

## R320

## 16 digital output module



### Summary

The R320 digital output module is a microprocessor-controlled, communicative 16 binary outputs module. It 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, 3<sup>rd</sup> party systems etc.

### Function

The R320 module hosts 16 open collector outputs to switch voltage up to 50 V DC, max. current 0,5 A. Usually small DC relays are connected to the outputs. They galvanically separate the power part and are able to switch low voltage circuits.

Removable connectors are used for all terminals 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 first or last in line, a terminating 120  $\Omega$  resistor shall 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). Eight LEDs at the outputs indicate the status of each of the outputs separately.

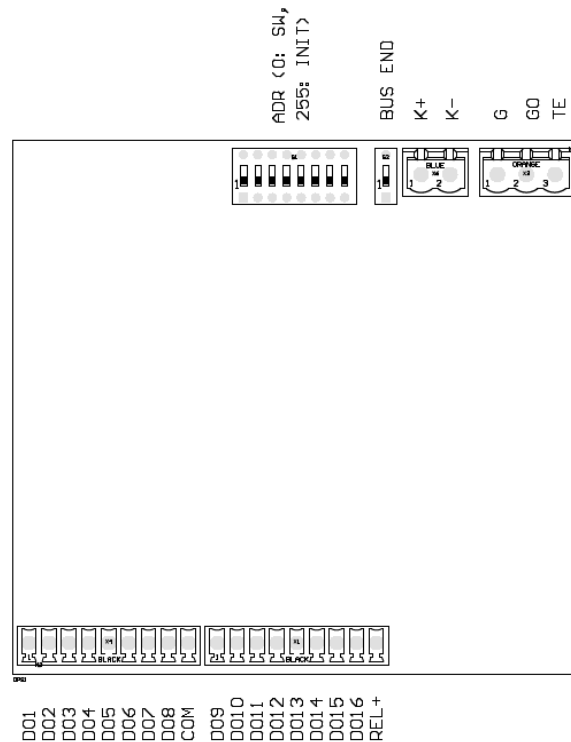
All module settings are backed up in an EEPROM chip. The module is equipped with a watchdog circuit.

See *domat - Technical application notes* for connection examples.

## Technical data

|                                   |                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                             | 24 V AC/DC $\pm$ 20 %                                                                                                                                                                                                                                                                                                                                       |
| Consumption                       | 2 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         | 16 x open collector digital outputs (500 mA / 50 V, thermal limit 100 mA for permanent switched)                                                                                                                                                                                                                                                            |
| SW                                | ModComTool 4.2.3.9 or higher for parameter setting,<br>Merbon IDE, SoftPLC IDE – predefined Modbus devices                                                                                                                                                                                                                                                  |
| Housing                           | Polycarbonate box (certification UL94V0)<br>Elbox 6                                                                                                                                                                                                                                                                                                         |
| Terminals                         | screw terminals M3 (bus, power supply), M2 (DO outputs)                                                                                                                                                                                                                                                                                                     |
| Dimensions                        | 105,6 (l) x 98,7 (w) x 64 (h) mm                                                                                                                                                                                                                                                                                                                            |
| Protection degree                 | IP20 (EN 60529)                                                                                                                                                                                                                                                                                                                                             |
| Recommended wire                  | 0,14–1,5 mm <sup>2</sup>                                                                                                                                                                                                                                                                                                                                    |
| Ambient temperature               | External conditions: -5 – 45 °C; 5 – 95 % relative humidity;<br>non-condensing gases and chemically non-aggressive<br>conditions (according to EN 60721-3-3 climatic class 3K5)<br><br>Storage: -5 – 45 °C; 5 – 95 % relative humidity; non-<br>condensing gases and chemically non-aggressive conditions<br>(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 +<br>A1:2010 (industrial environment)<br><br>Electrical safety EN 60950-1 ed.2:2006 + A11:2009 +<br>A12:2011 + A1:2010 + A2:2014 + Opr.1:2012 + Z1:2016<br><br>Hazardous substances reduction EN 50581:2012                                                                                              |

