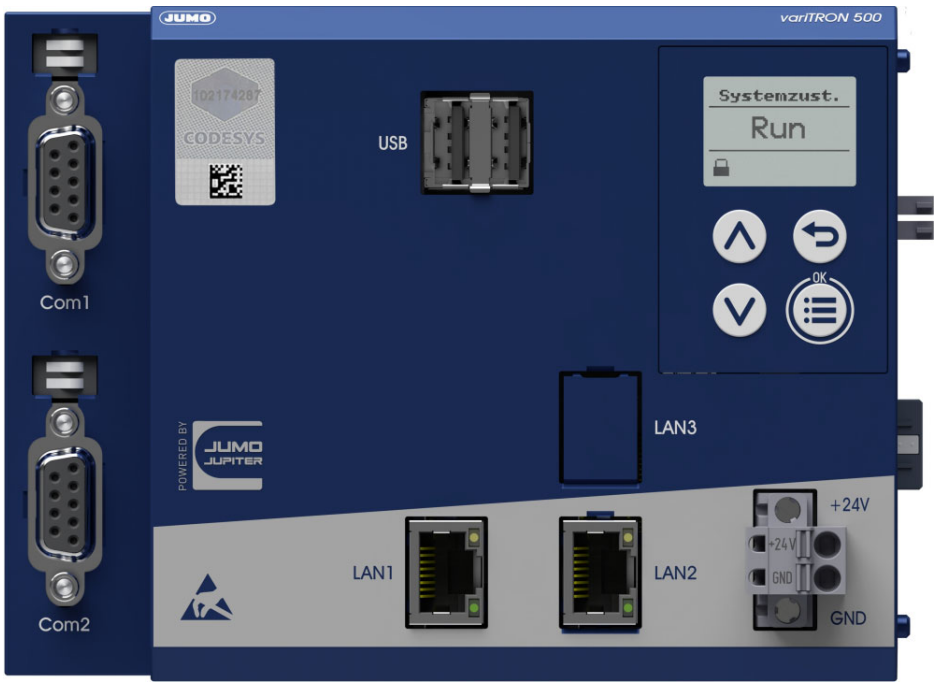
JUMO variTRON 500

Automation System

Central Processing Unit 705002



Operating Manual

70500200T90Z001K000

V1.00/EN/00703039/2020-02-10

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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

- Microsoft® is a registered trademark of Microsoft Corp., Redmond, VA 98052-6399, US.
- Windows® is a registered trademark of Microsoft Corp., Redmond, VA 98052-6399, US.
- Microsoft Edge® is a registered trademark of Microsoft Corp., Redmond, VA 98052-6399, US.
- Google Chrome® is a registered trademark of Google LLC, 94043, Mountain View, US.
- Opera® is a registered trademark of Opera Software AS, 0484, Oslo, NO.
- Mozilla® is a registered trademark of Mozilla Foundation, 94041, Mountain View, US.
- Firefox® is a registered trademark of Mozilla Foundation, 94041, Mountain View, US.

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

In the event of repair, 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 returning 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 assemblies/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.

1.5.4 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.

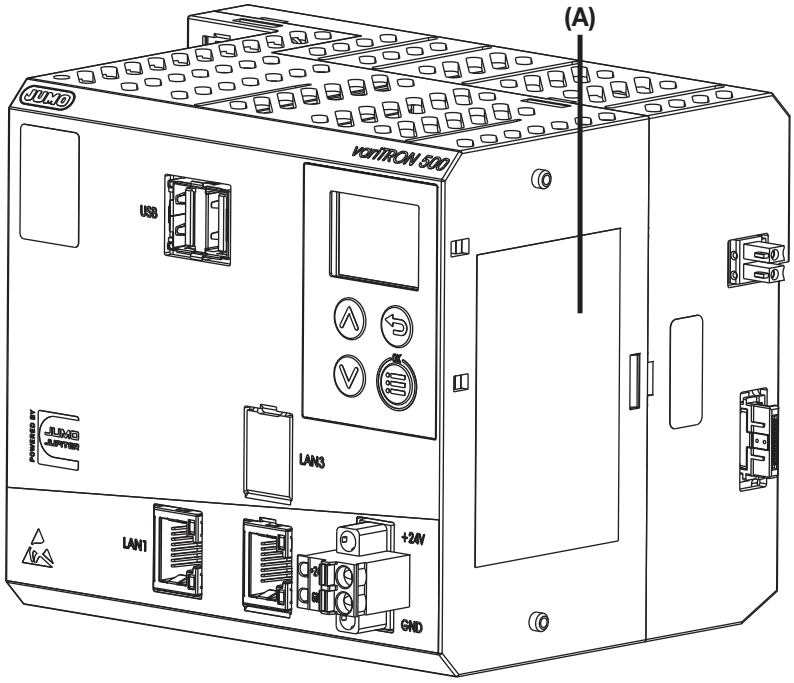
The country-specific laws and regulations for waste treatment and disposal must be observed.

1.6 Identifying the device version

1.6.1 Nameplate

Position

The nameplate (A) is affixed to the module case.



Contents

The nameplate contains important information. This includes:

Description	Designation on the nameplate	Example
Device type	Typ	705002/22108-00-00-00-36/000,224
Part no.	TN	00123456
Fabrication number	F-Nr.	0070033801219200006
Voltage supply	-	DC 24 V, +25/-20 %

Device type (Typ)

Compare the specifications on the nameplate with the order.

Identify the supplied device version using the order details.

Part no. (TN)

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

Fabrication no. (F-Nr)

Among other things, the fabrication number contains the date of manufacture (year/week).

Example: F-Nr = 0070033801**1920**0006

The figures concerned are in positions 12, 13, 14, and 15 (from the left).

The device was therefore produced in the 20th calendar week of 2019.

1.6.2 Order details

	(1)	**Basic type**
705002		Central processing unit, type 705002 (1 × Ethernet (RJ45), 1 × system bus (side), 2 × USB host interface)
	(2)	**Basic type extension 1**
2		Quad core CPU
	(3)	**Basic type extension 2**
2		RAM 1024 MB
	(4)	**Basic type extension 3**
1		eMMC 8 GB[a]
	(5)	**Basic type extension 4**
0		Without software control loops
	(6)	**Version**
8		Standard with default settings
	(7)	**Com1 interface**
00		Not used
51		RS232 Modbus-RTU[b] (as of system version xx)
55		RS485 Modbus-RTU[b] (as of system version xx)
	(8)	**Interface Com2**
00		Not used
51		RS232 Modbus-RTU[b] (as of system version xx)
55		RS485 Modbus-RTU[b] (as of system version xx)
	(9)	**Interface LAN2**
00		Not used
08		Ethernet (RJ45)
	(10)	**Voltage supply**
36		DC 24 V +25/-20 %, SELV
	(11)	**DNV GL approval**
000		Without approval
	(12)	**Extra codes**
214		Math and logic module (activation for all connected controller modules; as of system version xx)
224		PLC according to IEC 61131-3 (CODESYS V3.5; necessary to operate the device as a PLC)
225		Program generator 1 – 9 (as of system version xx)[c]
280		Remote TargetVisu[c]
281		WebVisu[c]
282		PROFINET IO controller[c]
283		OPC UA server[c]
284		Modbus-TCP master[c]
285		Modbus-TCP slave[c]
286		EtherCAT master[c]

[a] Flexible allocation between system data and application data.

[b] The PLC (extra code 224) enables additional interface protocols to be implemented (extra cost).

[c] Only in conjunction with extra code 224.

	(1)		(2)	(3)	(4)	(5)	(6)		(7)		(8)		(9)		(10)		(11)		(12)	
Order code	705002	/	2	2	1	0	8	-		-		-		-	36	/	000	,	224	, ...[a]
Order example	705002	/	2	2	1	0	8	-	00	-	00	-	00	-	36	/	000	,	224	

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

1.6.3 Scope of delivery

1 central processing unit, type 705002, in the ordered version
1 cover for system bus
2 screw-on end clamps for DIN rail
1 installation instructions

1.6.4 Accessories

Description	**Part no.**
Interface modules (expansion boards):	
RS232 Modbus-RTU (as of system version xx)	00679682
RS485 Modbus-RTU (as of system version xx)	00679678
Ethernet (RJ45)	00688709

1 Introduction

1.7 Module overview

1.7.1 Central processing unit

The central processing unit JUMO variTRON 500 along with the proven input and output modules (incl. controller module) form a complete system.

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

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

For visualization, commercially available panels are used which support CODESYS Remote TargetVisu or WebVisu functionality. 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 (as of system version xx) and can be individually integrated into the customer application.

Module designation	Data sheet	Features
JUMO variTRON 500 Central processing unit	705002	• Process mapping for all connected input/output modules (incl. controller modules) • Display and keys to display the system status • 2 USB host interfaces • OPC UA server (in conjunction with PLC) • 9 program generators (in conjunction with PLC, as of system version xx) • 2 field bus interfaces (as of system version xx) • PROFINET IO controller (in conjunction with PLC) • Plug and Play for input/output module replacement • Battery-buffered RAM • Real-time clock

1.7.2 Modules

The proven controller as well as input and output modules are available as module variants. For example: 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 record and digitize a highly diverse range of process variables.

JUMO variTRON 500 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 (as of system version xx).

In addition, JUMO digiLine sensors for liquid analysis can be connected directly to the central processing unit (as of system version xx).

Input/output modules

Module designation	Data sheet	Features
Multichannel controller module	705010	• 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	• 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	• 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	• 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	• 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	• 12 digital inputs or outputs • Each channel can be individually configured as an input DC 0/24 V or ouput 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 xx)	705031	• 17 digital outputs • up to 15 additional digital inputs or outputs • Load capacity per output: 500 mA • Switching states are visualized by LED
Thyristor power controller Type 70906x (as of system version xx)	709061, 709062, 709063	• 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

1 Introduction

Special modules

Module designation	Data sheet	Features
Router module 2-port (as of system version xx)	705041	• 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 xx)	705042	• 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)

Panels

Module designation	Data sheet	Features
JUMO variTRON Web panels	705070	• Versions for different requirements (e.g. standard, Foot & Beverage) • Screen diagonals from 17,8 cm (7″) to 54,6 cm (21,5″) • Capacitive TFT- touchscreen

Power supply units

Module designation	Data sheet	Features
Power supply unit 705090/05-33	705090	• AC 100 to 240 V wide-range input • Output: DC 24 V / 5 A
Power supply unit 705090/10-33	705090	• AC 100 to 240 V wide-range input • Output: DC 24 V / 10 A

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 Central processing unit	Data sheet	70500200T10...	-	X
	Operating manual	70500200T90...	-	X
	Installation instructions	70500200T94...	X	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 xx)	Data sheet	70503100T10...	-	X
	Operating manual	70503100T94...	X	X
	Installation instructions	70503100T90...	-	X

Thyristor power controller type 70906x (as of system version xx)	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 xx)	Data sheet	70504100T10...	-	X
	Installation instructions	70504100T94...	X	X
Router module 3-port (as of system version xx)	Data sheet	70504200T10...	-	X
	Installation instructions	70504200T94...	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 QS5.241		X	-
	Operating instructions QS10.241		X	-

1.9 System version

The system version of the automation system is determined by the compatibility index of the base unit.

