

R500

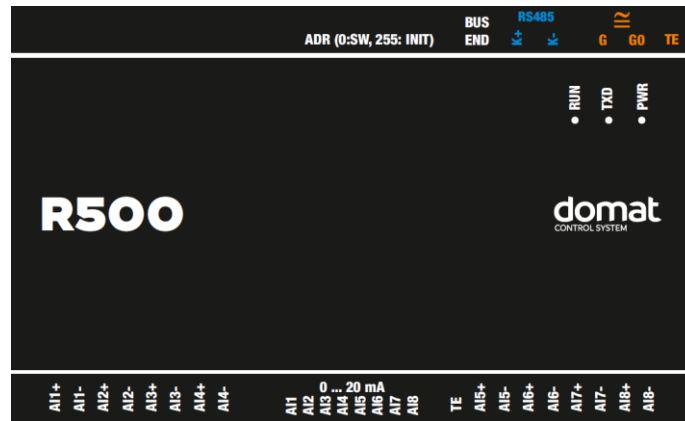
Analogue input module



Summary	The R500 is a microprocessor controlled, communicative module with 8 analogue inputs with variable measuring range (voltage, current loop). The module uses a RS485 bus for communication, and can be easily integrated in a variety of supervision and control systems.
Application	<ul style="list-style-type: none">• HVAC and industrial control systems – measuring of temperature, pressure, and other values
Function	<p>The module incorporates 8 analogue inputs. The input signals are processed and multiplexed into a 16 bit A/D converter. Each input is rangeable separately (see Technical data), and inputs can also be used as 0 to 20 mA current measurement inputs if the corresponding DIP switch is activated. The individual inputs are separated from each other.</p> <p>The module communicates by means of RS485 data bus. The Modbus RTU communication protocol ensures smooth and easy integration in a variety of control and data acquisition systems. It connects to process stations (PLCs) directly or through the R012 interface (RS485 to RS232 converter with galvanic isolation). Removable connectors are used for all signals as well as for data line so that mounting is fast and easy. The module has a DIN rail clip.</p> <p>The communication circuits are protected against overvoltage and galvanically isolated from other parts of the module. If the module is terminating the communication bus, i.e. it is the first or last in line, a terminating 120 Ω resistor may be switched on by activating the BUS END switches. Two LEDs located inside of the housing enable fast diagnostics – power and communication.</p> <p>All module settings are backed up in an EEPROM chip. The module is equipped with a watchdog circuit.</p> <p>See <i>domat - Technical application notes</i> for connection examples. R500 is a more universal replacement of M500.</p>

Technical data	Power	24 V AC/DC ±20 %
	Consumption	1.5 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 analogue inputs	8
	Galvanic isolation from supply	1 kV
	Input ranges	+/- 150mV, +/- 500mV, +/- 1V, +/- 5V, +/- 10V, 0...20 mA
	Sampling	10 samples/s
	Effective resolution	16 bit
	Measurement error	The measurement deviation for all measured variables is 0.25 % of the whole range.
	Input impedance	>10MΩ
	SW	ModComTool 4.2.7.5 or higher parameters setting, GUI Merbon IDE, SoftPLC IDE – predefined modbus devices
	Housing	Polycarbonate box (certification UL94V0) elbox 6U
	Terminals	screw terminals M3 (bus, power), M2 (AI inputs)
	Recommended wire	0.35...1.5 mm ² (AI)
	Dimensions	105.6 × 98.7 × 61.5 mm
	Protection degree	IP20 (EN 60529)
	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

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+	Input 1, positive
AI1-	Input 1, negative
AI2+	Input 2, positive
AI2-	Input 2, negative
...	
AI8+	Input 8, positive
AI8-	Input 8, negative