## Terminals



### Terminals and connectors:

|                     |                                                                                                              |
|---------------------|--------------------------------------------------------------------------------------------------------------|
| <b>RS485 K+</b>     | port COM - serial link RS485, terminals K+                                                                   |
| <b>RS485 K-</b>     | port COM - 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>COM</b>          | common terminals for DO1...DO16                                                                              |
| <b>REL+</b>         | common cathode of protection diodes (used to suppress voltage peaks which raise when relays are deenergized) |
| <b>DO1 ... DO16</b> | outputs 1 ... 16                                                                                             |

### LED indication:

|            |                                                                                                                                               |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RUN</b> | orange LED – system cycle (OK: LED flashes periodically 1 s ON, 1 s OFF; ERROR: LED flashes in another pattern, LED is permanently ON or OFF) |
| <b>TxD</b> | red LED – RS485 transmitting data at COM (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:

#### ADR

AUTO – if all switches are OFF, the address is used according to Modbus register 4 LSB

USER – address is set by DIP switches configuration

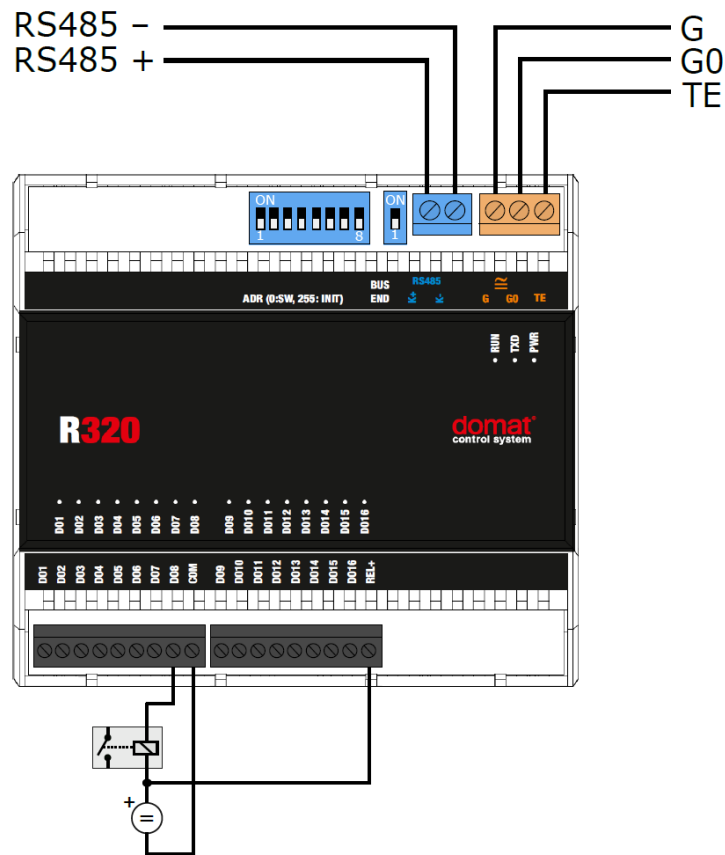
INIT - if are all switches ON at power-up, configuration parameters are set to defaults

