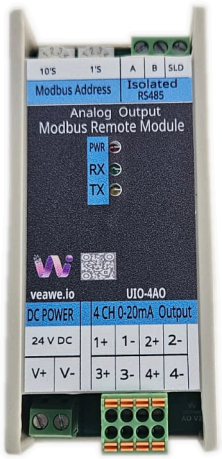
4-Channel Analog Output Modbus Remote I/O Module

Compact Modbus RTU remote I/O module with four
0-20mA analog outputs.

4 Analog Output Modbus Remote I/O Module

Compact Modbus RTU remote I/O module with four 0–20mA analog outputs, supporting direct write control and Master Mode remote read.



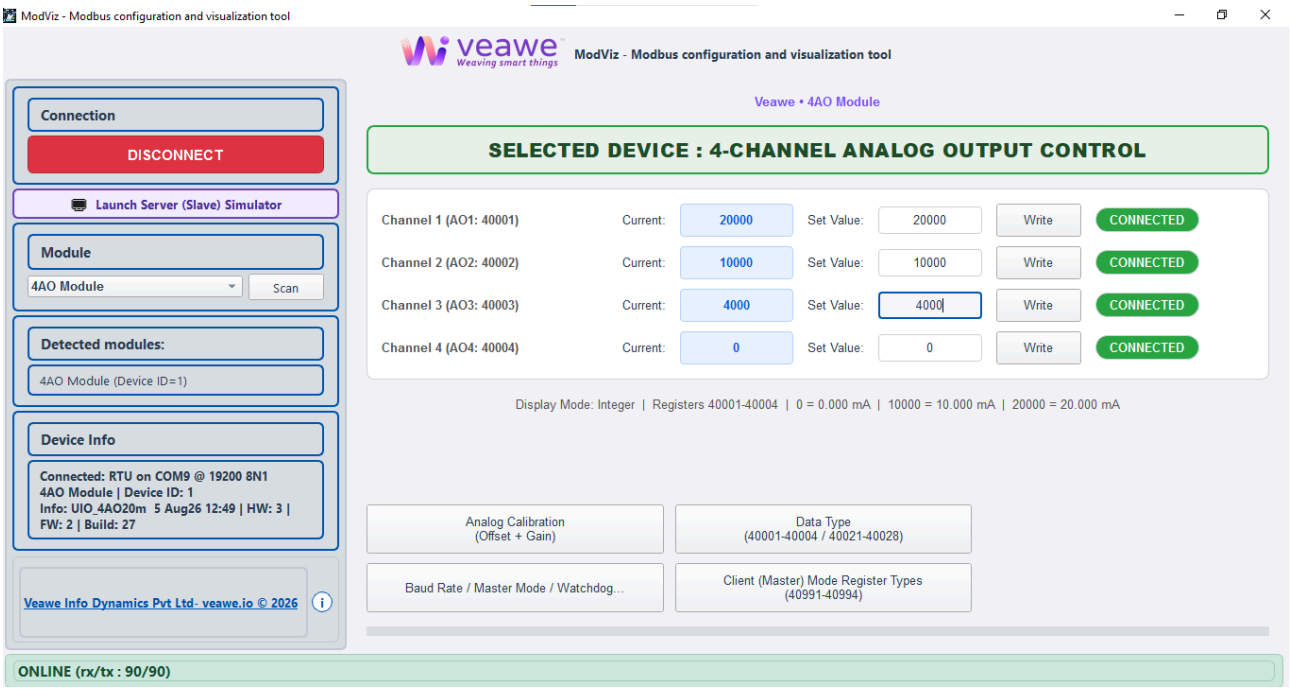
Key Features

- 4 Channel 0–20mA Analog Outputs
- Resolution at 0.02 mA
- Individual channel offset and gain calibration
- Integer and IEEE754 float value support
- Modbus RTU over RS-485
- Read from remote device – Master Mode
- Rotary address switch for address selection from 1 to 99
- Wide supported baud rates from 300 to 115200
- DIN rail mountable
- Dimensions: 110 mm x 50 mm x 55 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
UIO-4AO-20mA	**4-Channel Analog Output Modbus Remote I/O Module**
UIO-2AO-20mA	2-Channel Analog Output Modbus Remote I/O Module

