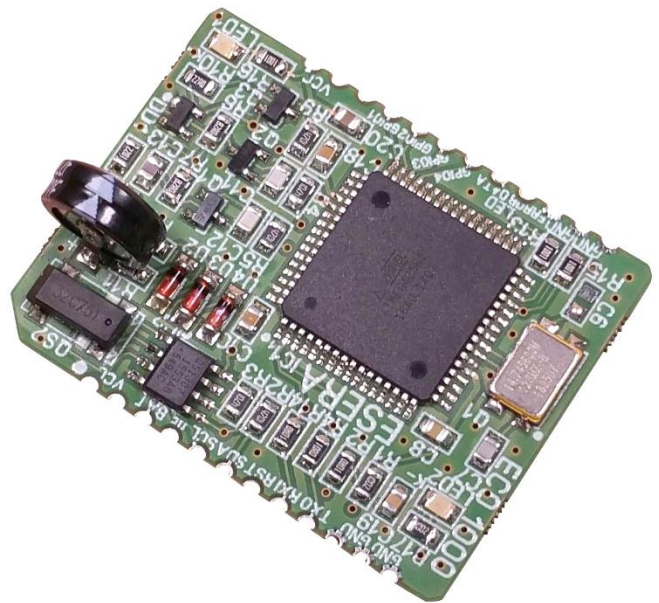


User Guide ECB-100 Embedded 1-Wire Controller / Gateway

- 1-Wire Controller /Gateway for Embedded Applications
- Universal and extremely powerful Embedded 1-Wire interface for your system
- Compact dimensions 42 x 32mm
- Modbus RTU and ASCII protocol
- supports Auto-E-Connect Level 1-3
- Fast readout of all 1-Wire devices in the 1-2 seconds intervals
- No 1-Wire knowledge necessary
- Ready prepared 1-Wire data in plain writing
- Serial data interface (RX, TX 5V TTL level)
- Simple 5V power supply for the module and the 1-Wire network
- Designed for small to large 1-Wire networks
- Evaluation Carrier available
- Management of all ESERA-Automation and many standard 1-Wire chips and modules



1 Introduction

Before you start with the installation of the 1-Wire Controller Embedded Module, hereinafter referred to as ECB-100, and put the device into operation, read these operating instructions through to the end, especially the section on safety instructions.

All settings and configurations of the ECB-100 can be carried out with the ESERA Config Tool 3 or by your own application.

You can find this software on the ESERA website. Please observe the operating instructions for Config Tool 3, which can be found within the Config Tool software under the "HELP/SUPPORT" tab.

2 Product description

The ECB-100 1-Wire Controller represents a fully automatic and extremely powerful 1-Wire interface for embedded applications for your system. No knowledge of 1-Wire technology is required. The ECB-100 takes over the complete communication for the 1-Wire Bus.

Autonomous administration

The ECB-100 controller module has very compact dimensions to be able to equip many systems with a powerful 1-Wire interface.

The ECB-100 is intended for the fully automatic and self-sufficient administration of a 1-Wire network. You no longer need to worry about 1-Wire commands or formulas for the evaluation of sensor data.

The ECB-100 takes over all 1-Wire functions fully automatically.

It scans automatically for new 1-Wire devices (sensors, actuators, memory chips and iButton) and, depending on the component found, outputs the corresponding data converted to plain text.

Data interface

You can communicate via ESERA ASCII or Modbus RTU data protocol with the ECB-100 via the UART interface.

Formatted data output

The ECB-100 provides the sensor and actuator data ready prepared, e.g. for temperature sensors. in C° cyclically. Only one dividing by 100 is necessary.

Designed for all 1-Wire networks

The 1-Wire interface of the ECB-100 1 is specially designed to handle small up to very large 1-Wire networks with long cable lengths. Mixed 1-Wire sensors can be operated in parasitic or normal mode simultaneously.

The currently strongest 1-Wire interface for maximum data security even for complex network structures has been installed.

System time / real time clock

You do not have a real-time clock with battery buffering in your system? No problem, the ECB-100 is happy to provide the time and date. The real-time clock (RTC) is supplied by a maintenance-free gold cap (super capacitor) for approx. 2 days in the event of a power failure.

