

Acquisition Modules



RMS2-AI

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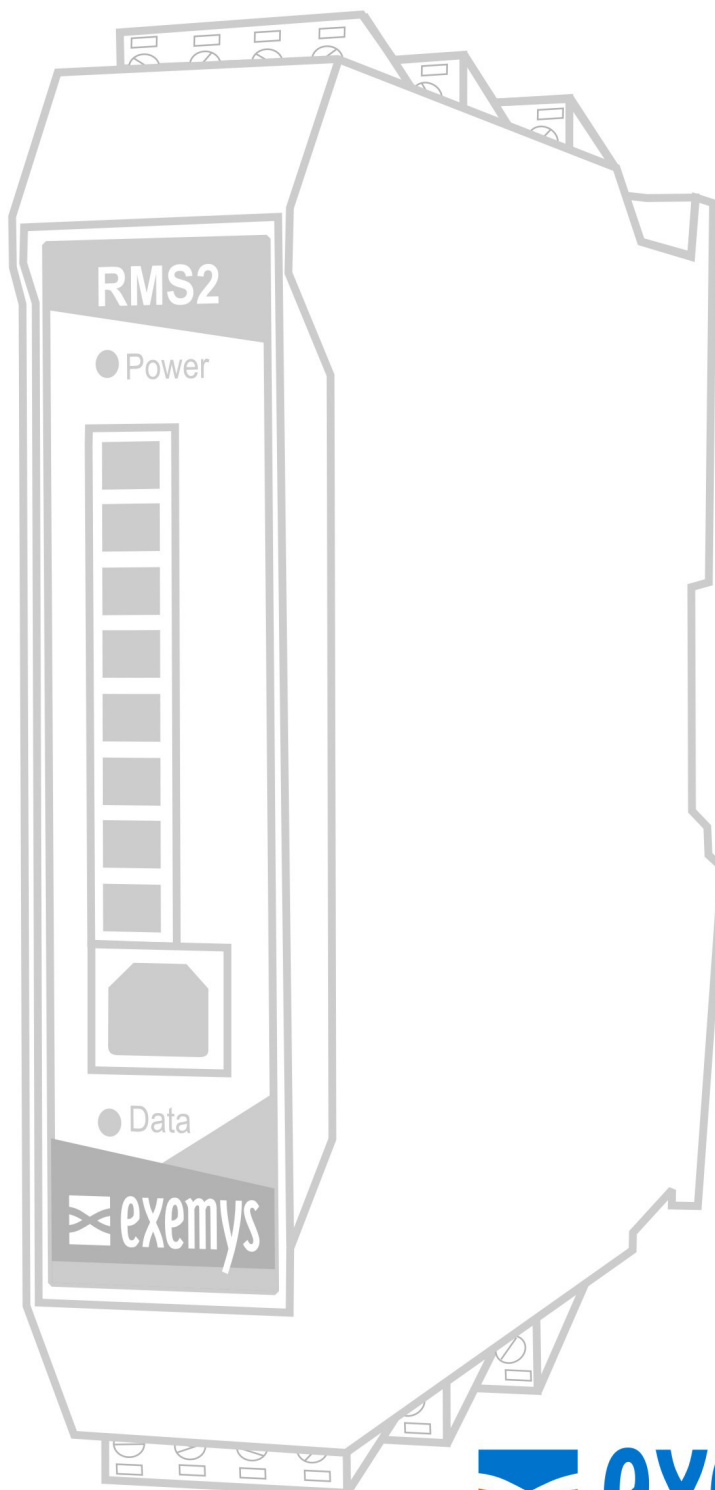
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User's Manual

Business Hours: Monday - Friday 8:30AM - 6:15PM





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INDEX

1	INTRODUCTION	4
1.1	Purpose of the manual	4
1.2	Product Overview	4
1.3	Order numbers	5
1.4	Technical Specifications	5
2	INSTALLATION	6
2.1	Power Input Connection	6
2.2	Connections and terminals	6
2.2.1	Analog inputs wiring	7
2.2.2	RS232 serial port wiring	8
2.2.3	RS485 serial port connection	8
2.3	LEDs Indicators	8
3	Configuration	9
3.1	Serial port configuration	10
3.2	Inputs Configuration	11
3.2.1	Scaling Configuration.	11
3.3	Advanced Configuration	12
3.4	Other Configuration Items	13
4	Modbus Communication	14
4.1	ModbusRegisters	14
A. FACTORY SETTINGS		15
B. DIN RAIL MOUNTING		16

1 INTRODUCTION

1.1 Purpose of the manual

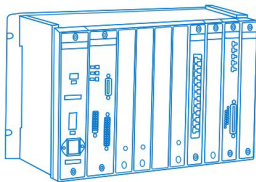
This manual provides instructions for easy and quick installation and operation of the RMS2-AI-IA3 analog module. The manual starts with a general description of the product, and then provides instructions for the correct hardware installation. Configuration and operation of the device is detailed below.

