

JUMO variTRON 300

Automation System

Central Processing Unit 705003



Operating Manual



70500300T90Z001K000

V3.00/EN/00748411/2021-05-27

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Contents

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

If repairs are needed, return the complete device in clean condition.
Use the original packaging to return goods.

Accompanying letter for repair

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

Do not forget to state the following:

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

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

<http://productreturn.jumo.info>

Protection against electrostatic discharge (ESD)

(ESD = electrostatic discharge)

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

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

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

No liability can be assumed for damage caused by ESD.



CAUTION!

Electrostatic charges occur in non-ESD-protected environments.

Electrostatic discharges can damage modules or components.

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

1 Introduction

1.5.4 Disposal

Disposing of the packaging material

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

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

Disposing of the device



DISPOSAL!

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

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

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

1.6 Identifying the device version

1.6.1 Nameplate

Position

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

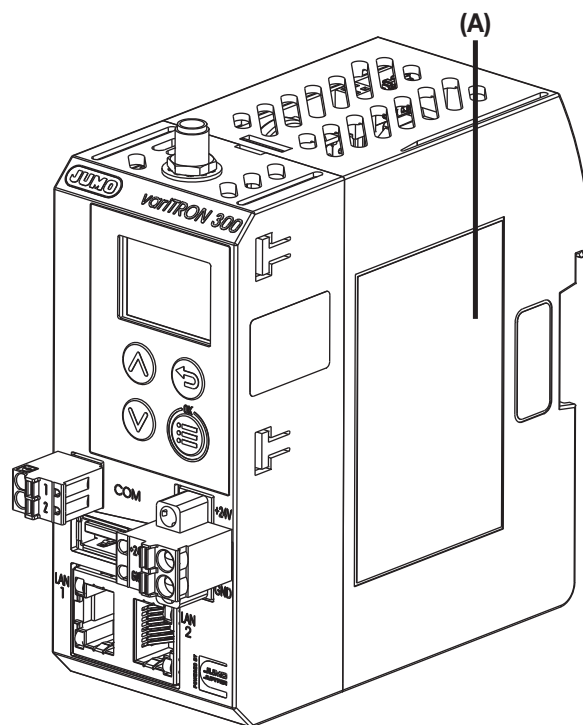


Table of contents

The nameplate contains important information. This includes:

Description	Designation on the nameplate	Example
Device type	Type	705003/01008-00-36/000.224
Part no.	TN	00123456
Fabrication number	F-Nr.	0070033801220500006
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 (order code).

Part no. (TN)

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

Fabrication number (F-Nr.)

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

Example: F-Nr = 00700338012**20500006**

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

The device was therefore produced in the 50th week of 2020.

1 Introduction

1.6.2 Order details

	(1) Basic type
705003	Central processing unit, type 705003 (2 × Ethernet (RJ45), 1 × USB host interface, 1 × RS485 interface), Node-RED)
	(2) Basic type extension 1
0	Single core CPU
	(3) Basic type extension 2
1	RAM 512 MB
	(4) Basic type extension 3
0	eMMC 2 GB ^a
	(5) Basic type extension 4
0	Without software control loops
	(6) Version
8	Standard with default settings
	(7) Wireless interface
00	Without interface
10	Wtrans 868.4 MHz (Europe)
20	Wtrans 915 MHz (America, Australia, Canada and New Zealand)
	(8) Voltage supply
36	DC 24 V +25/-20 %, SELV
	(9) DNV GL approved
000	Without approval
	(10) Extra codes^b
224	PLC according to IEC 61131-3 (CODESYS V3.5; necessary to operate the device as a PLC)
225	Program generator 1 – 9 ^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
289	BACnet/IP ^c

^a Flexible allocation between system data and application data.

^b The central processing unit can be extended with various functions through extra codes. The simultaneous use of these functions is not possible for performance reasons. As a more powerful device, the JUMO variTRON 500 central processing unit (type 705002) is available. Your contact person in Technical Sales will be happy to advise you on selecting the appropriate central processing unit for your application.

^c Only in conjunction with extra code 224.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)							
Order code	705003	/	0	1	0	0	8	-	00	-	36	/	000	,	224	,	...
Order example	705003	/	0	1	0	0	8	-	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 705003, in the ordered version
1 lambda/4-antenna (only for device with wireless interface)
1 installation instructions

1.6.4 Accessories

Designation	Part no.
RJ45 patch cable SF/UTP, length 0.3 m	00747472
Antenna cable, length 1 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 85 °C	00710813
Antenna cable, length 3 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 85 °C	00482646
Antenna cable, length 5 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 85 °C	00490066
Antenna cable, length 5 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 125 °C	00660378
Antenna cable, length 10 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 85 °C	00490068
Antenna cable, length 10 m, impedance 50 ohm with preconfigured screw-type connection, $T_{max.}$ 125 °C	00511870
Antenna holder for wall mounting with antipole for lambda/4-antenna	00482648
Lambda/4-antenna with waterproof line permanently connected, length 10 m, $T_{max.}$ 125 °C	00757047
Additional lambda/4-antenna, impedance 50 ohm, $T_{max.}$ 125 °C	00757039

1 Introduction

1.7 Module overview

1.7.1 Central processing unit

The central processing unit JUMO variTRON 300 along with the proven input and output modules (incl. controller module) as well as the router modules (primarily router module 1-port, 705043) form a complete system.

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

- CODESYS runtime system
- 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 (see order details).

A convenient setup program is used for configuration. JUMO standard functions for CODESYS are provided in libraries (as of system version x) and can be individually integrated into the customer application.

As of system version 5, the central processing unit JUMO variTRON 300 is also optionally usable as a receiver for the JUMO Wtrans transmitters, thereby enabling wireless transmission of measured values.

Module designation	Data sheet	Features
JUMO variTRON 300 Central processing unit	705003	<ul style="list-style-type: none">• Process mapping for all connected input/output modules (incl. controller modules)• Display and keys to display the system status• USB host interface• OPC UA server (in conjunction with PLC)• 9 program generators (in conjunction with PLC)• Field bus interface (RS485; Modbus RTU in conjunction with PLC)• 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 input and output modules are available as module variants (type 7050xx; incl. controller module).

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 acquire and digitize a highly diverse range of process variables.

JUMO variTRON 300 enables simultaneous operation of up to 32 control loops so that it can also be used for sophisticated processes. Through expansion slots the inputs and outputs of each controller module can be individually expanded and adapted. The control loops here operate fully independently, which means they do not require resources from the central processing unit.

Thyristor power controllers can also be connected via EtherCAT or PROFINET. In addition, JUMO digiLine sensors for liquid analysis can be connected to the central processing unit.

Wireless transmission of measured values

As of system version 5, the central processing unit JUMO variTRON 300 is also available with a wireless interface that enables wireless transmission of measured values. The transmitters of the JUMO Wtrans series are available as measuring probes (Wtrans T, Wtrans B, Wtrans p). A maximum of 32 transmitters can be operated on the central processing unit.

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

Input/output modules

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

1 Introduction

Module designation	Data sheet	Features
Digital input/output module 12-channel	705030	<ul style="list-style-type: none"> • 12 digital inputs or outputs • Each channel can be individually configured as an input DC 0/24 V or output DC 24 V • Load capacity per output: 500 mA • Switching states are visualized by LED
Digital input/output module 32-channel (as of system version 3)	705031	<ul style="list-style-type: none"> • 17 digital outputs • up to 15 additional digital inputs or outputs • Load capacity per output: 500 mA • Switching states are visualized by LED
Thyristor power controller Type 70906x (as of system version 3)	709061, 709062, 709063	<ul style="list-style-type: none"> • For one-phase and three-phase operation • Continuous load current up to 250 A, load voltage up to 500 V • Different circuit variants, load types and operating modes can be realized

Special modules

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

Panels

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

Power supply units

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

1.8 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 300	Data sheet	70500300T10...	-	X
Central processing unit	Operating manual	70500300T90...	-	X
	Installation instructions	70500300T94...	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 3)	Data sheet	70503100T10...	-	X
	Operating manual	70503100T90...	-	X
	Installation instructions	70503100T94...	X	X

1 Introduction

Thyristor power controller type 70906x (as of system version 3)	Operating manual (integration in the automation system)	70500153T90...	-	X
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1.8.3 Special modules

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

1.8.4 Panels

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

1.8.5 Power supply units

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

1.9 System version

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

Example composition of a version number for the central processing unit 705003: 431.x.y.z.b

