

Programs (setpoint values, operating contacts) are created here using the program editor.

System status UI (only for variTRON 300 and variTRON 500)

The screensaver is configured here.

Real-time processing

Here the process values to be recorded are selected and the data recording is configured (available as of system version 6).

Datastore gateway

Here the connection to the database (datastore) is configured and activated (available as of system version 6).

Cloud gateway

The connection to the JUMO Cloud (available as of system version 4) is configured here.

Wtrans gateway (only for variTRON 300 and variTRON 500 touch)

Settings for using the JUMO Wtrans transmitters are made here (available as of system version 5).

Node-RED

Here, the use of the programming tool Node-RED is activated.

Batches

Batch reporting is configured here (available as of system version 6).

4.4.5 Service

EtherCAT (system bus)

Information on the system bus master and the slaves is displayed here, for example:

- Actual and target status (system bus status)
- Device address and alias address
- Available ports (system bus interfaces)
- Hardware and software version
- Assignment of expansion slots

The following functions are available:

- Bus topology mode active (as of system version 5): Only for servicing purposes; shows the actual hardware configuration.
- Debug output active: Only for servicing purposes
- Reset: System bus restart
- Stop/Run: Switchover of the system bus status (Safe-Operational/Operational; independent of system status)
- Reset statistics

4 Operation



CAUTION!

If the bus topology mode is activated in the system bus state "Operational", the system bus goes into the state "Initialization".

This interrupts the cyclic transmission of values.

► Use this function for servicing purposes only!

Wtrans gateway (only for variTRON 300 and variTRON 500 touch)

Information about the Wtrans transmitters is displayed here (e.g. status, transmitter ID, battery status, RSSI value).

User management

Users are created and assigned user rights here.

The user rights are defined in what are known as roles, which represent typical remits such as administrator or operator. Users are assigned rights by assigning them the relevant role. Users can also be assigned more than one role.

⇒ chapter 7.1 "User rights", Page 109

Import configuration

A configuration file (.jcf) is selected and transferred to the device here.

Once the configuration has been successfully transferred, the device restarts.

Extract configuration

The configuration is extracted from the device and saved as a configuration file (.jcf) here.

Function activation

Extra codes are activated here.

Extra codes are additional functions which are usually subject to a fee.



NOTE!

The files for enabling the extra codes (also referred to as license files or FeatureResponse files) should be stored after initial receipt in such a way that they are available again for transfer to the device after a factory reset.

Firmware

The device's firmware is updated here.

For this purpose, switch the device to the status "Stop". Then select a firmware file (.raucb) and transfer it to the device. Afterward, create a new hardware configuration for the system (connected modules) using the setup program and transfer it to the device.

As an option, a configuration file (.jcf) can also be selected and transferred to the device here.

As of system version 8.2, it is also possible to adopt the current configuration (must be compatible with the firmware).

Log list

Log entries are extracted from the device and listed here.

The information shown can be filtered by entry type (information, warning, error, event, audit trail message, alarm, malfunction). It is also possible to run a full-text search.

Debug

Debug data is extracted from the device here.

The file containing the debug data (.jdf) can be saved locally on the PC and sent to the manufacturer for analysis purposes.

Use of a USB flash drive



NOTE!

It is also possible to update the firmware, import and extract the configuration (import, export), and extract the debug data using a USB flash drive.

⇒ chapter 4.2.2 "Device menu", Page 42

4.4.6 File explorer

Files and subfolders located in the Shared Folder are displayed here.

The files are available for download in the web browser (click on the file).

As of system version 8, the following functions are available (as buttons or in the context menu):

- Create new folder, rename, open, delete
- Download folder (as ZIP file)
- Upload, download, delete file(s)

In a CODESYS application, the shared folder can be accessed via the relative path **../ShareJumo**.

4 Operation

5.1 General information

As a basic principle, the device can be configured on the device itself, as well as using the setup program or the "JUMO Web Cockpit" web application. However, these configuration options differ in terms of the function areas that can be configured.

The following table provides an overview of which function areas are configurable by which means (= X).

Function area	Device with LCD display	Device with TFT screen	Setup program	Web application
Device manager	X ^a	X ^a	X	X
System bus			X	X
Data carrier management			X	X
Ethernet	X	X	X	X
Port configuration	X	X	X	X
System user interface (TFT screen, only for variTRON 500 touch)		X	X	X
Web server	X	X	X	X
Email			X	X
PLC configuration			X	X
PLC parameters			X	X
Programs			X	X
System status UI (LCD display, only for variTRON 300 and 500)	X		X	X
Real-time processing			X	X
Datastore gateway			X	X
Cloud gateway			X	X
Wtrans gateway (only for variTRON 300 and 500 touch)			X	X
Node-RED			X	X
Batches			X	X

^a Some functions are not available.



NOTE!

The functions "Hardware assistant" (for defining the hardware configuration for the system), "PLC application" (for defining the start parameters and starting the programming system), and "Languages" (for defining the project language, and exporting and importing languages) are only available in the setup program.

Device with LCD display (variTRON 300, variTRON 500): If the configuration has been changed on the device, this change will not take effect until you confirm the query "Save settings" using the "Menu/OK" key.

Device with TFT display (variTRON 500 touch):

= Save settings and exit menu level

= Exit menu level without change

In the web application, selecting "Save" ensures the device applies a change that was made to the configuration. The change is not applied if you select "Exit".

5 Configuration

In the setup program, the changed configuration must be transferred to the device in order for the change to take effect.

If applicable, the default settings are shown in **bold** in the following tables.

5.2 Device manager

Device settings

Parameter	Selection/data input	Description
Device language	Select language	Language in which the texts are shown on the device display. Texts that do not have a translation in the selected language are displayed in English or German (or, if applicable, in the so-called developer language).
Start-up behavior		System status that is adopted by the device once it switches on:
	Run	"Run" system status
	Stop	"Stop" system status
	Last status	Last system status before the switch-off
Partition change after [x] start-up errors	5 to 50	After [x] errors during the boot process, the device boots from the secondary partition (backup partition). Afterwards there is a one-time possibility to boot from the primary partition again with REBOOT SYSTEM. If this fails, a software update is required. Possible errors during the boot process: <ul style="list-style-type: none"> • Error in the device software • Interruption of the voltage supply

Device designations

Parameter	Selection/data input	Description
Device name	Enter text (or use existing text)	Designation of the device The device name is used in the web application, in the setup program, and, if applicable, in other PC programs. It can also be used by DeviceScan and the CODESYS application, for example for identification purposes.
DNS name	Enter text (or use existing text) The DNS name must not be used more than once in the network.	Name by which the device can be identified and addressed in the network. The name set per default is unique as it comprises the product group number and the MAC address.

Time zone/NTP

Parameter	Selection/data input	Description
Time zone	Select time zone	Time zone in which the device is operated.
NTP active		The device's time settings can be synchronized with a time server using the Network Time Protocol (NTP).
	Yes	Synchronization is active.
	No	Synchronization is not active.

5 Configuration

Parameter	Selection/data input	Description
Server 1 Server 2 Server 3	Enter the address of the time server (or use an existing address) Example: de.pool.ntp.org	Up to three time servers can be entered. The server list is processed top down, in other words, the next time server on the list is only queried if the previous server is unreachable. It must be ensured that the server name is resolved to an IP address via a DNS server (see Configuration > Ethernet).
Maximum round-trip time	0 bis 99999 (5)	Maximum time in seconds between the client's request and the server's response (for local time server).

Date and time

Parameter	Selection/data input	Description
Time	Enter the date and time	Device's time settings (NTP must be inactive) In the web application, the PC's time settings are applied (the current time in the device is not shown). These settings can be changed individually.

5.2.1 Customer-specific linearization

You can use the customer-specific linearization to create a customized linearization characteristic line for analog values. Two procedures are available for this: formulas or grid values (value pairs).

Temperature values must always be specified in °C. In general, use the measuring units without prefixes (e.g. A instead of mA).

Formula

Customer-specific linearization is specified using a polynomial. The polynomial is calculated for the entire linearization range.

Example (4th order polynomial): $y = X4 \cdot x^4 + X3 \cdot x^3 + X2 \cdot x^2 + X1 \cdot x + X0$

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of linearization
Measuring range start (Ymin)	-99999 to 99999 (0)	Start value of the y axis
Measuring range end (Ymax)	-99999 to 99999 (100)	End value of the y axis
Decimal places	0 to 6 (4)	Number of decimal places
Polynomial:		
X0	-99999 to 99999 (0)	Absolute component of the polynomial (point of intersection with the y axis)
X1	-99999 to 99999 (1)	Coefficient of the linear component (x)
X2	-99999 to 99999 (0)	Coefficient of the quadratic component (x ²)
X3	-99999 to 99999 (0)	Coefficient of the cubic component (x ³)
X4	-99999 to 99999 (0)	Coefficient of the quartic component (x ⁴)

5 Configuration

Parameter	Selection/data input	Description
...	-99999 to 99999 (0)	(max. up to 20th order)

Grid values

Customer-specific linearization is specified by entering up to 200 grid points (pairs of values X/Y). The value of X stands for the physical measured value (e.g., voltage in V, current in A, or resistance in ohm; depending on the sensor type) and the value of Y stands for the linearized value (e.g., temperature in °C).

