AMiNi4W2

Compact control system with Ethernet interface

Operation manual

Version 1.00

amini4w2_g_en_100

Producer: AMiT, spol. s r. o.
Naskové 1100/3, 150 00 Praha
www.amit.cz

Technical support: support@amit.cz

Contents

History of revisions

Document name: amini4w2_g_en_100.pdf

Author: Zbyněk Říha

Revision	Date	Changes
100	23. 5. 2014	New document

Related documentation

1. DetStudio Development Environment Help
2. Application Note AP0016 – Principles of using RS485 interface
   file: ap0016_en_xx.pdf
3. Application Note AP0017 – Counter inputs, counting of revolutions/pulses
   file: ap0017_en_xx.pdf
4. Application Note AP0033 – Alternative using of analogue inputs
   file: ap0033_en_xx.pdf
5. Application Note AP0037 – Principles of using Ethernet network
   file: ap0037_en_xx.pdf
6. Application Note AP0046 – Setting web server
   file: ap0046_en_xx.pdf
7. Application Note AP0050 – Project documentation for AMiT company products
   file: ap0050_en_xx.pdf

1. Introduction

AMiNi4W2 is a small, compact control system built in plastic box.

Basic features

- 8 galvanically separated digital inputs
- 8 galvanically separated digital outputs
- 8 analogue inputs U / I / Ni1000 / Pt1000
- 4 analogue outputs 0 V to 10 V
- RS232 serial interface
- RS485 serial interface with galvanic separation
- Ethernet 10/100 Mbps interface
- Integrated web server
- Slot for SD card
- DIN 35 mm rail mounting

2. Technical parameters

CPU

Procedural / Communication	ST10F269 / STM32F207
FLASH memory	256 KB + 2048 KB
RAM	1024 KB
EEPROM	2 KB
RAM + RTC back-up	Panasonic BR2477/CHCE Lithium battery
Battery lifetime	5 years

RTC

Type	RTC72423A
Precision at 25 °C	±20 ppm
Precision 0 °C to 50 °C	-40 ppm to +20 ppm

SD card

Type	Micro SD (HC)
Capacity	128 MB to 16 GB *)

Note: *) Micro SD card is not part of delivery.

Digital inputs

Quantity	8
Configuration	1 × 8
Common pole	Minus
Type of input	24 V DC / 24 V AC
Logical 0	Min. -30 V, max. 5 V
Logical 1	Min. 16 V, max. 30 V
Input current	11 mA at 24 V DC
Input peak current	Max. 16 mA at 30 V DC
Maximum frequency	60 kHz at 10 % duty cycle distortion 160 kHz at 30 % duty cycle distortion
Galvanic separation	Yes, common with DO
Insulation strength	300 V AC /1 minute *)
Connection point	WAGO 231-309/102-000 connector
Wire cross section	0.08 mm^2 to 2.5 mm^2

Note: *) Insulation must not be used for dangerous voltage separation.

Digital outputs

Number of outputs	8
Configuration	1 × 8
Common wire	Minus
Switching element	MOS
Switched voltage	19.2 V DC to 28.8 V DC
Switched current	300 mA
Protection current maximum	Typically 1.5 A
Residual current at Log. 0	0 mA
Switch-on time	40 µs
Switch-off time	100 µs
Shortcut protection	Electronic
Inductive load protection	Electronic
Galvanic separation	Yes, common with DI
Insulation strength	300 V AC /1 minute *)
Connection point	WAGO 231-309/102-000 connector
Wire cross section	0.08 mm^2 to 2.5 mm^2

Note: *) Insulation must not be used for dangerous voltage separation.

Analogue inputs

Number of inputs	8
Configuration	1 × 8
Common wire	Minus
Type of inputs	0 V to 5 V / 0 V to 10 V / 0 mA to 20 mA / / Ni1000 / Pt1000 / / 24 V digital input
Resolution	10 bit
Galvanic separation	No
Connection points	WAGO 231-305/102-000 connector WAGO 231-304/102-000 connector
Wire cross section	0.08 mm^2 to 2.5 mm^2

Caution: AGND (24) terminal is internally connected with GDN (33) terminal of system power supply connector.

Input range 0 V to 5 V DC

AD converter resolution (LSB)	5 mV
Accuracy	0.1 % *)
Temperature dependence	25 ppm/°C
Input DC resistance	Minimum 1 MΩ
Input circuit time constant	1 ms
Input overvoltage protection	Diodes
Maximum input voltage	50 V DC permanently

Input range 0 V to 10 V DC

AD converter resolution (LSB)	10 mV
Accuracy	0.2 % *)
Temperature dependence	35 ppm/°C
Input resistance	20 kΩ
Input circuit time constant	0.5 ms
Input overvoltage protection	Diodes
Maximum input voltage	50 V DC permanently

Input range 0 mA to 20 mA

AD converter resolution (LSB)	20 µA
Accuracy	0.2 % *)
Temperature dependence	75 ppm/°C
Input resistance	249 Ω/0.1 %
Input circuit time constant	1 ms
Input overvoltage protection	Diodes
Maximum input current	30 mA DC **)

Note:
*) Measurement accuracy may be reduced by 15 % during electromagnetic interference, see chapter 3.
**) At input voltage higher than 7.5 V (input current higher than 30 mA DC) thermal overload of sensing resistor occurs.

Ni1000 input

Measuring range	-50 °C to 150 °C
Ni1000 sensor constant	6180 ppm/°C
AD converter resolution (LSB)	0.3 °C *)

Accuracy (range Ni1000. Depends on measured value. Interpolation needs to be performed)	T = -50 °C 0.8 °C **) T = 0 °C 0.9 °C **) T = 150 °C 1.2 °C **)
Input temperature dependence	75 ppm/°C
Input circuit time constant	1 ms
Input overvoltage protection	Diodes ***)

Note: *) While NOS operating system is used.

**) Measurement accuracy may be reduced by 15 % during electromagnetic interference, see chapter 3.

***) Only a resistive sensor can be connected to this input. According to technical design, when sensor is not connected, voltage of 12 V occurs on AIx input – voltage is switched on for 10 ms in 110 ms interval, common voltmeter will show average value.

Pt1000 input

Measured temperature range	-50 °C to 250 °C
Pt1000 sensor constant	3900 ppm/°C
AD converter resolution (LSB)	1 °C *)
Accuracy	T = -50 °C 1.0 °C **) T = 0 °C 1.3 °C **) T = 250 °C 2.6 °C **)
Input temperature dependence	75 ppm/°C
Input circuit time constant	1 ms
Input overvoltage protection	Diodes ***)

Note: *) While NOS operating system is used.

**) Measurement accuracy may be reduced by 15 % during electromagnetic interference, see chapter 3.

***) Only a resistive sensor can be connected to this input. According to technical design, when sensor is not connected, voltage of 12 V occurs on AIx input – voltage is switched on for 10 ms in 110 ms interval, common voltmeter will show average value.

Digital input 24 V

Logical 0	Min. -30 V, max. 5 V
Logical 1	Min. 8 V, max. 30 V
Input current	2 mA at 24 V DC
Input peak current	Max. 3 mA at 30 V DC
Input overvoltage protection	Diodes
Maximum frequency	100 Hz at 10 % duty cycle distortion 500 Hz at 30 % duty cycle distortion
Galvanic separation	No
Maximum input voltage	50 V DC permanently

Analogue outputs

Number of outputs	4
Configuration	1 × 4
Common wire	Minus
Output range	0 V to 10 V
Minimum load	1 kΩ
Maximum capacitive load	10 nF
Maximum output current	10 mA

Adjustment error	0.2 %
Resolution	10 bit
Resolution per 1 bit	10 mV
Transition time 0 V to 10 V DC, accuracy 1 %	Maximum 25 ms
Residual ripple	20 mV
Temperature dependence	35 ppm/°C
Maximum wire length	100 m
Output circuitry protection	Transil 600 W
Galvanic separation	No
Connection point	WAGO 231-305/102-000 connector
Wire cross section	0.08 mm^2 to 2.5 mm^2

Caution: AGND (1) terminal is internally connected with GDN (33) terminal of system power supply.
Presented parameters are valid while NOS operating system is used.

RS232

Logical level 0 (input)	Min. +3 V, max. +30 V
Logical level 1 (input)	Min. -30 V, max. -3 V
Logical level 0 (output)	Min. +5 V, max. +10 V
Logical level 1 (output)	Min. -10 V, max. -5 V
Maximum cable length	10 m
Operation indication	LED on panel
Galvanic separation	No
Connection points	RJ45 connector, according to EIA-561

RS485

Overvoltage protection	Transil 600 W
Terminating resistor **)	120 Ω on control system
Idle state definition **) up to +5 V up to 0 V	 1 KΩ on control system 1 KΩ on control system
Maximum wire length	1200 m / 19200 bps
Maximum stations count	32
Operation indication	LED on panel
Galvanic separation	Yes
Insulation strength	300 V AC / 1 minute *)
Connection point	WAGO 231-303/102-000 connector
Wire cross section	0.08 mm^2 to 2.5 mm^2

Note: *) Insulation must not be used for dangerous voltage separation.
**) Terminating resistor and idle state definition are connected together.

Ethernet

Data transmission rate	10/100 Mbps
Interface controller used	STM32F207 + LAN8720
Operation indication	LED on panel
Galvanic separation	Yes
Insulation strength	300 V AC / 1 minute *)
Connection point	RJ45 connector, according to IEEE802.3

Note: *) Insulation must not be used for dangerous voltage separation.

