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JUMO Process Control, Inc.
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JUMO variTRON 500 – Automation System

Central Processing Unit 705002

Brief description

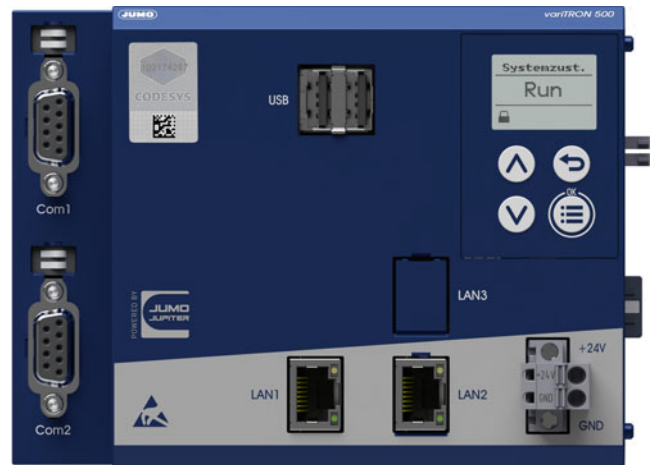
The central processing unit JUMO variTRON 500 along with the proven input and output modules (incl. controller module) form a complete system.

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

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

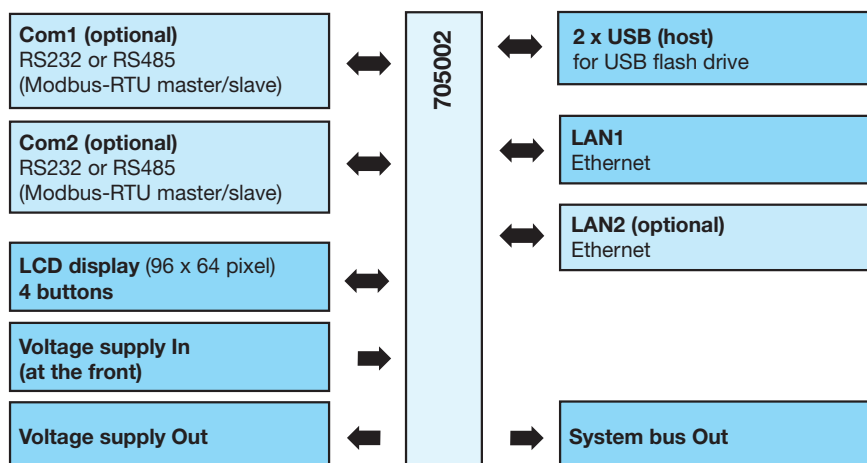
For visualization, commercially available panels are used which support CODESYS Remote TargetVisu or WebVisu functionality. The visualization is also possible via web browser. Visualizations have to be implemented with CODESYS resources.

A convenient setup program is used for configuration. JUMO standard functions for CODESYS are provided in libraries (as of system version 6) and can be individually integrated into the customer application.



Type 705002

Block diagram



Features

- Process mapping for all connected input/output modules (incl. controller module)
- 2 USB host interfaces
- OPC UA server (in conjunction with PLC)
- 9 program generators (in conjunction with PLC, as of system version 4)
- 2 field bus interfaces (as of system version 3)
- PROFINET IO controller (in conjunction with PLC)
- Plug and Play for input/output module replacement
- Battery-buffered SRAM (retain data)
- Battery-buffered real-time clock
- Data evaluation with JUMO smartWARE Evaluation (as of system version 6)

Approvals and approval marks (see technical data)



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Description

JUMO variTRON 500

The central processing unit JUMO variTRON 500 is based on a new hardware platform with an 800 MHz processor, which is used as a quad-core variant.

Due to the scalability of hardware and software a modular, flexible, and above all sustainable hardware platform is available that is combined with a modern software architecture. Based on this new platform, innovative operating concepts can now be implemented using state-of-the-art display technologies.

The advantages at a glance:

- High speed performance
- Flexible operating philosophy
- Modern communication interfaces (e.g. OPC UA, MQTT)
- Integration of different fieldbus protocols such as PROFINET IO, EtherCAT, and Modbus-TCP/-RTU
- Easy integration of new software functions via PLC (CODESYS V3.5)
- Availability of function and visualization libraries (as of system version 6)
- Easy adaptation of hardware inputs and outputs
- Customized operation and visualization with several operator stations via CODESYS remote target visualization or via web visualization (mixed operation is possible)
- Panels in various formats (portrait or landscape, 4:3 or 16:9)
- JUMO Web Cockpit

Input/output modules

The proven input and output modules (incl. controller module) are available as module variants.

For example: the analog input module with universal inputs for thermocouples, RTD temperature probes, and voltage or current standard signals. As a result the same hardware can be used to precisely record and digitize a highly diverse range of process variables.