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of linearization
Decimal places	0 to 6 (4)	Number of decimal places
Grid values:		
Measured value (X)	-99999 to 99999 (0)	Value of the relevant grid point on the x axis
Linearized value (Y)	-99999 to 99999 (0)	Value of the relevant grid point on the y axis

5 Configuration

5.3 System bus

Master

Parameter	Selection/data input	Description
Max. repetitions (max. no. of re-tries)	5 to 10	Maximum number of times a faulty frame is repeated before the system bus switches to the status "Stop".
Continuation after system bus error (run after s. bus err.)		The device can continue automatically as soon as a system bus error that previously occurred is no longer present.
	Inactive	No continuation The device or the system bus must be manually switched back to the status "Run". For example, the system bus can be separately switched to the status "Stop" (Safe-Operational) or "Run" (Operational) in the web application using the function "Service > System bus".
	Active	Continuation The device automatically switches back to the status "Run".
Ignore system start		The system bus status can be independent of the current system status (device status). This may be required if a CODESYS application first needs to perform extensive initialization before the system bus is permitted to switch to the status "Run".
	Inactive	The system bus status follows the system status.
	Active	When the system starts, the system bus remains in the status "Stop", regardless of the system status. The system bus must be separately switched to the status "Run". This can be done in the CODESYS application (CmpSystembus), or performed manually in the web application (Service > System bus).



NOTE!

The settings configured under "Master" influence the transfer of data via the system bus. Sub-optimal settings here will disrupt or even interrupt the communication within the system. For this reason, these parameters are only permitted to be modified by a service engineer from the device manufacturer (or by someone acting on their instructions).

Modules

The process of configuring the modules (controller, relay, analog IO units, digital IO units) is described in the operating manual for the respective module.

⇒ chapter 1.8 "Available technical documentation", Page 18

If used together with a type JUMO variTRON CPU, the description of the NV connecting list provided in the manual does not apply. In this case, all external connections (connections running via the system bus) must be realized in the PLC application.

5.4 Data carrier management

Network drives

Here up to 5 network drives are mounted under Linux (available as of system version 7).

Parameter	Selection/data input	Description
Name	Enter text (only ASCII characters)	Designation for the network drive Examples: Drive1, Drive2
Network path	Enter text (only ASCII characters)	Network path of the drive Examples: //Server/NetDrive, //Server/NetDrive2
File system	SMB/CIFS	Network file system SMB/CIFS is supported up to and including version 3.1.1. To use a specific version, it must be specified as an additional mount option (vers=x.x).
Log on as guest (as of system version 8)	Off (FALSE) On (TRUE)	Username and password are required for logon. Logon without user name and password
User name (as of system version 8)	Enter text	User name for access to the network drive
Password (as of system version 8)	Enter text	Password for access to the network drive
Additional mount options	Enter text	Additional options for mounting the drive under Linux The options are to be entered separated by commas. Example (public drive, SMB/CIFS in version 1.0): guest,user=,vers=1.0



NOTE!

As of system version 7, access to the file system on USB storage media via CODESYS is also supported.

5 Configuration

5.5 Ethernet

LAN1

Parameter	Selection/data input	Description
Method		Method for assigning the IP address
	Manual	The IP address must be assigned manually.
	Automatic	The IP address is obtained from a DHCP server.
IP address	0.0.0.0 to 255.255.255.255	Manually assigned IP address The IP address may need to be requested from the administrator in question.
Subnet mask	0.0.0.0 to 255.255.255.255 (255.255.0.0)	Subnet mask if the IP address is manually assigned The structure of the subnet mask may need to be requested from the responsible administrator.
Standard gateway	0.0.0.0 to 255.255.255.255	IP address of the standard gateway (router) if the IP address is manually assigned The IP address of the standard gateway may need to be requested from the administrator in question.
DNS server IP		Obtain DNS server IP automatically
	Off (FALSE)	The IP address must be assigned manually (see below).
	On (TRUE)	The IP address is obtained automatically.
DNS server	0.0.0.0 to 255.255.255.255	Manually assigned IP address of the DNS server The IP address may need to be requested from the administrator in question.

LANx

Additional (optional) LAN interfaces may be provided depending on the device. The setting options are identical to those for LAN1.

5.6 Port configuration

Parameter	Selection/data input	Description
PROFINET port		Select which Ethernet interface (LANx, device dependent) is to be used as PROFINET port.
	No port	None of the existing Ethernet interfaces is used as PROFINET port.
	LANx	The respective Ethernet interface is used as PROFINET port

5.7 System user interface

These settings concern the integrated TFT screen (touch panel).

General information

Parameter	Selection/data input	Description
Boot logo	The currently used graphic file is displayed. The following functions are available in the setup program:	Boot logo graphic file (static or animated graphic) Supported graphic types: .svg, .jpg, .jpeg, .png, .gif The size of the graphic should correspond to the resolution of the screen. Otherwise, static graphics may be distorted and animated graphics may be jerky.
	Import file	Imports a graphic file from an external directory.
	Remove imported file	Deletes the current graphic file.
	Display file	Displays the current graphic file as an image. An animated graphic is only displayed statically.
	Save imported file externally	Saves the current graphic file in an external directory.

Screen

Parameter	Selection/data input	Description
Screensaver		
Function		Activate screen switch-off
	Off	The function is inactive.
	On	The screen is switched off once the waiting period has elapsed.
Waiting period	10 to 3600 (900)	Waiting period in seconds
Screen brightness		
Brightness	0 to 100 (80)	Brightness in percent
Screen orientation (as of system version 8.2)		
Orientation		Orientation of the display of the screen content
	Landscape format (0°)	Display not rotated (for a screen in landscape format).
	Portrait format (90°)	Display rotated 90° clockwise (for a screen rotated 90° to the left).
	Inverse portrait format (270°)	Display rotated 270° clockwise (for a screen rotated 90° to the right)

5.8 Web server

Parameter	Selection/data input	Description
HTTP		The web server can always be reached via HTTPS; HTTP can be activated in addition.
	Active	HTTP is active in addition to HTTPS.
	Inactive	HTTP is not active.
	Redirect to HTTPS	HTTP is active, but there is an immediate redirect to HTTPS.

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Parameter	Selection/data input	Description
HTTP port number	0 to 65535 (8090)	Port number for HTTP
HTTPS port number	0 to 65535 (8443)	Port number for HTTPS

5.9 Email

Parameter	Selection/data input	Description
SMTP server	Enter address (smtp.example.de)	Address (URL) of the email server for SMTP
Port	0 to 65535 (25)	Port number of the email server for SMTP The port number is dependent on the email provider and the type of encryption (usually: TLS = 465, StartTLS = 587).
User account	Enter designation (user@example.de)	Designation of the user account (user name) for logging on to the email server
Authentication		Authentication at logon to email server
	None	No authentication
	Password	Authentication using password
Password	Enter password	Password for authentication
Encryption		Type of encryption between email client and email server (depending on the email provider)
	None	Unencrypted transfer
	StartTLS	TLS where the connection is unencrypted to begin with (encryption takes place while the connection is being established)
	SSL/TLS	Transport Layer Security
Check certificates		Check SSL/TLS certificates
	No	No check
	Yes	Certificates are checked.
Sender	Enter designation (device@example.de)	Email address as sender address

5 Configuration

5.10 PLC configuration

5.10.1 Units

These settings are relevant for the automatic conversion performed when the temperature unit is changed (°C/°F) (relates only to the PLC application).

Parameter	Selection/data input	Description
Setting for absolute temperature		Unit for temperature value
	°C	Deg. Celsius
	°F	Deg. Fahrenheit
	K	Kelvin
Setting for relative temperature		Unit for temperature difference
	°C	Deg. Celsius
	°F	Deg. Fahrenheit
	K	Kelvin

5.10.2 Program generator

Nine independent program generators are available as an optional extra (extra code 225 required), meaning that nine independent programs can run asynchronously at the same time.

General

Parameter	Selection/data input	Description
Name of program generator	Enter text (or use existing text)	Designation of program generator
Function	Inactive	The program generator is switched off.
	Program generator	The program generator is controlled by a program.
	Fixed-setpoint generator	The program generator operates as a fixed-setpoint generator. In this case, the setpoint values for the basic status or manual mode are used.
Program start	Program start	The program starts at the first programmed setpoint value.
	Actual value	The program starts at the point at which the setpoint value corresponds to the current actual value.
	Time	A start time specified for program start is adopted as the start time in a 24 h program. Example: Start time: 06:00:00; 24 h program from 00:00 to 24:00: The program starts at 6 a.m. and runs until midnight.
Response by out of range (O-o-R) (behavior at O-o-R)		Behavior of the program generator if measuring range is exceeded or if there is measuring range underflow (Out-of-Range)
	Continuation	Program continues to run.
	Program stop	The program is stopped.

5 Configuration

Parameter	Selection/data input	Description
Power off		Behavior of the program generator when the power failure is over.
	Abort	The program is aborted; the program generator enters basic status.
	Continuation	The program continues running from the point that it was at when the power failed.
	Standstill	The program is stopped (program generator stays in automatic mode). The program can be continued or aborted by means of operation.
	Continuation at x %	If the difference in the actual value (before and after the power failure) is less than or equal to x %, the program continues running from the point that it was at when the power failed. If this is not the case, the program generator enters standstill.
	Continuation at actual value	The program continues running at the actual value; consideration is given to whether the program profile had a positive or negative slope at the time of the power failure.
Start with time		The program can be started at a specific time (entry of date and time by means of operation).
	No	Immediate program start (e.g., by means of operation or digital signal)
	Yes	Program start at a specific time
Actual-value difference	0 to 100	The maximum admissible difference between the actual value before and after the power failure for the program to continue running.
End signal (s)	0 to 32767	Length of the program end signal
Events (Program start, ...)		Activate the event message for the relevant event.
	Off (FALSE)	No event message
	On (TRUE)	The event is entered in the event list.
Event text	Enter text (or use existing text)	This text is entered into the event list in case of the event.

