2-Channel Analog Input Modbus Remote I/O Module

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

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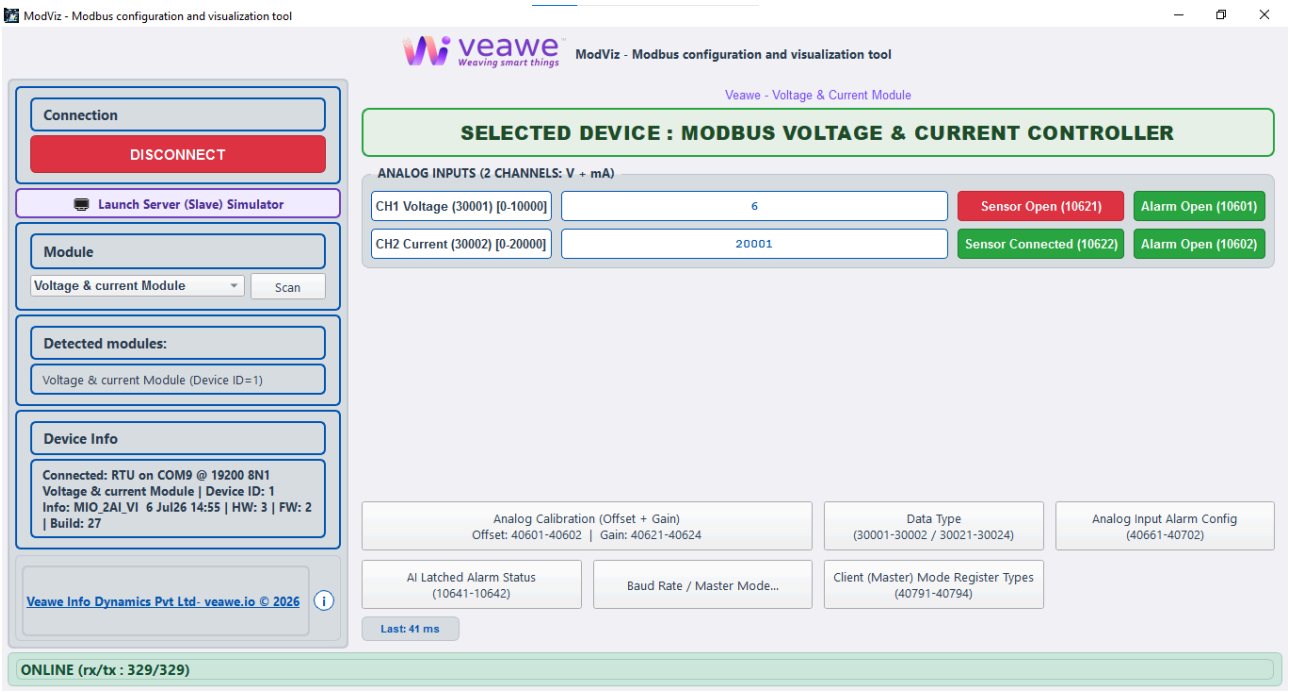
Key Features

- 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 in Master Mode
- DIP switch for address selection from 1 to 15
- Wide supported baud rates from 300 to 115200
- DIN rail mount support
- Dimensions: 60 mm x 50 mm x 20 mm (L x W x H)

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/



Ordering Information

Product Code	Description
MIO-2AI-VI	**2-Channel Analog Input Module (0–20mA / 0–36V DC)**
UIO-8IN-20MA	8-Channel Analog Input Module (0–20mA)
UIO-4IN-20MA	4-Channel Analog Input Module (0–20mA)
UIO-4IN-10V	4-Channel Analog Input Module (0–10V DC)
UIO-444-20mA	4-Channel Analog Input with DI and DO

Applications

- **Industrial Automation** – Monitor analog sensors in PLC and SCADA systems
- **Process Monitoring** – Measure current and voltage from transmitters and sensors
- **Energy & Utilities** – Monitor DC voltage, current, and other process parameters
- **Building Management** – Integrate sensors for HVAC, power monitoring, and environment control
- **Remote Monitoring** – Ideal for distributed installations and remote data acquisition

