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**JUMO Process Control, Inc.**  
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# JUMO Wtrans Receiver with Wireless Data Transmission

- For measuring temperature, pressure, potentiometer, and voltage.
- Interface RS485 with Modbus protocol
- Wireless measured value reception
- No wiring work due to modern wireless technology
- For up to 16 transmitters per receiver

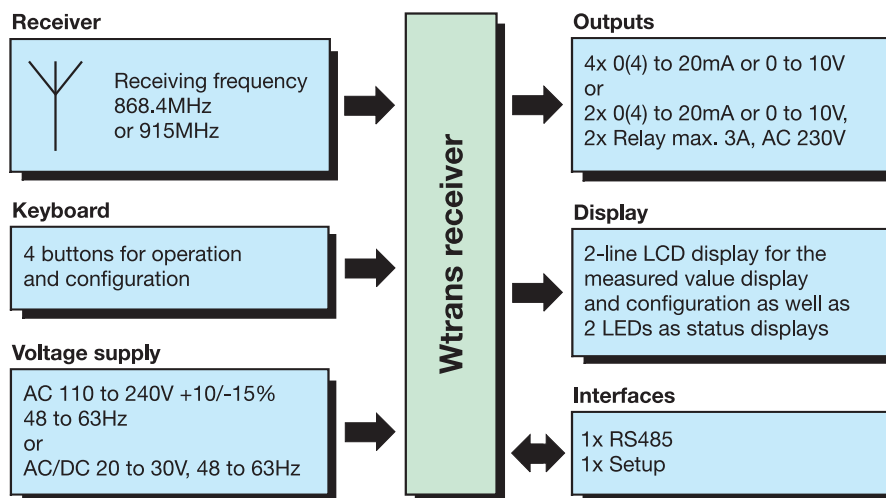
The Wtrans receiver T01 in combination with suitable Wtrans transmitters is used for mobile or stationary measurements of physical variables. A significant reduction of the installation work is achieved due to the use of trendsetting wireless technology found in the industrial radio frequency 868.4 MHz or 915 MHz. Cable connections are not required, the radio-based sensor technology also functions in a rough industrial environment. The supplied lambda/4-antenna with an impedance of 50 ohm can be screwed on directly or fitted externally. If the antenna wall holder with a 3 m antenna cable is used then the open air range is 300 m. In the receiver the received measured values are converted, displayed, and are available as linear current or voltage signals (0(4) to 20 mA, 0 to 10 V) and via the digital interface RS485. All receiver outputs are electrically isolated. The connection to higher-ranking systems (e.g. the plant visualization software JUMO SVS3000 or the Modbus master compatible paperless recorder JUMO LOGO-SCREEN nt) is possible via the digital interface with Modbus protocol.

Operation and configuration is possible via the keypad in connection with a 2-line LCD display or a setup program for greater comfort. Thus, parameters such as filter constants, offset, alarms, and drag indicator (minimum and maximum value memory) can be separately set for each channel. For this purpose, a plug is provided on the front for a PC interface with TTL/RS232 or USB/TTL converter to connect the receiver and the PC. The receiver in the mounting rail case is intended for fitting on a DIN rail 35 mm x 7.5 mm according to DIN EN 60715. The screw terminals for the electrical connection are arranged at different levels. The conductor cross section may not exceed 2.5 mm<sup>2</sup>.



Basic type 902931/10

## Block diagram



## Suitable Wtrans transmitters

- Wtrans RTD temperature probe  
Data sheet 902930
- Wtrans B  
Data sheet 707060
- Wtrans p  
Data sheet 402060

For further information see page 10/10

Approvals/approval marks (see "Technical Data")



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## Technical data

### Input

Number of transmitters	Up to 16 transmitters can be received per receiver.
Radio frequency	868.4 MHz (Europe); 915 MHz (America, Australia, Canada, and New Zealand); Ten frequencies can be configured in the 915 MHz frequency band.
Open air range	Up to 300 m when using the antenna wall holder with a 3 m antenna cable When installing the antenna directly to the receiver, a reduced range of approx. 40 % must be taken into account.
Measuring range limits	Depending on the set sensor
Configuration	Using the keys on the device or the setup program
Unit	The units for temperature, pressure, potentiometer, and voltage are configurable on the device or with the setup program.