Power supply

Nominal power supply voltage	24 V DC
Power supply voltage range	19.2 V DC to 28.8 V DC
Power consumption	Max. 200 mA at 24 V DC
Connection point	WAGO 231-302/102-000 connector
Wire cross section	0.75 mm^2 to 2.5 mm^2

Mechanics

Mechanical design	Plastic box
Mounting	DIN 35 mm rail mounting
Ingress protection rate	IP20
Weight – netto – brutto	0.46 kg ±5 % 0.56 kg ±5 %
Dimensions (w × h × d)	(160 × 95 × 74) mm

Temperatures

Operating temperature range	0 °C to 50 °C
Storage temperature range	-20 °C to 70 °C

Others

Maximum ambient humidity	< 95 % non-condensing
Programming	DetStudio (NOS)

2.1. Dimensions

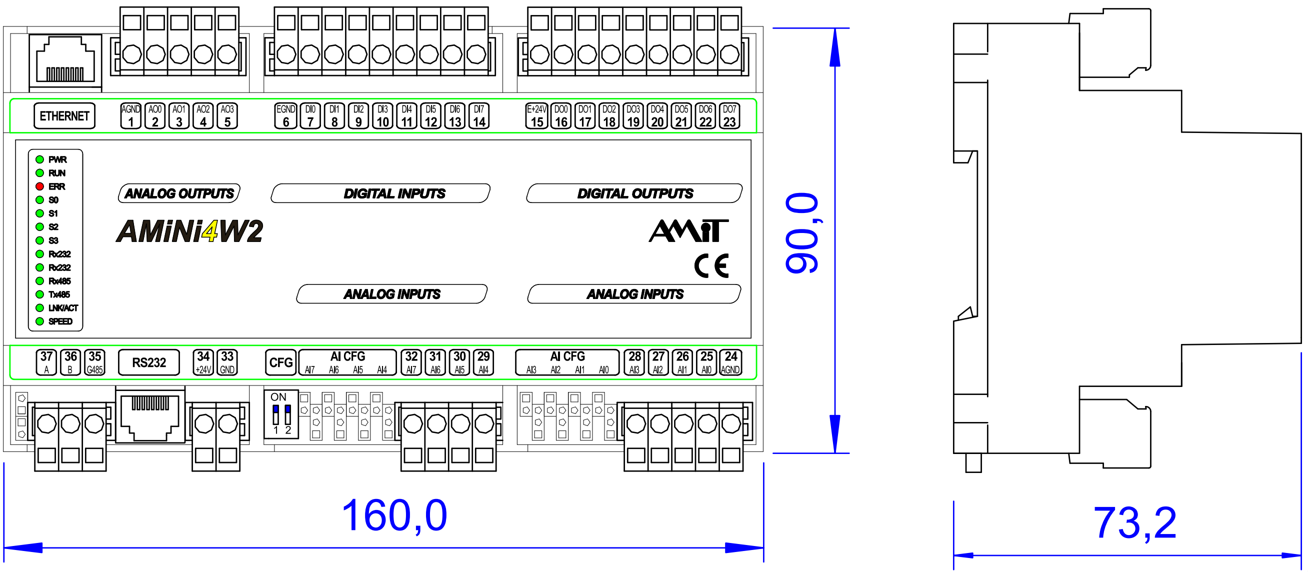

Fig. 1 - **AMiNi4W2** dimensions

2.2. Recommended drawing symbol

Following drawing symbol is recommended for **AMiNi4W2** control system. Only part of it will be visible in following examples.

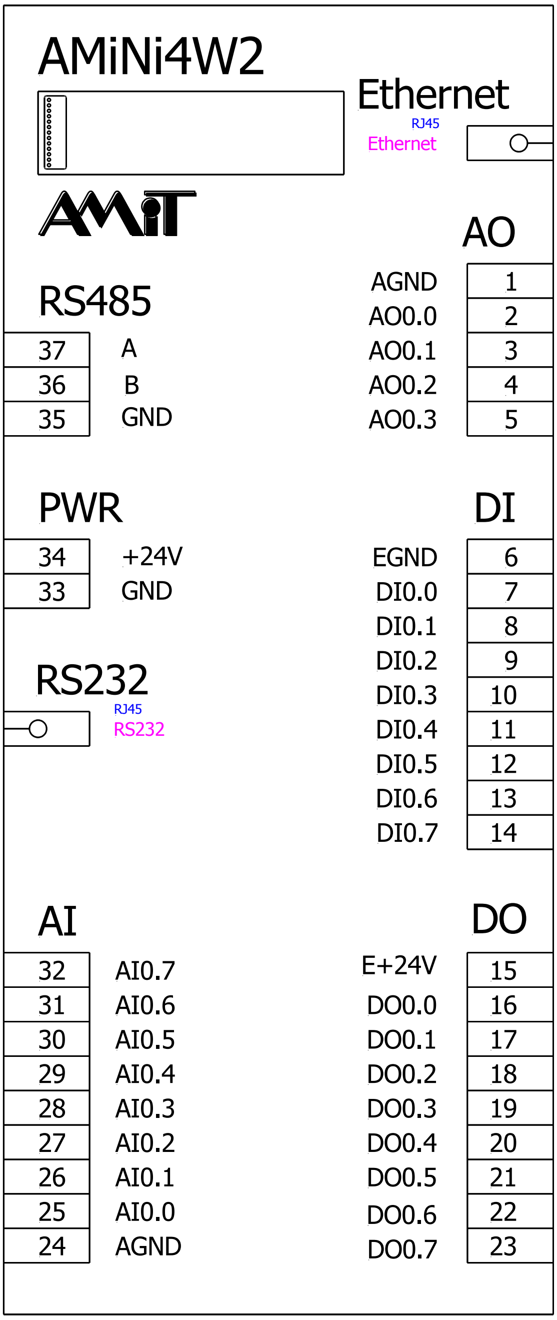

Fig. 2 - Recommended drawing symbol for **AMiNi4W2**

3. Conformity assessment

The equipment meets the requirements of NV616/2006 Czech governmental decree. The compliance assessment has been performed in accordance with harmonized standard EN 61326.

Tested in accordance with standard	Type of test	Class
EN 55011:2009	Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement	Complies, A *)
EN 61000-4-2:2009	Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test	8 kV
EN 61000-4-3:2006	Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test	Complies **)
EN 61000-4-4:2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test, power supply	±4 kV
EN 61000-4-4:2012	Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test, input	±2 kV
EN 61000-4-5:2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Electrostatic discharge immunity test, power supply.	±2 kV
EN 61000-4-5:2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test, RS485, Ethernet	±2 kV #)
EN 61000-4-5:2006	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test, other	±1 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	10 V **)

*) This is device of Class A. In the internal environment this product can cause some radio disturbances. In such case the user may be asked to take the appropriate measures.

**) During interference, measurement accuracy on analogue inputs is reduced.

#) Other than power supply circuitry cabling, which is longer than 30 m must be carried out by using the shielded cables.

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
EN 61000-4-29:2000	Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests	Complies

4. Power supply

AMiNi4W2 control system can be powered only by DC power supply. Power source must meet the requirements stated in chapter 2. Technical parameters.

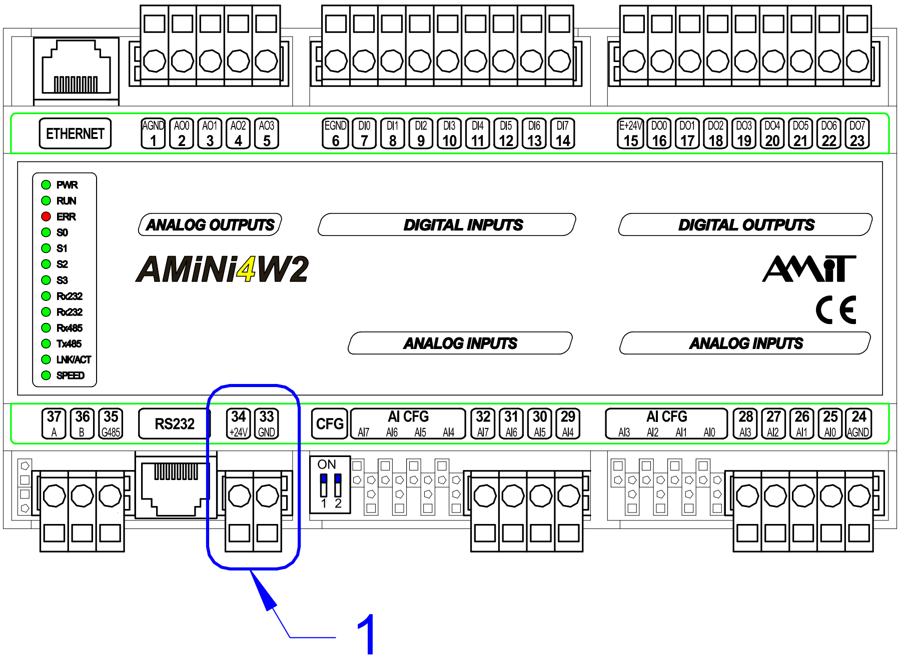

Fig. 3 - Power supply connector location

Legend

Number	Meaning
1	Power supply connector

Connectors numbering

Terminal	Label	Meaning
33	GND	Power supply GND
34	+24V	Power supply +24 V DC

Wiring example

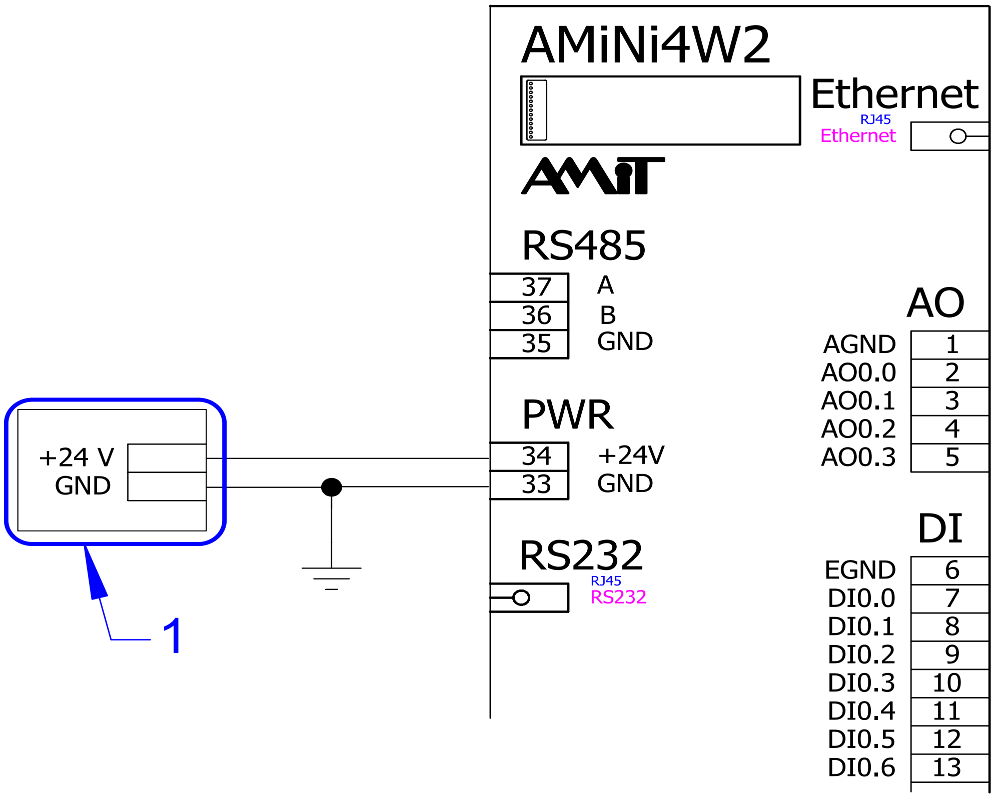

Fig. 4 - Wiring example of single control system

Legend

Number	Meaning
1	External power supply 24 V DC

Note: It is recommended to connect the GND, AGND and EGND terminals with switchboard PE terminal when installation is made.

