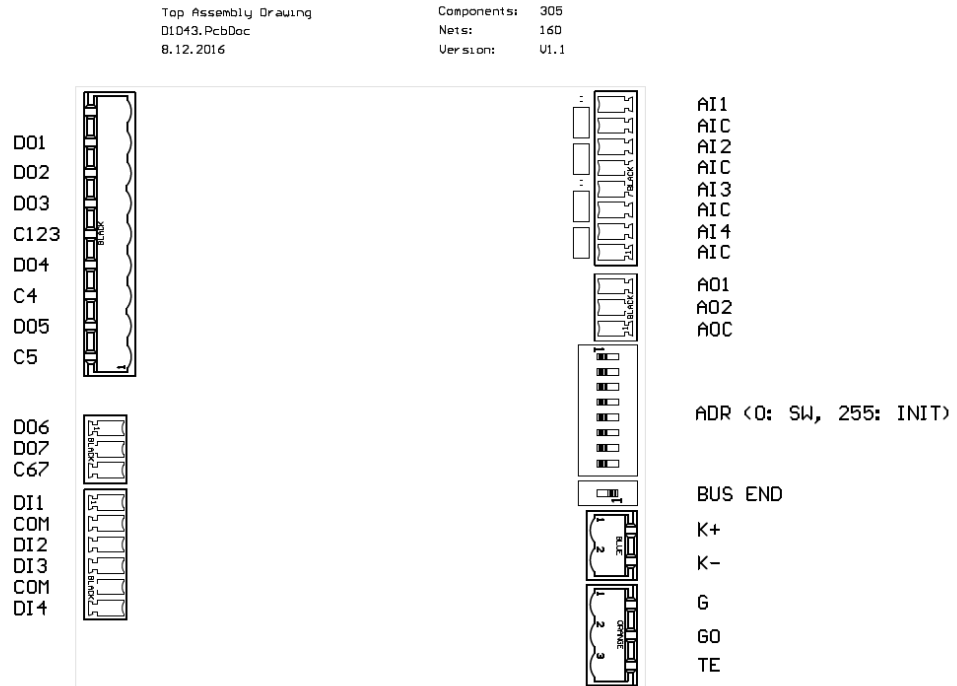# domat
### control system

# RMIO      Compact I/O module

**Summary**    **The RMIO is a universal, compact, microprocessor controlled, communicative module with its I/O mix optimized for control of small HVAC units, fancoils, and floor heating. It communicates over a RS485 bus with Modbus RTU (slave) and thus can be easily integrated in a range of control systems.**

**Application**
- **Compact I/O module for small heat exchange stations, fancoils and IRC applications, add-on module for larger systems, data acquisition.**

**Function**    The RMIO contains inputs and outputs (4× analogue input, 2× analogue output, 4× digital input, 7× digital output). The inputs and outputs are controlled over RS485 with Modbus RTU. Find the Modbus register table in a separate document. The universal compact module RMIO is replacement of the older MMIO module.

The communication circuits are protected against overvoltage and galvanically isolated from other parts of the module. If the module is installed as the first or the last on the bus, set the BUS END DIP switches to ON to terminate the bus. The module is installed on a standard DIN rail. Two LEDs located inside of the housing enable fast diagnostics – power and communication.

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

All module settings are backed up in an EEPROM chip.

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

| Technical data | Power | 24 V AC/DC ±20% |
|---|---|---|
| | Consumption | 7 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 |
| | Analogue inputs | 2 analogue inputs (AI1, AI2): 0-10 V DC, 0-20 mA DC, Pt1000, 0-1600 Ω, 0-5000 Ω; resolution 16 bit, measurement error 0.25 % |
| | | For current measurement, external resistor 125 Ω must be connected! |
| | | 2 analogue inputs (AI3, AI4): Pt1000, 0-1600 Ω, 0-5000 Ω; resolution 16 bit, measurement error 0.25 % |
| | Analogue outputs | 2 analogue outputs 0-10 VDC (max. 10 mA, short-circuit proof, short-circuit current 50 mA, 8 bit A/D converter) |
| | Digital inputs | 4 digital inputs 24 VDC/VAC, |
| | | Input current 4 mA, galvanic isolation 1.5 KV |
| | Digital outputs | 5 digital output, relay SPST 5 A (AC1, general use, non-inductive load according to EN 60947-4-1 ed. 3), 250 VAC/30 VDC |
| | | 2x solid state relay with zero switching for AC or DC load, 24 V DC / AC, max. Switching current 0.4 A |
| | Software for configuration and control | ModComTool 4.2.4.6 or higher for parameters setting |
| | | Merbon IDE, SoftPLC IDE – predefined Modbus devices |
| | | Any Modbus RTU master PLC |
| | Housing | Polycarbonate box (certification UL94V0) |
| | | elbox 6U |
| | Terminals | Power supply, bus and DO1 - DO5 screw terminals M3, for AI, AO, DI and DO6,7 screw terminals M2 |
| | Dimensions | 105 (l) x 98,5 (w) x 64 (h) mm |
| | Protection degree | IP20 (EN 60529) |
| | Recommended wire | 0,14–1,5 mm² |
| | 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 + cor.1:2012 + Z1:2016 |
| | | Hazardous substances reduction EN 50581:2012 |