### Analog outputs

Quantity	4 analog outputs for basic type 902931/10, 2 analog outputs for basic type 902931/30
Output signal: - Current - Voltage	Configurable with the keys on the device or the setup program Load-independent direct current 0 to 20 mA or 4 to 20 mA Direct voltage 0 to 10 V
Transmission behavior	Linear, freely scalable
Burden (at current output)	≤ 500 ohm
Load (at voltage output)	≥ 10 k ohm
Setting time for temperature changes	The setting time depends on the transmission interval that is set in the transmitter.
Setting time after switch-on or reset	≤ 5 s
Calibration conditions	AC 230 V/22 °C (±3 K) or DC 24 V/22 °C (±3 K)
Accuracy	≤ ±0.1 % <sup>1</sup> (accuracy includes calibration, linearization, burden influence, load error, and voltage supply error)
Residual ripple	≤ ±0.2 % <sup>1</sup>
Electrical isolation	The analog outputs are electrically isolated from each other and the interfaces.
Isolation voltage	50 V

### Measuring circuit monitoring of the analog outputs

Underrange - Current output 4 to 20 mA - Current output 0 to 20 mA - Voltage output 0 to 10 V	Dropping to 3.8 mA, then jump to the configured signaling Dropping to -0.1 mA, then jump to the configured signaling Dropping to -0.1 V, then jump to the configured signaling
Overrange - Current output 4 to 20 mA - Current output 0 to 20 mA - Voltage output 0 to 10 V	Increasing to 20.5 mA, then jump to the configured signaling Increasing to 20.5 mA, then jump to the configured signaling Increasing to 10.25 V, then jump to the configured signaling
Probe short-circuit or Probe/cable break and alarms: - Current output 4 to 20 mA  - Current output 0 to 20 mA  - Voltage output 0 to 10 V	Positive signaling: > 21 mA Negative signaling: < 3.6 mA Positive signaling: > 21 mA Negative signaling: < -0.1 mA Positive signaling: > 10.5 V Negative signaling: < -0.1 V
Output behavior	The output behavior (positive or negative signaling) can be configured.

<sup>1</sup> All accuracy specifications in % from the measuring range end value of 20 mA or 10 V.

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**Relay outputs**

Quantity	2 relay outputs for basic type 902931/30
Relay	N/O contact configurable as N/C contact
Switching capacity	Up to 3 A at AC 230 V resistive load
Contact life	150,000 operations at 3 A / AC 230 V resistive load 350,000 operations at 1 A / AC 230 V resistive load 310,000 operations at 1 A / AC 230 V and $\cos \phi > 0.7$
Electrical isolation	Relay to analog outputs and interface; test voltage AC 3700 V (reinforced insulation) Relay to relay; test voltage AC 2300 V (basic insulation) <b>Combined operation of mains voltage AC 230 V and SELV or PELV voltage is not admissible due to the basic insulation between the relays.</b>

**Electrical data**

Voltage supply	AC 110 to 240 V +10/-15 %, 48 to 63 Hz or AC/DC 20 to 30 V, 48 to 63 Hz
Power consumption	12 VA
Electrical connection	Screw terminals up to 2.5 mm <sup>2</sup>
Electrical safety	According to DIN EN 61010, part 1 overvoltage category III, pollution degree 2, for installation into a control cabinet according to DIN EN 50178
Electrical isolation	The voltage supply is electrically isolated from the analog outputs, relays, and interfaces.
Test voltage	AC 3700 V