5. Inputs/outputs

5.1. Digital inputs

Digital inputs of **AMiNi4W2** control system can be used for AC as well as for DC signal. The way of evaluating is determined by software.

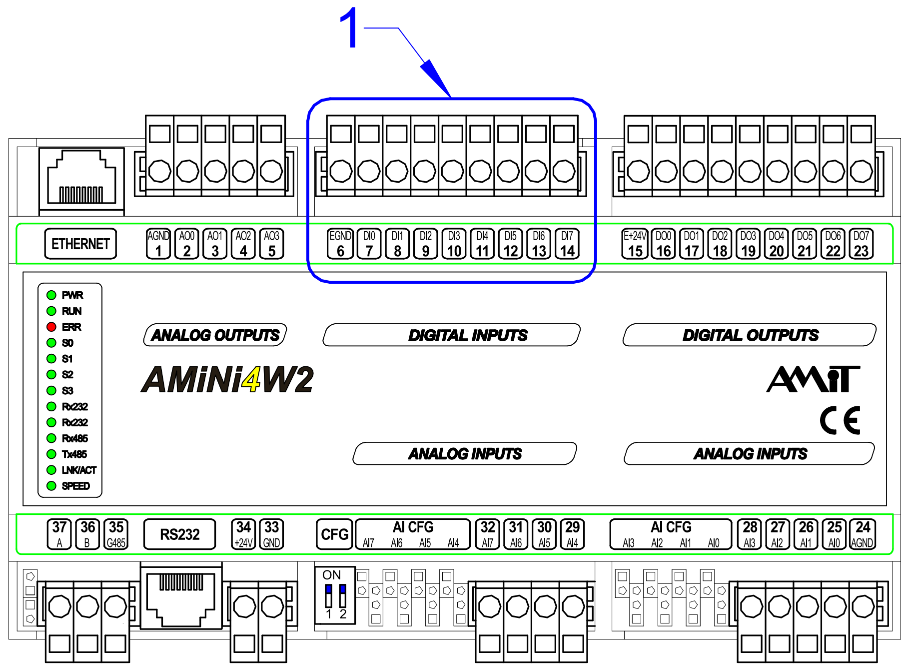

Fig. 5 - Inputs DI0.0 to DI0.7 connector location

Legend

Number	Meaning
1	Inputs DI0.0 to DI0.7 connector

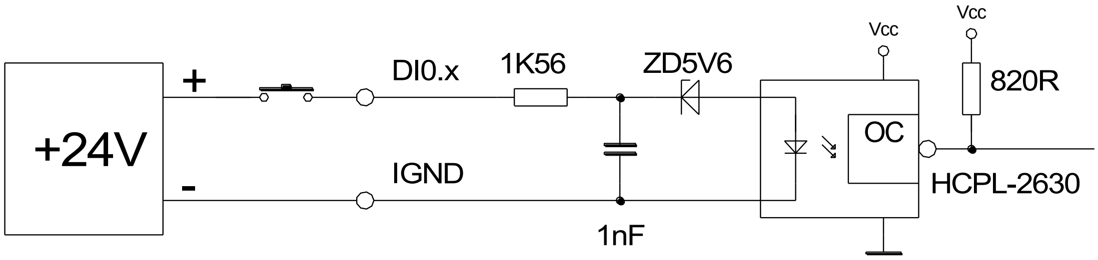

Fig. 6 - Wiring scheme of single digital input channel

Counter inputs Digital counter inputs can be used on two different ways:

- INT program counter
- Program counter

INT program counter Each digital input of the system can generate hardware interruption. These inputs can be programmed as counters through Interrupt_x processes.

Limitation of input signal frequency is given by program. It can be used typically up to 10 kHz frequency.

Program counter

Each digital input can be operated by program in Hi_x processes. These inputs can be programmed as counters. Limitation of input signal frequency is given by program. It can be used typically up to 250 Hz frequency.

Other information about counter inputs can be found in Application Note *AP0017 – Counter inputs, counting of revolutions/pulses*.

Connectors numbering

Terminal	Label	Meaning
6	EGND	Ground terminal
7	DI0.0	Digital input 0
8	DI0.1	Digital input 1
9	DI0.2	Digital input 2
10	DI0.3	Digital input 3
11	DI0.4	Digital input 4
12	DI0.5	Digital input 5
13	DI0.6	Digital input 6
14	DI0.7	Digital input 7

Wiring examples

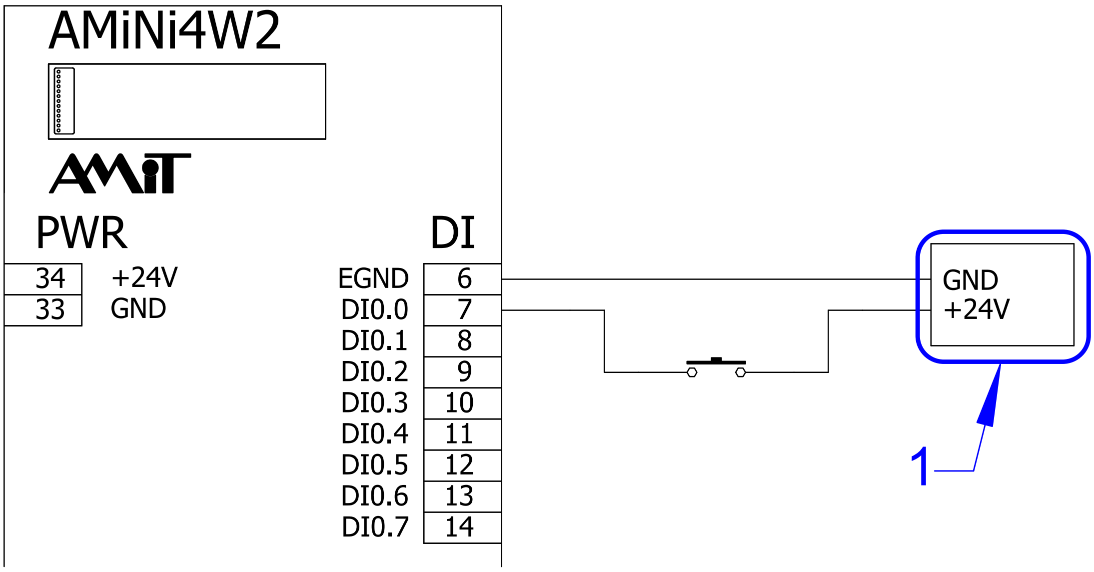

Fig. 7 - Passive contact supplied from individual power supply

Legend

Number	Meaning
1	External power supply 24 V DC

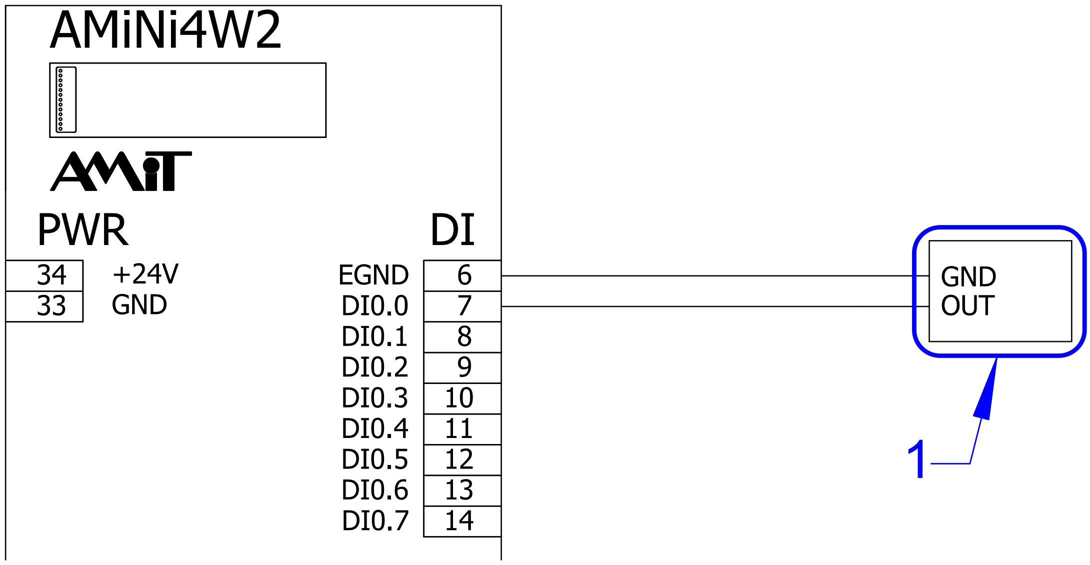

Fig. 8 - Connecting self-supplied active output

Legend

Number	Meaning
1	Sensor with self-supplied active output

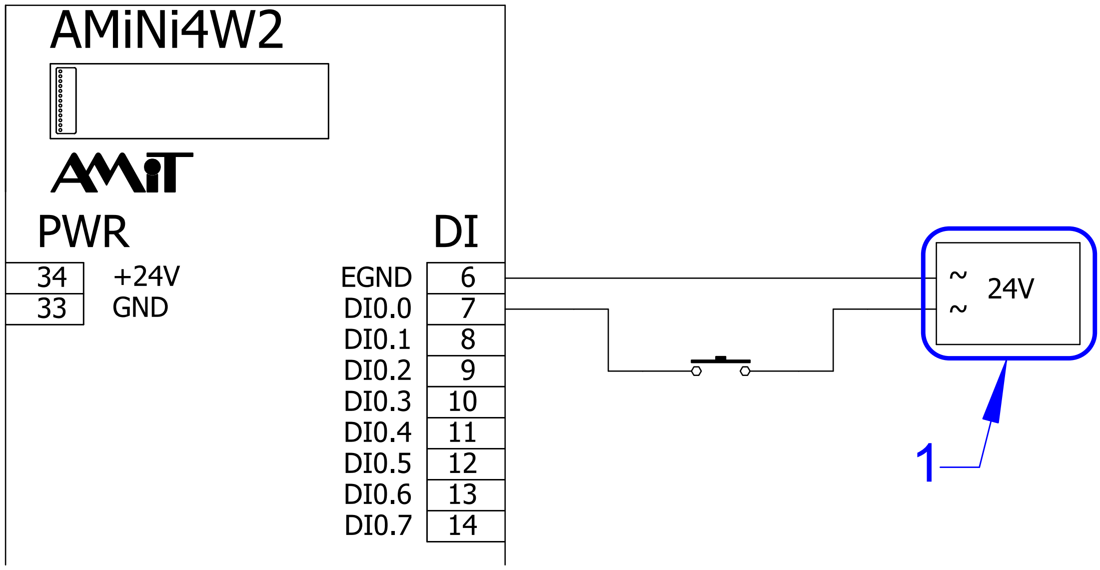

Fig. 9 - Passive contact supplied from AC power supply

Legend

Number	Meaning
1	External power supply 24 V AC

Note: It is recommended to connect the GND and EGND terminals with switchboard PE terminal when installation is made.