Example composition of a version number for the central processing unit 705002: 388.**xx**.yy

388 = basic version, **xx = compatibility index (system version)**, yy = current version

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

2.1 General information on installation/dismounting

DANGER!

With multichannel controller module 705010 and relay module 705015, the load circuits from relay or solid state relay outputs can be operated with a dangerous electrical voltage (e.g. 230 V).

There is a risk of electric shock.

▶ Prior to the installation/dismounting of these modules or the removal of the module insert, the load circuits are to be disconnected from the voltage and the terminal strips are to be removed from the module. This work must only be performed by qualified personnel.

WARNING!

The modules must never be installed in areas with an explosion hazard.

Explosion hazard.

▶ The entire system must only be used outside of areas with an explosion hazard.

Mounting site

All modules have protection type IP20 and are only intended for use in fireproof control cabinets or switch boxes. The mounting site should be virtually vibration-free. Electromagnetic fields caused by equipment such as motors or transformers should be avoided.

Type 705070 panels are designed for installation in a panel cut-out. Information on the protection type and other technical data can be found in data sheet 705070.

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 modules. The mounting site must be free from dust, powder, and other suspended matter so that the cooling slots do not become blocked.

DIN rail

All modules are mounted on a DIN rail according to DIN EN 60715 (35 mm × 7.5 mm × 1 mm). For reasons of stability, the spacing of the fastening screws for the DIN rail should not exceed 200 mm. The minimum distances for the modules that are specified in the module-specific installation or operating instructions must be observed.

Installation position

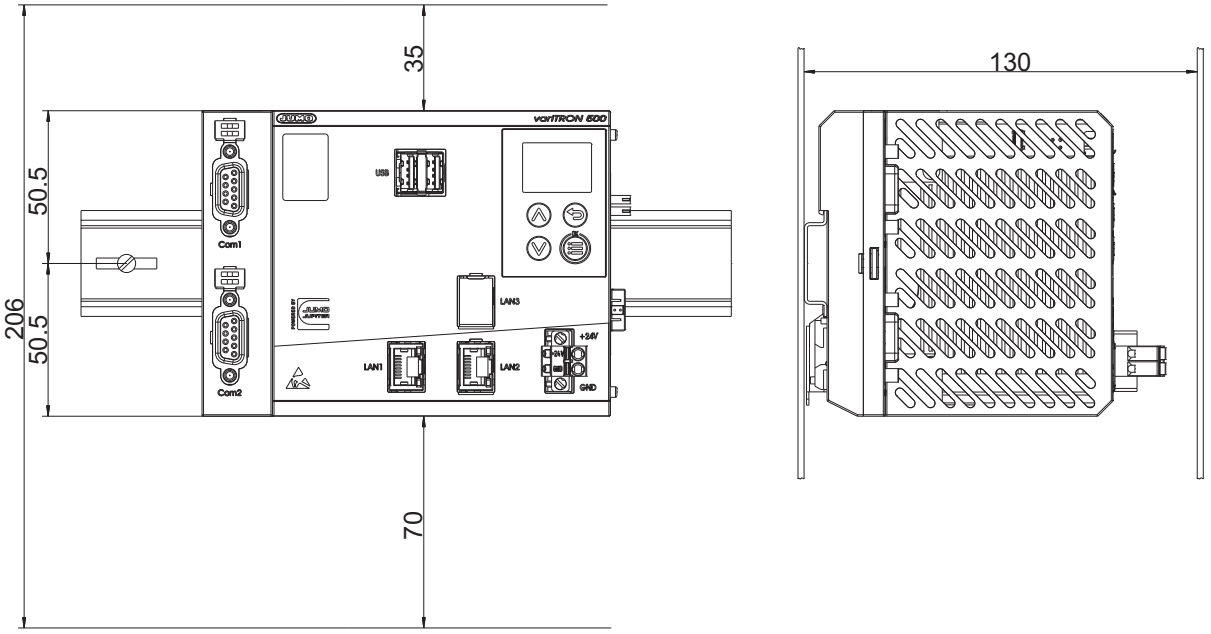
The DIN rail should be mounted horizontally so that all modules are arranged vertically. Otherwise the admissible ambient temperature range will be restricted.

Space requirement

The modules require the minimum distances shown in the following figure for the purpose of installation/dismounting and for future maintenance or replacement. In the event of shorter distances the minimum bending radius of the cables, the performance of the electrical installation, and the clear arrangement of the plant are no longer guaranteed.

2 Mounting

Minimum distances



2.2 Installation/dismounting on DIN rail

All modules in the system are intended for installation on a DIN rail according to DIN EN 60715 (35 mm × 7.5 mm × 1 mm).

The following must always be installed on the left side at the start of the DIN rail:

- A central processing unit *or*
- A router module 705042

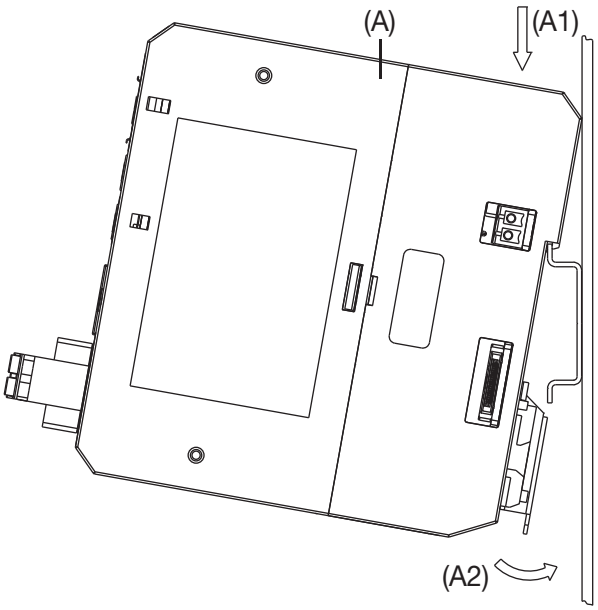
These connect the input/output modules to the voltage supply and the system bus.

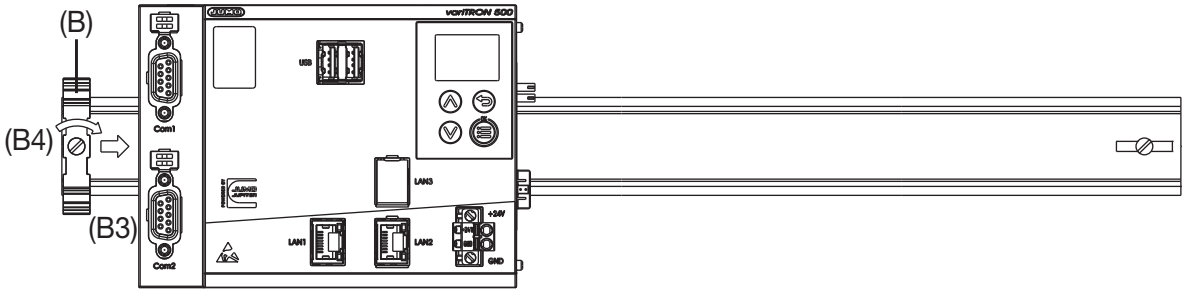
NOTE!

To determine the required minimum width of the DIN rail, the widths of the individual modules are to be added (see technical data of the modules in the respective data sheet or the module-specific installation instructions).
The widths of the cover (17.5 mm) and both end brackets (each 9.5 mm) should also be taken into consideration: 17.5 mm + 2 × 9.5 mm = 36.5 mm.

2.2.1 Central processing unit

Installation of the central processing unit 705002



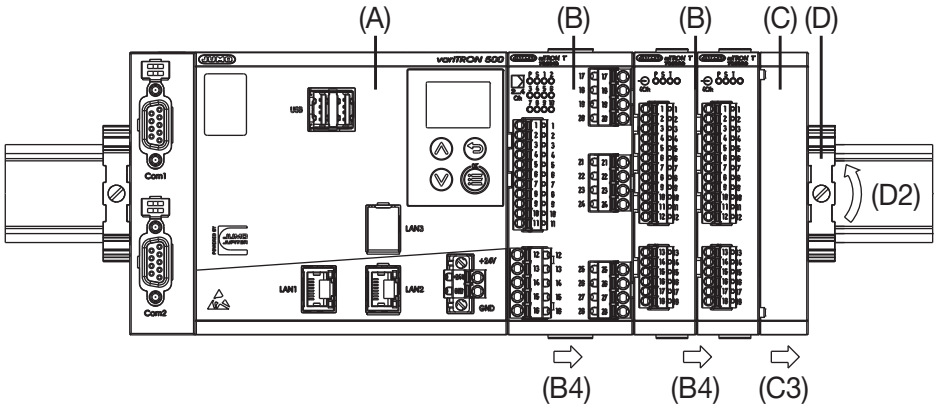


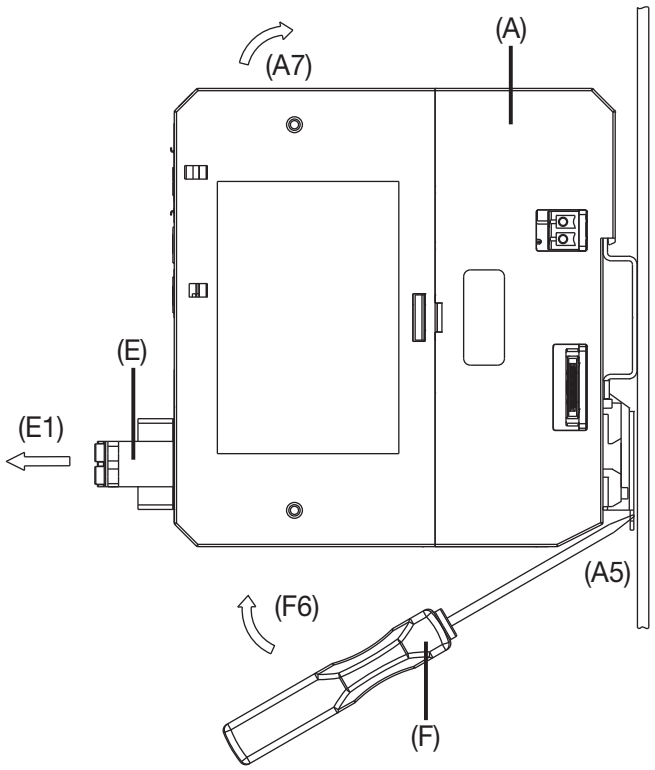
Process:

1. Mount the central processing unit (A) on the DIN rail from above (A1).
2. Pivot the central processing unit (A) downwards until it snaps into place (A2).
3. Position the end bracket (B) on the DIN rail and move to the right against the central processing unit (B3).
4. Fasten the end bracket using a screwdriver (B4).