Names of operating contacts

Parameter	Selection/data input	Description
Name of contact 01 to Name of contact 32	Enter text (or use existing text)	Designation of the operating contact concerned

5 Configuration

Tolerance band monitoring

Parameter	Selection/data input	Description
Alarm type	Inactive	The tolerance band monitoring is not active.
	Event	The tolerance band violation is entered as an event in the event list.
	Alarm	The tolerance band violation is entered as an alarm in the event list and the alarm list.
Alarm at level	High	Alarm at high level (1 = actual value outside the tolerance band)
	Low	Alarm at low level (0 = actual value within the tolerance band)
Event text	Enter text (or use existing text)	This text is entered in the relevant list in the event of a violation of the tolerance band.
Hold when tolerance band is exceeded		If the tolerance band is violated, the program can be stopped until the condition is over.
	Yes	The program is stopped.
	No	The program is not stopped.

Setting of setpoint values: setpoint specification

Parameter	Selection/data input	Description
Setpoint value 01 to Setpoint value 30		Specification of whether a change made to the setpoint value should take the form of a step or a ramp.
	Setpoint step	Setpoint value change as step
	Setpoint ramp	Setpoint value change as ramp
	End value for setp. ramp 1 to End value for setp. ramp 10	The relevant setpoint value acts as the end value for the ramp function of the setpoint value (1 to 10) which is selected here. If there is no end value specified in a program section, then the program generator works in accordance with its configuration (setpoint step or setpoint ramp).

Setting of setpoint values: setpoint limits

Parameter	Selection/data input	Description
Decimal places	Auto	The number of decimal places is selected automatically.
	XXXXXp	No decimal place
	XXXXpX	One decimal place
	XXXpXX	Two decimal places
	XXpXXX	Three decimal places
	XpXXXX	Four decimal places
Lower tolerance band limit (tol. band lower limit)		
Minimum	-99999 to 99999	Admissible minimum value for the lower tolerance band limit
Maximum	-99999 to 99999	Admissible maximum value for the lower tolerance band limit

5 Configuration

Parameter	Selection/data input	Description
Upper tolerance band limit (tol. band upper limit)		
Minimum	- 99999 to 99999	Admissible minimum value for the upper tolerance band limit
Maximum	-99999 to 99999	Admissible maximum value for the upper tolerance band limit
Setpoint value 01 to Setpoint value 30		
Designation (name)	Enter text (or use existing text)	Designation of the setpoint value
Minimum	- 99999 to 99999	Admissible minimum setpoint value
Maximum	-99999 to 99999	Admissible maximum setpoint value

Setting of setpoint values: setpoint values for manual mode

Parameter	Selection/data input	Description
Lower tolerance value (tol. min)	- 99999 to 99999	Lower value of the tolerance band
Upper tolerance value (tol. max)	-99999 to 99999	Upper value of the tolerance band
Setpoint value 01 to Setpoint value 30	-99999 to 99999 (0)	Value of the setpoint value concerned
Contact 01 to Contact 32		Position of the operating contact concerned
	Off (FALSE)	Contact not active
	On (TRUE)	Contact active

Setting of setpoint values: setpoint values for basic status

Parameter	Selection/data input	Description
Lower tolerance value (tol. min)	- 99999 to 99999	Lower value of the tolerance band
Upper tolerance value (tol. max)	-99999 to 99999	Upper value of the tolerance band
Setpoint value 01 to Setpoint value 30	-99999 to 99999 (0)	Value of the setpoint value concerned
Contact 01 to Contact 32		Position of the operating contact concerned
	Off (FALSE)	Contact not active
	On (TRUE)	Contact active

5 Configuration

Setting of setpoint values: setpoint value units

Parameter	Selection/data input	Description
Setpoint value 01 unit to Setpoint value 30 unit		Unit of the setpoint value concerned
	No unit	
	Absolute temperature	Temperature value
	Relative temperature	Temperature difference
	Relative humidity	Relative humidity
	Ratio	Ratio of two values A and B (A / B) in percent
	Hours	Hours
	Minutes	Minutes
Seconds	Seconds	

5.10.3 Analog variables

These settings affect the use of the analog variables (analog PLC outputs) for functions that have been implemented in the device firmware (e.g. data recording).

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Name of the variable concerned
Unit	Select signal type and unit from the list (drop-down menu)	Signal type and unit of the variable concerned
Display start	-99999 to 99999 (0)	Lower limit of display range
Display end	-99999 to 99999 (100)	Upper limit of display range

5.10.4 Digital variables

These settings affect the use of the digital variables (digital PLC outputs) for functions that have been implemented in the device firmware (e.g. data recording).

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Name of the variable concerned

5.11 PLC parameters

The configuration structures that were individually created using the CPV Editor (CPVE) are displayed here.

This configuration data can be used in the setup program, in the web application, and in the CODESYS application.



NOTE!

The CPV Editor requires specific knowledge and is intended for use by the manufacturer only (service that is subject to a fee).

5.12 Programs

Each program (each program plan) can consist of a maximum of 200 program sections. Up to 30 setpoint values and up to 32 operating contacts can be used in each program section.

Tolerance band monitoring can be set up for the first setpoint value. This means that the relevant actual value is monitored; if it leaves the tolerance band, the program is stopped until it returns to a value that is within the tolerance band (depending on configuration).

A total of up to 300 programs can be managed in a program pool.

A program generator is required to execute a program. A program can also be assigned multiple program generators.

Program header

Parameter	Selection/data input	Description
Program GUID	Enter ID (0)	ID for uniquely identifying the program (length: 64 bits)
Program name	Enter text (or use existing text)	Designation of the program
Program information	Enter text (or use existing text)	Description of the program
Pictogram name	Select pictogram	Pictogram (icon) for graphical identification marking of the program
Favorite		Programs marked as favorites are placed at the start of the program start menu. If there is more than one favorite, the program number is the decisive criterion (in ascending order).
	No	Program is not a favorite
	Yes	Program is a favorite
Repetitions		Cyclic program repetition
	Inactive	The program is not repeated (only one program run).
	Endless	The program is repeated endlessly.
	Number	The program is repeated as many times as is specified by the parameter "Number of repetitions".
Program assignment (allocation)	-9223372036854775808 to 9223372036854775807 (0)	Number (length: 64 bits) for assigning a program to a plant or a group. This number can be used in the customer-specific application to group similar programs.
Number of repetitions	0 to 99999	Number of program repetitions
Assignment (allocation)		Selection of program generators to be used to execute the program.
	Off (FALSE)	Program generator not selected
	On (TRUE)	Program generator selected

5 Configuration

Program channel

Parameter	Selection/data input	Description
Number of sections	0 to 200	Number of program sections that the program generator is to process.
Program section 1 to Program section 200		
Process step (procedural step) (available as of system version x)	0 to 200	The process step specifies the limits of the section time and defines which setpoint values are available.
Section time (hh:mm:ss)	00:00:00 to 99:59:59	Duration of program section As from system version x: The section time must be within the limits specified by the process step.
RS (Repeat section) Start section	1 to 200	Number of the program section that is to be repeated together with the following sections.
NoC (Number of cycles) Number of cycles	0 to 999	Number of repetitions of a program section (or multiple linked program sections)
Setpoint value 01 to Setpoint value 30	-1000000 to 1000000 The limits depend on the admissible minimum and maximum setpoint values of the program generator.	Setpoint values in the program section As from system version x: Only the setpoint values approved in the process step can be used.
Tol high	-1000000 to 1000000 (0) The limits depend on the admissible minimum and maximum upper limit of the tolerance band for the program generator.	Upper limit value for tolerance band monitoring of setpoint value 01
Tol low	-1000000 to 1000000 (0) The limits depend on the admissible minimum and maximum lower limit of the tolerance band for the program generator.	Lower limit value for tolerance band monitoring of setpoint value 01
Operating contact 01 to		Operating contacts in the program section
Operating contact 32	Off (FALSE) On (TRUE)	Operating contact is not active. Operating contact is active.

5.13 Real-time processing

5.13.1 Data recording

The process values (analog and digital signals) to be recorded are selected here (available as of system version 6). The process values are organized in groups as analog or digital channels. The input signals of the channels are selected from a selector.

Grouping of signals (channels) allows the user, for example, to create a separate group for each plant or to record signals with different memory cycle.

The maximum number of channels (analog and digital) that can be recorded depends on the device (variTRON 300: 60 channels; variTRON 500 and variTRON 500 touch: 240 channels). However, the number of licensed channels is decisive for the evaluation of the recorded data (fee-based licenses for JUMO smartWARE Evaluation).



NOTE!

The user must ensure that the maximum number channels is not exceeded (60 or 240). The sum of analog and digital channels of all groups is decisive for this.

If the maximum number of channels is exceeded during the configuration of a group, this results in the complete group not being recorded. In case of configuration with the Web Cockpit, a fault message is immediately entered into the event list.



