Art. No. 11324

User Guide
1-Wire Gateway 10 Modbus RTU

- 1-Wire Gateway for autonomous communication between PLC and a 1-Wire sensor and actuator network
- Fast readout of all 1-Wire devices in the
- 1-2 seconds clock
- Data output via Modbus RTU (RS485) Protocol
- Processed sensor and actuator data
- Status of each sensor and actuator can be called up
- Convenient configuration program
- No additional drivers necessary
- Optional data storage in case of interruption of communication to the control system / host system
- Power supply for 1-Wire network
- Designed for all 1-Wire network sizes
- DIN rail enclosure for switchboard assembly
- Wide supply voltage range
- Management of all ESERA automation and many
- Standard 1-Wire sensors and actuators

1 Introduction

Before you begin with the installation of the 1-Wire Gateway 10 Modbus and put the device into operation, please read these operating instructions carefully until the end, especially the section on safety instructions. All settings and configurations of the 1-Wire Gateway are carried out with the ESERA Config Tool 3. You can find this software on the ESERA website. Please observe the operating instructions for the ESERA Config Tool 3, which can be found within the Config Tool 3 software under the "HELP/SUPPORT" tab.

2 Product description

Standard Modbus RTU Protocol

You can communicate with your industrial controller, e.g. PLC, via standard Modbus RTU protocol with the 1-Wire Gateway 10. The addressing is clearly structured, comparable to many other Modbus systems. Addresses for system, sensor and actuator data are available.
We provide an address overview with all available data points via the download area of the article on our website and via the ESERA Config Tool 3 configuration software.

3 Auto-E-Connect® Support

The ESERA **Auto-E-Connect®** 1-Wire Plug and Play system will be used for the 1-Wire Bus supported. This enables fully automatic configurations of 1-Wire sensors and actuators on the 1-Wire bus. It is optimized for industrial applications and enables significant added value beyond the sensor and chip data.
The Auto-E-Connect function automatically recognizes ESERA chips, sensors and actuators, starts suitable libraries and outputs fully formatted data.
The Auto-E-Connect functionality will be available from mid 2020 via 1-Wire Controllers, 1-Wire Gateways and 1-Wire ECO from ESERA available.
Further information on ESERA Auto-E-Connect can be found on the ESERA website, ESERA Config-Tool 3, or in the download area for this article in the ESERA Webshop.

4 Equipment

Standalone Controller

The 1-Wire Gateway is designed for autonomous management of a 1-Wire network. You no longer need to worry about 1-Wire commands or formulas to evaluate the sensor data. The 1-Wire Gateway 10 automatically scans the 1-Wire network for new sensors and actuators and provides the corresponding data in plain text using the Modbus protocol, depending on the modules found.

Formatted data output

The 1-Wire Gateway prepares plausibility-tested sensor and actuator data, e.g. for temperature sensors in C° with 2 decimal places. Only one dividing by 100 is necessary. Within the 1-Wire Gateway, product-specific conversion formulas are available for almost all 1-Wire sensors or actuators offered by ESERA.

Designed for all 1-Wire networks

Designed for all 1-Wire networks
The 1-Wire interface of the 1-Wire Gateway 10 is specifically designed to handle all sizes from 1-Wire networks, even with long cable lengths, safe to operate. 1-Wire sensors can be operated simultaneously in parasitic or normal mode.
The currently strongest 1-Wire interface for maximum data security even for complex network structures has been installed

Configuration of the 1-Wire Gateway 10 Modbus

For the configuration of the 1-Wire Gateway 10 we provide a very powerful and user-friendly software (ESERA Config-Tool 3) free of charge. Within the software, the complete documentation is always at your fingertips, as it is automatically updated via the Internet. The software is available via the download area of the article on our website and via the configuration software ESERA Config Tool 3. Please use only the USB interface for configuration

System time / Real time clock

You do not have a real-time clock with battery buffering in your system? No problem! The 1-Wire Gateway 10 is happy to provide the time and date. A real-time clock with battery buffering is integrated. This also allows a plausibility check of the data at any time.