2 Mounting

Dismounting of the central processing unit 705002





Process:

1. Remove the connecting cables if required (interfaces).
2. If required, use a screwdriver to release the wired terminal (E) of the central processing unit (A) and pull off toward the front (E1).
3. Fully release the end bracket (D) using a screwdriver (D2), press upward from below, pivot toward the front, and remove from the DIN rail.

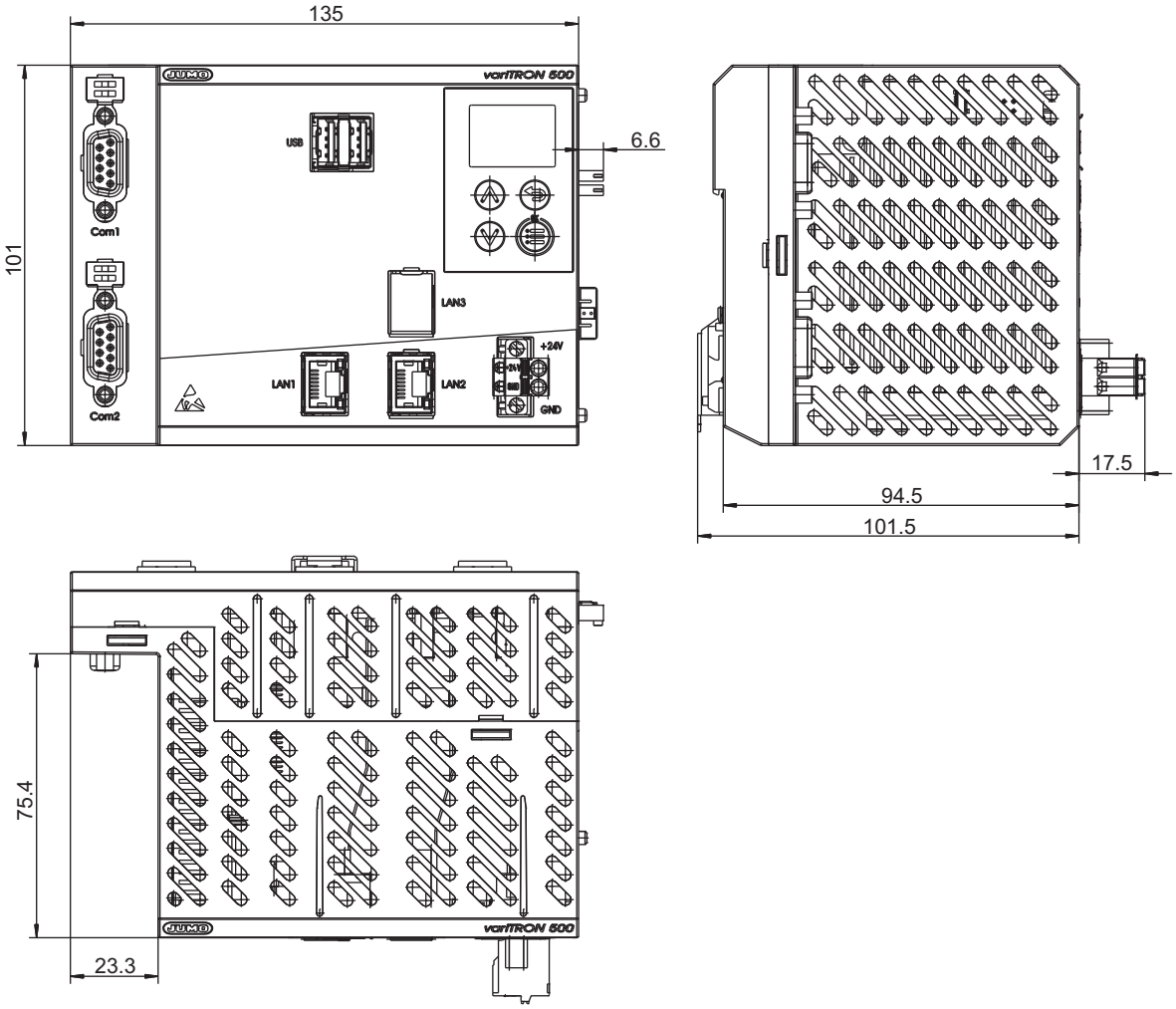
   Note: The end bracket does not need to be removed from the DIN rail if there is sufficient space to the side to move it at least 10 mm to the right.
4. Move the cover (C) to the right (C3) until the side contacts of the neighboring module are exposed. Then release the cover at the bottom using a screwdriver, press upward, and remove from the DIN rail.

Note: The cover does not need to be removed from the DIN rail if there is sufficient space to the side to move it at least 10 mm to the right.

5. Move the modules (B) on the right next to the central processing unit (A) to the right (B4) until the side contacts of the central processing unit are exposed.
   These modules are now isolated from the voltage supply and the system bus.
6. Insert a suitable screwdriver (F) into the unlocking slot of the central processing unit (A5) and press upward (F6).
7. Pivot the central processing unit (A) upward off the DIN rail (A7) and remove it.

2 Mounting

2.3 Dimensions



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 loopthroughs 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

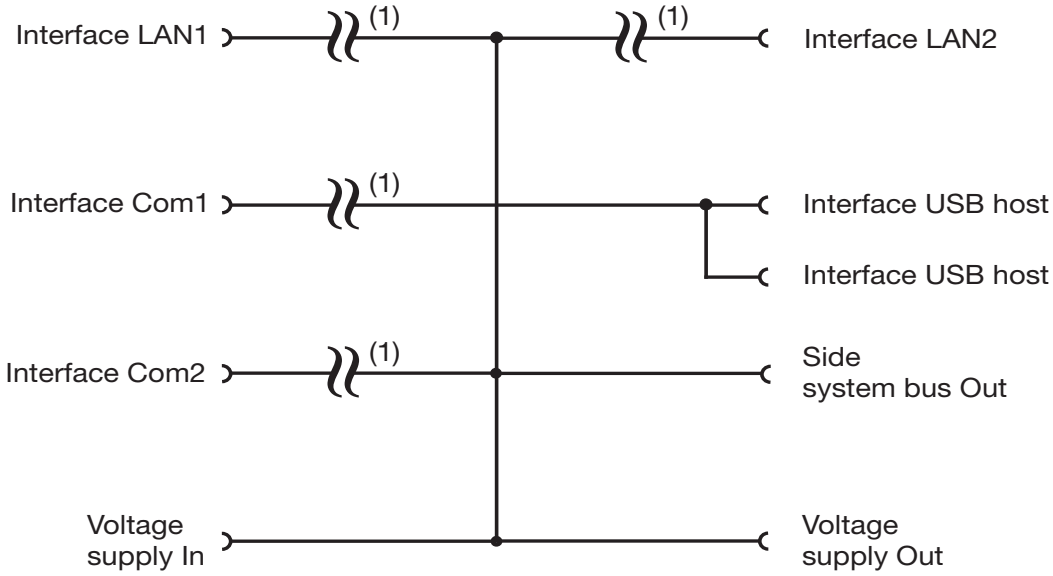
- Isolate power supply units from the voltage supply on the primary side if there is a risk of touching parts with dangerous electrical voltage (e.g. 230 V) during active use.
- The fuse rating of the power supply units on the primary side should not exceed a value of 10 A (inert).
- With modules that 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 Galvanic isolation



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

3.3 Connection diagram

CAUTION!

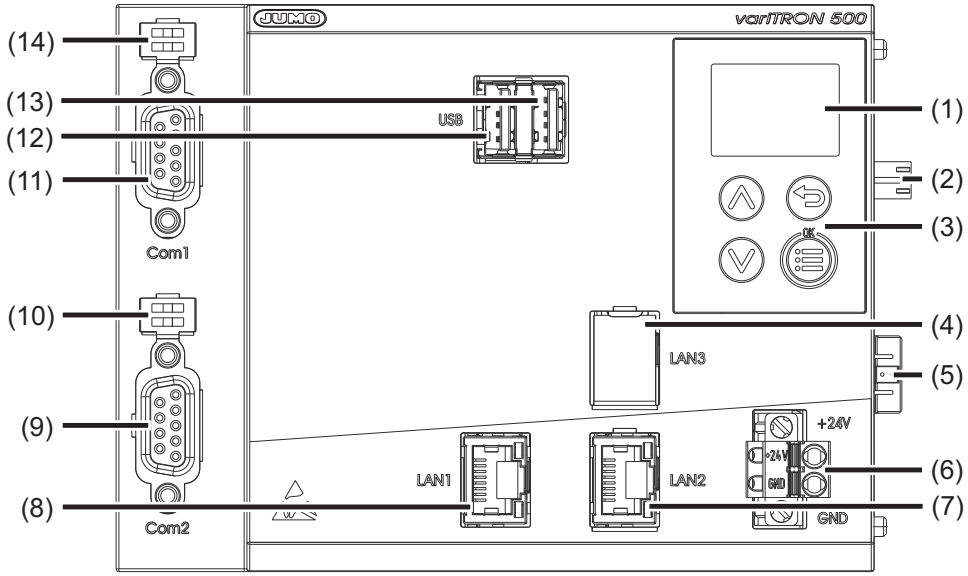
At maximum load, the temperature may exceed 60 °C at the terminals "+24 V" and "GND" (voltage supply In).

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

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

3.3.1 Display, operating, and connection elements

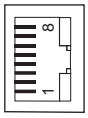
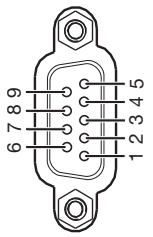
This overview shows the position of the display, operating, and connection elements. The assignment to individual functions is illustrated in the following sections.



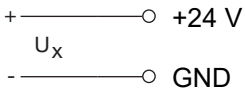
(1) Display
(2) Voltage supply Out, DC 24 V
(3) Control elements
(4) Interface LAN3 (for future use)
(5) Side system bus Out
(6) External voltage supply DC 24 V (voltage supply In)
(7) Interface LAN2
(8) Interface LAN1
(9) Interface Com2
(10) Com2 terminating resistors
(11) Interface Com1
(12) USB host interface 1
(13) USB host interface 2
(14) Com1 terminating resistors

3 Electrical connection

3.3.2 Interfaces

Connection	Designation	Number	Connection element	Assignment	
USB host (2 ×)	USB	(12), (13)			
Ethernet (LAN2 optional)	LAN1, LAN2	(8), (7)		1 TX+ 2 TX- 3 RX+ 6 RX-	Transmission data + Transmission data - Received data + Received data -
Serial interface RS232 (optional)	Com1, Com2	(11), (9)		2 RxD 3 TxD 5 GND	Received data Transmission data Ground
Serial interface RS485 (optional)	Com1, Com2	(11), (9)		3 TxD+/RxD+ 5 GND 8 TxD-/RxD-	Transmission/received data + Ground Transmission/received data -

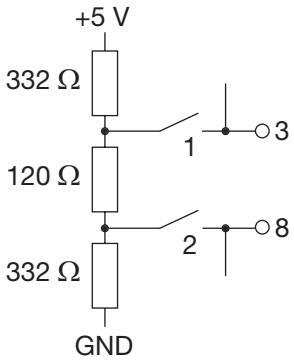
3.3.3 Voltage supply

Connection	Designation	Number	Symbol and terminal designation
Voltage supply In	+24 V and GND	(6)	

3.3.4 Terminating resistors

The internal terminating resistors for the Com1 and Com2 interfaces are only available for RS485.

