Art. No. 11218

User Guide

Binary output / Dual Switching Module for 1-Wire Bus system

- Two changeover relays with 10A continuous output
- Control inputs for push-buttons and 1-Wire Bus
- LED display for activated relays
- Switching of direct or alternating current consumers, such as lighting, heating or sockets
- DIN rail housing for control cabinet installation
- Simple software control
- Little space required in the switch cabinet
- Simple mounting

Note
Before you start installing the unit and put it into operation, read these operating instructions through to the end, especially the section on safety instructions.

1 Product description

The Dual Digital Switching Module can be used to switch direct and alternating current consumers with an output of up to 10A continuous current. It is also possible to control motors such as roller shutter drives.

The Switching Module can be controlled directly via an external push-button (e.g. light push-button) or via a push-button on the top of the module, also independently of the 1-Wire interface. For this switching function via push-button, it is sufficient if the 12V supply voltage is present. This achieves an extremely high level of reliability, e.g. for switching lights, socket circuits or other important consumers, even if a central control/software fails.

The built-in high-performance relays can be operated in a special power-saving mode to reduce current consumption. In this way, the current consumption of the two output relays can be reduced by approx. 40 %.

We recommend using one of our 1-Wire hub modules to supply the switching module.

> **Note**
> Basics and Tips on the 1-Wire Bus system can be found in the ESERA Online Shop under
> 1-Wire Basics or please refer to our eBook in the shop under Training/Documentation.

2 Technical data

Switching channels	2, change-over relay (NO and NC contact)
Switching voltage	max. 250V direct or alternating voltage
Switching current / power	max. 10A continuous current, max. 2200VA continuous power with resistive load. Minimum load 10mA In the case of capacitive or inductive loads, appropriate additional circuits, e.g. spark suppression capacitors, must be provided. The max.current and power are reduced.
Fuses	External back-up fuse with 10A per channel must be provided.
Data interface	1-Wire Bus (12V, Data and ground), DS2408 commands
Auto-E-Connect Support	Level I to II
Operating voltage	12VDC (+/-10%)
Current consumption 12V	Idle state, no output relay active: approx. 6mA both outputs active: approx. 57mA
Push-button interface	2, Input for push-button (make contact), no external voltage permitted Pulse duration min. 40ms The cable length between module and push-button is not critical, but should not exceed 30m.
Connection	Screw terminals (up to 2.5qmm cable cross-section)

3 Ambient conditions

Temperature, operation	-10°C to +50°C
Air humidity	10 - 92% (non condensing
Dimensions	25 x 90 x 70mm (WxHxD)
Protection class	II
Protection system	IP20
Insulation resistance	500VAC output to 1-Wire Bus, 250VAC output to output

4 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

5 Auto-E-Connect Support

The Dual Switching Module supports Auto-E-Connect Level I and II.

6 Auto-E-Connect System

With the launch of the ECO controllers, the ESERA Auto-E-Connect® 1-Wire Plug and Play system for the 1-Wire Bus is now introduced and supported.

This means that fully automatic configuration of the 1-Wire Devices* (sensors and actuators) on the 1-Wire Bus is now possible.

It is optimised for commercial and industrial applications and enables significant added value beyond sensor and chip data.

The Auto-E-Connect function is built up in three levels. Currently there are Level I, Level II and Level III available.

With Auto-E-Connect Level III, fully automatic configurations of the 1-Wire Devices on the 1-Wire Bus are possible. It is optimised for industrial and IoT applications and enables significant added value beyond sensor and chip data.

With the Auto-E-Connect function, ESERA Devices are recognised fully automatically, suitable libraries are started and ready-formatted data is output.

The Auto-E-Connect functionality will be available for the ECO Controller and ESERA-Station 200 Pro from 2021.

Auto-E-Connect Level I

OWD Detect: detection of new sensors* and actuators* and automatic start of adapted libraries.

Auto-E-Connect Level II

Visualisation product data: reading out and visualising of the Auto-E-Connect and manufacturer data of sensors* and actuators*, e.g. article number, date of manufacture, firmware and hardware version.

Auto-E-Connect Level III

Extended Plug and Play System for 1-Wire Bus

o **Pre Configuration**: The OWD number for the next installation can be written to the 1-Wire Device*.
o **Automatic Positioning**: The Device* logs on to each ECO Controller with Auto-E-Connect III with the new desired OWD number. This automatic login works up to the maximum possible OWD number of the ECO Controller.
o **Sensorfinder Function: The** ECO Controller can activate a status LED within the ESERA 1-Wire Pro sensors*. The status LED flashes or lights up continuously for a certain time. This makes it much easier to detect a device in a 1-Wire network. Faster detection saves a lot of time and therefore money when searching for a 1-Wire device.
o **Classes Assignment**: ESERA 1-Wire Devices are assigned to OWD classes with the same properties. This assignment enables fully automatic visualisation and data evaluation in control systems. A class list is available from ESERA**.**

For further information on the ESERA Auto-E-Connect system, please refer to the ESERA Website and the ESERA Config Tool 3.