431 = basic number

x = major version (= system version)

y = minor version

z = patch version

b = build number

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

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

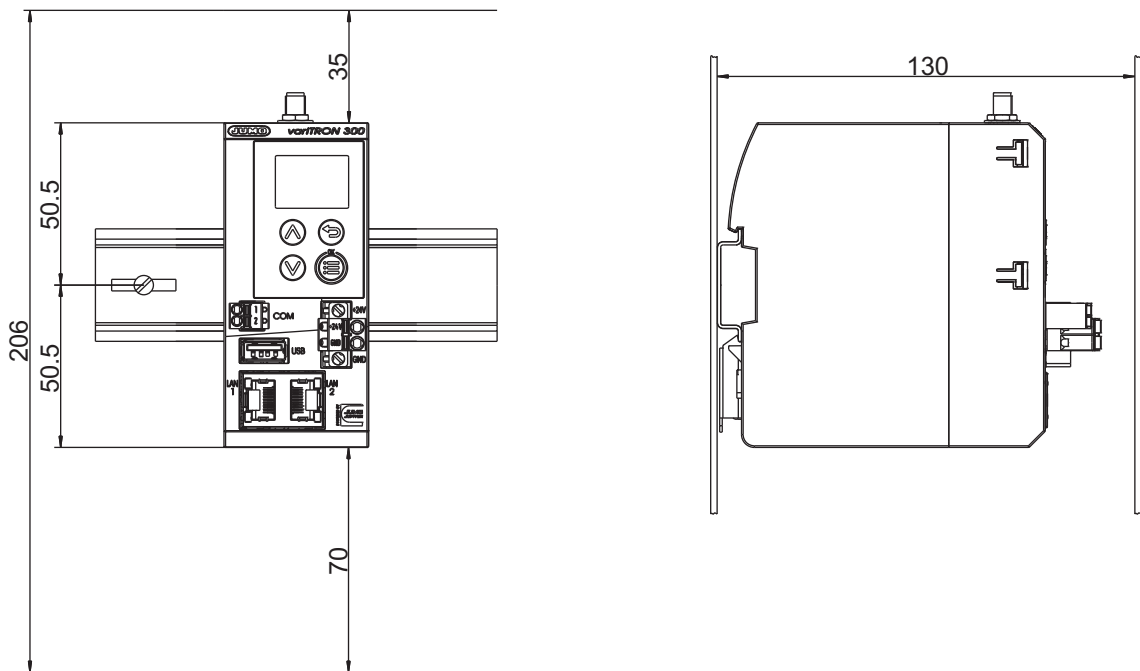
The modules require the minimum distances shown in the following figure for the purpose of installation/dismounting and for future maintenance or replacement. In the event of shorter distances the minimum bending radius of the cables, the performance of the electrical installation, and the clear arrangement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

Cleaning

Only use a dry cloth for cleaning the modules (protection type IP20).

2 Mounting

Minimum distances



NOTE!

The upper minimum distance 35 mm is sufficient to connect a cable to the antenna socket. If the antenna is connected directly to the antenna socket, a minimum distance of 100 mm is required.

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 (or 705043)

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



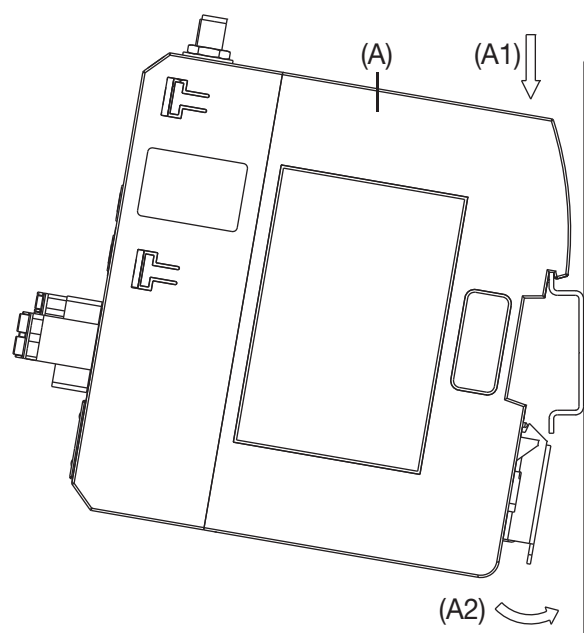
NOTE!

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: $17.5 \text{ mm} + 2 \times 9.5 \text{ mm} = 36.5 \text{ mm}$.

2.2.1 Central processing unit

Installation of the central processing unit 705003



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).

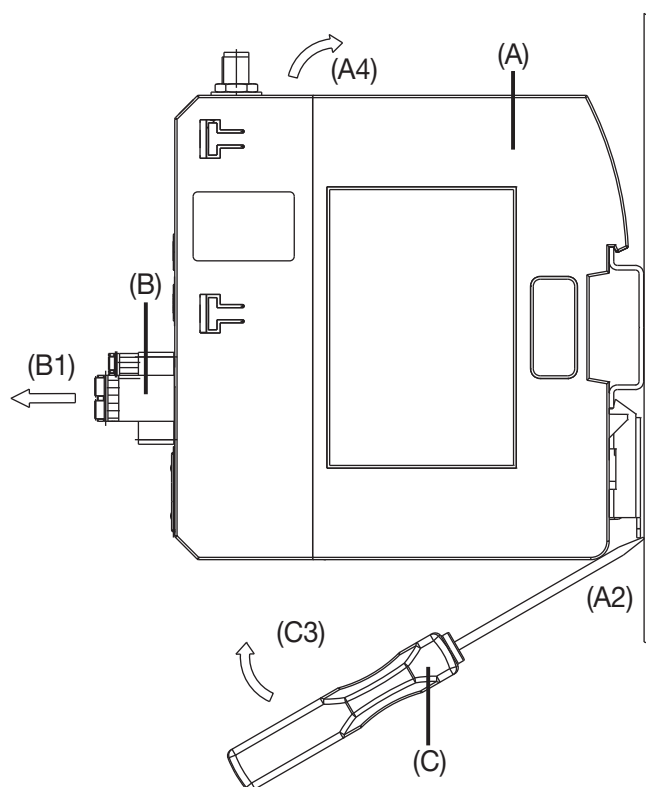


NOTE!

If necessary, activate the terminating resistors of the RS485 interface before installation (see chapter "Electrical connection")!

2 Mounting

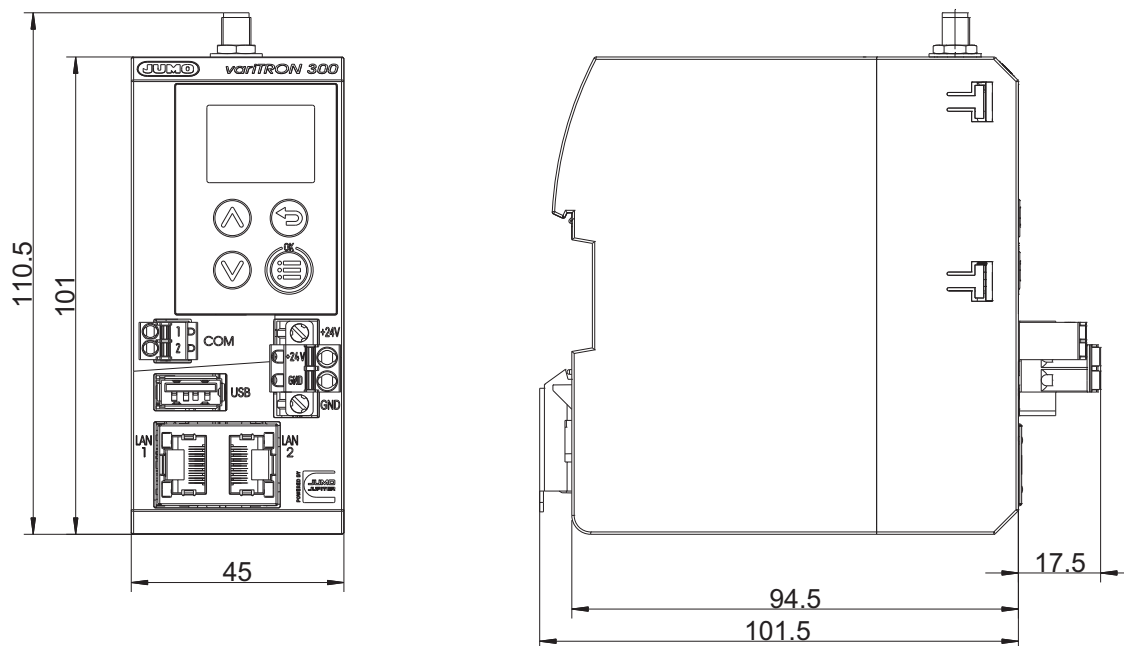
Dismounting of the central processing unit 705003



Process:

1. Remove the connecting cables if required (interfaces).
2. If required, use a screwdriver to release the wired terminal (B) of the central processing unit (A) and pull off toward the front (B1).
3. Insert a suitable screwdriver (C) into the unlocking slot of the central processing unit (A2) and press upward (C3).
4. Pivot the central processing unit (A) upward off the DIN rail (A4) and remove it.