5.2. Digital outputs

Semiconductor outputs are implemented as galvanically separated MOS switches 24 V/300 mA DC. Output is shortcut-protected, overheating-proof and protected against overvoltage upon switching an inductive load.

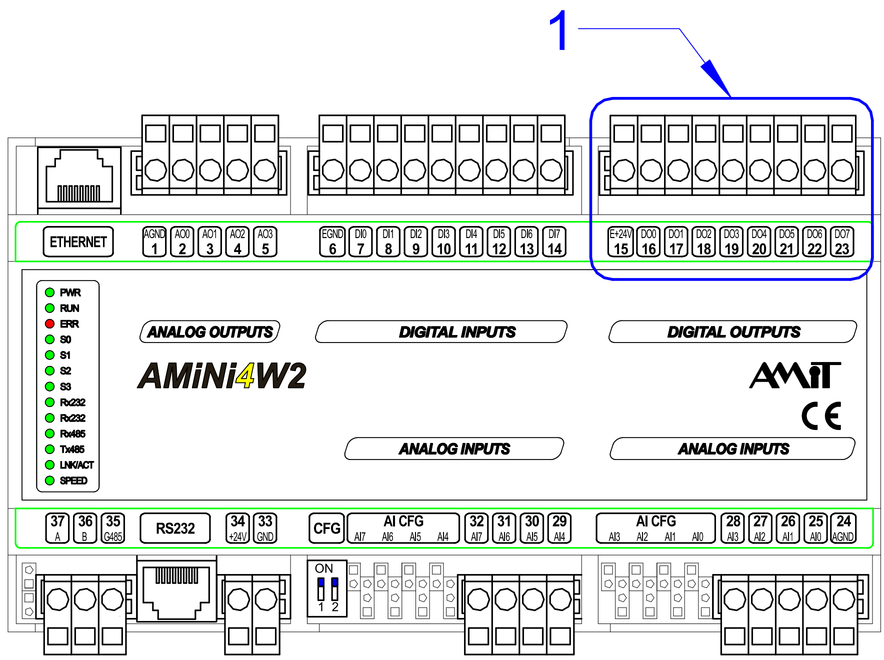

Fig. 10 - Outputs DO0.0 to DO0.7 connector location

Legend

Number	Meaning
1	Outputs DO0.0 to DO0.7 connector

Connectors numbering

Terminal	Label	Meaning
15	E+24V	Supplying of outputs
16	DO0.0	Digital output 0
17	DO0.1	Digital output 1
18	DO0.2	Digital output 2
19	DO0.3	Digital output 3
20	DO0.4	Digital output 4
21	DO0.5	Digital output 5
22	DO0.6	Digital output 6
23	DO0.7	Digital output 7

Note: Digital input ground terminal 6 (EGND) should be used as a digital output ground terminal (it is common for digital inputs and outputs).

Wiring example

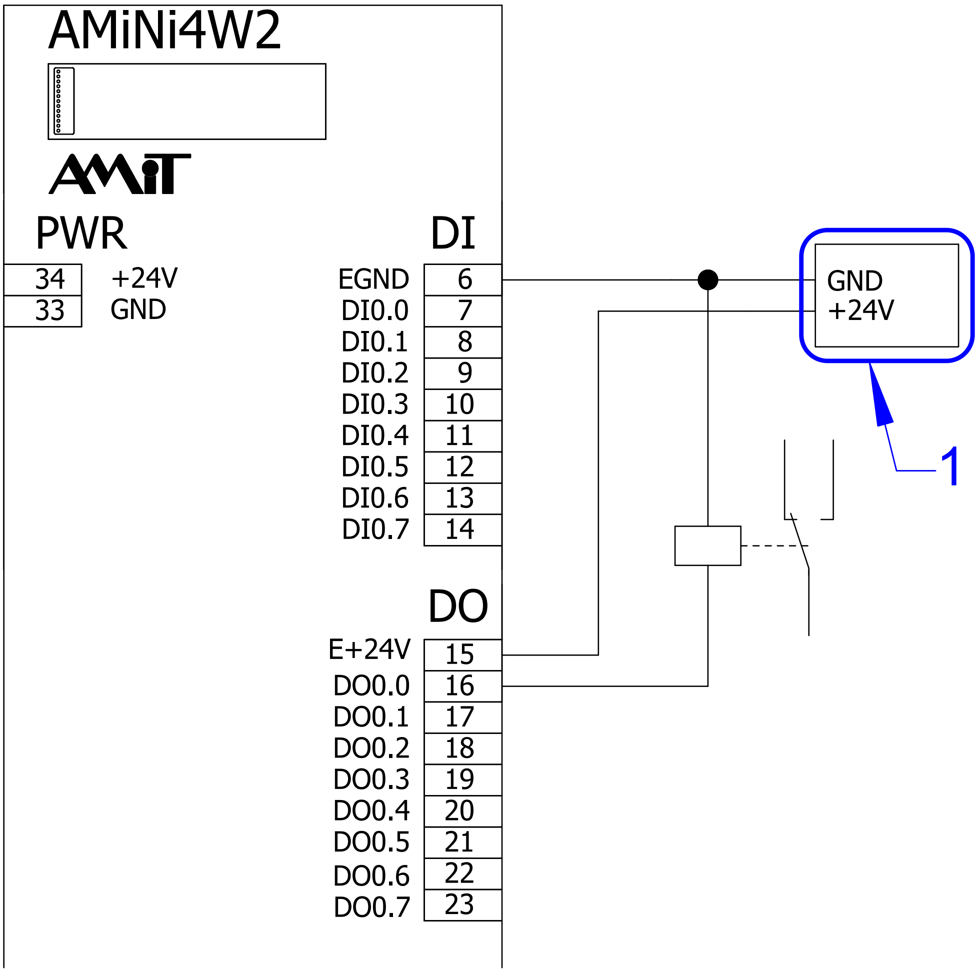

Fig. 11 - Operating the power contactor by semiconductor output

Legend

Number	Meaning
1	External power supply 24 V DC

Note: **It is necessary to wire terminals E+24V as well as EGND, otherwise the outputs will not work properly.**

It is recommended to connect the GND and EGND terminals with switchboard PE terminal when installation is made.

5.3. Analogue inputs

AMiNi4W2 control system has eight built-in analogue input channels. All inputs can be independently configured for ranges 0 V to 5 V / 0 V to 10 V / 0 mA to 20 mA or for direct connection of Ni1000 / Pt1000 sensors.

The analogue inputs can be also utilized as digital inputs. The way of signal evaluating is determined by software.

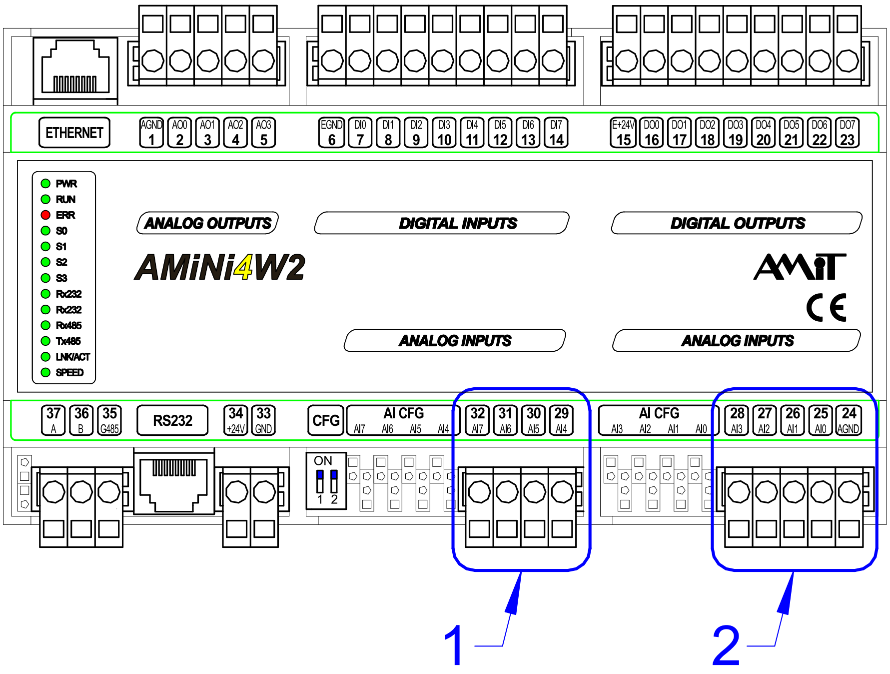

Fig. 12 - Inputs AI0.0 to AI0.7 connectors location

Legend

Number	Meaning
1	Inputs AI0.4 to AI0.7 connector
2	Inputs AI0.0 to AI0.3 connector

Connectors numbering

Terminal	Label	Meaning
24	AGND	Analogue ground
25	AI0.0	Analogue input 0
26	AI0.1	Analogue input 1
27	AI0.2	Analogue input 2
28	AI0.3	Analogue input 3
29	AI0.4	Analogue input 4
30	AI0.5	Analogue input 5
31	AI0.6	Analogue input 6
32	AI0.7	Analogue input 7

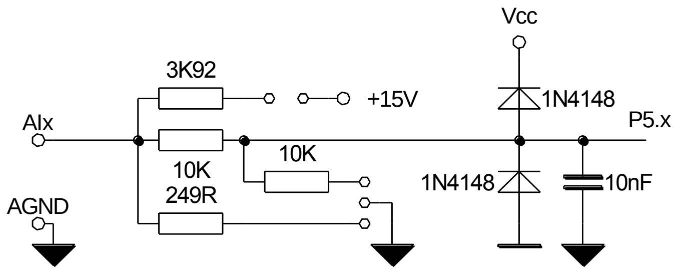

Fig. 13 - Wiring scheme of analogue input single channel

0 V to 5 V

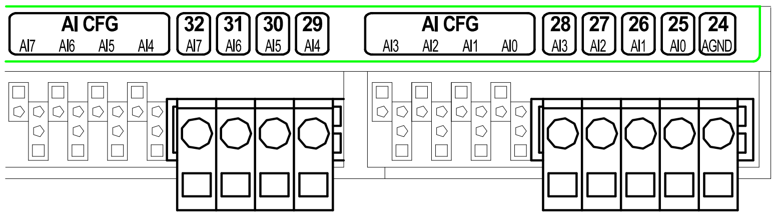

Fig. 14 - Setting configuration jumpers for range 0 V to 5 V

0 V to 10 V

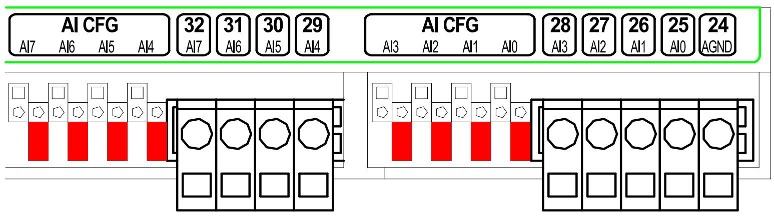

Fig. 15 - Setting configuration jumpers for 0 V to 10 V range, digital input 24 V