NOTE!

The process values are only temporarily stored in the central processing unit to bridge network failures before these values are transferred to the Datastore for storage. The Datastore is part of the JUMO smartWARE Evaluation software. A visualization using only the central processing unit is not possible.

Parameter

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of the group The designation is displayed in the visualization (JUMO smartWARE Evaluation).
Recording (as of system version 8)	Normal	Amount of data stored in one memory cycle Additional data is stored for the current measured value (minimum value, maximum value, average value).
	Compact	Only the current measured value is stored.

Analog channels

Parameter	Selection/data input	Description
Input signal	Select signal from selector	Analog signal System version 5: Analog PLC outputs (analog values 001 to 120) As of system version 6: Additional analog signals available (values of the system monitoring, process values of the modules).
As of system version 6:		
Designation	Enter text (or use existing text)	Designation of the signal

5 Configuration

Parameter	Selection/data input	Description
Replace designation	Inactive Active	If active: Data evaluation: The original designation is replaced by the designation used here.
Start of display range	-99999 to 99999 (0) As of system version 7: -1.7e+307 to 1.7e+307	Lower limit of display range
End of display range	-99999 to 99999 (100) As of system version 7: -1.7e+307 to 1.7e+307	Upper limit of display range
Unit (only with system version 6)	Select unit (No unit)	Value unit As of system version 7, the unit of the input signal is used.
Replace display parameters	Inactive Active	If active: Data evaluation: The original display parameters are replaced by the display parameters used here.
As of system version 7:		
Scaling type		Scaling of the y-axis
	Linear	Linear
	Logarithmic	Logarithmic

Digital channels

Parameter	Selection/data input	Description
Input signal	Select signal from selector	Digital signal (binary signal) System version 5: Digital PLC outputs (binary values 001 to 120) or signal from the event list (central detector: active after each new alarm, inactive after acknowledgement). As of system version 6: Additional digital signals available (process values of the modules).
As of system version 6:		
Designation	Enter text (or use existing text)	Designation of the signal
Replace designation	Inactive Active	If active: Data evaluation: The original designation is replaced by the designation used here.

Standard operation

Parameter	Selection/data input	Description
Memory status		Activation of data recording
	On	The data is recorded at the configured interval
	Off	Data recording is not active.
Memory rate [hh:mm:ss]	00:00:01 to 24:00:00 (00:00:05)	Recording interval Time interval at which the values of the analog and digital signals of the group are stored for evaluation.

Event operation

This function is available as of system version 7.

Event operation has the highest priority of all three operating modes.

Parameter	Selection/data input	Description
Control signal	Select signal from selector	Digital signal (binary signal) that starts (high active) and stops event operation.
Post-trigger time [s]	0 to 10 (0)	Extends event operation after the control signal has been deactivated.
Memory rate [hh:mm:ss]	00:00:01 to 24:00:00 (00:00:01)	Recording interval Time interval at which the values of the analog and digital signals of the group are stored for evaluation.

Time operation

This function is available as of system version 7.

Time operation has higher priority compared with standard operation, but lower priority than event operation.

Parameter	Selection/data input	Description
Start [hh:mm:ss]	00:00:00 to 23:59:59 (00:00:00)	Time at which the time operation is started. Start = End: Time operation is not active.
End [hh:mm:ss]	00:00:00 to 23:59:59 (00:00:00)	Time at which the time operation ends.
Memory rate [hh:mm:ss]	00:00:01 to 24:00:00 (00:00:01)	Recording interval Time interval at which the values of the analog and digital signals of the group are stored for evaluation.

Recorded values

The following values are determined within a recording interval:

- Current value (current value at the end of the interval)
- Measured value status (status of the current value according to NAMUR NE107)
- Minimum value (for digital signal: number of low values (logical 0))
- Maximum value (for digital signal: number of high values (logical 1))
- Average value (for digital signal: number of high values in relation to the number of low values)
- Number of values with measuring range underflow
- Number of values with measuring range overflow
- Number of valid value
- Number of invalid values

5 Configuration

5.14 Datastore gateway

Here the connection to the database (Datastore) is configured and activated (available as of system version 6). In the Datastore, the recorded process data is stored. The data is then available for evaluation with JUMO smartWARE Evaluation (as of system version 6).

Parameter	Selection/data input	Description
Data export		Export of the recorded process data
	Inactive	The function is switched off.
	Active	The function is active. The data is transferred to the datastore at the set time interval (period).
Datastore URL	Enter URL (<host>/store)	URL of the Datastore The URL is usually entered as follows (without "http://"): <Host name>/store <IP address>/store In special cases, the complete path can also be used. Example: http://<Host name>/store/v1/rawdata/store
Period [hh:mm:ss]	00:01:00 to 24:00:00 (00:15:00)	Interval at which the recorded data is transferred to the Datastore.

5.15 Cloud gateway

Here the connection to the JUMO Cloud is configured (available as of system version 4). Before this, the device must be configured as a data source in the JUMO Cloud.

As of system version 8, the connection to a SCADA system is also configured here.

Parameter	Selection/data input	Description
Connection to cloud or SCADA		Activation of the cloud gateway
	Inactive	Gateway is not active.
	Active	Gateway is activated.
Target server		Selection of the destination server
	JUMO Cloud	The JUMO Cloud is used.
	SCADA (individual)	The destination server is determined by an individual URL (JUMO smartWARE SCADA, compatible third-party systems).
SCADA URL for configuration	Enter URL	Individual URL for connecting to a SCADA system (configuration)
SCADA URL for MQTT	Enter URL	Individual URL for connecting to a SCADA system (MQTT broker)
Device ID	Enter device ID	ID used by the device (data source) to authenticate itself to the JUMO Cloud or the SCADA system. The ID is generated in the JUMO Cloud or in the SCADA system and must be entered here.
Ignoring server certificate	Inactive	In the case of HTTPS connections, this parameter must be set to active, as otherwise no connection will be established. Only HTTPS connections to JUMO Cloud are possible.
	Active	
Password	Enter password	Password used by the device (data source) to authenticate itself to the JUMO Cloud or the SCADA system. The password is generated in the JUMO Cloud or in the SCADA system and must be entered here.
Permanent live mode		In permanent live mode, the live data is sent to the JUMO Cloud or the SCADA system each second.
	Inactive	No permanent live mode The transfer of live data together with historical data depends on the configuration in the JUMO Cloud or in the SCADA system.
	Active	The permanent live mode is active.
Sampling rate (polling) [ms]	250 to 25000 (1000)	Sampling rate for data from peripheral devices (Modbus TCP, S7 TCP) The average value for transmitting the historical data is found from the sampled data.



NOTE!

The permanent live mode is usually used during startup; it should be deactivated after startup. This avoids costs that may be incurred for the transmission of the data (e.g. in the mobile network).

5 Configuration

5.16 Wtrans gateway

Settings for using the JUMO Wtrans transmitters are made here (available as of system version 5).

General

Parameter	Selection/data input	Description
Radio frequency		Wtrans radio frequency (MHz)
	868.4	Europe
	912.6 to 917.4	America, Australia, Canada and New Zealand

Wtrans transmitter

These settings are required for each transmitter selected in the Wtrans hardware configuration (Wtrans hardware assistant in the Setup program).

Parameter	Selection/data input	Description
General		
Name	Enter text (or use existing text)	Transmitter designation
Transmitter ID	0 to 99999	ID of the Wtrans transmitter The unique ID set on the transmitter side must also be set here to identify the transmitter.
Radio timeout	2 to 20	Number of radio telegrams not received, which leads to timeout detection. The set transmission interval of the transmitter is transmitted with the radio telegram. When the first telegram is received, this value is saved in the receiver and the radio timeout monitoring function is activated. If no new telegram is received throughout the entire timeout period, the measured value is set to "no input value" and the "Radio timeout" alarm is activated.
Analog processing		
Name (for Wtrans E01; as of system version 6)	Enter text (or use existing text)	Designation of measured value
Factor	-99999 to 99999 (1)	Factor for correction of the measured value
Offset	-99999 to 99999 (0)	Offset value for correction of the measured value
Linearization	Select linearization from selector (customer-specific linearization: formula or grid points)	Linearization for the measured value Configuration of linearization: Configuration > Device manager > Customer-specific linearization



NOTE!

Wtrans B (707060) with thermocouple: With system version 5, only types J, K, and B are supported. With system version 6, all types except MoRe5-MoRe41 and W3Re-W26Re are supported.

5.17 Node-RED

The Node-RED graphical programming tool is present by default, but must be activated before use.

Parameter	Selection/data input	Description
Graphical programming tool Node-RED		Activation of Node-RED in the central processing unit
	Inactive	Node-RED is not active.
	Active	Node-RED is active and can be used with a web browser. To start Node-RED, the IP address of the central processing unit and the port number 1880 must be entered: http://<IP address>:1880

5 Configuration

5.18 Batches

Batch logging is configured here (available as of system version 6).

The batch data is displayed together with the channels of the assigned groups and the event messages in the batch visualizations (evaluation with JUMO smartWARE Evaluation).

The maximum number of batches that can be recorded depends on the device (variTRON 300: 10 batches; variTRON 500 and variTRON 500 touch: 20 batches). However, the number of licensed batches is decisive for the evaluation of the recorded batches (fee-based licenses for JUMO smartWARE Evaluation).