2.3 Dimensions



2 Mounting

3.1 Installation notes



NOTE!

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

Requirements for personnel

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

Cables, shielding, and grounding

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

Ensure that the potential equalization is correct.

Electrical safety

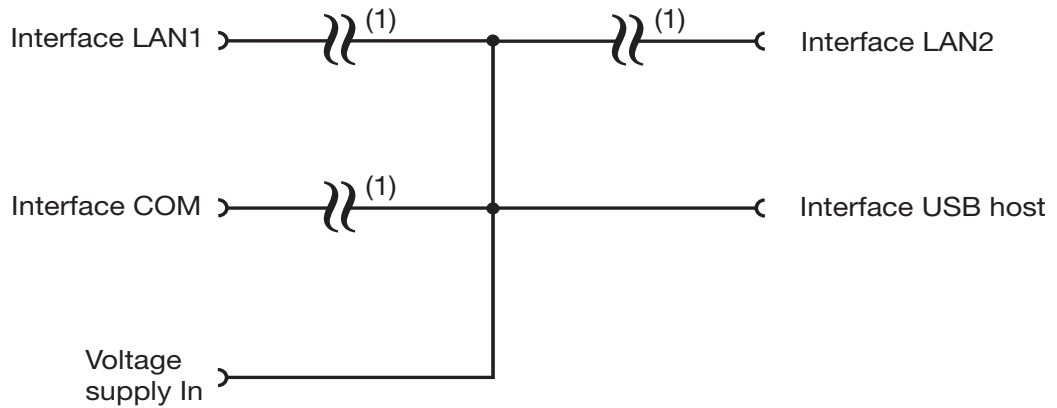
- Isolate power supply units from the voltage supply on the primary side if there is a risk of touching parts with dangerous electrical voltage (e.g. 230 V) during active use.
- The fuse rating of the power supply units on the primary side should not exceed a value of 10 A (inert).
- With modules that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

References to other information

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

3 Electrical connection

3.2 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).

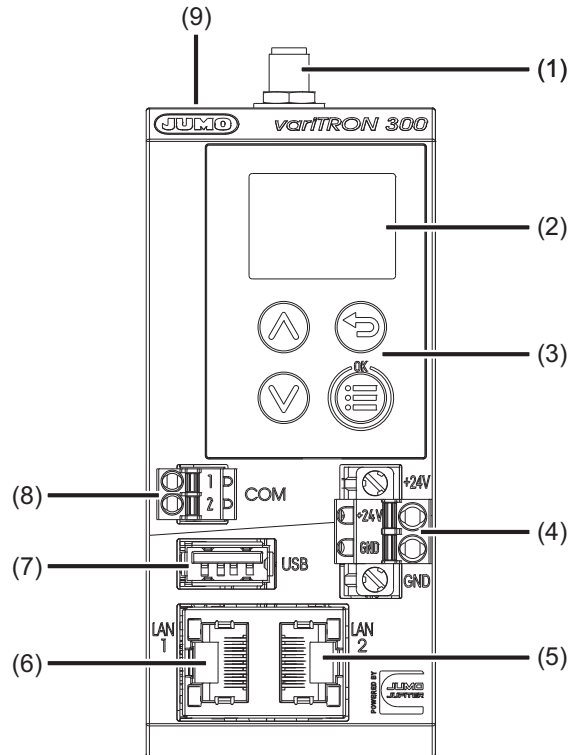
As a result the insulation of the cable may be damaged.

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

3.3.1 Display, operating, and connection elements

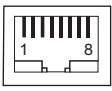
This overview shows the position of the display, operating, and connection elements. The assignment to individual functions is illustrated in the following sections.

3 Electrical connection



- (1) Antenna connector
- (2) Display
- (3) Control elements
- (4) Voltage supply DC 24 V
- (5) Interface LAN2
- (6) Interface LAN1
- (7) USB host interface
- (8) RS485 interface
- (9) Switches for terminating resistors (RS485), inside the housing

3.3.2 Interfaces

Connection	Designation	Number	Connection element	Assignment
Antenna (optional)		(1)	SMA socket	
Ethernet	LAN1, LAN2	(6), (5)		1 TX+ Transmission data + 2 TX- Transmission data - 3 RX+ Received data + 6 RX- Received data -
USB host	USB	(7)	USB socket type A	
Serial interface RS485	COM	(8)	Terminal strip 2-pole	1 TxD+/RxD+ Transmission/received data + 2 TxD-/RxD- Transmission/received data -

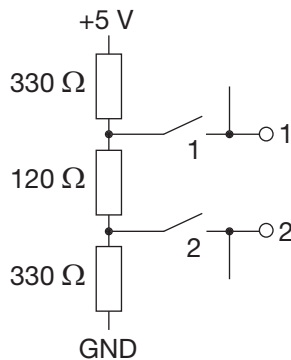
3 Electrical connection

3.3.3 Voltage supply

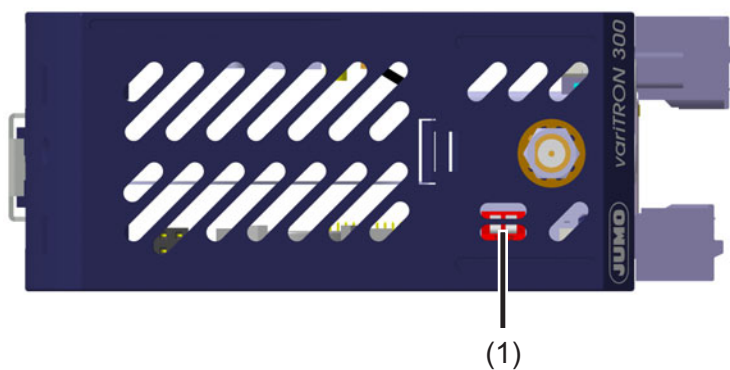
Connection	Designation	Number	Symbol and terminal designation
Voltage supply In	+24 V and GND	(4)	

3.3.4 Terminating resistors

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



The switches are located inside the housing and are accessible through the ventilation slots (1).



NOTE!

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

4.1 General information

The following options are available to operate the device:

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

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

IP address

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

The Ethernet settings may need to be changed beforehand using the device menu (Configuration > Ethernet > LANx). A user 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 87

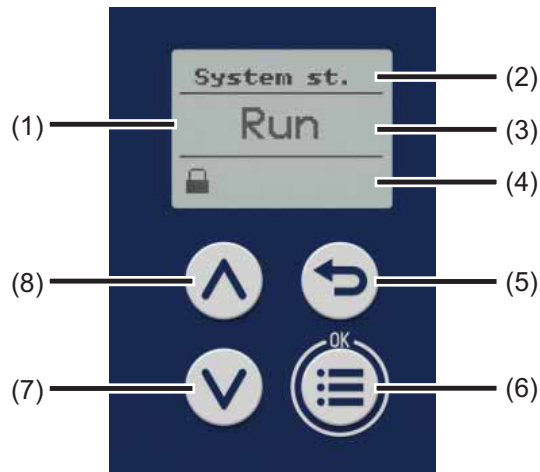
Device-specific information in this chapter

All the information in this chapter that refers to the JUMO variTRON 500 (705002) device also applies in principle to the JUMO variTRON 300 (705003) device. Differences between the devices will be mentioned at the relevant points if necessary for the use of this manual. Device-specific sections or subchapters are also used where required.

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), Reboot system	---	---

⇒ chapter 4.4.1 "Device information", Page 58

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)
		Max. round-trip time (to be entered)
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

4 Operation

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 60

Device info

Sub-menu 1	Sub-menu 2	Sub-menu 3	
Device information	Device	Device name (display)	
		Total root volume memory (display)	
		Product group (display)	
		Recorder service ID (display)	
		Certification number (inspection number) (display)	
		Fabrication number (production number) (display)	
	Hardware versions	(dependent on what hardware is fitted to the device) Submenu 4 displays:	<ul style="list-style-type: none"> – Hardware type – Comment – LP ID – Compatibility index – Hardware version
		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 58

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	---	---
Export license request (as of system version 4)	Functions (extra codes) that can be enabled. A separate request file (license request) must be exported for each function.	---
Import license file (as of system version 4)	If several functions are available, they must be enabled one after the other. A separate response file (license file) is required for each function.	---

4.2.3 User log-on

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.

4 Operation



CAUTION!

Reset to default settings

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

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



NOTE!

