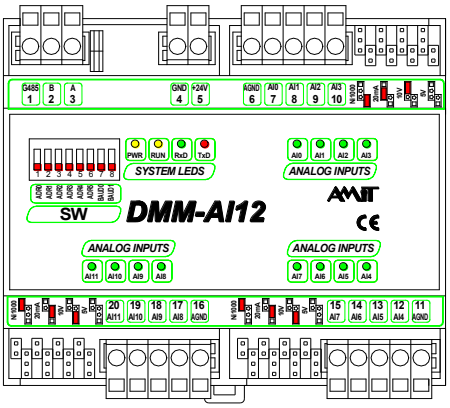
DMM-AI12

Module of analogue inputs with protocol MODBUS

- **Module of 12 AI, type Ni1000 / 5 V DC / 10 V DC / 20 mA DC**
- **Inputs without galvanic isolation**
- **Operation through RS485 interface, protocol MODBUS RTU**



TECHNICAL DATA

Inputs	12
Input measuring ranges	0 V to 5 V DC / 0 V to 10 V DC / 0 mA to 20.08 mA DC / Ni1000
Measuring range selection	By jumpers on module
Converter resolution	12 bits
Accuracy, U, I range	0.2 %
Accuracy, Ni1000 range Depends on measured value. Interpolation needs to be performed	T = -50 °C 0.6 °C T = 0 °C 0.8 °C T = 150 °C 1.5 °C
Temperature dependence	70 ppm/°C
Common wire	Analogue ground
Input overvoltage protection	Diodes
Maximum input voltage	50 V DC permanently (range 0 V to 5 V DC, 0 V to 10 V DC, Ni1000)
Maximum input current	30 mA DC (range 20 mA DC)
Galvanic isolation of inputs	No
Communication	RS485
Interface galvanic isolation	Yes *)
Overvoltage interface protection	Transil 600 W
Communication speeds	9600 bps to 57600 bps
Number of modules on RS485 network	63
Number of modules on RS485 segment	31
Power supply	19.2 V DC to 28.8 V DC
Power consumption	Max. 150 mA at 24 V DC
Others	
Connection	Cage clamps WAGO 231
Ingress protection rate	IP20
Operating temperature range	0 °C to 50 °C
Maximum ambient humidity	< 95 % non-condensing
Mounting	DIN rail 35 mm
Weight	250 g
Dimensions (w × h × d)	(106 × 97 × 73) mm

The terminals AGND are internally connected with a terminal GND of power supply connector.

*) Insulation strength 500 V AC / 1 minute, galvanic isolation must not be used for safe and unsafe parts separation.

ORDERING INFORMATION

DMM-AI12	Module of 12 analogue inputs with protocol MODBUS, connectors WAGO

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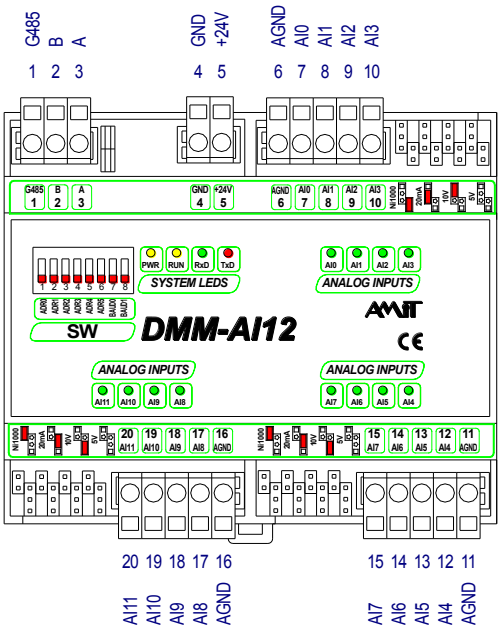
TERMINALS IDENTIFICATION

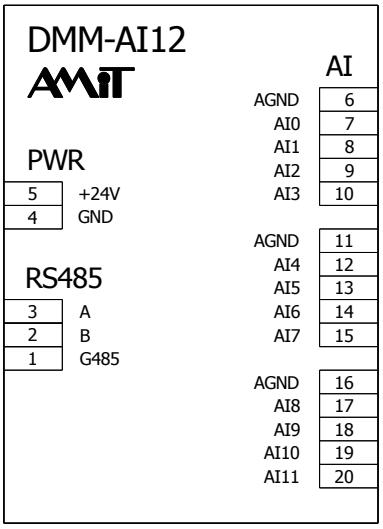
Terminal	Signal	Description
1	G485	RS485, shielding
2	B	RS485, wire B
3	A	RS485, wire A
4	GND	Power supply, ground
5	+24V	Power supply +24 V DC
6	AGND	Analogue GND
7	AI0	Input 0
8	AI1	Input 1
9	AI2	Input 2
10	AI3	Input 3

Terminal	Signal	Description
11	AGND	Analogue GND
12	AI4	Input 4
13	AI5	Input 5
14	AI6	Input 6
15	AI7	Input 7
16	AGND	Analogue GND
17	AI8	Input 8
18	AI9	Input 9
19	AI10	Input 10
20	AI11	Input 11

