veawe™	Remote IO Module / Modbus transmitter MIO-2AI-VI

2AI Modbus Remote I/O Module

Compact Modbus RTU remote I/O module with one 0–20mA and one 0 – 36V analog inputs, configurable alarm logic.

Key Features

- One 0 – 20mA and one 0 – 36V DC Analog Inputs
- 16-bit analog resolution
- Raw analog value resolution of 0.001mA
- Sensor open / broken wire indication
- Individual channel offset and gain calibration
- Integer and IEEE754 float value support
- Modbus RTU over RS-485
- Read from remote device – Master Mode
- DIP switch for address selection from 1 to 15
- Wide Supported baud rates from 300 to 115200
- DIN Rail mount support
- Dimensions: 60mm x 50mm x 20mm (L x W x H)

Supported Modbus Function Codes

- 01 – Read Coils
- 02 – Read Discrete Inputs
- 03 – Read Holding Registers
- 04 – Read Input Registers
- 05 – Write Single Coi
- 06 – Write Single Register
- 15 – Write Multiple Coils
- 16 – Write Multiple Registers

Basic Registers

Analog Input Values

Address	Type	Description
30001–30002	int16	AI1 to AI2 raw analog values
30021–30024	float	AI1 to AI2 scaled engineering values

ModViz – Modbus Configuration & Visualization Tool

ModViz is a powerful yet simple configuration and visualization tool designed to work seamlessly with **Veawe Modbus I/O modules**. It enables engineers, system integrators, and technicians to quickly configure, monitor, and test field devices through an intuitive graphical interface.

The Software can be downloaded from https://veawe.io/modviz/

Table of Contents

Discrete Inputs (1xxxx)

Analog Input Live Alarm Status

Address	Description
10601–10602	AI1 to AI2 alarm active indication

If an analog sensor vale is out of the range set in Alarm Configuration:

- Corresponding alarm led is ON.
- Alarm indication status bit is set

Analog Sensor Open Status

Address	Description
10621–10622	AI1 to AI2 sensor open indication

If an analog sensor is disconnected or open:

- Analog value reads as 0.000mA
- Corresponding sensor open status bit is set

Analog Input Latched Alarm Status

Address	Description
10641–10642	AI1 to AI2 latched alarm status, Auto clears on read

- Latched alarm status stays high even after the alarm is cleared and auto clears only after the master reads this bit

Coils (0xxxx)

AI Alarm Counter Reset

Address	Description
00601–00602	Reset alarm counters for AI1 to AI2

Writing 1 to the coil resets the corresponding Retentive Alarm counter value, This bit is self clearing

Input Registers (3xxxx)

Analog Input Values

Address	Type	Description
30001–30004	int16	AI1 to AI4 raw analog values
30021–30028	float	AI1 to AI4 scaled engineering values

Example: - 20000 = 20.000mA - Float values use IEEE754 format and occupy 2 Modbus registers

Analog Input Alarm Counter Values

Address	Type	Description
30601–30602	int16	AI1 to AI2 alarm counters

Holding Registers (4xxxx)

Analog Input Calibration

Address	Type	Description
40601–40602	int16	AI1 to AI2 offset calibration
40621–40024	float	AI1 to AI2 gain calibration

Examples: Offset value 1000 = +1.000mA, Gain value 0.005 = multiplier correction

Analog Input Alarm Configuration

Address	Type	Description
40661–40662	int16	AI1 to AI2 alarm mode
40681–40682	int16	AI1 to AI2 alarm minimum
40701–40702	int16	AI1 to AI2 alarm maximum

Alarm Modes Values: -

0 = Disabled
1 = Outside minimum or maximum
2 = Maximum only
4 = Inside minimum and maximum window
3 = Minimum only

Analog Input Master Mode Configuration

These values are applicable when the device is in the Master mode 40104 = 1

Address	Type	Description
40791	int16	Remote device source register type to write 0 = Holding Register
40792	int16	Remote device source data type to write 0 = int16 raw data 0 to 20000 for 0 ~ 20.000 mA and 0 to 36000 for 0 ~ 36.000 V 1 = float scaled data as per offset and gain 2 = int16 scaled data as per offset and gain
40793	int16	Remote device source start address
40794	int16	Remote source channel count Max channels is 2

Communication Settings

Address	Type	Description
40101	int16	Modbus slave address (switch value)
40102	int16	Baud rate selection
40103	int16	Serial format selection
40104	int16	Serial device mode 0 = slave, 1 = master
40105	int16	Remote read/write poll interval e.g 10 = 1 Seconds

Modbus Address (40101) is set using the rotary/dip switches

Baud Rate Register (40102) and Serial Format Register (40103)

40102				40103	
Value	Baud Rate	Value	Baud Rate	Value	Format
0	300	7	9600	0	8N1
1	600	8	14400	1	8E1
2	1200	9	19200	2	8O1
3	1800	10	38400	3	8N2

40102				40103	
4	2400	11	57600	4	8E2
5	4800	12	62500	5	8O2
6	7200	13	115200		
Default: 19200 baud				Default: 8N1	

Default Mode

Default mode is useful when communication settings are unknown.
When rotary address switch is set to 00:

- Slave Address = 1
- Baud Rate = 19200
- Serial Format = 8N1

Changing to default mode does not overwrite stored settings. Stored settings remain unchanged until written through Modbus.

