

User Guide

1-Wire Gateway 20 Modbus TCP

- 1-Wire Gateway for self-communication between PLC and a 1-Wire sensor and actuator Network
- Data evaluation of all 1-Wire modules in 1 - 2 seconds increments
- Modbus data output as TCP protocol Edited sensor- and actuator data
- Status updates for all sensors and actuators
- Easy configuration
- No extra drivers needed
- Data storage in case of loss of communication to the host system (optional)
- Power supply for 1-Wire network
- Designed for all dimensions of 1-Wire networks
- DIN rail housing for switchboard assembly
- Wide range of power voltage
- Management of all ESERA-Automation 1-Wire modules and many of standard 1-Wire sensors and actuators (e.g. switch-modules)



1 INTRODUCTION

Before you start assembling the **1-Wire Gateway 20 Modbus TCP** and before you take the device into operation, please read this assembly and operating instruction carefully to the end, especially the section referring to the safety notes.

We recommend to use Config-Tool 3 for all kind of setup and configuration tasks. Please find the latest release on our website at, www.esera.de. Please also refer to the Help/Support section to find the user guide for Config-Tool 3.

2 PRODUCT DESCRIPTION

Standard Modbus TCP protocol

You can use your industrial controller, e.g. PLC and standard TCP protocol to connect to the 1-Wire Gateway 20. Addressing is similar to other Modbus systems and easy to handle. You can use addresses for system data, sensor data and actuator devices. A complete address list including all available data points is available for [download](#) on our webpage. These addresses are also available within the ESERA configuration software Config-Tool 3.

Standalone controller

The 1-Wire Gateway 20 Modbus is designed to control 1-Wire Networks. You no longer have to worry about 1-Wire commands or algorithms to analyze sensor data. 1-Wire Gateway 20 Modbus scans 1-Wire Networks by itself in order to identify new sensors or actuator devices. All data found were automatically provided in a ready to use Modbus protocol format.

Formatted data output

1-Wire Gateway 20 Modbus provides plausibility checked sensor and actuator data in a ready to use format. E.g. temperature sensor provides values in Celsius degrees with 2 decimal places. You only need to divide this number by 100. Within the 1-Wire Gateway a product specific transformation table is available for most of our selling 1-Wire sensor and actuator products.

Designed for all 1-Wire Networks

The 1-Wire interface of the 1-Wire Gateway 20 Modbus is specially designed to securely support all sizes of 1-Wire networks. 1-Wire sensor devices can be operated in parasitic or normal mode at the same time. The latest available most powerful 1-Wire interface for a maximum level of data security has been used. This includes complex network structures as well.

1-Wire Gateway 20 Modbus configuration

Free configuration software (Config-Tool 3) is provided. When using Config-Tool 3, the latest documentation is available at any time hence it automatically updates via internet. This software is available for [download](#) on our webpage. Communication to Modbus TCP is parallel with no switching.

System time / real time clock

No real time clock with battery buffering available in your system? No problem at all. Our 1-Wire Gateway 20 Modbus is providing time and date as real time clock including an integrated backup battery. Data plausibility check is possible at any time.

Power supply

Input voltage for 1-Wire Gateway 20 Modbus is 9 – 30 VDC. Therefore it can be used for 12 V as well as 24 VDC (industrial applications). Appropriate hat-rail mounted power supplies or power plugs can be found in our webshop.