NOTE!

If no group has been assigned to the batch (or none of the assigned groups is active), only event messages are recorded.



NOTE!

With the variTRON 300, the user must ensure that the maximum number of 10 batches is not exceeded. If the maximum number of batches is exceeded during configuration, this will result in the batch in question not being recorded. In case of configuration with the Web Cockpit, a fault message is immediately entered into the event list.



NOTE!

The configuration must not be changed during an ongoing batch reporting process. Otherwise, there is a risk that the batch documentation will become unusable.

General information

Parameter	Selection/data input	Description
Batch active	Off (FALSE)	Batch reporting is not active.
	On (TRUE)	Batch reporting is active and can be started.
Batch application (batch name)	Enter text (or use existing text)	Assignment or designation of the batch
Control signal	Select signal from selector	Signal that is used to start (high active) and stop batch reporting.
Response to power interruption (behavior after power interruption)	Continuation	Batch reporting is continued.
	Abort	Batch reporting is stopped. The batch is completed with the last recorded data (before the power failure).
Group allocation	Select group from selector	Group that is assigned to the batch. All groups can be assigned to one batch.

Batch lines

For each batch, up to 10 lines can be defined for the batch report.

Parameter	Selection/data input	Description
ID	Enter text (or use existing text)	Designation (ID) of the relevant line of the batch report (e.g. for use in the PLC application) The identifier must be unique within a batch.

5 Configuration

Parameter	Selection/data input	Description
Text left column	Enter text (or use existing text)	Text in the left column of the batch report. The left column contains the designation for the content of the right column.
Contents of right column		Text or text source for the right line of the batch report
	Empty	No text
	Default text	Text from the "Default text" parameter
	Batch name	The batch name is used (see "General" section).
	Batch number	The batch number is used together with the text from "Default text". The batch number is incremented at the end of batch reporting.
	Batch start	Start (date and time) of batch reporting
	Batch end	End (date and time) of batch reporting
Delete line	Batch duration	Duration of batch reporting (time difference between batch start and batch end)
		Only for "Default text": The parameter decides whether a text edited during batch reporting is replaced again by the text specified in the configuration after the batch has been completed.
	Off (FALSE)	Text changes are retained.
	On (TRUE)	The original text (default text) is used for the next batch reporting.
Default text	Enter text (or use existing text)	The text is used in the batch report if the text in the right column is composed of "Default text" or "Batch number".
Editable		This parameter enables editing of the text within the current batch report.
	Off (FALSE)	The text in the right column can only be edited by changing the "Default text".
	On (TRUE)	The text in the right column can be changed - for the current batch report. Depending on the "Delete line" parameter, the configured text can be automatically reactivated after the batch is completed.

Batch number

Parameter	Selection/data input	Description
Batch number offset	0 to 2147483647	The automatic batch numbering starts with the offset value.

5 Configuration

By means of a summary list, this chapter describes the basic procedure to be followed when initially starting up the automation system. This list is intended to enable experienced users to get started quickly.

Requirements

- The work required to mount the entire system – comprising the CPU (also referred to as the "device" here) and the connected modules – and establish its electrical connections is complete (incl. establishing the network connection via the Ethernet interface).
- The network includes a DHCP server from which the CPU obtains its IP address (otherwise this address must be assigned manually; see "Configuration > Ethernet").
- The setup program has been installed and started on a PC that is also connected to the network.

Procedure

1. Switch on the voltage supply.
 - a) Wait until the boot process is complete and the start screen is displayed.
 - b) Open the device menu and check the system status of the central processing unit.
Once the system has started up, "Run" is displayed.
 - c) Identify the IP address of the relevant interface in the device menu (Device info > Ethernet).
2. Create a new project: Setup program > Projects
 - a) Select project template (central processing unit and version)
 - b) Project management: Assign a project designation and, if necessary, create a description.
 - c) Save the project file, under a different name if necessary.
3. Create the hardware configuration: Setup program > Project > Hardware assistant (for) system bus
 - a) Add the first DIN rail and place the 1-port router module (705043) or 3-port router module (705042) as the first module on the DIN rail.
 - b) Place the modules in the correct order on the DIN rail (change the module designation if necessary).
 - c) If necessary, select the hardware for the module's expansion slots.
 - d) Establish connection between central processing unit and router module.
 - e) If necessary, add another DIN rail and place the 1-port router module (705043) or the 3-port router module (705042) as the first module on the DIN rail.
 - f) If necessary, establish the connection between the router modules.
4. If necessary, create Wtrans hardware configuration: Setup program > Project > HW assistant (for) Wtrans.
 - a) Select Wtrans transmitter(s)
5. Configure the connection to the CPU: Setup program > Connections
 - a) Enter the CPU's IP address under "Host address".
 - b) If necessary, enter the designation and description.
 - c) Use the user "Master" available per default.
 - d) Use port 8443 (if the connection is secure).
6. Transfer the project (hardware configuration only) to the CPU: Setup program > Project > Data transfer
 - a) Select the connection that was previously configured.
 - b) Establish the connection ("Connect..."), and enter the default password 9200 when doing so.
 - c) Send the configuration to the CPU ("Send to device").
 - d) Check the status LED of all modules.
The LED will light up steady green as soon as the system bus has the status "Operational".
7. Configure the modules: Setup program > Project > Configuration > Bus

6 Startup

- a) Configure the digital and analog inputs and outputs.
 - b) If necessary, configure the controller function of the controller module (incl. controller parameters).
 - c) If necessary, configure other functions (e.g., limit value monitoring function, setpoint values).
 - d) If necessary, configure the CPU (e.g. if setpoint value programs are being used):
 - Configure the program generator (Configuration > PLC configuration)
 - Create the program (Configuration > Programs)
8. If necessary, configure Wtrans transmitter(s): Setup program > Project > Configuration > Wtrans gateway
- a) Select radio frequency.
 - b) Set transmitter ID and value for radio timeout.
 - c) If necessary, set parameters for processing the transmitted measured value (factor, offset, linearization).
9. Optional: Create the CODESYS application: Setup program > Configuration > PLC application
- a) Select and apply the appropriate CODESYS version.
 - b) Start CODESYS.
 - c) Create the CODESYS application.
10. Optional: Use existing CODESYS application
Download at: qr-705004-en.jumo.info
- a) Either: Download Visu Template
 - b) Or: Download Process Technology template (as of system version x)
11. Optional: Setting up data recording without using CODESYS
- a) Setup program > System bus hardware assistant
 - Change module designation if necessary.
 - b) Setup program > Configuration > Real time processing > Data recording > Modules > Groups > Group x
 - Assign a meaningful designation for the group.
 - Assign input signals (process values) to the analog and digital channels.
 - Set memory status and memory rate (memory cycle).
 - c) Setup program > Configuration > Datastore gateway > Datastore interface
 - Configure and activate connection to the database (datastore) (condition for data recording).
12. Optional: Setting up data recording using CODESYS
- a) Setup program > System bus hardware assistant
 - Note the module label.
 - b) Setup program > Configuration > Real time processing > Data recording > Modules > Groups > Group x
 - Assign a meaningful designation for the group.
 - Assign input signals (process values; in system version 5 only PLC outputs) to the analog and digital channels.
 - Set memory status and memory rate (memory cycle).
 - c) CODESYS application: Connecting (mapping) input signals of the modules with PLC outputs
 - I/O image of the module: Assign the input signal (channel) to a self-created variable.
 - I/O image of the PLC manager: Assign the PLC output (channel) to another self-created variable.
 - Link both variables together in the PLC program (PLC_PRG).
 - If necessary, create a table for documentation, which contains the linked signals (input signal > PLC output).

- d) Setup program > Configuration > Datastore gateway > Datastore interface
 - Configure and activate connection to the database (datastore) (condition for data recording).
- 13. After creating the CODESYS application, transfer it to the setup project and close CODESYS if applicable.
- 14. Transfer the project to the CPU: Setup program > Project > Data transfer
 - a) Send the configuration (incl. CODESYS application) to the CPU ("Send to device").



NOTE!

For debugging in the CODESYS application, it is possible to connect "online" to the PLC. In this way, for example, the states of variables can be checked or values can be changed without stopping the application. Before CODESYS is started from the setup program, the option "Start to debug" must be activated. After that, the connection with the PLC can be established in the CODESYS programming environment.

If the CODESYS application is changed while the PLC is running, the "Login with online change" option must be selected in the CODESYS programming environment during transfer. If the change is to be retained in the CPU during power off, the "Update boot application" option must also be activated.



NOTE!

Certain changes made to the configuration (e.g., changes to the hardware configuration) will cause the CPU to restart.

Further information

The JUMO Help Center provides further information, especially on the following topics:

- JUMO Cloud
- JUMO smartWARE SCADA
- JUMO smartWARE Evaluation (as of system version 6)
- JUMO smartWARE Program (JUMO variTRON 500 as of system version 7, JUMO variTRON 500 touch as of system version x)

<https://www.helpcenter-jumo.net>

7.1 User rights

The information in this chapter applies to system version 8 and higher.