Resetting to factory settings with the "Menu/OK" (6) and "Down" (7) keys also removes the extra codes (chargeable functions). For this reason, the files for enabling the extra codes (also referred to as license files or FeatureResponse files) should be stored after initial receipt in such a way that they are available again for transfer to the device after a factory reset (see JUMO Web Cockpit > Service).

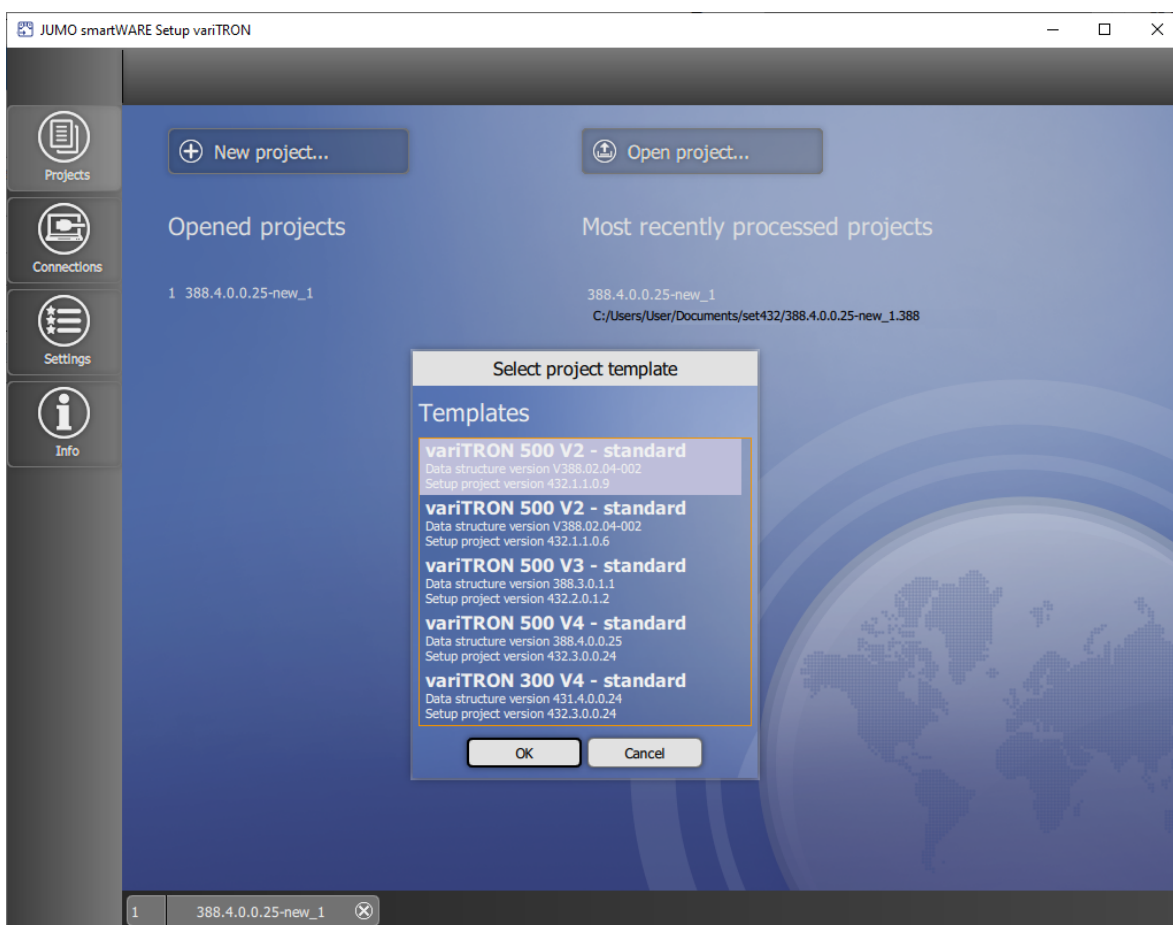
4.3 Setup program

4.3.1 Start page

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

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

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



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

- Projects: Create new project, open existing project
- Connections: Configure and manage connections to devices
- Settings: Select the language of the setup program
- Info: Display information about the setup program

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



NOTE!

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

4 Operation

4.3.2 Project map

Create project using individual functions

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



The following functions are available within a project:

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

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

4.3.3 Project management

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



Parameters/functions:

- Filename (non-editable): Project file name, which was automatically assigned when creating the project.
- Path (non-editable): Path under which the project file has been saved.
- Project version (non-editable): Version of the setup project
- Device version (non-editable): Version of the device software
- Project name (button): Opens a window for entering a designation for the project (in several languages).
- Description: Input field for providing a more detailed description of the project (in one language)

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

4 Operation

4.3.4 System bus HW assistant

Define the hardware configuration for the entire system



The window is separated into three areas:

- Hardware configuration
- System components
- Settings (at the bottom; hidden here)

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 300 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).

Since the variTRON 300 CPU does not have any lateral connections for power supply and system bus, a router module is required (primary: router module 1 port) to connect further modules. In the setup program, this router module must be placed on an additional DIN rail. In a real system, it can be placed on the same DIN rail as the central processing unit.

In the setup program, the connection between the router module and the central processing unit is established in the same way as the connection between router modules (see following description). In the real system, a commercially available network cable is used (min. CAT5, S/FTP; connection to the LAN2 socket of the central processing unit).

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

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

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.

With the "Bus Scan" button, the system bus of the connected device is scanned and the hardware configuration is read into the setup project.

System components

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

Settings

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

- Product group number (non-editable)
- Designation (button): Opens a window for entering a designation for the system component (in several languages)
- Module label: Tag name for the system component (editable; can no longer be changed once the hardware configuration has been applied)
- Expansion slot (dependent on the module): For selecting the option (open the drop-down menu by clicking on it)
- Optional module (alias device address): ⇨ chapter 4.3.5 "Optional module (alias device address)", Page 40



NOTE!

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

Router units

If the hardware configuration contains router units (router modules), these units must be connected with one another. To do so, proceed as follows (also applies analogously to the connection between the variTRON 300 CPU and the router module):

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 Operation

4. If necessary, establish connections to other router modules (connections are depicted by different colors for the relevant RJ45 sockets).

4.3.5 Optional module (alias device address)

Basic differences between the mandatory module and optional module

Mandatory module:

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

Optional module:

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

Differences at system start and during operation

System start:

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

During operation:

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

Configuration of optional modules

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

- Router module 2-port (705041)

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

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

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

- Router module 3-port (705042)

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

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

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

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

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

- Router module 1-port (705043)

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

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

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

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

4 Operation

4.3.6 Wtrans HW assistant

Select Wtrans transmitters (wireless measured value transmission)



The window is separated into three areas:

- Transmitter configuration
- System components
- Settings

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

Transmitter configuration

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

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

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

System components

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

Settings

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

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

4 Operation

4.3.7 Configuration

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



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

- Device manager: Device settings (device language, start-up behavior), time zone/NTP, date and time, customer-specific linearization (as of system version 5)
- Node-RED (as of system version 4): Activation of programming tool Node-RED
- 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, analog and digital variables (as of system version 5)
- PLC parameters: Display of the configuration structures that were created using the CPV Editor (CPVE)
- Programs: Creation of programs using the program editor (setpoint values, operating contacts)
- System status UI: screensaver (activation and waiting period)
- Real-time processing (as of system version 5): Configuration of data recording
- Datastore gateway (as of system version 5): Configuration of the connection to the database
- Cloud gateway: Configuration of the connection to JUMO Cloud (as of system version 4)
- Wtrans gateway (only for variTRON 300): Settings for using the JUMO Wtrans transmitters (as of system version 5)
- Batches (as of system version x): Configuration of batch reporting

Details can be found in the "Configuration" chapter.

⇒ chapter 5 "Configuration", Page 65



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).