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 TECHNICAL DATA

Data Interface:	Modbus TCP and ESERA ASCII text protocol
Ethernet Interface:	TCP/IP or UDP <ul style="list-style-type: none">- 10/100 MBit Ethernet Interface (RJ45)- Auto Negotiation (Full-duplex and Half-duplex)- Auto MDI/MDIX- Support for DHCP and fix IP-address- DNS support- DYN-DNS server sSupport
Firmware Update:	via ESERA Config-Tool 3
Power supply:	15 – 30 VDC
Power consumption:	maximum 1 A
1-Wire interface:	1-Wire bus (12 V, 5 V, GND and data)
Protective circuits:	ESD protection and polarity protection
Connection:	Screw terminals (up to 2,5 qmm wire cross section)
Output voltage:	12 V maximum 250 mA (+/- 10 %), 5 V maximum 200 mA (+/- 10 %) overload-proof and short-circuit-proof
Isolation:	Galvanic separation among data and 1-Wire interface

5 AMBIENT CONDITIONS

Temperature, operation	-10 °C up to +55 °C (extended temperature range available upon request)
Air humidity:	10 – 92 % (non-condensing)
Protection system:	IP20
Protection class:	III
Dimensions:	35 x 90 x 70mm (WxHxD)

6 CONFORMITY

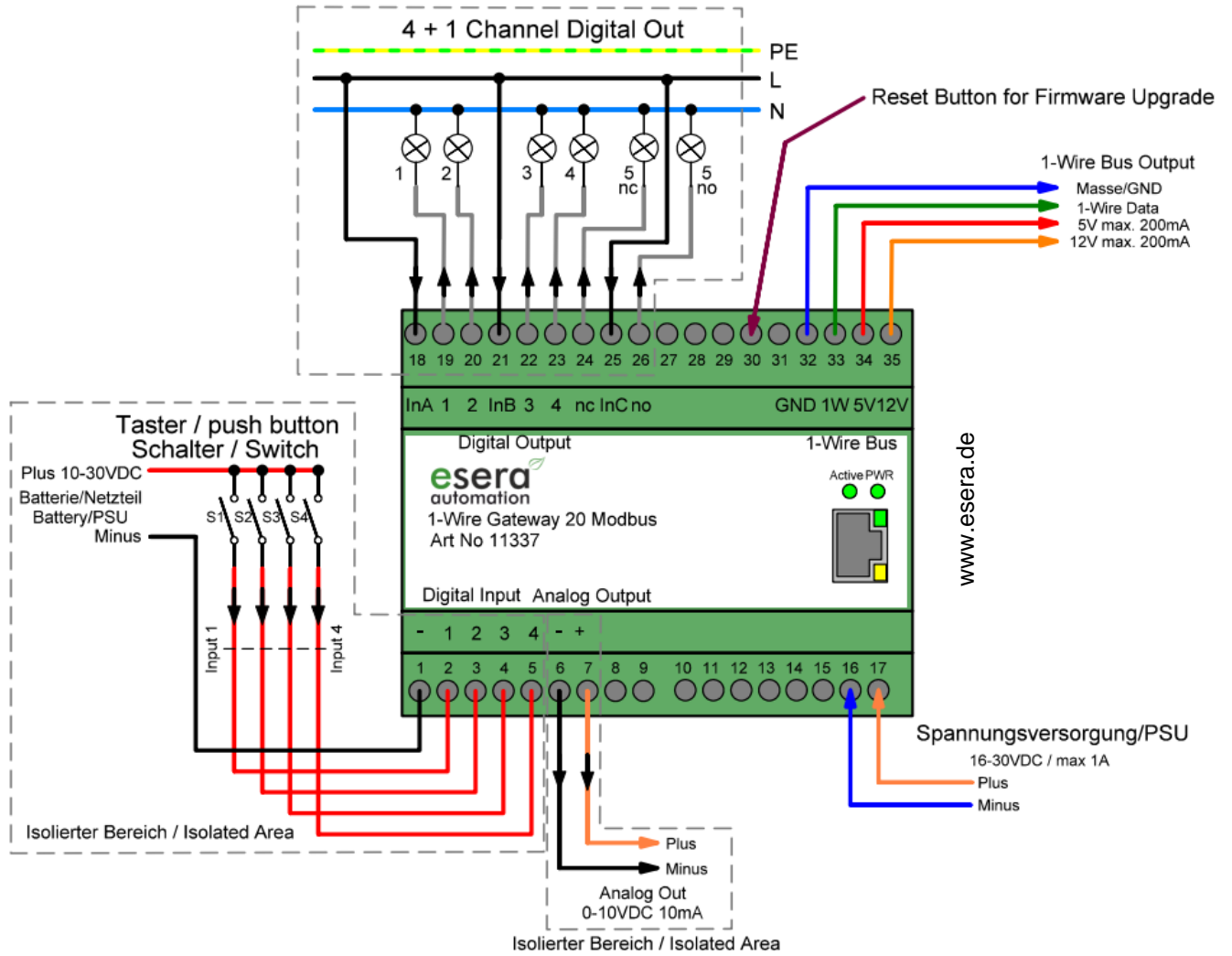
EN 50090-2-2
 EN 61000-4-2, ESD
 EN 61000-4-3, HF
 EN 61000-4-4, Burst
 EN 61000-4-5, Surge
 EN 61000-6-1, Fault-free operation
 EN 61000-6-3, Stray radiation
 RoHS

