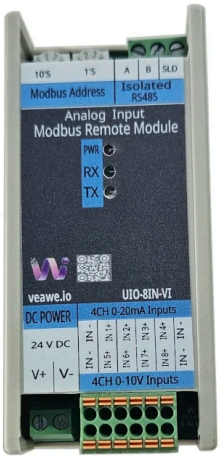
8AI Modbus 4 Channel 20mA and 4 Channel 10V

Compact Modbus RTU remote I/O module with four
0-20mA and four 0-10V analog inputs.

8 Analog Input - four 0-20mA and four 0-10V

Compact Modbus RTU remote I/O module with four 0–20mA and four 0-10V analog inputs, configurable alarm logic.



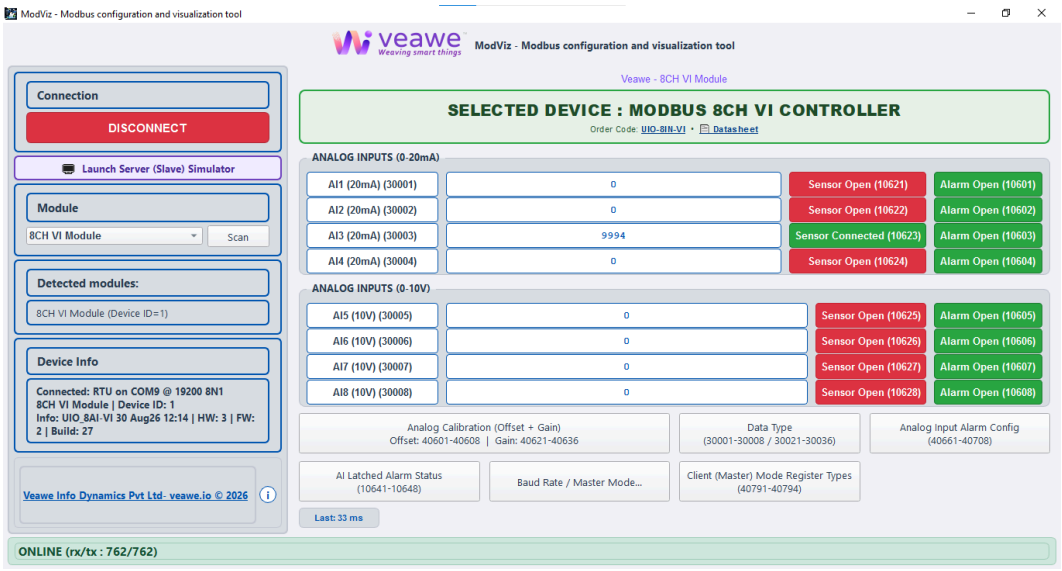
Key Features

- 4 Channel 0–20mA Analog Inputs
- 4 Channel 0–10V Analog Inputs
- 16-bit analog resolution
- Factory calibrated accuracy: ± 0.1% from upper-range
- Raw analog value resolution in steps of 0.001mA & 0.001 V
- Sensor open / broken wire indication
- Configurable individual alarms indication
- Retentive alarm counters on power cycle
- Individual channel offset and gain calibration
- Integer and IEEE754 float value support
- Modbus RTU over Isolated RS-485
- Modbus RTU remote write master mode
- Easy to use free ModViz software
- Rotary address switch for address selection from 1 to 99
- Wide Supported baud rates from 300 to 115200
- DIN rail mountable
- Dimensions: 110mm × 50mm × 55mm

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-8IN-VI	**8-Channel Analog Input (4: 0–20mA + 4: 0–10v)**
UIO-4IN-20MA	4-Channel Analog Input Module (0–20mA)
MIO-2AI-VI	2-Channel Analog Input Module (0–20mA / 0–36V DC)
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 4–20mA and 0–10V analog sensors across up to 8 channels in PLC and SCADA systems
- **Process Monitoring** – Measure current loop signals from transmitters and sensors on high-density installations
- **Energy & Utilities** – Monitor current-based process parameters from field instrumentation
- **Remote Monitoring** – Ideal for distributed installations and remote data acquisition
- **Modbus Gateway** – Master Mode writes AI1–AI8 values to a remote Modbus slave device, retransmitting analog values to legacy PLCs or building a Modbus-to-analog gateway