## Terminals



```
Top Assembly Drawing          Components:  305
D1D43.PcbDoc                  Nets:        160
8.12.2016                     Version:     V1.1
```

### Terminals and connectors:

| | |
|---|---|
| **RS485 K+** | port COM1 - serial link RS485, terminals K+ |
| **RS485 K-** | port COM1 - serial link RS485, terminals K- |
| **G** | G power supply |
| **G0** | G0 power supply |
| **TE** | optional connection for shielding, technical ground |
| **AI1 … AI4** | analogue input 1 … 4 |
| **AIC** | common terminal for inputs AI1…AI4 |
| **DI1 … DI4** | digital input 1 … 4 |
| **COM** | common terminals for inputs DI1…DI4 |
| **DO1 … DO7** | digital output 1 … 7 |
| **C123** | common terminal for DO1…DO3 |
| **C4, C5** | terminals for DO4 and DO5 |
| **C67** | common terminal for DO6 and DO7 |
| **AO1, AO2** | analogue output 1 and 2 |
| **AOC** | common terminal for AO1 and AO2 |
| | |
| **RUN** | orange LED – system cycle (OK: LED flashes periodically 1 s ON, 1 s OFF; ERROR: LED flashes in other pattern, LED is still ON or OFF) |
| **TxD** | red LED – RS485 transmitting data at COM1 (flashing: transmitting data; OFF: no data traffic) |
| **PWR** | green LED – power supply (ON: power OK; OFF: no power applied, weak or damaged power supply, …) |

### DIP switches:

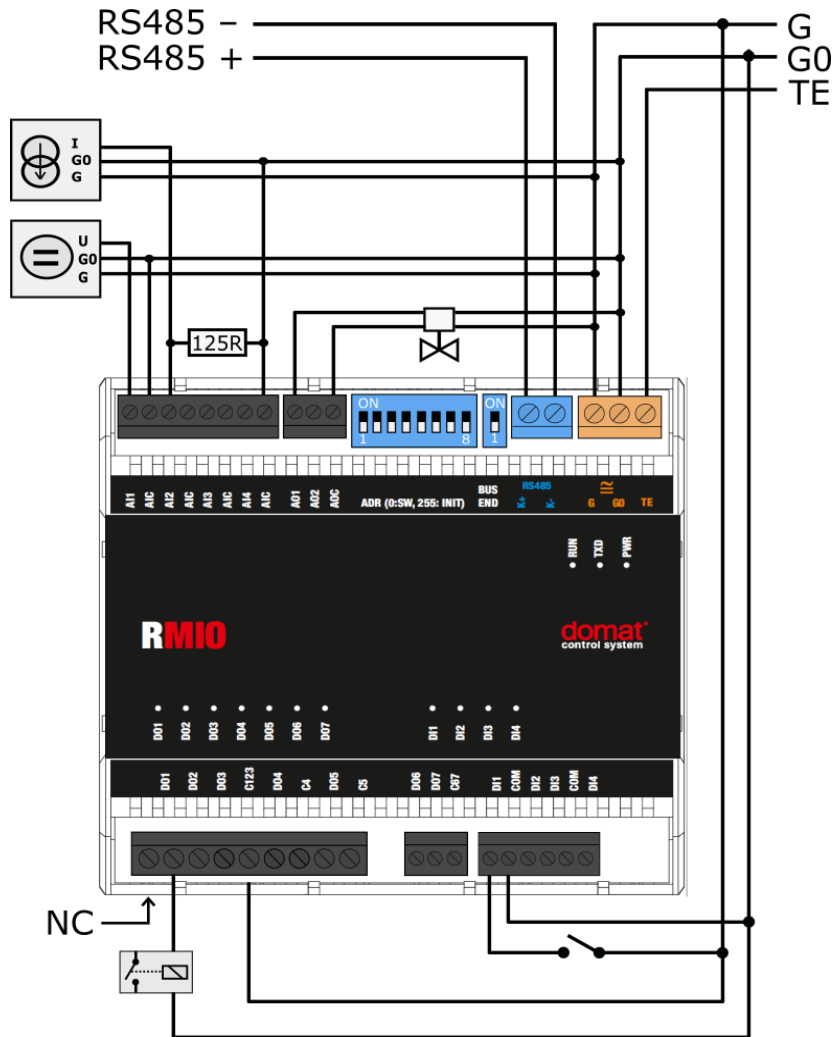| | |
|---|---|
| **ADR** | AUTO – if all switches are OFF, the address is used according to Modbus register 4 LSB |
| | USER – address is set by DIP switches configuration |

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**
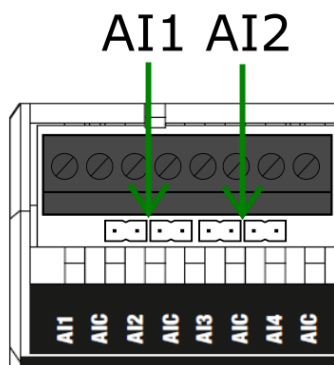
**BUS END**  Switch for bus RS485 termination (located at the RS485 connector); ON = bus end; the first and last devices on bus should have bus end ON