What is a Goldcap (super capacitor)? An explanation can be found here:

<https://de.wikipedia.org/wiki/Superkondensator>

Power supply

For the voltage supply of the ECB-100 module only a simple 5V DC voltage with min. 100mA load capacity is required.

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 please refer to our eBook in the shop under Training/Documentation

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.

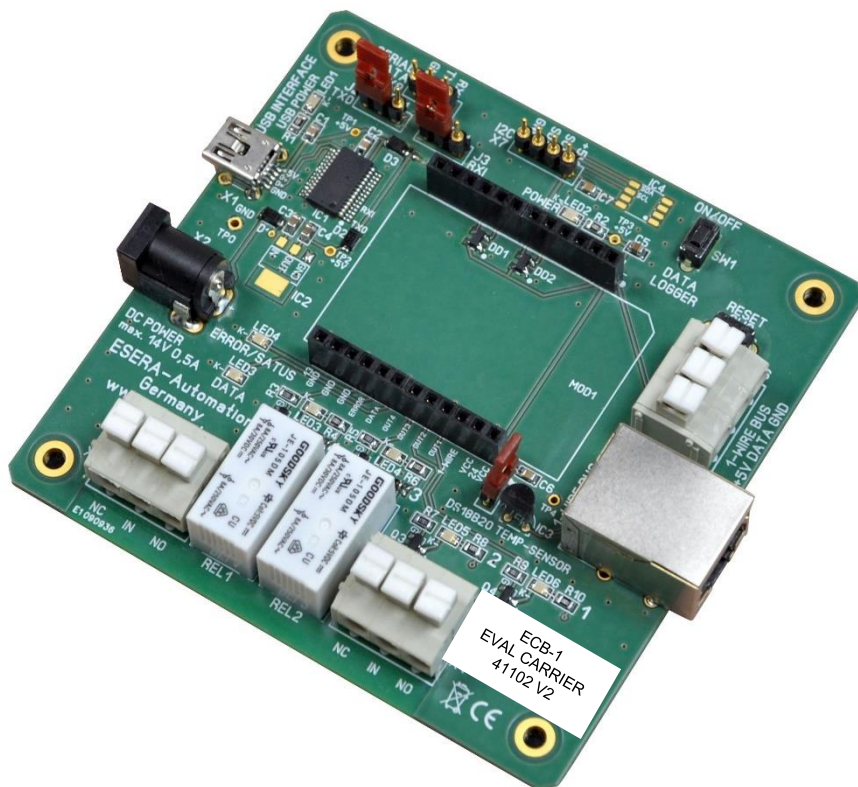
The Auto-E-Connect functionality will be available from mid 2020 via 1-Wire Controllers, 1-Wire Gateways and 1-Wire ECO from ESERA available.

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 EVAL CARRIER ECB-1

To facilitate your development work, a suitable EVAL Carrier is available. Art. No. 41102, ECB-1 Carrier

Illustration example



5 Technical data

Interface: UART Data interface, 5V TTL Level

Firmware Update/

Configuration: e.g. by ESERA Config Tool 3

Supply voltage : 5VDC +/-10%

Current consumption: min. 100mA, max. 500mA (Depending on the 1-Wire load)

Power supply RTC: Goldcap, Buffering of the internal clock (RTC) for approx. 4 days if the supply voltage fails. In case of a longer failure the RTC must be reset. The gold cap is charged after approx. 30 minutes. An external additional power supply can be connected.

1-Wire interface: 1-Wire Bus (+5V, ground and Data)

Protection circuits: ESD and reverse polarity protection

Output voltage: +5V (+/-10%), max. 200mA, Overload and short-circuit proof supported

1-Wire components: DS2401, DS1963, DS1990, DS1820, DS18S20, DS18B20, DS2413, DS2438, DS2450, DS2408, DS2405, DS2406 (input only), DS2423, additional chips on request. We are happy to support further chips as OEM products for you.