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

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

Acquisition of process data

As of system version 6, the JUMO variTRON 500 central processing unit provides a function for acquiring process data. This allows up to 240 analog or digital channels (signals) to be logged. The channels are arranged in groups for this purpose.

By grouping the channels, the user can, for example, create a separate group for each plant or log signals with a different memory cycle. The grouping of channels is also the basis for acquiring batches.

The process data is only temporarily stored in the central processing unit to bridge network failures before this data is transferred to the Datastore for storage. The Datastore is part of the JUMO smartWARE Evaluation software, which is used to visualize and evaluate the data. A fee-based license is required for this purpose (number of channels). A visualization using only the central processing unit is not possible.

Acquisition of batches

As of system version 6, the scope of the JUMO variTRON 500 central processing unit also includes the acquisition of batches. As a result, up to 20 batches can be logged simultaneously.

The batch data is acquired together with the channels (signals) of the assigned groups and the event messages.

The batches are also only temporarily stored in the central processing unit. Storage, visualization, and evaluation are then carried out with the JUMO smartWARE Evaluation software. A fee-based license is also required for this purpose (number of batches).

JUMO Cloud

The IoT platform for process visualization as well as data acquisition, evaluation, and archiving enables worldwide access to measurement data using common web browsers. The JUMO Cloud is characterized by a high degree of security as well as valuable visualization, alarm, and planning functions.

Further information on the JUMO Cloud:

[qr-en-cloud.jumo.info](https://www.jumo.net/en/cloud)

JUMO smartWARE SCADA

The JUMO smartWARE SCADA software provides easy access to measurement data using conventional web browsers. It offers functions

for process visualization as well as for evaluation of the acquired data. The software also supports manufacturing and work processes with valuable visualization, alarm, and planning functions.

Further information on the JUMO smartWARE SCADA software:

[qr-en-scada.jumo.info](https://www.jumo.net/en/scada)

JUMO smartWARE Evaluation

JUMO smartWARE Evaluation stores process data from distributed plants that is acquired by JUMO variTRON devices. The collected data can be viewed and evaluated with a web browser. Thanks to Docker technology, JUMO smartWARE Evaluation can be installed on a desktop computer, on a server in your own network, or on a cloud server. A manipulation detection system ensures data security.

Further information on the JUMO smartWARE Evaluation software:

[qr-en-evaluation.jumo.info](https://www.jumo.net/en/evaluation)

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Technical data

Interfaces

USB host Description Type Number Device category Application Data rate Max. current	USB A (socket) 2 Mass storage class For connecting a USB flash drive (interfaces cannot be used simultaneously) Low Speed, Full Speed, Hi-Speed 500 mA per interface
Ethernet Description Type Number Protocol Application Transfer rate Connection cable Cable length	LAN1, LAN2 (optional) RJ45 1 (optional: 2) TCP, IPv4, HTTP(S) Via CODESYS as an option: Modbus-TCP, PROFINET IO controller, EtherCAT master, OPC UA server, BACnet/IP (as of system version 4) 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 10 Mbit/s, 100 Mbit/s Network cable, at least CAT5 (S/FTP) Up to 100 m
RS232 or RS485 (serial interface) Description Type Number Application Protocol Data format Transfer rate	Depending on the device version Com1, Com2 D-Sub 9-pole 2 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 9600 Bd, 19200 Bd, 38400 Bd
System bus Description Type Number Application	None (side connector) System specific 1 Connection of a router module 705041 or an input/output module

Display

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


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Electrical data

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

Housing and environmental conditions

Case type	Plastic case for DIN rail mounting in the control cabinet (indoor use); DIN rail acc. to DIN EN 60715, 35 mm x 7.5 mm x 1 mm
Dimensions (W × H × D)	135 mm × 101 mm × 101.5 mm (without connection elements)
Weight (fully fitted)	Approx. 590 g
Protection type	IP 20, according to DIN EN 60529
Ambient temperature range	-20 to +55 °C
Storage temperature range	-40 to +70 °C
Resistance to climatic conditions	Relative humidity ≤ 90 % annual average without condensation (climate class 3K3 acc. to DIN EN 60721-3-3 with extended temperature and humidity range)
Site altitude	Up to 2000 m above sea level
Vibration Amplitude Acceleration	Acc. to DIN EN 60068-2-6, table C.2 0.15 mm from 10 to 58.1 Hz 20 m/s ² from 58.1 to 150 Hz
Shock Peak acceleration Shock duration	Acc. to DIN EN 60068-2-27, table A.1 150 m/s ² 11 ms