Acronym	Description
BPS	Bits per second
PC	Personal Computer
GND	Ground (Reference)

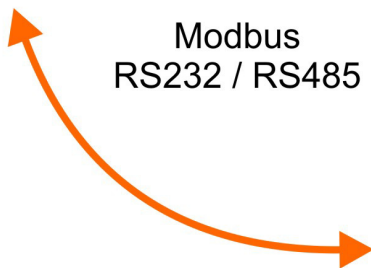
1.2 Product Overview

RMS2-AI-IA3 acquisition module is a complete interface for your analog sensors, because it allows to monitor and supervise analog devices whose output is 4-20 mA current loops or 0-10V voltage range. This device works in differential mode, which means that it measures the difference between the absolute values of two signals.

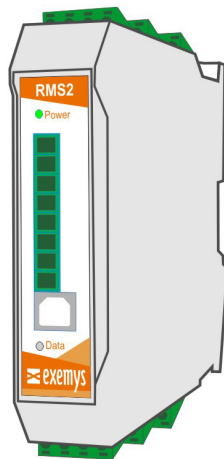
Master Modbus



Modbus
RS232 / RS485



RMS2-AI

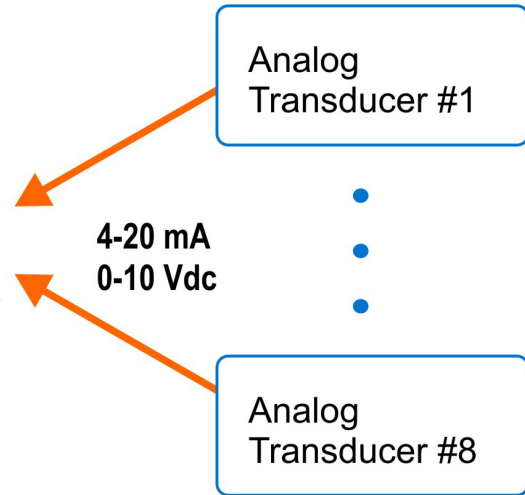


Analog
Transducer #1



Analog
Transducer #8

4-20 mA
0-10 Vdc



1.3 Order numbers

Product order numbers are the following:

Code number	Description
RMS2-AI-110-00-80-IA3-MB	(1) serial port RS-232 / RS-485 optoisolated (8) 4-20 mA / 0-10V Inputs