6 Ambient conditions

Temperature, Operation: -40°C bis +85°C

Humidity: 10 - 92% (non condensing)

Protection system: IP00

Protection class: III

Dimensions: 42 x 32 x 8mm (LxWxH)

7 Conformity

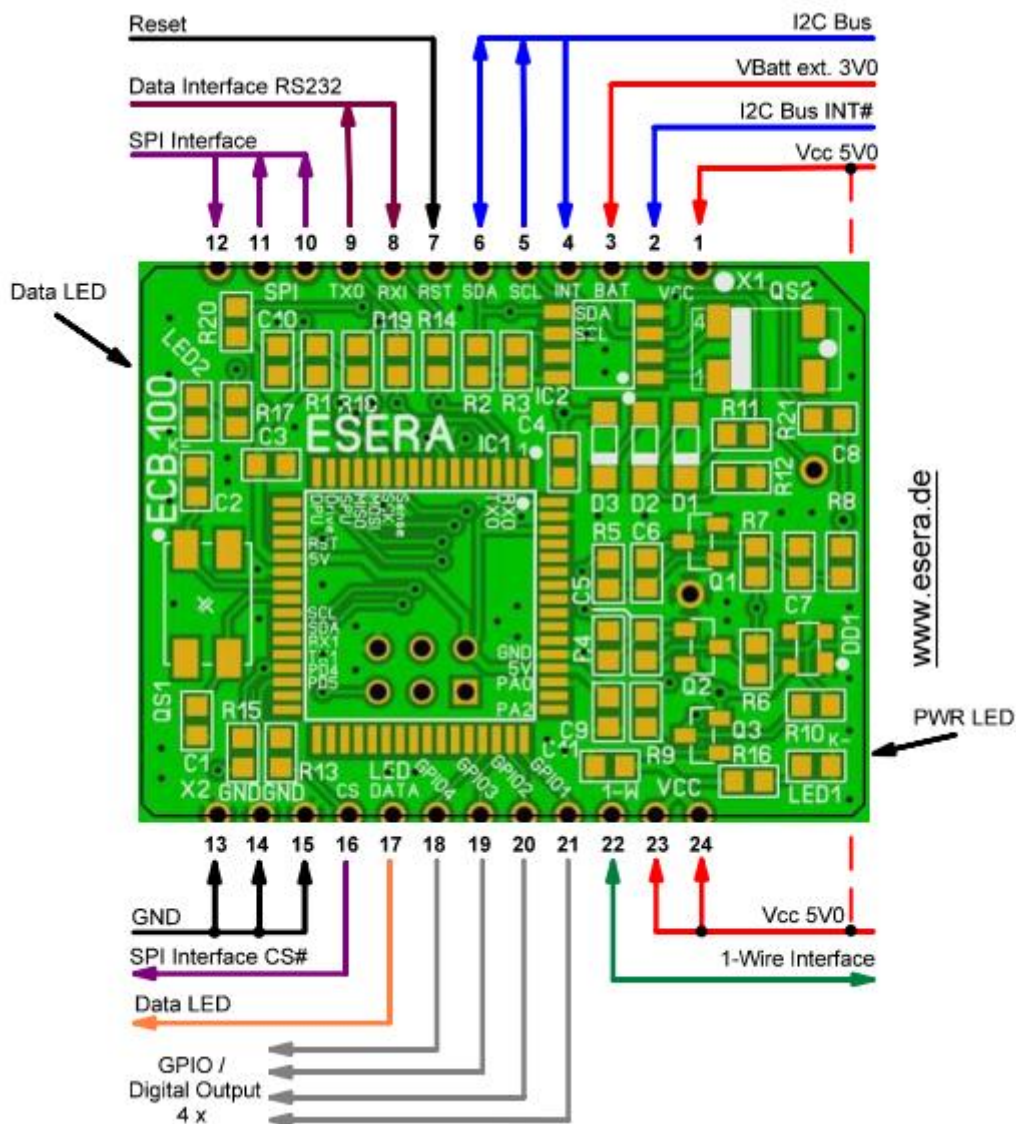
EN 50090-2-2, EN 61000-4-2 ESD, EN 61000-4-3 HF, EN 61000-4-4 Burst, EN 61000-4-5 Surge, EN 61000-6-1 Interference immunity, EN 61000-6-3 Interference radiations, RoHS

8 Display LED

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

Display	Bezeichnung	Funktion
LED 1, green	PWR	Display for supply voltage
LED 2, green	DATA	<ul style="list-style-type: none"> After switching on the device, the LED flashes 3x. flashes during 1-Wire activity flashes when sending data via the data interface flashes very quickly if "KAL Receive" has been activated and the "KAL messages" of the control system do not appear.

