

User Guide ESERA-Station 200

- Central hard- and software control (system-open) for smart home, building automation, IoT and commercial automation
- Hybrid construction consisting of Embedded Computer and 1-Wire Gateway
- Powerful, modern quad core computer with 1.4GHz CPU speed
- Fast reading of all 1-Wire devices within 1-2 seconds
- Data exchange among 1-Wire Gateway and computer via Modbus or text protocol
- Large 1-wire libraries for sensors and actuators
- 2 x binary output 16A
- 2 x binary input 10-30VDC
- 2 x System clocks with power-failure buffering
- Convenient configuration program for 1-Wire Gateway and interface parameters
- 24V power supply for Embedded Computer and 1-Wire gateway
- Designed for all sizes of 1-Wire Networks
- Top-hat rail case for switchboard assembly



1 Introduction

Before you start assembling the ESERA-Station 200 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.

2 Product description

The ESERA-Station 200 is a modern and system-open hybrid system consisting of two modules, a powerful 1-Wire gateway and an Embedded Computer.

Both modules are internally connected by a serial data interface and the power supply.

Each module has an own power supply and a system clock (real time clock) with power-failure buffering by a low-maintenance, high-performance capacitor (Goldcap).

2.1 Embedded Computer

The ESERA-Station 200 includes a standardized and powerful computer that comes with a Quad Core CPU with 1400MHz. This CPU provides enormous power reserves by low power consumption. Given to its 1024 MB RAM memory, even large automation projects can be implemented.

All modern interfaces such as LAN, WLAN with 2.4GHz and 5GHz, as well as Bluetooth with standard 4.2 are available for connection with the "outside world".

The Embedded Computer also has 3 external and one internal USB 2.0 interfaces.

2.2 1-Wire Gateway

In addition to the Embedded Computer, the ESERA-Station 200 has an extremely powerful and reliable 1-Wire interface, the 1-Wire Gateway developed by ESERA.

The 1-Wire Gateway is internally connected to the Embedded Computer by serial interface. Via an USB slave interface, the 1-Wire Gateway can also be accessed directly, without an Embedded Computer. Once you use the USB interface, the internal communication to the Embedded Computer is interrupted. The Embedded Computer is only able to receive data.

Standard Modbus TCP protocol

You can work with your industrial controller, e.g. SPS to communicate with the 1-Wire Gateway 20 via standard Modbus TCP protocol. The addressing is structured in a way that is comparable to many other Modbus systems. Addresses for system and sensor or actuator data are available.

An address overview with all available data points is available at the article download section of our website.

Independent administration

The ESERA-Station 200 is intended for self-sufficient management of 1-Wire networks. You no longer have to worry about 1-Wire commands or formulas for evaluating sensor data. The ESERA-Station 200 independently scans the 1-Wire network for new sensors and actuators and makes them available, in plain text by using Modbus protocol, depending on the modules found and the corresponding data converted.

Formatted data output

The ESERA-Station 200 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 all 1-Wire sensor and actuator products offered by ESERA.

Designed for all 1-Wire Networks

The 1-Wire interface of the ESERA-Station 200 is specially designed to securely support all sizes of 1-Wire networks, even for huge cable length. 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 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. ESERA-Station 200 is providing time and date as real time clock including an integrated backup battery. Data plausibility check is possible at any time.

Power supply

The ESERA-Station 200 is supplied with the industrial 24V voltage.

Connection

Standard connectors are provided for USB and Ethernet connections. All other connectors are designed in modern screwless push-in technology for rigid and fine-stranded cables with cross sections up to 1.5 or 2.5qmm.

Input voltage for the ESERA-Station 200 is 16 – 30 VDC. Therefore it can be used for 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

Embedded Computer

CPU:	Quad-Core processor ARM-Cortex-A53 64Bit, 1400 MHz
Memory:	RAM 1024 MB LPDDR2 memory microSD card 8GB for operating system and software application
Operating system:	Linux Debian (Raspian), software already installed
Software, option:	- IP-Symcon, basic, professional or unlimited - Codesys 3.x
External interface:	LAN RJ45 10/100/1000 Mbit (Gigabit LAN by USB 2.0 with up to 300 Mbit) - Auto negotiation (full-duplex and half-duplex) - Support for DHCP and IP-address - DNS support - Auto MDI/MDIX WLAN 802.11 b/g/n/ac (2,4 + 5,0 GHz) Bluetooth 4.2
System clock (RTC):	DS1307 with ability to bypass power failure with Goldcap for min. 24 hours