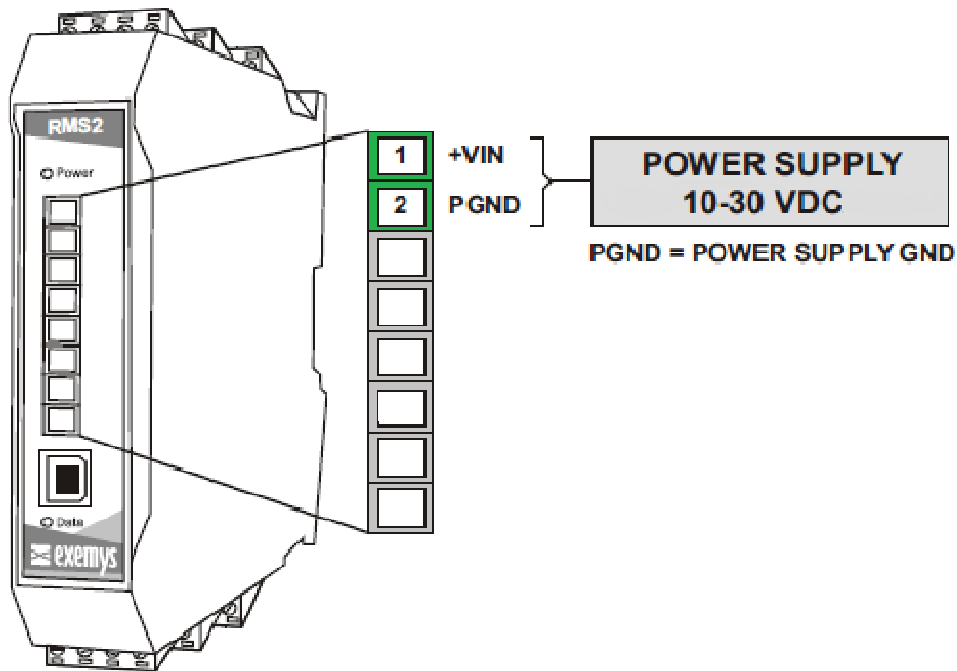
1.4 Technical Specifications

Technical specifications	
Communication protocols	Modbus RTU, Modbus ASCII.
Analog Inputs	0-10V / 4-20mA ($Z_i = 62\Omega$).
Input resolution	12 bits
USB port	1 USB port type B, for device configuration
Serial Protocol	Modbus RTU/ASCII
Serial Port	1 RS-232 + 1RS-485 optoisolated with plug-in terminals
Indicators	Power LED Data LED
Measurements	100 mm x 22,5 mm x 112 mm (High x Width x Depth).
Power input	10 to 30 V.
Average consumption	12 Vdc – 50mA / 24 Vdc – 30mA.
Temperature	Operation Temperature: -15 °C to 65 °C. Storage Temperature: -40 °C to 75 °C.
Warranty	1 year. Technical Support included

2 INSTALLATION

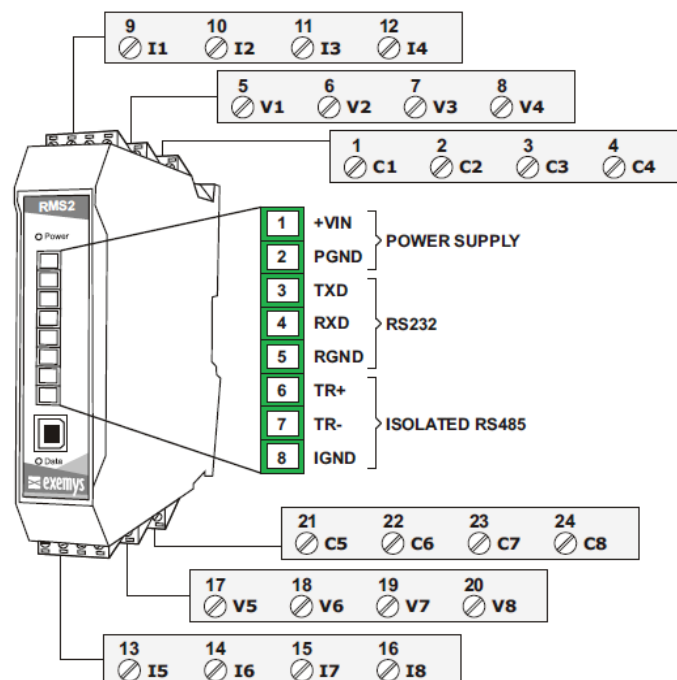
2.1 Power Input Connection

RMS2-AI-IA3 allows a power input from +10 to 30 V_{DC}. Positive power supply must be connected to the terminal N° 1 and negative power supply to terminal N° 2 as can be shown in the following figure:



2.2 Connections and terminals

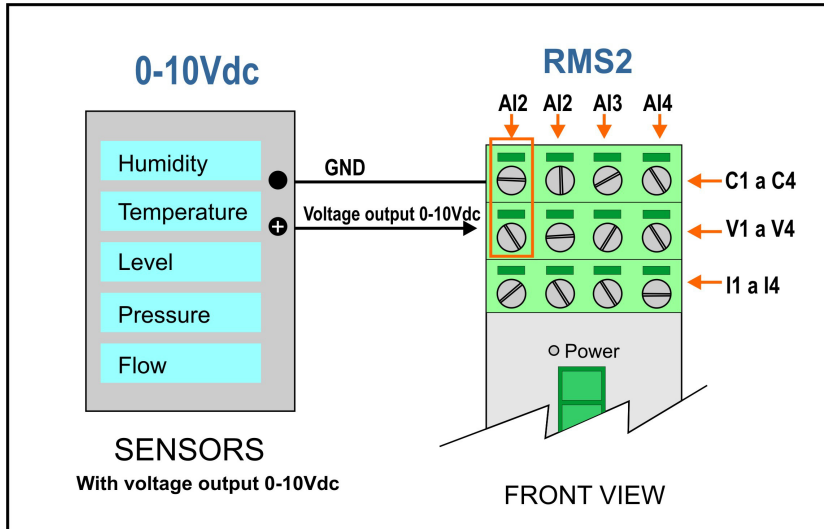
Device has 7 plug-in terminals. The function of each terminal is indicated in the following picture.