Specifications

Parameter	Value
Mounting	DIN rail
Dimensions	60 mm x 50 mm x 20 mm (L x W x H)

Electrical Specifications

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

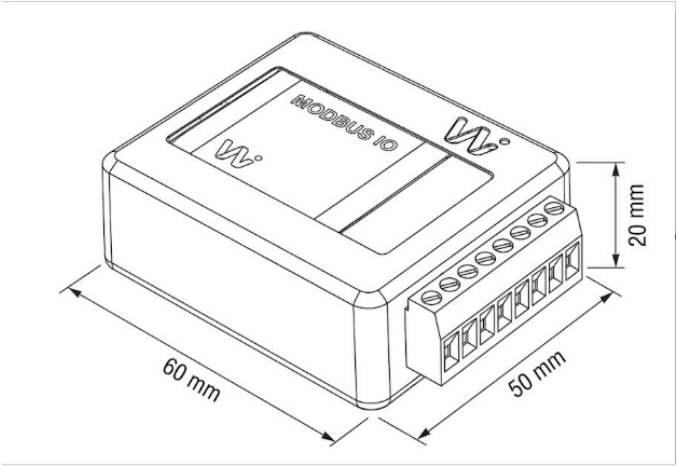
Input/Output Specifications

Parameter	Value
Channel Count	2
Signal Range	0–20mA (CH1), 0–36V DC (CH2)
Resolution	16-bit, 0.001mA raw resolution

Isolation & Protection Specifications

Parameter	Value	Notes / Description
Supply Reverse Polarity Protection	Integrated	Series protection diode (continuous protection, zero reverse leakage)
Supply Isolation	Non-Isolated	Common ground between input power, internal circuitry, analog inputs
Transient Voltage Clamping	Up to 600W	Clamps overvoltage spikes (10/100 µs peak pulse rating)
EMC & Immunity Standards	Class-Compliant	Meets IEC 61000-4-2 (ESD), IEC 61000-4-4 (EFT), & IEC 61000-4-5 (Surge)
RS-485 Bus ESD Protection	15kV HBM/Air	IEC61000-4-2 Integrated high-ESD protected transceiver on A/B lines

Mechanical Dimensions

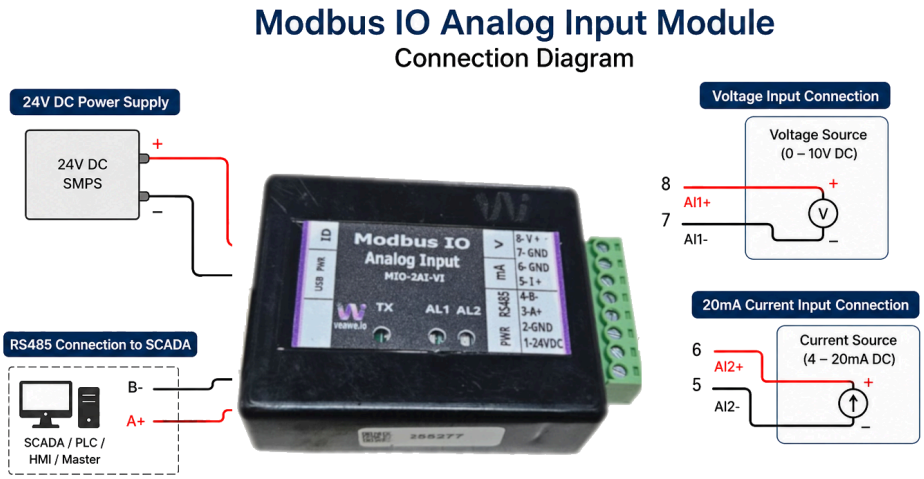


Terminal Details

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

Wiring Diagrams

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



Communication Interface

Protocol	Physical Layer	Default Baud Rate	Default Format
Modbus RTU	RS-485	19200	8N1