1-Wire Gateway

Data interface:	Modbus RTU and ESERA ASCII text protocol
Internal interface:	serial, 19200 baud 8 data bit, 1 start bit, no stop bit
Firmware update and configuration	by ESERA Config-Tool 3
1-Wire interface:	1-Wire bus (Masse/GND, 5V, 12V and data)
Protection circuits:	ESD- and reverse polarity protection
Connection:	Push In connector for cables up to 1.5qmm cable cross section
Output voltage:	5V max. 1A, 12VDC max. 1,2A Overload and short circuit proof
Digital- /binary input:	2 x input 10-30VDC, max. 10mA per channel isolated with common negative pole
Digital- /binary output:	2 x output (relays) 16A switching current (NO), isolated Push In connector for cables up to 2.5qmm cable cross section
System clock (RTC):	DS1307 with ability to bypass power failure with Goldcap for min. 24 hours

Entire system

Power supply:	16 – 30 VDC
Input:	3,4 – 38W*
	* depending on the CPU load and load on the 1-wire interface

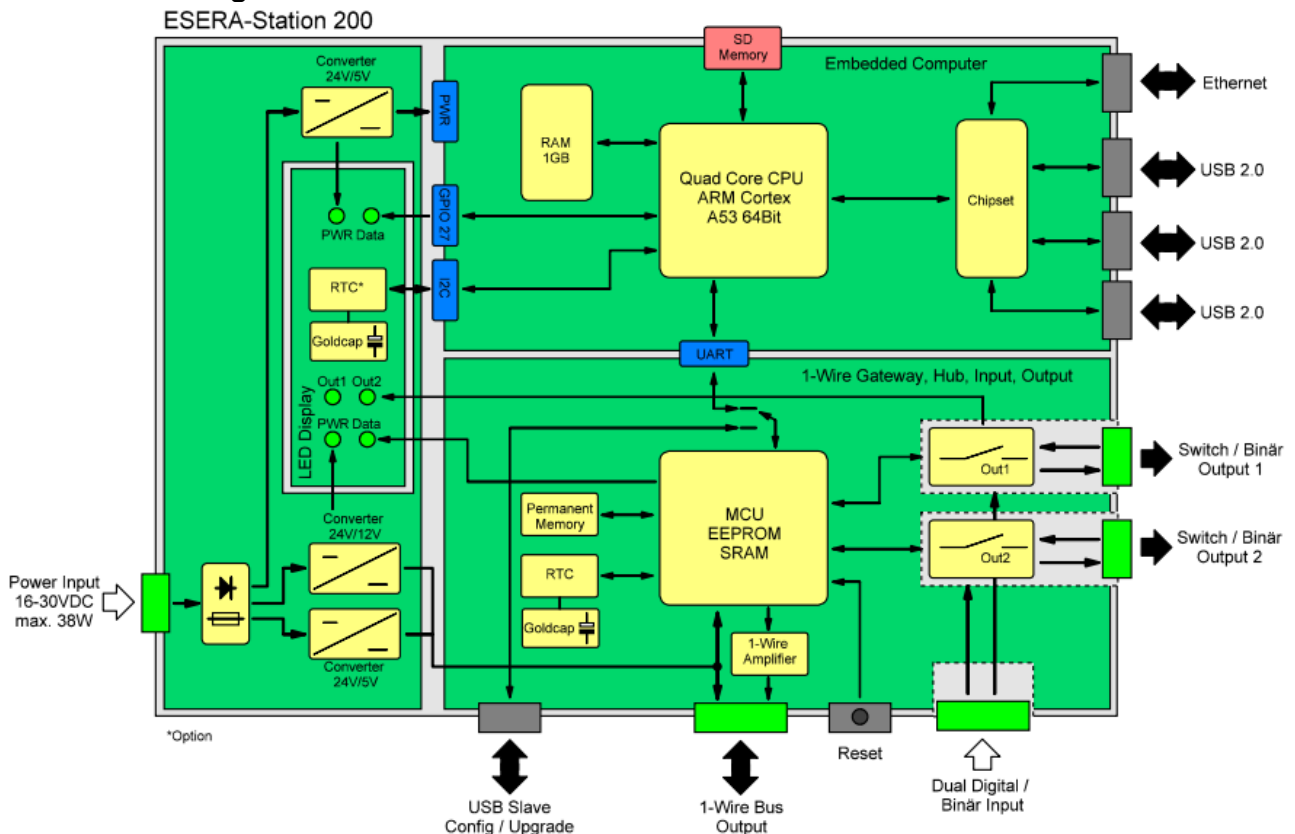
5 Ambient conditions

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 Block diagram



8 LED display

The ESERA-Station 200 has various display LEDs. Please refer to the following table for their functions:

LED Status	Description	Function
Embedded Computer		
LED green front	PWR	Display supply voltage Embedded Computer
LED green front	DATA	LED, can be programmed for individual use (GPIO 27)
LED green Ethernet	DATA	Flashes while transferring data
LED green Ethernet	LINK	Is lit if Ethernet connection is active
1-Wire Gateway		
LED green	PWR	Display supply voltage 1-Wire Gateway
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 no "KAL messages" received.
LED green	REL1	Output 1, is lit when relay 1 is active
LED green	REL2	Output 2, is lit when relay 1 is active

9 Connection

Module top side (left to right)

- Supply voltage 16-30VDC
- USB Slave for 1-Wire Gateway Configuration and firmware update/upgrade
- Optional input (not equipped)
- 2 x digital input 10-30VDC isolated

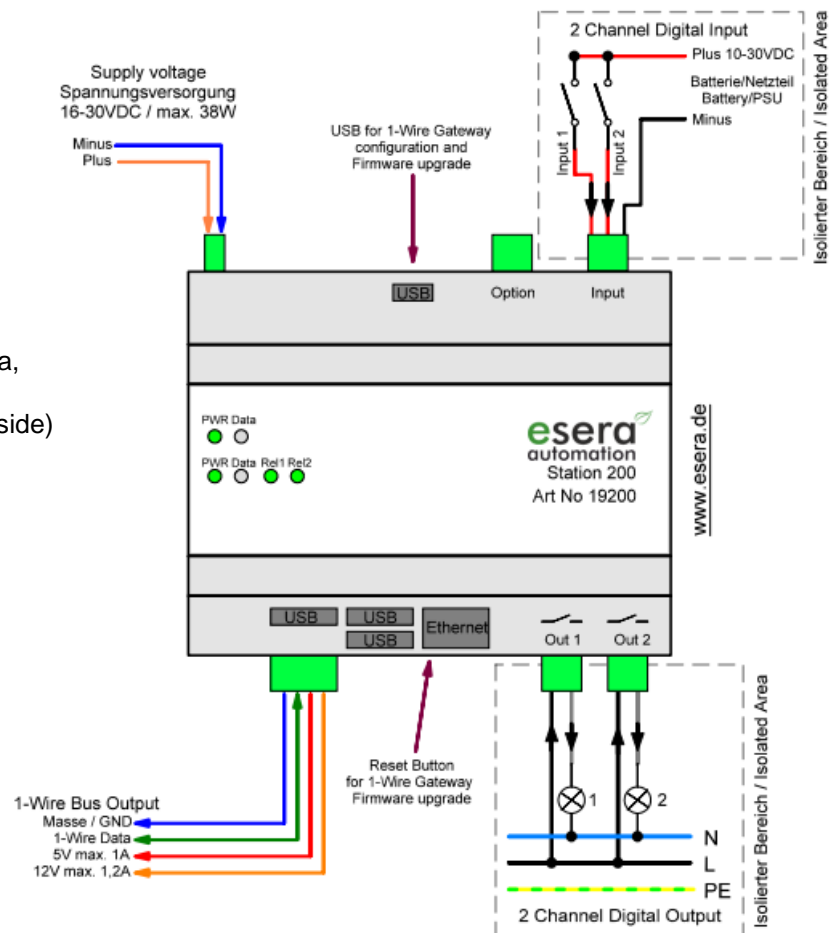
Module bottom side (left to right)

lower level

- 1-Wire bus output, Masse/GND, Data, 5V (max. 1A) and 12V (max. 1,2A)
- Reset button for 1-Wire Gateway (inside)
- Digital output 1 (max. 16A)
- Digital output 2 (max. 16A)

