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JUMO Wtrans Receiver
Universal Receiver
for JUMO Wireless Measuring Probes

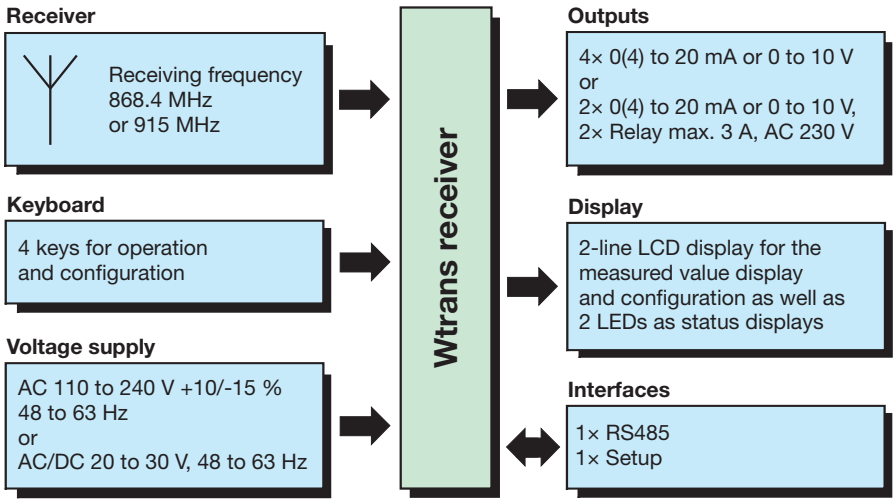
- **For processing physical measurands of the JUMO Wtrans series**
- **RS485 interface with Modbus protocol**
- **Wireless measured value reception**
- **No wiring work required due to modern wireless technology**
- **For max. 16 measured values per receiver**

The Wtrans receiver T01 in combination with suitable Wtrans transmitters is used for mobile or stationary measurements of physical measurands. 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 directly screwed on or mounted externally. If the antenna holder for wall mounting 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 galvanically isolated. A connection to higher-ranking systems (such as the plant visualization software JUMO SVS3000 or the Modbus master-compatible JUMO LOGOSCREEN nt paperless recorder) is possible via the digital interface with Modbus protocol.
Operation and configuration can be performed via the keypad in conjunction with a 2-line LCD display, or with a setup program for greater convenience. This way, parameters such as filter constants, offset, alarms, and drag indicators (minimum and maximum value memory) can be set separately for each channel. For this purpose, a connector is provided on the front for a PC interface with USB/TTL converter for connecting the receiver and the PC. The receiver in the mounting rail case is intended for mounting on a DIN-rail 35 mm × 7.5 mm according to DIN EN 60715. The screw terminals for the electrical connection are located at different levels. The conductor cross section should not be bigger than 2.5 mm^2.



Basic type 902931/10

Block diagram



Suitable Wtrans transmitters:

- Wtrans T,
  data sheet 902930
- Wtrans B,
  data sheet 707060
- Wtrans p,
  data sheet 402060
- Wtrans E01,
  data sheet 902928

For further information see page 10/10

Approvals/approval marks (see "Technical data")

2014-10-21/00473257

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Technical data

Input

Number of transmitters	Up to 16 measured values can be received per receiver.
Radio frequency	868.4 MHz (Europa), 915 MHz (America, Australia, Canada, and New Zealand); Ten frequencies are configurable in the 915 MHz frequency band
Open air range	Up to 300 m 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 of approx. 40 % must be taken into account.
Measuring range limits	Dependent on the set sensor
Configuration	Using the keys on the device or with the setup program
Unit	The units for temperature, pressure, potentiometer, and voltage are configurable on the device or with the setup program.

Analog outputs

Number	4 analog outputs for basic type 902931/10, 2 analog outputs for basic type 902931/30
Output signal	Configurable with the keys on the device or with the setup program
Current	Load-independent direct current 0 to 20 mA or 4 to 20 mA
Voltage	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 %[a] (accuracy includes calibration, linearization, burden influence, load influence, and voltage supply influence)
Residual ripple	≤ ±0.2 %[a]
Galvanic isolation	The analog outputs are galvanically isolated from each other and the interfaces.
Isolation voltage	50 V

[a] All accuracy specifications in % from the measuring range end value of 20 mA or 10 V.

Measuring circuit monitoring of the analog outputs

Underrange	
Current output 4 to 20 mA	Dropping to 3.8 mA, then jump to the configured signaling
Current output 0 to 20 mA	Dropping to -0.1 mA, then jump to the configured signaling
Voltage output 0 to 10 V	Dropping to -0.1 V, then jump to the configured signaling
Overrange	
Current output 4 to 20 mA	Increasing to 20.5 mA, then jump to the configured signaling
Current output 0 to 20 mA	Increasing to 20.5 mA, then jump to the configured signaling
Voltage output 0 to 10 V	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	Positive signaling: > 21 mA Negative signaling: < 3.6 mA
Current output 0 to 20 mA	Positive signaling: > 21 mA Negative signaling: < -0.1 mA
Voltage output 0 to 10 V	Positive signaling: > 10.5 V Negative signaling: < -0.1 V
Output behavior	The output behavior (positive or negative signaling) is configurable.