0 mA to 20 mA

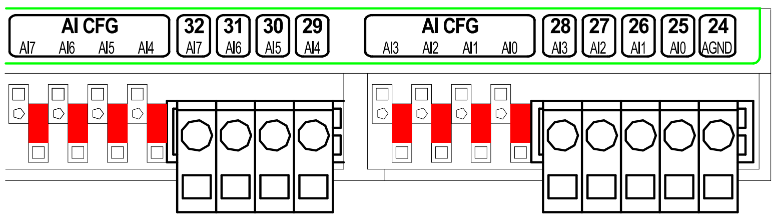

Fig. 16 - Setting configuration jumpers for 0 mA to 20 mA range

Ni1000
Pt1000

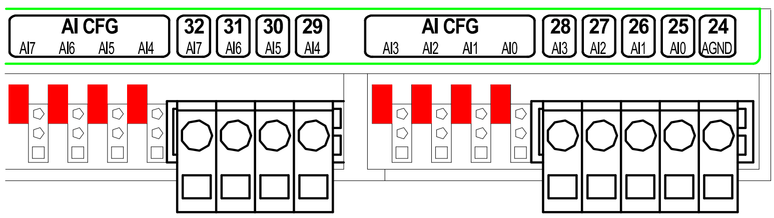

Fig. 17 - Setting configuration jumpers for Ni1000 / Pt1000 sensors

Jumpers location Configuration jumpers are accessible without cover dismounting.

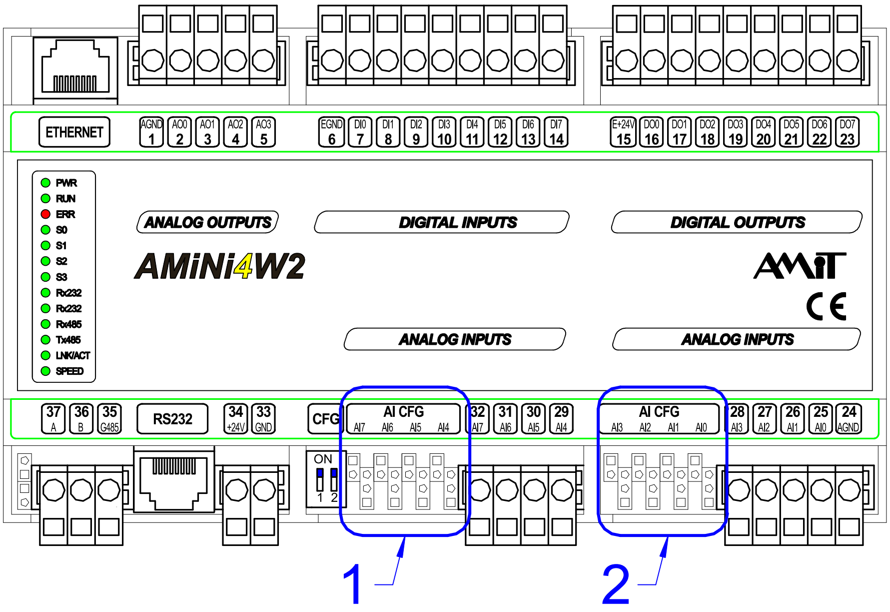

Fig. 18 - Configuration jumpers location

Legend	**Number**	**Meaning**
	1	Configuration jumpers for inputs AI0.4 to AI0.7
	2	Configuration jumpers for inputs AI0.0 to AI0.3

Wiring examples

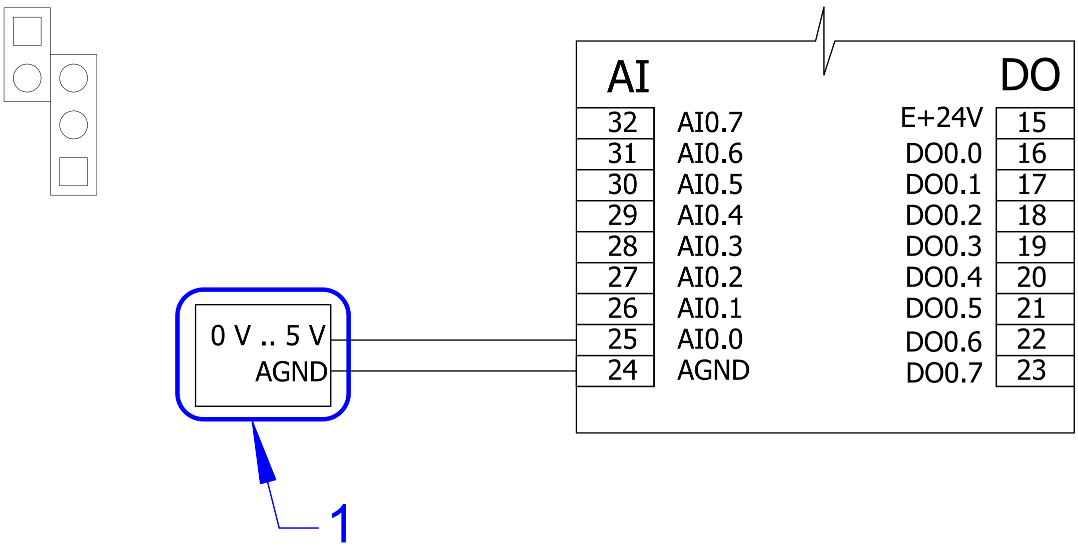

Fig. 19 - Connecting voltage sensor 0 V to 5 V

Legend	**Number**	**Meaning**
	1	Voltage sensor with 0 V to 5 V output

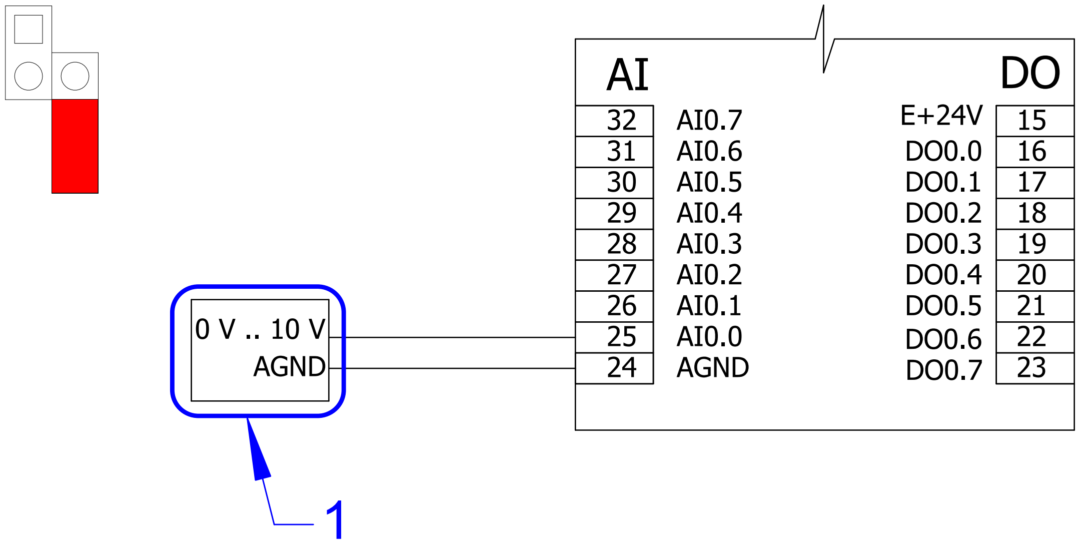

Fig. 20 - Connecting voltage sensor 0 V to 10 V

Legend

Number	Meaning
1	Voltage sensor with 0 V to 10 V output

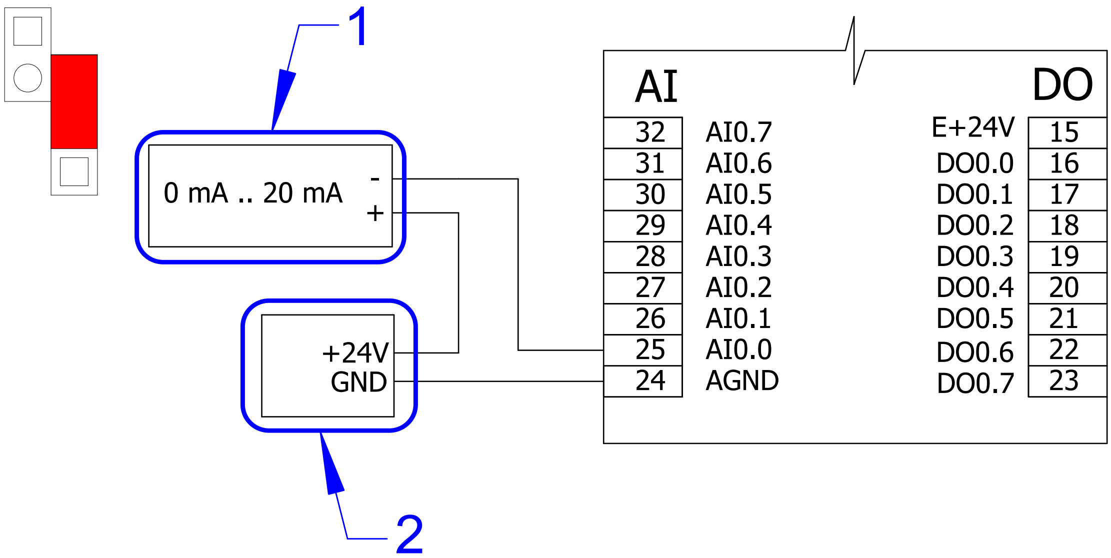

Fig. 21 - Connecting sensor with current output 0 mA to 20 mA (4 mA to 20 mA)

Legend

Number	Meaning
1	Current sensor with 0 mA to 20 mA (4 mA to 20 mA) output
2	Power supply 24 V DC

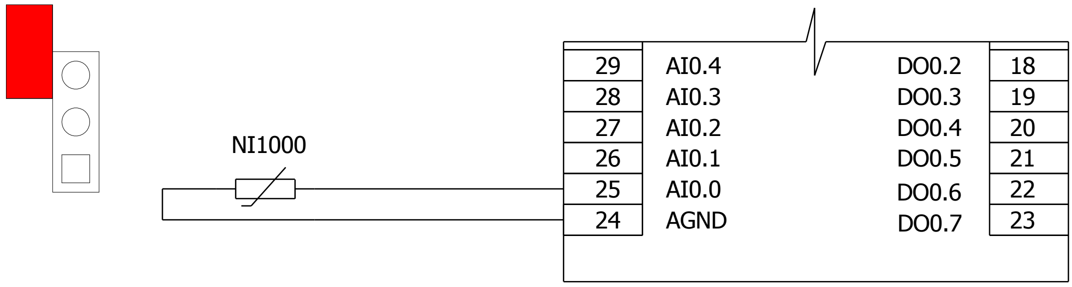

Fig. 22 - Connecting Ni1000 sensor

Reference voltage supply The +5.0 V DC reference voltage is located on control system I/O board. By manufacturer is set the reference voltage with 1 mV precision. The setting trimmer is secured by colour drop.