The terminating resistors are deactivated per default. To activate them, switches 1 and 2 for the relevant interface must be 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 Services" 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 will need to be logged on to do this (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

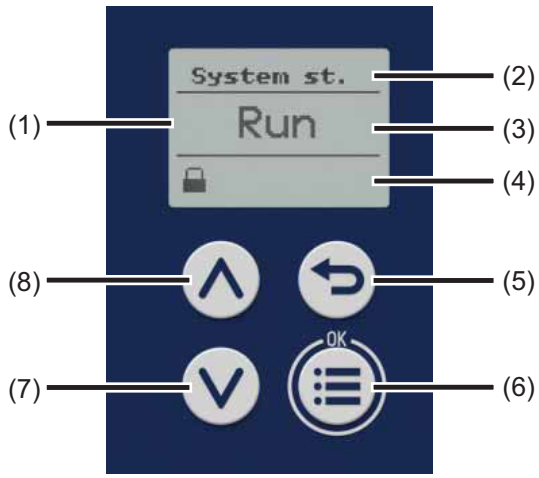
Procedure during startup:

⇨ chapter 6 "Startup", Page 71

4 Operation

4.2 Device

4.2.1 Display and control elements



(1) Display in basic status
(2) Title of display
(3) Display of system status or system bus status
(4) Display of log-on status or event, e.g. using icons (see table)
(5) "Back" key (in menu: back to previous menu level, exit editing mode without making a change)
(6) "Menu/OK" key (call up main menu, switch to submenu/level, switch to editing mode, exit editing mode with a change made, confirm entry or change)
(7) "Down" key (in menu: reduce value, select next menu item, parameter, or value; in basic status: switch between displaying the system status and the system bus status)
(8) "Up" key (in menu: increase value, select previous menu item, parameter, or value; in basic status: switch between displaying the system status and the system bus status)

Icons (display in basic status)

Icon designation	Depicted as	Meaning
Logon status (position 1 = left)		User is not logged on.
		User is logged on.
Alarm status (position 2)		There is at least one malfunction (but no alarm).
		There is at least one alarm.
External medium (position 3)		An external medium has been connected (USB port).
Transfer of configuration (position 4)		Configuration is being transferred (setup program).
CODESYS online status (position 5)		The CODESYS programming system has been connected to the device.

4.2.2 Device menu

To access the device menu from the start screen, press the "Menu/OK" key.

The following overview shows the menu levels where individual functions can be configured (by selecting or entering data) or information is shown. The information that is shown on the device display depends on the user's rights.

Beyond this, there are functions that can only be configured with the setup program or the web application; these functions are not listed here.

If you need further information on the individual functions, please see the subsequent chapters in this manual (see cross-references).

User management

Sub-menu 1	Sub-menu 2	Sub-menu 3
Logon (log in)	User (to be selected), password (to be entered)	---
Logoff (log out)	---	---

⇨ chapter 4.2.3 "User log-on", Page 33

System status

Sub-menu 1	Sub-menu 2	Sub-menu 3
Change the system status Selection options: Run, Stop, Reset, Reset (Cold), Reset (Origin)	---	---

⇨ chapter 4.4.1 "Device information", Page 52

Configuration

Sub-menu 1	Sub-menu 2	Sub-menu 3
Device manager	Device settings	Device language (selection)
		Start-up behavior (selection options: Run, Stop, Last status)
	Device designations	Device name (display)
		DNS name (display)
	Time zone/NTP	Time zone (selection)
		NTP active (selection)
		NTP server (display)
	Date and time	Time (to be entered: date and time)
Ethernet	LAN1	Method (selection options: Manual, Automatic)
		IP address (to be entered)
		Subnet mask (to be entered)
		Standard gateway (to be entered)
		Obtain DNS server IP (selection options: False, True)
		DNS server (entry of IP address)
	LANx	see LAN1

Sub-menu 1	Sub-menu 2	Sub-menu 3
Web server	HTTP (selection options: Active, Inactive, Redirect to HTTPS)	---
	HTTP port number (to be entered)	---
	HTTPs port number (to be entered)	---
System status UI	Screensaver	Function (selection options: Off, On)
		Waiting period (idle time) (to be entered, in milliseconds)

⇨ chapter 4.4.4 "Configuration", Page 54

Device info

Sub-menu 1	Sub-menu 2	Sub-menu 3
Device information	Device	Fabrication number (production number) (display)
		Total root volume memory (display)
		Product group (display)
		Reg. number (display)
		Certification number (inspection number) (display)
	Hardware versions (dependent on what hardware is fitted to the device) Submenu 4 displays: – Hardware type – LP ID – Compatibility index – Hardware version	Bus (display)
		CPU (display)
		Com1 (display)
		Com2 (display)
		Display (display)
		Ethernet (display)
		Power supply (display)
		USB/Ethercat (display)
	Software versions	Bootloader version (display)
		Operating system version (display)
		Application building version (display)
		Software version (display)
System status	System status (display)	---
Ethernet	LAN1	IP address (display)
		Transfer rate (display)
		MAC address (display)
		DNS server (display)
		Standard gateway (display)
		Subnet mask (display)
	LANx	see LAN1

⇨ chapter 4.4.1 "Device information", Page 52

Service

Sub-menu 1	Sub-menu 2	Sub-menu 3
Device manager	Activate debug interface (selection)	---
Certificate administration	Remove certificates (selection)	---
Email	Send email (selection)	---

Removable media

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

Sub-menu 1	Sub-menu 2	Sub-menu 3
Remove hardware Must be run before the USB flash drive is removed!	---	---
Import configuration	---	---
Export configuration	---	---
Firmware update	---	---
Export debug data	---	---

4.2.3 User log-on

Logon

1) Press the "Menu/OK" key to open the device menu.
2) Switch to the submenu "User administration > Logon".
3) Select the user from the list and press the "Menu/OK" key to confirm.
4) Enter the password: Select the 1st digit by pressing the "Up" or "Down" key and press the "Menu/OK" key to confirm.
5) Enter the subsequent digits of the password one after the other.
6) Once you have entered the last digit, press the "Menu/OK" key again.

Logoff

1) Press the "Menu/OK" key to open the device menu.
2) Switch to the submenu "User administration > Logoff".
3) Press the "Menu/OK" key.

4.2.4 Reset to factory settings

To perform a reset to default settings, first switch off the device (device disconnected from the voltage supply), then simultaneously press the "Menu/OK" (6) and "Down" (7) keys, and then switch the device back on (restore the voltage supply). When doing so, press and hold the keys until the display's backlight has been activated.

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.

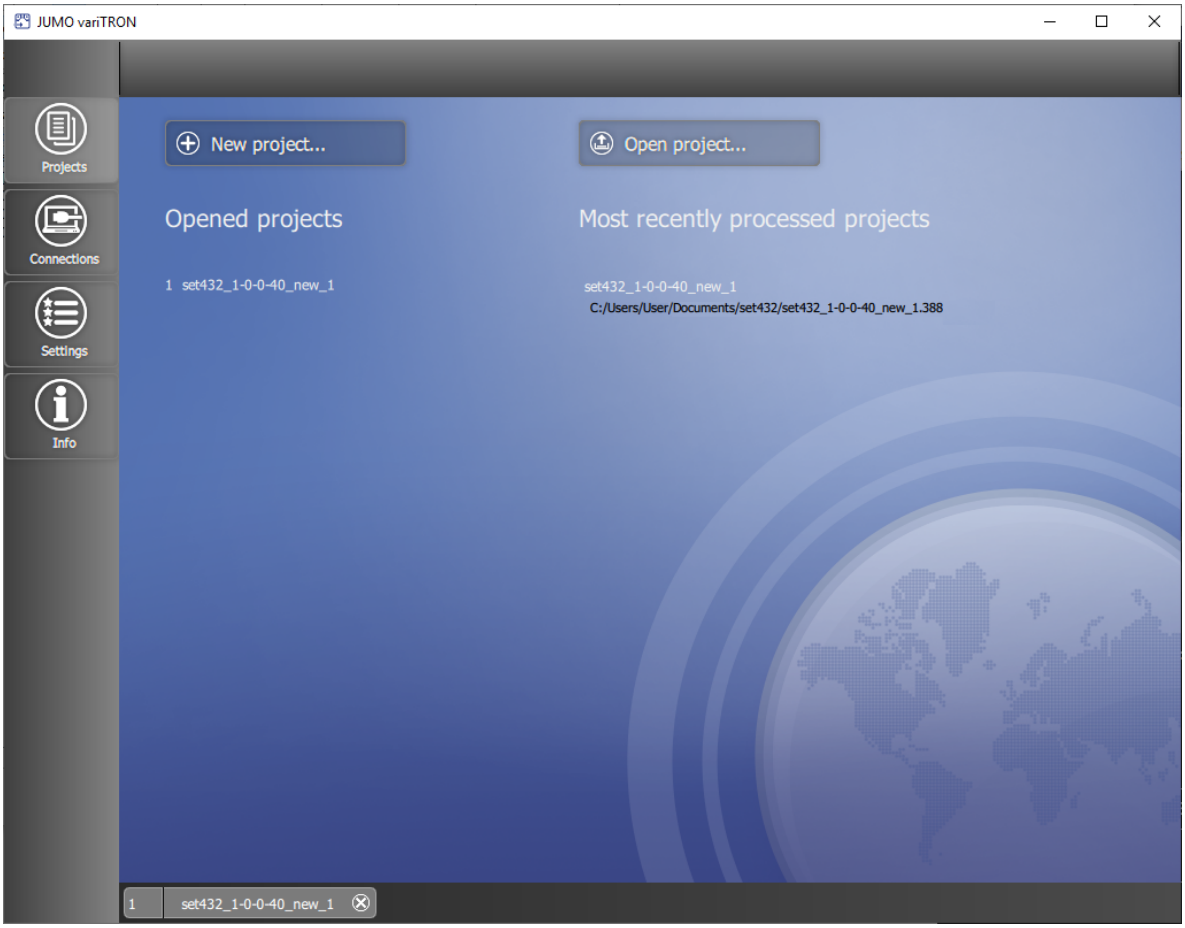
4 Operation

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.



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

- Projects: Create new project, 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.