Basic Process Registers

Signal	Address	Type	Description
AI1 (0–20mA)	30001 / 30021–30022	int16 / float	Raw analog (0.001mA) / Scaled engineering value
AI2 (0–36V)	30002 / 30023–30024	int16 / float	Raw analog (0.001V) / Scaled engineering value

Supported Modbus Function Codes

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

Register Map Overview

Function	Address Range	Type	Description
Discrete Inputs	10601–10602	Bit	AI1 to AI2 alarm active indication
Discrete Inputs	10621–10622	Bit	AI1 to AI2 sensor open indication
Discrete Inputs	10641–10642	Bit	AI1 to AI2 latched alarm status
Coils	00601–00602	Bit	Reset AI alarm counter
Input Registers	30001–30002	int16	AI1 to AI2 raw analog values
Input Registers	30021–30024	float	AI1 to AI2 scaled engineering values
Input Registers	30601–30602	int16	AI1 to AI2 alarm counters
Holding Registers	40101	int16	Modbus slave address (switch value)
Holding Registers	40102	int16	Baud rate selection
Holding Registers	40103	int16	Serial format selection
Holding Registers	40104	int16	Device mode: 0 = Server, 1 = Client
Holding Registers	40105	int16	Remote read/write poll interval
Holding Registers	40601–40602	int16	AI1 to AI2 offset calibration
Holding Registers	40621–40624	float	AI1 to AI2 gain calibration
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
Holding Registers	40791–40794	int16	Master Mode write configuration registers

Detailed Register Tables

Discrete Inputs (1xxxx)

Analog Input Live Alarm Status

Address	Description
10601–10602	AI1 to AI2 alarm active indication

If an analog sensor value is out of the range set in the alarm configuration:

- The corresponding alarm LED is ON.
- The 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:

- The analog value reads as 0.000mA.
- The 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
30001–30002	int16	AI1 to AI2 raw analog values
30021–30024	float	AI1 to AI2 scaled engineering values

Example: 20000 = 20.000mA. Float values use IEEE754 format and occupy two Modbus registers.

Analog Input Alarm Counter Values

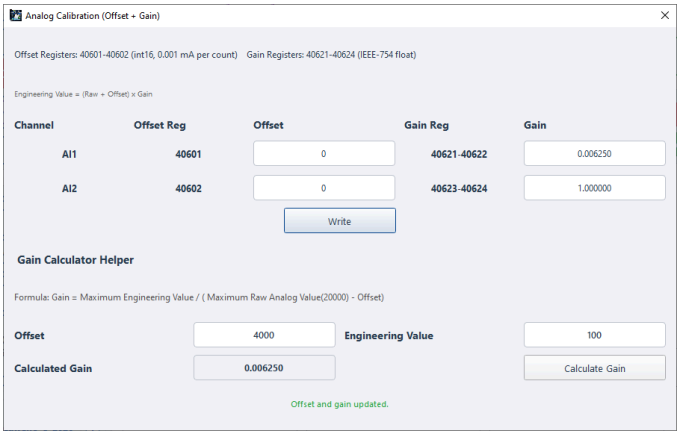
Address	Type	Description
30601–30602	int16	AI1 to AI2 alarm counters

Holding Registers (4xxxx)

Analog Input Calibration

Address	Type	Description
40601–40602	int16	AI1 to AI2 offset calibration
40621–40624	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 mode values:

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

Analog Input Master Mode Configuration

These values are applicable when the device is in Master Mode and 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, 1 = float scaled data, 2 = int16 scaled data
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. Example: 10 = 1 second

