

## User Guide DOUT 8/8, 8x10A/16A 8-fold high power Switching Module / binary output

### 8 x relay output, 8 x pushbutton input for 1-Wire Bus system

- 8 outputs with high power relays with 10A / 16A switching capacity
- Separate power supply per output
- Pushbutton interface for manual control of relay outputs
- LED display for active output
- Switching of DC or AC loads, such as lighting, heating or sockets
- DIN rail housing for control cabinet installation
- 1-Wire Bus interface (DS2408)
- Simple software control
- Low space requirement in the control cabinet
- Simple mounting



#### Note

Before you start mounting the device and put the device into operation, read this operating manual through to the end at your leisure, especially the section of the safety instructions.

## 1 Product description

The 8-fold Digital Output 8/8 can be used to switch DC and AC loads with a current of 10A continuous (16A for 3 seconds).

The Module supports the manual and automatic function through the three control options, pushbutton on top of the module, pushbutton interface and 1-Wire Bus interface.

The Switch Module can be controlled directly by an external pushbutton (e.g. light pushbutton) or by a pushbutton menu on the top of the module, also independently of the 1-Wire interface. For this switching function via pushbutton it is sufficient if the 12V supply voltage is present. Thus an extremely high reliability is achieved, e.g. for the switching of lightings, socket circuits or other important consumptions, even if a central control/software fails.

For the supply of the high Power Switching Module we recommend the use of one of our 1-Wire Hub modules.

### Note

Basics and tips for 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 store under Training/Documentation.

## 2 Technical data

Switching channels	8, Normally open relay (NO contact )
Switching voltage	max. 250V DC or AC voltage
Switching current/ power	max. 16A for 3 seconds, 10A continuous current per output for resistive load. for capacitive or inductive loads, appropriate additional circuitry, such as spark suppression capacitors, must be provided. minimum load 10mA per output the max. current and power are reduced for non-resistive load..
Fuses	external back-up fuse with 16A per channel is recommended
Data interface	1-Wire Bus (12V, Data and ground)
Auto-E-Connect Support	Level I to II
Operating voltage	12VDC (+/-10%)
Power consumption 12V	idle state, no output relay active: approx. 10mA all outputs active: approx. 270mA
Pushbutton interface	8 digital / binary inputs, pulse input e.g. for pushbutton switch (normally open contact) pulse duration min. 40ms input voltage 10-30VDC, max. 10mA per input, common ground. inputs isolated from 1-Wire interface and power supply. cable length between module and pushbutton 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	100 x 90 x 70mm (WxHxD)
Protection class	II
Protection system	IP20
Auto-E-Connect Support	Level I to II
Insulation strength	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

\* if the sensor or actuator supports Auto-E-Connect. For details, please refer to the operating instructions of the sensor or actuator.

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## 5 Auto-E-Connect Support

The 8-fold 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

- **Pre Configuration:** The OWD number for the next installation can be written to the 1-Wire Device\*.
- **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.
- **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.
- **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.

\* if the sensor or actuator supports Auto-E-Connect. For details, please refer to the operating instructions of the sensor or actuator.

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## 7 Connection diagram

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

**Note: A back-up fuse must be provided**

### Connection topside:

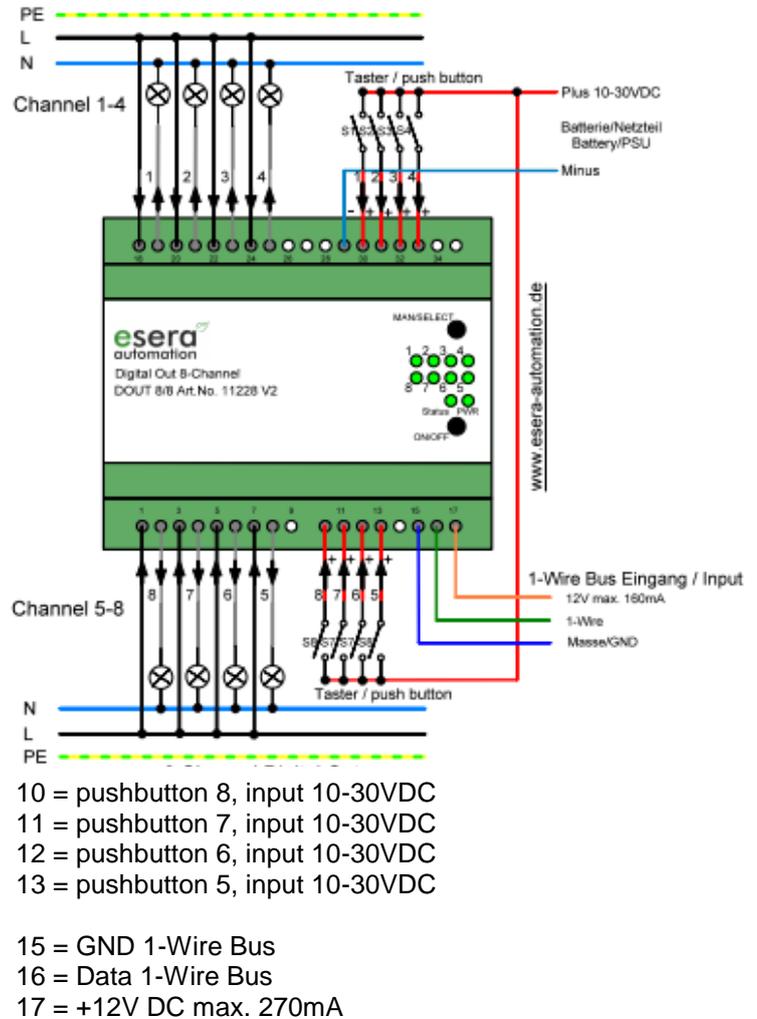
18 = Relay 1, input  
 19 = Relay 1, output  
 20 = Relay 2, input  
 21 = Relay 2, output  
 22 = Relay 3, input  
 23 = Relay 3, output  
 24 = Relay 4, input  
 25 = Relay 4, output

