

User Guide

1-Wire Serial Bus Coupler

- 1-Wireⁱ Bus Coupler for serial interfaces with UART Standard
- Galvanic isolation among input and 1-Wire Network
- LED display for power and 1-Wire activity
- Top-hat rail case for control cabinet installation
- Supply voltage of the bus coupler 9-32 VDC
- Connection via screw terminals
- Upgradeable with all ESERA 1-Wire modules
- Low space required in the control cabinet
- Easy to assemble



1 Introduction

Before you start assembling the 1 Wire Serial Bus Coupler and before you take the device into operation, please read these assembly and operating instructions carefully to the end, especially the section referring to the safety notes.

2 Product description

The 1 Wire Serial Bus Coupler establishes a stable, electrically isolated connection among a 1 Wire Network and a serial PC interface with V24-Standard (COM-Port/UART Standardⁱⁱ).

If a data connection to a WAGO SPS should be established, we recommend you to use our 1 Wire Serial Bus Coupler SPS (article number 11302-T). For USB interfaces, the 1 Wire Bus Coupler USB (article number 11302-U) should be used.

The 1 Wire Bus Coupler RS232 is isolated between the data input (D-SUB connection jack) and the 1 Wire interface. Thus, ground loops or EMC emissions and grounding issues from a computer to the 1 Wire Network are efficiently prevented. The isolation significantly reduces stray radiations ("electric smog") in living areas and enhances electric safety among the systems. For galvanic isolation state-of-the-art high-speed optocouplers and special isolated power adapters are being used.

The 1-Wire module DS2480 from Dallas/Maxim is used for this 1 Wire Bus Coupler. The module, combined with a complex internal voltage supply, builds the base for a stable 1 Wire Network. The DS2480 module supports the „Strong Pull Up“function and is thus meant for the use in major 1 Wire Networks as well. Individual 1 Wire sensors can be directly connected. For 1-Wire Networks it is recommended to use a 1-Wire Hub III or a 1-Wire Hub IV.

For the voltage supply, the 1 Wire Bus Coupler has a wide-range input of 9 - 32 VDC and is thus equally suitable for 12 V system environments and typically industrial 24 VDC supplies. Compatible top-hat rail power adapters or socket power adapters can be found in our webshop.

Please refer to the connection plan for further details in regards to the electric connection.

3 Technical data:

1-Wire Bus

Interface: 1-Wire Bus with DS2480 Bus Master Component (5 V, load and data)
Protective circuits: ESD protection and reverse voltage protection
Connection: Screw terminals (up to 2,5 qmm wire cross section)
Output voltage: 5 V (+/-10 %), maximally 400 mA, overload-proof and short-circuit-proof
Isolation: Galvanic separation between data input and 1-Wire Interface
No isolation between voltage supply and 5 V output.
Isolation: minimum 500 VDC between PC Interface and 1-Wire Bus

Serial Interface (V24 Standard)

Connection: D-SUB 9 PIN connection jack
Interface: RS232 UART Level (+/-3-12 V)
Connection cable: „Null modem cable“ (Article No. 43004) available in our webshop

Supply Voltage:

Supply voltage: 9-32 VDC
Power consumption: maximum 500 mA (internal fuse)

4 Ambient conditions:

Protection type: IP20
Protection class: III
Operating temperature: 0 °C to +60 °C
Humidity: 10 to 92 % (non-condensing)
Dimensions: 35 x 90 x 70 mm (WxHxD)

5 Conformity:

EN 50090-2-2
EN 61000-4-2, ESD
EN 61000-4-3, HF
EN 61000-4-4, Burst
EN 61000-4-5, Surge
EN 61000-6-1, Fault-free operation
EN 61000-6-3, Stray radiations
RoHS

6 LED indicator

The module status will be displayed by various LEDs. Please refer to the following table for their functions:

Indicator	Designation	Function
LED green	Power	Display for supply voltage (external voltage)
LED yellow	Data	<ul style="list-style-type: none">Flashes while 1-Wire activityIs lit in case of a shortcut of the 1-Wire dataline

7 Software

The 1-Wire Serial Bus Coupler can be operated with any software, which is aligned to operate the Universal 1-Wire COM Port Adapter „DS9097“.

