

User Guide

1-Wire Dual S0 Counter Module

- Professional Dual S0 counter module for recording energy meters, such as electricity, gas, water meters or wind sensors
- Readout of meter values via 1-Wire Bus
- Permanent data retention of meter values without operating voltage
- Counter values can be reset
- DIN rail housing with only 17mm width
- Designed for control cabinet installation
- Connection via screw terminals
- Power supply 12VDC



1 Introduction

Before you start assembling the module and before you take the device into operation, please read these operating instructions carefully to the end, especially the section referring to the safety notes.

2 Product description

The Dual S0 counter module is designed for energy recording of two independent electricity, water and gas meters or wind turbines. All S0 devices manufactured according to DIN 43864 can be equipped with an isolated S0 interface can be connected. If in doubt, check the data sheet of your energy measuring device. After applying the operating voltage, the Dual S0 counter module is ready for operation. The integrated Counter modules count the input pulses continuously. The counter readings are transmitted via the 1-Wire Network from the memory of the Dual S0 counter module. The current number of pulses per Time unit can be calculated by delta formation. Typical readout intervals are in the range of 1 - 3 minutes for electricity or gas meter. The Dual S0 counter module can be set to "zero" by pressing the reset button.

The Dual S0 counter module is supplied by a 12V DC voltage. The working voltage of the 1-Wire data line is typically 5V.

After failure of the operating voltage, previously counted input pulses are permanently stored internally. The Dual S0 counter module counts pulses which are generated by closing an input (falling edge). One green LED is available for each counter input. The respective LED lights up when the input is closed. A permanently closed input does not cause any further changes to the counter reading.

3 Technical data

1-Wire device:	command set DS2423 (Dual Counter)
Operating voltage:	12 V= (+/-10%)
Current consumption:	max. 15mA when both LEDs are on
Buffer time counter values:	unlimited
Counter size:	2 x 32 Bit Counter, resettable
Interface:	1-Wire Bus (1-Wire Data (5V), 12V and GND)
Connection:	screw terminals for 1-wire bus and S0 interface
S0 input:	2 x S0 interface (pulse inputs) for energy meters with isolated S0 Interface according to DIN 43864
S0 Voltage:	working voltage approx. 10VDC with approx. 3mA working current
Counting frequency:	max. 300Hz (300 pulses per second)
Length of supply cable S0:	It is recommended to use a supply cable between S0 meter and sensor with max 10m. When using twisted pair and shielded cables max. 15m, Depending on the EMC load of the environment, may also be less possible.
LED indicators:	2 x LED green, lights when input is closed

4 Ambient conditions

Temperature, operation:	-10°C to +50°C
Humidity:	10 - 92% (non-condensing)
Dimensions:	17 x 71 x 90mm (WxDxH)
Protection system:	IP20
Protection class:	III

5 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 radiation
RoHS

6 LED display

The module has two yellow LED displays, which flash when an input is being closed. When the input is open, a 5V power is measurable. The edge is being counted during the closing of the input. A continuously closed input does not cause a modification of the counter readings.

Display	Label	Function
2 x LED green	Input 1, Input 2	Display of received pulses at the inputs <ul style="list-style-type: none">• LED flashes in case of cyclically incoming pulses• LEDs flash continuously, if the respective input is closed.

7 Software / Control

The component is being read out per 1-Wire commands for the DS2423 module. Details for a power counter can be taken from a sample program in the download area of the shop.

8 Function S0 Interface

The S0 interface is suitable for all types of energy meters and wind turbines and should not be confused with an S0 interface of ISDN telephone systems.

An S0 interface works according to the principle that e.g. an energy meter provides a defined number of pulses for a certain amount of energy. Once the number of pulses related to the amount of energy, e.g. an electricity meter, is known, the current electricity consumption can be calculated very easily.

9 How is an electricity consumption recorded / calculated?

Example: An electricity meter emits 1000 pulses per kW/h. One pulse corresponds to an output of 1W/h. If the counted impulses are read in every 3 minutes and the delta to the last readout cycle was formed, we know how

much energy was consumed in the last 3 minutes. In order to display the power consumption in kW/h, we have to extrapolate the power consumption to one hour (60 minutes / 3 minutes = factor 20).

We calculate the delta for the current number of pulses from the last and current meter values that we read from the S0 meter. With a delta of 25 pulses, these correspond to a power consumption of 25 watts in the last 3 minutes.

In 60 minutes, with constant power consumption, there is a consumption of: $25 \times 20 = 500\text{W/h}$

→ 0,5KW/h Power consumption

Calculation

The evaluation cycle of the S0 pulses is 3 minutes.