User

The following users are created per default:

User name	Password	Assigned role
Master	9200	<ul style="list-style-type: none"> AdministratorRole CodesysUiRole LcdUiRole TftUiRole WebUiRole
User1	1	<ul style="list-style-type: none"> UserRole CodesysUiRole LcdUiRole TftUiRole WebUiRole
Service	9200	<ul style="list-style-type: none"> ServiceDisplayRole CodesysUiRole LcdUiRole TftUiRole WebUiRole
UnregisteredUser This user must not be deleted!		<ul style="list-style-type: none"> ReadOnlyRole

A user can be edited, and it can also be removed. Likewise, the user's password can also be changed. The function  is used to create a new user.



NOTE!

Due to the restricted possibilities for displaying and entering data on the device display, users with the right "SystemStatusUi" can only be assigned simple passwords. To prevent these passwords from being cracked via the web application, these users must not also be given the right "WebUi".

Roles

The following roles are defined per default:

- AdministratorRole
- UserRole
- ReadOnlyRole (do not delete this role)
- ServiceDisplayRole
- LcdUiRole (formerly: SystemStatusUi; do not delete this role)
- TftUiRole (formerly: SystemUi); do not delete this role)
- WebUiRole (do not delete this role)
- CodesysUiRole (do not delete this role)

The following tables show the roles defined per default and the rights they confer (= X):

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AdministratorRole	UserRole	ReadOnlyRole	ServiceDisplayRole	LcdUIRole	TftUIRole	WebUIRole	CodesysUIRole	Right	Description
X	X							AlarmAcknowledgement	Acknowledge alarm
X			X					BusControl	Change the system bus status (Stop, Start, Reset statistics)
X								CertificateAdministration	Manage certificate
X	X	X	X					ConfigurationRead	Read configuration This right is a prerequisite for the assignment of a special configuration right.
X	X	X	X					ConfigurationWrite	Write configuration This right is a prerequisite for the assignment of a special configuration right.
X	(X)	(X)	(X)					x.Configuration.Read	Read special configuration The special configuration rights are listed in the table below.
X	(X)	(X)	(X)					x.Configuration.Write	Write special configuration The special configuration rights are listed in the table below.
X								DebugDataDelete	Delete debug data
X	X	X	X					DebugDataRead	Read debug data
X			X					DebugInterfaceActivation	Activate SSH interface (only possible on the device)
X	X	X	X					DeviceInformationRead	Read device information
X								EventlistDelete	Delete event list
X	X							EventlistRead	Read event list
X			X					FirmwareUpdate	Perform a firmware update
X								RecorderAdministration	Delete data base
X			X					SystemStateControl	Change the system status
X								UserManagement	Manage users
				X				SystemStatusUi	Visibility of the user in the device display (only for variTRON 300 and 500) When assigning this right, take into account the restricted possibilities for displaying and entering data on the device display (user name, password).
					X			SystemUi	Visibility of the user in the device display (only for variTRON 500 touch)
						X		WebUi	Logon in the "JUMO Web Cockpit" web application
							X	CodesysUi	Visibility of the user in the CODESYS UI

Special configuration rights:

AdministratorRole	UserRole	ReadOnlyRole	ServiceDisplayRole	Right	Description
X				AccessControlManager.Configuration.Read	Read settings for users, roles and rights
X				AccessControlManager.Configuration.Write	Write settings for users, roles and rights
X	X	X		BatchManager.Configuration.Read	Read settings for batch control
X	X	X		BatchManager.Configuration.Write	Write settings for batch control
X				CertificateHandler.Configuration.Read	Read settings for certificate management (e.g., for Node-RED, HTTPS)
X			X	CertificateHandler.Configuration.Write	Write settings for certificate management (e.g., for Node-RED, HTTPS)
X				CloudGatewayBackend.Configuration.Read	Read settings for connection to JUMO Cloud
X				CloudGatewayBackend.Configuration.Write	Write settings for connection to JUMO Cloud
X	X		X	ConfigurationDataManager.Configuration.Read	Export configuration (e.g. to USB flash drive) or read out in Web Cockpit
X			X	ConfigurationDataManager.Configuration.Write	Import configuration (e.g. from USB flash drive) or import in Web Cockpit
X				DataBaseManagement.Configuration.Read	Read settings for datastore gateway
X				DataBaseManagement.Configuration.Write	Write settings for datastore gateway
X			X	DebugDataManager.Configuration.Read	Read settings for debug data (texts only)
X			X	DebugDataManager.Configuration.Write	Write settings for debug data (texts only)
X	X	X	X	DeviceManager.Configuration.Read	Read settings for device manager
X	X		X	DeviceManager.Configuration.Write	Write settings for device manager
X	X	X	X	DeviceManager.UnitManagerConfiguration.Read	Read settings for units
X	X		X	DeviceManager.UnitManagerConfiguration.Write	Write settings for units
X				EmailManager.Configuration.Read	Read settings for email sending
X				EmailManager.Configuration.Write	Write settings for email sending
X				EtherCatGateway.Configuration.Read	Read settings for system bus
X				EtherCatGateway.Configuration.Write	Write settings for system bus
X				EventlistHandler.Configuration.Read	Read settings for events (texts only)
X				EventlistHandler.Configuration.Write	Write settings for events (texts only)
X				LicenceManager.Configuration.Read	Read settings for licenses (texts only)
X				LicenceManager.Configuration.Write	Write settings for licenses (texts only)
X				NodeRedBackend.Configuration.Read	Read settings for Node-RED
X				NodeRedBackend.Configuration.Write	Write settings for Node-RED
X	X	X	X	PeripheryManager.Configuration.Read	Read settings for Ethernet
X			X	PeripheryManager.Configuration.Write	Write settings for Ethernet
X	X	X	X	PeripheryManager.PortManagement.Read	Read settings for Ethernet port management
X			X	PeripheryManager.PortManagement.Write	Write settings for Ethernet port management

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AdministratorRole	UserRole	ReadOnlyRole	ServiceDisplayRole	Right	Description
X				RealTimeScheduler.Configuration.Read	Read settings for real-time processing (e.g. groups)
X				RealTimeScheduler.Configuration.Write	Write settings for real-time processing (e.g. groups)
X				SpsConfigurationManager.Codesys.Read	Read CODESYS application
X				SpsConfigurationManager.Codesys.Write	Write CODESYS application
X				SpsConfigurationManager.Configuration.Read	Read settings for PLC configuration
X				SpsConfigurationManager.Configuration.Write	Write settings for PLC configuration
X				SpsConfigurationManager.Parameter.Read	Read application-specific PLC settings 1 (PLC parameters)
X				SpsConfigurationManager.Parameter.Write	Write application-specific PLC settings 1 (PLC parameters)
X				SpsConfigurationManager.Parameter2.Read	Read application-specific PLC settings 2 (PLC parameters 2)
X				SpsConfigurationManager.Parameter2.Write	Write application-specific PLC settings 2 (PLC parameters 2)
X				SpsConfigurationManager.Parameter3.Read	Read application-specific PLC settings 3 (PLC parameters 3)
X				SpsConfigurationManager.Parameter3.Write	Write application-specific PLC settings 3 (PLC parameters 3)
X				SpsConfigurationManager.Parameter4.Read	Read application-specific PLC settings 4 (PLC parameters 4)
X				SpsConfigurationManager.Parameter4.Write	Write application-specific PLC settings 4 (PLC parameters 4)
X	X			SpsConfigurationManager.Programs.Read	Read settings for programs
X	X			SpsConfigurationManager.Programs.Write	Write settings for programs
X				StorageManager.Configuration.Read	Read data carrier management settings (network drives)
X				StorageManager.Configuration.Write	Write data carrier management settings (network drives)
X			X	SystemLogger.Configuration.Read	Read settings for system logger (texts only)
X			X	SystemLogger.Configuration.Write	Write settings for system logger (texts only)
X				SystemObserver.Configuration.Read	Read settings for system monitoring (texts only)
X				SystemObserver.Configuration.Write	Write settings for system monitoring (texts only)
X				SystemStatusManager.Configuration.Read	Read settings for system status manager (texts only)
X				SystemStatusManager.Configuration.Write	Write settings for system status manager (texts only)

AdministratorRole	UserRole	ReadOnlyRole	ServiceDisplayRole	Right	Description
X	X		X	SystemStatusUi.Configuration.Read	Read settings for system state UI (device display); only for devices with LCD display, such as variTRON 300 and 500
X	X		X	SystemStatusUi.Configuration.Write	Write settings for system state UI (device display) (see above)
X		X		SystemUi.Configuration.Read	Read settings for system UI (device screen); only for devices with TFT display, such as variTRON 500 touch
X		X		SystemUi.Configuration.Write	Write settings for system UI (device screen) (see above)
X				SystemUpdateManager.Configuration.Read	Read settings for firmware update (texts only)
X				SystemUpdateManager.Configuration.Write	Write settings for firmware update (texts only)
X				WTransGateway.Configuration.Read	Read settings for Wtrans gateway
X				WTransGateway.Configuration.Write	Write settings for Wtrans gateway
X			X	WebGatewayBackend.Configuration.Read	Read settings for web server
X			X	WebGatewayBackend.Configuration.Write	Write settings for web server

A role can be edited, and it can also be removed.

The function  is used to define a new role

When editing a role, it is also possible to add your own rights (using the "add" function), which can be used in the CODESYS application by means of the "CmpAccessControlManager" library.

