

# ***AMR-RTV10/01***

## ***Heat source controller***

Operation manual

*Version 1.02*



AMiT, spol. s r. o. does not provide any warranty concerning the contents of this publication and reserves the right to change the documentation without obligation to inform anyone or any authority about it.

This document can be copied and redistributed under following conditions:

1. The whole text (all pages) must be copied without any changes.
2. All redistributed copies must retain the AMiT, spol. s r. o. copyright notice and any other notices contained in the documentation.
3. This document must not be distributed for purpose of making profit.

The names of products and companies used herein can be trademarks or registered trademarks of their respective owners.

AMiT is a registered trademark.

**Copyright (c) 2015, AMiT, spol. s r. o.  
Producer: AMiT, spol. s r. o.  
Naskové 1100/3, 150 00 Praha  
www.amitotion.com**

**Technical support: support@amit.cz**

---

**Contents**

---

	History of revisions .....	4
	Related documentation.....	4
<b>1</b>	<b>Introduction .....</b>	<b>5</b>
<b>2</b>	<b>Technical parameters .....</b>	<b>6</b>
2.1	Dimensions.....	8
2.2	Recommended drawing symbol .....	9
<b>3</b>	<b>Conformity assessment .....</b>	<b>10</b>
3.1	Other tests .....	11
<b>4</b>	<b>Power supply.....</b>	<b>12</b>
<b>5</b>	<b>Inputs / outputs.....</b>	<b>13</b>
5.1	Universal inputs.....	13
5.2	Relay outputs .....	15
<b>6</b>	<b>Communication interfaces.....</b>	<b>17</b>
6.1	RS485 .....	17
<b>7</b>	<b>Connectors and terminals layout.....</b>	<b>19</b>
<b>8</b>	<b>Mounting.....</b>	<b>21</b>
8.1	Installation rules.....	21
<b>9</b>	<b>Programming.....</b>	<b>23</b>
9.1	Communication parameters setting .....	23
9.1.1	DIP SW1 – communication speed and parity setting.....	24
9.1.2	DIP SW2 – address setting .....	24
9.2	Status LEDs .....	26
9.3	Loader .....	26
<b>10</b>	<b>Factory settings .....</b>	<b>28</b>
<b>11</b>	<b>Ordering information and completion .....</b>	<b>29</b>
11.1	Completion .....	29
<b>12</b>	<b>Maintenance .....</b>	<b>30</b>
<b>13</b>	<b>Waste disposal.....</b>	<b>31</b>

## History of revisions

---

Document name: amr-rtv1001\_g\_en\_102.pdf

Author: Lukáš Čeřovský, Zbyněk Říha

Revision	Date	Changes
100	22. 5. 2012	New document
101	21. 7. 2014	Chapters 1, 2, 3, 5.1, 6, 9.4, 9.5, 10 correction, figures correction.
102	24. 4. 2015	Chapters 2, 9, 10 correction.

## Related documentation

---

1. DetStudio development environment help
2. Application Note AP0005 – ARION Network Communication  
file: ap0005\_en\_xx.pdf
3. Application Note AP0016 – Principles of RS485 interface usage  
file: ap0016\_en\_xx.pdf
4. Application Note AP0025 – ARION Network Communication – definition by table  
file: ap0025\_en\_xx.pdf

# 1 Introduction

---

**AMR-RTV10/01** is a small, compact, metal-cased programmable controller of heating source.

- Basic features**
- 6 universal inputs (Ni1000 / Pt1000 / dry contact)
  - 7 relay outputs
  - RS485 serial interface without galvanic isolation
  - On-wall mounting

## 2 Technical parameters

<b>CPU</b>	CPU	ST32F103
	FLASH	512 KB
	RAM	64 KB
	EEPROM	2 KB

<b>Universal inputs</b>	Number of inputs	6
	Digital inputs	dry contact
	Analogue inputs	Ni1000/6180, Ni1000/5000, Pt1000
	Accuracy	Ni1000/6180 ppm $\pm 0.5$ °C Ni1000/5000 ppm $\pm 0.6$ °C Pt1000 $\pm 0.8$ °C
	Temperature dependence	70 ppm/°C
	Input overvoltage protection	Diodes
	R <sub>Max</sub> for log. 1	< 1000 $\Omega$
	R <sub>Min</sub> for log. 0	> 1300 $\Omega$
	Galvanic isolation	No
	Connection points	WAGO 256 cage clamp terminals
	Wire cross section	0.75 mm <sup>2</sup> to 2.5 mm <sup>2</sup>

<b>Relay outputs</b>	Number of outputs	7
	Configuration	6 × phase switching 1 × dry contact
	Contacts protection	Varistor
	Galvanic isolation strength	4000 V AC
	Nominal switched voltage	230 V AC (RL0 to RL5) 230 V AC / 24 V DC (RL6)
	Maximum switched current	4 A (resistance load)
	Maximum total current	10 A
	Galvanic isolation	Yes
	GI maximum operation voltage	500 V AC
	Max. switched output voltage (dry contact)	250 V AC
	Switch-on time	10 ms
	Switch-off time	5 ms
	Contact lifetime without load nominal load	30×10 <sup>6</sup> switches 10 <sup>5</sup> switches
	Maximum switching frequency without load nominal load	72 000 / hour 360 / hour
	Outputs protection	External circuit-breaker
	Connection points	WAGO 256 cage clamp terminals
	Wire cross section	0.75 mm <sup>2</sup> to 2.5 mm <sup>2</sup>

<b>RS485</b>	Quantity	1
	Overvoltage protection	Transil 600 W
	Galvanic isolation *)	Yes
	Terminating resistor **)	120 $\Omega$ on the unit

Idle state definition **) up to +5 V up to 0 V	1 kΩ on the unit 1 kΩ on the unit
Maximum wire length	1200 m / 19200 bps
Max. number of stations on segment	256
Operation indication	LED on the cover
Connection points	WAGO 256 cage clamp terminals
Wire cross section	0.75 mm <sup>2</sup> to 2.5 mm <sup>2</sup>

*Note* \*) Insulation strength is 2500 V towards power supply terminals. Insulation strength is 2500 V toward electronics. Galvanic isolation must not be used for dangerous voltage separation.

\*\*) Terminating resistor and idle state definition are connected concurrently.