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Relay outputs

Number	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
Galvanic isolation	Relay to analog outputs and interface; test voltage AC 3700 V (reinforced insulation) Relay to relay; test voltage AC 2300 V (basic insulation) Combined operation of mains voltage AC 230 V and SELV or PELV voltage is not admissible due to the basic insulation between the relays.

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^2
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
Galvanic isolation	The voltage supply is galvanically 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	≤ ±0.005 %[a]/K; per K deviation from the reference temperature 22 °C (±3 K)
Resistance to climatic conditions	Rel. humidity ≤ 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
Electromagnetic compatibility (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

[a] All accuracy specifications in % from the measuring range end value of 20 mA or 10 V.

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
Mounting	DIN-rail 35 mm × 7.5 mm according to EN 60715
Protection type	IP20 according to DIN EN 60529
Installation position	Vertical ⊥
Weight	Approx. 200 g

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Interfaces

Setup interface	
Baud rate	9600
PC interface	With TTL/RS232 or with USB/TTL converter
RS485 interface	
Protocol	Modbus
Baud rate	9600, 19200, 38400
Device address	1 to 254
Minimum response time	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 mark	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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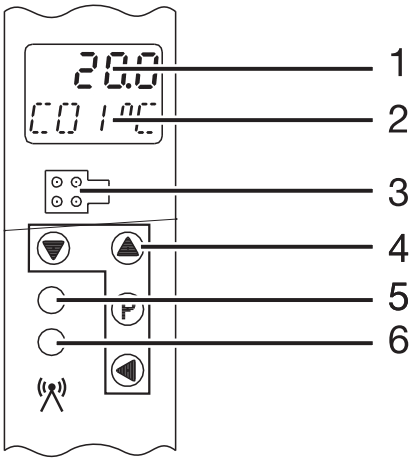
Operation and configuration

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)
- 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.



1 7-segment LCD display, 4.5 mm, 4-digit

2 16-segment LCD display, 4.0 mm, 5-digit

3 Setup interface

4 Function keys

5 Bicolor LED
- Green = malfunction-free operation
- Flashing red = collective alarm (the collective alarm covers the wireless timeout of transmitters 1 to 16, the limit value monitoring min./max. of channels C01 to C16, memory errors detected at power on, and the low battery signal of transmitters 1 to 16)

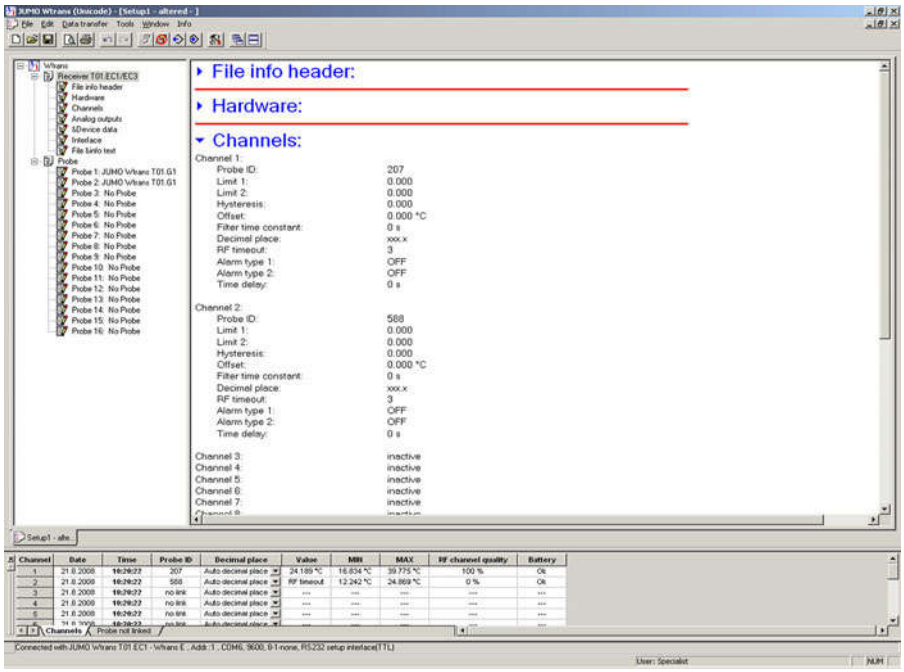
6 Yellow short flashing LED
- Receipt control for each data packet from the transmitter

Setup program

Configuration via the setup program is more convenient than using the receiver keypad. The configuration data can be archived on data storage devices and printed.
All configurable parameters are described in the operating manual.
The setup program can be used to overwrite changed parameters with the default settings at any time.
The connection between the receiver and PC is established via a PC interface (USB/TTL convertor).

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).



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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 via 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 maintained 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 (such as a PLC) via the RS485 interface at any time.