Applications

- Driving 4–20mA actuators, control valves, and VFDs directly from a Modbus master
- Retransmitting PLC or SCADA values to legacy analog-only equipment
- Converting tank level, pressure, flow, or temperature readings into analog output signals
- Feeding analog indicators, chart recorders, or third-party analog inputs from Modbus data
- Building a Modbus-to-analog gateway between digital control systems and analog field devices
- Remote analog control in Master Mode, without requiring a PLC to continuously poll and rewrite values

Specifications

Parameter	Value
Mounting	DIN rail
Dimensions	110 mm x 50 mm x 55 mm (L x W x H)

Electrical Specifications

Parameter	Value
Supply Voltage	15–24V DC
Analog Output Range	0–20mA
Communication Port	RS-485

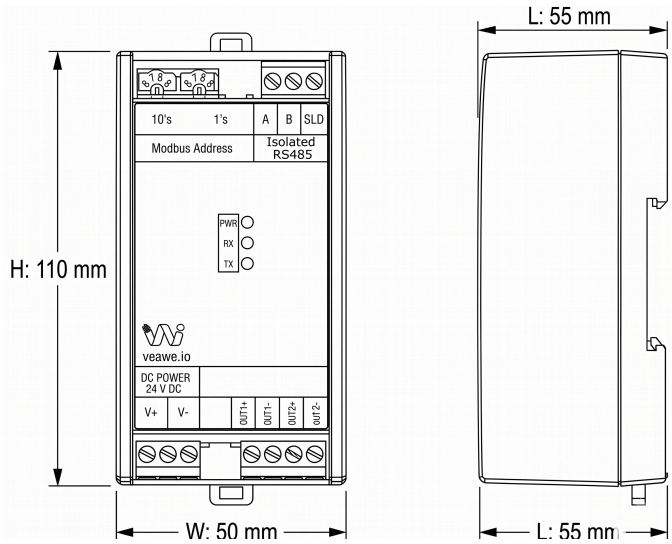
Input/Output Specifications

Parameter	Value
Channel Count	4
Signal Range	0–20mA
Resolution	0.02 mA

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 outputs
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
RS-485 Isolation	2.5kVrms	Isolated RS485 signal with other circuitry

Mechanical Dimensions



Terminal Details

Top Connector – RS-485

Pin	1	2	3
Signal	A	B	Shield

Bottom Connector – Power

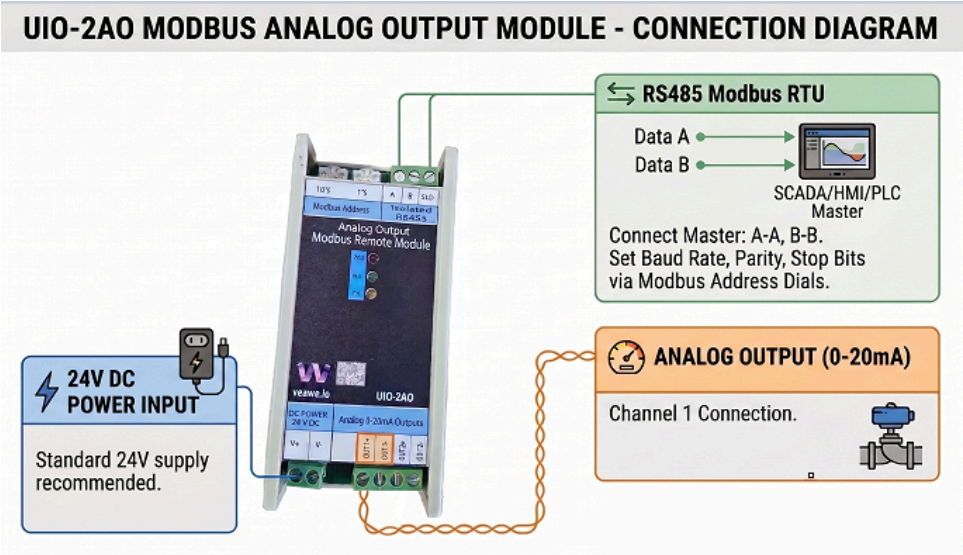
Pin	1	2
Signal	24V	GND

Analog Output Connector

Pin	1	2	3	4
Signal	CH1+	CH1-	CH2+	CH2-
Pin	5	6	7	8
Signal	CH3+	CH3-	CH4+	CH4-

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
AO1–AO4	40001–40004	int16	Analog output value (0.001mA resolution)