Note: Details about shield wiring and overvoltage protection are presented in Application Note – *AP0050 – Project documentation for AMiT company products*.

5.4. Analogue outputs

AMiNi4W2 control system has four voltage analogue outputs. Output range is 0 V to 10 V. Outputs control is internally realized on the PWM basis.

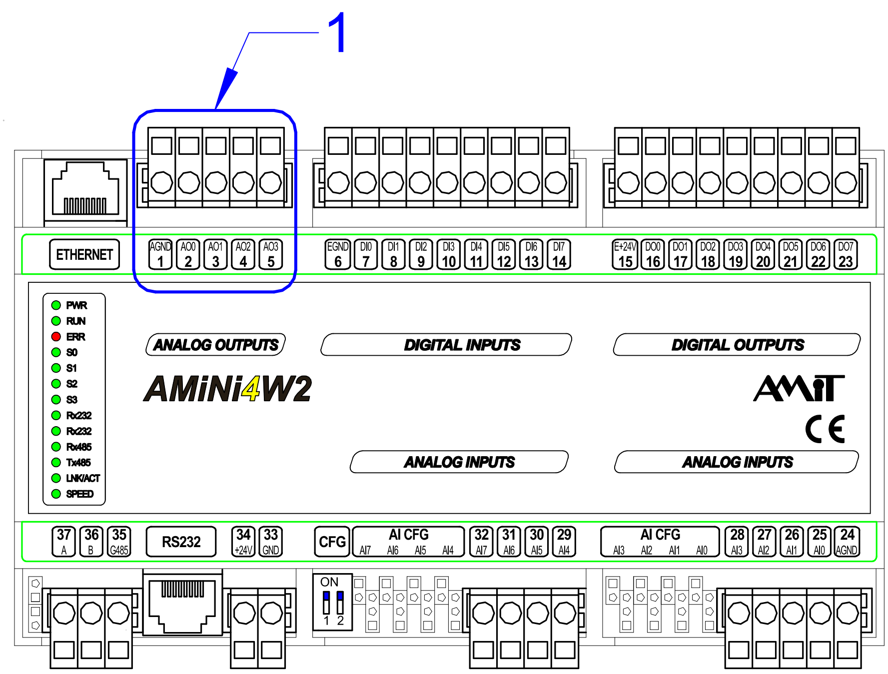

Fig. 23 - Outputs AO0.0 to AO0.3 connector location

Legend

Number	Meaning
1	Outputs AO0.0 to AO0.3 connector

Connectors numbering

Terminal	Label	Meaning
1	AGND	Analogue ground
2	AO0.0	Analogue output 0
3	AO0.1	Analogue output 1
4	AO0.2	Analogue output 2
5	AO0.3	Analogue output 3

Wiring scheme

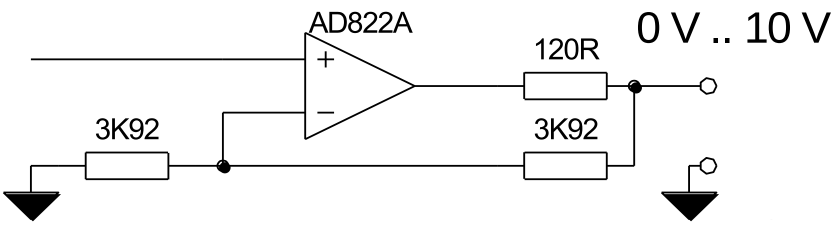

Fig. 24 - Wiring scheme of final stage of single channel analogue output

Wiring examples

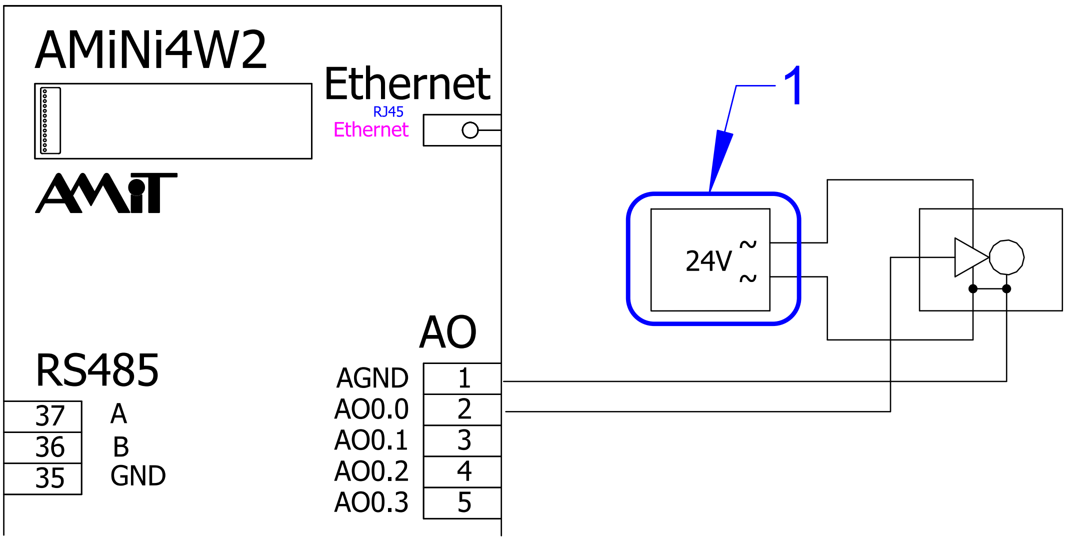

Fig. 25 - Connecting AC supplied servo

Legend

Number	Meaning
1	AC power supply

6. Communication lines

AMiNi4W2 control system is equipped with three communication interfaces.

- RS232 interface
- RS485 interface
- Ethernet interface

6.1. RS232

According to RS232 standard, this interface is assigned for connection of two devices. For bi-directional communication the three wires are sufficient, for modem commanding a full complementing of RJ45 connector is necessary.

RS232 has a number 0 within SW, in case of using NOS.

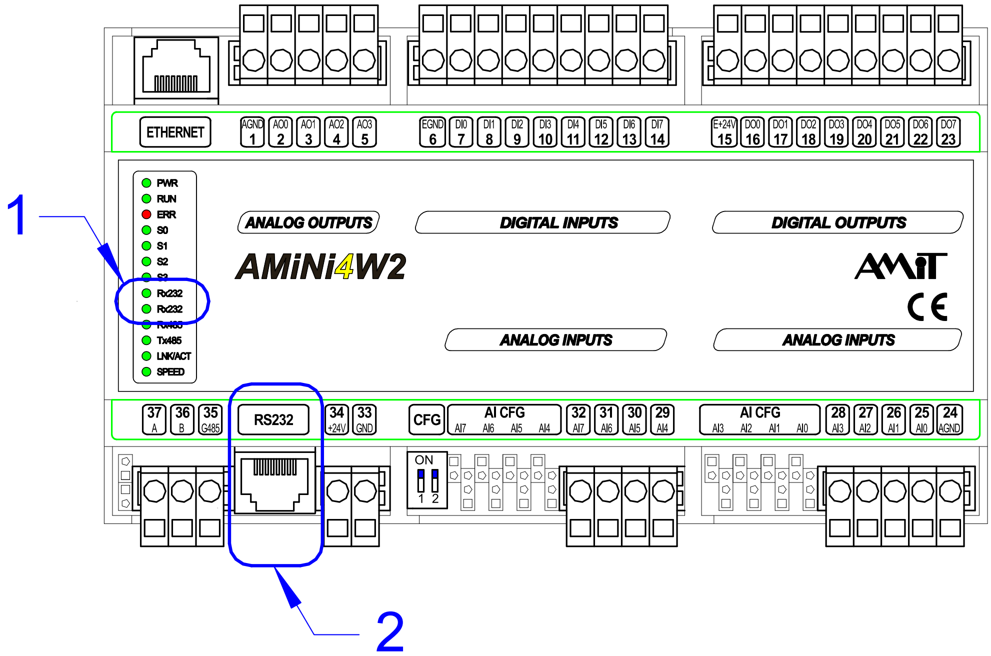

Fig. 26 - Connector and indication LEDs location

Legend

Number	Meaning
1	RS232 line LED indicators
2	RS232 line connector

Connector wiring RJ45 on **AMiNi4W2** control system

PIN	Meaning	Type
1	RI	Input
2	DCD	Input
3	DTR	Output
4	GND	Ground
5	RxD	Input
6	TxD	Output
7	CTS	Input
8	RTS	Output

Note: The **Meaning** item corresponds to **AMiNi4W2** control system signals. Item **Type** corresponds to signal type on **AMiNi4W2** control system.

Activity of RS232 line is indicated by LEDs located on front panel.

RS232 LED indicators

LED	Meaning
Rx232	Lights when receiving data
Tx232	Lights when sending data

Connection to PC For connection to PC, the **KABEL 232RP** cabel manufactured by AMiT company can be used.