<b>Power supply</b>	Nominal power supply voltage	230 V AC
	Power supply voltage range	207 V AC to 253 V AC
	Maximum power consumption	30 mA at 230 V AC
	Connection points	WAGO 256 cage clamp terminals
	Wire cross section	0.75 mm <sup>2</sup> to 2.5 mm <sup>2</sup>

<b>Mechanics</b>	Mechanical design	Metal case
	Mounting	On the wall
	Ingress protection rate	IP20
	Weight – netto	0.82 kg ±5 %
	– brutto	0.92 kg ±5 %
Dimensions (w × h × d)	(185 × 109 × 52) mm	

<b>Temperatures</b>	Operating temperature range	0 °C to 50 °C
	Storage temperature range	-20 °C to 70 °C

<b>Others</b>	Maximum ambient humidity	< 95 % non-condensing
	Programming	DetStudio / EsiDet

## 2.1 Dimensions

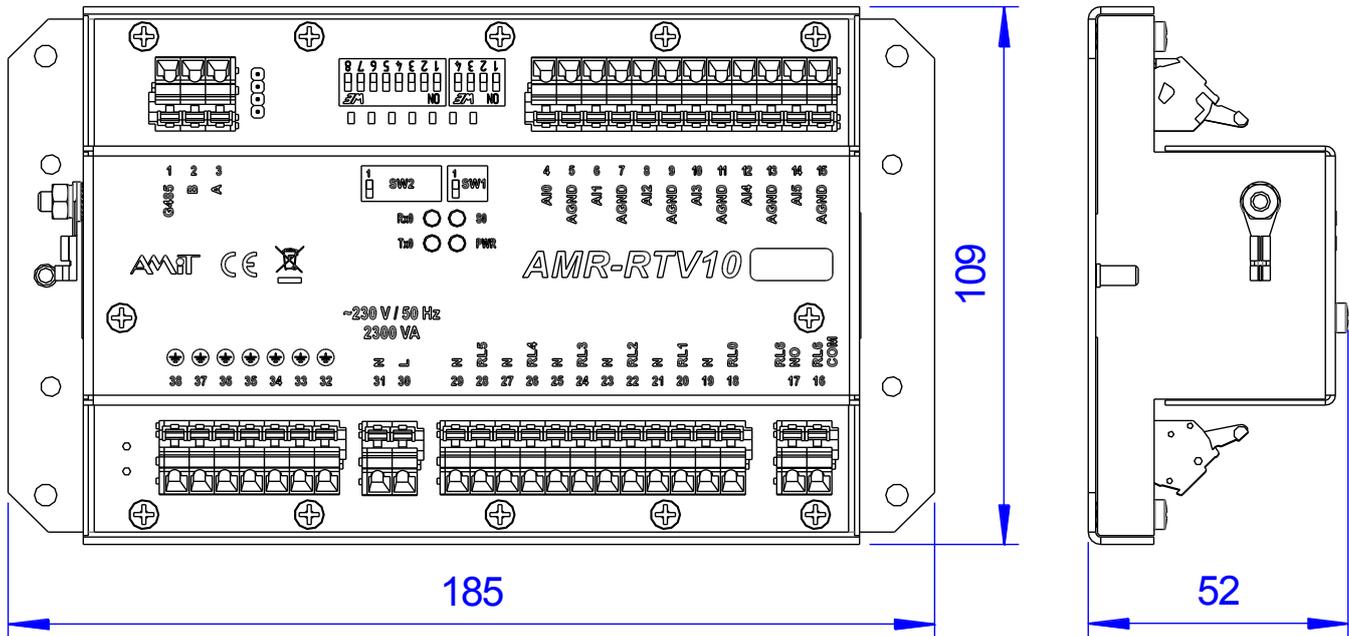


Fig. 1 – AMR-RTV10/01 dimensions

## 2.2 Recommended drawing symbol

Following drawing symbol is recommended for the controller **AMR-RTV10/01**. Only part of it will be visible in following examples.

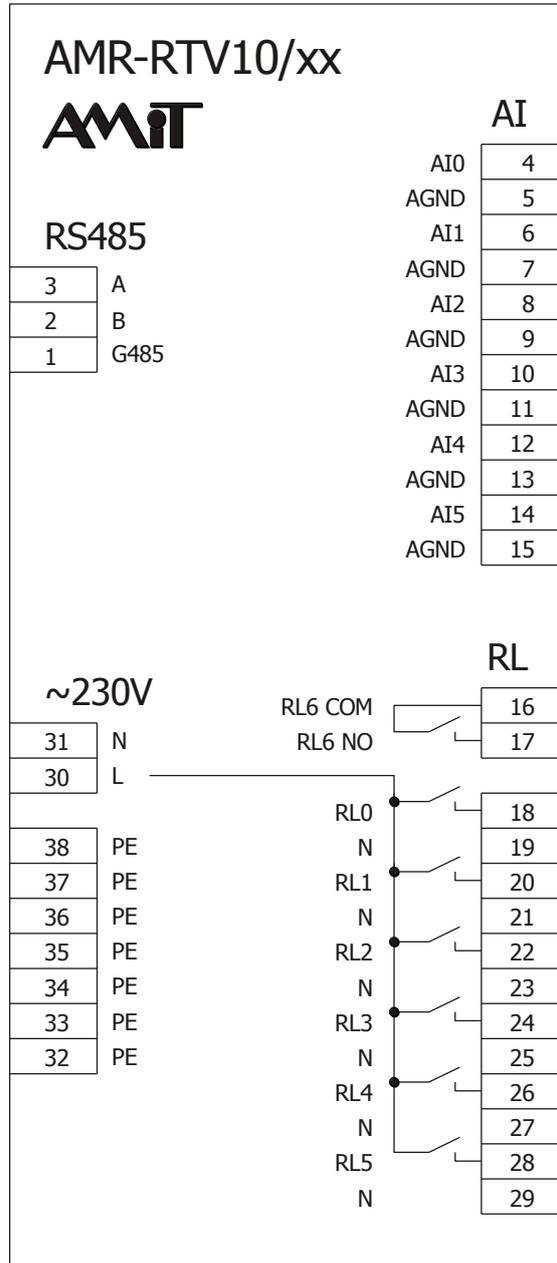


Fig. 2 – Recommended drawing symbol for **AMR-RTV10/01**

### 3 Conformity assessment

The equipment meets the requirements of Czech Government Decree NV616/2006 and NV17/2003. The compliance assessment with NV616/2006 has been performed in accordance with harmonized standard EN 61326, compliance assessment with NV17/2003 has been performed in accordance with harmonized standard EN 61010-1.

Tested in accordance with standard	Type of test	Classification
EN 55011:2009	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	Class B
EN 61000-3-3:2008	Electromagnetic compatibility (EMC) – Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection	Complies <sup>#)</sup>
EN 61000-4-2:2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Indirect electrostatic discharge immunity test, contact discharge	4 kV
EN 61000-4-2:2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test, aerial discharge	8 kV
EN 61000-4-3:2006	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test, 80 MHz to 1000 MHz	10 V/m
EN 61000-4-3:2006	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test, 1400 MHz to 2000 MHz	3 V/m
EN 61000-4-3:2006	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test, 2000 MHz to 2700 MHz	1 V/m
EN 61000-4-4:2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test, power supply	$\pm 2$ kV
EN 61000-4-4:2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test, RS485	$\pm 1$ kV

Tested in accordance with standard	Type of test	Classification
EN 61000-4-4:2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test, analogue inputs	±1 kV
EN 61000-4-5:2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test, power supply	±2 kV
EN 61000-4-6:2009	Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields	3 V
EN 61000-4-11:2004	Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	Complies
EN 61010-1:2010	Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements	Complies

#) This complies when any appliance being connected to device outputs does not have the peak current drain greater than 0.9 A AC. When the appliance has greater current consumption, it is necessary to review the compliance assessment with EN 61000-3-3:2013 again in terms of used program equipment.