7 LED INDICATORS

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

LED status	Description	Function
LED Green	PWR	power indicator
LED Green	DATA	<ul style="list-style-type: none"> • LED flashes 3 times after power on • Flashes at 1-Wire activity • Flashes while transferring data by the data interface • Flashes rapidly if "KAL Receive" has been activated and no "KAL messages" received.
LED Green Data Interface		Network Link LED Is lit when connected
LED Yellow Data interface		Network activity LED Is lit while data submission by data interface

8 CONNECTION



Module bottom side (power supply, digital input and analog output)

- 1 = GND/negative digital input isolated to negative supply
- 2 = digital input 1 10 – 30 VDC
- 3 = digital input 2 10 – 30 VDC
- 4 = digital input 3 10 – 30 VDC
- 5 = digital input 4 10 – 30 VDC
- 6 = GND/ negative analog output isolated to negative supply
- 7 = analog output 0 – 10 VDC
- 8 - 15 = not assigned
- 16 = GND/ negative supply voltage
- 17 = Positive supply voltage

Module top side (Digital Output and 1-Wire Bus)

- 18 = main supply for digital output 1+2
- 19 = digital output 1, max. 8 A
- 20 = digital output 2, max. 8 A
- 21 = main supply for digital output 3+4
- 22 = digital output 3, max. 8 A
- 23 = digital output 4, max. 8 A