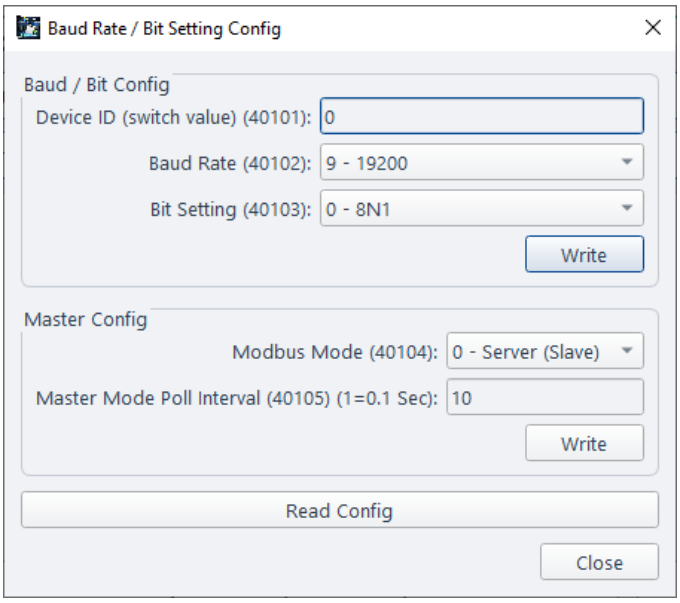
Modbus Address (40101)

This is set using the rotary or DIP switches.

Baud Rate Register (40102) and Serial Format Register (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
4	2400	11	57600	4	8E2
5	4800	12	62500	5	8O2
6	7200	13	115200		

Default: 19200 baud, 8N1.



Default Settings

Setting	Default
Slave Address	As per switch position
Baud Rate	19200
Serial Format	8N1

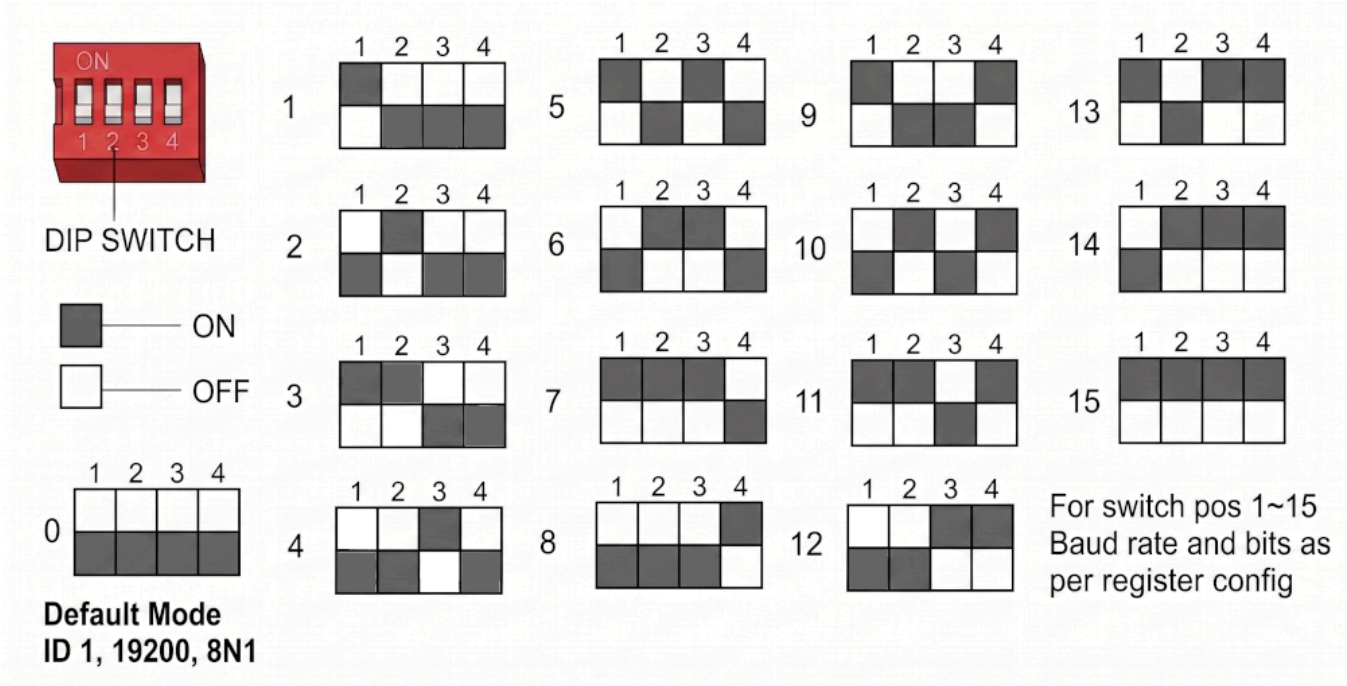
Configuration Settings

Default Mode

Default mode is useful when communication settings are unknown.