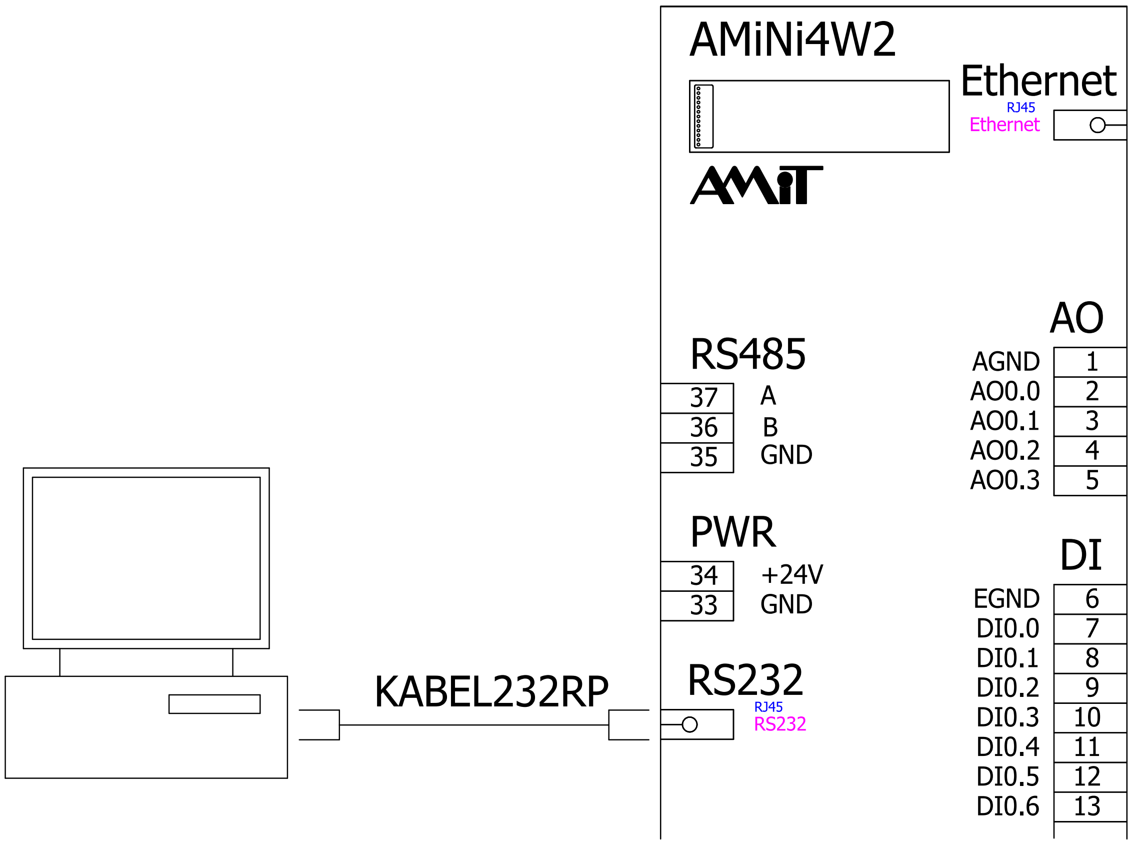

Fig. 27 - Interconnection with PC

6.2. RS485

RS485 is a Half-duplex serial interface, which is led out to WAGO connector. Interface can be also used for interconnecting of more stations (up to 32 on one segment) All stations communicate through single signal pair. RS485 has a number 1 within SW, in case of using NOS.

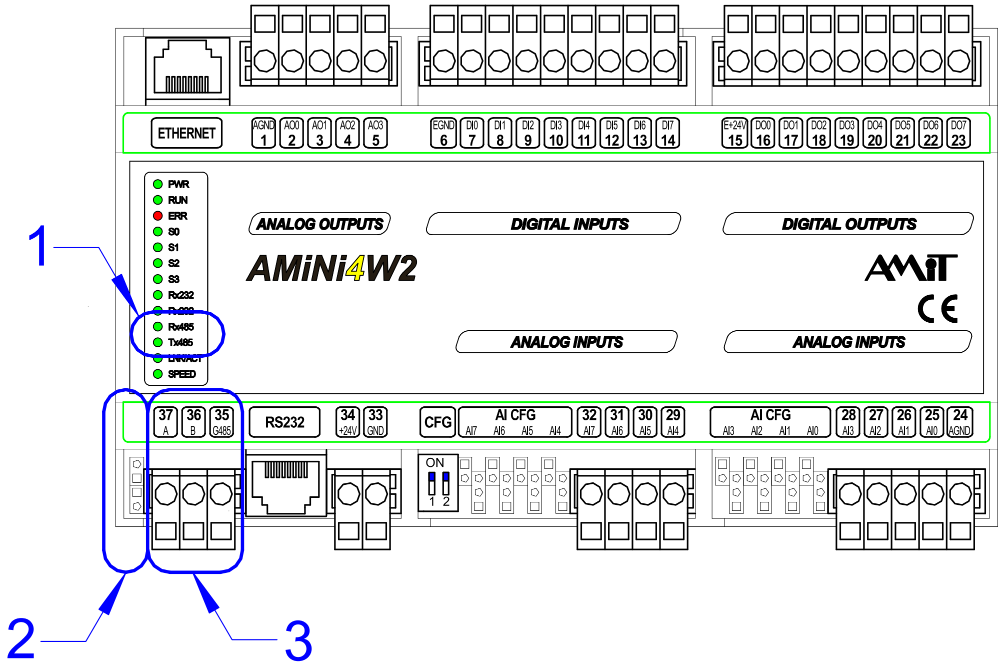

Fig. 28 - RS485 connector and indication LEDs location

Legend

Number	Meaning
1	RS485 line LED indicators
2	Jumpers for idle state definition and RS485 line termination
3	RS485 line connector

Connector numbering

Terminal	Label	Meaning
35	G485	RS485 line ground
36	B	RS485 line, signal B
37	A	RS485 line, signal A

Activity of RS485 line is indicated by LEDs located on front panel.

RS485 indication LEDs

LED	Meaning
Rx485	Lights when receiving data
Tx485	Lights when sending data

6.2.1 RS485 line termination

Two configuration jumpers which are used for line termination and idle state definition are located near RS485 interface.
Both jumpers must be set at end-station (idle state definition and line termination is connected).

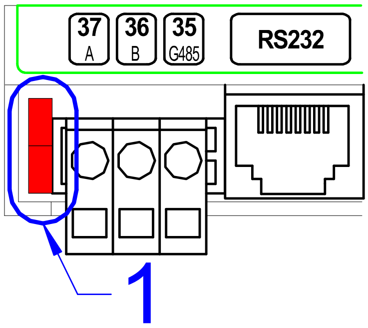

Fig. 29 - Connected jumpers on end station

Legend

Number	Meaning
1	Connected jumpers for idle state definition and RS485 line termination

Both jumpers must be disconnected at intermediate stations (idle state definition and line termination is disconnected).

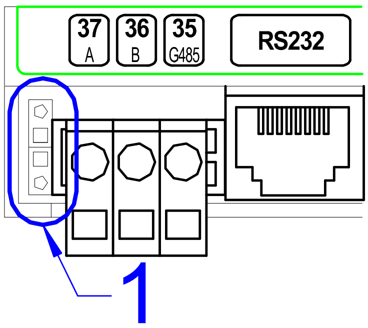

Fig. 30 - Disconnected jumpers on end station

Legend

Number	Meaning
1	Disonnected jumpers for idle state definition and RS485 line termination

Meaning of jumpers

Jumpers	Meaning
Are set	End-station – Idle state and line termination is active
Are not set	Intermediate station – Idle state and line termination is inactive

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

6.3. Ethernet

Through Ethernet interface the system can be directly connected into computer LAN network, and is led out to RJ45 connector. For connecting it is possible to use components of standard structured cabling.

Ethernet interface can be used for visualization as well as for control system remote application loading. TCP/IP protocols family is used for communication, therefore the communication network can be shared both by control systems and personal computers.

The **AMiNi4W2** control system can be utilized as bridge to RS485 network with DB-Net protocol.

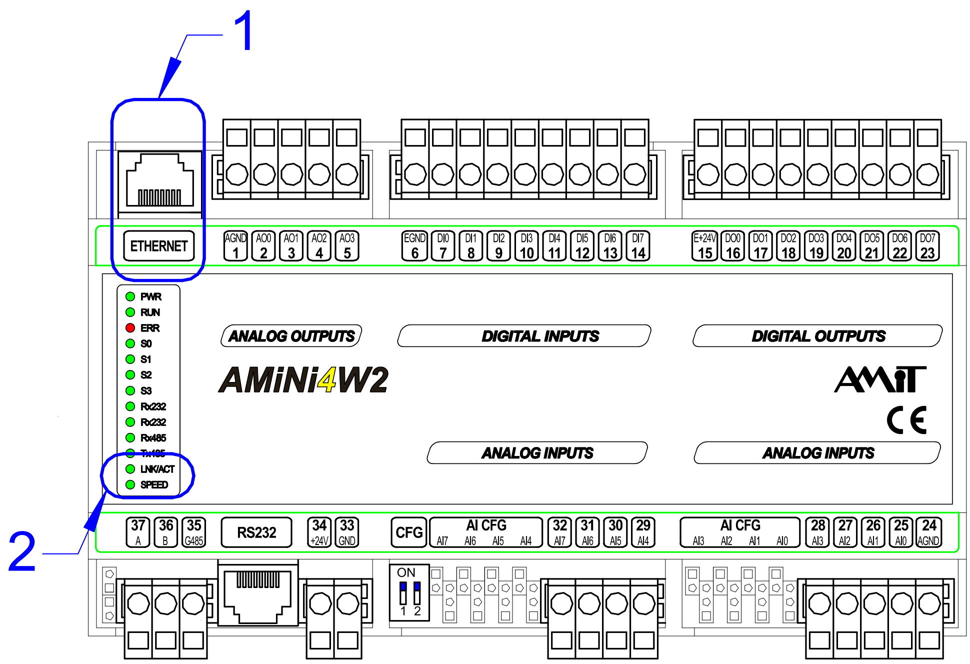

Fig. 31 - Ethernet connector and indication LEDs location

Legend

Number	Meaning
1	Ethernet line LED indicators
2	Ethernet line connector

Activity on Ethernet line is indicated by system LEDs located on front panel.

RS485 indication LEDs

LED	Meaning
LNK/ACT	Lights when connected to network, blinks when sending / receiving data
Speed	Lights in 100 Mbps network, does not light in 10 Mbps network

Details about Ethernet interface can be found in Application Note – *AP0037 – Principles of using Ethernet*.

7. Internal measuring, SD card

7.1. Backup battery measurement

Voltage of backup battery can be measured in applications, written in DetStudio development tool via predefined analogue channel.

Operation example

```
AnIn #Vbatt, fBat, 5.000, 0.000, 10.000, 0.000, 10.000
```

Measured value is battery voltage [V].

Warning that it is time to replace the battery can be displayed in application.

7.2. Measuring of power supply voltage

Value of power supply voltage can be measured in applications, written in DetStudio development tool via predefined analogue channel.

Operation example

```
AnIn #Vint, fPwr, 56.0000, 0.000, 56.000, 0.700, 55.000
```

Measured value is power supply voltage [V].

7.3. SD card

Micro SD card slot is located on the bottom of **AMiNi4W2** (behind the RS485 interface connector). The way the card is used depends on used operation system and communication process program. Details about card usage are described in application software documentation.