29 = GND (ground) pushbutton input  
 30 = pushbutton 1, input 10-30VDC  
 31 = pushbutton 2, input 10-30VDC  
 32 = pushbutton 3, input 10-30VDC  
 33 = pushbutton 4, input 10-30VDC

26 – 28 and 34, 35 not connected

### Module bottomside:

1 = Relay 8, input  
 2 = Relay 8, output  
 3 = Relay 7, input  
 4 = Relay 7, output  
 5 = Relay 6, input  
 6 = Relay 6, output  
 7 = Relay 5, input  
 8 = Relay 5, output  
 9, 14 not connected



### Note

The module may only be operated at the voltages and ambient conditions specified for it. The operating position of the device 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 disturbances in the logic of the switching module, the ECO controller and other devices. In order to extinguish these arcs or to attenuate the resulting interference to such an extent, appropriate additional circuitry, such as spark suppression capacitors and/or varistors per switching contact and free-wheeling diodes per relay.

For details on spark suppression, see Wikipedia: <https://de.wikipedia.org/wiki/Funken%C3%B6schung>  
 The max. switching current and max. switching capacity are reduced for capacitive or inductive loads.

## 8 Operating mode, display and operation

The module has two operating modes: Normal Operation and Manual Operation.

**Normal Operation:** After commissioning, the device is in Normal Operation, which means that a switching command via the 1-Wire interface is switched directly to the corresponding output relay. The corresponding output LED lights up

**Manual Operation:** By pressing the "MAN/Select" button for 2 seconds, the module switches to manual operation (manual mode). The "PWR" LED flashes as confirmation.

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An output is selected by briefly pressing the "MAN/Select" key. The LEDs 1-8 light up for the selected output. The selected output is switched on or off with the "ON/OFF" key.

Several outputs can be switched in one run.

After a waiting time of approx. 2 seconds, the system automatically switches to the "Normal Operation", the "PWR" LED lights up permanently again and the selected outputs are activated.

**Delete „Manual Operation“:** By pressing the "ON/OFF" key for 2 seconds, the outputs selected in Manual Operation are switched off.

Display	Designation	Function LED
LED 1-8	Output 1-8	<ul style="list-style-type: none"> <li>- LED lights up for 2 seconds for system start</li> <li>- Normal Operation: LED indicator is on when the output is active.</li> <li>- Manual Operation: By "select" button the output can be selected, which is switched on or off.</li> </ul>
LED PWR	Power	<ul style="list-style-type: none"> <li>- LED lights up for 2 seconds for system start</li> <li>- LED indicator lights up when an output relay is active</li> <li>- LED indicator flashes in Manual Operation</li> </ul>
LED Status	Status display Manual Operation	<ul style="list-style-type: none"> <li>- LED lights up for 2 seconds for system start</li> <li>- Status display of the selected output after transition to</li> <li>- Normal Operation (relay On or Off)</li> </ul>

pushbutton	Designation	Function pushbutton
MAN/Select	Operating mode / Channel selection	<ul style="list-style-type: none"> <li>The pushbutton has a double function</li> <li>- switching to Manual Operation (press 2 seconds)</li> <li>- selection of the output (press briefly)</li> </ul>
ON/OFF	Output 2 On/Off	<ul style="list-style-type: none"> <li>The pushbutton has a double function</li> <li>- selected output On - Off (press shortly)</li> <li>- deleting all outputs of the Manual Operation (press 2 seconds)</li> </ul>

## 9 8-fold digital input, pushbutton interface

In addition to the Manual Operation (module top side) and the 1-Wire interface, the module also has an 8-fold pushbutton interface (8 x digital input) for switching the outputs.