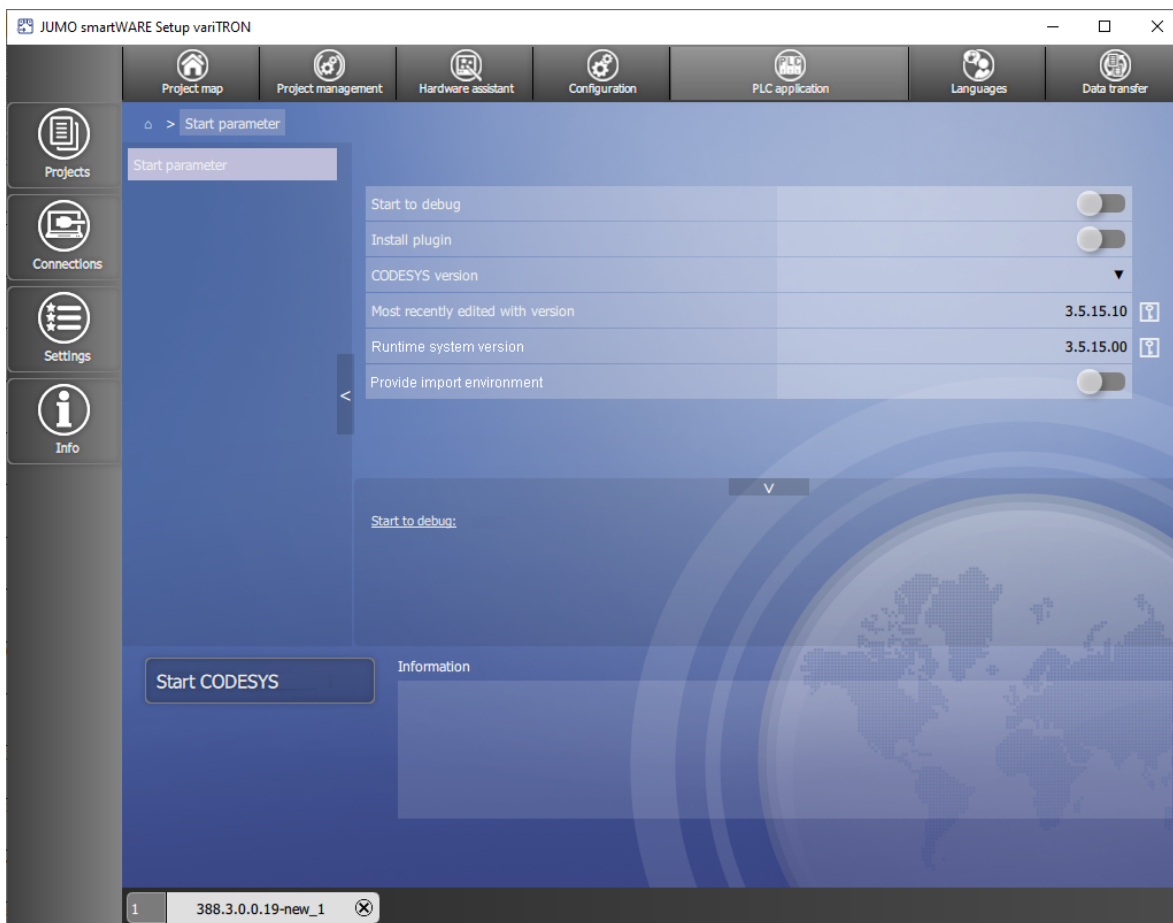
The process of configuring the modules (controller, relay, analog IO units, digital IO units) is described in the operating manual for the respective module.

⇒ chapter 1.8 "Available technical documentation", Page 17

4 Operation

4.3.8 PLC application

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



Parameters/functions:

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

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

4.3.9 PLC parameter definition

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

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



NOTE!

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

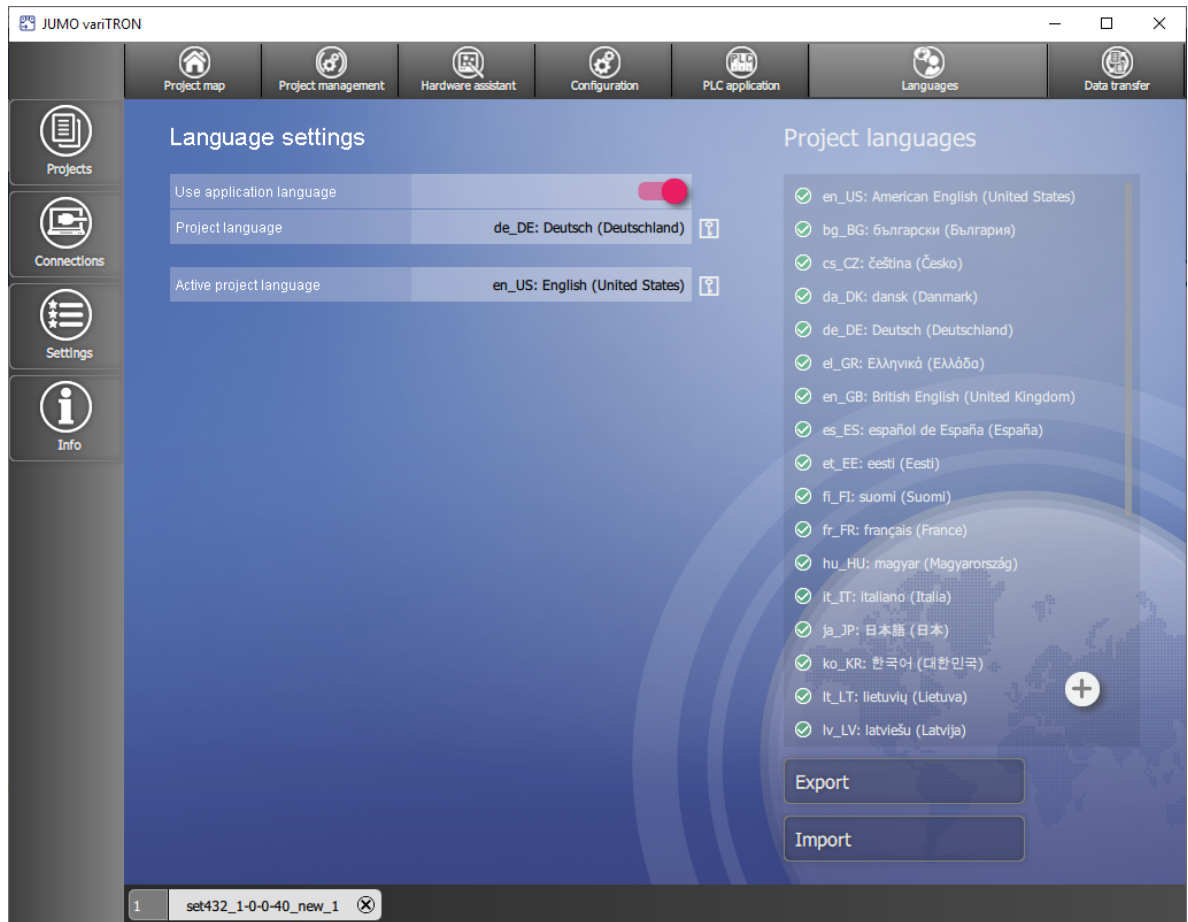
The CPV Editor requires specific knowledge and is intended for use by the manufacturer only (service that is subject to a fee).

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

4 Operation

4.3.10 Languages

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



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 Operation

4.3.11 Data transfer

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



Connection

Parameters/functions:

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

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

Transfer settings

Parameters/functions:

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



NOTE!

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



CAUTION!

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

This interrupts the processing of the PLC application.

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

Default settings:

Transfer type for sending or export: Complete configuration (as of system version 3: selective conf.)

Transfer type for extraction or import: Selective configuration

Data packet	Send/Export	Extract/import
User management (AccessControlManager)	No (= gray)	Do not transfer
Device manager	Yes (= red)	Only visible values of known parameters
Node-RED (as of system version 3)	No (= gray)	Do not transfer
Bus	Yes (= red)	Structure and values
Ethernet	Yes (= red)	Only visible values of known parameters