2.2.1 Analog inputs wiring

2.2.1.1 Voltage input wiring (0-10V)

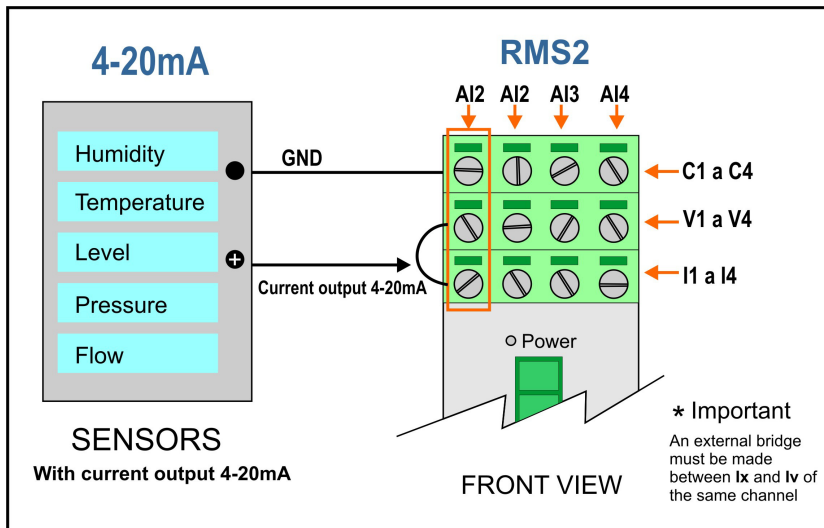
Sensors with voltage output (0-10V) can be connected to the device as shown in the following figure.



2.2.1.2 Current input wiring(4-20mA)

In this case, sensors with current loop output (4-20mA) can be connected to the device as shown in the following figure.

The input impedance value of each track is 62Ω.

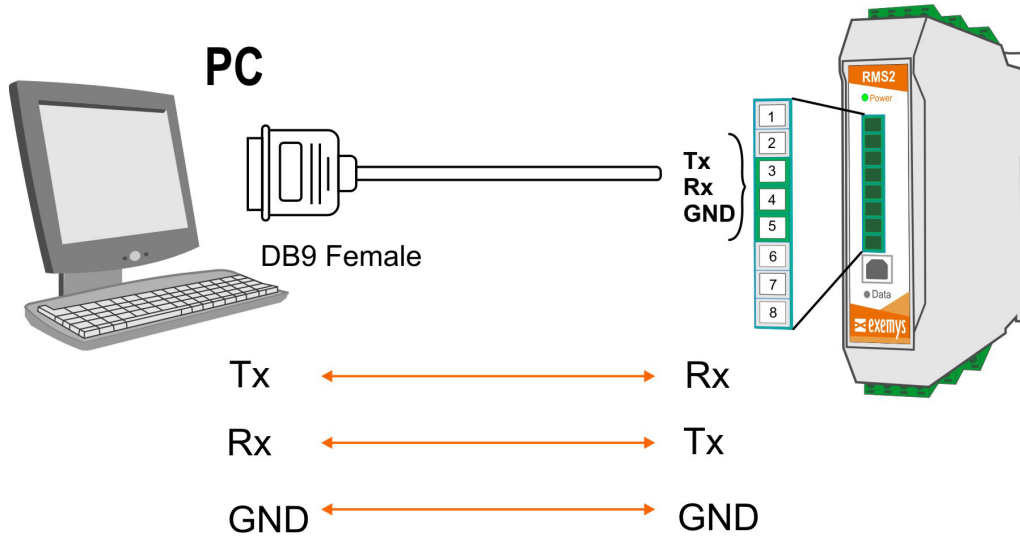


Do not exceed the signal limit for each case (10 V or 20 mA respectively).

Excessive signal level may cause abnormal operation or permanent damage to the device.