To switch an output, a short input signal (push the button, 10-30VDC inputs) to the corresponding input is sufficient.

The 8-fold pushbutton interface is intended for switching of lightings or sockets in the living area by e.g. light pushbuttons or motion detectors with pulse output. This ensures very fast switching even without system control. Due to the impulse control, comparable to a staircase lighting controller, any number of light switches and motion detectors can be switched in parallel.

For further details on the ESERA Lighting system, please refer to the website

<https://www.esera.de/smart-home/anwendungsbeispiele/lichtsteuerung/>

Besides light scanners, any other pulse control signal can be used to switch the outputs.

All three interfaces, manual operation, 1-Wire and push button interface, work in parallel on the outputs. An output switched by the 1-Wire interface, for example, can be switched off or on manually or via the pushbutton interface.

Light scanners for light on/off control can be connected to the pushbutton interface, for example. Normal light switches of all switch manufacturers can be used for this purpose.

Within the module a  $\mu$ Controller takes over the query of the pushbuttons, the 1-Wire interface and the control of the relays. The query of the pushbutton interface is done by edge detection.

## 10 Software / Control in general

The 1-Wire interface of the 8-fold Digital Output 8/8 is controlled by standard commands for the DS2408 module. The button interface and the relay status are output via the DS2408 variables. Outputs switched via the pushbutton interface or Manual Operation can be read back via the 1-Wire interface.

\* if the sensor or actuator supports Auto-E-Connect. For details, please refer to the operating instructions of the sensor or actuator.

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## 11 Control via ECO 1-Wire Controller / 1-Wire Controller

The 1-Wire interface of the 8-fold Digital Output 8/8 is controlled by standard commands for the DS2408 module. The outputs switched via the pushbutton interface or the Manual Operation can be read back via the 1-Wire interface. The 8-fold high power Switching Module can be very easily controlled via an ECO 1-Wire Controller / 1-Wire Controller. Two commands are available for this purpose. The two commands are shown below.

### 11.1 Switching an output relay

To switch a relay output, use the following command, which sets only 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.

### 11.2 Switching all output relays (PORT)

There are applications where it is necessary to switch all outputs with one command.

With one command all outputs of the 1-Wire Module are set to a certain state, which means that the previous relay state is overwritten.

The ECO 1-Wire Controller / 1-Wire Controller takes over the command adjustment to the connected 1-Wire 8-fold Digital Output 8/8.

The output value is output as decimal value 0-254. Each relay output has a valence which is summed up.  
output 1 = 1, output 2 = 2, output 3 = 4, output 4 = 8, output 5 = 16, output 6 = 32,  
output 7 = 64, output 8 = 128.

If you want to switch e.g. output 1, 3 and 5 to 1, add the output value together.

Here e.g.  $1 + 4 + 16 = 21$

All other relay outputs are switched to 0. If all outputs are to be switched to 0 or off, the output value is 0.

Permissible output values for 1-Wire digital outputs: 0 - 255

**command: SET,OWD,OUTH,OWD-Number, output value**

example: set,owd,outh,2,15 => OWD Number 2, outputs 1 to 4 are switched to "On"

After switching the output, the new status is output as confirmation.

### 11.3 Data output 1-Wire Controller / 1-Wire Gateway

For the 8-fold Digital Output 8 / 8, the following data is output for the binary / digital inputs (pushbutton interface) and relay outputs.

The input and output value are output as decimal value 0-254 and in a second data set binary with 0 and 1.

Each input and output has a value, which is added up in each case.

#### Input pushbutton interface:

input 1 = 1, input 2 = 2, input 3 = 4, input 4 = 8, input 5 = 16, input 6 = 32, input 7 = 64,  
input 8 = 128.

#### Relay output:

output 1 = 1, output 2 = 2, output 3 = 4, output 4 = 8, output 5 = 16, output 6 = 32, output 7 = 64, output 8 = 128.

#### Data output:

1_OWd1_1 8	=> Controller No._module No._Data set   Decimal value input
1_OWd1_2 10000000	=> Controller No._module No._Data set   Binary representation input
1_OWd1_3 3	=> Controller No._module No._Data set   Decimal value output
1_OWd1_4 00000111	=> Controller No._module No._Data set   Binary representation output

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

## 12 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.

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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/>

### 13 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.

### 14 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.



### 15 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!

### 16 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.

\* if the sensor or actuator supports Auto-E-Connect. For details, please refer to the operating instructions of the sensor or actuator.

- 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](https://en.wikipedia.org/wiki/German_Statutory_Accident_Insurance)) must be carried out.

## 17 Warranty

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