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
Holding Registers	40001–40004	int16	AO1 to AO4 raw analog values
Holding Registers	40021–40028	float	AO1 to AO4 scaled engineering values
Holding Registers	40101	int16	Modbus server (slave) address

Detailed Register Tables

Analog Output Values

Address	Type	Description
40001–40004	int16	AO1 to AO4 raw analog values
40021–40028	float	AO1 to AO4 scaled engineering values

Analog Output Calibration

Address	Type	Description
40901–40904	int16	AO1 to AO4 offset calibration
40921–40928	float	AO1 to AO4 gain calibration

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

Analog Output Master Mode Configuration

These values are applicable when the device is in Master Mode and 40104 = 1.

Address	Type	Description
40991	int16	Remote device source register type to read. 0 = Holding Register, 1 = Input Register
40992	int16	Remote device source data type to read. 0 = int16 raw data (0 to 20000 for 0~20.000 mA), 1 = float scaled data as per offset and gain, 2 = int16 scaled data as per offset and gain
40993	int16	Remote device source start address
40994	int16	Remote source channel count. Max channels is 4

Communication Settings

Address	Type	Description
40101	int16	Modbus server (slave) address (switch value)
40102	int16	Baud rate selection
40103	int16	Serial format selection
40104	int16	Serial device mode. 0 = Server (slave), 1 = Client (master)
40105	int16	Remote read/write poll interval. Example: 10 = 1 second
40106	int16	Watchdog interval. Example: 10 = 1 second
40107	int16	Watchdog action. 0 = Modbus Watchdog Disabled, 1 = Reset Outputs on Modbus Watchdog Expire

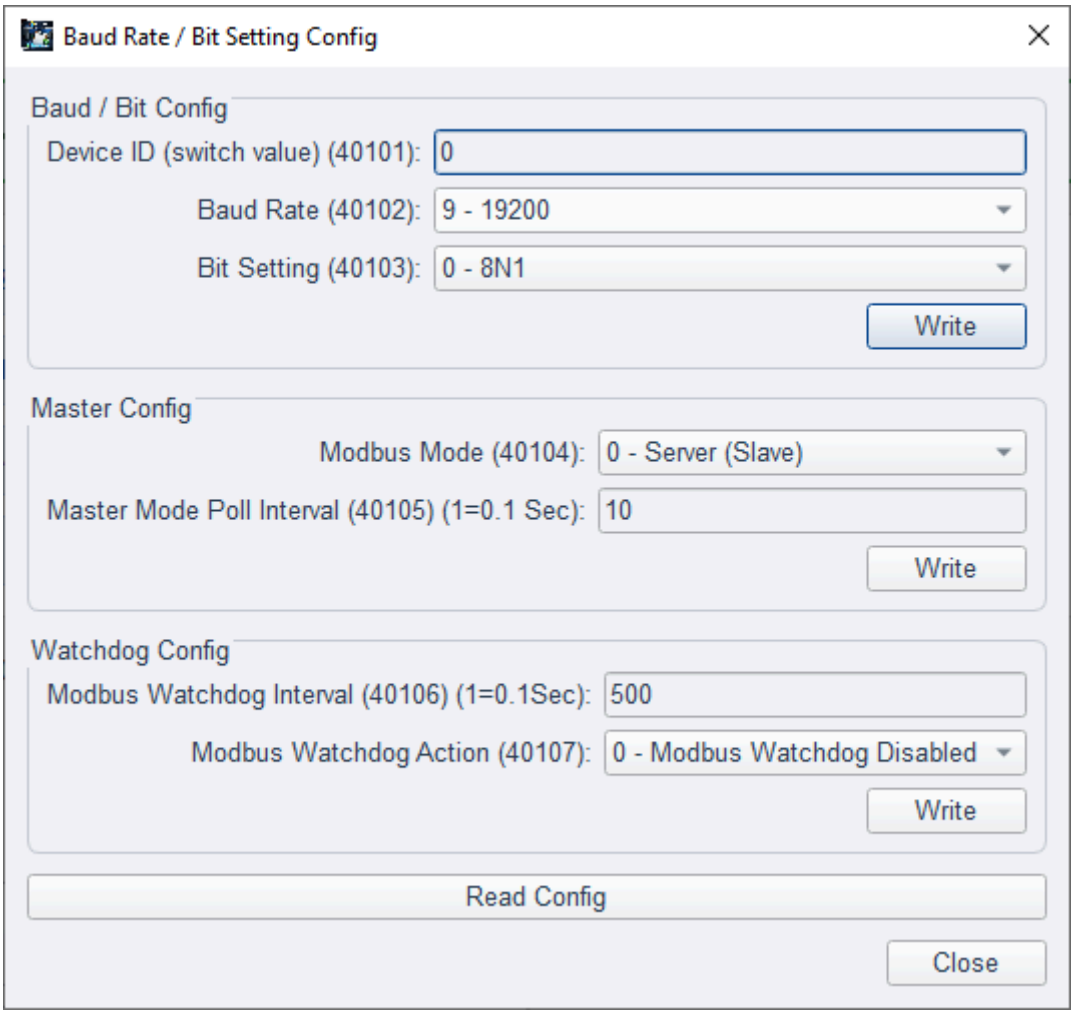
Modbus Address (40101)