### 3.1 Other tests

Tested in accordance with standard	Type of test	Classification
EN 60068-2-1:2007	Environmental testing – Part 2-1: Tests – Test A: Cold	Complies
EN 60068-2-2:2007	Environmental testing – Part 2-2: Tests – Test B: Dry heat	Complies

## 4 Power supply

The controller **AMR-RTV10/01** is power supplied by single-phase power network 230 V AC. The controller must be protected externally.

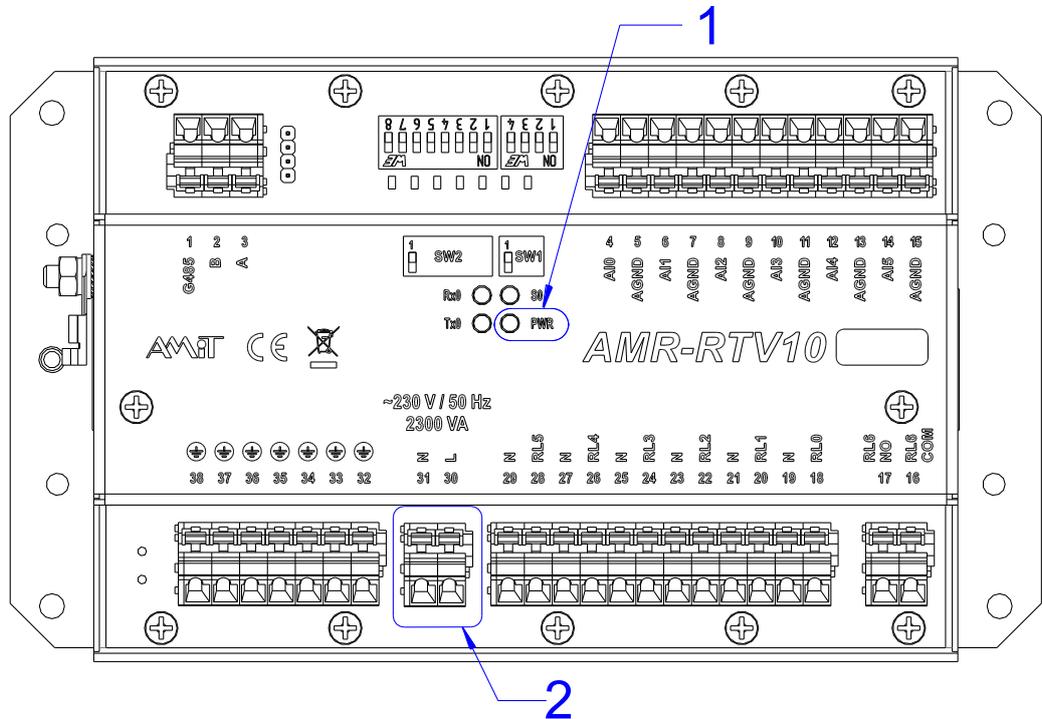


Fig. 3 – Power supply terminals location

Legend	Number	Signification
	1	LED, indicating connected power supply
	2	Power supply terminals

Terminals labelling	Terminal	Label	Signification
	32	⊕	Protective conductor
	31	N	Neutral conductor
	30	L	Phase conductor

**Protective conductor** The protective conductor terminal is connected with metal mechanical components in a way that hazardous contact voltage protection is ensured. The protective conductor must be always connected!!!

# 5 Inputs / outputs

## 5.1 Universal inputs

The controller **AMR-RTV10/01** contains 6 universal inputs. These inputs can be used as analogue inputs for sensors:

- Ni1000 with sensitivity 6180 ppm or with sensitivity 5000 ppm,
  - Pt1000,
- or as dry digital inputs.

Inputs are marked on the label as analogue inputs.

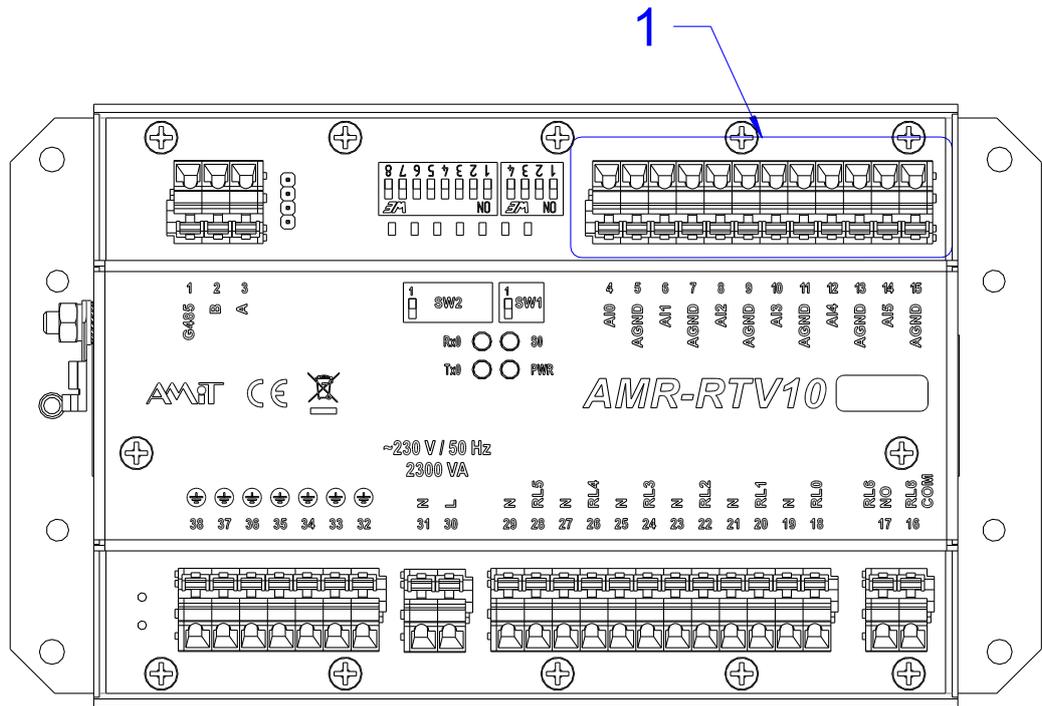


Fig. 4 – Universal input terminals location

Legend	Number	Signification
	1	Universal input terminals

Terminals labelling	Terminal	Label	Signification
	4	AI0	Universal input 0
	5	AGND	Universal input ground
	6	AI1	Universal input 1
	7	AGND	Universal input ground
	8	AI2	Universal input 2
	9	AGND	Universal input ground
	10	AI3	Universal input 3
	11	AGND	Universal input ground

Terminal	Label	Signification
12	AI4	Universal input 4
13	AGND	Universal input ground
14	AI5	Universal input 5
15	AGND	Universal input ground