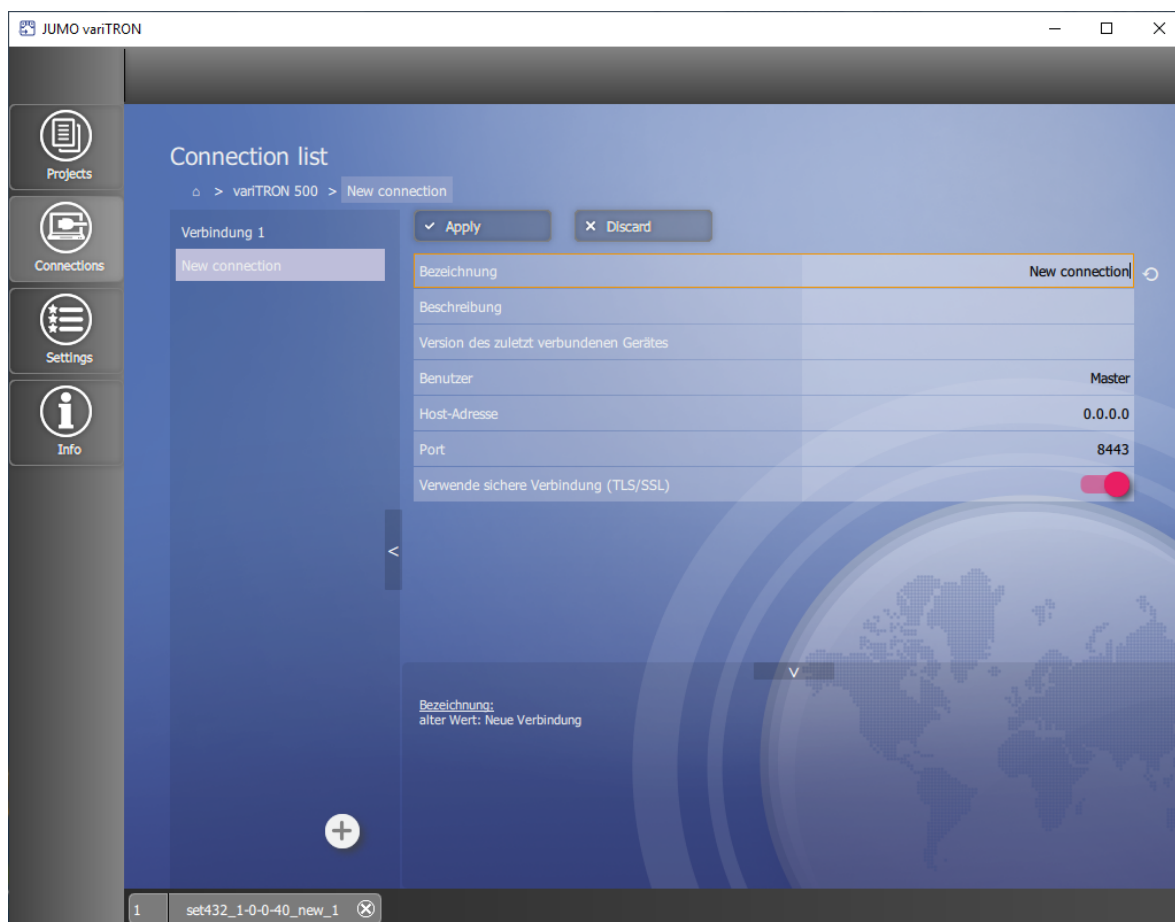
4 Operation

Data packet	Send/Export	Extract/import
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
CODESYS 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
Real-time processing (as of system version 5)	Yes (= red)	Only visible values of known parameters
Datastore gateway (as of system version 5)	Yes (= red)	Only visible values of known parameters
Cloud Gateway (as of system version 4)	Yes (= red)	Only visible values of known parameters
Wtrans Gateway (only for variTRON 300)	Yes (= red)	Only visible values of known parameters
Batches (as of system version x)	Yes (= red)	Only visible values of known parameters

4.3.12 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 5.6 "Web server", Page 70
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).

4 Operation

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 Cockpit

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

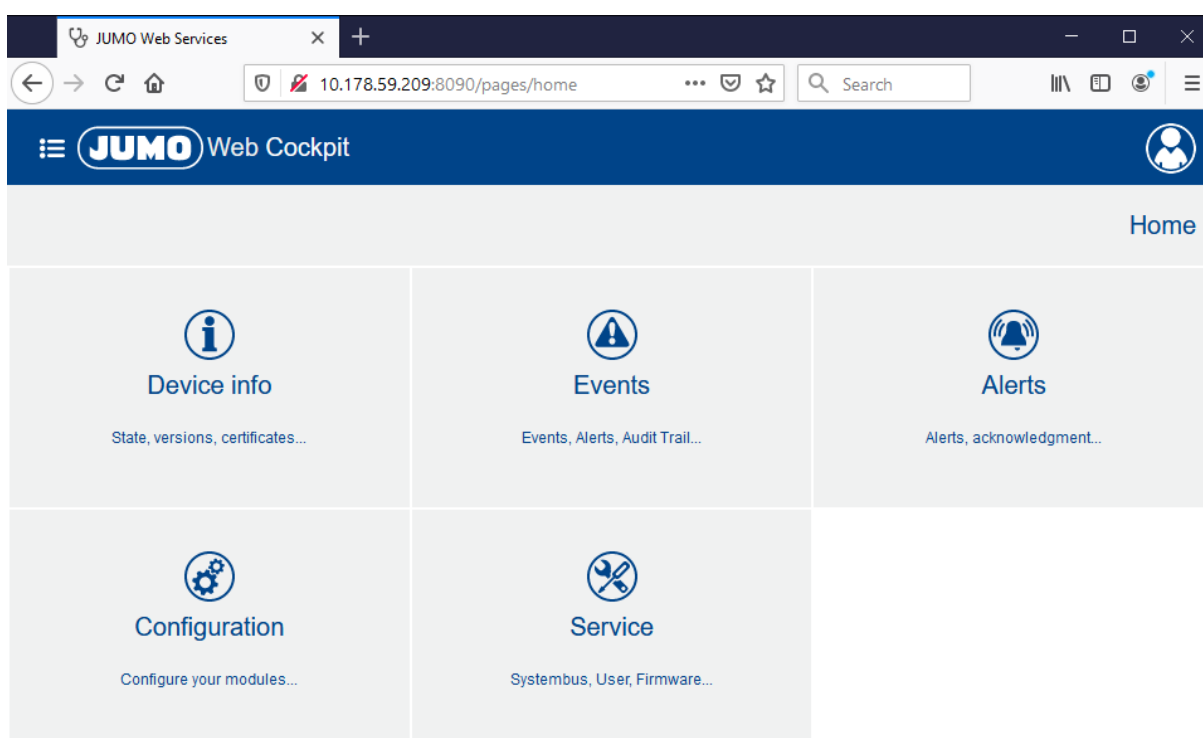


NOTE!

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

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

Homepage

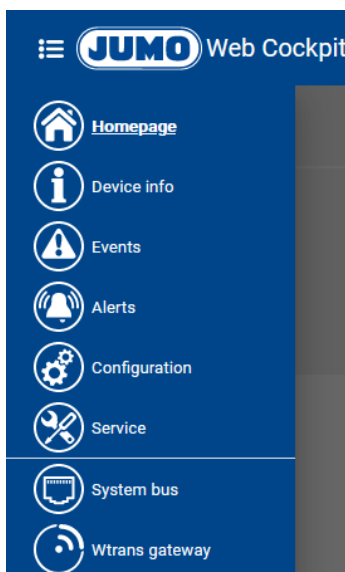


4 Operation

Designation	Description
Device info	Status, versions, certificates, etc. <ul style="list-style-type: none">• Display device information• Display and change the system status (Run, Stop, etc.)• Display Ethernet parameters• System monitoring (battery, memory, temperatures, voltage values)• Certificate management (display certificates)• PLC runtime system (display information)• PLC application (display information)• License management (display extra codes)• Real-time processing (display information on data recording)• Datastore gateway (export status, version)• Cloud gateway (status, version)• Only for variTRON 300: Wtrans gateway (version, radio frequency, Wtrans transmitters)
Events	Events, alarms, audit trail, etc. <ul style="list-style-type: none">• Messages shown in a list• Filter by message type• Filter by keyword• Plain-text search• Delete messages
Alerts	Alarms, acknowledgement, etc. <ul style="list-style-type: none">• Messages shown in a list• Filter by message type• Filter by keyword• Full-text search• Acknowledge alarms
Configuration	Configure modules, etc. <ul style="list-style-type: none">• Configure device• Configure connected modules (system bus)
Service	System bus, users, firmware <ul style="list-style-type: none">• EtherCAT (system bus): Display information on the master and slaves (modules); perform actions• Only for variTRON 300: Wtrans gateway (status of transmitters)• User management: Create users, assign roles• Import configuration: Transfer configuration file (.jcf) to the device• Extract configuration: Extract configuration from the device and save it as a file (.jcf)• Function activation: Activate extra codes• Firmware: Update the device firmware• Log list: Extract log entries from the device• Debug: Extract debug data from the device and create a debug file (.jdf)

"Menu" button

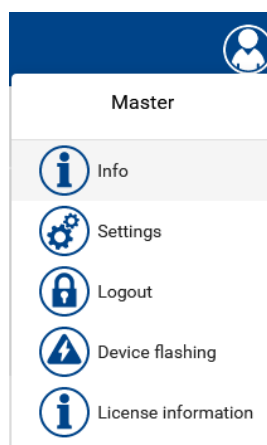
The functions on the homepage can also be accessed using the "Menu" button:



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

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

"User" button



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

4 Operation

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:

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

Ethernet

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

System monitoring

Information on the system battery status, memory usage, CPU temperature, and system voltages 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 runtime system

Information about the PLC runtime system is displayed here.

¹ variTRON 300: Retain area available as of system version x.

PLC application

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

License management

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

Real-time processing

Information on the relevant function (e.g. data recording) is displayed here (thread runtime, cycle counter, time-out counter, wakeup deviation).

Datastore gateway

Information about data recording is displayed here (version, export status of recorded data, database fill level).

Cloud gateway

Information about the cloud gateway is displayed here (status, version).