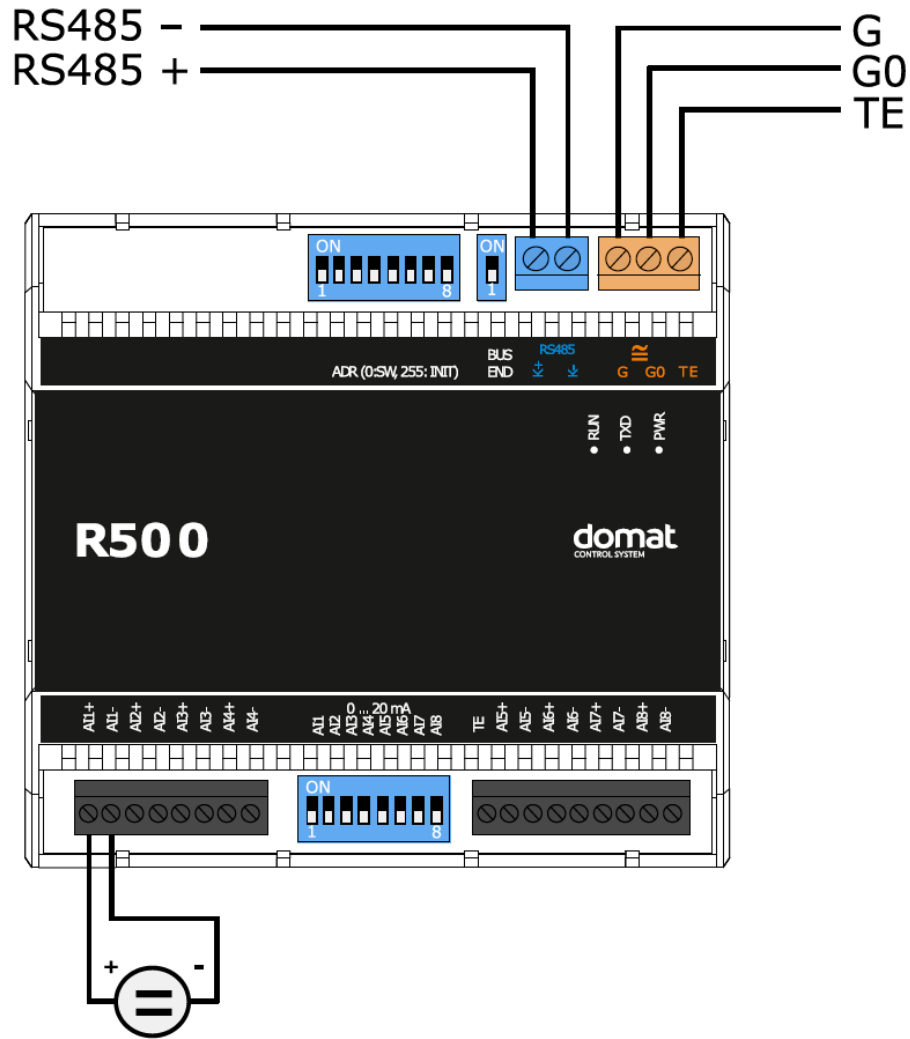
LED indication

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, ...)

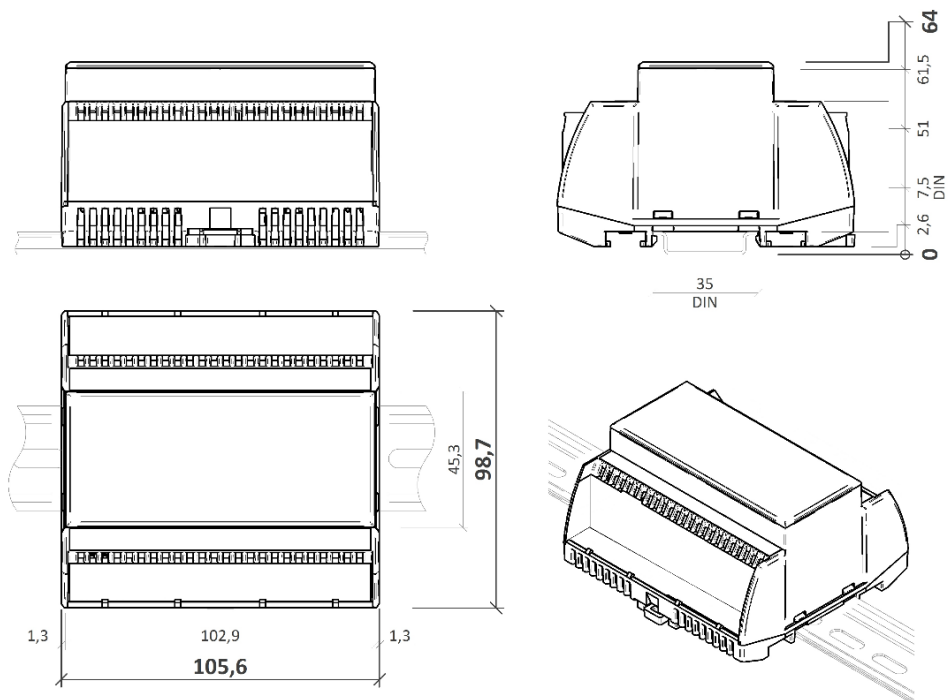
DIP switches

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
0...20 mA	For current measurement (0-20 mA) on individual channels switch the particular DIP switch to ON The 0...20 mA range must be also set over Modbus (e.g. using Domat ModComTool)

Connection



Dimensions

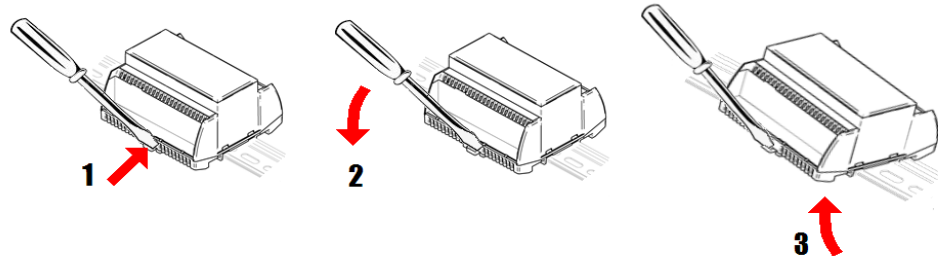


Dimensions are in *mm*.

Installation

The R500 module is fixed on standard DIN rail (by snapping).

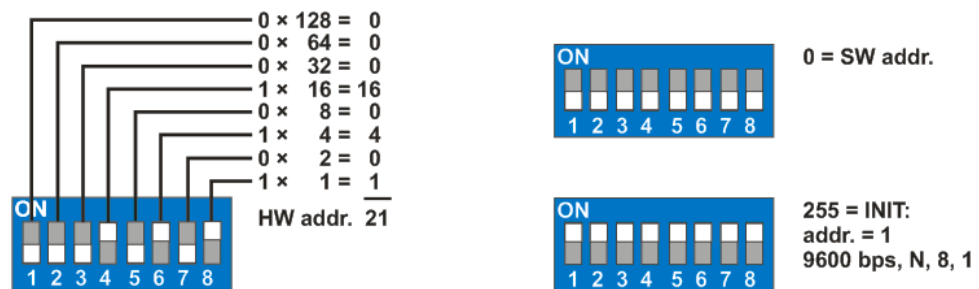
When removing the module from the DIN rail proceed as follows: Place a screwdriver in the plastic slot which is in the middle of bottom part of the module (1). Then push the screwdriver upwards (2). After that, the module can be removed by tilting it upwards (3).



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.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.

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**

12/2019 – First datasheet version.

08/2021 – Stylistic changes, logo change.

02/2022 – Added info about separating inputs.