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7.2 Technical data

7.2.1 Interfaces

<p>USB host</p> <p>Designation</p> <p>Type</p> <p>Number</p> <p>Device category</p> <p>Application</p> <p>Data rate</p> <p>Max. current</p>	<p>USB</p> <p>A (socket)</p> <p>2</p> <p>Mass Storage Class, Communications Device Class – Ethernet Control Module</p> <p>Connecting a USB flash drive or a USB to Ethernet converter</p> <p>Low Speed, Full Speed, Hi-Speed</p> <p>500 mA per interface</p>
<p>Ethernet</p> <p>Designation</p> <p>Type</p> <p>Number</p> <p>Protocol</p> <p>Application</p> <p>Transfer rate</p> <p>Connecting cable</p> <p>Cable length</p>	<p>LAN1, LAN2, LAN3 (optional)</p> <p>RJ45</p> <p>2 (optional: 3)</p> <p>TCP, IPv4, HTTP(S)</p> <p>Via CODESYS as an option: Modbus TCP, PROFINET IO controller/device (device as of system version 8.2), EtherCAT master, OPC UA server, BACnet/IP</p> <p>Communication with:</p> <ul style="list-style-type: none"> - PC (setup program, web browser) - email server - Modbus TCP master/slave - PROFINET IO device/controller - EtherCAT slave - OPC UA client - BACnet/IP server/client - JUMO system bus via JUMO variTRON router modules (LAN1 only) <p>10 Mbit/s, 100 Mbit/s (EtherCAT: 100 Mbit/s)</p> <p>Network cable, at least CAT5e (S/FTP)</p> <p>Up to 100 m</p>
<p>RS485 (serial interface)</p> <p>Designation</p> <p>Type</p> <p>Number</p> <p>Application</p> <p>Protocol</p> <p>Data format</p> <p>Transfer rate</p>	<p>COM</p> <p>Terminal strip 2-pole</p> <p>1</p> <p>Fieldbus applications, communication via modem with a PC or with an email server</p> <p>Via CODESYS: Modbus RTU master/slave</p> <p>8/1/n, 8/1/e, 8/1/o</p> <p>9600 Bd, 19200 Bd, 38400 Bd, 115200 Bd</p>

Wireless interface (optional)	
Antenna connector	SMA socket
Radio frequency	868.4 MHz (Europe) or 915 MHz (USA, Australia, Canada, New Zealand ...)
	In the 915 MHz frequency band (912.6 MHz to 917.4 MHz) one of 10 fixed frequencies can be set.
Open air range	300 m with 868.4 MHz or 200 m with 915 MHz
	Range when using the antenna holder for wall mounting with 3 m long antenna cable; when mounting the antenna directly to the receiver, a reduction in the range must be taken into account.
Required RSSI value for error-free transmission	> -90 (with stationary transmitter)
	The RSSI value is an indicator of the strength of the received signal (theoretical value range: -120 to 0).
Application	Receiver for JUMO Wtrans transmitters (wireless measured value transmission)
Compatible transmitters	Wtrans T (902930), Wtrans B (707060), Wtrans p (402060), Wtrans E01 (902928)
	Not supported thermocouple types with Wtrans B: MoRe5-MoRe41, W3Re-W26Re

7.2.2 Screen

Type	TFT color screen
Touch technology	Capacitive
Screen size (diagonal)	
Types 705004/0, 705004/1	Approx. 17.8 cm (7")
Types 705004/2, 705004/3	Approx. 25.7 cm (10.1")
Resolution	
Types 705004/0, 705004/1	1024 × 600
Types 705004/2, 705004/3	1280 × 800
Number of colors	16.7M
Brightness (luminance)	Typically 400 cd/m ²
Backlight	LED (dimnable in 7 steps)

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7.2.3 Electrical data

Voltage supply Symbol (see nameplate) Connection Voltage Residual ripple	 Removable terminal strip 3-pole with push-in technology (incl. connection for functional ground) DC 24 V +25/-20 % SELV 5 %
Current consumption Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	(at DC 19.2 V) Max. 0.84 A Max. 0.84 A Max. 0.91 A Max. 0.91 A
Power consumption Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	Max. 17.5 W Max. 17.5 W Max. 19.4 W Max. 19.4 W
Conductor cross section (terminals +24V, GND, FE) Wire or stranded wire without ferrule Stranded wire with ferrule 2 × stranded wire with twin ferrule with plastic collar Stripping length	Min. 0.2 mm ² , max. 2.5 mm ² Min. 0.25 mm ² , max. 2.5 mm ² Min. 0.5 mm ² , max. 1.5 mm ² 10 mm
Conductor cross section COM (terminals 1, 2) Wire or stranded wire without ferrule Stranded wire with ferrule Stripping length	Min. 0.14 mm ² , max. 1.5 mm ² Without plastic collar: min. 0.25 mm ² , max. 1.5 mm ² With plastic collar: min. 0.25 mm ² , max. 0.5 mm ² 9 mm
Electrical safety	According to DIN EN 61010-1:2020 Overvoltage category III, pollution degree 2
Protection rating	III
Electromagnetic compatibility Interference emission Interference immunity	According to DIN EN 61326-1:2022 Class A – only for industrial use – Industrial requirement
Radio frequency spectrum 868.4 MHz 915 MHz (912.6 MHz to 917.4 MHz)	According to ETSI EN 300 220-1 and ETSI EN 300 220-2 According to FCC - Title 47 CFR Part 15 and ANSI C63.4
Data backup	Buffered RAM
Buffer battery service life	Typically 6 years (lithium battery CR2032) Observe fault messages on battery status in the event list (battery almost empty, battery empty)!

7.2.4 Housing and environmental conditions

Case type Types 705004/0, 705004/2 Types 705004/1, 705004/3	Housing for installation in panel cut-out (indoor use), horizontal orientation only Plastic housing, display with glass front Plastic housing with stainless steel front (V2A), display with glass front
Front panel (width × height) Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	199.7 mm × 134.7 mm 229 mm × 164 mm 265.1 mm × 180.5 mm 294.4 mm × 209.8 mm
Thickness of the front frame (without seal) Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	8.1 mm 5.5 mm 8.1 mm 5.5 mm
Mounting depth (up to seal) Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	(without DIN rail) 49.6 mm (shallower housing), 58.7 mm (deeper housing) 53.6 mm (shallower housing), 62.7 mm (deeper housing) 49.6 mm (shallower housing), 58.7 mm (deeper housing) 53.6 mm (shallower housing), 62.7 mm (deeper housing)
Panel cut-out (width×height) Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	190.2 mm × 125.2 mm (+ 1 mm) 214 mm × 149 mm (+ 1 mm) 253 mm × 168.4 mm (+ 1 mm) 279.4 mm × 194.8 mm (+ 1 mm)
Panel thickness Types 705004/0, 705004/2 Types 705004/1, 705004/3	Max. 7 mm Max. 8 mm
Weight (fully fitted) Type 705004/0 Type 705004/1 Type 705004/2 Type 705004/3	Approx. 1020 g Approx. 1810 g Approx. 1440 g Approx. 2430 g
Protection type Types 705004/0, 705004/2 Types 705004/1, 705004/3	According to DIN EN 60529 At the front IP65, at the rear IP20 At the front IP69K (high-pressure cleaning > 70 °C only when switched off), at the rear IP20
Ambient temperature range (operation) Types 705004/0, 705004/1 Types 705004/2, 705004/3	-20 to +55 °C -20 to +50 °C
Storage temperature range	-30 to +70 °C
Resistance to climatic conditions Operation Storage	Relative humidity ≤ 90 % annual average, no condensation Climate class 3K22 according to DIN EN 60721-3-3 with extended temperature and humidity range Climate class 1K21 according to DIN EN 60721-3-3 with extended temperature and humidity range

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Site altitude	Up to 2000 m above sea level
Oscillation	According to DIN EN 60068-2-6, table C.2
Amplitude	0.15 mm from 10 to 58.1 Hz
Acceleration	20 m/s ² from 58.1 to 150 Hz
Shock	According to DIN EN 60068-2-27, table A.1
Peak acceleration	150 m/s ²
Shock duration	11 ms
Degree of protection against mechanical loads (shock resistance)	According to DIN EN 50102/A1
Types 705004/1, 705004/3	IK08 (shatterproof)

7.2.5 Approvals and approval marks

c UL us	
Test facility	Underwriters Laboratories
Certificate/certification number	Submitted
Inspection basis	UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)
Valid for	All types without DIN rail on the rear side
NEMA 4X	
Test facility	Keystone Compliance, LLC.
Certificate/certification number	2310-272N
Inspection basis	NEMA 250
Valid for	Variant with stainless steel front

7.3 PLC data

System times

	Typical
Adjustable PLC cycle time (Task) ^a Adjustable task cycles are not limited on the device side. If and where necessary, CODESYS restrictions in this regard must be observed (see documentation for CODESYS).	125 ms (factory setting when creating an IEC task)
System bus cycle time for - Multichannel controller module - Analog input module 4-channel - Analog input module 8-channel - Analog output module 4-channel	30 ms
System bus cycle time ^b for - Relay module 4-channel - Digital input/output module 12-channel - Digital input/output module 32-channel	10 ms
Sampling rate	
- Multichannel controller module ^a	50 ms
- Analog input module 4-channel ^a	50 ms
- Analog input module 8-channel ^a	375 ms
- Analog output module 4-channel ^a	20 ms
- Relay module 4-channel ^b	0 ms
- Digital input/output module 12-channel ^b	0 ms
- Digital input/output module 32-channel ^b	0 ms
Detection of a module failure for - Multichannel controller module - Analog input module 4-channel - Analog input module 8-channel - Analog output module 4-channel	100 to 750 ms
Detection of a module failure for - Relay module 4-channel - Digital input/output module 12-channel - Digital input/output module 32-channel	25 ms

^a Asynchronous with system bus

^b Synchronous with system bus

IEC tasks

Assignment of IEC tasks:

- 0 to 15: RT task
- 6 to 32: Normal priority
- Factory setting: Priority 31

Details are to be found in the CODESYS documentation.



