

User Guide Analog Output 0-10VDC for 1-Wire Bus system

- 1-Wire to analog output 0-10V
- 8 Bit resolution of the DA-converter
- Galvanic isolation of analog output and 1-Wire network
- LED-display for power and data update
- DIN rail housing for control cabinet installation
- analog- and digital areas with complex internal power supplies
- Connection via screw terminals
- Easy to assemble and easy software integration
- Output protected against overload and short circuit



1 Introduction

Before you start assembling the Analog Output 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

With the Analog Output, a DC voltage in the range of 0-10V with a resolution of 8 bits can be easily output. This DC voltage can be output for control, e.g. of a heating mixer, dimmer or other power control units. The analog output is galvanically isolated from the 1-wire bus and the power supply. The isolation avoids ground loops or effects due to potential differences.

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

Number of channels:	1
Output voltage:	0-10 VDC
Output current:	max. 20 mA
rise time (0-10V):	max. 5 ms
cut-off frequency:	20 Hz
output resistance:	ca. 100 Ohm
Resolution:	8 Bit
Smallest resolution:	40 mV
Accuracy:	>1% of the nominal value
Isolation:	min. 500VAC among 1-Wire Bus and Analog Output
1-Wire device:	DS2408 (8-fold digital I/O)
Interface:	1-Wire bus (12V, data (5V signal level) and GND/Ground)
Operating voltage:	12V= (+/-10%), current consumption max. 30mA
Current consumption:	max. 20 mA (output with 10k load)
Display:	2 x LED green, data update and supply voltage
Connection:	screw-terminals (up to 2,5qmm cable cross-section)

Note: A 12V supply voltage is required to operate the module. The use of one of our 1-Wire Hub devices is recommended. Avoid to connect the 12V power supply to the "data" terminal. This can cause permanent damage to the device.

5 Ambient Conditions

Protection type:	IP20
Protection class:	III
Temperature, operation:	0°C bis +50°C
Air humidity:	10 - 92% (non-condensing)
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 radiations
RoHS

7 LED indicator

The module has a green LED display which lights up when the module is supplied with 12V supply voltage.

Display	Designation	Function
LED green	PWR	Display for supply voltage
LED green	Data	<p>Flashing when new data value is received and output (data update) After switching on the supply voltage, the module starts in Start Up Mode. When a voltage value of less than 10V has been output once, it switches to normal operation.</p> <ul style="list-style-type: none"> Start Up Mode: LED flashes after switching on the supply voltage. Output voltage in this operating mode is 0V. Normal operation: Lights up permanently in normal mode

8 Connection plan

The connection diagram is available in our web-shop as a separate document.

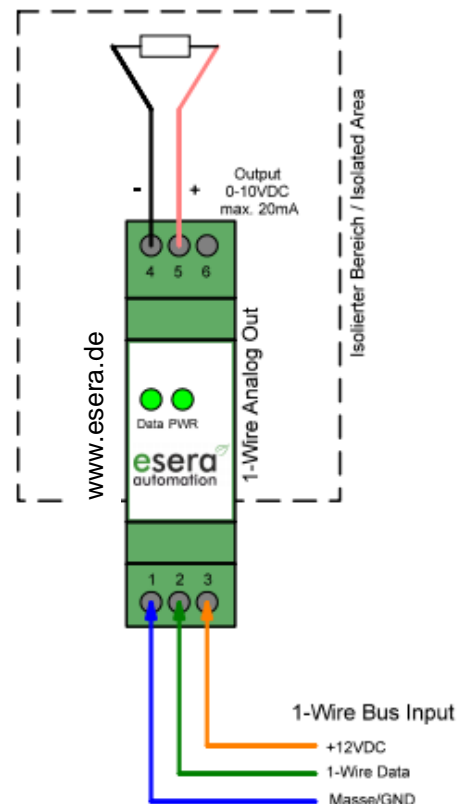
Module topside: (analog output)

- 4 = negative output
- 5 = analog output

Module bottom side:

1-Wire Bus

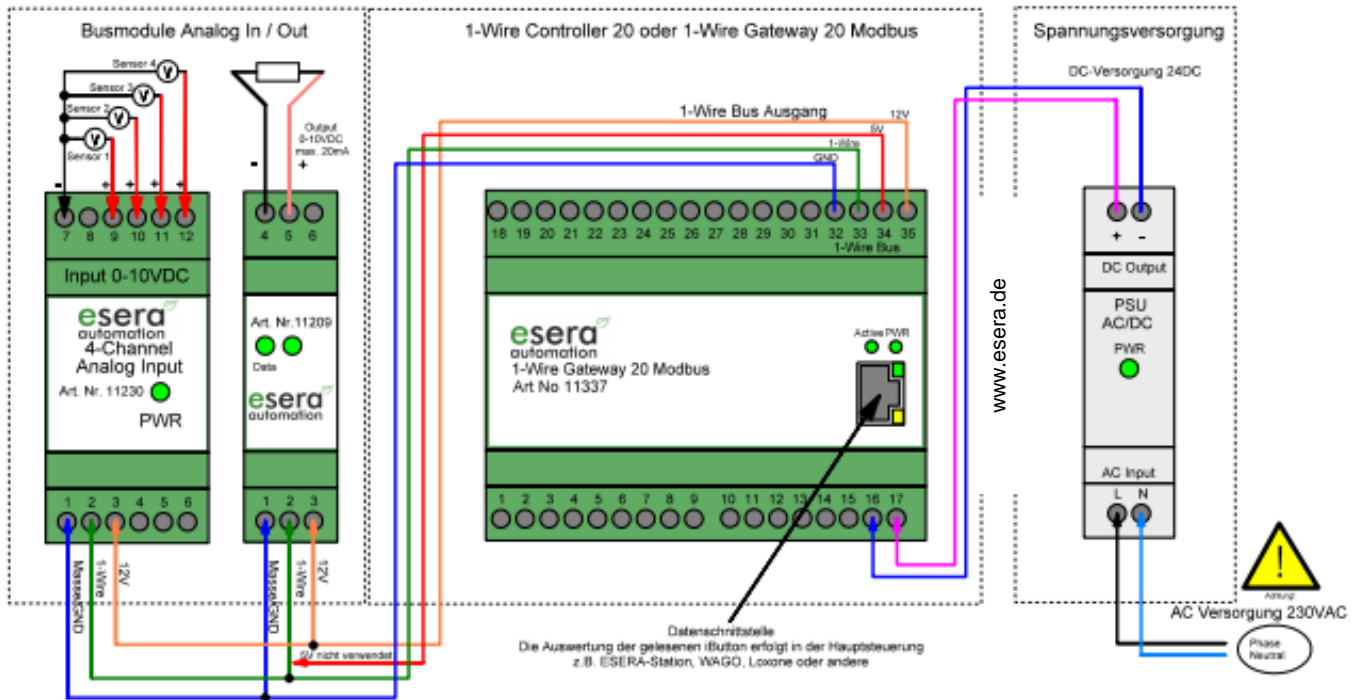
- 1 = GND (Ground)
- 2 = 1-Wire data (5V signal level)
- 3 = +12V voltage



9 Connection - Example

Here we would like to show you a connection example of the Analog Output 0-10V in combination with a 1-Wire Controller 20 or 1-Wire Gateway 20 Modbus.

This connection example is available as a separate document in the ESERA online shop download area of the article. Here the example is only shown in reduced size.



10 Software / Control

The Analog Output 0-10VDC works with a 1-Wire interface of type DS2408 (8-fold I/O device), which is controlled with the 1-Wire commands typical for this device.

The DS2408 device can display a total of max. 256 states through its 8 outputs, which can be read in internally by a microcontroller and converted into an analog output signal.

The individual DS2408 outputs have the following values: channel 0 = 1, channel 1 = 2, channel 2 = 4, channel 3 = 8, channel 4 = 16, channel 5 = 32, etc. The outputs are read by a microcontroller and output as analog values. All 8 outputs to value 0 mean 10V output voltage. All 8 outputs to value 1 (or 255 decimal) mean 0V output voltage.

This logic is inverted. The active outputs are added according to their value and output as analog values. Details can be found in our example program in the download area of the shop.

Note:

The Analog Output 0-10VDC module starts after switching on the supply voltage into the standby mode, in which no voltage (0V) is output. In standby mode the DATA LED flashes.

The module changes to normal operation after a voltage value of less than 10V has been output once. In normal operation a voltage between 0-10V can be output.

11 Control by 1-Wire Controller / 1-Wire Gateway

The 1-Wire interface of the Analog Output 0-10VDC is controlled by standard commands for the device DS2408. The Analog Output 0-10VDC can easily be controlled via a 1-Wire Controller / 1-Wire Gateway. The following command is available for this purpose.

11.1 Set analog output

Use the following command to set a new analog value.

Command

SET,OWD,OUTA,OWD-number, output voltage

Example: SET,OWD,OUTA,1,1000 => OWD1,10,00V

11.2 Data output 1-Wire controller / 1-Wire gateway

For the 1-Wire Analog Output module 0-10V, the following data are output for the status of the analog value. The following formatting is available since firmware 1.18_43.

data output

1_OWD1|1000 => Controller No._device No._data record | analog value, example 1000 = 10,00V

Further information in regards to options and commands can be found in the current 1-Wire Controller /1-Wire Gateway documentation.

12 Operating conditions

The device may only be operated at the specified voltages and ambient conditions. The device may only be used in dry indoor areas.

If condensation forms inside the unit, 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. 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 equipment must be observed.

13 Assembly

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

14 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!



15 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.

16 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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