Power supply

For power supply, the 1-Wire Gateway 10 has a power supply input of
9 - 30VDC and is therefore equally suitable for 12V and industry-typical 24VDC supplies.
You can find suitable DIN rail- or plug-in power supplies in our webshop.

Commissioning

Support Videos for commissioning and configuration can be found on our website www.esera.de under Service and Support, Support Videos.

Note: Basics and tips for the 1-Wire bus system can be found in the ESERA Online Shop at 1-Wire Basics or see our eBook in the shop under Training / Documentation

5 Technical data

Data interface:	Modbus RTU (RS485) and ESERA ASCII text protocol
Modbus interface:	RS485 with activatable, integrated terminating resistor
Data interface:	USB 2.0, Type B Mini
Firmware update:	via ESERA Config-Tool 3
Supply voltage:	9-30VDC
Current consumption	max. 500mA
1-Wire interface:	1-Wire bus (5V, ground and data)
Protection circuits:	ESD- and reverse polarity protection
Connection:	screw terminals (up to 2.5qmm cable cross-section)
Output voltage:	5V (+/-10%), max. 200mA, overload and short-circuit proof
Isolation:	Galvanic isolation between data and 1-Wire interface

6 Environmental conditions

Temperature, operation -10°C to +55°C (extended temperature range possible on request)
Humidity: 10 - 92% (non-condensing)
Protection system: IP20
Protection class: III
Dimensions: 35 x 90 x 70mm (WxHxD)

7 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 Störfestigkeit, EN 61000-6-3 Störstrahlungen, RoHS
The module has different display LED´s. Following the function of the displays

8 Display LED

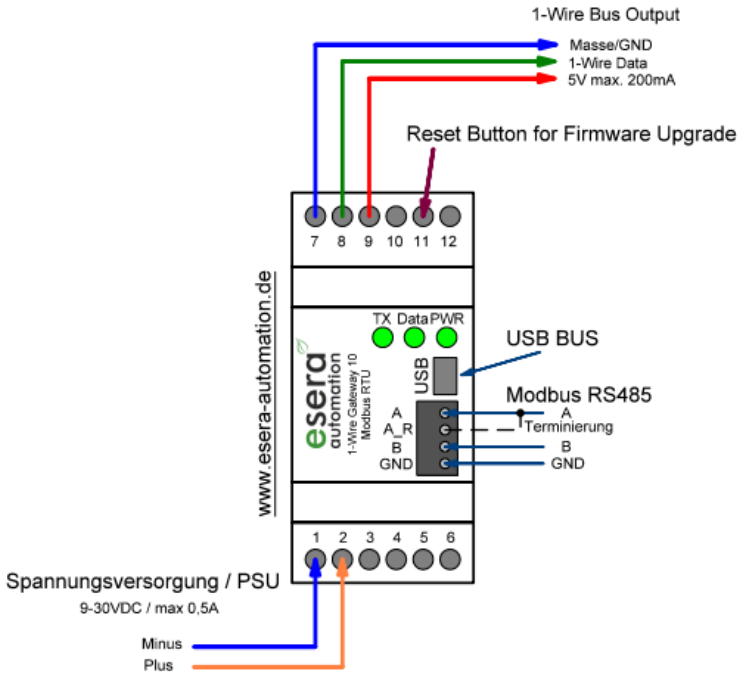
The module has different display LED´s. Following the function of the displays

Anzeige	Bezeichnung	Funktion
LED Green	PWR	Display for supply voltage
LED Green	DATA	• After switching on the device, the LED flashes 3 times. • Flashes during 1-Wire activity • Flashes when data is being sent via the interface port • Flashes very quickly if "KAL Receive" has been activated and the "KAL messages" of the control system do not appear.
LED Green data interface	TX	Send LED, Lights up when data is sent via USB and RS485 interface