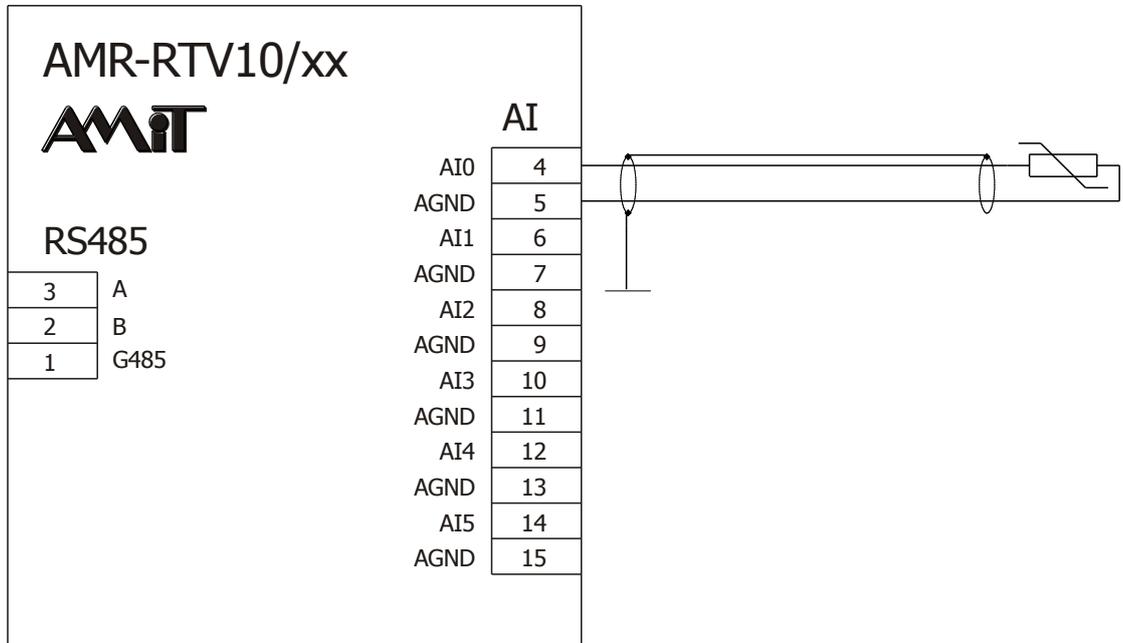


Fig. 5 – Ni1000/ Pt1000 sensor wiring example

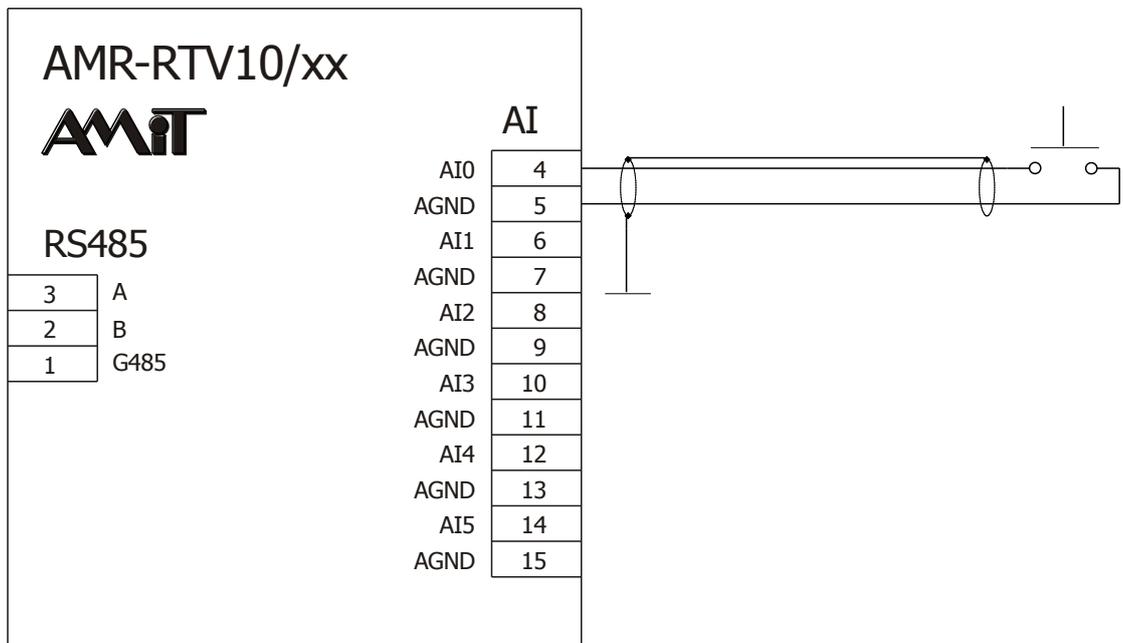


Fig. 6 – Dry contact wiring example

## 5.2 Relay outputs

The controller **AMR-RTV10/01** contains 6 relay outputs, with common contact, attached to the main voltage phase and 1 independent switching output.

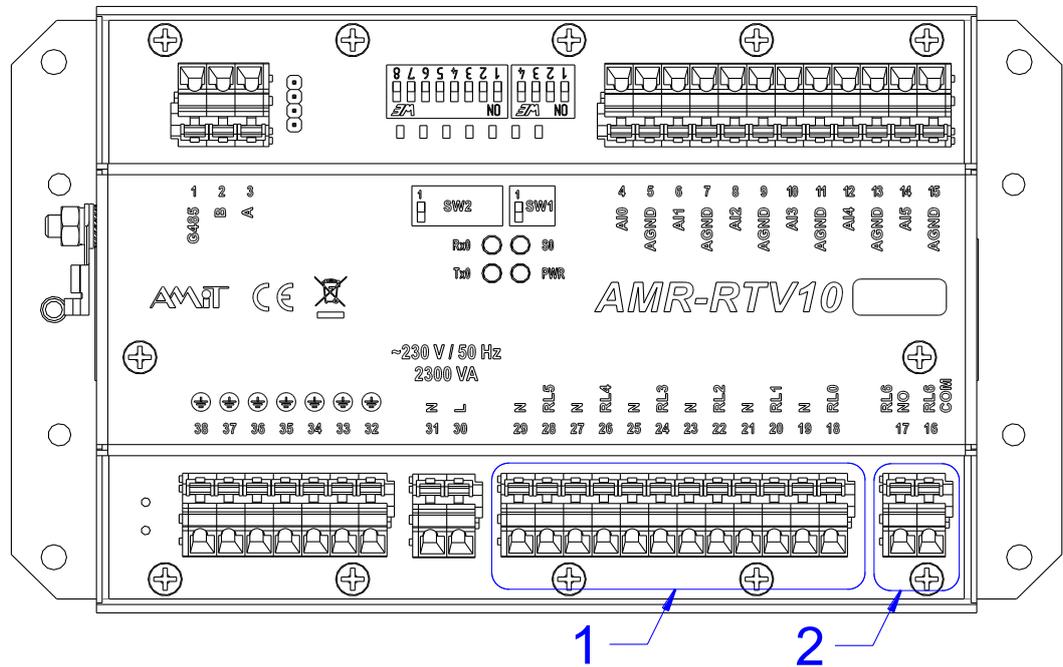


Fig. 7 – Relay outputs terminals location

Legend

Number	Signification
1	Relay outputs terminals with common contact
2	Relay outputs terminals with individual contacts