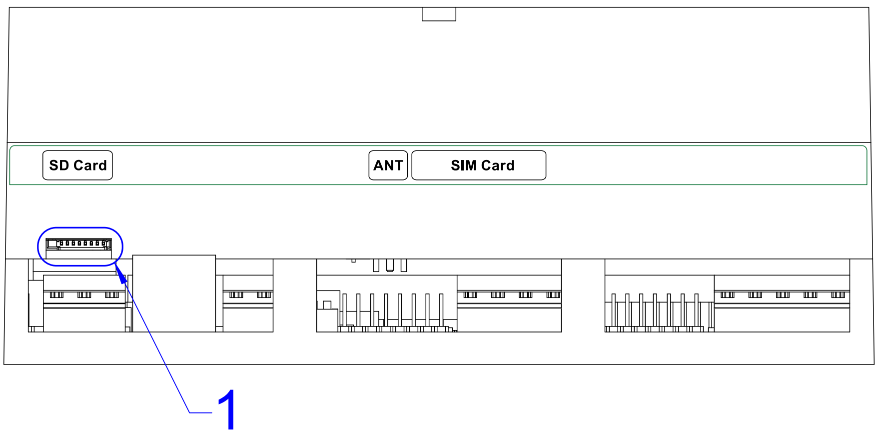

Fig. 32 - Micro SD card slot location

Legend

Number	Meaning
1	Micro SD card slot

Card is inserted contacts up (towards **AMiNi4W2** label). Inserting / removing an SD card is not subject to the connected / disconnected power supply. Card can be freely manipulated during system run, without danger of data loss or corruption.

Caution: If the Micro SD card capacity is up to 2 GB, the FAT16 has to be used. Over 2 GB the FAT32 has to be used.

8. System LEDs and CFG switches

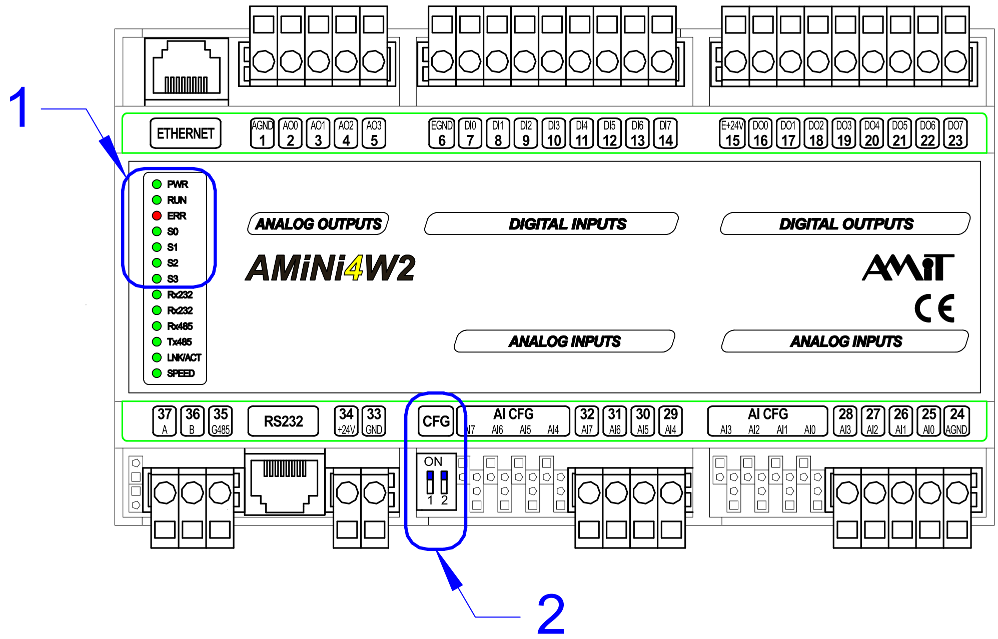

Fig. 33 - DIP switch and status indicator locations

Legend

Number	Meaning
1	System LEDs
2	CFG switches

System LEDs

LED	Colour	Meaning
PWR	Green	Power supply is attached
RUN	Green	Run of SW equipment Blinks with 0.5 s period – NOS operation system run Blinks with 1 s period – application run
ERR	Red	SW equipment error Lights – SW error
S0	Green	Procedural processor activity
S1	Green	Procedural processor activity
S2	Green	Procedural processor activity
S3	Green	Communication processor activity

CFG switches

Switch	Position	Meaning
1	ON	Setting factory defaults of communication parameters
	OFF	Standard run
2	ON	Switching to special mode for loading NOS
	OFF	Standard run

9. Configuration

9.1. HW configuration

HW configuration is done for analogue inputs and RS485 interface via configuration jumpers, described in previous chapters. Position of all configuration jumpers is apparent from the following figure.

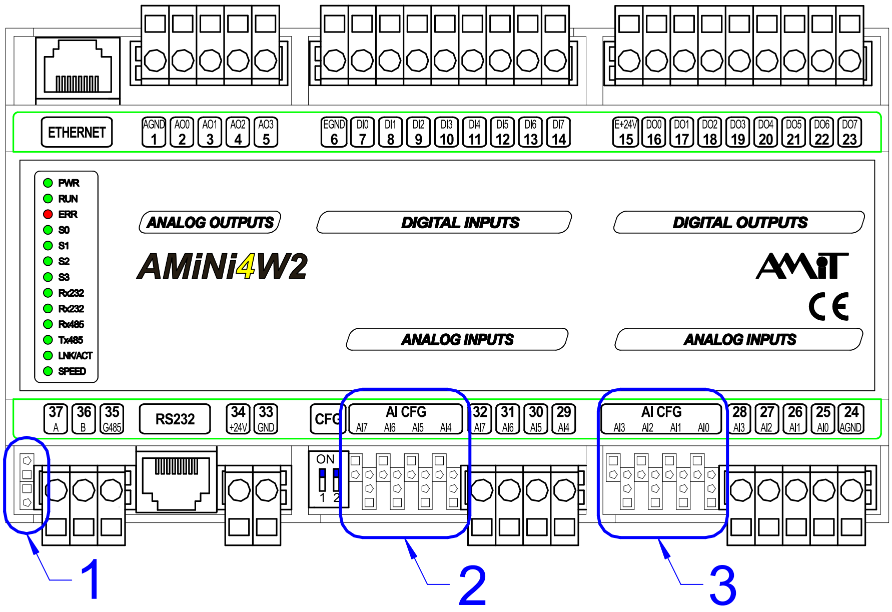

Fig. 34 - Configuration jumpers location

Legend

Number	Meaning
1	RS485 configuration jumpers
2	Configuration jumpers for inputs AI0.4 to AI0.7
3	Configuration jumpers for inputs AI0.0 to AI0.3

9.2. SW configuration

AMiNi4W2 control system is is configured by:

- external utility,
- **DetStudio** environment.

The configuration procedure is described in the help file for the particular SW equipment.

9.3. Factory setting, jumpers

Analogue inputs All analogue inputs are set for range of 0 V to 10 V.

RS 485 configuration Jumpers, which activates line termination and idle state definition are fitted.

Ethernet

Parameter	Default value
Station IP address	192.168.1.1
Network mask	255.255.255.0
Default gateway	0.0.0.0

Web server

Parameter	Default value
Administrator login/pass	root/amit
Service login/pass	service/amit
User login/pass	user/amit

Parameter	Default value
FTP server – data	20
FTP server – control	21
WEB server	80

DB-Net/IP servers

Parameter	Default value
UDP Port	59
Password	0

9.4. Restoring the factory setting

User can use this option in case of problems in communication with control system, for example, in case of control system with unknown IP address, problems in communication over Ethernet, etc.

To restore factory settings- turn OFF power supply, put HW configuration DIP switch n. 1 to position ON (see Fig. 33), turn power supply ON. It is necessary to wait, in this state, until the LED S3 is permanently lit for minimum of 15 s. Then disconnect power supply, switch the DIP switch n. 1 backwards to position OFF, and reconnect power supply. S3 LED will blink with cca 1 s. period. Factory settings are restored.

10. Mounting

AMiNi4W2 control system is intended for DIN 35 mm rail mounting. Control system can be mounted in horizontal and vertical position.

10.1. Installation rules

EMC filter EMC filter is used on power supply input. Based on environment nature, power source properties and wiring layout this requirement can be revised.

Connecting to PE Connect the negative supplying terminal of control system (GND) to the switchboard PE terminal.

Digital I/O Connect the negative terminal of all inputs and outputs to the switchboard PE terminal.

The separate supplying section is recommended. Common section for digital inputs and outputs is convenient as well.

Accomplish the connection with PE on the switchboard inlet.

Use the shielded wires for longer distance lead wires and in higher level disturbance environment. Connect the shielding to the PE terminal just on switchboard input.

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

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

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

Analogue outputs When connecting the power source for analogue drives, be particular that power circuit does not close itself through control system analogue ground.

Use the shielded signal cables for wiring. Connect the cable shielding to the PE terminal just on switchboard input.

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

RS485 channel It is necessary to perform connecting of RS485 line according to recommendations presented in Application Note – *AP0016 – Principles of using RS485 interface*.

RS232 channel When used only for service purposes or utilized within the switchboard frame, the unshielded flat communication cable can be used.

Use the shielded cables for permanent use outside the switchboard frame. Connect the shielding to the PE terminal just on switchboard input. Cable length is limited to 30 m.

Ethernet interface Unshielded – patch cable can be used for service or when utilized within the switchboard frame.

In case of permanent use outside the switchboard frame, it is necessary to perform connecting of Ethernet line according to recommendations presented in Application Note – *AP0037 – Principles of using Ethernet network*.

Note: All connections to PE terminal must be realized with as low as possible impedance. Technical parameters of unit are guaranteed only when these wiring rules are applied.

11. Ordering information and completion

Control system	**AMiNi4W2**	Complete, see the chapter 11.1. Completion

11.1. Completion

AMiNi4W2

Part	Quantity
Control system	1
WAGO 231-309/102-000	2
WAGO 231-305/102-000	2
WAGO 231-304/102-000	1
WAGO 231-303/102-000	1
WAGO 231-302/102-000	1
Operation manual	1

12. Maintenance

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

Reference voltage source The reference voltage 5.0 V DC for A/D converter is set by manufacturer with 1 mV precision. For voltage inspection should be used a sufficiently precise measuring instrument!

Inspection must be carried out once every five years.

Backup battery For program and parameters backup in the RAM memory the backup battery is used. Its nominal voltage is 3.0 V DC; nominal capacity is 1 Ah. If battery voltage drops under 2.7 V DC, then it is considered to be discharged. When it happens, it is necessary to change it.

Inspection must be carried out once every five years.

With reference to manufacturer, the assumed battery lifetime is 10 years.

Cleaning Time after time with regard to way of device usage, it is necessary to remove dust from inside electronics. The equipment 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 off in common public waste. It must be delivered to places specified for that purpose and recycled.

Battery disposal The equipment contains a lithium battery. The battery is a dangerous waste. Therefore, it must be delivered to places specified for that purpose. Disposal of worn-out batteries and accumulators must not be in contrary to valid regulations.