

## R220

## Digital outputs module



### Summary

The R220 digital output module is a microprocessor-controlled, communicative 12 binary outputs module. The module uses a RS485 bus with Modbus RTU for communication, and can be easily integrated in a variety of supervision and control systems.

### Application

- HVAC and industrial control systems – binary signal control: fans, pumps, lights etc.

### Function

The R220 module controls 9 normally open and 3 change-over relays. All outputs are galvanically separated from each other as well as from the control and communication part.

The module uses RS485 bus for communication and is connected to the process station either directly (to process stations with RS485 interface), or through R012 (optically separated RS485 to RS232 converter). Removable connectors are used for incoming and outgoing data line so that mounting is fast and easy. The module mounts on a DIN rail.

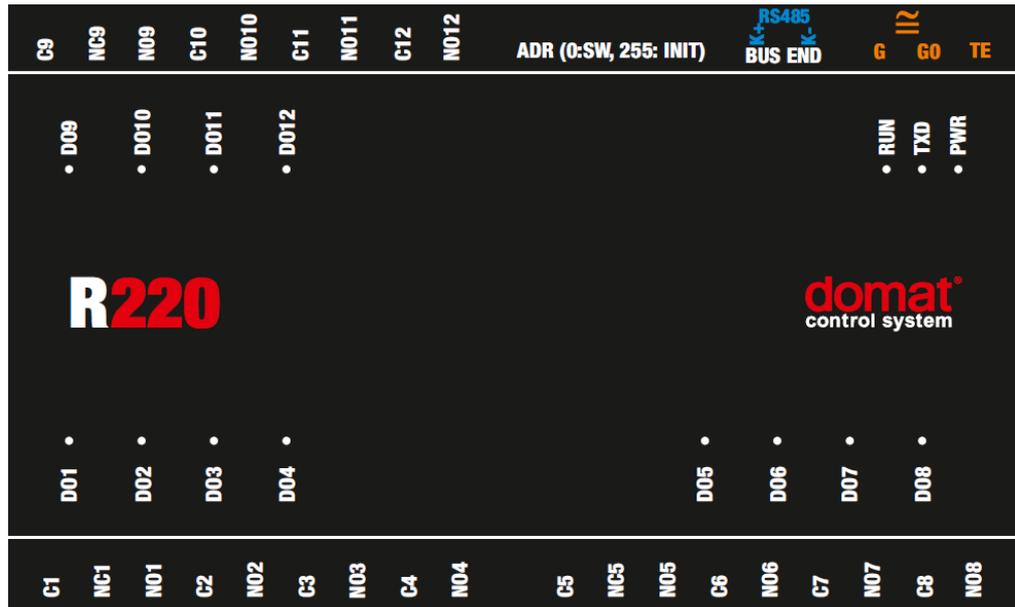
The communication circuits are protected against overvoltage. If the module is terminating the communication bus, i.e. it is the last in line, a terminating 120  $\Omega$  resistor may be switched on by switching the BUS END DIP switch to ON. Two LEDs located inside of the housing enable fast diagnostics – power up and communication (Tx). Twelve LEDs at the outputs indicate the status of each of the outputs separately.

Connection examples: see *domat - Technical application notes*.

All the settings are backed up in a EEPROM chip. The module is equipped with a watchdog circuit.

<b>Technical data</b>	Power	24 V AC/DC ±20 %
	Consumption	4 W
	Communication	Modbus RTU RS485, 1200...115200 bit/s
	Galvanic isolation	1 kV
	Max. bus length	1200 m
	Max. amount of modules on the bus	256
	Number of digital outputs	12
	Relay type	DO1, DO5, DO9 – SPDT nominal load: 8 A (AC1, general use, non-inductive load acc. to EN 60947-4-1 ed. 3), 250 VAC/30 VDC DO2-DO4, DO6-DO8, DO10-DO12 – SPST nominal load: 5 A (AC1, general use, non-inductive load acc. to EN 60947-4-1 ed. 3), 250 VAC/30 VDC
	SW	ModComTool for parameters setting Merbon IDE, SoftPLC IDE – predefined Modbus devices
	Protection degree	IP20 (EN 60529)
	Housing	polycarbonate box (certification UL94V0) elbox 6U
	Terminals	screw terminals M3
	Dimensions	105.6 × 98.7 × 61.5 mm
	Recommended wire	0.14...1.5 mm <sup>2</sup>
	Ambient temperature	external conditions: -5...45 °C; 5...95 % relative humidity; non-condensing gases and chemically non-aggressive conditions (according to EN 60721-3-3 climatic class 3K5) storage: -5...45 °C; 5...95 % relative humidity; non-condensing gases and chemically non-aggressive conditions (according to EN 60721-3-1 climatic class 1K3)
	Standards conformity	EMC EN 61000-6-2 ed.3:2005, EN 61000-6-4 ed.2:2006 + A1:2010 (industrial environment) electrical safety EN 60950-1 ed.2:2006 + A11:2009 + A12:2011 + A1:2010 + A2:2014 + Opr.1:2012 + Z1:2016 hazardous substances reduction EN 50581:2012