**Environmental influences**

Ambient temperature range	-20 to +50 °C without condensation (even with close mounting)
Storage temperature range	-30 to +70 °C
Temperature influence	$\leq \pm 0.005 \% ^1 / K$ ; per K deviation from the reference temperature 22 °C ( $\pm 3 K$ )
Resistance to climatic conditions	Rel. humidity $\leq 85 \%$ without condensation according to DIN EN 60721-3-3 3K3
Vibration resistance	Max. 1 g at 10 to 55 Hz according to DIN IEC 60068-2-6
EMC	DIN EN 61326-1
- Interference emission	Class A - only for industrial use -
- Interference immunity	Industrial requirements
- Radio frequency spectrum	ETSI EN 300 220-1 and ETSI EN 300 220-2

**Case**

Material	Polyamide
Flammability class	UL 94 V-2
Dimensions	
With antenna screw connection (W × H × D)	22.5 mm × 115.0 mm × 117.8 mm
Installation	DIN rail 35 mm × 7.5 mm according to EN 60715
Protection type	IP20 according to DIN EN 60529
Installation position	Vertical $\perp$
Weight	Approx. 200 g

**Interfaces**

<sup>1</sup> All accuracy specifications in % from the measuring range end value of 20 mA or 10 V.

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Setup interface - Baud rate - PC interface	9600 With TTL/RS232 or with USB/TTL converter
RS485 interface - Protocol - Baud rate - Device address - Minimum response time	Modbus 9600, 19200, 38400 1 to 254 0 to 500 ms

**LCD display**

Top line	4-digit 7-segment display, 4.5 mm high
Bottom line	5-digit 16-segment display, 4.0 mm high

**Approvals/approval marks**

Approval marks	Testing agency	Certificates/certification numbers	Inspection basis	Valid for
c UL us	Underwriters Laboratories	E201387	UL 61010-1 CAN/CSA-C22.2 No. 61010-1	915 MHz, 230 V, Basic type 902931/10
IC	Industry Canada	7472A-WTRANST01 7472A-WTRANST0102	RSS-210 Issue 7 RSS-210 Issue 8 RSS-GEN Issue 3 RSS-102 Issue 4	915 MHz, 230 V, Basic type 902931/10
FCC	Federal Communications Commission	VT4-WTRANST01 VT4-WTRANST01-02	FCC Rule Part 15C FCC Rule Part 15C	915 MHz, 230 V, Basic type 902931/10

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## Operation and configuration

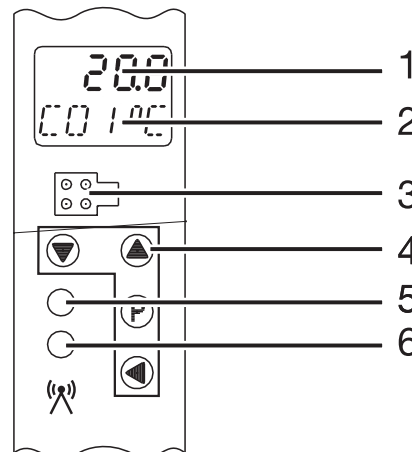
### At the receiver

Operation and configuration of the receiver require four keys located at the front. These have various functions depending on the menu. The dialog is supported by a 2-line LCD display. Two LEDs signal various operating statuses. The operation and configuration of the parameters are organized into three different levels:

- Normal display (display of values and signal quality)
- Commissioning/start-up level (channel linking to transmitter ID)
- Parameter level (editing of configuration parameters)

Each of the two levels can be protected against unauthorized access by a code.

- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1 7 segment LCD display, 4.5 mm, 4 digit</li> <li>2 16 segment LCD display, 4.0 mm, 5 digit</li> <li>3 Setup interface</li> <li>4 Function keys</li> </ol> | <ol style="list-style-type: none"> <li>5 Bicolor LED           <ul style="list-style-type: none"> <li>- Green = malfunction-free operation</li> <li>- Red flashing = collective alarm (the collective alarm includes the radio timeout of transmitters 1 to 16, the limit value monitoring min./max. of channels C01 to C16, detected memory errors during power on, and the low battery signal of transmitters 1 to 16)</li> </ul> </li> <li>6 Yellow short flashing LED           <ul style="list-style-type: none"> <li>- Receipt control for each data packet from the transmitter</li> </ul> </li> </ol> |
|---|---|



## Setup program

Configuration via the setup program is more comfortable than using the receiver keypad. The configuration data can be archived on data storage devices and printed. All configurable parameters are described in this operating manual.

The setup program can be used to overwrite changed parameters with the factory settings at any time.

The connection between receiver and PC is established via a PC interface (USB/TTL or TTL/RS232 converter).

### OnlineChart (optional)

The OnlineChart extension can graphically display and save the measured values of eight analog and four binary channels.

### Customer specific linearization

For transmitters with potentiometer or voltage input the user can define up to four customer-specific linearizations (value pairs or polynomial formula).

The screenshot shows the 'Setup1 - altered' window of the JUMO Whirans software. The left pane shows a tree view of the configuration structure, including 'Receiver T01.ECI/EC2', 'Channels', and 'Probe'. The main area displays configuration for 'Channel 1' and 'Channel 2', with parameters like Probe ID, Limit 1, Limit 2, Hysteresis, Offset, Filter time constant, Decimal place, RF timeout, Alarm type 1, Alarm type 2, and Time delay. Channel 3 through 8 are listed as 'inactive'. At the bottom, a table shows measurement data for six channels.

Channel	Date	Time	Probe ID	Decimal place	Value	MIN	MAX	RF channel quality	Battery
1	21.8.2008	18:20:27	207	Auto decimal place	24.189 °C	16.824 °C	39.775 °C	100 %	OK
2	21.8.2008	18:20:27	588	Auto decimal place	RF timeout	12.242 °C	24.866 °C	0 %	OK
3	21.8.2008	18:20:27	no link	Auto decimal place	---	---	---	---	---
4	21.8.2008	18:20:27	no link	Auto decimal place	---	---	---	---	---
5	21.8.2008	18:20:27	no link	Auto decimal place	---	---	---	---	---
6	21.8.2008	18:20:27	no link	Auto decimal place	---	---	---	---	---

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## Assignment of transmitters to the receiver (linking)

A receiver can display and process data from up to 16 transmitters. Each transmitter must be linked with the receiver. Three linking methods are available:

- On the device using a list of received, non-linked transmitter IDs or by directly entering the transmitter ID
- Using the setup program, and
- Via the RS485 interface by Modbus commands.

The list of received, non-linked transmitter IDs is automatically saved by the receiver. The transmitter IDs are automatically detected in this list (max. 25 entries); then they are entered and deleted. The transmitter ID can be directly entered at the device or with the setup program. The transmitter IDs can also be set from a Modbus master (e.g. PLC) via the RS485 interface at any time.

## Open air range

The open air range is 300 m. To achieve this max. receiving quality and to achieve an optimum adaptation of the  $\lambda/4$ -antenna, use the antenna wall holder with the 3 m antenna cable (available in the accessories). When installing the antenna directly on the receiver, a reduced range of approx. 40 % must be taken into account. The transmission range may be additionally reduced by buildings, concrete ceilings, walls, and other structural works.