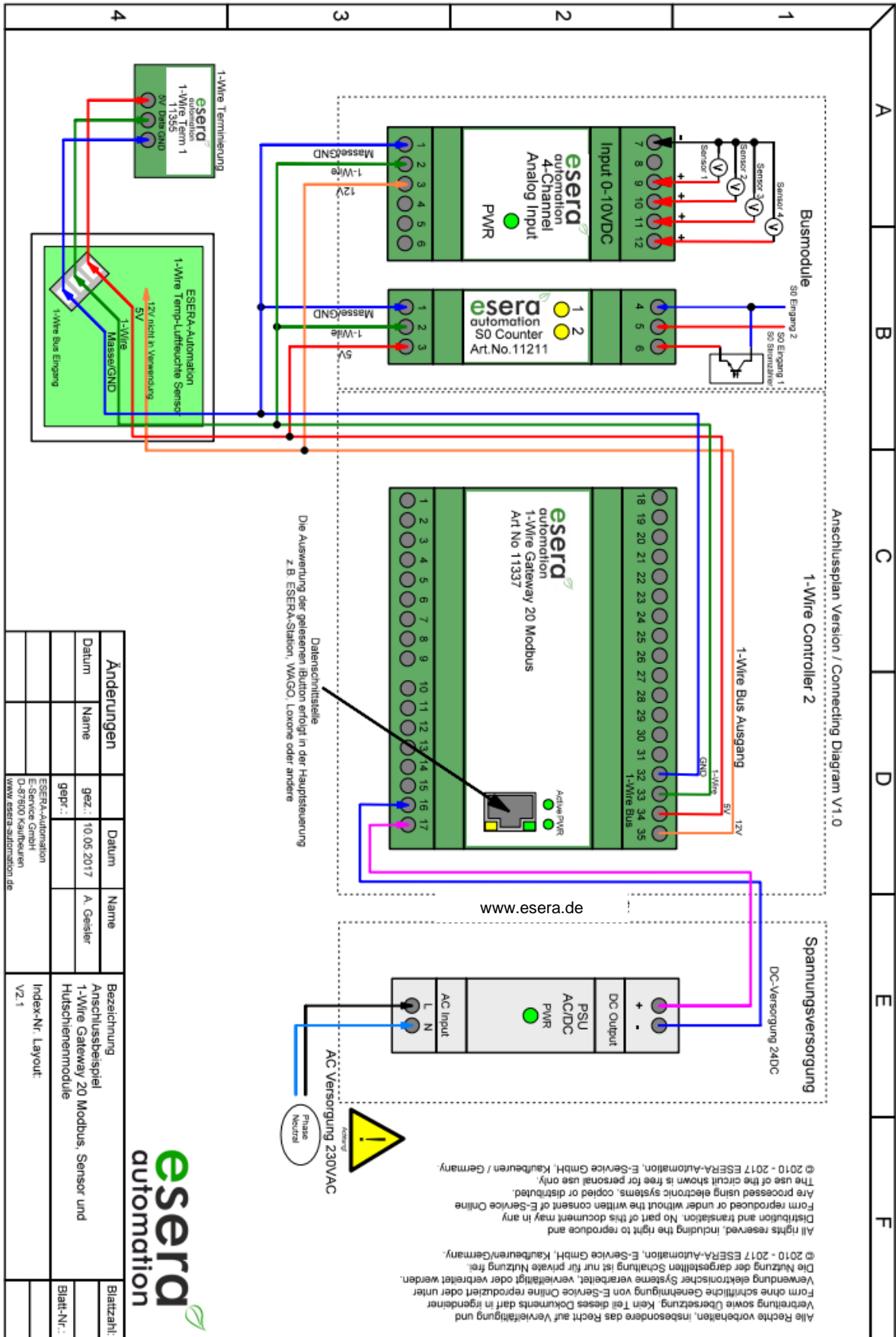
- 24 = digital output 5 break contact, max. 5A
- 25 = main supply for digital output 5
- 26 = digital output 5 make contact, max. 5A

- 30 = Reset Button inside

- 32 = GND/ negative 1-Wire Bus
- 33 = 1-Wire Data
- 34 = 5 V voltage supply for 1-Wire Bus, max. 200 mA
- 35 = 12 V voltage supply for 1-Wire Bus, max. 250 mA

Basics and tips for 1-Wire Bus systems can be found in our webshop (<https://www.esera.de/1-wire-rundlagen/>) or in our e-book which is also available in our webshop (<https://www.esera.de/service-support/dokumentation/352/grundlagen-1-wire-bus-ebook?number=11901>).

9 CONNECTION - EXAMPLE 1-WIRE GATEWAY, SENSORS AND ACTUATORS



10 DATA INTERFACE MODBUS TCP AND ESERA ASCII TEXT PROTOCOL

THE ETHERNET INTERFACE IS CONFIGURED USING THE WINDOWS ESERA PROGRAM "CONFIG-TOOL 3".

YOU CAN FIND THIS PROGRAM IN THE DOWNLOAD AREA OF THE ESERA ONLINE SHOP.

11 INTEGRATION IN IP-SYMCON / ESERA-STATION

ESERA IP-Symcon software modules are provided at our webpage for easy integration of the 4-fold analog input in IP-Symcon by using a 1-Wire Controller / 1-Wire Gateway. Using software scripts are no longer necessary. Further details can be found on our webpage: <https://www.esera.de/kompatible-steuerungen-zentralen/ip-symcon-integration/>.