## Terminals



### Terminals and connectors

<b>RS485 K+</b>	port COM1 - serial link RS485, terminals K+
<b>RS485 K-</b>	port COM1 - serial link RS485, terminals K-
<b>G</b>	G power supply
<b>G0</b>	G0 power supply
<b>TE</b>	optional connection for shielding, technical ground
<b>C1...C12</b>	common terminals for relays 1...12
<b>NO1...12, NC1...12</b>	relay output 1...12

### LED indication

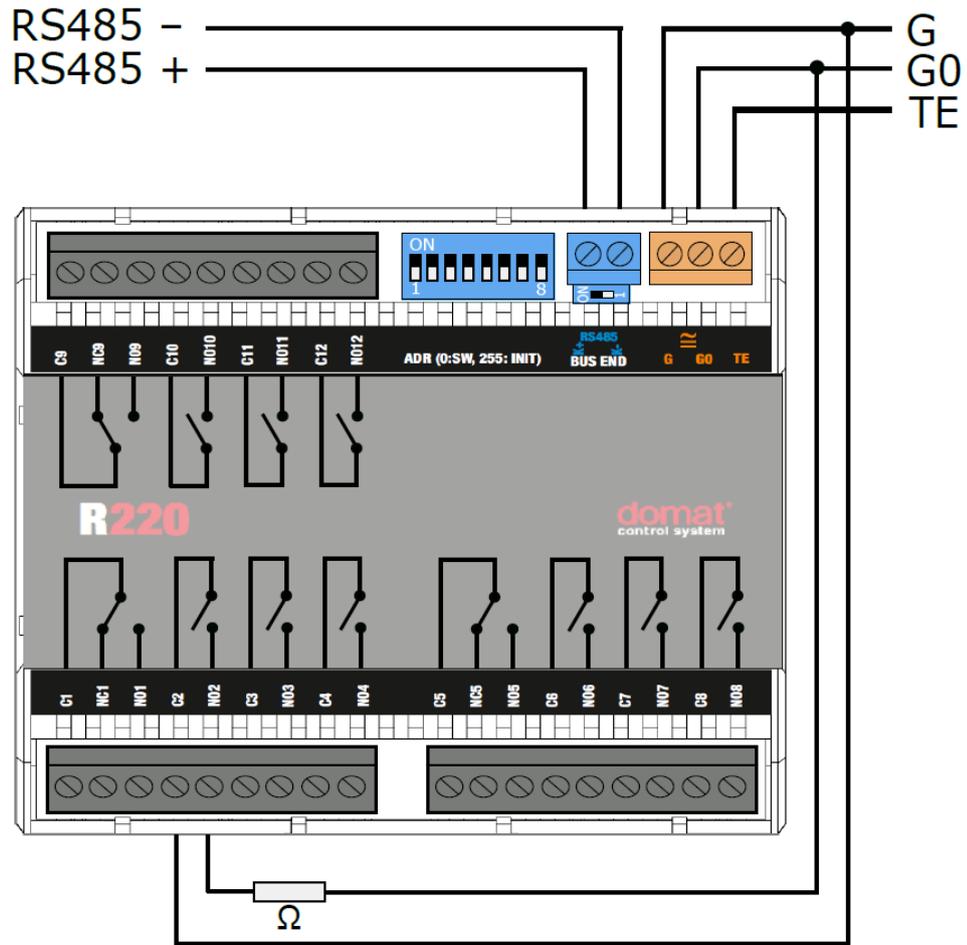
<b>TxD</b>	red LED – RS485 transmitting data at COM1 (flashing: transmitting data; OFF: no data traffic)
<b>PWR</b>	green LED – power supply (ON: power OK; OFF: no power applied, weak or damaged power supply, ...)