9 Wiring diagram

module top side, 1-Wire Bus
7 = Ground 1-Wire
8 = 1-Wire Data
9 = + 5V output
11 = Reset Button

module bottom, voltage power supply 9-30VDC
1 = Minus supply voltage
2 = Plus supply voltage

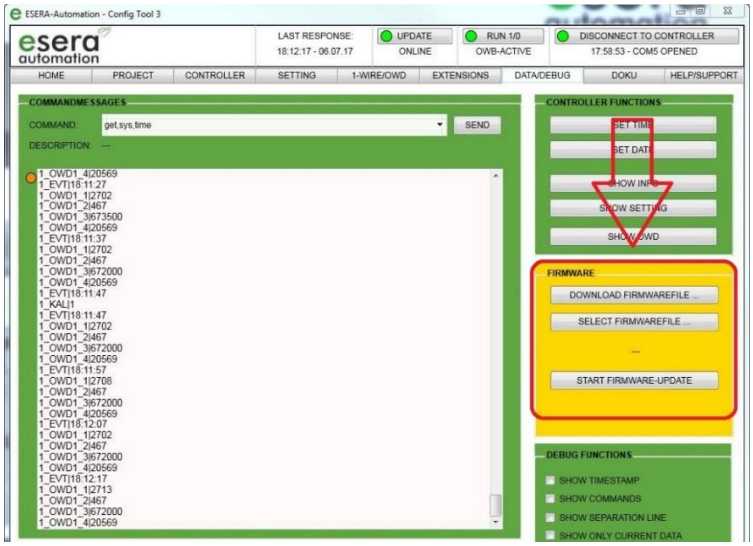


10 Terminating resistor / termination RS485 interface

Within the 1-Wire Gateway 10 there is a termination or termination resistor with 120 Ohm. You can activate this by establishing a cable connection between PIN A and A_R of the RS485 connector.

11 Firmware-Update

A firmware update can be performed with the ESERA Config Tool 3 software under the "DEBUG/DATA" tab via the USB interface.
The "DOWNLOAD FIRMWARE" button opens a window for downloading new software (firmware) for the 1-Wire Controller / 1-Wire Gateway.
The firmware is available for all device versions of the 1-Wire Controller and 1-Wire Gateways applicable. The corresponding functionality is enabled on the installed device.
As of firmware version V1.18_38, there is no need to press the Reset Button of the 1-Wire Controllers / 1-Wire Gateways more necessary.