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 Input Range	0–20mA & 0–10V
Communication Port	RS-485

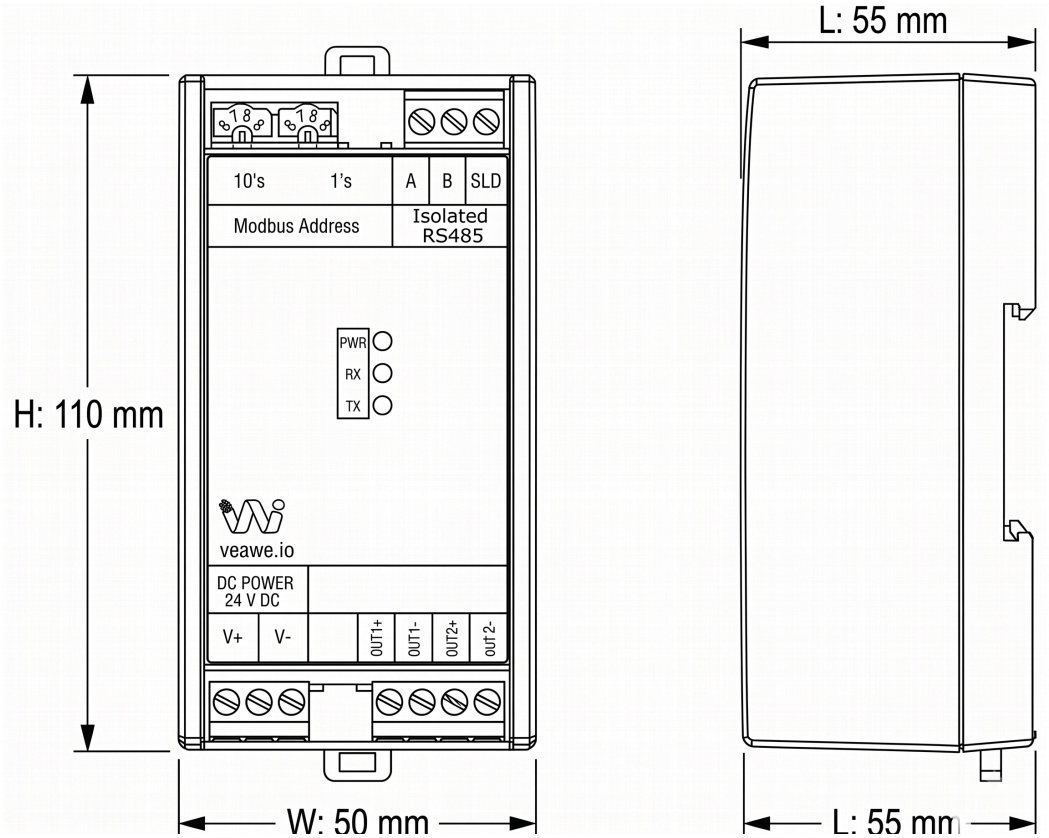
Input/Output Specifications

Parameter	Value
Channel Count	4
Signal Range	0–20mA
Resolution	0.001 mA
Channel Count	4
Signal Range	0–10V
Resolution	0.001 V