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

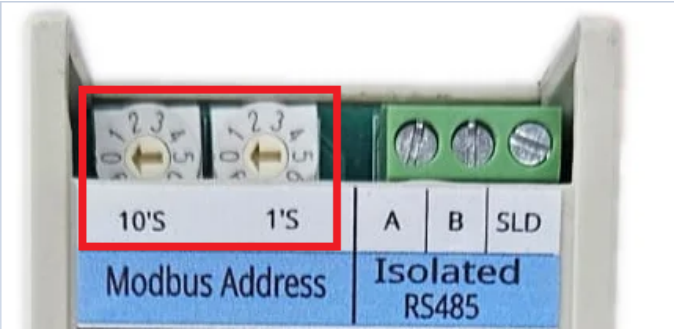
Configuration Settings

Default Mode

Default mode is useful when communication settings are unknown.

When the rotary address switch is set to 00:

- Server address = 1
- Baud rate = 19200
- Serial format = 8N1

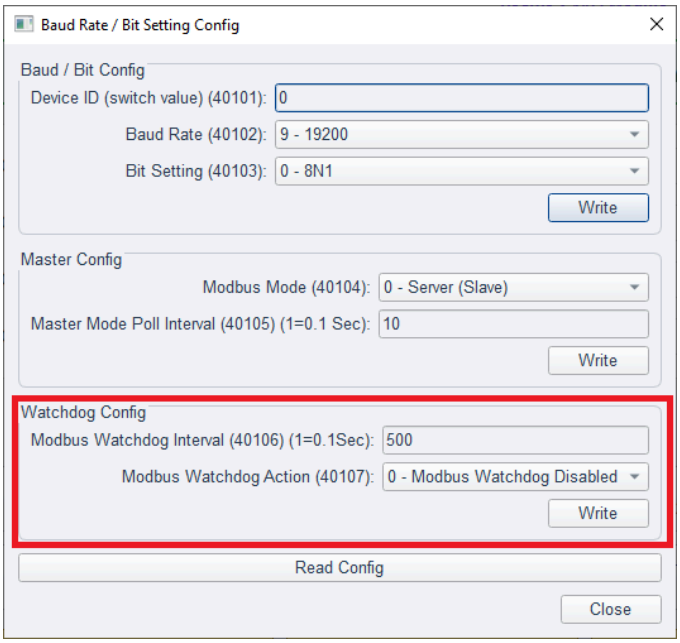


Changing to default mode does not overwrite stored settings. Stored settings remain unchanged until written through Modbus.