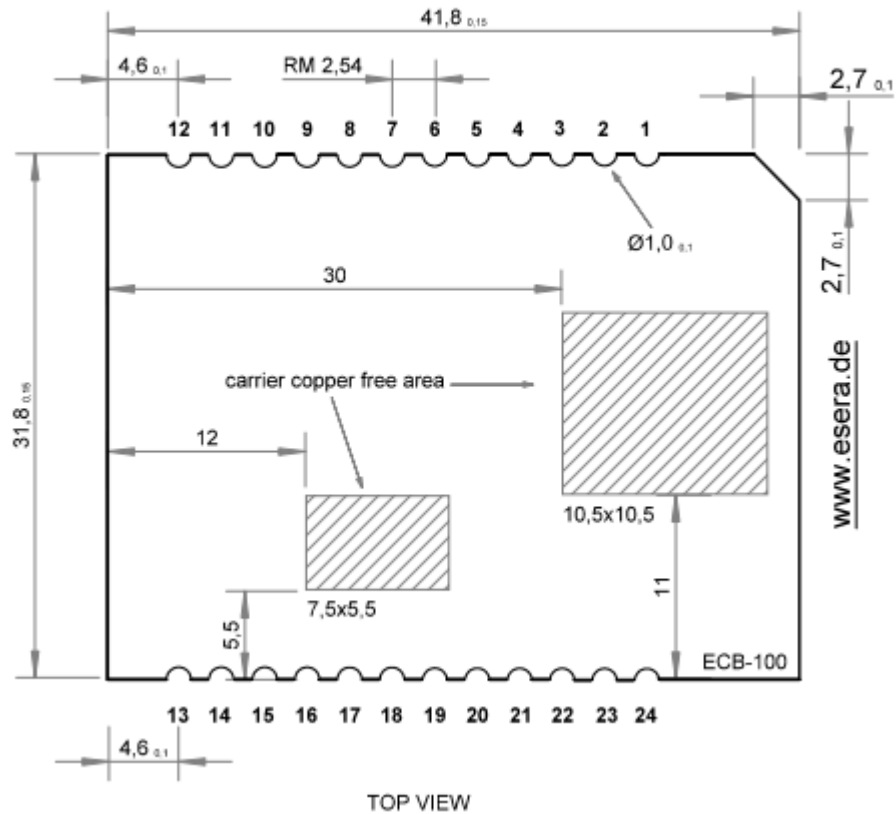
9 Connection plan



PIN	Description	Function	Input / Output
1	Vcc 5V0	Power supply 5VDC Connection between PIN 1,23 und 24	Input
2	I2C Interrupt#	Interrupt input for I2C interface	Input
3	VBatt. Extern 3V0	RTC External power supply. Battery connection for external battery. Battery voltage 3V. PIN connected to internal RTC power supply.	Input
4	I2C Interrupt	Interrupt input for I2C Bus Designed e.g. for digital inputs Signal level 5V Pull Up to 5V available	Output
5	I2C Bus, SCL	I2C clock line Signal level 5V Pull Up to 5V available	Output
6	I2C Bus, SDA	I2C Data line 100KHz Signal level 5V Pull Up to 5V available Software support for PCF8574 Portexpander. Further optional	Input / Output
7	Reset	External hardware reset input, e.g. for reset button, Low Active, Pull Up to 5V available	Input
8	Data Interface, RXI	Data interface input 5V TTL level, Baud rate 19200, no Start bit, one Stop bit (8N1)	Input
9	Data Interface, TXO	Data interface output 5V TTL level, Baud rate 19200, no Start bit, one Stop bit (8N1)	Output
10	SPI Interface SCK	SPI Interface Clock Signal	Output
11	SPI Interface MOSI	SPI Interface Data cable, MOSI	Output
12	SPI Interface MISO	SPI Interface Data cable, MISO	Input
13	GND	Ground / Ground potential alfor: <ul style="list-style-type: none"> • Power supply • Data Interface • I2C Bus • SPI Interface • Interrupt input • Reset • Digital outputs 	GND
14			
15			
16	SPI Interface CS#	SPI Interface Chip Select, Low Active, Open Collector	Output
17	Data LED	Output for data (activities of the 1-wire controller) Low active, series resistor with 470R available	Output
18	GPIO / Digital Output 4	Digital output for controlling e.g. a relay. Bipolar transistor or logic level MOSFET required as driver stage. Signal level 5V, High active	Output
19	GPIO / Digital Output 3		Output
20	GPIO / Digital Output 2		Output
21	GPIO / Digital Output 1		Output
22	1-Wire Interface	1-Wire interface, signal level 5V	Input / Output
23	Vcc 5V0	Power supply 5VDC Connection between PIN 1,23 und 24	Input
24			