### DIP switches

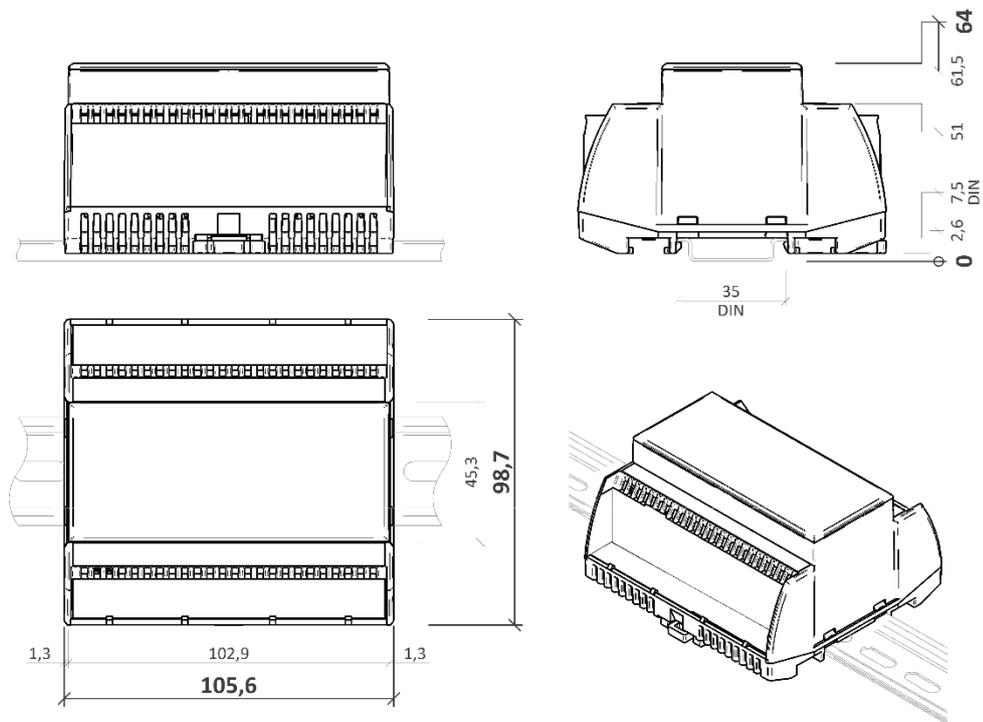
<b>ADR</b>	AUTO – if all switches are OFF, the address is used according to Modbus register 4 LSB USER – address is set by DIP switches configuration INIT - if are all switches ON at power-up, configuration parameters are set to defaults <b>DIP 8 = bit 0; switches increase their bit weight from right to left, see below</b>
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<b>BUS END</b>	Switch for bus RS485 termination (located at the RS485 connector); ON = bus end; the first and last devices on bus should have bus end ON
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## Connection



## Dimensions

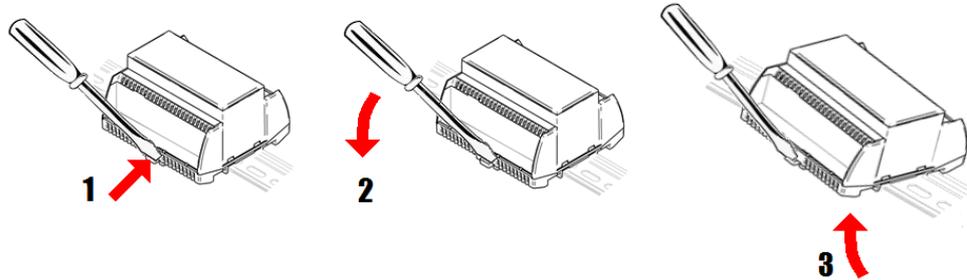


Dimensions are in *mm*.

## Installation

The R220 module is fixed on standard DIN rail (by snapping).

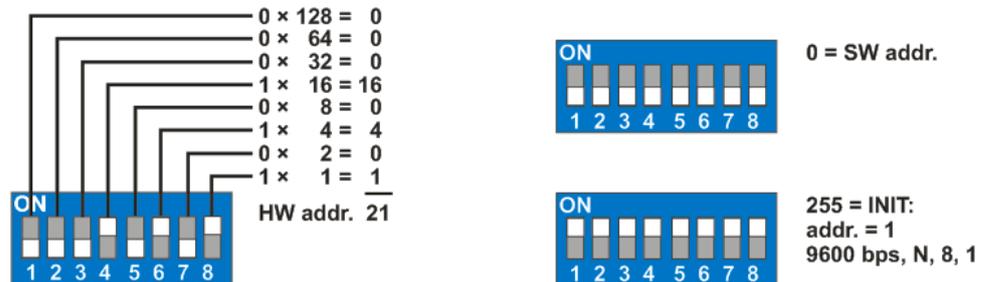
When removing the module from the DIN rail proceed as follows: Place a screwdriver in the plastic slot which is in the middle of bottom part of the module (1). Then push the screwdriver upwards (2). After that, the module can be removed by tilting it upwards (3).



## Addressing

The Modbus address can be set as follows:

- **hardwarewise:** using DIP switches. The switches increase their bit weight from right to left, see image with example where address of 21 is set by activation of switches 4, 6, and 8 with bit weight of 16, 4, and 1 respectively. Valid settable range is 1 to 254. Address 0 (all switches OFF) means that the address is set as entered in the Modbus table. Address 255 (all switches ON) brings the module to INIT mode, where Modbus address is 1 and communication parameters are set to N, 8, 1, see image below. All changes apply after the module is switched off and on again.



- **softwarewise** using the ModComTool software, available for free at [www.domat-int.com/en/](http://www.domat-int.com/en/). The default address (factory setting) is 1, default communication parameters are 9600, 8, N, 1. Parity and stopbits can be set in Modbus register 1005 LSB. **The software address is only active if the hardware addressing switch is set to 0.** All changes apply after the module is switched off and on again.

## Safety note

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Changes in  
versions**

06/2018 – First datasheet version.

08/2018 – Correction (12 DO in Summary)

08/2021 – Stylistic adjustments, change of logo.