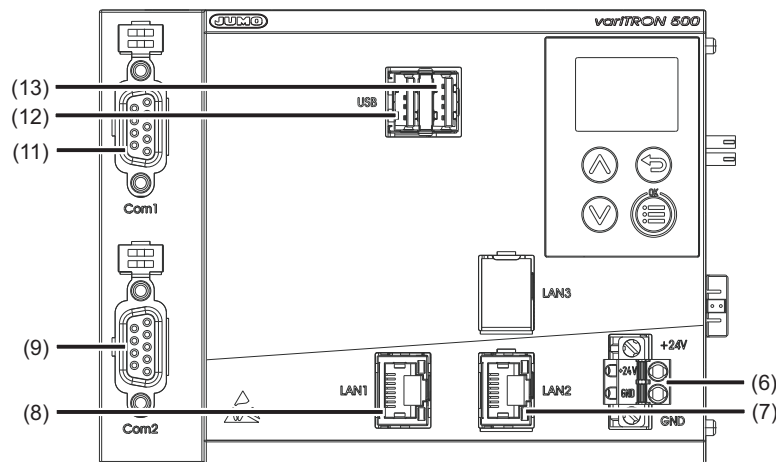
Approvals and approval marks

Approval mark	Test facility	Certificate/certification number	Inspection basis	Valid for
c UL us	Underwriters Laboratories	E201387	UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)	All types



Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.



Interfaces

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

Voltage supply

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

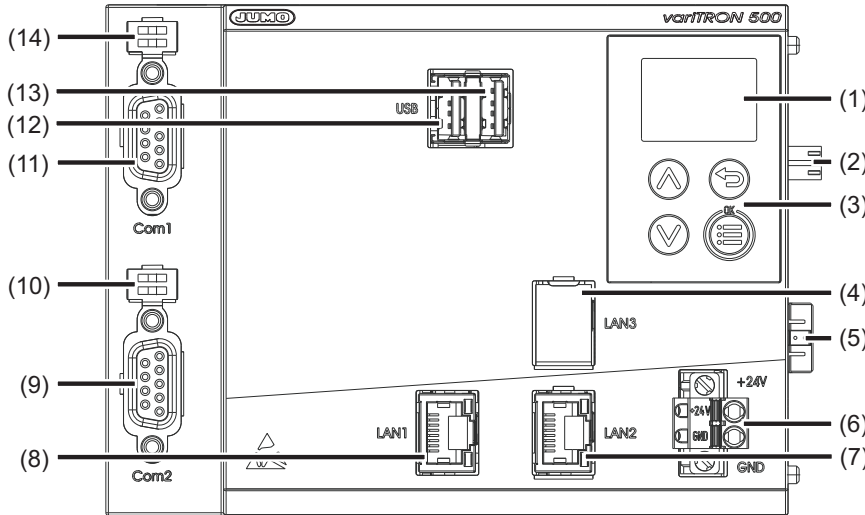
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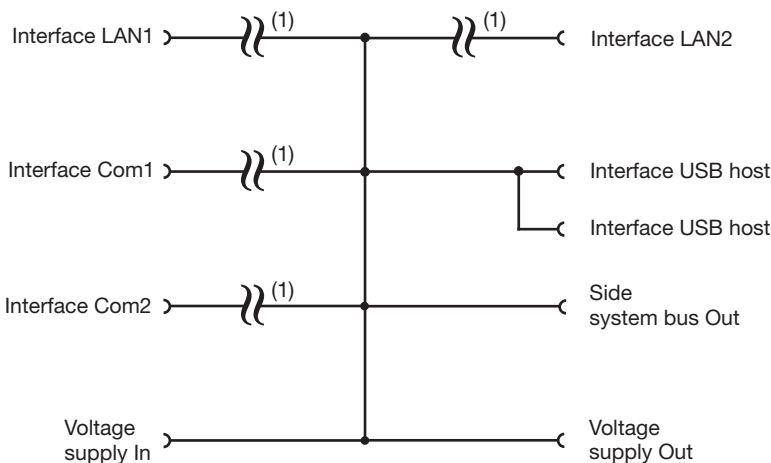