Wtrans gateway (only for variTRON 300)

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

4.4.2 Events

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

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

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

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

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 Operation

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 65

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

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. In addition, the customer-specific linearization is configured here (as of system version 5).

System bus

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



NOTE!

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

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

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), the program generators are configured, and settings for the analog and digital variables (as of system version 5) are made.

PLC parameters

If applicable, PLC parameters are defined here.

Programs

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

System status UI

The screensaver is configured here.

Wtrans gateway (only for variTRON 300)

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

Real-time processing

Here the process values to be recorded are selected and the data recording is configured (available as of system version 5).

Datastore gateway

Here the connection to the database (datastore) is configured and activated (available as of system version 5).

Cloud gateway

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

Node-RED

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

Batches

Batch reporting is configured here (available as of system version 5).

4 Operation

4.4.5 Service

EtherCAT (system bus)

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

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

The following functions are available:

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



CAUTION!

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

This interrupts the cyclic transmission of values.

- ▶ Use this function for servicing purposes only!

Wtrans gateway (only for variTRON 300)

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

User management

Users are created and assigned user rights here.

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

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

Administrator	ReadOnly	SystemStatusUi	WebUi	Right	Description
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
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 Cockpit" 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.

4 Operation

Function activation

Extra codes are activated here.

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



NOTE!

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

Firmware

The device's firmware is updated here.

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

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

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](#)

5.1 General information

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

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

Function area	Device	Setup program	Web application
Device manager	X ^a	X ^a	X
Node-RED		X	X
Bus (system 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
Real-time processing		X	X
Datastore gateway		X	X
Cloud gateway		X	X
Wtrans gateway (only for variTRON 300)		X	X
Batches		X	X

^a Some functions are not available.



NOTE!

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

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.
Maximum round-trip time	0 bis 99999 (5)	Maximum time in seconds between the client's request and the server's response (for local time server).

Date and time

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

5.2.1 Customer-specific linearization

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

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

Formula

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

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

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of linearization
Measuring range start (Ymin)	-99999 to 99999 (0)	Start value of the y axis
Measuring range end (Ymax)	-99999 to 99999 (100)	End value of the y axis
Decimal places	0 to 6 (4)	Number of decimal places
Polynomial:		
X0	-99999 to 99999 (0)	Absolute component of the polynomial (point of intersection with the y axis)
X1	-99999 to 99999 (1)	Coefficient of the linear component (x)
X2	-99999 to 99999 (0)	Coefficient of the quadratic component (x ²)
X3	-99999 to 99999 (0)	Coefficient of the cubic component (x ³)
X4	-99999 to 99999 (0)	Coefficient of the quartic component (x ⁴)
...	-99999 to 99999 (0)	(max. up to 20th order)

Grid values

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

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of linearization
Decimal places	0 to 6 (4)	Number of decimal places

5 Configuration

Parameter	Selection/data input	Description
Grid values:		
Measured value (X)	-99999 to 99999 (0)	Value of the relevant grid point on the x axis
Linearized value (Y)	-99999 to 99999 (0)	Value of the relevant grid point on the y axis

5.3 Node-RED

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

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

5.4 System bus

Master

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



NOTE!

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

Modules

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

⇒ chapter 1.8 "Available technical documentation", Page 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 Configuration

5.5 Ethernet

LAN1

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

LANx

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

5.6 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

5.7 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

5.8 PLC configuration

5.8.1 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

5.8.2 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.

5 Configuration

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

Names of operating contacts

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

5 Configuration

Tolerance band monitoring

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

Setting of setpoint values: setpoint specification

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

Setting of setpoint values: setpoint limits

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

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

Setting of setpoint values: setpoint values for manual mode

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

Setting of setpoint values: setpoint values for basic status

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

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Setting of setpoint values: setpoint value units

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

5.8.3 Analog variables

These settings affect the use of the analog variables (analog PLC outputs) for functions that have been implemented in the device firmware (e.g. data recording; as of system version 5).

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

5.8.4 Digital variables

These settings affect the use of the digital variables (digital PLC outputs) for functions that have been implemented in the device firmware (e.g. data recording; as of system version 5).

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

5.9 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).

5.10 Programs

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

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

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

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

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.
	Off (FALSE)	Program generator not selected
	On (TRUE)	Program generator selected

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Program channel

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

5.11 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

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5.12 Real-time processing

5.12.1 Data recording

The process values (analog and digital signals) to be recorded are selected here (available as of system version 5). The process values are organized in groups as analog or digital channels.

Several groups with a total of up to 240 channels (analog and digital channels) can be configured (device-dependent). The input signals of the channels are selected from a selector.

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



NOTE!

The user must ensure that the number of usable (licensed) channels is not exceeded. The sum of analog and digital channels of all groups is decisive for this.. This is not automatically checked in the setup program or in the Web Cockpit.

If the number of licensed channels is exceeded during the configuration of a group, this results in the complete group not being recorded and a fault message being issued.

Parameter

Parameter	Selection/data input	Description
Name	Enter text (or use existing text)	Designation of the group The designation is displayed in the visualization (JUMO smartWARE Evaluation).

Analog channels

Parameter	Selection/data input	Description
Input signal	Select signal from selector	Analog signal System version 5: Analog PLC outputs (analog values 001 to 120)

Digital channels

Parameter	Selection/data input	Description
Input signal	Select signal from selector	Digital signal (binary signal) System version 5: Digital PLC outputs (binary values 001 to 120) or signal from the event list (central detector: active after each new alarm, inactive after acknowledgement).

Standard operation

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

The following values are determined within a recording interval:

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

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5.13 Datastore gateway

Here the connection to the database (Datastore) is configured and activated (available as of system version 5). In the Datastore, the recorded process data is stored. The data is then available for evaluation with JUMO smartWARE Evaluation (as of system version x).

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

5.14 Cloud gateway

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

Parameter	Selection/data input	Description
Connection to the cloud		Connection to the cloud server
	Inactive	No connection
	Active	The connection is active.
Cloud server		Selection of the cloud server
	JUMO Cloud	The JUMO Cloud is used. Individual settings are ignored.
	Individual	The cloud server is determined by an individual URL.
Individual URL for configuration (as of system version 05)	Enter URL	URL of the cloud server If the JUMO Cloud is not used, a different URL can be entered here.
Individual URL for MQTT (as of system version 05)	Enter URL	URL of the cloud server (MQTT protocol) If the JUMO Cloud is not used, a different URL can be entered here.
Device ID	Enter device ID	ID used by the device (data source) to authenticate itself to the cloud. The device ID is automatically assigned during configuration in the cloud.
Password	Enter password	Password used by the device (data source) to authenticate itself to the cloud. The password is automatically assigned during configuration in the cloud.
Permanent live mode		In permanent live mode, the live data is permanently sent to the cloud (see cycle time), regardless of the configuration in the cloud.
	Inactive	No permanent live mode The transfer of live data depends on the configuration in the cloud
	Active	The permanent live mode is active.
Cycle time for live data [ms]	250 to 25000	Interval at which live data is sent to the cloud when permanent live mode is active.



NOTE!

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

5 Configuration

5.15 Wtrans gateway

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

General

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

Wtrans transmitter

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

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

NOTE!

Wtrans B (707060) with thermocouple: With system version 5, only types J, K, and B are supported.



5.16 Batches

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

Up to 20 batches can be configured (device-dependent). The batch data is displayed together with the channels of the assigned groups and the event messages in the batch visualizations (available as of system version x; evaluation with JUMO smartWARE Evaluation).



NOTE!

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

General information

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

Batch lines

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

Parameter	Selection/data input	Description
ID	Enter text (or use existing text)	Designation (ID) of the relevant line of the batch report (e.g. for use in the PLC application) The identifier must be unique within a batch.
Text left column	Enter text (or use existing text)	Text in the left column of the batch report. The left column contains the designation for the content of the right column.
Contents of right column		Text or text source for the right line of the batch report
	Empty	No text
	Default text	Text from the "Default text" parameter
	Batch name	The batch name is used (see "General" section).
	Batch number	The batch number is used together with the text from "Default text". The batch number is incremented at the end of batch reporting.
	Batch start	Start (date and time) of batch reporting
	Batch end	End (date and time) of batch reporting
	Batch duration	Duration of batch reporting (time difference between batch start and batch end)

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Parameter	Selection/data input	Description
Delete line		Only for "Default text": The parameter decides whether a text edited during batch reporting is replaced again by the text specified in the configuration after the batch has been completed.
	Off (FALSE)	Text changes are retained.
	On (TRUE)	The original text (default text) is used for the next batch reporting.
Default text	Enter text (or use existing text)	The text is used in the batch report if the text in the right column is composed of "Default text" or "Batch number".
Editable		This parameter enables editing of the text within the current batch report.
	Off (FALSE)	The text in the right column can only be edited by changing the "Default text".
	On (TRUE)	The text in the right column can be changed - for the current batch report. Depending on the "Delete line" parameter, the configured text can be automatically reactivated after the batch is completed.