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

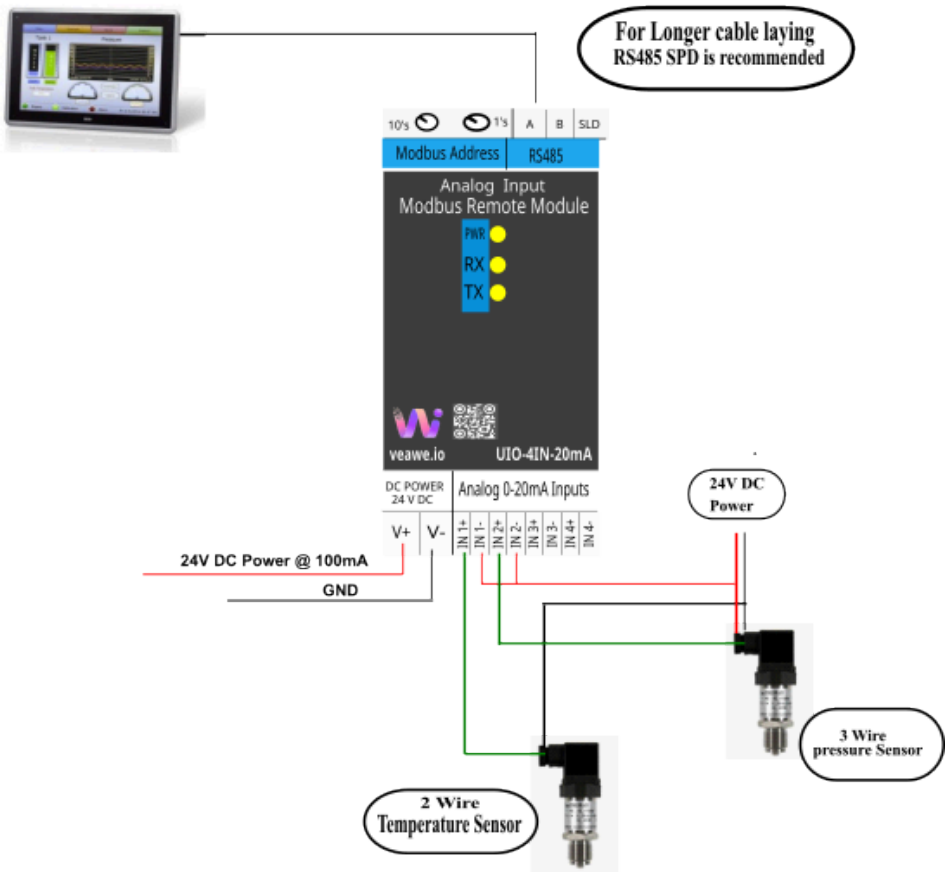
Pin	1	2	3
Signal	A	B	Shield

Analog input Connector

Pin	1	2	3	4	5	6
Signal	GND	CH1+	CH2+	CH3+	CH4+	GND
Pin	7	8	9	10	11	12
Signal	GND	CH5+	CH6+	CH7+	CH8+	GND

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–AI4 (0–20mA), AI5–AI8 (0–10V)	30001–30008 / 30021–30036	int16 / float	Raw analog / 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	10601–10608	Bit	AI1 to AI8 alarm indication
Discrete Inputs	10621–10628	Bit	AI1 to AI8 sensor open indication
Discrete Inputs	10641–10648	Bit	AI1 to AI8 latched alarm indication
Coils	00601–00608	Bit	Reset AI alarm counter
Input Registers	30001–30008	int16	AI1 to AI8 raw value
Input Registers	30021–30036	float	AI1 to AI8 scaled value
Input Registers	30601–30608	int16	AI1 to AI8 alarm counters
Holding Registers	40101	int16	Slave address
Holding Registers	40102	int16	Baud rate selection
Holding Registers	40103	int16	Serial format
Holding Registers	40601–40608	int16	AI1 to AI8 offset
Holding Registers	40621–40636	float	AI1 to AI8 gain
Holding Registers	40661–40668	int16	AI1 to AI8 alarm mode
Holding Registers	40681–40688	int16	AI1 to AI8 alarm minimum
Holding Registers	40701–40708	int16	AI1 to AI8 alarm maximum