Watchdog Action

The Bus Watchdog automatically resets all outputs to their initial safe state if communication with the Modbus client is lost. This helps ensure safe operation during cable disconnection, client failure, or other communication faults.

Configurable timeout: 1 to 600 seconds (100 ms resolution).



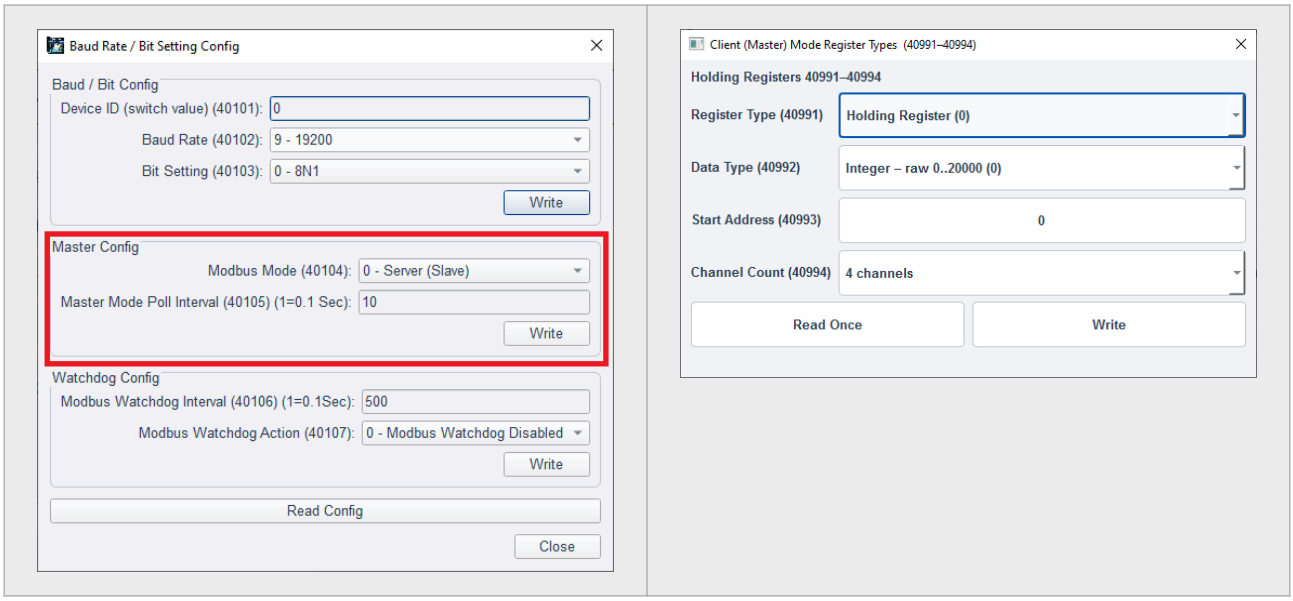
Read Remote Device – Master Mode

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

In this mode, the module periodically reads data from another Modbus server (slave) device and automatically updates its analog outputs based on the received values.

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 source device register type is selected using 40991.
- The source data type is selected using 40992.
- The start address of the remote data is defined in 40993.
- The number of channels to read is defined in 40994.
- Read values are automatically mapped to AO1 through AO4 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 and Diagnostics

LED	Description
Power	Module power ON indication
Tx	RS-485 transmit activity
Rx	RS-485 receive activity

Calibration and Engineering Values

The module internally measures analog current output 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, and percentage.

Sensor Type	Output 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:

Raw Output Value = Offset + (Engineering Value / Gain)

Where:

- Raw Value = measured current in 0.001mA units
- Offset = calibration correction in 0.001mA units
- Gain = engineering unit multiplier
- Offset defines the minimum current output point
- Gain defines how many engineering units correspond to each raw count step above the offset

Examples:

Raw to mA	Eng Input Value	Offset	Gain	Result
0–100% to 4–20mA	50.00	4000	0.00625	12.00 mA
0–10 Bar to 4–20mA	5	4000	0.000625	12.00 mA
0–200°C to 4–20mA	0	4000	0.0125	4.00 mA

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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