Terminals labelling

Terminal	Label	Signification
16	RL6 COM	Relay output 6, switching contact
17	RL6 NO	Relay output 6, switching contact
18	RL0	Relay output 0, switched phase
19	N	Neutral conductor
20	RL1	Relay output 1, switched phase
21	N	Neutral conductor
22	RL2	Relay output 2, switched phase
23	N	Neutral conductor
24	RL3	Relay output 3, switched phase
25	N	Neutral conductor
26	RL4	Relay output 4, switched phase
27	N	Neutral conductor
28	RL5	Relay output 5, switched phase
29	N	Neutral conductor

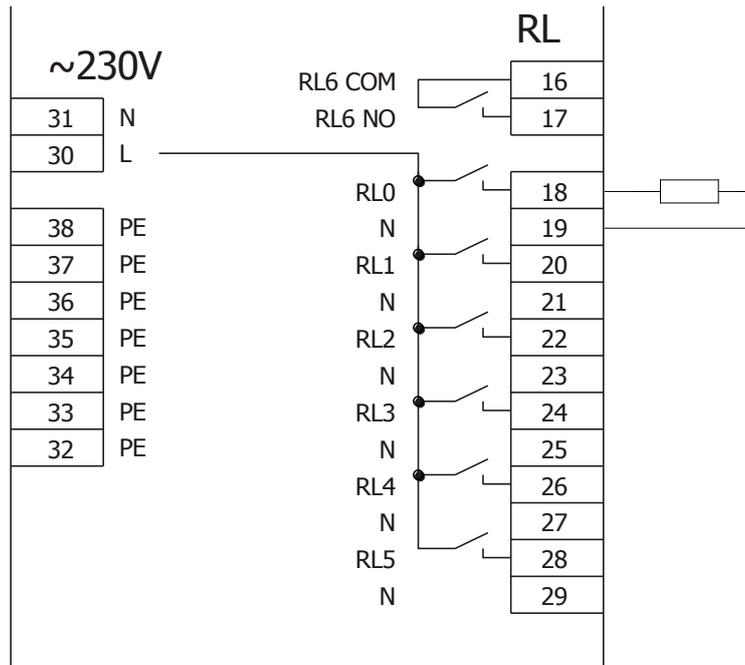


Fig. 8 – Relay output wiring example

## 6 Communication interfaces

The controller **AMR-RTV10/01** is equipped with one RS485 communication interface that is galvanically isolated.

RS485 is a half-duplex serial interface. It is used for loading of application software into the controller and can be also used for multiple stations connection. All stations communicate through single signal pair.

### 6.1 RS485

Up to 255 stations can be connected to RS485 interface. It can be used for, e.g. communication with superior control system.

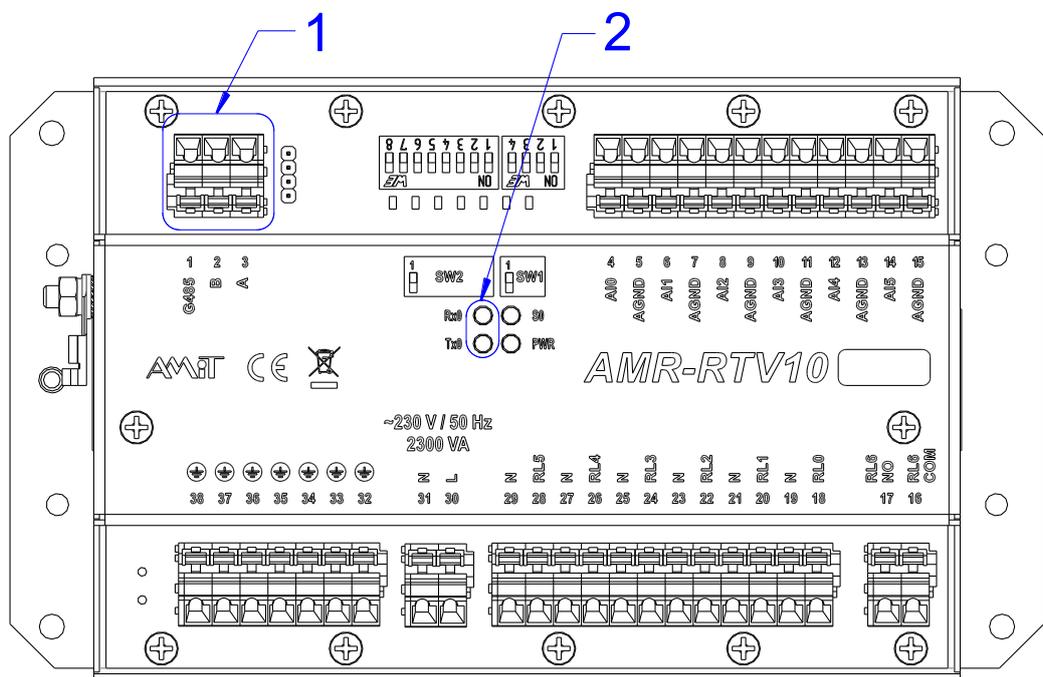


Fig. 9 – RS485 interface terminals location

Legend	Number	Signification
	1	RS485 terminals
	2	RS485 status LEDs

Connector wiring	Terminal	Label	Signification
	1	G485	RS485 interface, shielding
	2	B	RS485 interface, signal B
	3	A	RS485 interface, signal A

RS485 interface activity is indicated by LEDs located on the front panel.

**RS485 status LEDs**

LED	Signification
Rx0	Station is reading data
Tx0	Station is transmitting data

Each station on RS485 network must have wires terminating resistors properly set. Configuration jumpers located near the RS485 connector are used for termination setting. When jumpers are set, wires termination is connected. The terminal stations must have always connected terminating resistors, intermediate stations – disconnected.

More information about using the RS485 interface can be found in Application Note AP0016 – Principles of RS485 interface usage.

**Jumpers signification**

Jumper	Signification / Location
	Jumpers are not set Terminating resistors and idle state definitions are not set, intermediate unit (within the segment).
	Jumpers are set Terminating resistors and idle state definitions are set, terminal unit (on the segment ends).