Auto-E-Connect is registered by ESERA GmbH as a German and European Patent.

7 Connection diagram

The connection diagram is available in the shop as a separate document.
Note: A backup fuse of 10A must be provided before terminals 8 and 11.
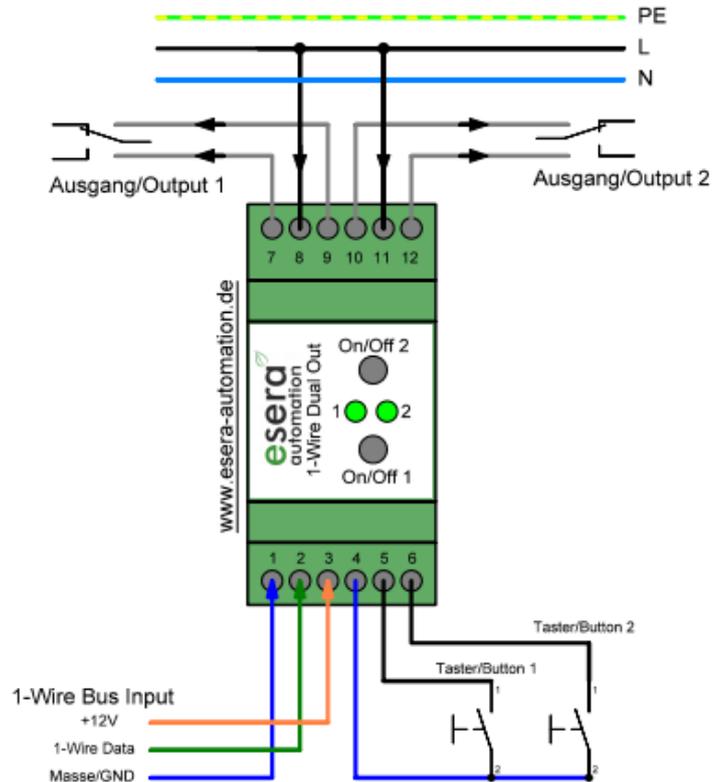
7.1 Option: Changeover relay, Switch
Connection top side:
7 = Relay 1, normally open contact
8 = Relay 1, input
9 = Relay 1, opener
10 = Relay 2, opener
11 = Relay 2, input
12 = Relay 2, normally open contact

1-Wire Bus
Module bottom side:
1 = GND (ground)
2 = 1-Wire data line
3 = +12V voltage
4 = GND (ground)
5 = push-button interface 1 ext.
6 = push-button interface 2 ext.

Note
The module may only be operated at the voltages and under the ambient conditions specified for it. The operating position of the unit is arbitrary.
The modules may only be put into operation by a qualified electrician.

For further information on the operating conditions, see the following instructions under "Operating conditions".

Note on switching loads
When switching capacitive or inductive loads, very strong arcs can occur at the relay contacts, which can cause interference with the logic of the switching module, the ECO Controller and other devices. In order to extinguish these arcs or to dampen the resulting disturbances to such an extent, appropriate additional circuits, such as spark quenching capacitors, and/or varistors per switching contact and free-wheeling diodes per relay, must be provided.
For details on spark quenching, see Wikipedia: https://de.wikipedia.org/wiki/Funkenl%C3%B6schung
The max. switching current and max. switching capacity are reduced for capacitive or inductive loads.