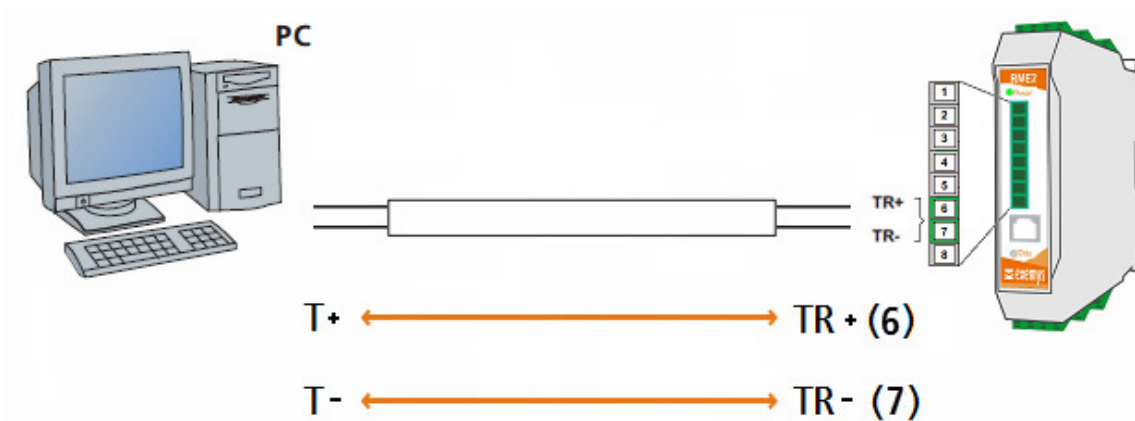
2.2.2 RS232 serial port wiring

To connect the device RS232 serial port to PC serial port or any other serial device, it must be connected as can be shown in the following figure. You should consider RMS2-AI-IA3 is a DTE device, which means it must cross wire with those of the PC.



2.2.3 RS485 serial port connection

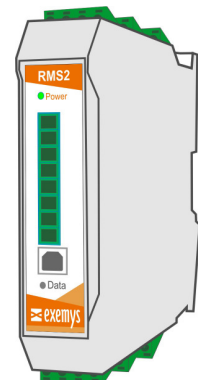
To connect the device RS485 serial port to PC serial port or any other serial device, it must be connected as can be shown in the following figure.



2.3 LEDs Indicators

RMS2-AI-IA3 has two LEDs indicators. Power LED indicates that device is energized, whereas Data LED shows activity of RS232 / RS485 port.

Power	Data	Description
Switched on	-	Energized device
-	Flashes turning off	Data Transmission or reception
Flashes alternately with the Data LED	Flashes alternately with the Power LED	Critical failure. Contact technical support.



3 Configuration

RMS2-AI-IA3 configuration is done through a command console connecting the device to a USB port on the PC.

To access the command console, you must connect the RMS2-AI-IA3 to a USB port on a PC and you must install an Exemys serial terminal program, named *Exemys Console*.

Download the USB driver:

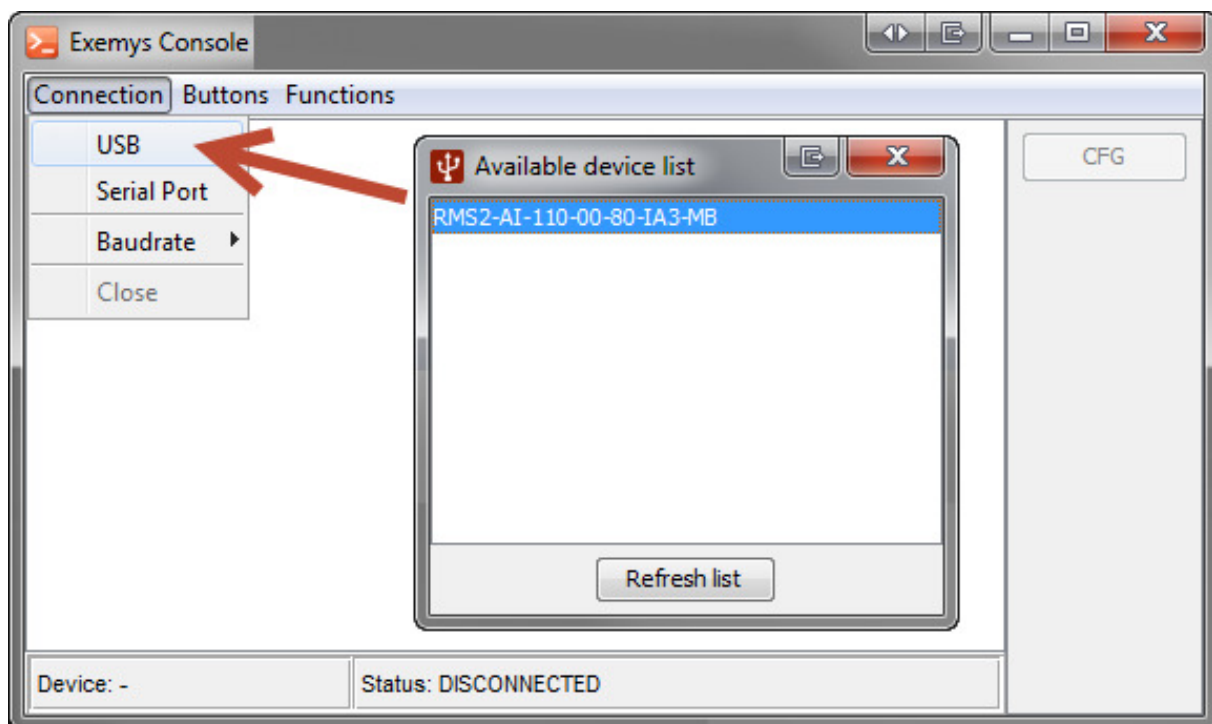
<http://www.exemys.com/rmsrmdriver>

Download the Exemys Console:

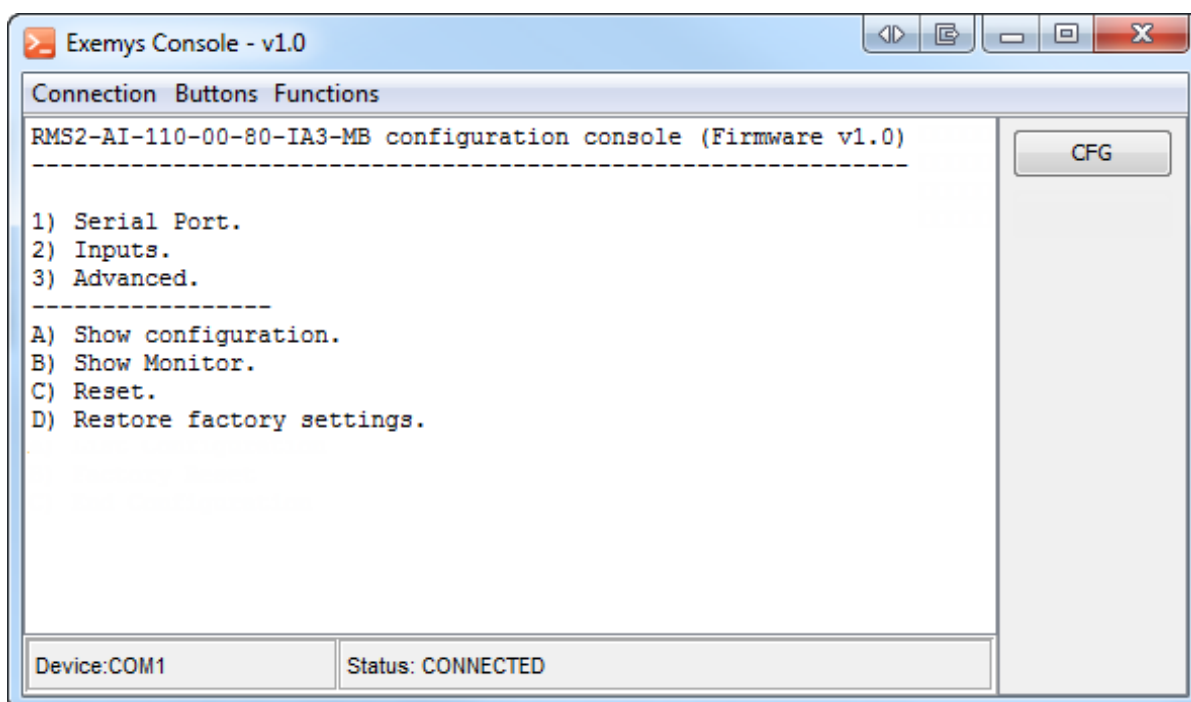
<http://www.exemys.com/console>

Once the driver and the serial terminal program are installed, connect the RMS2-AI-IA3 to a USB port on the PC and execute the *Exemys Console*.

1. Click on Connection -> USB, it will open a window with the description of all the Exemys products with USB port. Select with double click the product you want to set.



2. Type CFG and press ENTER or press the CFG button. RMS2-AI-IA3 will display welcome message on the configuration command console.



3. Type the menu or submenu number to which you want to access and edit its parameters with the proposed values.

3.1 Serial port configuration

Option	Description
1->1 Baud Rate (1200 ... 115200)	Setting the Baud Rate. <ul style="list-style-type: none"> ▪ Values: 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200. Example: 1->1->4 (Serial Port->Baud Rate->1200)
1->2 Data Bits (7 8)	Setting the Data Bits <ul style="list-style-type: none"> ▪ Values: 7 Bits, 8 Bits. Example: 1->2->1 (Serial Port->Data Bits->7 Bits)
1->3 Parity (N E O)	Setting the Parity <ul style="list-style-type: none"> ▪ Values: None, Odd, Even. Example: 1->3->3 (Serial Port->Parity->ODD)
1->4 Stop Bits (1 2)	Setting the Stop Bits <ul style="list-style-type: none"> ▪ Values: 1,2 Example: 1->4->1 (Serial Port->Stop Bits->1)
1->5 Modbus Mode (RTU ASCII)	Setting the Modbus Mode <ul style="list-style-type: none"> ▪ Values: RTU, ASCII. Example: 1->5->1 (Serial Port->Modbus Mode->RTU)