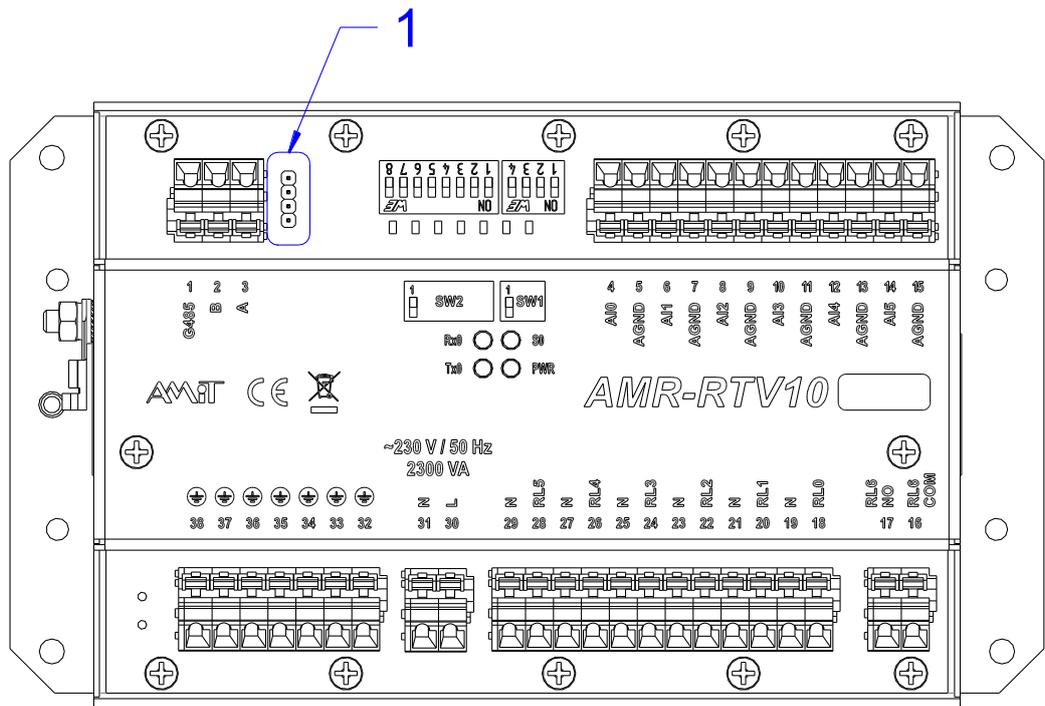


Fig. 10 – RS485 configuration jumpers location

**Legend**

Number	Signification
1	RS485 configuration jumpers

## 7 Connectors and terminals layout

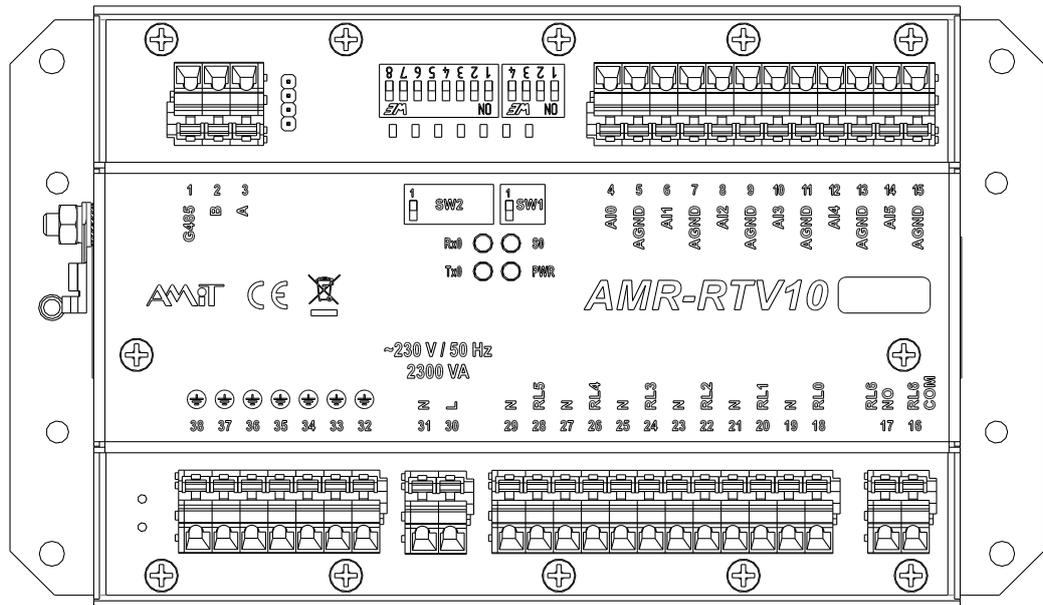


Fig. 11 – Terminals location

Terminal	Label	Signification
1	G485	RS485 interface, shielding
2	B	RS485 interface, signal B
3	A	RS485 interface, signal A
4	AI0	Universal input 0
5	AGND	Universal input ground
6	AI1	Universal input 1
7	AGND	Universal input ground
8	AI2	Universal input 2
9	AGND	Universal input ground
10	AI3	Universal input 3
11	AGND	Universal input ground
12	AI4	Universal input 4
13	AGND	Universal input ground
14	AI5	Universal input 5
15	AGND	Universal input ground
16	RL6 COM	Relay output 6
17	RL6 NO	Relay output 6, switching contact
18	RL0	Relay output 0, switched phase
19	N	Neutral conductor
20	RL1	Relay output 1, switched phase
21	N	Neutral conductor
22	RL2	Relay output 2, switched phase
23	N	Neutral conductor
24	RL3	Relay output 3, switched phase
25	N	Neutral conductor

Terminal	Label	Signification
26	RL4	Relay output 4, switched phase
27	N	Neutral conductor
28	RL5	Relay output 5, switched phase
29	N	Neutral conductor
30	L	230 V AC power supply, phase
31	N	230 V AC power supply, neutral conductor
32 to 39	⊕	Protective conductor

## 8 Mounting

The controller **AMR-RTV10/01** is intended to be mounted on the wall or into plastic box.