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8   Connection example

Here is a connection example with 1-Wire Controller or 1-Wire Gateway, Dual Digital Output and 8-fold Digital Input.
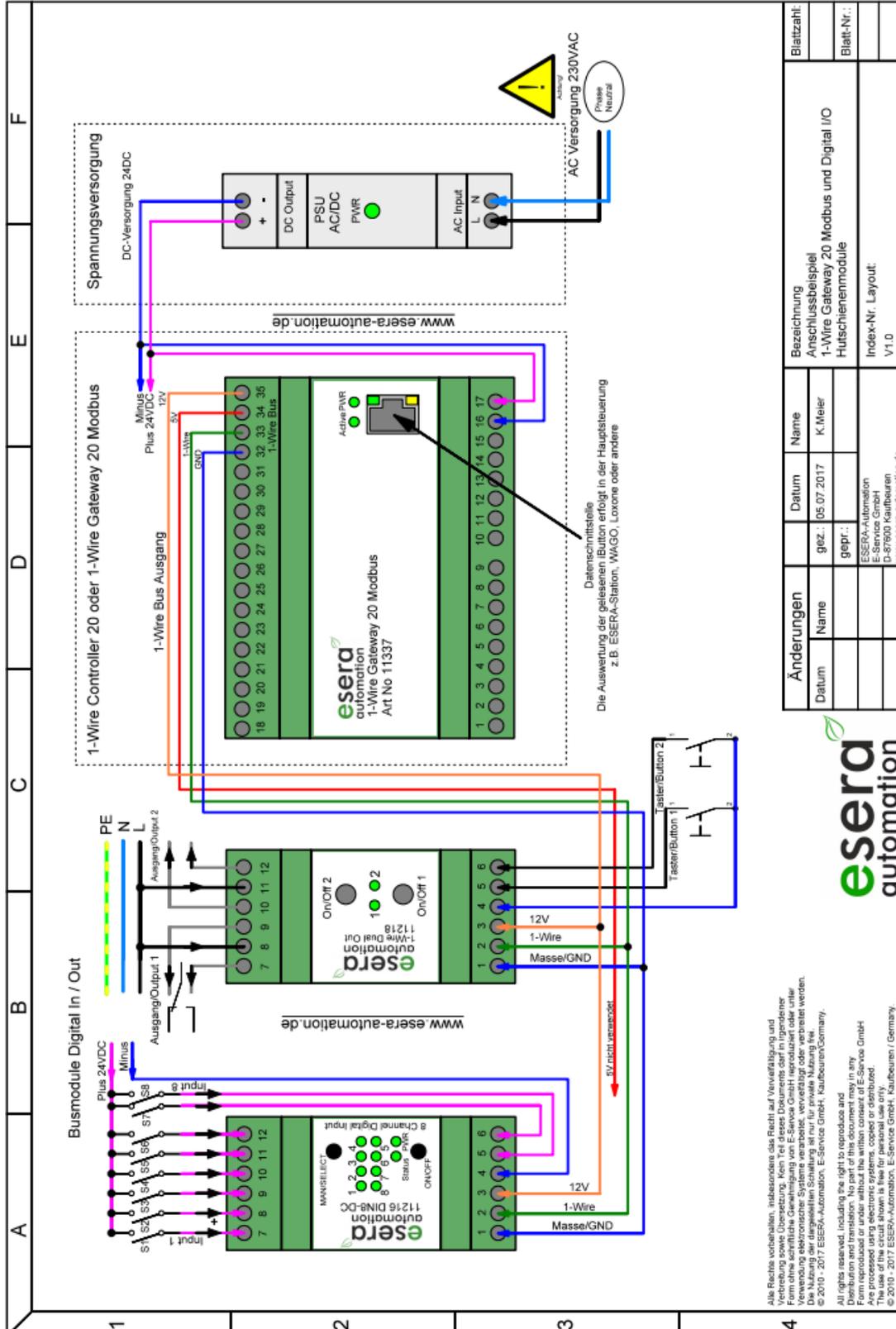
* if the sensor or actuator supports Auto-E-Connect. For details, please refer to the operating instructions of the sensor or actuator.

## 9	Display LED and Push-button

The Module has two LED displays.

Display	Designation	Function LED
LED Green	Output 1	- LED flashes for system start-up - LED lights up when an output relay is active - Display of the energy mode
LED Green	Output 2	- LED flashes for system start-up - LED lights up when an output relay is active

Push-button	Designation	Function Push-button
1 internal	Output 1 On/Off	Switching relay 1
2 internal	Output 2 On/Off	Switching relay 2
1 external	Output 1 On/Off	Switching relay 1
2 external	Output 2 On/Off	Switching relay 2

## 10	Push-button and 1-Wire interfaces

In addition to the buttons on the top of the module, the module has an external button interface for connecting two external buttons (normally open contact). Light switches for light on/off control, for example, can be connected to the external switch interface. Normal light switches from all switch manufacturers can be used for this purpose. Within the module, a µController takes over the interrogation of the push-buttons, the 1-Wire interface and the control of the relays. The scanning of the push-buttons and the 1-Wire module is done by edge control.
The switching status of the relays can be switched via the external and internal push-buttons. The relays can also be switched via the 1-Wire interface.
The relay state triggered via the buttons cannot be read via the 1-Wire interface.

External and internal control inputs:
- push-button interface, external push-button 1
- push-button interface, external push-button 2
- module top side, push-button 1 internal / Mode: energy-saving mode/normal operation
- module top side, push-button 2 internal
- 1-Wire module, DS2413 channel 0
- 1-Wire module, DS2413 channel 1

No voltage source may be connected to the external push-button interface. The connecting cables between the module and the push-button must be laid insulated from other cables. At rest, 5V DC voltage is applied to the connections of the push-button interface.

