Art. No. 11230

User Guide
4-fold analog input insulated
for 1-Wire Bus

- 4 input channels with 0-10VDC measuring range
- electrical insulation between analog and Bus area
- analog converter with high 12-bit resolution
- analog inputs with overvoltage protection
- input filter for "calmed" measured value acquisition
- DIN rail housing for control cabinet installation according to DIN EN 50022
- screw terminal connection
- easy to assemble
- housing colour green

1   Introduction

Before you start the installation of the 4-fold analog input and put the device into operation, please read these installation and operating instructions carefully to the end, especially the section referring to the safety instructions.

2   Product description

With the 4-fold analog input insulated, sensors with DC voltage output such as pressure sensors, light sensors, setpoint generators or other sensors with 0-10V output voltage with galvanic isolation can be easily measured. The triggering of the analog converter is fixed at 12Bit.

With the 4-fold analog input insulated DC voltages or sensors can be monitored with low load of the sensor.

The 4 input channels are galvanically insulated from the 1-wire bus and the supply voltage. This allows analog signals from sensors or modules to be measured with different potentials. The isolation avoids effects caused by ground loops due to potential differences. In order to obtain "calm measured values", the module has optimally adapted filters in the input area.

The input channels have a common ground potential. If different analog signals with different potentials are to be measured, separate modules must be provided.
We will be pleased to advise you on the possible applications.

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

Analog inputs:

Resolution:	Resolution 12Bit fix, ca. 3mV
Number of input channels:	4 x analog input 0-10VDC
Measuring range:	0 - 10VDC
Max. input voltage:	12V (overvoltage protection)
Insulation:	Isolation of the input section from the 1-Wire bus. All analog inputs have a common ground potential.
Insulation strength:	Minimum 500VAC
Input impedance:	200 KOhm
Input filter:	Cut-off frequency 0,5 Hz

1-Wire Interface:

1-Wire function:	Control via DS2450 commands
Interface:	1-Wire bus insulated (5V, 12V, data and load)
Operating voltage:	12V= (+/-10%)
Current consumption	Ca. 20mA/12V (all inputs to 100% measuring range)
Display:	Green LED indicator for power supply
Connection:	Screw terminals (up to 2.5qmm cable cross-section)

Note: A 12V supply voltage is required to operate the module. Recommended is the use of one of our 1-Wire Hub III or Hub IV devices.

5   Ambient conditions

Temperature, operation:	-20°C to +60°C
Humidity:	10 - 92% (non-condensing)
Dimensions:	Housing 35 x 90mm
Protection class:	III
Protection type:	IP20

6   Connection plan

Connection module top side:
Analog input

7 + 8 = minus input (internally connected)
9   = Plus input 1
10 = Plus input 2
11 = Plus input 3
12 = Plus input 4
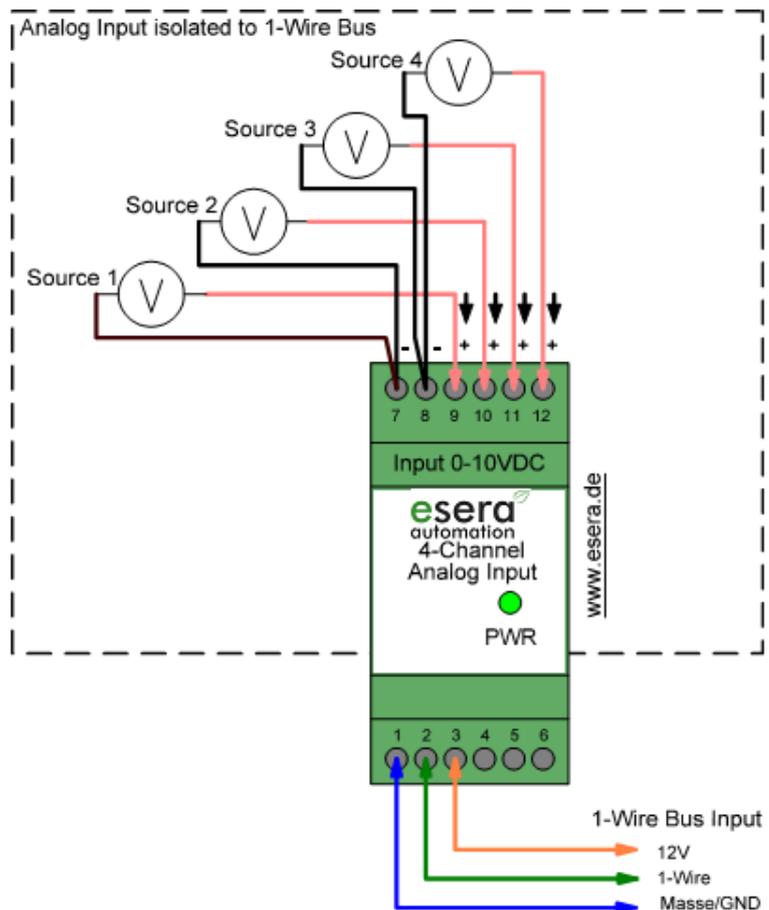
Note:
Minus inputs Pin 7 + 8 interconnected.