Detailed Register Tables

Discrete Inputs (1xxxx)

Analog Input Live Alarm Status

Function	Address Range	Type	Description
Discrete Inputs	10601–10608	Bit	AI1 to AI8 alarm indication

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

- Alarm indication status bit is set

Analog Sensor Open Status

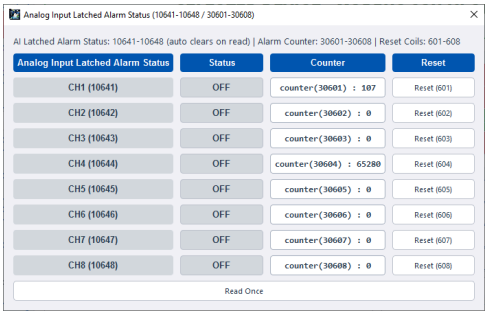
Function	Address Range	Type	Description
Discrete Inputs	10621–10628	Bit	AI1 to AI8 sensor open indication

If an analog sensor is disconnected or open:

- Analog value reads as 0.000mA (AI1–AI4) or 0.000V (AI5–AI8)
- Corresponding sensor open status bit is set

Analog Input Latched Alarm Status

Function	Address Range	Type	Description
Discrete Inputs	10641–10648	Bit	AI1 to AI8 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

Function	Address Range	Type	Description
Coils	00601–00608	Bit	Reset AI alarm counter

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

Input Registers (3xxxx)

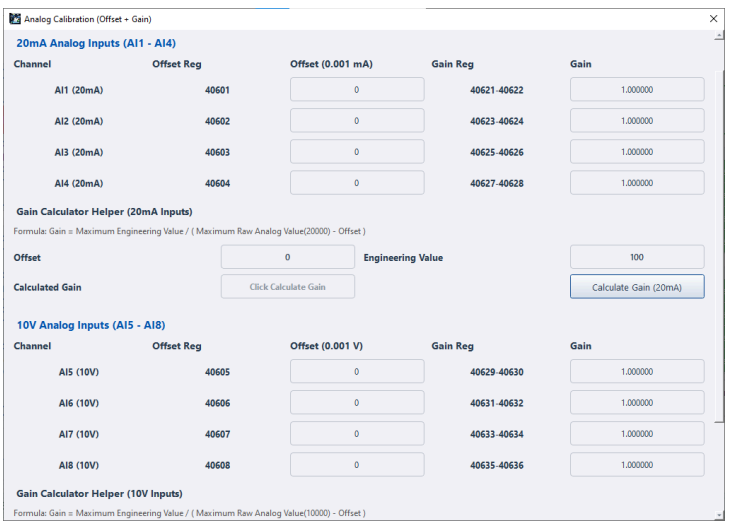
Analog Input Values

Function	Address Range	Type	Description
Input Registers	30001–30008	int16	AI1 to AI8 raw value
Input Registers	30021–30036	float	AI1 to AI8 scaled value
Input Registers	30601–30608	int16	AI1 to AI8 alarm counters

Holding Registers (4xxxx)