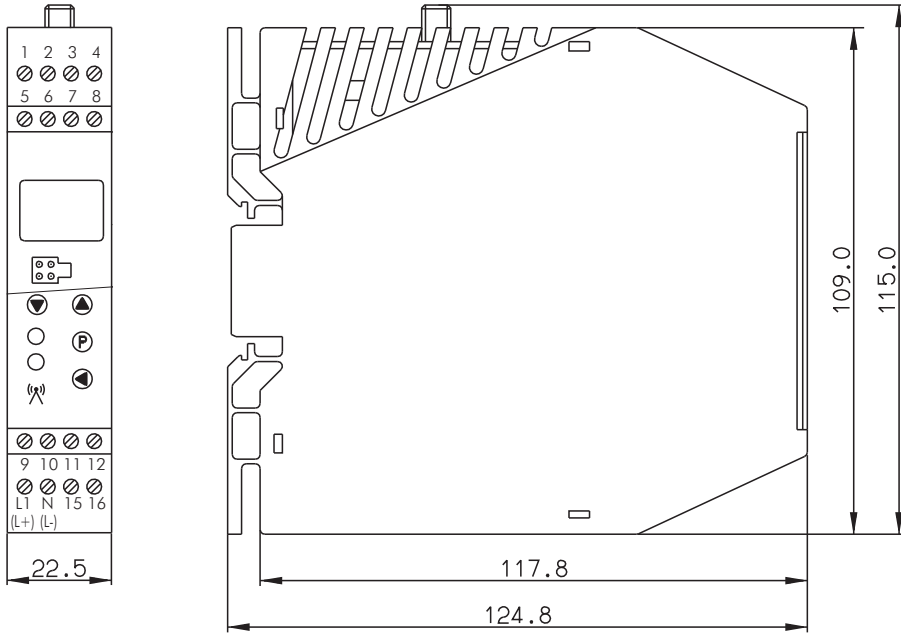
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## Dimensions



Basic type 902931/10 and 902931/30

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## Connection diagram

The connection diagram in the data sheet provides preliminary information about the connection possibilities. Only use the installation instructions or the operating manual for the electrical connection. The knowledge and the correct technical execution of the safety information/instructions contained in these documents are mandatory for installation, electrical connection, and commissioning/start-up as well as for safety during operation.

### Voltage supply

Connection for	Terminal assignment
Voltage supply according to nameplate: L1 and N at AC 110 to 240 V L+ and L- at AC/DC 20 to 30 V	<p style="text-align: center;">       L1 N        (L+) (L-)   L1 N        (L+) (L-)     </p>

### Outputs

Basic type 902931/10	Analog output 1	Analog output 2	Analog output 3	Analog output 4
Current 0(4) to 20 mA or voltage 0 to 10 V				
Basic type 902931/30	Relay output 1	Relay output 2	Analog output 3	Analog output 4
Current 0(4) to 20 mA or voltage 0 to 10 V				
Relay N/O contact, configurable as an N/C				

### Digital interface

RS485		9 TxD+/RxD+ 10 GND 11 TxD-/RxD-	Transmit/receive data + Ground Transmit/receive data -
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**Order details: JUMO Wtrans receiver T01**

**(1) Basic type**

902931/10	Wtrans receiver T01.EC1 with wireless value transmission, C rail case, protection type IP20, 4x analog outputs 0(4) to 20 mA or 0 to10 V, interface RS485 with Modbus protocol
902931/30	Wtrans receiver T01.EC3 with wireless value transmission, C rail case, protection type IP20, 2x analog outputs 0(4) to 20 mA or 0 to10 V and 2x relay outputs AC 230 V/5 A potential free, interface RS485 with Modbus protocol
x x	<b>(2) Version</b>
x x	8 Standard with factory settings
x x	9 Customer-specific configuration (specifications in plain text)
x x	<b>(3) Radio frequency</b>
x	10 868.4 MHz (Europe)
x	20 915 MHz (America, Australia, Canada, and New Zealand) (not in connection with AC/DC 20 to 30 V) In the 915 MHz frequency band, ten frequencies are configurable
x x	<b>(4) Voltage supply</b>
x x	23 AC 110 to 240 V +10/-15 %, 48 to 63 Hz
x x	25 AC/DC 20 to 30 V, 48 to 63 Hz
x x	<b>(5) Extra codes</b>
x x	000 None