## 11	Software / Control

The module is controlled by 1-Wire commands for the DS2408 module.

12 Control via 1-Wire Controller / 1-Wire Gateway

The 1-Wire interface of the Dual Digital Switch Module is controlled by standard commands for the DS2413 module. The outputs switched via the push-button interface or manual operation cannot be read back via the 1-Wire interface. The Dual Digital Switching Module can be very easily controlled via a
1-Wire Controller / 1-Wire Gateway. Two commands are available for this purpose. The two commands are listed below.

12.1 Switching an output relay

To switch a relay output, use the following command, which only sets the selected output to 0 or 1.

command: SET,OWD,OUT,OWD-Number, output, Value
example: set,owd,out,2,1,1 => OWD Number 2, output 2 is switched to „On".
After switching the output, the new status is output as confirmation.

12.2 Switching all output relays (Port)

There are applications where it is necessary to switch all outputs with one command.
With the following command, both outputs of the 1-Wire device are set to a specific state. The 1-Wire controller / the 1-Wire gateway takes over the command adaptation to the connected Dual Digital Switching Module.

The output value is output as a decimal value 0-3. Each relay output has a value which is added up.
Output value 0 = all off, 1 = output 1 active, 2 = output 2 active

If you want to switch e.g. output 1 and 2 to "active", add the output value together.
As an example, output value: 1 + 2 = 3
Permissible output values for 1-Wire digital outputs: 0 - 3

command: SET,OWD,OUTH,OWD-Number, output value
example: set,owd,outh,2,3 => OWD Number 2, output 1 and 2 are switched to "Active"
After switching the output, the new state is output as confirmation.

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

For the Dual Digital Switching Module, the following data is output for the status of the relay outputs.

Data output:
1_EVT|12:27:40
1_OWD2_1|0   => Controller No._module No._data set |status output 1
1_OWD2_2|1   => Controller No._module No._data set |status output 2

For further information on the possibilities and commands, please refer to the current documentation
1-Wire Controller /1-Wire Gateway.

13   1-Wire Network Cabling

The special feature of the 1-Wire system is the "BUS technology". All devices (sensors and actuators) are operated in parallel on a three-wire line, which is used for both power supply and data communication. The 1-Wire Bus system joins the list of other successful bus systems such as CAN or Modbus RTU. All of the installation principles recommended for these are also applicable and appropriate to 1-Wire.

The maximum size of a 1-Wire network is determined by various factors. These are mainly:
- Total cable length and cable type
- Number of 1-Wire devices
- Type of cable installation (topology)
- Number and design of cable connectors (unnecessary connection transitions should be avoided)

All factors in total are summarised and designated as 1-Wire Bus load. Each increase in a factor increases the total 1-Wire Bus load for the 1-Wire Controller and thus reduces the maximum network size.

According to our many years of experience and a lot of feedback from customers, the following conservative recommendation can be made:
- Maximum cable length 50 -120m
- Number of 1-Wire devices no more than 20 -22 pieces
- As linear a topology as possible without T-junctions

The topology in particular plays a major role. If possible, it should be installed in a linear topology. The linear topology can be compared like pearls on a pearl necklace. The data line should be laid from one device to the next without T-joints.

Furthermore, the type of cable used can also be mentioned here. We recommend for the cabling CAT5 or CAT6 network cable. It is also possible to use J-Y(St)Y telephone cables and KNX cables. Longer cable runs are possible with CAT5 versus CAT7 cables.

With twisted pair cables, a longer connection length can be achieved in an undisturbed environment, as the capacitive bus load is lower. A total length of 50 m and more can be easily achieved without additional measures. In disturbed, commercial and industrial environments, the cable should always be shielded in order to increase the "robustness" or interference sensitivity of the system.

Note

The above statements on 1-Wire are hints and tips and do not describe any product property or represent any guaranteed product property of the product and the 1-Wire controllers.

Information on the basics and tips on the 1-Wire Bus system can also be found in the ESERA Online Shop under https://www.esera.de/1-wire-grundlagen/

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14 Operating conditions

The module may only be operated at the voltages and under the ambient conditions specified for it. The unit may be operated in any position. The unit is intended for use in dry and dust-free rooms. If condensation forms, wait at least 2 hours for the unit to acclimatise.

Do not operate the assembly in an environment where flammable gases, vapours or dusts are or could be present.

15 Assembly

The module may only be operated at the voltages and under the ambient conditions specified for it. The unit is intended for installation inside a control cabinet as a stationary unit.

16 Disposal note

Do not dispose of the unit in household waste! Electronic devices must be disposed of at the local collection points for electronic devices in accordance with the Directive on Waste Electrical and Electronic Equipment!

17 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.

18 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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