**DIP 8 = bit 0; switches increase their bit weight from right to left, see below**

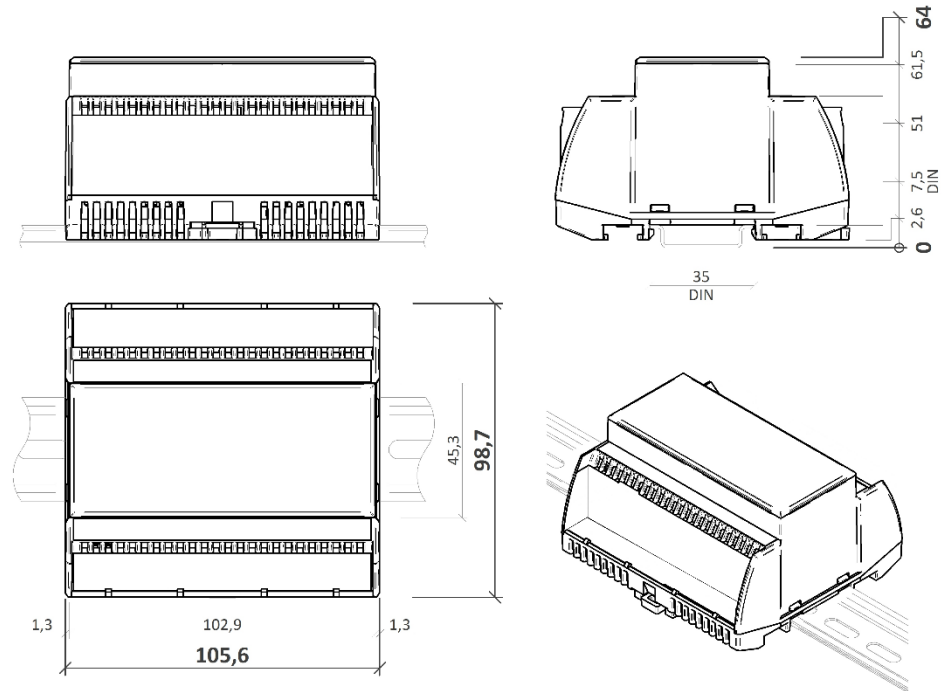
#### BUS END

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

### Connection



## Dimensions

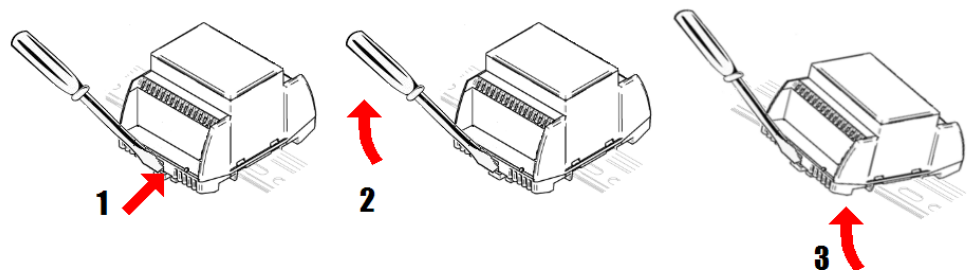


Dimensions are in *mm*.

## Installation

The R320 module is fixed by snapping on standard DIN rail.

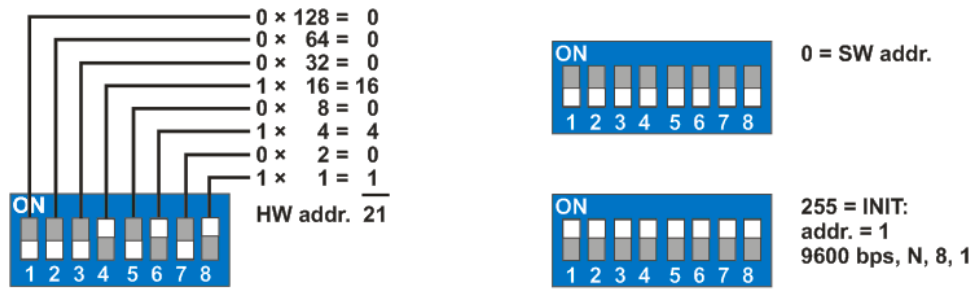
When removing the module from the DIN rail proceed as follows: Place a screwdriver in the plastic slot which is in the middle of bottom part of the module (1). Then push the screwdriver upwards (2). After that, the module can be removed by tilting it upwards (3).



## 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.  
09/2022 – Title image changed.