4.3.2 Project map

Create project using individual functions

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

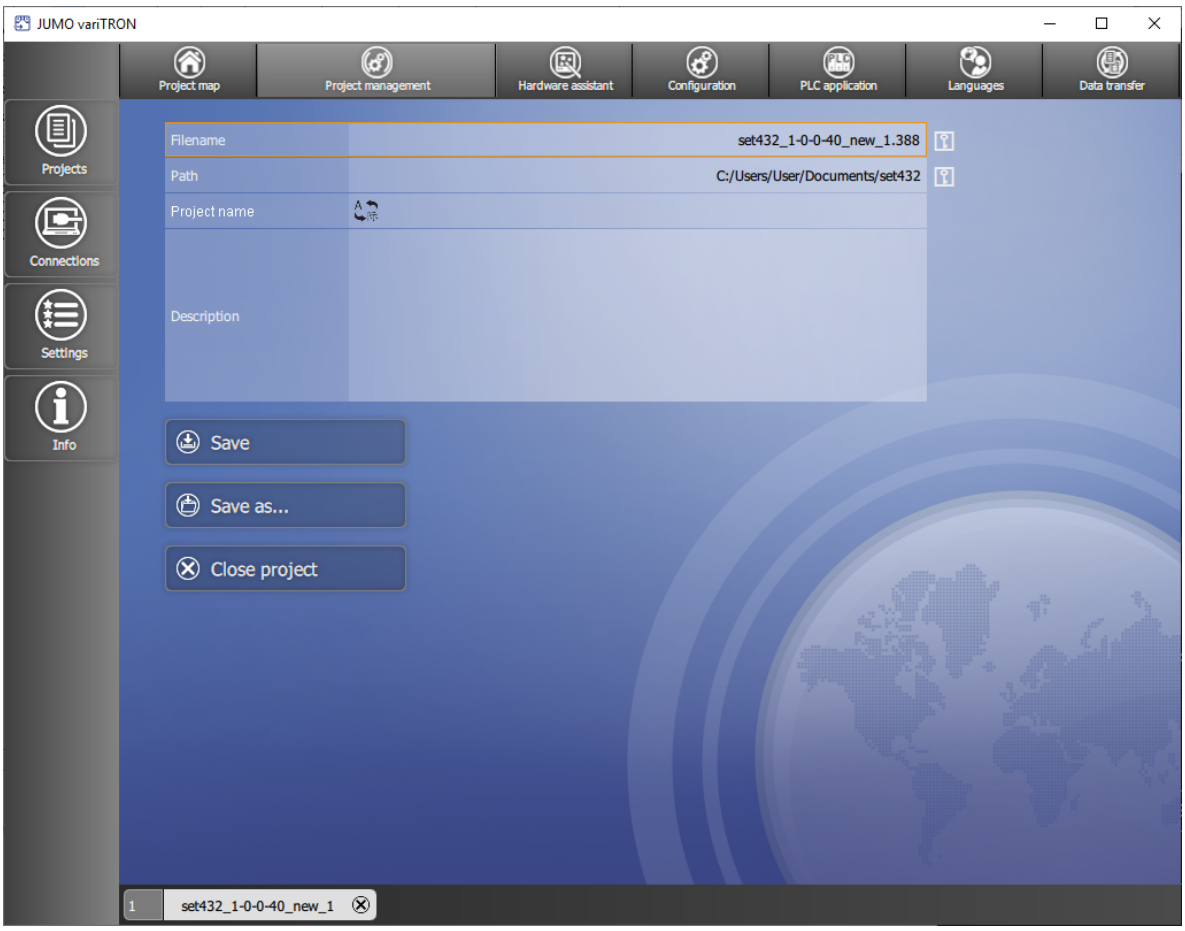
The following functions are available within a project:

- Project management: Display the name and path of the project file, enter the designation and description of the project
- Hardware assistant: Define the hardware configuration for the entire system
- 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

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 the name and path of the project file, enter the designation and description of 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 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)

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

4.3.4 Hardware 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 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 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).

As from system version xx: You can use the "+" button to add additional DIN rails. 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.

4 Operation

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[1]). 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).

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)
- Alias address (only for router module 705042): Assigning an alias address declares the router module (as well as all modules on the same DIN rail) as an optional module. The alias address must be unique, i.e., it is permitted to occur only once in the system.

Router units

If the hardware configuration contains router units[1] (router modules), these units must be connected with one another. To do so, proceed as follows:

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).

[1] Router units available as of system version xx

4.3.5 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), time zone/NTP
- Bus: Master (settings relating to the system bus; see below), module... (module-specific configuration parameters; see below)
- 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
- 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)
- Screensaver: Activation and waiting period

Details can be found in the "Configuration" chapter.

⇨ chapter 5 "Configuration", Page 59

NOTE!

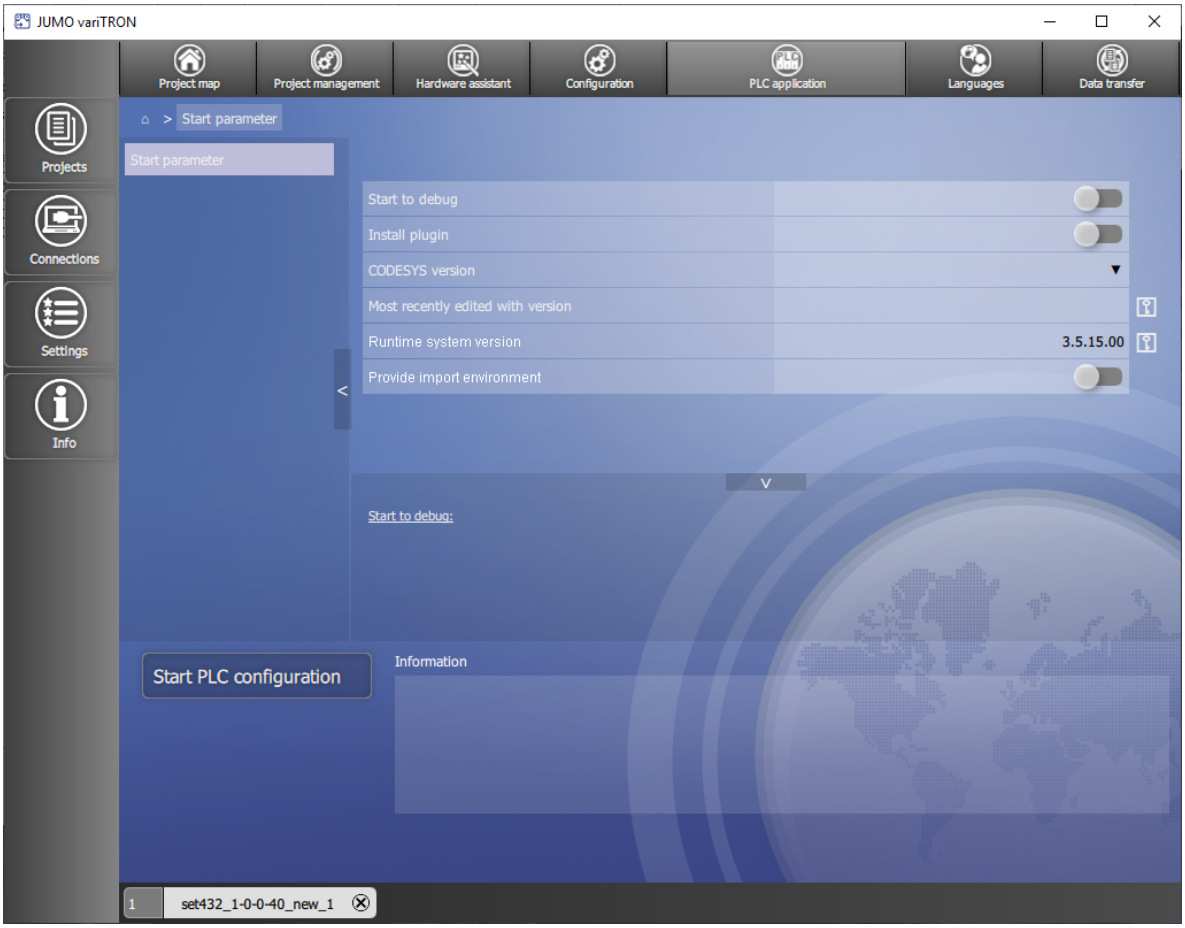
The settings configured under "Bus > Master" influence the transfer of data via the system bus. Sub-optimal settings here will disrupt or even interrupt the communication within the system. For this reason, these parameters are only permitted to be modified by a service engineer from the device manufacturer (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 17

4.3.6 PLC application

Determine the start parameters for the CODESYS PLC programming system, start the PLC configuration process (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)
- CODESYS version: Select the version of the programming system (drop-down menu)
- Most recently edited with version (display only): Most recently used CODESYS version
- Runtime system version (display only): Version of the CODESYS runtime system in the device
- Provide import environment: Provide texts from the "PLC Parameter" configuration area for import (after starting the PLC configuration)

To start the programming system, click the "Start PLC configuration" button.

4.3.7 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!

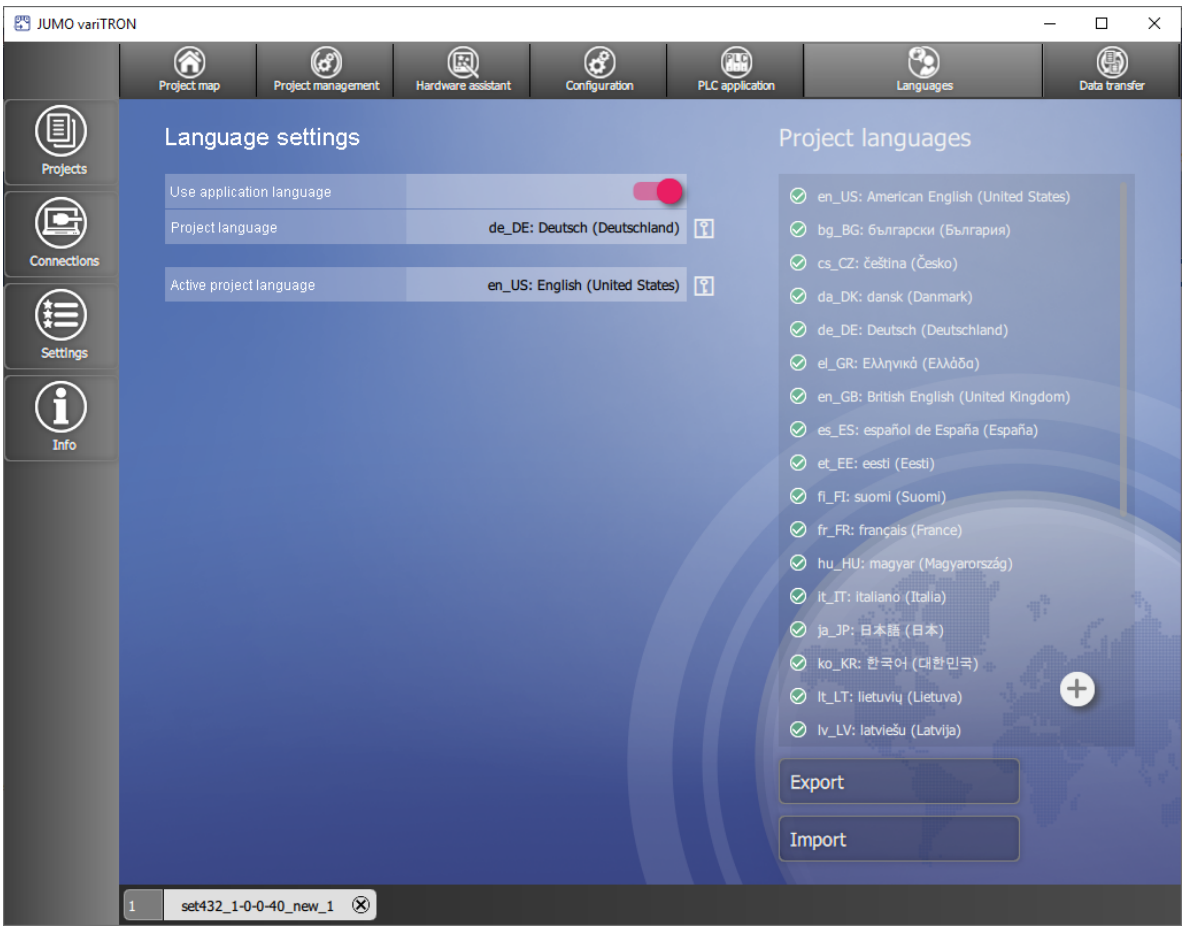
The CPV Editor is used to create customer-specific configuration and process data.