A script for regular connections by 1-Wire Bus Coupler is also available for download on our webpage. Further details can be found in the sample script.

12 INTEGRATION IN LOXONE

We provide a sample project e.g. for read out analog voltages by 4-fold analog input via 1-Wire Controller 1 in our webshop.

Further details can be found here: <https://www.esera.de/kompatible-steuerungen-zentralen/loxone-integration/demo-1-wire-controller-1-loxone-integration/>

13 INTEGRATION IN FHEM

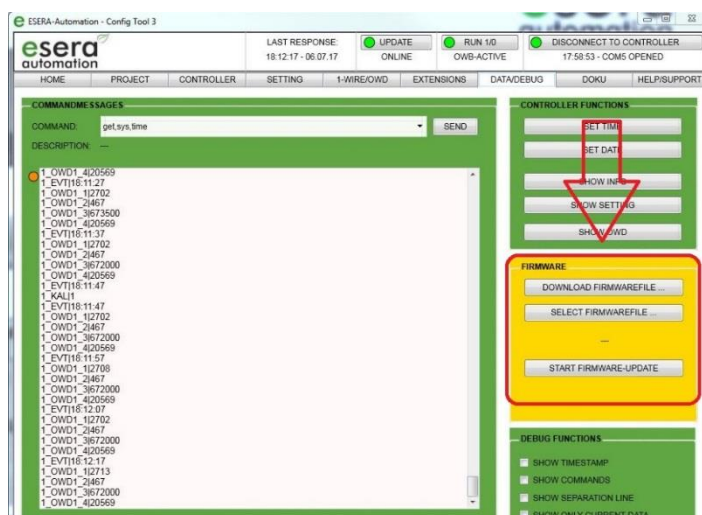
We provide a software module for easy integration in the Open Source automation software FHEM of the 4-fold analog input into FHEM by 1-Wire Controller / 1-Wire Gateway. Using this software scripts are no longer necessary. Further details can be found on our webpage: <https://www.esera.de/kompatible-steuerungen-zentralen/fhem-integration/>

14 CONFIGURATION AND COMMUNICATION WITH 1-WIRE GATEWAY 20

1-Wire Gateway 20 offers various configuration and formatting options. All options can be read out and controlled by the ESERA Config-Tool 3. 1-Wire Gateway and Config-Tool 3 communication is based on an open ESERA ASCII text protocol. Therefore configuration and data transfer with any terminal program (such as Hercules or Putty) by UDP/TCP/IP and 1-Wire Gateway 20 is possible at any time. For detailed communication commands please refer to the "[Programming Manual](#)" which is available for download in our webshop.

15 FIRMWARE-UPDATE

Firmware will be updated by using a Config-Tool 3 software which can be found at the "DEBUG/DATA" tab. By clicking the button "DOWNLOAD FIRMWARE" a new window opens to download new software (firmware) for the 1-Wire Controller / 1-Wire Gateway. This firmware is compatible with all releases of the 1-Wire Controller and 1-Wire Gateways. The features are individually unlocked at the installed device. Starting with firmware version V1.18_38 the reset button of the 1-Wire Controller / 1-Wire Gateway does not need to be pressed for updates anymore.



Recovery function Firmware-update

Should an error occur during the firmware update e.g. losing power while updating the firmware, a recovery function can be started. Press and hold the reset button (the reset button is located beneath hole no. 30 at module top side). Then start the update in Config-Tool 3 and release the reset button after 1 second after the update has been started. The update should start now.

When the updated is completed we recommend to disconnect the 1-Wire Controller / 1-Wire Gateway for approx. 30 seconds, then restart again. If any issues should occur when installing the update, please contact the ESERA support team: E-Mail:

support@esera.de.