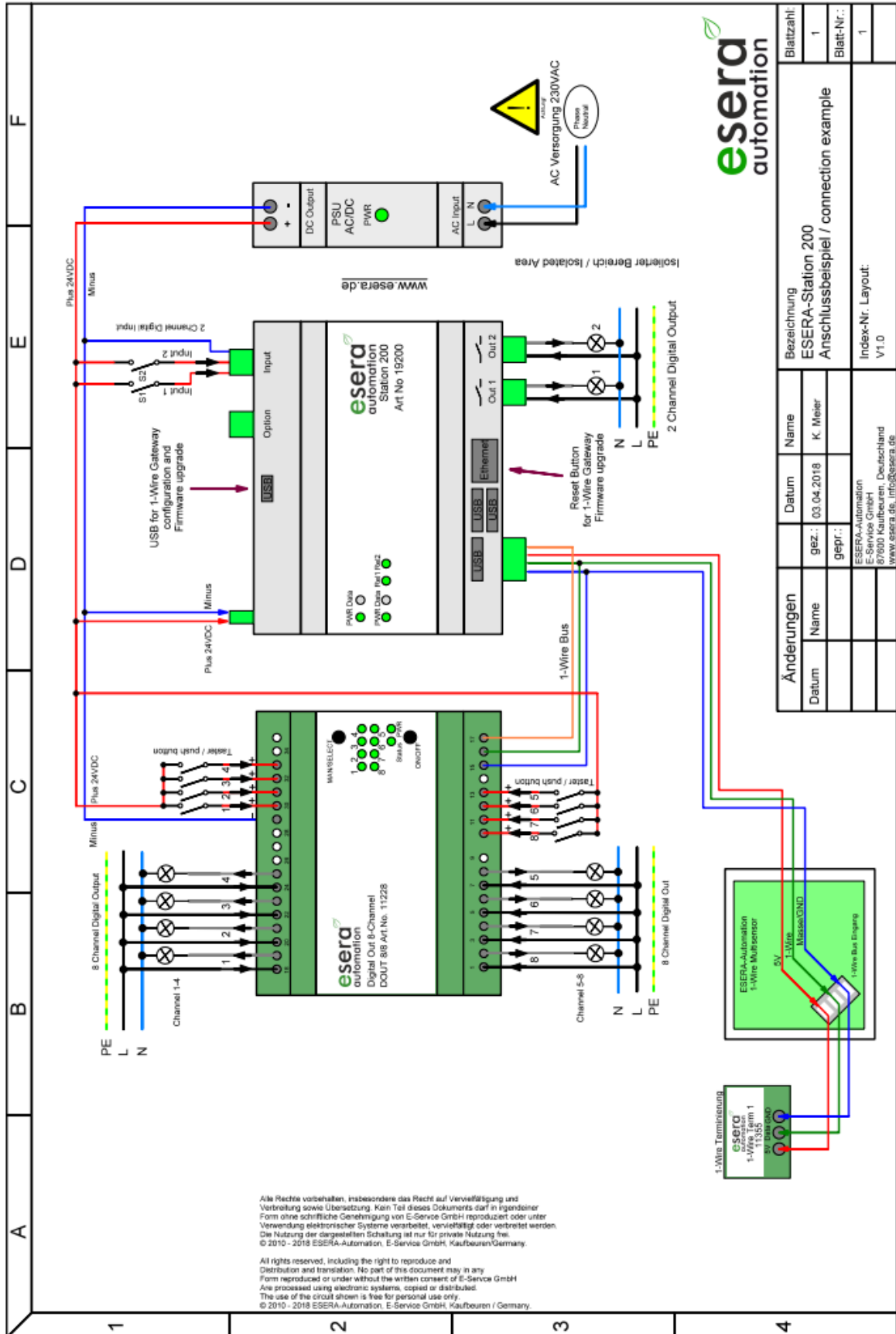
upper level

- 3 x USB output (5V max. 0,5A)
- Ethernet input RJ45
- 10/100/1000 MBit



Note: Basics and tips for 1-Wire bus systems can be found in our webshop (<https://www.esera.de/1-wire-grundlagen/>) 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>).

10 Connection ESERA-Station 200, sensors and actuators



Änderungen		Datum	Name	Bezeichnung	Blattzahl
		gez.: 03.04.2018	K. Meier	ESERA-Station 200	1
		gepr.:		Anschlussbeispiel / connection example	Blatt-Nr.: 1
				Index-Nr. Layout:	1
				V1.0	

11 Software

Data interface Modbus RTU and ESERA ASCII text protocol

You can address the 1-Wire Gateway either by the USB slave socket on the top of the device or by the internal data interface between the 1-Wire Gateway and the Embedded Computer.