Display, operating, and connection elements



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

Electrical isolation



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

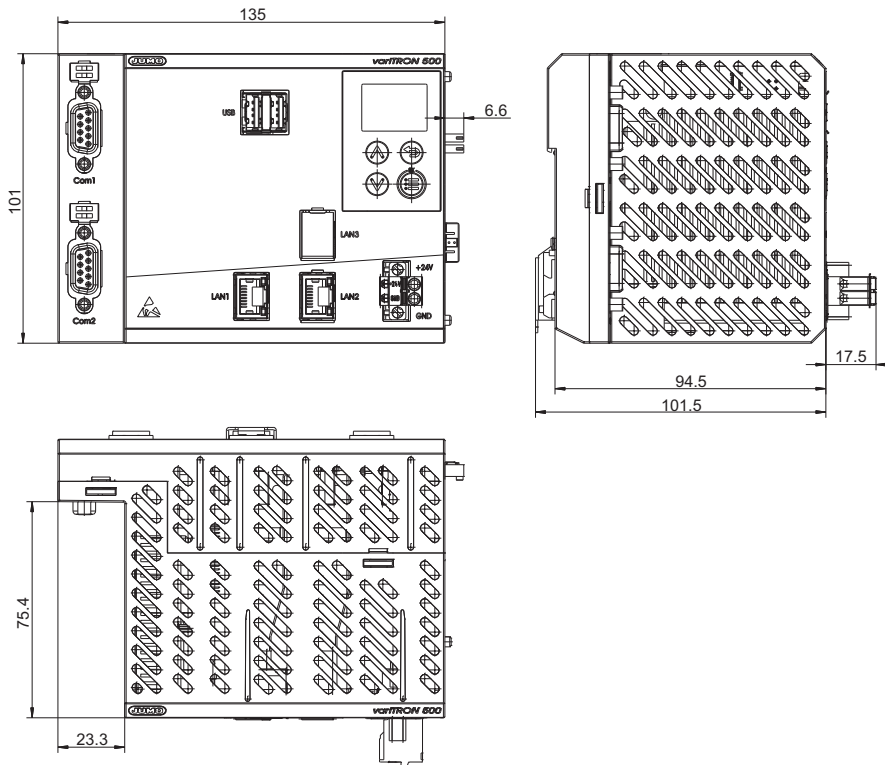
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Dimensions



Module overview

Central processing unit

- JUMO variTRON 500
Data sheet 705002

Input/output modules

- Multichannel controller module
Data sheet 705010
- Relay module 4-channel
Data sheet 705015
- Analog input module 4-channel
Data sheet 705020
- Analog input module 8-channel
Data sheet 705021
- Analog output module 4-channel
Data sheet 705025
- Digital input/output module 12-channel
Data sheet 705030
- Digital input/output module 32-channel
Data sheet 705031
(as of system version 3)
- Thyristor power controller type 70906x
Data sheet 709061, 709062, 709063
(as of system version 3)

Special modules

- Router module 2-port
Data sheet 705041
(as of system version 3)
- Router module 3-port
Data sheet 705042
(as of system version 3)
- Router module 1-port
Data sheet 705043
(as of system version 4)

Panels

- JUMO variTRON Web panels
Data sheet 705070

Power supply units

- 705090/03-33
Data sheet 705090
- 705090/05-33
Data sheet 705090
- 705090/10-33
Data sheet 705090

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Order details

(1)	Basic type
705002	Central processing unit, type 705002 (1 × Ethernet (RJ45), 1 × system bus (side), 2 × USB host interface), Node-RED
(2)	Basic type extension 1
2	Quad core CPU
(3)	Basic type extension 2
2	RAM 1024 MB
(4)	Basic type extension 3
1	eMMC 8 GB ^a
(5)	Basic type extension 4
0	Without software control loops
(6)	Version
8	Standard with default settings
(7)	Com1 interface
00	Not used
51	RS232 Modbus-RTU ^b (as of system version 3)
55	RS485 Modbus-RTU ^b (as of system version 3)
(8)	Interface Com2
00	Not used
51	RS232 Modbus-RTU ^b (as of system version 3)
55	RS485 Modbus-RTU ^b (as of system version 3)
(9)	Interface LAN2
00	Not used
08	Ethernet (RJ45)
(10)	Voltage supply
36	DC 24 V +25/-20 %, SELV
(11)	DNV GL approval
000	Without approval
(12)	Extra codes
001	Program generator incl. JUMO smartWARE Program (701850; as of system version x) ^{c, d}
224	PLC according to IEC 61131-3 (CODESYS V3.5; necessary to operate the device as a PLC) ^e
225	Program generator 1 – 9 (as of system version 4) ^c
280	Remote TargetVisu ^{c, e}
281	WebVisu ^{c, e}
282	PROFINET IO controller ^{c, e}
283	OPC UA server ^{c, e}
284	Modbus-TCP master ^{c, e}
285	Modbus-TCP slave ^{c, e}
286	EtherCAT master ^{c, e}
289	BACnet/IP (as of system version 4) ^{c, e}

^a Flexible allocation between system data and application data.

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

^c Only in conjunction with extra code 224.

^d Only in conjunction with extra code 281.

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

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

Order example 705002 / 2 2 1 0 - 8 - 00 - 00 - 00 - 36 / 000 , 224

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

Scope of delivery

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

Stock versions

Order code	Part no.
705002/2210-8-00-00-00-36/224,281	00735779
705002/2210-8-00-00-08-36/224,281	00741870

Accessories

Description	Part no.
Interface modules (expansion boards):	
RS232 Modbus-RTU (as of system version 3)	00745041
RS485 Modbus-RTU (as of system version 3)	00745042
Ethernet (RJ45)	00745043