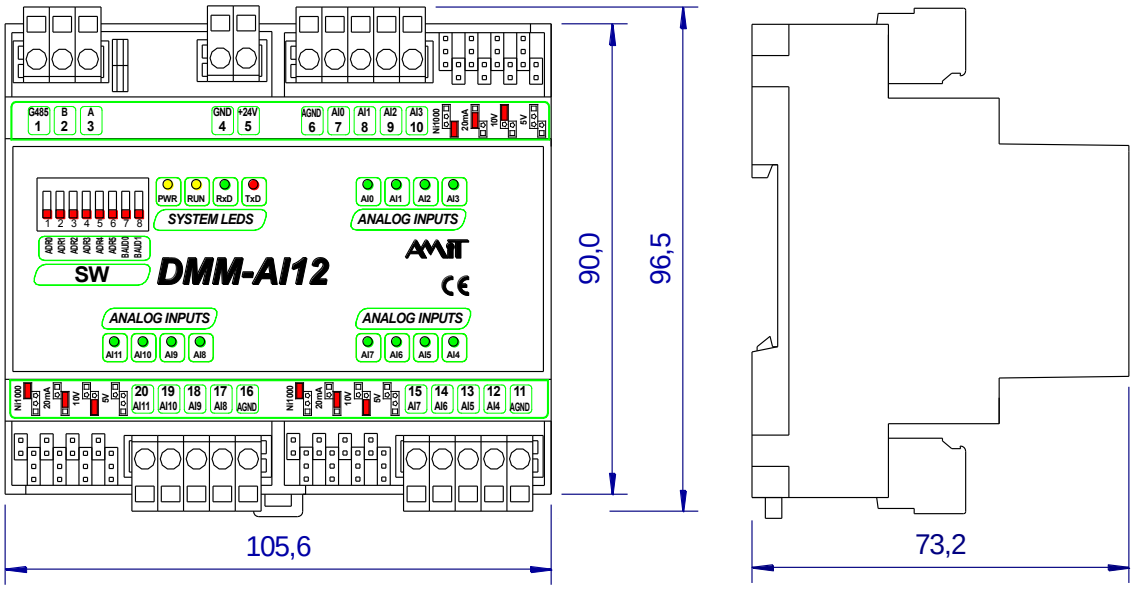
TERMINALS LOCATION



RECOMMENDED DRAWING SYMBOL



MECHANICAL DIMENSIONS



JUMPERS – RS485 INTERFACE

Jumper	Description
J5, 1-2	Idle state line definition + A termination
J5, 3-4	Idle state line definition + B termination

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PARITY SETTINGS

Turn the unit power supply off, set all switches to OFF position and turn the power supply on again. The parity can be set by the switches ADR0 (DIP 1) and ADR1 (DIP 2) according to a table:

ADR0 (DIP 1)	ADR1 (DIP 2)	Parity
OFF	OFF	None
ON	OFF	Even
OFF	ON	Odd

The settings must be confirmed by switching the switch BAUD1 (DIP 8) to a position ON ("light snake" is running on module LEDs). Parity settings are displayed on corresponding LEDs. A change will be active after turning the module off and on again.

SETTINGS OF ADDRESS AND COMMUNICATION SPEED

Address settings can be performed by the switches ADR0 (DIP 1) to ADR5 (DIP 6). Available address values are 1 to 63. **Address 0 is not allowed!** Communication speed settings can be performed by the switches BAUD0 (DIP 7) and BAUD1 (DIP 8).

ADDRESS

DIP	Value
ADR0 (DIP 1)	Value of 1
ADR1 (DIP 2)	Value of 2
ADR2 (DIP 3)	Value of 4
ADR3 (DIP 4)	Value of 8
ADR4 (DIP 5)	Value of 16
ADR5 (DIP 6)	Value of 32

COMMUNICATION SPEED

BAUD0 (DIP 7)	BAUD1 (DIP 8)	Communication speed
OFF	OFF	9600 bps
ON	OFF	19200 bps
OFF	ON	38400 bps
ON	ON	57600 bps

An example of address: address = 35, the switches 1, 2 and 6 (1 + 2 + 32) are ON. A change of switches settings will be active after turning the module off and on again.

SUPPORTED MODBUS FUNCTIONS

Function	Use
4	Reading of A/D converter value

The values of individual inputs (read by A/D converters) are mapped to the network Modbus as the input registers according to the table.

DMM-AI12 input	Modbus IR number	Modbus IR type	Description
AI0	0	R	Value read by A/D converter of input AI0
AI1	1	R	Value read by A/D converter of input AI1
…	…	…	…
AI10	10	R	Value read by A/D converter of input AI10
AI11	11	R	Value read by A/D converter of input AI11

The values will be loaded in a range 0 to 32767 into the registers. This corresponds to a range 0 % to 100 % of analogue input. If the input is set to a range 0 V to 10 V by the configuration jumpers and measured voltage value is 1 V, a value 3276 will be read by Modbus.
A method of read value to the measured temperature is mentioned in Application Note AP0008 – Communication in Network Modbus.

Other documentation and examples can be downloaded from **www.amitomation.com**.

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