3.2 Inputs Configuration

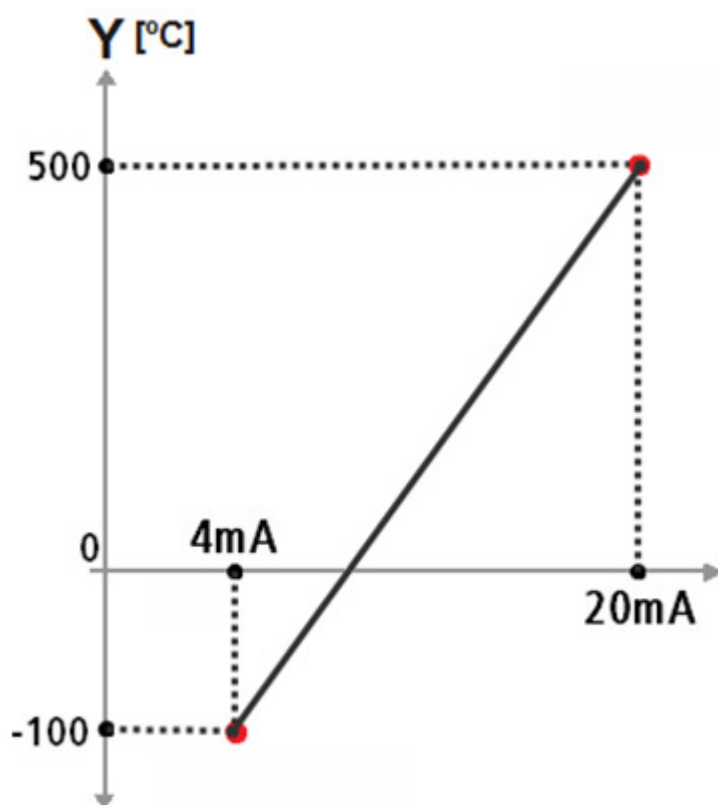
Option	Description
1->1...8->1 Input Type (4-20mA 0-10V)	Setting the analog input type <ul style="list-style-type: none"> Values: Voltage 0-10 V, Current Loop 4-20 mA. Example: 2->1->1->2 (Inputs->Input N°1->Input Type ->0-10V)
1->1...8->2 Average (1 ... 100)	Setting the number of samples that are taken to make an average of readings. This is the value shown when the input is monitored. <ul style="list-style-type: none"> Values: 1, 5, 10, 20, 50, 100. Example: 2->2->2->20 (Inputs->Input N°2->Average->20)
1->1...8->3 Scaling (X0 Y0 X1 Y1)	RME2-AI-IA3 can convert the measured value to a scaled value. For example, you can convert a signal from a temperature transducer with 4-20mA output to a reading of -100 to 500 degrees Celsius; for this, you must set the 2 points to scale, in this way, device applies the equation of a line given that you know two points it passes through.

3.2.1 Scaling Configuration.

Option	Description
1->1...8->3->1 Y0 (-32767 32767)	The value YMIN will be the desired minimum output value. <ul style="list-style-type: none"> Values: -32767...32767. Example: 2->5->3->1->-100 (Inputs->Input N°5->Scaling->YMIN->-100)
1->1...8->3->2 Y1 (-32767 32767)	The value YMAX will be the desired maximum output value. <ul style="list-style-type: none"> Values: -32767...32767. Example: 2->5->3->2->500 (Inputs->Input N°5->Scaling->YMAX->500)

Next, we will post an example about it was explained previously:

It's necessary to convert a signal from a temperature transducer with 4-20mA output to a reading of -100 to 500 degrees Celsius. For this, the output values would be YMIN = -100 and YMAX = 500.



3.3 Advanced Configuration

Option	Description
1->1 Modbus Slave ID (1...254)	Setting the internal Modbus Slave ID to access to the data transfer memory <ul style="list-style-type: none"> Values: 1...254. Example: 3->1->50 (Advanced->Modbus Slave ID->50)
3->2 CSV Monitor (0 1)	Enables/Disables the text monitor option <ul style="list-style-type: none"> Values= Enabled / Disabled Example: 3->2->1 (Advanced->CSV Monitor->Enabled)

After enabling CSV monitor you must choose option 'E' on the main menu for it to start working.

While it's enabled the device will send once a second the scaled value of the 8 analog inputs on the USB port. It will be text formatted and separated with commas.