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.

4.3.8 Languages

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



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)

4.3.9 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
- 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:

- 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.

Default settings:

Transfer type for extraction or import: Selective configuration

Transfer type for sending or export: Complete configuration

Data packet	Send/Export	Extract/import
AccessControlManager	Yes (= red)	Only visible values of known parameters
Device manager	Yes (= red)	Only visible values of known parameters
Bus	Yes (= red)	Structure and values
Ethernet	Yes (= red)	Only visible values of known parameters
Web server	Yes (= red)	Only visible values of known parameters
Email	Yes (= red)	Only visible values of known parameters
PLC configuration	Yes (= red)	Only visible values of known parameters
PLC parameters	Yes (= red)	Only values of known parameters
Programs	Yes (= red)	Only visible values of known parameters
System status UI	Yes (= red)	Only visible values of known parameters

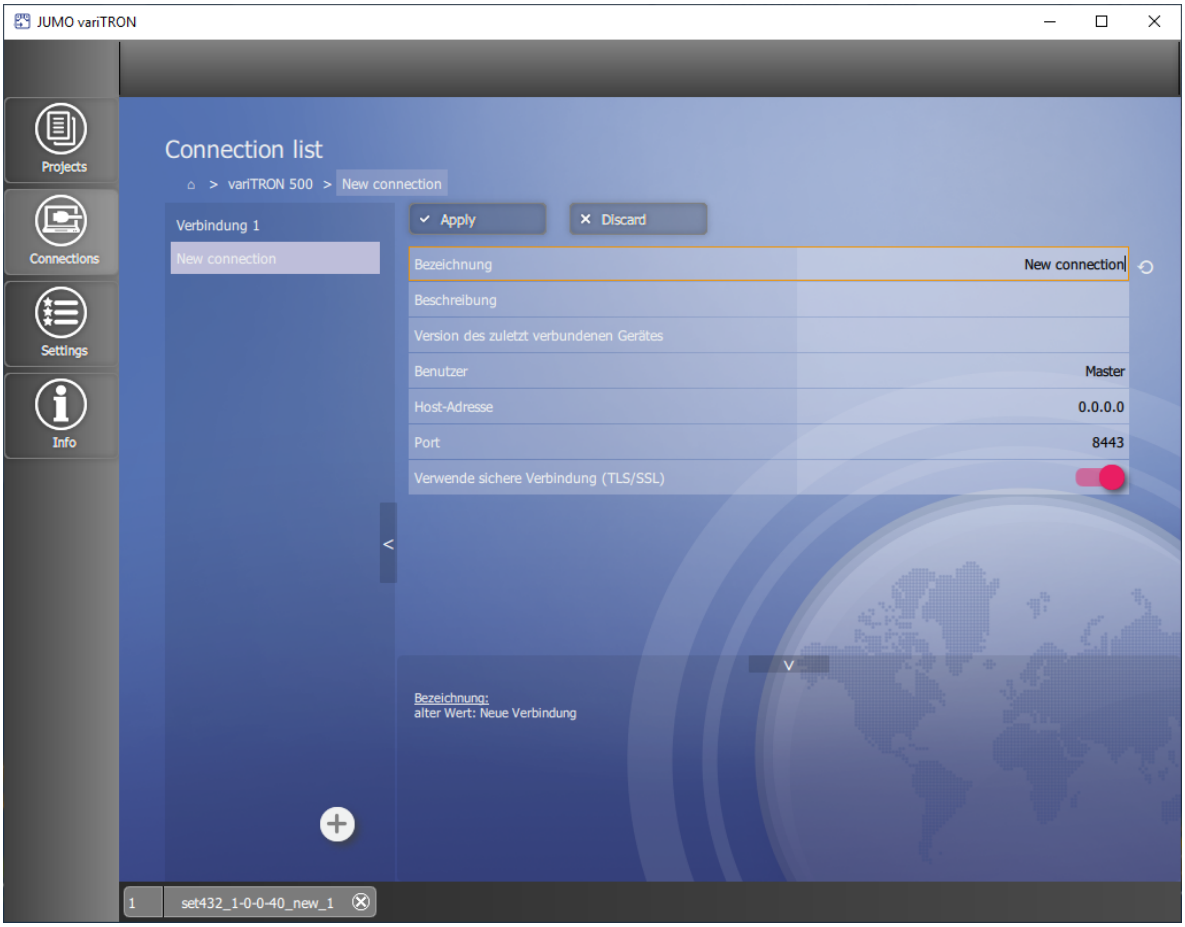
NOTE!

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

4.3.10 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 5.5 "Web server", Page 62
  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).

4.4 JUMO Web Services

JUMO Web Services is a web application that enables you to access the device using a web browser.

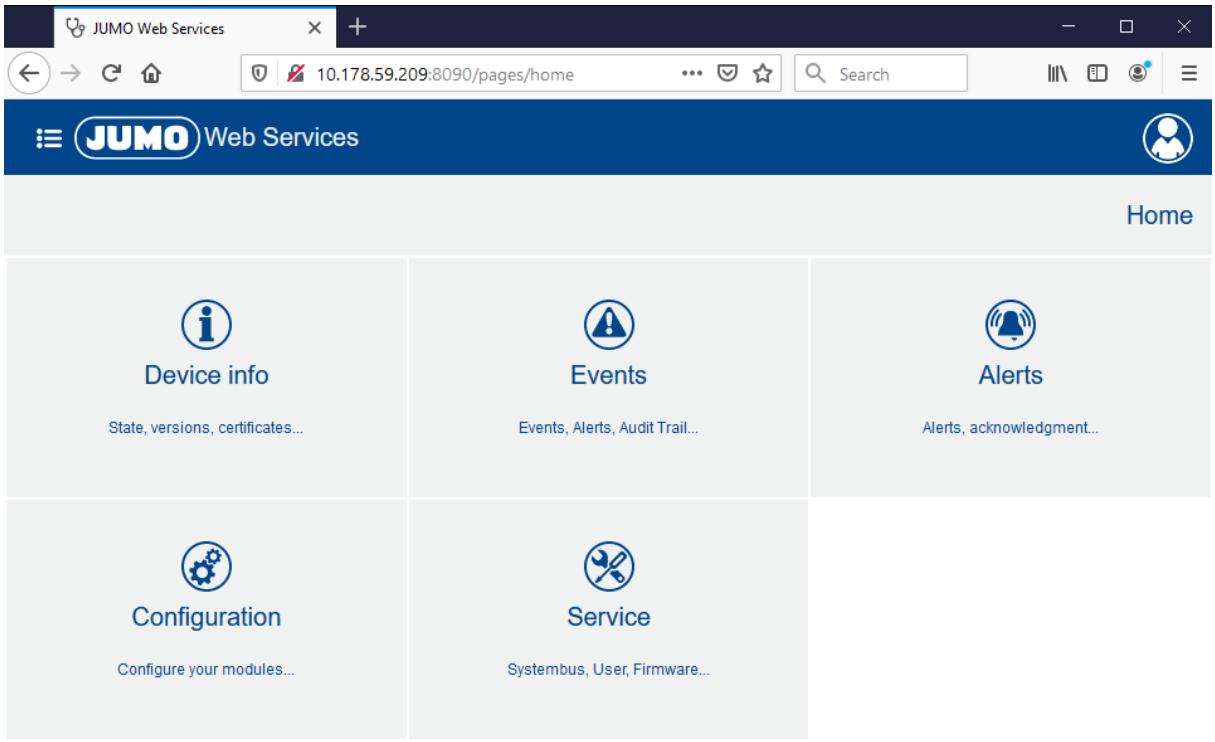
The following web browsers are supported: Mozilla Firefox, Google Chrome, Microsoft Edge, Opera

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

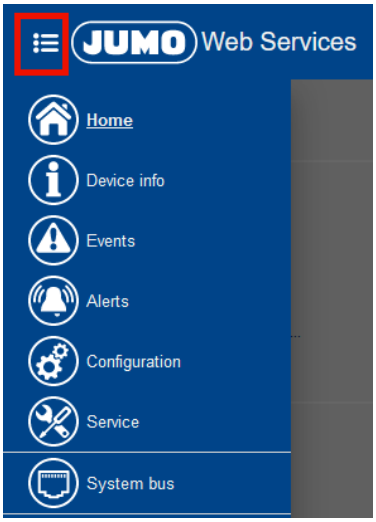


Designation	Description
Device info	Status, versions, certificates, etc. • Display device information • Display and change the system status (Run, Stop, etc.) • Display Ethernet parameters • System monitoring (battery, memory, temperatures, voltage values) • Certificate management • Display PLC information • License management (display extra codes)

Designation	Description
Events	Events, alarms, audit trail, etc. • Messages shown in a list • Filter by message type • Filter by keyword • Plain-text search • Delete messages
Alerts	Alarms, acknowledgement, etc. • Messages shown in a list • Filter by message type • Filter by keyword • Full-text search • Acknowledge alarms
Configuration	Configure modules, etc. • Configure device • Configure connected modules (system bus)
Service	System bus, users, firmware • System bus: Display information on the master and slaves (modules); perform actions • 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)

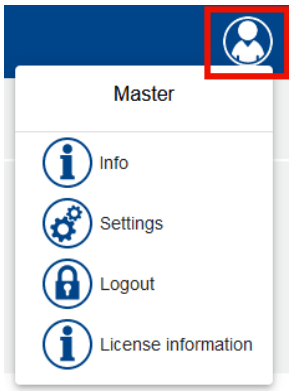
"Menu" button

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



Selecting the menu item "System bus" accesses the function "Service > System bus" 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
License information	Display license information

4.4.1 Device information

The individual items of information displayed under the tiles "Device information", "System status", and "Ethernet" are identical to those in the device menu.