The 1-Wire Bus Coupler is being operated with 9600 Baud and the following settings: 8 data bits, no parity and 1 stop bit.

Note: The 1-Wire „Strong Pullup“ function of the 1-Wire Bus Coupler must be activated by using the software.

8 Cable length data line (serial cable)

Please note the physical limit of the cable length for the serial data cable among the 1-Wire Bus Coupler and the PC interface. The 1-Wire Bus Coupler is connected to the PC by a „null modem cable“ⁱⁱⁱ.

Due to transmitting data (= voltage), the receiver signal level gets lower with increasing line length (because of the increasing electrical line resistance and the cable capacity), thus, the length of the line is limited.

According to the interface standards, a maximum cable capacitance of 2500 pF is allowed. This corresponds to a cable length of 15 m in maximum for standard cables. Cables that have low capacitance (e.g. UTP CAT-5 cables with 55 pF7m) a maximum length of 45 m is possible.

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9 Connection plan

Connection 1-Wire Bus

(module topside)
 7+8 = 1-Wire load
 9+10 = 1-Wire data
 11+12 = + 5V output

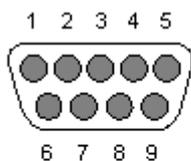
Connection voltage supply

(module bottom side)
 1 = Voltage Supply negative
 2 = Voltage Supply positive
 3-6 = not assigned

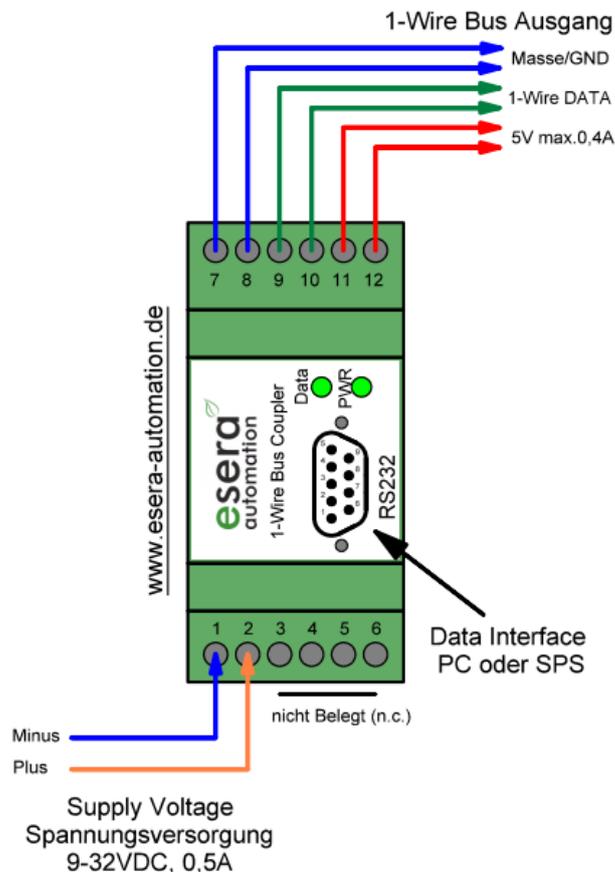
10 Configuration data interface

D-SUB 9-pole connector as data interface of the 1-Wire Bus Coupler.

Please refer to the image below for connector pin assignment. The figure below shows a schematic representation.



Pin 2 - Daten-Eingang (RxD)
 Pin 3 - Daten-Ausgang (TxD)
 Pin 5 - Masse (GND)



11 Operating requirements

The operation of the assembly group can take place only on condition of observing the required voltage and the ambient conditions. The operating position of the device is irrelevant. The device is meant to be used in dry areas free of dust.

Should condensed water build up within the sensor, an acclimatization period of at least 2 hours must be met. The components can be operated only under the supervision of an electrically skilled person. Assembly groups and components do not belong into the hands of children.