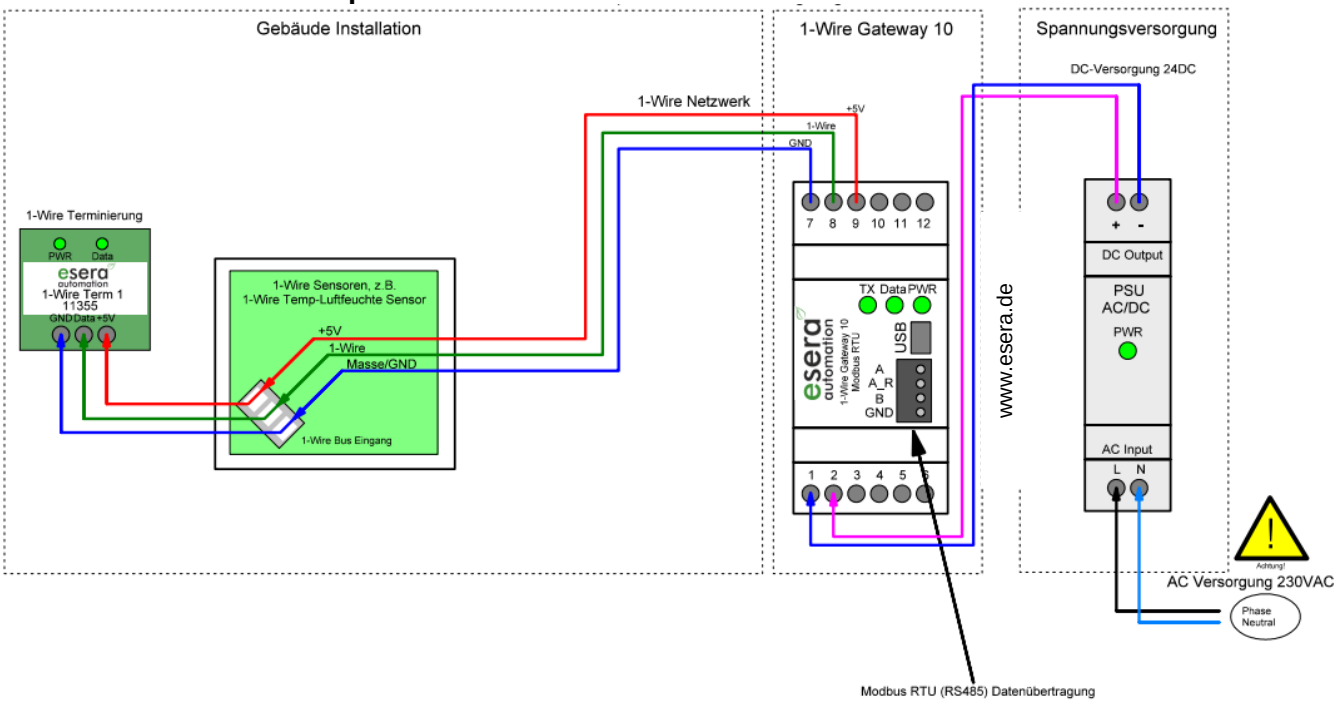


Recovery function Firmware-Update

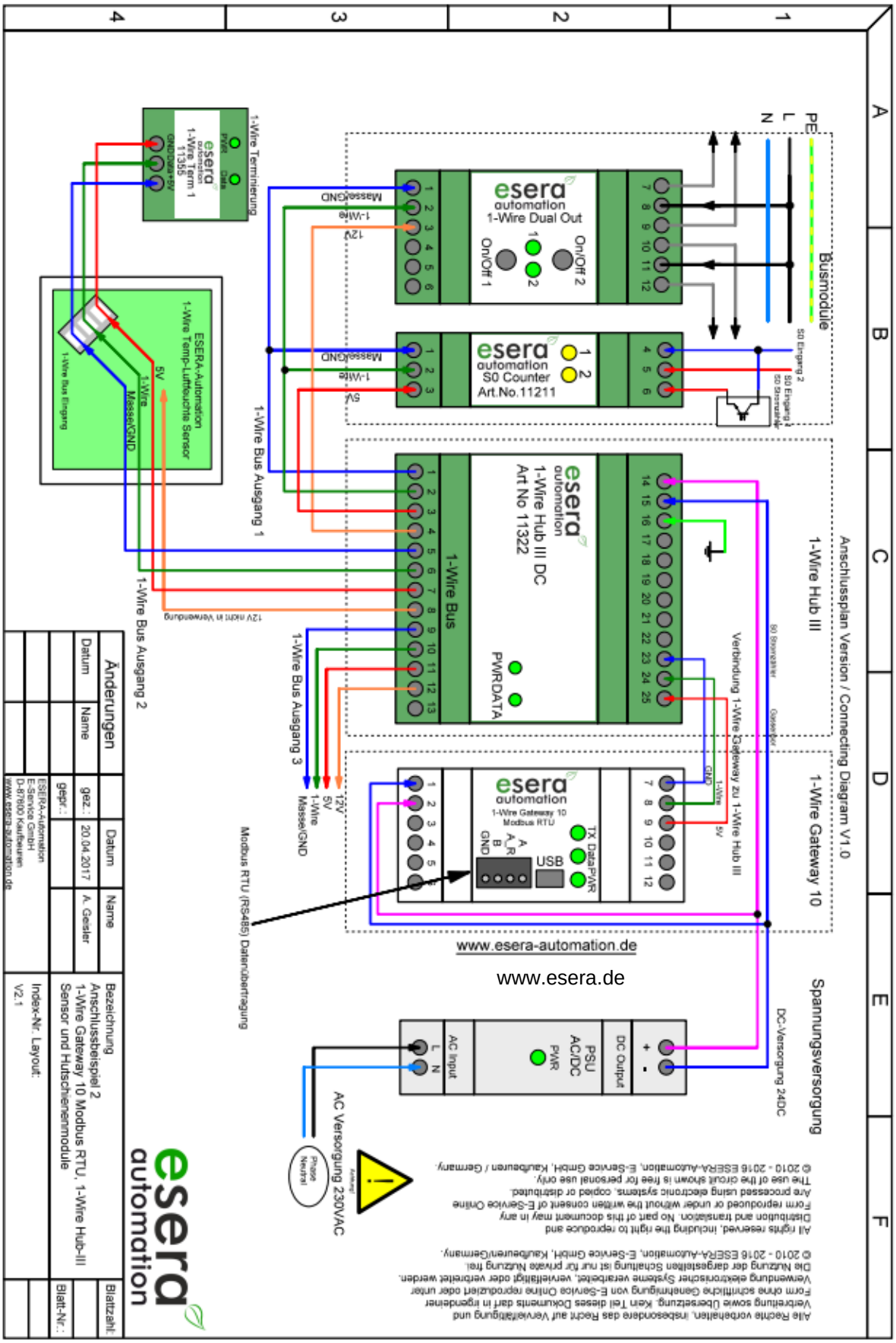
If the update is faulty, e.g. due to a power failure during the update, you can use the recovery function.
To do this, hold down the reset button (located under hole 11 on the top of the module), start the update in Config Tool 3 and release the reset button in Config Tool 3 after approx. 1 second after starting. Now the update should start. After an update we recommend to disconnect the 1-Wire Controller / 1-Wire Gateway from the power supply for approx. 30 seconds and to restart it. If you have any problems with the installation, we will be happy to help you. Simply contact our support by
E-mail (support@esera.de).