When the USB slave interface is used, internal communication among 1-wire gateway and Embedded Computer will automatically be interrupted. Both, USB slave and internal serial interface have the setting 19200 baud, 8 data bits, 1 start bit and no stop bit (19200,8N1).

The software "Config Tool 3" for Windows operating systems can be found in the download area of the article or at our website, Service & Support, Download. <https://www.esera.de/produkte/software/downloads-firmware-1-wire-controller-1-wire-gateway/>.

This software is available for download on our webpage.

12 Integration IP-Symcon / ESERA-Station

ESERA IP-Symcon software modules are provided at our webpage for easy integration of the ESERA-Station 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.

13 Configuration and communication 1-Wire Gateway

The well-tested 1-Wire Gateway is installed inside the ESERA-Station. The 1-Wire Gateway has a wide range of configuration and formatting options, which are read out and operated with the ESERA "Config-Tool 3". For communication among 1-Wire Gateway and Config-Tool 3 the open ESERA ASCII text protocol is used. Any communication can also be handled directly from the Embedded Computer or a terminal program (e.g., Hercules or Putty).

Binary inputs and outputs are available by 1-wire gateway for the Embedded Computer to control.

14 Firmware update 1-Wire Gateway

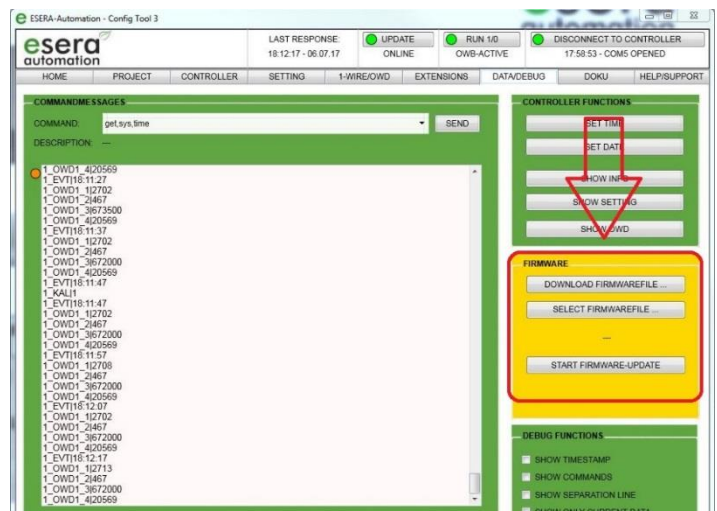
Firmware will be updated by using an existing USB connection (USB slave module top side) with Config-Tool 3 software which can be found at the "DEBUG/DATA" tab. By clicking the button "DOWNLOAD FIRMWARE" a new window opens to download new software (firmware) for the 1-Wire Controller / 1-Wire Gateway.

This firmware is compatible with all releases of the 1-Wire Controller and 1-Wire Gateways as well as ESERA-Station 200. The features are individually unlocked at the installed device.

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 (module bottom side (inside)). 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 ESERA-Station 200 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.



15 Internal communication among 1-Wire Gateway and Embedded Computer

15.1 ESERA ASCII text protocol / programming manual

The 1-Wire Gateway inside the ESERA-Station 200 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.

15.2 Modbus protocol

ESERA-Station 200 is able to communicate to ESERA text protocol or Modbus TCP protocol with no switching. For communication any Modbus slave-address (device address) can be chosen. Device address equals the 1-wire Gateway / Controller number. Device address is set to 1 by default.

The Modbus protocol is standardized configured. Please refer to the following table for a partial address-overview. The entire addressing overview can be found in the programming manual, which can be found in the download area of this product on our website and by the configuration software ESERA "Config Tool 3".

Partial Modbus address specification

Specification	reading address	number of words (16Bit)	type of data
Controller No.	60000	1	text
Article-No.	60001	1	text
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 1	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 2	40200	1	Integer
	40201, 40202	2	Dword1
	40203, 40204	2	Dword2
	...		

16 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 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.

17 Assembly

The device may only be used in dry indoor areas. The sensor must be mounted upright, with the ventilation openings at the top and bottom.

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

18 Disposal note

Do not dispose of the device within the household waste!

According to the directive concerning old electrical and electronic appliances, electronic devices must be disposed of via the collecting points for old electronic appliances!



19 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.

20 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.

If defects occur for which the ESERA GmbH is responsible, and in the case of replacement goods, the replacement is faulty, the buyer has the right to have the original purchase price refunded or a reduction of the purchase price.

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