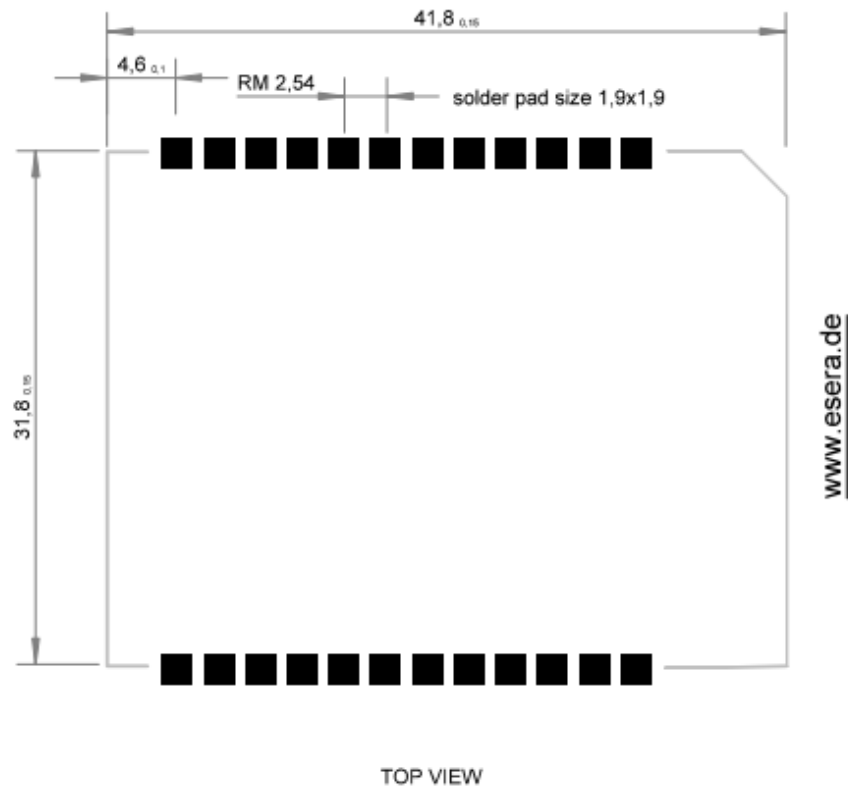
10 Mechanical dimensions

Mechanical dimensions



11 Solder Pads geometry

Solder pads description



12 Software, Data interface

Data interface with ESERA ASCII text protocol and Modbus RTU.

Communication with the ECB-100 takes place via the UART interface (RX, TX). With this interface you can exchange data with the ESERA text protocol or Modbus RTU telegrams. The complete configuration is also carried out via this data interface. The data interface has the following fixed settings: 19200 baud, 8 data bits, no start bit, one stop bit (19200, 8N1).

13 Configuration and communication with ECB-100

The ECB-100 has extensive configuration and formatting options which can be read out and operated with the ESERA Config-Tool 3 or your own software.