Picture 1-Wire Controller 1

12 Connection example with Multisensor



13 Connection example 1-Wire Gateway 10, 1-Wire Hub III, sensors and actuators



14 Software

Data interface Modbus RTU and ESERA ASCII text protocol

The Ethernet interface can be configured using the Windows ESERA program Config Tool 3. This program can be found in the download area of the ESERA online shop.

14.1 Configuration and Communication with 1-Wire Gateway 10

The 1-Wire Gateway 10 has extensive configuration and formatting options, which can be read out and operated with the ESERA Config Tool 3.
Since communication between 1-Wire Gateway 10 and Config Tool 3 takes place via the open ESERA ASCII text protocol, you can also exchange data with any terminal program (e.g. Hercules or Putty) at any time via UDP / RTU with the 1-Wire Gateway 10 and carry out the configuration.
Details about the communication commands can be found in the document "Programmer's Guide" in the download area of the article on our website, www.esera.de and within Config Tool 3.

15 Communication

15.1 ESERA ASCII Text Protocol / Programming Manual

The 1-Wire Gateway 10 provides two protocols. The ESERA text protocol in ASCII format can easily be used for configuration and analysis. Special attention has been paid here to good legibility and traceability for people. The ESERA text protocol works with "GET" and "SET" commands, which probably every programmer has already used in his own projects.
The ESERA text protocol is completely open and documented. The current version of the programming manual can be found in the article download area of our website and via the configuration software ESERA Config Tool 3.

15.2 Modbus Protocol

You can communicate with the 1-Wire Gateway 10 without switching over the ESERA Text or Modbus RTU protocol. The IP address and the port for the communication can be freely selected. The default settings are Port 5000 and DHCP operation.
The Modbus protocol has a standardized structure.The following is a small excerpt of the addressing overview. The complete addressing overview can be found in EXCEL format in the download area of the 1-Wire Gateway 10.