Factor = 60 minutes / 3 minutes Evaluation cycle

Delta pulses = new pulses - old pulses

Power consumption (KW/h) = (delta * factor) / 1000

Further information can be found, for example, on the Wikipedia website:

https://en.wikipedia.org/wiki/Electricity_meter

<https://de.wikipedia.org/wiki/S0-Schnittstelle>

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

For the Dual S0 counter module the following data of the 32Bit counter values are output.

The 1-Wire interface of the Dual S0 counter module is controlled by standard commands for the DS2423 block and the data is read out.

The power of electricity meters, gas or water consumption can be calculated using the continuous meter values output. A wind sensor can also be evaluated.

Data output:

The data output for the Dual Counter is in the following data format.

1_OWD1_1|Counter value A => Controller no._One Module no._Data set|Counter value 32Bit

1_OWD1_2|Counter value B => Controller no._One Block no._Data set|Counter value 32Bit

Further information on the possibilities and commands can be found in the current documentation 1-Wire Controller /1-Wire Gateway.

11 Connection plan

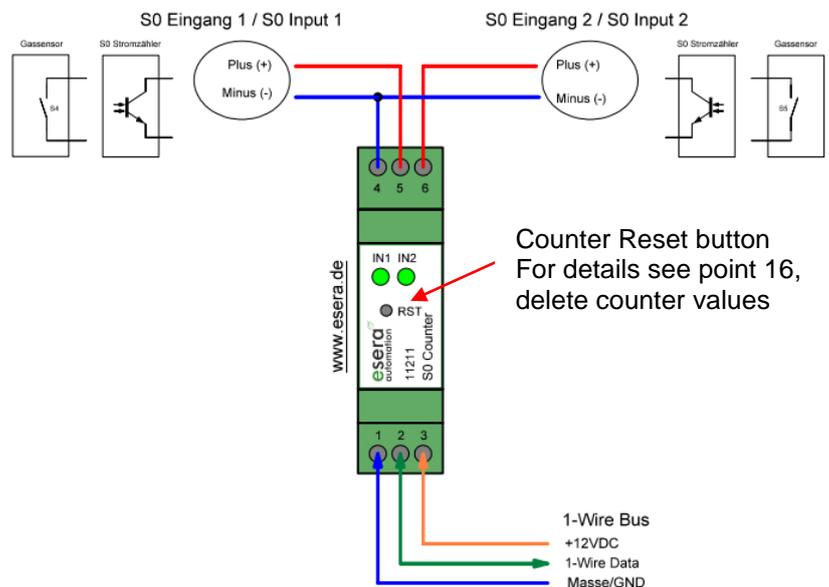
The connection plan is available in the shop as a separate document.

Operation top side (pulse inputs):

- 4 = GND/ground
- 5 = S0 input 1, plus
- 6 = S0 input 2, plus

Underside (1-Wire Bus):

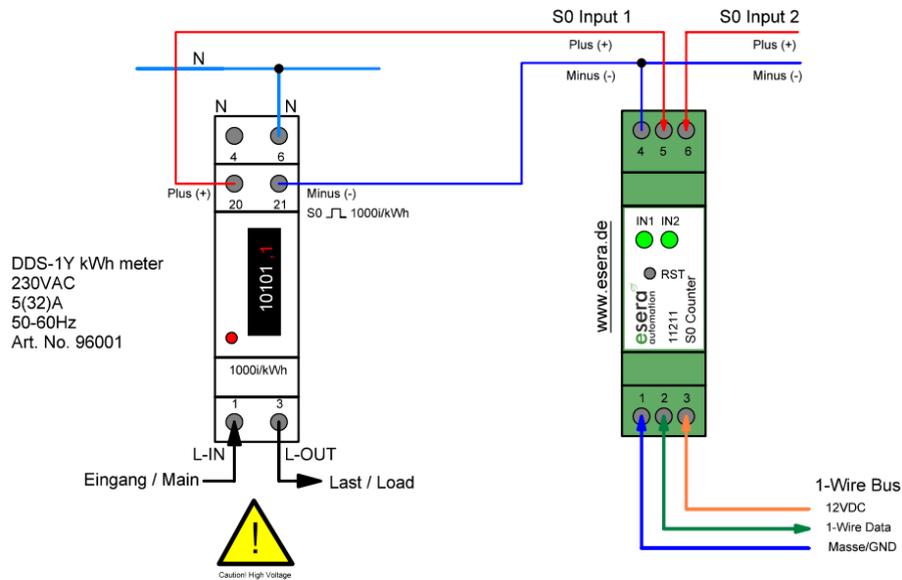
- 1 = GND (ground)
- 2 = 1-Wire Data
- 3 = 12VDC power supply