NOTE!

If the device does not have integrated UPS, the IEC tasks are not terminated in a defined manner in the event of a power failure.

The retain data should be backed up by regularly synchronizing the data within a CODESYS application. The required cycle time and, if necessary, additional parameters must also be defined by the user.

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If the device is equipped with an integrated UPS, a bridging time of 1 second is ensured. Of this, a period of 150 ms is available to terminate all IEC tasks in a defined manner. They are then terminated with a hard shutdown. The retain data is then backed up.

The UPS can be integrated as of system version 8.4 and can be determined via the basic type extension 5.

⇒ chapter 1.6 "Identifying the device version", Page 11

Memory for customer-specific PLC programs

The available memory space for customer-specific PLC programs (program code, data, retain data) is dynamic and depends on how much free memory is available in the device.

The free memory is displayed in the system monitoring (Device info > System monitoring > Memory). However, this memory must not be used completely, as the system will then no longer run stably.

7.4 LED displays

The "S" LED (Status) indicates the status of the relevant module (prerequisite: "P" LED lights up).

Display modes

The following table lists all possible states of the "S" LED (module-dependent).

Display mode	Description	Green symbol	Red symbol
---	LED state not relevant	---	---
Off	LED off	○	○
On	LED on (permanently lit)	■	●
Flickering	LED flickers (50 ms on, 50 ms off)	■ ■ ■ ■	● ● ● ●
Single flickering	LED flashes briefly (50 ms on, 200 ms off)	■ □ □ □ □	● ○ ○ ○ ○
Blinking	LED flashes (200 ms on, 200 ms off)	■ □ ■ □ ■	● ○ ● ○ ●
Single flash	LED flashes once (200 ms on, 1000 ms off)	■ □ □	● ○ ○
Double flash	LED flashes twice (on/off/on for 200 ms each time, 1000 ms off)	■ ■ □ □	● ● ○ ○
Triple flash	LED flashes three times (on/off/on/off/on for 200 ms each time, 1000 ms off)	■ ■ ■ □ □	● ● ● ○ ○
Quadruple flash	LED flashes four times (on/off/on/off/on/off/on for 200 ms each time, 1000 ms off)	■ ■ ■ ■ □ □	● ● ● ● ○ ○
Blinking red/green	LED flashes red and green (200 ms red, 200 ms green)	● ■ ● ■	
On green/ Single flickering red	LED lights up green, flashes red (50 ms red)	■ ●	

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System states and errors

The following table lists all the system states and errors that are indicated by the "S" LED (module-dependent).

Category	"S" LED (Status)	Meaning	Diagnosis with	Recommended action
Start error	○	Module error (hardware does not start up)	LED	Replace module
Start error	●	Internal error (bootloader) Various errors during startup (e.g. no memory, initialization error)	LED	Replace module
Start error	●●●●	No firmware	LED	Replace module
Start error	●○●○●	Incorrect optional board 1, 2, 3 (actual/target)	LED	Check optional board and replace, load, or remove as required; replace module if necessary
Bus status	○	No connection to central processing unit	LED	Check whether the central processing unit is running; check cabling and topology
Bus status	○	System in "Stop" (INIT) state – no error, only in start phase	LED	
Bus status	■□■□■	System in "Stop" (PREOP) state – no error, only in start phase	LED	
Operation	●■●■ (Priority 1)	Module not calibrated (LED flashes red-green) or module in calibration mode (calibrate/test; LED flickers red-green)	LED/setup program	
Operation	■● (Priority 2)	Collective alarm (incl. out of range)	LED/setup program	
Operation	■□□ (Priority 3)	System in "Stop" (SAFEOP) state – no error	LED	
Operation	■ (Priority 3)	System in "Run" (OP) state – no error	LED	

The web application (service) and the setup program (hardware configuration) must be used for further diagnosis and, if necessary, measures.

7.5 Buffer battery replacement



CAUTION!

The device contains a buffer battery that is used for data buffering when the device is in switched off mode or if the power fails. The operating life of the battery is typically 6 years. If the battery is low, this is indicated by a fault message in the event list ("Battery almost empty").

Danger of data loss!

- Replace battery in time.

**NOTE!**

The battery can be replaced during operation. The fault message "System battery empty!", which occurs after removing the battery, can be ignored. After inserting a new battery, the battery status should be checked (Device info > System monitoring > Battery status).

**NOTE!**

Only replace the battery with the following battery type (available from the manufacturer of the device):
Battery manufacturer: RENATA
Type: CR2032 MFR
Temperature range: -30 to +85 °C

**WARNING!****Use of an unsuitable battery type**

Risk of fire or explosion!

- ▶ Only replace the battery with the battery type specified above.
-

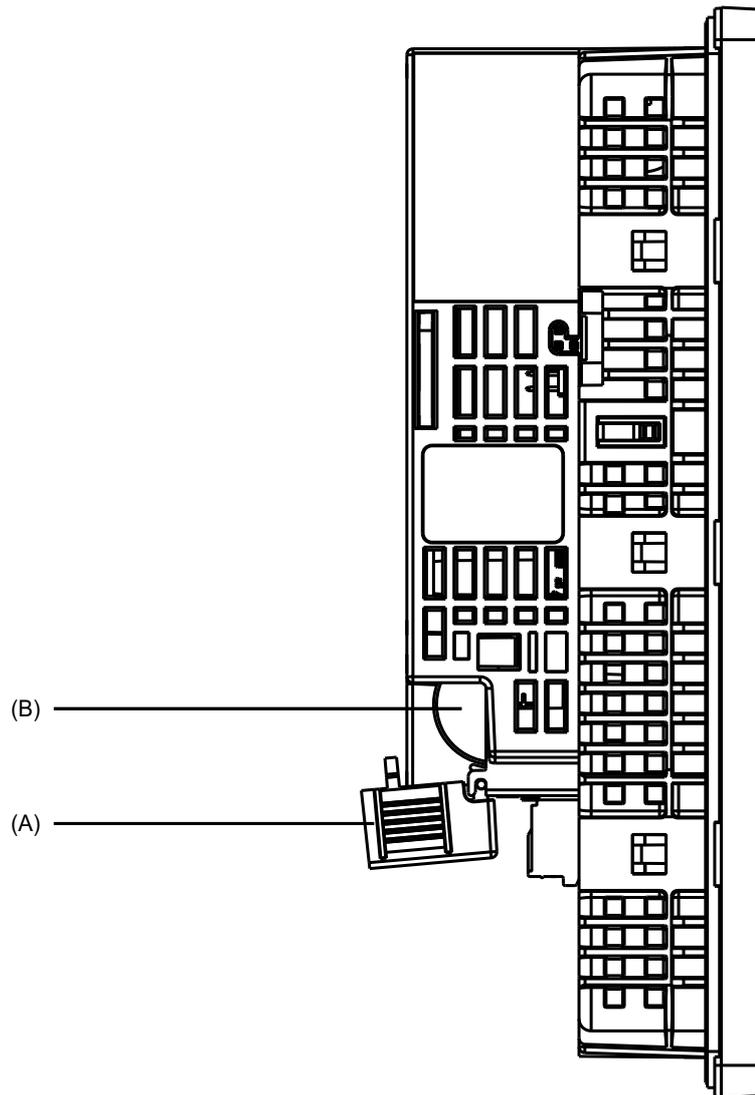
**WARNING!****Improper handling of the battery (lithium button cell)**

Risk of fire or explosion!

- ▶ Do not recharge, disassemble or dispose of the battery in a fire.
-

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Replacing the battery



1. Slightly press in (unlock) the cover (A) of the battery compartment at the grooved surface and swing it down.
2. Remove the old battery (B) from the holder and replace it with a new one of the same type. Pay attention to the correct polarity (marking "-" and "+" on the housing).
3. Swivel the cover (A) of the battery compartment upwards until the locking mechanism engages.

7.6 Cleaning



NOTE!

Before cleaning the screen (touchscreen), make sure that no unintentional operating action is triggered by the cleaning.

Cleaning agent

- Commercially available washing, rinsing and cleaning agents can be used on the front side.
- Use cleaning agents only in diluted form.
- Do not use highly aggressive solvents, chemicals and abrasive cleaners!
Do not use cleaning agents containing chlorine, strong acids or strong bases!
- Clean the back cover only with a dry cloth.

High-pressure cleaning

- High-pressure cleaning is only permitted for devices with IP69K front protection type (types 705004/1 and 705004/3).
- High-pressure cleaning may only be performed with a properly mounted device (panel mounting).
- If the temperature of the cleaning agent is higher than 70 °C, the device must be switched off before starting cleaning.

7.7 Open-source software

The software of device and/or components of the device was developed using open-source software.

Insofar as the respective applicable license conditions justify a claim to the provision of the source code or other information, JUMO GmbH & Co. KG will provide the source code and the license texts on a conventional data carrier at the costs incurred for the provision of the data carrier.

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