⇨ chapter 4.2.2 "Device menu", Page 31

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:

- 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 area are deleted (see CODESYS documentation on origin (full) reset of PLC).
  - The retain variables of the external inputs (interfaces) are reset.
  - An event message is issued (origin reset).
- COLD RESET
  - The PLC performs a cold start, which means that the retain area is deleted (see CODESYS documentation on cold start of PLC).
  - The retain variables of the external inputs (interfaces) are reset. An event message is issued (cold start reset).
  - An event message is issued (cold start reset).
- RESET
  - The PLC performs a warm start, which means that the retain area is retained (see CODESYS documentation on warm start of PLC).
  - The retain variables of the external inputs (interfaces) are also retained.
  - 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 is displayed here.

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

Certificate management

If applicable, information on certificates is displayed here.

PLC information

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).

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.

4.4.3 Alarms

Alarm messages (alerts) 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.

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 59

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 17

The individual functions under the tiles "Device manager", "Ethernet", "Web server", and "System status UI" are identical to those in the device menu.

⇨ chapter 4.2.2 "Device menu", Page 31

Device manager

Here, device settings are configured (device language, start-up behavior), device designations are assigned, the time zone and time server are selected, and the date and time are manually set.

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.

Ethernet

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

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) and the program generators are configured.

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

The screensaver is configured here.

4.4.5 Service

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:

- DebugActive: Only for servicing purposes
- Reset: System bus restart
- Stop/Run: Switchover of the system bus status (Safe-Operational/Operational; independent of system status)
- ResetStatistic: Reset of statistics

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.

The following **roles** are defined per default:

- Administrator
- ReadOnly
- SystemStatusUi
- WebUi

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

Administrator	ReadOnly	SystemStatusUi	WebUi	Right	Description
X	X			DeviceInformationRead	Read device information
X				EventlistRead	Read event list
X				ConfigurationRead	Read configuration
X				ConfigurationWrite	Write configuration
X				FirmwareUpdate	Perform a firmware update
X				SystemStateControl	Change the system status
X				BusControl	Change the system bus status (Stop, Start, Reset statistics)
X				CertificateAdministration	Manage certificate
X	X			DebugDataRead	Read debug data
X				LicenceFileWrite	Activate extra code
X				AlarmAcknowledgement	Acknowledge alarm
X				DebugDataDelete	Delete debug data
X				EventlistDelete	Delete event list

Administrator	ReadOnly	SystemStatusUi	WebUi	Right	Description
X				UserManagement	Manage users
X	X			CodesysUi	Visibility of the user in the CODESYS UI
		X		SystemStatusUi	Visibility of the user in the device display When assigning this right, take into account the restricted possibilities for displaying and entering data on the device display (user name, password).
			X	WebUi	Logon in the "JUMO Web Services" web application

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

The function "addRole" 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.

The following **users** are created per default (the roles are shown in brackets):

- Master (Administrator, SystemStatusUi, WebUi)
- UnregisteredUser (ReadOnly)

A user can be edited, and it can also be removed. Likewise, the user's password can also be changed.

The "addUser" 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".

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.

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.

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 31

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 Services" 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). Please also note that some functions cannot be configured on the device due to the restricted possibilities for entering data.

Function area	Device	Setup program	Web application
Device manager	X	X	X
Bus		X	X
Ethernet	X	X	X
Web server	X	X	X
Email		X	X
PLC configuration		X	X
PLC parameters		X	X
Programs		X	X
System status UI (device display)	X	X	X

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.

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.

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".

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 Configuration

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

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.
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.

Date and time

Parameter	Selection/data input	Description
Time	Enter the date and time	Device's time settings 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.

5.3 Bus

Master

Parameter	Selection/data input	Description
Max. repetitions (max. no. of retries)	**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 17

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 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
	FALSE (gray)	The IP address must be assigned manually (see below).
	TRUE (red)	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.

5.5 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.
HTTP port number	0 to 65535 (**8090**)	Port number for HTTP
HTTPS port number	0 to 65535 (**8443**)	Port number for HTTPS

5.6 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

5.7 PLC configuration

5.7.1 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

5.7.2 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.

The following description applies for program generators 1 to 9.

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.

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

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 limit (tol. band lower limit)		
Minimum	**-99999** to 99999	Admissible minimum value for the lower tolerance limit
Maximum	-99999 to **99999**	Admissible maximum value for the lower tolerance limit
Upper tolerance limit (tol. band upper limit)		
Minimum	**-99999** to 99999	Admissible minimum value for the upper tolerance limit
Maximum	-99999 to **99999**	Admissible maximum value for the upper tolerance 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
	FALSE (gray)	Contact not active
	TRUE (red)	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

Parameter	Selection/data input	Description
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
	FALSE (gray)	Contact not active
	TRUE (red)	Contact active

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

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

5.8 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 Configuration

5.9 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.

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.

The following description applies to program plans 001 to 300.

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.
	FALSE (gray)	Program generator not selected
	TRUE (red)	Program generator selected

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 xx)	**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 xx: 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 xx: 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 contact 32		Operating contacts in the program section
	FALSE (gray)	Operating contact is not active.
	TRUE (red)	Operating contact is active.

5 Configuration

5.10 System status UI

This function area relates to the configuration of the device display.

Screensaver

Parameter	Selection/data input	Description
Function		Activate screen switch-off
	Off	The function is inactive.
	On	The screen is switched off once the waiting period has elapsed.
Waiting period (s) (idle time)	10 to 3600 (**900**)	Waiting period in seconds

6 Startup

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) Check the system status in the display of the CPU.
      Once the system has started up, "Run" is displayed.
   b) Open the device menu and identify the IP address of the interface concerned.
2. Create a new project: Setup program > Projects
   a) Project management: Assign a project designation and, if necessary, create a description.
   b) Save the project file, under a different name if necessary.
3. Create the hardware configuration: Setup program > Project > Hardware assistant
   a) Add the modules to the CPU in the correct order (change the module designation if necessary).
   b) If necessary, select the hardware for the module's expansion slots.
   c) If necessary, add another DIN rail and place router module 705042 as the first module on the DIN rail (router module 705041 must be on the first DIN rail).
   d) If necessary, establish the connection between the router modules.
4. 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).
5. 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".
6. Configure the modules: Setup program > Project > Configuration > Bus
   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 (if setpoint value programs are being used):
      - Configure the program generator (Configuration > PLC configuration)
      - Create the program (Configuration > Programs)
7. Create the CODESYS application: Setup program > Configuration > PLC application
   a) Select and apply the appropriate CODESYS version.

b) Start the PLC configuration.
c) Create the CODESYS application.

8. 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!

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

7 Retrofitting interfaces

This section describes how to retrofit the modules for optional interfaces of central processing unit 705002.

CAUTION!

Incorrect handling may result in damage or malfunctions.

This compromises the function of the central processing unit or the system as a whole.

▶ Only qualified personnel are permitted to carry out module retrofits. The country-specific requirements regarding changes to an electrical device must be observed. Before a retrofit, the system must be shut down and isolated from the power supply.

CAUTION!

Modules may be damaged by electrostatic discharge.

This compromises the function of the central processing unit or the system as a whole.

▶ Modules may only be retrofitted at a grounded workstation and in compliance with the relevant safety measures.

Identifying the module

The module can be identified using the part no. on the packaging.

Assembly	Code (order code)	Part no.	Compatible with interface
RS232 Modbus-RTU (as of system version xx)	51	00679682	Com1, Com2
RS485 Modbus-RTU (as of system version xx)	55	00679678	Com1, Com2
Ethernet (RJ45)	08	00688709	LAN2

NOTE!

For modules that have already been fitted **at the factory**, the type designation on the nameplate of the central processing unit indicates the module type and interface.

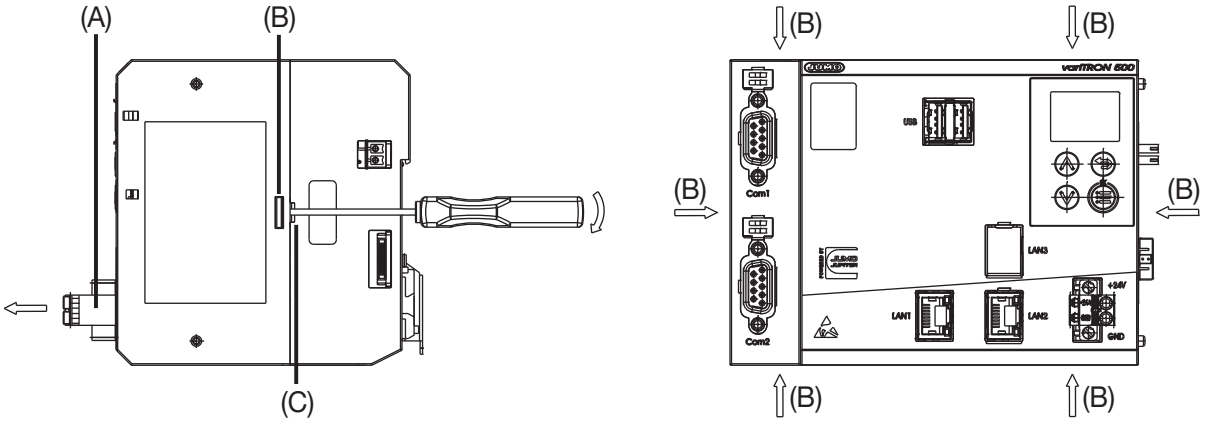
If required, information regarding this can be found in the "Identifying the device version" chapter in operating manual 70500200T90 or installation instructions 70500200T94 (the installation instructions are included in the scope of delivery of the device).

Shutting down the system and removing the central processing unit from the DIN rail

1. Shut down the system and disconnect it from the voltage supply. To do this, loosen the 2 screws of the wired terminal strip +24V/GND and pull the terminal strip forward.
2. If necessary, remove other connecting cables (USB, LAN).
3. Disconnect the central processing unit from the modules and remove from the DIN rail. To do this, please follow the instructions on dismounting previously provided in this document.