In industrial facilities, the accident prevention regulations of the federation of industrial professional associations for electrical installations and equipment must be observed.

Do not operate the components in an environment with inflammable gases, vapors or dusts or in an environment where such gases, vapors or dusts may occur.

12 Assembly

The mounting place must be protected against moisture. The module may only be used in dry indoor rooms or in protected outside areas. The device is designed for fixed installation within a switching cabinet.

13 Disposal Note

Do not dispose of this device in the household waste. Electronic devices must be disposed in accordance with directives for disposing of waste electrical and electronic equipment at local collection points for electronic waste material.



14 Safety Instructions

When using products that come into contact with electrical voltage, the valid VDE regulations must be observed, especially VDE 0100, VDE 0550/0551, VDE 0700, VDE 0711 and VDE 0860

- All final or wiring work must be carried out with the power turned off.
- Before opening the device, always unplug or make sure that the unit is disconnected from the mains.
- Components, modules or devices may only be put into service if they are mounted in a contact proof housing. During installation they must not have power applied.
- Tools may only be used on devices, components or assemblies when it is certain that the devices are disconnected from the power supply and electrical charges stored in the components inside the device have been discharged.
- Live cables or wires to which the device or an assembly is connected, must always be tested for insulation faults or breaks.
- If an error is detected in the supply line, the device must be immediately taken out of operation until the faulty cable has been replaced.
- When using components or modules it is absolutely necessary to comply with the requirements set out in the accompanying description specifications for electrical quantities.
- If the available description is not clear to the non-commercial end-user what the applicable electrical characteristics for a part or assembly are, how to connect an external circuit, which external components or additional devices can be connected or which values these external components may have, a qualified electrician must be consulted.
- It must be examined generally before the commissioning of a device, whether this device or module is basically suitable for the application in which it is to be used.
- In case of doubt, consultation with experts or the manufacturer of the components used is absolutely necessary.
- For operational and connection errors outside of our control, we assume no liability of any kind for any resulting damage.
- Kits should be returned without their housing when not functional with an exact error description and the accompanying instructions. Without an error description it is not possible to repair. For time-consuming assembly or disassembly of cases charges will be invoiced.
- During installation and handling of components which later have mains potential on their parts, the relevant VDE regulations must be observed.
- Devices that are to be operated at a voltage greater than 35 VDC / 12mA, may only be connected by a qualified electrician and put into operation.
- Commissioning may only be realized if the circuit is built into a contact proof housing.
- If measurements with an open housing are unavoidable, for safety reasons an isolating transformer must be installed upstream or a suitable power supply can be used.
- After installing the required tests according to DGUV / regulation 3 (German statutory accident insurance, https://en.wikipedia.org/wiki/German_Statutory_Accident_Insurance) must be carried out.

15 Warranty

ESERA GmbH guarantees that the goods sold at the time of transfer of risk to be free from material and workmanship defects and have the contractually assured characteristics. The statutory warranty period of two years begins from date of invoice. The warranty does not extend to the normal operational wear and normal wear and tear. Customer claims for damages, for example, for non-performance, fault in contracting, breach of secondary contractual obligations, consequential damages, damages resulting from unauthorized usage and other legal grounds are excluded. Excepting to this, ESERA GmbH accepts liability for the absence of a guaranteed quality resulting from intent or gross negligence. Claims made under the Product Liability Act are not affected.

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- i 1-Wire is a product name of Maxim Integrated Products, Inc., USA. Further information at <http://www.maxim-ic.com>
 - ii Serial interfaces according to UART/EIA-232 standard with +/- 3 to 12V signal levels. Further information at <http://de.wikipedia.org/wiki/RS-232>
 - iii It is a crossed, shielded cable with D-Sub connection jacks at both cable ends. Unlike a serial standard cable, connecting a computer to a modem, in this case, different cables must be crossed (for instance, *Receive Data* and *Transmit Data*, pin 2 and 3 of the connection jacks). Further information at <http://de.wikipedia.org/wiki/Nullmodem>