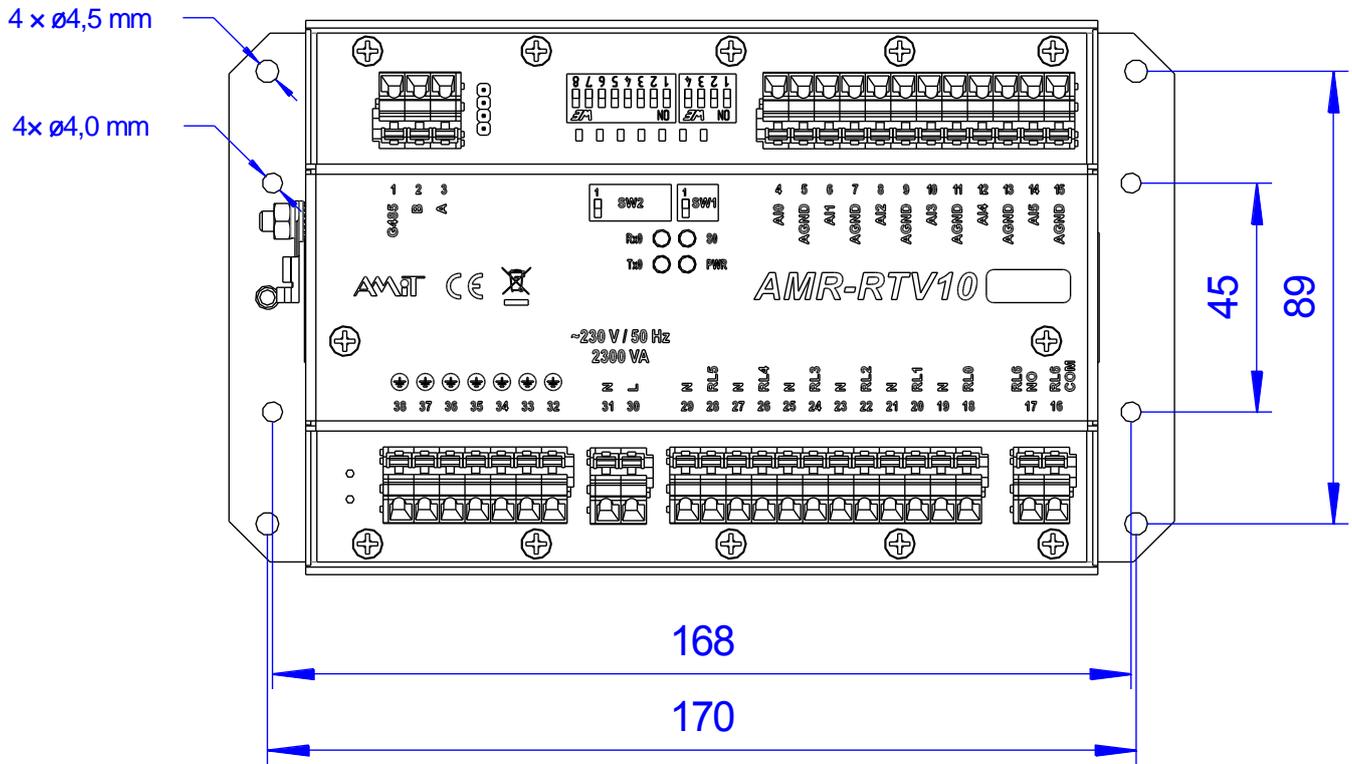


Fig. 12 – Dimensions of mounting holes

### 8.1 Installation rules

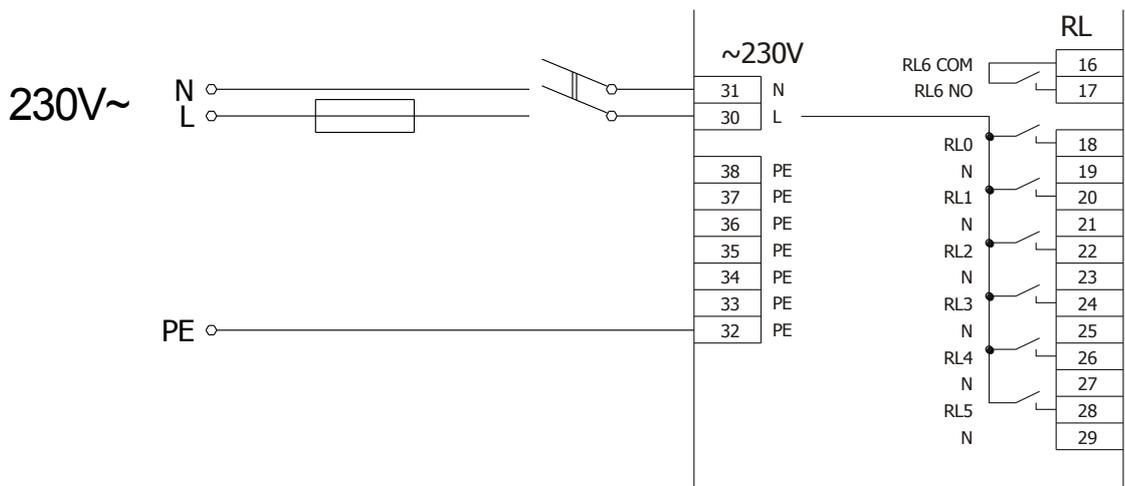


Fig. 13 – Power connection scheme of **AMR-RTV10/01**

**EMC filter** Use an EMC filter on 230 V AC supply voltage input. This requirement can be revised on the basis of environment character and wiring layout.

**Main power inlet** A bi-polar switch must be used as disconnecting element, alternatively circuit breaker with coupled break contact.  
The disconnecting element must be: implemented into the installation, placed in close vicinity of the equipment, available for operator and it must be marked as disconnecting element of equipment.

**Protection** Equipment must be protected with external circuit breaker. Its value depends on maximal consumption of appliances that are connected to relay outputs.

**Connecting to PE** Negative power supply terminal (GND) of the device is connected with PE. Realize the connection with PE on the switchboard input.

If the wires are led outside the building, the appropriate inputs and outputs need to be overvoltage protected.

**Analogue inputs** Use the shielded signal cables for wiring. Connect the cable shielding to the PE terminal immediately on switchboard input.

If the wires are led outside the building, the appropriate inputs and outputs need to be overvoltage protected.

**RS485 interface** It is necessary to perform RS485 interface connection according to recommendations in Application Note AP0016 – Principles of RS485 interface usage.

**Note** All PE terminal connections must be realized with the lowest impedance as possible. Technical unit parameters are guaranteed only when these wiring rules are applied.

## 9 Programming

New application can be created using:

- DetStudio / EsiDet development tool

Application program can be downloaded into module using:

- DetStudio development tool
- AMRconfig service and programming utility
- AMRmultidownload multiprogramming utility
- AppLoader tool for loading application

Programs can be downloaded from [www.amitautomation.com](http://www.amitautomation.com), Download section.

### 9.1 Communication parameters setting

Two sets of DIP switches are used for communication parameters setting.

- SW1 communication speed and parity setting
- SW2 controller address setting

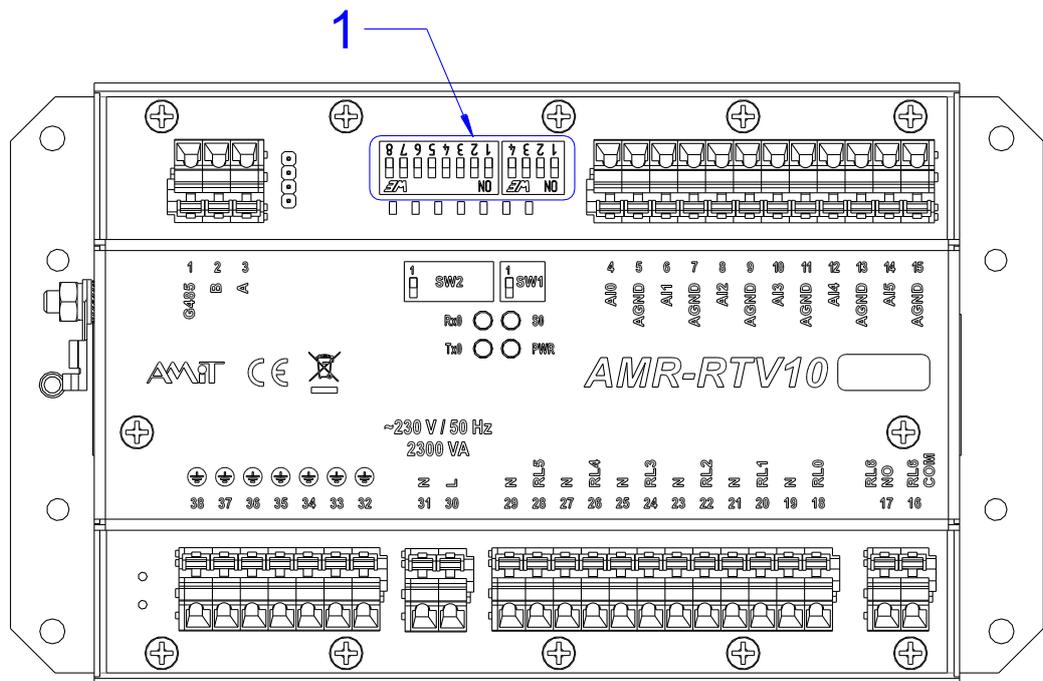


Fig. 14 – Location of configuration DIP switches

Legend	Number	Signification
	1	Configuration DIP switches

**PC connection** The controller **AMR-RTV10/01** must be connected to the PC through RS485 converter (for example **SB485s** type from AMiT offer) using point – to – point connection.