**Connection**



Analog inputs AI1 and AI2 have adjustable measuring ranges by jumpers facing the inner side of analog input terminals. AI3 and AI4 inputs have a fixed range (R, temp):
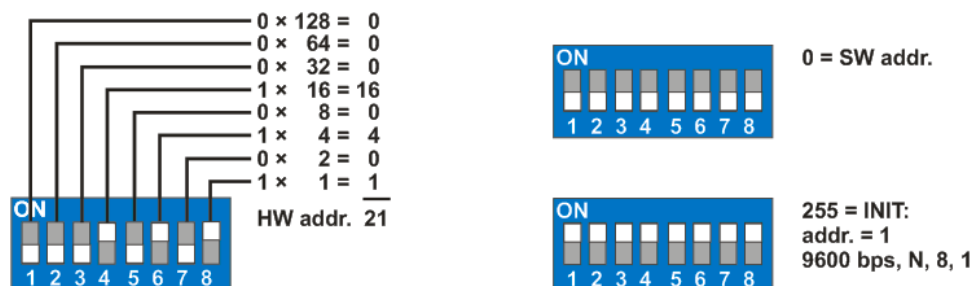
Setting of analogue inputs AI1 and AI2 is as follows:

| Range | AI1 | AI2 |
|---|---|---|
| R, temp |  |  |
| 0…10 V |  |  |
| 0…20 mA |  |  |

**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.
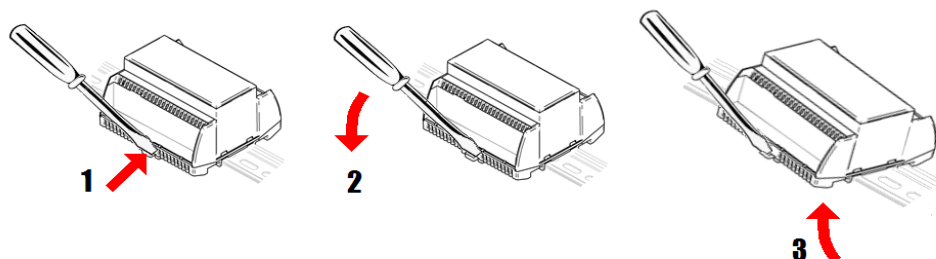All changes apply after the module is switched off and on again.



- **softwarewise** using the ModComTool software, available for free at **www.domat.cz**. 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**.
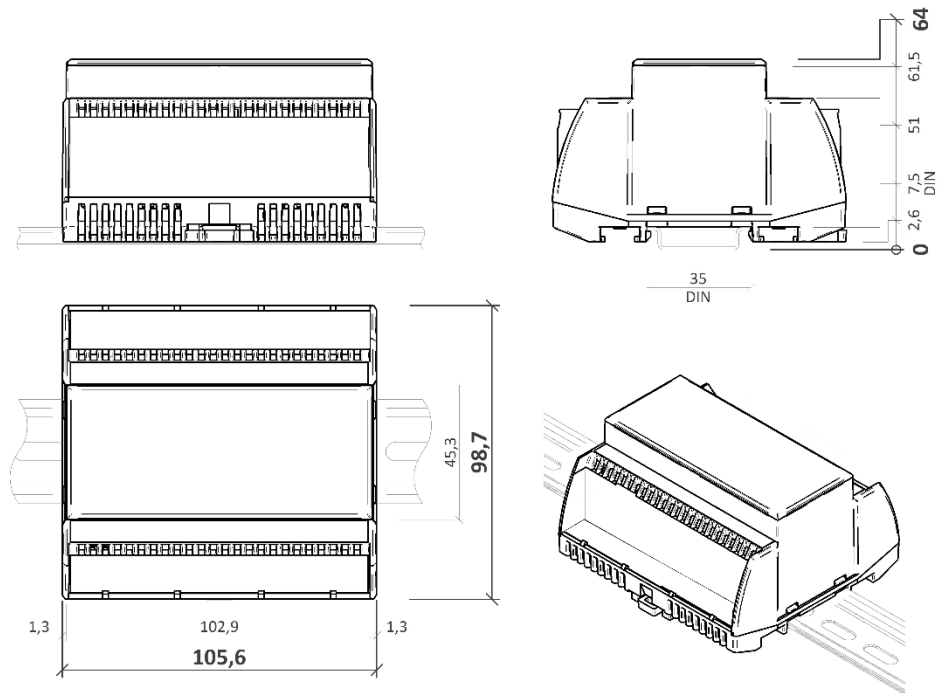All changes apply after the module is switched off and on again.

**Installation**  The RMIO 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).

**Dimensions**



Dimensions are in *mm*.

**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**

04/2018 – First datasheet version.
05/2018 – AI ranges setting added in section *Connection*.
10/2018 – Connection scheme and terminals description corrected.