Analog Input Calibration

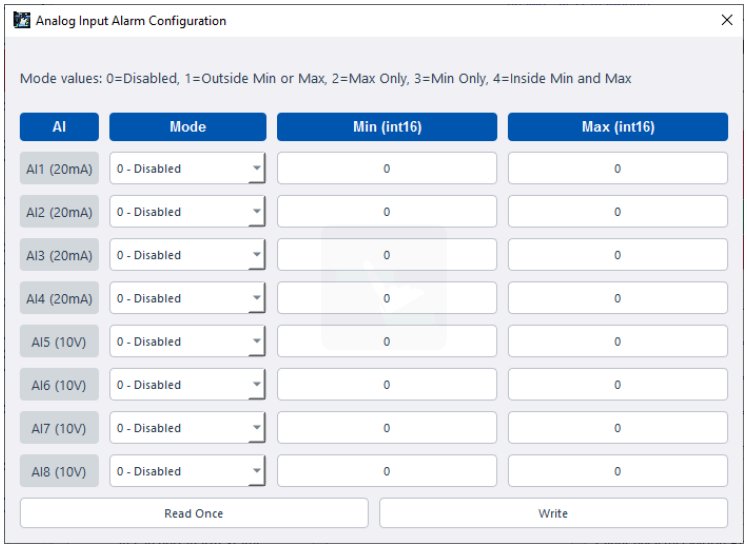
Function	Address Range	Type	Description
Holding Registers	40601–40608	int16	AI1 to AI8 offset
Holding Registers	40621–40636	float	AI1 to AI8 gain



Examples: Offset value 1000 = +1.000mA (AI1–AI4) or +1.000V (AI5–AI8), Gain value 0.005 = multiplier correction

Analog Input Alarm Configuration

Function	Address Range	Type	Description
Holding Registers	40661–40668	int16	AI1 to AI8 alarm mode
Holding Registers	40681–40688	int16	AI1 to AI8 alarm minimum
Holding Registers	40701–40708	int16	AI1 to AI8 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 Master Mode and 40104 = 1.

Address	Type	Description
40791	int16	Remote device destination register type to write. 0 = Holding Register
40792	int16	Remote device destination data type to write. 0 = int16 raw data (0 to 20000 for AI1–AI4 0~20.000 mA; 0 to 10000 for AI5–AI8 0~10.000 V), 1 = float scaled data as per offset and gain, 2 = int16 scaled data as per offset and gain
40793	int16	Remote device destination start address
40794	int16	Remote destination channel count. Max channels is 8

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

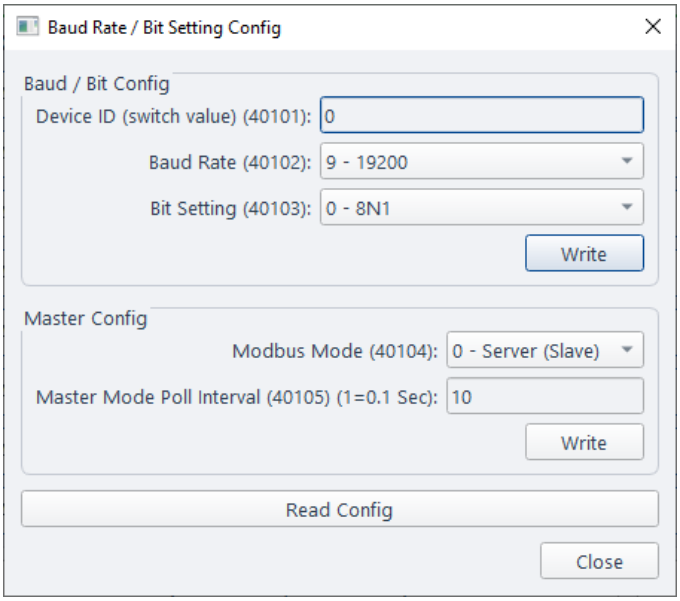
Modbus Address (40101)

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

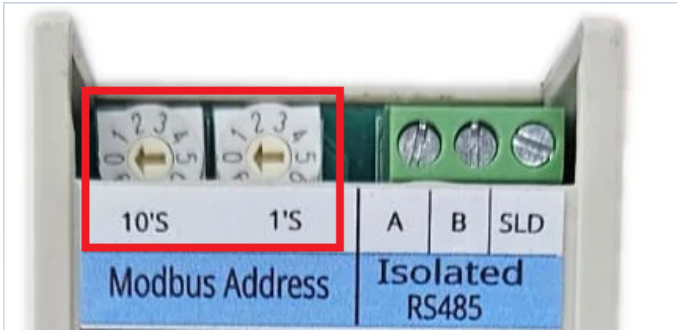
Configuration Settings

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.