Write Remote Device – Master Mode

When 40104 is set to 1, the module operates in Modbus Master mode.

In this mode, the module periodically writes data to another Modbus slave device and automatically updates its analog inputs to the remote device.

Typical applications:

- Converting remote Modbus analog values into digital outputs
- Sending analog values to legacy PLC with only slave support
- Converting tank level, pressure, or flow registers into digital retransmission inputs
- Creating a Modbus-to-analog gateway

Working of Master mode

- Master mode polls the remote device-id as set in the rotary/dip switch
- Master mode polls the remote device at the interval defined by 40105
- The destination device register type is selected using 40791
- The destination data type is selected using 40792
- The start address of the remote data is defined in 40793
- The number of channels to write is defined in 40794
- Automatically write values of AI1 and AI2 to mapped address as per the count
- If float mode is selected, two Modbus registers are used per channel
- If int16 mode is selected, one Modbus register is used per channel
- Offset and gain settings are still applied in master mode

LED Indications

LED	Description
Power	Module power ON indication
Tx	RS-485 transmit status and active blink
AL1–AL2	Alarm active status

Electrical Specifications

Parameter	Value
Supply Voltage	9–24V DC or USB 5V
Analog Input Range	0 – 20mA, 0 – 36V
Communication Port	RS-485

Connector Terminal Details

DC Input RS485 Analog Inputs V&I

24V+	24V-	A+	B-	AI2- mA	AI2+ mA	AI1- V DC	AI1+ V DC
1	2	3	4	5	6	7	8

Register Summary Tables

1. AI Complete Register Table

Function	Address Range	Type	Description
Discrete Inputs	10601–10602	Bit	AI1 to AI2 alarm indication
Discrete Inputs	10621–10622	Bit	AI1 to AI2 sensor open indication
Discrete Inputs	10641–10642	Bit	AI1 to AI2 latched alarm indication
Coils	00251–00252	Bit	Reset slow counter
Coils	00601–00602	Bit	Reset AI alarm counter
Input Registers	30001–30002	int16	AI1 to AI2 raw value
Input Registers	30021–30024	float	AI1 to AI2 scaled value
Input Registers	30601–30602	int16	AI1 to AI2 alarm counters
Holding Registers	40101	int16	Slave address

Function	Address Range	Type	Description
Holding Registers	40102	int16	Baud rate selection
Holding Registers	40103	int16	Serial format
Holding Registers	40104	int16	Serial device mode 0 = slave, 1 = master
Holding Registers	40105	int16	Remote read/write poll interval e.g 10 = 1 Seconds
Holding Registers	40601–40602	int16	AI1 to AI2 offset
Holding Registers	40621–40624	float	AI1 to AI2 gain
Holding Registers	40661–40662	int16	AI1 to AI2 alarm mode
Holding Registers	40681–40682	int16	AI1 to AI2 alarm minimum
Holding Registers	40701–40702	int16	AI1 to AI2 alarm maximum

Engineering Value and Calibration

The module internally measures analog current input as a raw integer value.

Example:

- 0mA = 0
- 4mA = 4000
- 12mA = 12000
- 20mA = 20000

Raw values are stored in int16 registers with a resolution of 0.001mA.

Engineering value registers allow the raw current value to be converted into user units such as:

● Pressure ● Temperature ● Tank level ● Flow ● Weight ● Percentage

Example conversions:

Sensor Type	Input Range	Engineering Value Range
Pressure Transmitter	4–20mA	0 to 10.0 Bar
Tank Level Sensor	4–20mA	0 to 100 %
Temperature Transmitter	4–20mA	0 to 200 °C

Engineering values are available in float format using IEEE754 registers.

Formula:

Engineering Value = (Raw Value + Offset) × Gain

Where:

- Raw Value = measured current in 0.001mA units
- Offset = calibration correction in 0.001mA units
- Gain = engineering unit multiplier

Example:

- Raw input = 12000

- Offset = -4000
- Gain = 0.01
- Engineering Value = 80

This can be used for a transmitter scaled from 0–20mA to -40 to +160 °C.