Counter Reset button
For details see point 16,
delete counter values

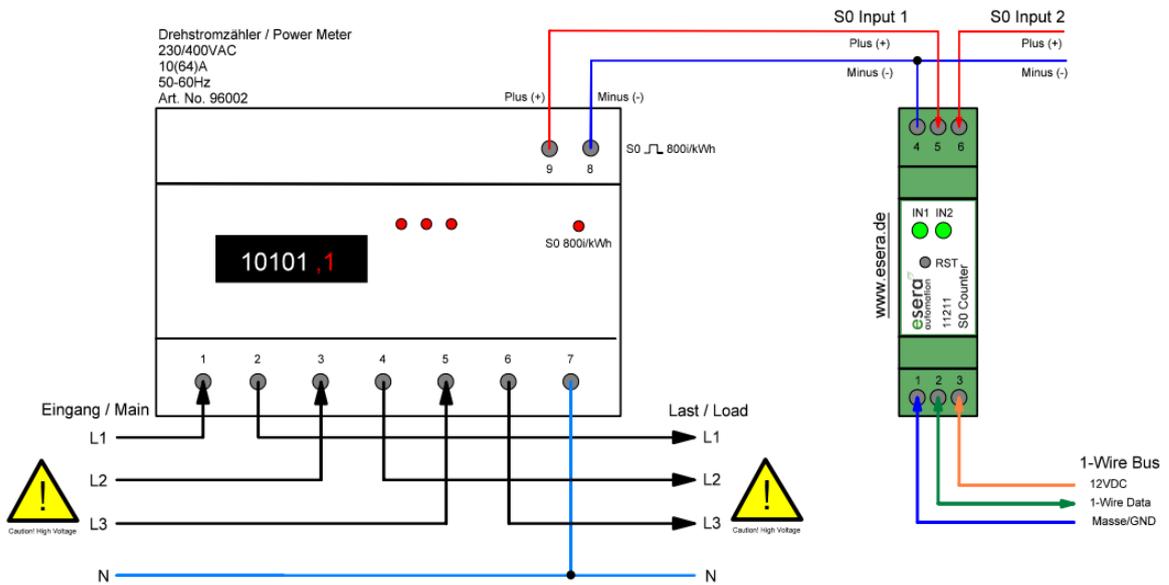
12 Connection example 1

Combination of AC meter and Dual S0 counter module



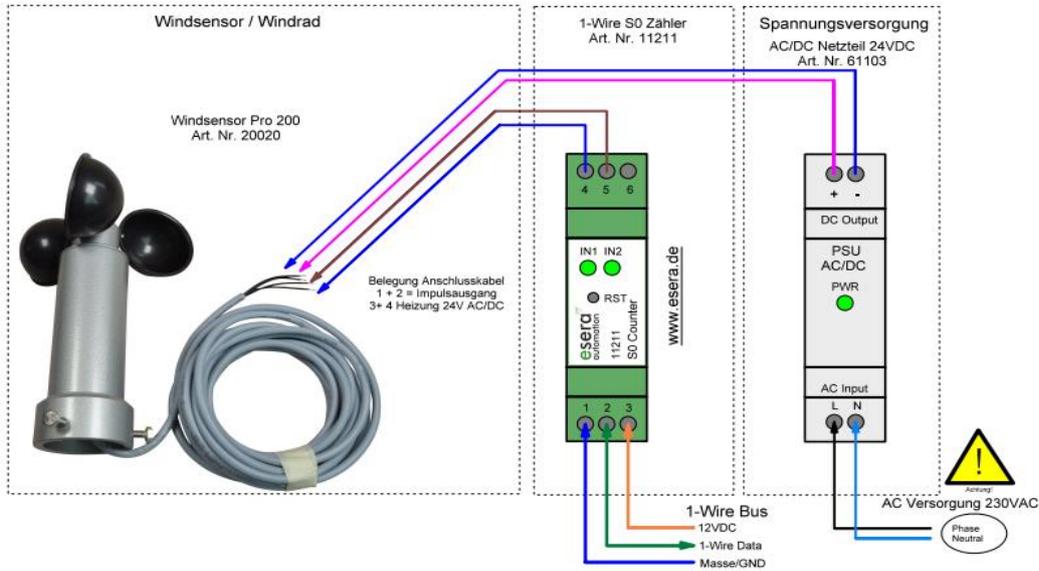
13 Connection example 2

Combination of three-phase meter and Dual S0 counter module



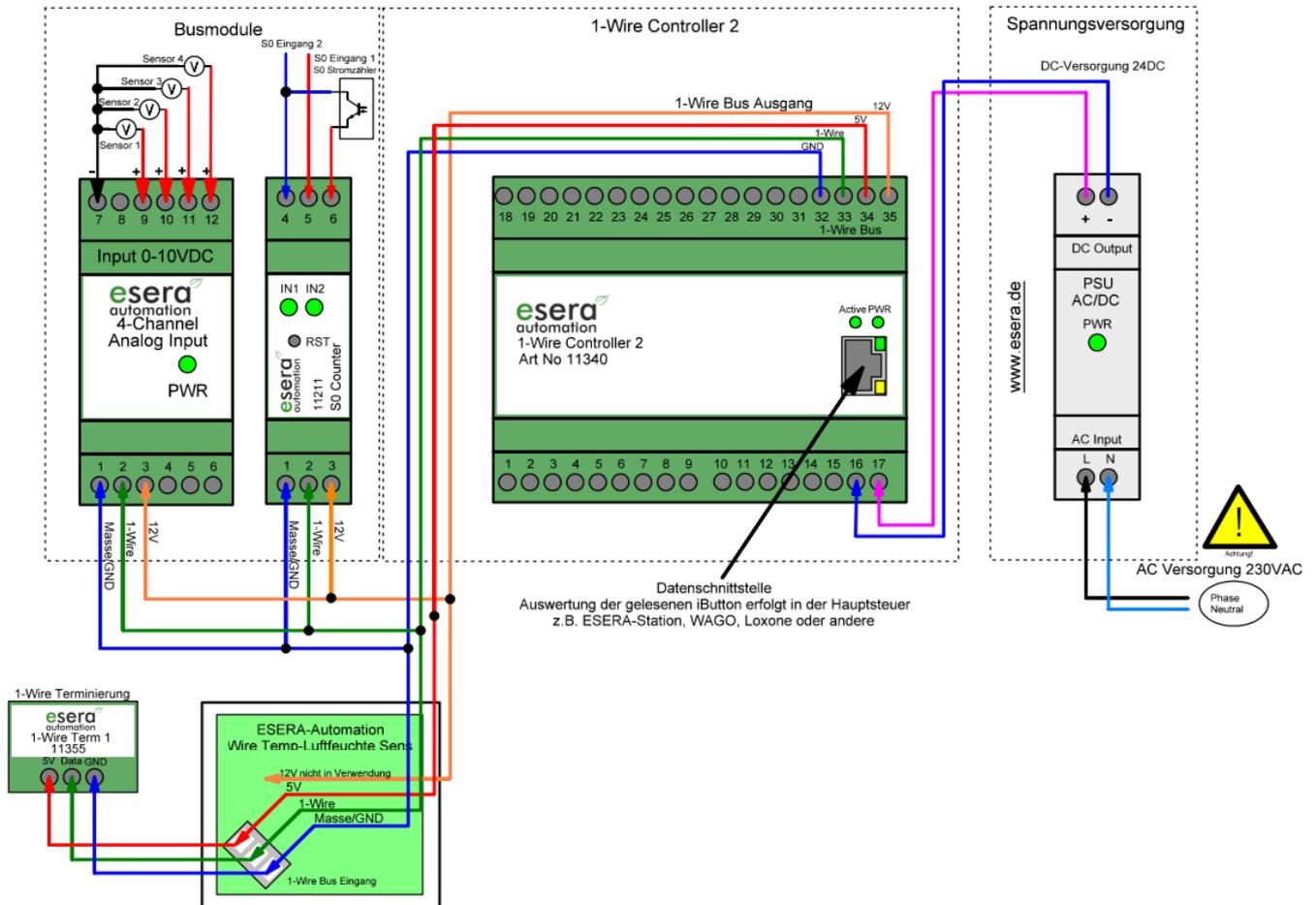
14 Connection example 3

Combination of wind sensor and Dual S0 counter module



15 Connection example 4

The following example shows the combination of 1-Wire Controller 20 / 1-Wire Gateway 20 Modbus, 1-Wire Analog Input Module and 1-Wire S0 Dual Counter Module.



16 Storage of counter values / Delete counter values

The counter reading of the Dual S0 counter module is stored permanently, even without power supply.

The counter reading can be set to 0 by pressing the reset button for approx. 3 seconds. In order to avoid an accidental reset of the counter reading, the reset button is recessed on the top of the module. To operate the reset button, you need a pointed object, such as a match or toothpick.

17 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.

The modules may only be put into operation under the supervision of a qualified electrician. Do not operate the module in an environment in which flammable gases, vapors or dust are present or could be present.

18 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.

19 Disposal instructions

Do not dispose of the device in domestic waste! Electronic devices are to be disposed of according to the Directive on waste electrical and electronic equipment (WEEE) on local authorities and collection points for waste electronic equipment!

20 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 installation 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.



21 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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