<b>Order code</b>	(1)	-	(2)	-	(3)	-	(4)	/	(5)
<b>Order example</b>	902931/10	-	8	-	10	-	23	/	000

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## Scope of delivery

1 device in the ordered version  
1 lambda/4-antenna, impedance 50 ohm, 868.4 MHz,  $T_{max}$  125 °C or  
1 lambda/4-antenna, impedance 50 ohm, 915 MHz,  $T_{max}$  125 °C  
1 operating manual B 902931.0

## Accessories

	Part no.
Setup program on CD-ROM, multilingual	00488887
Setup program including OnlineChart on CD-ROM, multilingual	00549067
OnlineChart activation	00549188
Additional lambda/4-antenna, impedance 50 ohm, 868.4 MHz, $T_{max}$ 125 °C	00503151
Additional lambda/4 antenna, impedance 50 ohm, 915 MHz, $T_{max}$ 125 °C	00503152
Antenna wall holder with antipole for lambda/4-antenna	00482648
Lambda/4-antenna with waterproof line permanently connected, length 10 m, 868.4 MHz, $T_{max}$ 125 °C	00523293
Lambda/4-antenna with waterproof line permanently connected, length 20 m, 868.4 MHz, $T_{max}$ 125 °C	00523294
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 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
PC interface with USB/TTL converter, adapter (socket) and adapter (pins)	00456352
PC interface with TTL/RS232 converter and adapter (socket)	00350260
Power adapter for interface converter (serial)	00365933
Interface converter RS232 to RS485 external (serial)	00376969
Interface card 2" RS485 Moxa CP-132i internal	00397804
Plant visualization software JUMO SVS3000 (data sheet 700755)	-
Paperless recorder JUMO LOGOSCREEN nt (data sheet 706581)	-

## JUMO Wtrans device series

JUMO Wtrans receiver	Receiver (voltage supply AC 110 to 240 V or AC/DC 20 to 30 V)	Data sheet 902931
Type T01.EC1	4x analog outputs	
Type T01.EC3	2x analog outputs and 2x relay outputs	
JUMO Wtrans transmitter	Food insertion RTD temperature probe (for receivers as of software version 01.01)	902930
Type T01.G1	Ambient temperature for the case -30 to +85 °C	
Type T02.G1	Ambient temperature for the case: -25 to +125 °C	
Type T03.G1 Ex	Ambient temperature for the case: -30 to +85 °C	
JUMO Wtrans transmitter	Mineral-insulated RTD temperature probe with bendable protection tube (for receivers as of software version 01.01)	902930
Type T01.G1	Ambient temperature for the case -30 to +85 °C	
Type T02.G1	Ambient temperature for the case: -25 to +125 °C	
Type T03.G1 Ex	Ambient temperature for the case: -30 to +85 °C	
JUMO Wtrans transmitter	With M12 x 1 plug connection for RTD temperature probes (for receivers as of software version 01.01)	902930
Type T01.G2	Ambient temperature for the case: -30 to +85 °C	
Type T02.G2	Ambient temperature for the case: -25 to +125 °C	
JUMO Wtrans transmitter	With M12 x 1 plug connection and RTD temperature probe with PTFE connecting cable (for receivers as of software version 01.01)	902930
Type T03.G2 Ex	Ambient temperature for the case: -30 to +85 °C	
JUMO Wtrans B	Programmable head transducer with wireless data transmission (for receivers as of software version 03.01)	707060
JUMO Wtrans p	Pressure transmitter with wireless data transmission (for receivers as of software version 04.01)	402060

## Stock versions

(1)	(2)	(3)	(4)	(5)	Part no.
902931/10	-	8	-	23	/ 000 00543004
902931/10	-	8	-	23	/ 000 00543032
902931/10	-	8	-	25	/ 000 00543005
902931/30	-	8	-	23	/ 000 00543006
902931/30	-	8	-	25	/ 000 00543007