1-Wire Controller 1

16 COMMUNICATION

16.1 ESERA ASCII TEXT PROTOCOL / PROGRAMMING MANUAL

The 1-Wire Gateway 20 Modbus provides two types of protocols. The ESERA text protocol in ASCII format easily supports configuration and analysis whereas the ESERA text protocol runs on "GET" and "SET" commands. The ESERA text protocol is totally open and documented. The latest version of the ESERA protocol description is available for download in our webshop (<https://www.esera.de/produkte/software/downloads-firmware-1-wire-controller-1-wire-gateway/>) as well as in the ESERA Config-Tool 3 download area.

16.2 MODBUS TCP PROTOCOL

1-Wire Gateway 20 Modbus communication to ESERA text protocol or Modbus TCP protocol is parallel with no switching. For communication any IP address and any port can be chosen. Default is set to port 5000 and CHCP mode.

The Modbus protocol is standardized configured. Please refer to the following table for a partial address-overview. A complete address overview is available for download in EXCEL format at the download area of the 1-Wire Gateway 20 Modbus.

Partial Modbus address specification

Specification	Reading address	number of words (16Bit)	type of data
Gateway No.	60000	1	word
Article-No.	60001	1	word
Firmware Version	61000	4	string
Hardware	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	DWord1
	40103, 40104	2	DWord2
	40105, 40106	2	DWord3
	40107, 40108	2	DWord4
	40109, 40110	2	DWord5
	40111, 40112	2	DWord6
	40113, 40114	2	DWord7
	40115, 40116	2	DWord8
OWD 2/1-Wire module	40200	1	Integer
	40201, 40202	2	DWord1
	40203, 40204	2	DWord2
	...		

17 OPERATING CONDITIONS

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 and dust-free areas.

Should condensed water build up, an acclimatization period of at least 2 hours must pass.

Assembly groups and components do not belong into the hands of children!

The building group can be operated only under the supervision of an electrically skilled person.

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

Do not operate the assembly group in an environment with inflammable gases, vapours or dusts or in an environment where such gases, vapours or dusts may be found.

18 ASSEMBLY

The location of the assembly must be protected against humidity. The device may be used only in dry inside spaces and protected outside areas. The device is designed to be assembled as a fixed device within a switchboard.

19 DISPOSAL



Electronic devices must not be disposed of with household waste. According to the directive on waste electrical and electronic equipment, electronic devices must be disposed of at designated local collection points for electronic waste. These collection points are specialized facilities that ensure electronic devices are properly recycled and reused to minimize potential environmental impacts and recover valuable resources.

Please note that the specific collection points and procedures for disposing of electronic devices may vary depending on the region. Therefore, consult local authorities, recycling centers, or waste disposal companies to learn the correct procedure for disposing of electronic devices in your area. By properly disposing of electronic devices, you contribute to environmental protection and the sustainable use of resources.

20 SAFETY INSTRUCTIONS

When dealing with products that come into contact with electrical voltage, it is very important to observe the applicable VDE regulations. The VDE regulations are standards set by the Association for Electrical, Electronic & Information Technologies (VDE) and are designed to ensure safety when working with electrical systems and devices.

Here are some of the relevant VDE regulations to consider when handling electrical voltage:

VDE 0100

This standard defines the general provisions for low-voltage electrical installations, including planning, installation, commissioning, maintenance, and testing.

VDE 0550/0551

These standards address the safety of electrical household appliances and similar purposes. They cover requirements for household devices such as hairdryers, irons, coffee machines, etc.

VDE 0700

This standard focuses on the safety of electrical devices in commercial, industrial, and similar environments. It includes requirements for electrical machines, tools, and other devices used in these settings.

VDE 0711

This standard specifies requirements for the electrical safety of medical devices. It applies to medical equipment used for diagnosing, treating, and monitoring patients.

VDE 0860

This standard covers the safety of electronic devices used in office applications, including computers, printers, monitors, etc.