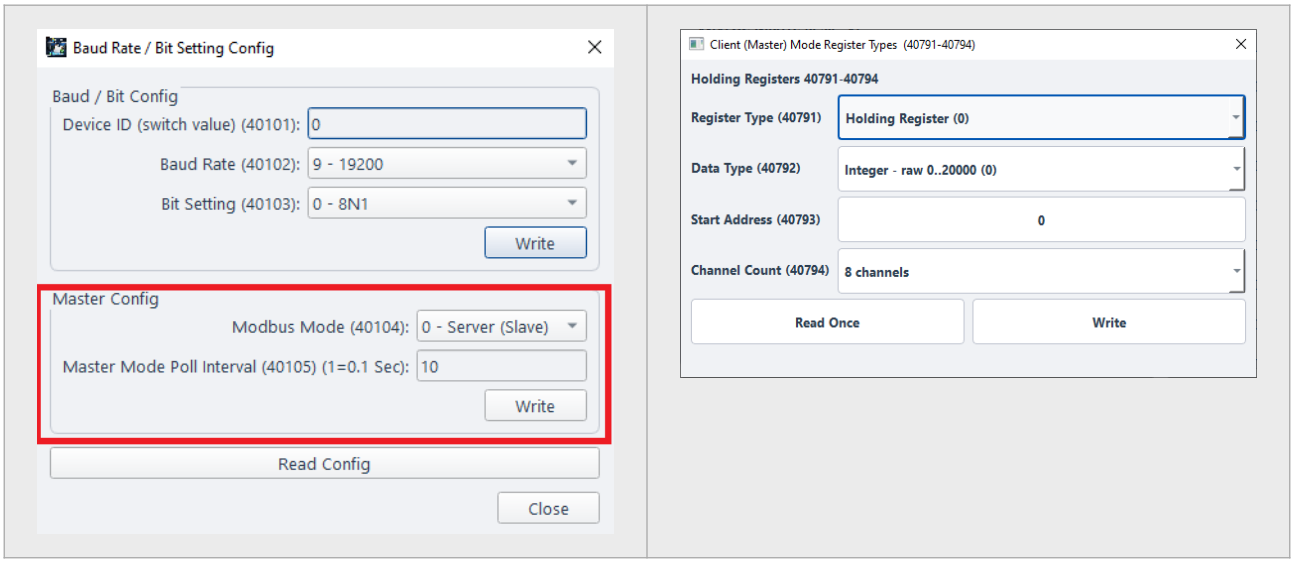
Write Remote Device – Master Mode

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 ~ AI8 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.



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 and voltage inputs as raw integer values:

Current Inputs (AI1–AI4: 0–20mA):

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

Raw values are stored in int16 registers with a resolution of 0.001mA (1 µA).

Voltage Inputs (AI5–AI8: 0–10V):

- 0V = 0
- 1V = 1000
- 5V = 5000
- 10V = 10000

Raw values are stored in int16 registers with a resolution of 0.001V (1 mV).

Engineering value registers allow raw values 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
Pressure transmitter	1–10V	0 to 10.0 Bar
Tank level sensor	0–10V	0 to 100%
Temperature transmitter	0–5V	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 analog input in 0.001mA units (AI1–AI4) or 0.001V units (AI5–AI8)
- Offset = calibration correction in 0.001mA units (AI1–AI4) or 0.001V units (AI5–AI8)
- 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

Similarly for 10V

Raw to V	Raw Value	Offset	Gain	Result
0–10V to 0–100%	5000	0	0.01	50%
0–10V to 0–10 Bar	5000	0	0.001	5.0 Bar
0–10V to 0–200°C	5000	0	0.02	100.0°C

Revision History

Revision	Date	Changes
Rev 1.0	2026-08-25	Initial datasheet, HW Version = 3, FW Version = 2

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