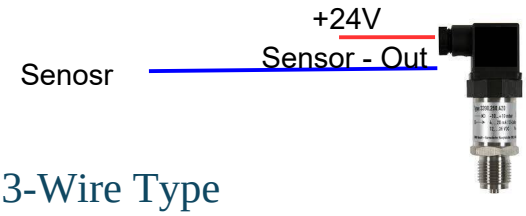
Examples:

Raw to mA	Raw Value	Offset	Gain	Result
4–20mA to 0–100 %	12000	0	0.001	12.000mA
4–20mA to 0–10 Bar	12000	-4000	0.00625	50.0 %
4–20mA to 0–200 °C	12000	-4000	0.0125	100.0 °C

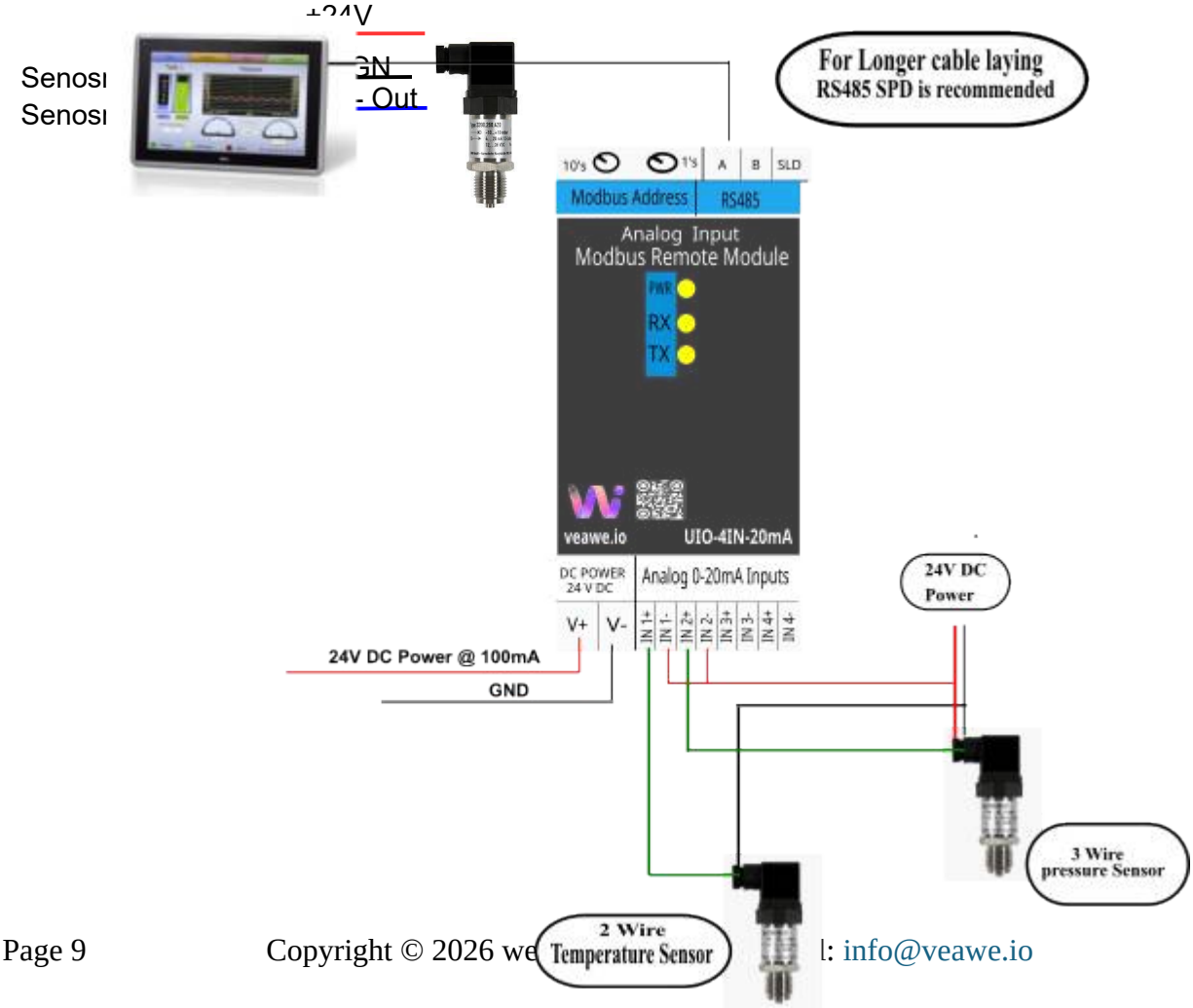
Analog 20mA sensor connection diagram

“Note: All images and connection diagrams shown are for illustrative purposes only and may differ from the actual product.”

2-Wire Type



3-Wire Type



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