When the 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.

LED Indications and Diagnostics

LED	Description
Tx	RS-485 transmit status and run blink every 2 sec when idle
AL1–AL2	Alarm active status

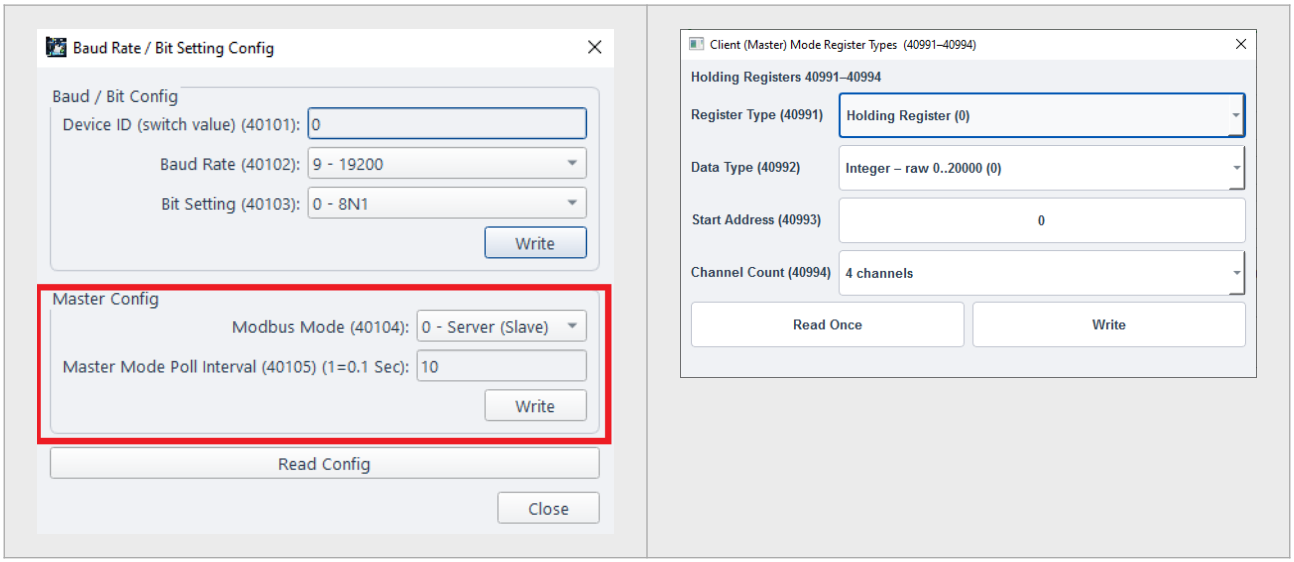
Write Remote Device – Master Mode

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.

Working of Master Mode:

- Master Mode polls the remote device ID as set in the rotary or 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.
- Values of AI1 and AI2 are automatically written to the 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.



Calibration and Engineering Values

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

Examples:

- 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, and percentage.

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.

Raw to mA	Raw Value	Offset	Gain	Result
4–20mA to 0–100%	12000	0	0.001	50.0%
4–20mA to 0–10 Bar	12000	−4000	0.00625	5.0 Bar
4–20mA to 0–200°C	12000	−4000	0.0125	100.0°C

Revision History

Revision	Date	Changes
Rev 1.0	2026-08-10	Initial datasheet, HW Version = 3, FW Version = 2

Get the latest version of this datasheet : **click here..**

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