Since communication between ECB-100 and Config-Tool 3 takes place via the open ESERA ASCII text protocol, you can also use any terminal program at any time to (e.g. Hercules or Putty) with the ECO 1000 and carry out the configuration.

Details on the communication commands can be found in the document "Programming Manual" in the download area of the ESERA online shop and within Config-Tool 3.

13.1 Figure Config Tool 3, OWD Overview

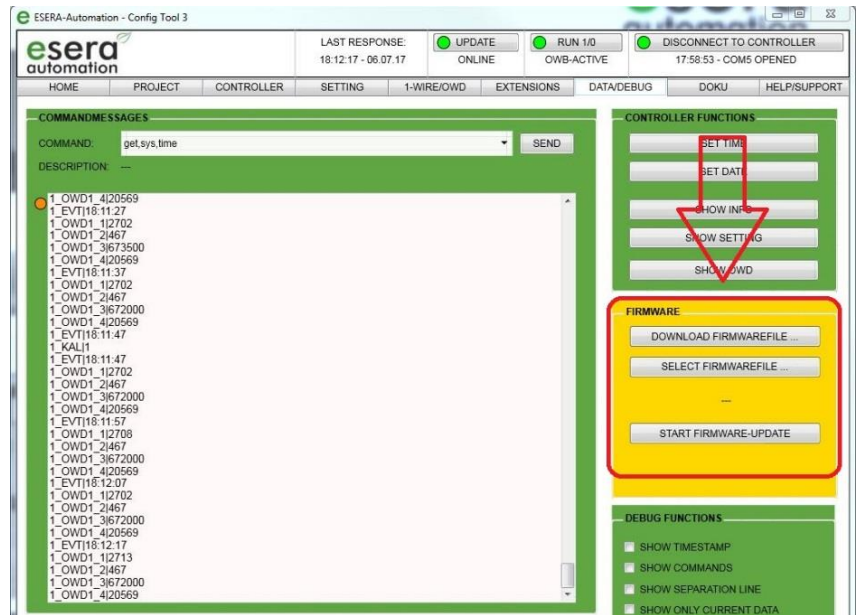
The screenshot shows the ESERA-Automation - Config Tool 3 interface. At the top, there are status indicators: 'LAST RESPONSE: 17:52:47 - 05.05.17', 'UPDATE ONLINE', 'RUN 1/0 OWB-ACTIVE', and 'DISCONNECT TO CONTROLLER 18.04.10 - COM5 OPENED'. The main menu includes 'HOME', 'PROJECT', 'CONTROLLER', 'SETTING', '1-WIRE/OWD', 'EXTENSIONS', 'DATA/DEBUG', 'DOKU', and 'HELP/SUPPORT'. The '1-WIRE/OWD' section is active, displaying a list of OWD devices (1_OWD1 to 1_OWD30) with their IDs and status. The 'OWD INFO' panel shows details for OWD NO. 2, including its type (Temperatur-Feuchte-Helligkeit Sensor), name, and serial number (26B460FB010000E5). It also features a 'SELECT ARTNO.' field set to 11134 and 'OWD MOVE FROM' and 'OWD MOVE TO' fields. The 'OWD DATA AND CONTROL' panel shows 8 channels (CH.1 to CH.8) with 'OFF' and 'ON' buttons, and a list of values (VALUE 1 to VALUE 8). At the bottom, there are buttons for 'UPDATE OWD-LIST FROM CONTR.', 'DELETE ALL OWD IN CONTROLLER', and 'SAVE ALL OWD PERMANENT'.

14 Firmware Upgrade

You will find the current device software (firmware) in the download area of Config Tool 3. When commissioning the ECB-100, please check for the new firmware version. Please always use the latest version. You can update the firmware using Config Tool 3 or your firmware.

Please refer to the user manual for Config Tool 3, which can be found within the Config Tool software under the "HELP/SUPPORT" tab.

**Figure Config Tool 3,
Data/Debug Firmware Update**



15 Operating conditions

The module 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. Do not operate the module in an environment in which flammable gases, vapors or dusts are present or could be present.

16 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.

17 Disposal instructions

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!



18 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.

19 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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