Module bottom side:
1-Wire bus

1 = GND (ground)
2 = 1-Wire
3 = +12V voltage
4, 5 + 6 = no function

Note:
Do not connect the GND/ground of the
1-Wire Bus to the minus inputs.

7   Connection - Example

Please refer to the following connection example with 1-Wire Controller or 1-Wire Gateway, 4-fold analog input and Dual S0-Counter.

8 LED indicator

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

Indicator	Designation	Function
LED green	Power	• Lights up permanently as an indicator for operational readiness.

9 Software / Control

The block is controlled by a 1-Wire command for the DS2450 block.
The module is internally fixed to the following parameters: Resolution: 12Bit, voltage range: 5V
Details can be taken from our example program in the shop.

10 Calculation

The following formula can be used to evaluate the analog module:

Calculation from integer raw values
DS2450_Integer = raw values in integer (0-1024)
Analog value (V) = (5.0 / 4096) * 2.004 + (DS2450_Integer)

Calculation from analog value
DS2450_Analog = raw value in Volt
Analog value (V) = DS2450_Analog * 2.004

Sample program (PHP for IP-Symcon)
The analog values are calculated using a script. For details see example script in the shop.

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

The control and data output of the 4-fold analog input via the 1-Wire Controller / 1-Wire Gateway is simplified. The current sensor data is output continuously. No query of the data is necessary nor available.

11.1 Data output 1-Wire Controller / 1-Wire Gateway

The following data formats are output for the ESERA-Automation modules. If you divide the value by 100, you will receive the data with two decimal places.

Data output:
1_OWD1_1|50 =>   Controller No._module no._Data set|Voltage 0-10V (mV) Example: 0.050V
1_OWD1_2|250 => Controller no._module no._Data set|Voltage 0-10V (mV) Example: 2.50V
1_OWD1_3|491 => Controller no._module no._Data set|Voltage 0-10V (mV) Example: 4.91V
1_OWD1_4|500 => Controller no._module no._Data set|Voltage 0-10V (mV) Example: 5.00V

Further information on the possibilities and commands can be found in the current programming manual of the 1-Wire Controller /1-Wire Gateway, which can be found within Config Tool 3.

12 Integration in IP-Symcon / ESERA-Station

At our website we provide ESERA IP-Symcon software modules for easy integration of 4-fold analog input into IP-Symcon via 1-Wire controller / 1-Wire gateway. No scripts are necessary anymore. Details can be found on the ESERA website under "Compatible controllers / Central/IP-Symcon integration"
https://www.esera.de/kompatible-steuerungen-zentralen/ip-symcon-integration/

A script for the conventional connection via 1-Wire bus coupler can be found in the article download area. Further details can be found in the example script.

13 Integration in Loxone

Via the shop we provide an example project for the reading of analog voltages via 4-fold analog input via 1-Wire Controller 1. Details see here:
https://www.esera.de/kompatible-steuerungen-zentralen/loxone-integration/demo-1-wire-controller-1-loxone-integration/

14 Integration in FHEM

For the integration into the open source automation software FHEM we provide a software module for easy integration of the 4-fold analog input into FHEM via 1-Wire Controller / 1-Wire Gateway. This eliminates the need for evaluation scripts.

Details can be found on the ESERA website under "Compatible Controls / Central/FHEM Integration".

https://www.esera.de/kompatible-steuerungen-zentralen/fhem-integration/

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 module may only be operated at the voltages and ambient conditions specified for it. The device is intended for mounting inside a switch cabinet as a stationary device.

17 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!

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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