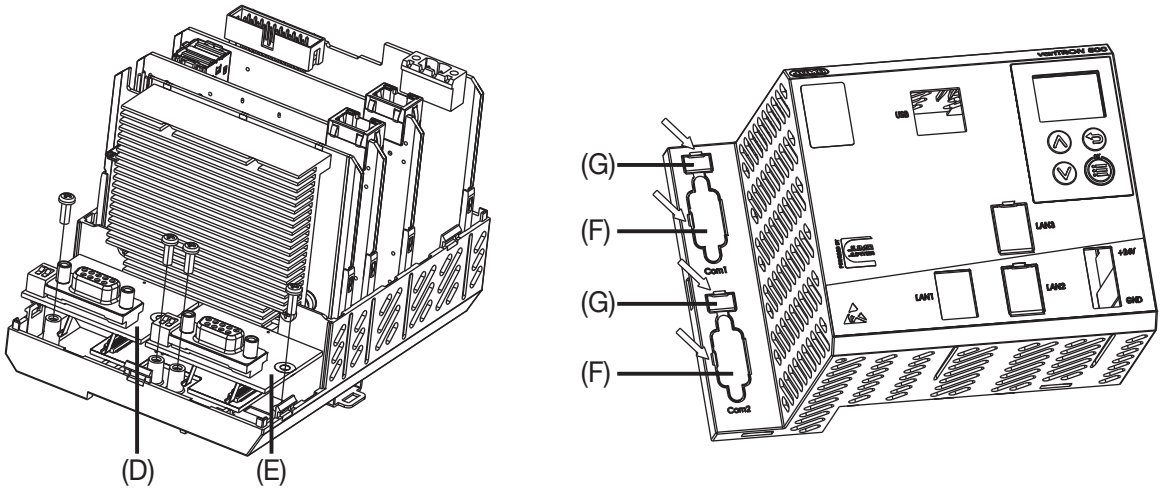
7 Retrofitting interfaces

Opening the housing



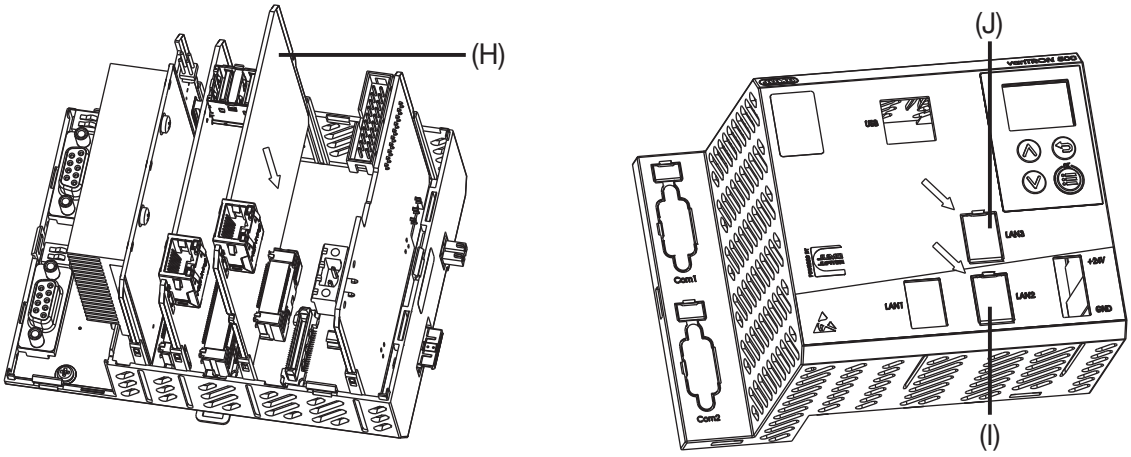
1. Loosen and remove terminal strip (A), if not already done during shutting-down.
2. Loosen all locking hooks (B) one after the other using a screwdriver. To do this, insert the screwdriver into the small slot (C) below the locking hook and turn carefully (maximum 90°). When doing so, pull the housing parts slightly apart so that the locking connections can be released.
3. Remove the upper part of the housing.

Retrofitting an RS232 or RS485 interface



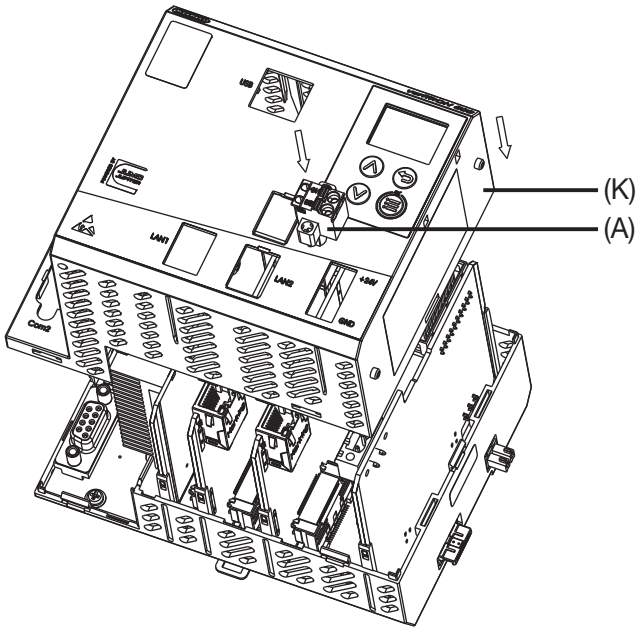
1. Carefully move module for Com1 (D) or Com2 (E) into position until the plug-in connection is connected.
2. Fasten the module with the enclosed screws (tightening torque 0.7 Nm).
3. Use a screwdriver to remove the blind cover (F) of the relevant interface in the upper part of the housing. In case of an RS485 interface, also remove the blind cover (G) for the switches of the terminating resistors.

Retrofitting an Ethernet interface



1. Carefully move module (H) into position until the plug-in connection is connected.
2. Use a screwdriver to remove the blind cover for LAN2 (I) in the upper part of the housing. (Do not remove the blind cover for LAN3 (J).)

Closing the case



1. Place the upper housing part (K) on the lower part and make sure that all locking hooks engage.
2. Attach terminal strip (A) and fasten with the 2 screws (if necessary only during startup).

Positioning the central processing unit on the DIN rail and starting up the system

1. Position the central processing unit on the DIN rail and connect the other modules to the central processing unit. To do this, please follow the instructions on installation/dismounting previously provided in this document.
2. If necessary, reconnect the connecting cables (USB, LAN).
3. Attach wired terminal strip +24V/GND and fasten. Restart the system.

7 Retrofitting interfaces

8.1 Technical data

8.1.1 Interfaces

USB host	
Description	USB
Type	A (socket)
Number	2
Device category	Mass storage class
Application	For connecting a USB flash drive (interfaces cannot be used simultaneously)
Data rate	Low Speed, Full Speed, Hi-Speed
Max. current	500 mA per interface
Ethernet	
Description	LAN1, LAN2 (optional)
Type	RJ45
Number	1 (optional: 2)
Application	Communication with: - PC (setup program, web browser) - Email server - Modbus-TCP master/slave - PROFINET IO device - EtherCAT slave - OPC UA client
Protocol	TCP, IPv4, HTTP(S)
	Via CODESYS as an option: Modbus-TCP, PROFINET IO controller, EtherCAT master, OPC UA server
Transfer rate	10 Mbit/s, 100 Mbit/s
Connection cable	Network cable, at least CAT5 (S/FTP)
Cable length	Up to 100 m
RS232 or RS485 (serial interface)	Depending on the device version
Description	Com1, Com2
Type	D-Sub 9-pole
Number	2
Application	Fieldbus applications, communication via modem with a PC or with an email server
Protocol	Via CODESYS: Modbus-RTU master/slave
Data format	8/1/n, 8/1/e, 8/1/o
Transfer rate	9600 Bd, 19200 Bd, 38400 Bd
System bus	
Description	None (side connector)
Type	System specific
Number	1
Application	Connection of a router module 705041 or an input/output module

8.1.2 Display

Type	LCD, monochrome
Resolution	96 × 64 pixels (8 rows)

8.1.3 Electrical data

Voltage supply	
Connection	At the front (removable terminal strip, 2-pole with Push-In technology)
Voltage	DC 24 V +25/-20 % SELV
Residual ripple	5 %
Current consumption	Max. 1.16 A (at DC 19.2 V) Current consumption of lined-up modules also has to be considered (see "Hardware configuration" in the setup program)!
Power consumption	Max. 25 W
Conductor cross section (voltage supply)	
Wire or stranded wire without ferrule	Min. 1.5 mm^2, max. 2.5 mm^2
Stranded wire with ferrule	Min. 1.5 mm^2, max. 2.5 mm^2
2 × stranded wire with twin core-end ferrule with plastic collar	1.5 mm^2
Stripping length	10 mm
Electrical safety	According to DIN EN 61010-1 Overvoltage category III, pollution degree 2
Protection rating	III
Electromagnetic compatibility	Acc. to DIN EN 61326-1
Interference emission	Class A - only for industrial use -
Interference immunity	Industrial requirement
Data backup	Buffered RAM
Buffer battery service life	Approx. 6 years (lithium battery) Observe fault messages on battery status in the event list (battery almost empty, battery empty)!

8.1.4 Housing and environmental conditions

Case type	Plastic case for DIN rail mounting in the control cabinet (indoor use); DIN rail acc. to DIN EN 60715, 35 mm x 7.5 mm x 1 mm
Dimensions (W × H × D)	135 mm × 101 mm × 101.5 mm (without connection elements)
Weight (fully fitted)	Approx. 590 g
Protection type	IP 20, according to DIN EN 60529
Ambient temperature range	-20 to +55 °C
Storage temperature range	-40 to +70 °C
Resistance to climatic conditions	Relative humidity ≤ 90 % annual average without condensation (climate class 3K3 acc. to DIN EN 60721-3-3 with extended temperature and humidity range)
Site altitude	Up to 2000 m above sea level
Mechanical environmental influences	Classification acc. to DIN EN 60721-3-3, table 6, class 3M2

8.1.5 Approvals and approval marks

Approval mark	Test facility	Certificate/certification number	Inspection basis	Valid for
c UL us	Underwriters Laboratories	Submitted	UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)	All types

8 Annex

8.2 PLC data

System times

	Min.	Max.	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	-	30 ms
System bus cycle time[b] for - Relay module 4-channel - Digital input/output module 12-channel - Digital input/output module 32-channel	7,5 ms	-	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!

The device is equipped with an integrated UPS which guarantees a backup time of 1 second. A time span of 150 ms is available to terminate all IEC tasks in a defined manner. Afterwards they are terminated hard. Subsequently, the retain data is saved.

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.

8 Annex

8.3 Open-source software

The software was developed using open-source software.

8.3.1 Information on open-source software

Insofar as the respectively applicable license terms justify a claim on the provision of source codes or other information, JUMO GmbH & Co. KG will provide the source code and the license texts on a conventional data carrier at the cost incurred by creating the data carrier.

This offer is valid for three years after the software is made available. If provided for in the license terms, this offer is valid beyond that.

For questions regarding open source software, please contact:

Address JUMO GmbH & Co. KG
License Compliance
Moritz-Juchheim-Straße 1
36039 Fulda, Germany

Email licensecompliance@jumo.net

8.4 China RoHS

产品组别 Product group: 705002 部件名称 Component Name	产品中有害物质的名称及含量 China EEP Hazardous Substances Information

	铅 （Pb）	汞 （Hg）	镉 （Cd）	六价铬 （Cr(VI)）	多溴联苯 （PBB）	多溴二苯醚 （PBDE）
外壳 Housing (Gehäuse)	○	○	○	○	○	○
过程连接 Process connection (Prozessanschluss)	○	○	○	○	○	○
螺母 Nuts (Mutter)	○	○	○	○	○	○
螺栓 Screw (Schraube)	○	○	○	○	○	○

本表格依据SJ/T 11364的规定编制。
This table is prepared in accordance with the provisions SJ/T 11364.
○：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
Indicate the hazardous substances in all homogeneous materials' for the part is below the limit of the GB/T 26572.

×：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。
Indicate the hazardous substances in at least one homogeneous materials' of the part is exceeded the limit of the GB/T 26572.

8 Annex

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