Open air range

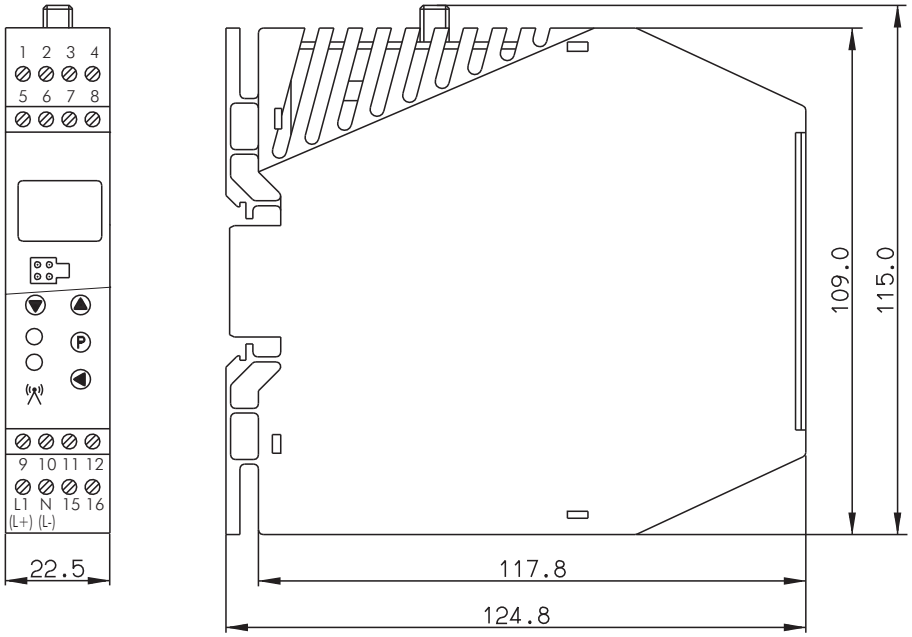
The open air range is 300 m. To achieve this receiving quality and to achieve an optimum adaptation of the lambda/4-antenna, use the antenna holder for wall mounting with the 3 m antenna cable (available in the accessories). When mounting the antenna directly to the receiver, a reduction in the range of approx. 40 % must be taken into account. The 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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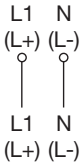
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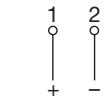
Connection diagram

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 execution of the safety information/instructions contained in these documents are mandatory for mounting, electrical connection, startup, and for safety during operation.

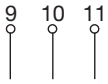
Voltage supply

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	

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-	Transmission/received data + Ground Transmission/received data -

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Order details

			(1)	**Basic type**
		902931/10		Wtrans receiver T01.EC1 C rail case, protection type IP20, 4 analog outputs 0(4) to 20 mA or 0 to 10 V, RS485 interface with Modbus protocol
		902931/30		Wtrans receiver T01.EC3 C rail case, protection type IP20, 2 analog outputs 0(4) to 20 mA or 0 to 10 V and 2 relay outputs AC 230 V/5 A potential free, RS485 interface with Modbus protocol
			(2)	**Version**
x	x	8		Standard with default settings
x	x	9		Customer-specific configuration (specifications in plain text)
			(3)	**Radio frequency**
x	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
			(4)	**Voltage supply**
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
			(5)	**Extra code**
x	x	000		None

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

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

Item	**Part no.**
Setup program on CD-ROM, multilingual[a]	00488887
Setup program incl. OnlineChart on CD-ROM, multilingual[a]	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 holder for wall mounting 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

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Item	Part no.
Plug-in power supply unit for interface converter (serial)	00365933
Interface converter I-7520A – RS232 to RS422/485	00376969
Interface card MOXA CP-132i – 2 × RS422/485	00397804
Plant visualization software JUMO SVS3000 (data sheet 700755)	-
Paperless recorder JUMO LOGOSCREEN nt (data sheet 706581)	-

[a] Configuration using a laptop/PC is only possible with an interface (PC interface with USB/TTL convertor or RS485) and one of the two setup programs.

JUMO Wtrans series

Type	Description	Data sheet
JUMO Wtrans receiver	Universal receiver for JUMO wireless measuring probes (voltage supply AC 110 to 240 V or AC/DC 20 to 30 V)	902931
JUMO Wtrans T	Transmitter RTD temperature probe with wireless data transmission (for universal receivers as of software version 01.01) As insertion or mineral-insulated RTD temperature probe for various ambient and operating temperatures with fixed and flexible protection tubes with plug connector M12 × 1 for RTD temperature probes with plug connector M12 × 1 for RTD temperature probes with connecting cable with ATEX approval	902930
JUMO Wtrans E01	Transmitter Measuring probe for humidity, temperature, and CO_2 with wireless data transmission (for universal receivers as of software version 05.01)	902928
JUMO Wtrans B	Transmitter Programmable head transmitter with wireless data transmission (for universal receivers as of software version 03.01)	707060
JUMO Wtrans p	Transmitter Pressure transmitter with wireless data transmission (for universal receivers as of software version 04.01)	402060

Stock versions

Order code	Part no.
902931/10-8-10-23/000	00543004
902931/10-8-20-23/000	00543032
902931/10-8-10-25/000	00543005
902931/30-8-10-23/000	00543006
902931/30-8-10-25/000	00543007