Batch number

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

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) Select project template (central processing unit and version)
 - b) Project management: Assign a project designation and, if necessary, create a description.
 - c) Save the project file, under a different name if necessary.
3. Create the hardware configuration: Setup program > Project > System bus hardware assistant
 - a) Add DIN rail and place router module 1-port (705043) or router module 3-port (705042) as the first module on the DIN rail.
Since the variTRON 300 CPU does not have any lateral connections for power supply and system bus, a router module is required (primary: router module 1 port) to connect further modules. In the setup program, this router module must be placed on an additional DIN rail. In a real system, it can be placed on the same DIN rail as the central processing unit.
 - b) Establish connection between central processing unit and router module.
 - c) Add the modules to the router module in the correct order (change the module designation if necessary).
 - d) If necessary, select the hardware for the expansion slots.
 - e) If necessary, add another DIN rail and place router module 1-port (705043) or router module 3-port (705042) as the first module on the DIN rail. (router module 705041 must be on the first DIN rail). In this case, place an additional router module 2-port (705041) on the preceding DIN rail (position is arbitrary).
 - f) If necessary, establish the connection between the router modules.
4. If necessary, create Wtrans hardware configuration (as of system version 5): Setup program > Project > Wtrans hardware assistant
 - a) Select Wtrans transmitters
5. Configure the connection to the CPU: Setup program > Connections
 - a) Enter the CPU's IP address under "Host address".
 - b) If necessary, enter the designation and description.
 - c) Use the user "Master" available per default.
 - d) Use port 8443 (if the connection is secure).
6. Transfer the project (hardware configuration only) to the CPU: Setup program > Project > Data transfer
 - a) Select the connection that was previously configured.
 - b) Establish the connection ("Connect..."), and enter the default password 9200 when doing so.
 - c) Send the configuration to the CPU ("Send to device").

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- d) Check the status LED of all modules.
The LED will light up steady green as soon as the system bus has the status "Operational".
7. Configure the modules: Setup program > Project > Configuration > Bus
 - a) Configure the digital and analog inputs and outputs.
 - b) If necessary, configure the controller function of the controller module (incl. controller parameters).
 - c) If necessary, configure other functions (e.g., limit value monitoring function, setpoint values).
 - d) If necessary, configure the CPU (e.g. if setpoint value programs are being used):
 - Configure the program generator (Configuration > PLC configuration)
 - Create the program (Configuration > Programs)
8. If necessary, configure the Wtrans transmitters (as of system version 5): Setup program > Project > Configuration > Wtrans gateway
 - a) Select radio frequency.
 - b) Set transmitter ID and value for radio timeout.
 - c) If necessary, set parameters for processing the transmitted measured value (factor, offset, linearization).
9. Create the CODESYS application: Setup program > Configuration > PLC application
 - a) Select and apply the appropriate CODESYS version.
 - b) Start CODESYS.
 - c) Create the CODESYS application.
10. Transfer the project to the CPU: Setup program > Project > Data transfer
 - a) Send the configuration (incl. CODESYS application) to the CPU ("Send to device").



NOTE!

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

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



NOTE!

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

Further information

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

- JUMO Cloud
- JUMO smartWARE SCADA
- JUMO smartWARE Evaluation (as of system version x)

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

7.1 Technical data

7.1.1 Interfaces

USB host Designation Type Number Device category Application Data rate Max. current	USB A (socket) 1 Mass storage class For connecting a USB flash drive Low Speed, Full Speed, Hi-Speed 500 mA
Ethernet Designation Type Number Protocol Application Transfer rate Connecting cable Cable length	LAN1, LAN2 RJ45 2 TCP, IPv4, HTTP(S) Via CODESYS as an option: Modbus TCP, PROFINET IO controller, EtherCAT master, OPC UA server, BACnet/IP Communication with: - PC (setup program, web browser) - email server - Modbus TCP master/slave - PROFINET IO device - EtherCAT slave - OPC UA client - BACnet/IP server/client - JUMO system bus via JUMO variTRON router modules (LAN2 only) 10 Mbit/s, 100 Mbit/s Network cable, at least CAT5 (S/FTP) Up to 100 m
RS485 (serial interface) Designation Type Number Application Protocol Data format	Com Removable terminal strip, 2-pole with PUSH IN technology 1 Fieldbus applications, communication via modem with a PC or with an email server Via CODESYS: Modbus RTU master/slave 8/1/n, 8/1/e, 8/1/o

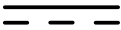
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Wireless interface (optional, as of system version 5)	
Antenna connector	SMA socket
Radio frequency	868.4 MHz (Europe) or 915 MHz (America, Australia, Canada and New Zealand) In the 915 MHz frequency band (912.6 MHz to 917.4 MHz), one of 10 fixed frequencies can be set.
Open air range	300 m at 868.4 MHz or 200 m at 915 MHz Range when using the antenna holder for wall mounting with a 3 m antenna cable; when mounting the antenna directly to the receiver, a reduction in the range must be taken into account.
Required RSSI value for error-free transmission	> -90 (with stationary transmitter) The RSSI value is an indicator of the strength of the received signal (theoretical value range: -120 to 0).
Application	Receiver for JUMO Wtrans transmitters (wireless transmission of measured values)
Compatible transmitters	Wtrans T (902930), Wtrans B (707060), Wtrans p (402060) Supported thermocouple types for Wtrans B: J, K, B

7.1.2 Display

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

7.1.3 Electrical data

Voltage supply (terminals +24 V and GND) Symbol (see nameplate) Connection	 At the front (removable terminal strip, 2-pole with PUSH IN technology)
Voltage Residual ripple	DC 24 V +25/-20 % SELV 5 %
Current consumption	Max. 280 mA (at DC 19.2 V)
Power consumption	Max. 5.6 W
Conductor cross section on terminals +24 V and GND Wire or stranded wire without ferrule Stranded wire with ferrule 2 × stranded wire with twin ferrule with plastic collar Stripping length	Min. 0.2 mm ² , max. 2.5 mm ² Min. 0.25 mm ² , max. 2.5 mm ² Min. 0.5 mm ² , max. 1.5 mm ² (both stranded wires with identical cross section) 10 mm
Conductor cross section on terminals 1 and 2 (COM) Wire or stranded wire without ferrule Stranded wire with ferrule Stripping length	Min. 0.14 mm ² , max. 1.5 mm ² Without plastic collar: min. 0.25 mm ² , max. 1.5 mm ² With plastic collar: min. 0.25 mm ² , max. 0.5 mm ² 9 mm
Electrical safety	According to DIN EN 61010-1 Overvoltage category III, pollution degree 2
Protection rating	III
Electromagnetic compatibility (EMC) Interference emission Interference immunity	Acc. to DIN EN 61326-1 Class A – only for industrial use – Industrial requirement
Radio frequency spectrum 868.4 MHz 915 MHz (912.6 MHz to 917.4 MHz)	Acc. to ETSI EN 300 220-1 and ETSI EN 300 220-2 Acc. to FCC - Title 47 CFR Part 15 and ANSI C63.4
Data backup	Buffered RAM
Buffer battery service life	Typically 6 years (lithium battery) Observe error messages on battery status in the event list (battery almost empty, battery empty)!

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7.1.4 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 × 7.5 mm × 1 mm
Dimensions (W × H × D)	45 mm × 101 mm × 101.5 mm (without connection elements)
Weight (fully fitted, incl. antenna)	Approx. 215 g
Protection type	IP20, 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
Vibration	Acc. to DIN EN 60068-2-6, table C.2
Amplitude	0.15 mm from 10 to 58.1 Hz
Acceleration	20 m/s ² from 58.1 to 150 Hz
Shock	Acc. to DIN EN 60068-2-27, table A.1
Peak acceleration	150 m/s ²
Shock duration	11 ms

7.1.5 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

7.2 Buffer battery replacement



CAUTION!

The device contains a buffer battery, which is used to buffer data when the device is switched off or in the event of a power failure. The battery life is typically 6 years. If the battery is low, this is indicated by a fault message in the event list ("Battery almost empty").

If the battery is not changed in time, there is a risk of data loss!

- ▶ Please contact the manufacturer. The battery can only be replaced by the manufacturer's service personnel.

7.3 LED displays

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

Display modes












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

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

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System states and errors

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

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

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

7.4 Open-source software

The software was developed using open-source software.

7.4.1 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

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7.5 China RoHS

 产品组别 Product group: 705003 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.
 x：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.

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