Extract Mode Address Description

Description	**read address**	**Number of words (16Bit)**	**data type**
Gateway No.	60000	1	Word
Article No.	60001	1	Word
Firmware Version	61000	4	String
Hardware Status	61010	3	String
serial number	61020	9	String
time	61030	4	String
date	61035	4	String
…			

1-Wire Bus Sensors and Actuators			
OWD 1 /1-Wire Module	40100	1	Integer
	40101,40102	2	DWord 1
	40103,40104	2	DWord 2
	40105,40106	2	DWord 3
	40107,40108	2	DWord 4
	40109,40110	2	DWord 5
	40111,40112	2	DWord 6
	40113,40114	2	DWord 7
	40115,40116	2	DWord 8
OWD 2 /1-Wire Module	40200	1	Integer
	40201,40202	2	DWord 1
	40203,40204	2	DWord 2
	…		

16 Operating conditions

The assembly may only be operated at the specified voltages and ambient conditions. The device can be operated in any position. The device is intended for use in dry and dust-free rooms.
If condensation is formed, allow at least 2 hours for the unit to acclimatize.
The assembly can only be put into operation under the supervision of a qualified electrician. Do not operate the module in an environment in which flammable gases, vapours or dust are present or could be present.

17 Assembly

The installation site must be protected from moisture. The device may only be used in dry indoor areas. The device is intended for installation inside a control cabinet as a stationary device.

18 Disposal information

Do not dispose of the device in domestic waste! Electronic devices must be disposed of at the local collection points for electronic waste in accordance with the Directive on Waste Electrical and Electronic Equipment!

19 Safety Instructions

When handling products that come into contact with electrical voltage, the valid VDE regulations must be observed, in particular VDE 0100, VDE 0550/0551, VDE 0700, VDE 0711 and VDE 0860.
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- All termination and wiring work must only be carried out when the power is disconnected.
- 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 if it is ensured that the devices are disconnected from the supply voltage and that electrical charges stored in the components inside the device have been discharged beforehand.
- Live cables or wires to which the device, component or assembly is connected must always be checked for insulation faults or breakages.
- If a fault is detected in the supply line, the device must be taken out of operation immediately until the defective line has been replaced.
- When components or assemblies are used, strict compliance with the characteristics for electrical quantities specified in the corresponding description must always be pointed out.
- If it is not clear from the present description for the non-commercial end user which electrical characteristic values apply to a component or assembly, how external wiring is to be carried out or which external components or accessories may be connected and which connection values these external components may have, a qualified electrician must be consulted.
- Before commissioning a device, it must generally be checked whether this device or the module is basically suitable for the application for which it is to be used.
- In case of doubt, it is absolutely necessary to consult experts, experts or the manufacturer of the modules used.
- We accept no liability whatsoever for operating and connection errors beyond our control.
- In the event of non-function, kits should be returned with an exact description of the fault and the associated assembly instructions without housing. A repair is not possible without a fault description. Time-consuming assembly or disassembly of enclosures must be charged additionally.
- The relevant VDE regulations must be observed during installation and when handling parts that later carry mains voltage.
- Devices which are operated at a voltage greater than 35 VDC/ 12mA may only be connected and commissioned by qualified electricians.
- Commissioning may only be carried out if the circuit is installed in a housing in a touch-proof manner.
- If measurements are unavoidable when the housing is open, a safety isolating transformer must be connected upstream or a suitable power supply unit must be used for safety reasons.
- 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.

20 Warranty

ESERA GmbH guarantees that the sold goods are free of material and manufacturing defects at the time of transfer of risk and have the contractually assured properties. The statutory warranty period of two years from invoicing shall apply. The warranty does not cover normal wear and tear. Claims of the customer 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.. Except for this, ESERA GmbH shall be liable in the absence of a warranted quality, in the case of intent or gross negligence. Claims from the product liability law are not affected by this. Should defects occur for which ESERA GmbH is responsible, and should the replacement delivery also be defective in the case of exchange of the goods, the purchaser shall be entitled to conversion or reduction. ESERA GmbH accepts no liability for the constant and uninterrupted availability of ESERA GmbH nor for technical or electronic errors in the online offer.
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