Once enabled, it will be enabled even after turning the device off. To enter configuration mode again press ESC or ENTER and type CFG and ENTER

3.4 Other Configuration Items

Option	Description
<p style="text-align: center;">A</p> <p>Show Configuration</p>	<p>Listing the current device configuration.</p>
<p style="text-align: center;">B</p> <p>Show Monitor</p>	<p>Showing the current device measurements, represented in 3 different types of values, detailed below:</p> <p>Analog Value: Value in Ampere or Volt according to each of the inputs configured. Range 0-10 V or 4-20 mA.</p> <p>Scaled Value: In this field you see the value calculated according to the scaling configuration.</p> <p>A/D Convert Value: Analog digital converter counts for each of the eight inputs.</p>
<p style="text-align: center;">C</p> <p>Reset</p>	<p>Restart the device.</p>
<p style="text-align: center;">D</p> <p>Factory Reset</p>	<p>Reset to the factory setting This command must be typed 2 times to begin working.</p>
<p style="text-align: center;">E</p> <p>End</p>	<p>Ends the configuration mode.</p>

4 Modbus Communication

4.1 Modbus Registers

Each input has a register in the Modbus Holding Registers area. In this way, once the communication is established, the data is transferred transparently from the analog inputs to the corresponding Modbus address.



NOTA

Holding Registers presented below are **read only**.

Modbus TCP Registers	Description
40001 to 40008	Analog Value (x 100).
	Current inputs status (This field that indicates the status of each analog input configured in current).
40009 to 40016	0: Normal. 1: Below 4mA 2: Above 20mA
	Note: these registers are 0 when the inputs are configured in voltage.
40017 to 40024	Scaling Value.
40025 to 40032	Analog digital converter counts 0 for 0V and 4000 for 10V. 800 for 4mA and 4000 for 20mA.
	Input type.
40201 to 40208	0: Current 4-20mA. 1: Voltage 0-10V.
	Average.
40209 to 40216	1, 5, 10, 20, 50, 100 ->Number of samples to average.
40217 to 40224	Scaling YMIN value for all the inputs (values from - 32.767 to 32.767)
40225 to 40232	Scaling YMAX value for all the inputs (values from - 32.767 to 32.767)

Appendix **A**

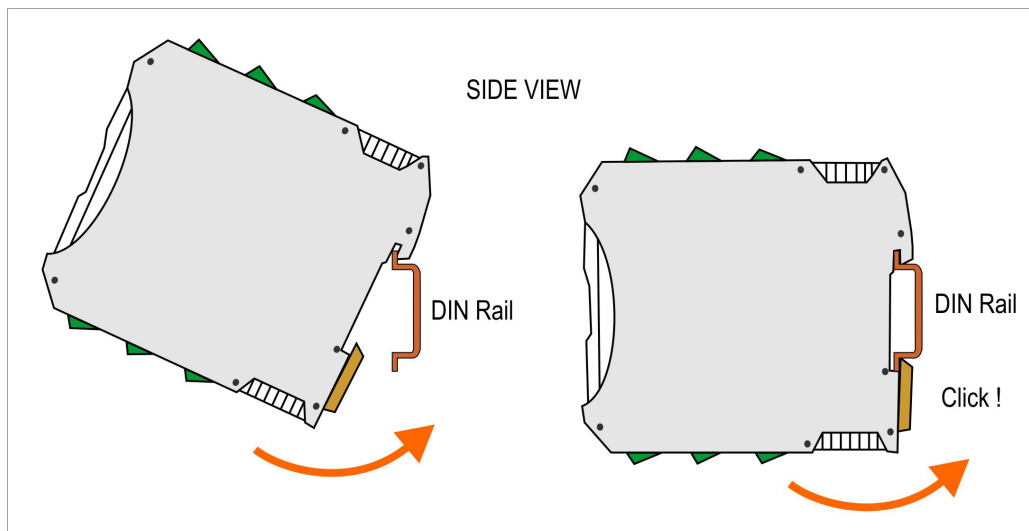
A.Factory Settings

Parameters	Value
Serial Port A	
Baud Rate.	9600 bps
Data Bits	8
Parity.	NO
Stop Bits	1
Modbus Mode.	Modbus RTU
INPUTS x 8	
Configuration	
Type.	4-20 mA
Average.	5
YMIN	400
YMAX	2000
Others	
Internal Memory ID.	240

Appendix B

B.DIN Rail Mounting

Device can be mounted on a DIN rail. To assembly the module to the rail, make the upper side of the device fit the DIN rail and then push gently until you hear a Click! As shown in the figure.



To disassemble the device of the rail DIN, pull down the metallic clip and then remove it as shown in the figure.