Note Communication of controller can be established from DetStudio only through MODBUS communication protocol (e.g. anytime after loader activation, see chapter 9.3 Loader).

### 9.1.1 DIP SW1 – communication speed and parity setting

All devices must have the parity and communication speed identical. Parity (if not given by communication protocol) and communication speed can be set by different DIP switches combination according to the tables.

SW1.1	SW1.2	SW1.3	Speed	Parity
OFF	OFF	OFF	9 600	According to SW1.4
ON	OFF	OFF	19 200	According to SW1.4
OFF	ON	OFF	38 400	According to SW1.4
ON	ON	OFF	57 600	According to SW1.4
OFF	OFF	ON	9 600	Without parity, SW1.4 setting is meaningless
ON	OFF	ON	19 200	Without parity, SW1.4 setting is meaningless
OFF	ON	ON	38 400	Without parity, SW1.4 setting is meaningless
ON	ON	ON	115 200	According to SW1.4

SW1.4	Parity
OFF	even
ON	odd

Stop bits number is set automatically according to selected parity:

Even parity	1 stop bit
Odd parity	1 stop bit
Without parity	2 stop bits

### 9.1.2 DIP SW2 – address setting

The controller occupies a single network address. Each device must have a unique network address (usable addresses range is given by communication protocol). Address can be set by DIP switches combination according to the table.

SW2.1	SW2.2	SW2.3	SW2.4	SW2.5	Module address in MODBUS network							
OFF	OFF	OFF	OFF	OFF	0	32	64	96	128	160	192	224
ON	OFF	OFF	OFF	OFF	1	33	65	97	129	161	193	225
OFF	ON	OFF	OFF	OFF	2	34	66	98	130	162	194	226
ON	ON	OFF	OFF	OFF	3	35	67	99	131	163	195	227
OFF	OFF	ON	OFF	OFF	4	36	68	100	132	164	196	228
ON	OFF	ON	OFF	OFF	5	37	69	101	133	165	197	229
OFF	ON	ON	OFF	OFF	6	38	70	102	134	166	198	230
ON	ON	ON	OFF	OFF	7	39	71	103	135	167	199	231
OFF	OFF	OFF	ON	OFF	8	40	72	104	136	168	200	232

					SW2.8	OFF	OFF	OFF	OFF	ON	ON	ON	ON
					SW2.7	OFF	OFF	ON	ON	OFF	OFF	ON	ON
					SW2.6	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW2.1	SW2.2	SW2.3	SW2.4	SW2.5	Module address in MODBUS network								
ON	OFF	OFF	ON	OFF	9	41	73	105	137	169	201	233	
OFF	ON	OFF	ON	OFF	10	42	74	106	138	170	202	234	
ON	ON	OFF	ON	OFF	11	43	75	107	139	171	203	235	
OFF	OFF	ON	ON	OFF	12	44	76	108	140	172	204	236	
ON	OFF	ON	ON	OFF	13	45	77	109	141	173	205	237	
OFF	ON	ON	ON	OFF	14	46	78	110	142	174	206	238	
ON	ON	ON	ON	OFF	15	47	79	111	143	175	207	239	
OFF	OFF	OFF	OFF	ON	16	48	80	112	144	176	208	240	
ON	OFF	OFF	OFF	ON	17	49	81	113	145	177	209	241	
OFF	ON	OFF	OFF	ON	18	50	82	114	146	178	210	242	
ON	ON	OFF	OFF	ON	19	51	83	115	147	179	211	243	
OFF	OFF	ON	OFF	ON	20	52	84	116	148	180	212	244	
ON	OFF	ON	OFF	ON	21	53	85	117	149	181	213	245	
OFF	ON	ON	OFF	ON	22	54	86	118	150	182	214	246	
ON	ON	ON	OFF	ON	23	55	87	119	151	183	215	247	
OFF	OFF	OFF	ON	ON	24	56	88	120	152	184	216	248	
ON	OFF	OFF	ON	ON	25	57	89	121	153	185	217	249	
OFF	ON	OFF	ON	ON	26	58	90	122	154	186	218	250	
ON	ON	OFF	ON	ON	27	59	91	123	155	187	219	251	
OFF	OFF	ON	ON	ON	28	60	92	124	156	188	220	252	
ON	OFF	ON	ON	ON	29	61	93	125	157	189	221	253	
OFF	ON	ON	ON	ON	30	62	94	126	158	190	222	254	
ON	ON	ON	ON	ON	31	63	95	127	159	191	223	255	

**Attention** All switch setting changes take their effect only after controller restarting (i.e. power supply disconnection and connection).

## 9.2 Status LEDs

LED S0 serves for indication of module program status, see table.

LED	Light	Signification
S0	0.1 s flashing for 1 s period	Reset passage indication
	Regular flashing with 0.2 s period	Loader is launched
	Regular flashing with 1 s period	Application is launched
	Irregular flashing with 0.5 s period	Running application is indicating error. Irregular flashing means that 2 s pause follows after a particular number of flashes. Number of flashes between two pauses indicates numeric error code: 1 – error during reading from BackUp RAM 2 – error during reading from eeprom 3 – suspiciously frequent writing to eeprom 15 – unknown error
S1		Reserved for future use.

## 9.3 Loader

Loader running state can be used in cases the user application is causing any troubles, e.g. repeated restarting, controller connection inability, etc.

**Loader activation** Loader can be activated by turning service DIP 2 switch into ON position according to procedure shown in table.

DIP 2 in ON position	Action
> 1 s After turning-on	Loader with communication parameters set on DIP switches (SW1 a SW2) is launched.
> 1 s During application run	Loader with communication parameters set on DIP switches (SW1 a SW2) is launched.

The service DIP switch is located under controller's front panel.



## 10 Factory settings

---

**RS485 configuration** The RS485 interface is fitted by jumpers that activate the wires termination and idle state definition.

**Program settings** Communication protocol MODBUS RTU. Communication parameters are set according to DIP SW1 and DIP SW2 position.

# 11 Ordering information and completion

---

*Heat source controller*

AMR-RTV10/01	Complete, see chapter 11.1 Completion
--------------	---------------------------------------

## 11.1 Completion

---

<i>AMR-RTV10/01</i>	<b>Part</b>	<b>Quantity</b>
	Heat source controller	1

## 12 Maintenance

---

The device does not require any regular checking or service, except checking of reference voltage setting as well as voltage of backup accumulator.

**Cleaning** Time after time with regard to a way of device usage, it is necessary to remove dust from inside electronics. The device can be cleaned by dry soft brush or vacuum cleaner, only when turned-off and disassembled.

**Note** The maintenance mentioned above can be performed by manufacturer or authorized service only!

## 13 Waste disposal

---

**Electronics disposal** The disposal of electronic equipment is subject to the regulations on handling electrical waste. The equipment must not be disposed of in common public waste. It must be delivered to places specified for that purpose and recycled.