It is important that professionals working with electrical systems and devices are familiar with and follow the relevant VDE regulations to ensure the safety of people and property.

Basic Safety Rules

When working on electrical devices, always observe basic safety rules.

- **All connection or wiring work must be carried out in a de-energized state.**
It is a fundamental safety measure that all connection and wiring work on electrical systems and devices should only be done when they are not live. Never work on electrical devices while they are powered.
- Before starting work, check that the device is disconnected by unplugging it or turning off the relevant power supply.
- Be especially cautious when handling high voltages and be aware of potential hazards.
- Always unplug the device or ensure it is de-energized before opening it.
- Components, assemblies, or devices must only be operated if they are safely enclosed. They must be de-energized during installation.
- Tools may only be used on devices, components, or assemblies when it has been ensured that they are disconnected from the power supply and any electrical charges stored in the device have been discharged.
- Power cables or lines connected to the device, component, or assembly must always be inspected for insulation faults or breaks.
- If a fault is found in the supply line, the device must be immediately removed from service until the faulty line is replaced.
- When using components or assemblies, always strictly adhere to the specified electrical values mentioned in the accompanying documentation.
- If it is unclear which electrical ratings apply to a component or assembly, how external wiring should be carried out, or which external components or accessories may be connected and their connection values, a qualified electrician must be consulted.
- Before commissioning a device, always verify that the device or assembly is suitable for the intended application.
- In case of doubt, always consult experts, professionals, or the manufacturer of the used assemblies.
- We assume no liability for damages resulting from operational or connection errors beyond our control.
- Kits that do not function properly should be returned without the housing and with a detailed description of the error and the corresponding assembly instructions. Repairs cannot be made without an error description. Time-consuming assembly or disassembly of housings will be additionally charged.
- When installing and handling parts that will later carry mains voltage, always observe the relevant VDE regulations.
- Devices operating at voltages greater than 35 VDC/12mA must only be connected and commissioned by qualified electricians.
- Commissioning should only take place if the circuit is installed in an enclosure that prevents accidental contact.
- If measurements must be taken with the housing open, a safety isolating transformer or suitable power supply must be used for safety reasons.
- After installation, a required inspection must be conducted in accordance with DGUV Regulation 3 (formerly known as BGV A3).

DGUV Regulation 3 is a safety regulation for electrical systems and equipment and defines the requirements for electrical safety.

The DGUV Regulation 3 inspection includes checking the proper installation, functionality, and safety of the electrical device.

The inspection should be carried out by a qualified electrician or an authorized inspection service. The purpose of the inspection is to identify potential hazards, detect defects, and take appropriate measures to ensure electrical safety.

The DGUV Regulation 3 inspection should be repeated at regular intervals to ensure the continuous safety of electrical systems and equipment.

The DGUV Regulation 3 inspection is legally required in many countries and serves to protect people and property from electrical hazards.

Also, be aware of additional national and local regulations and standards that may apply in your region.

21 WARRANTY

ESERA GmbH warrants that the goods sold are free from material and manufacturing defects at the time of transfer of risk and have the contractually warranted characteristics. The statutory warranty period of two years from the date of invoice shall apply. The warranty does not extend to normal wear and tear. Claims of the customer for damages, e.g. due to non-performance, culpa in contrahendo, breach of secondary contractual obligations, consequential damages, damages in tort and other legal grounds are excluded. ESERA GmbH shall be liable in the absence of a warranted characteristic, in the event of intent or gross negligence. Claims arising from the Product Liability Act are not affected. Should defects occur for which ESERA GmbH is responsible, and if the replacement delivery is also defective in the event that the goods are exchanged, the purchaser shall be entitled to cancel the contract or reduce the purchase price. ESERA GmbH accepts no liability for the constant and uninterrupted availability of ESERA GmbH or for technical or electronic errors in the online offer.

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23 CONTACT

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