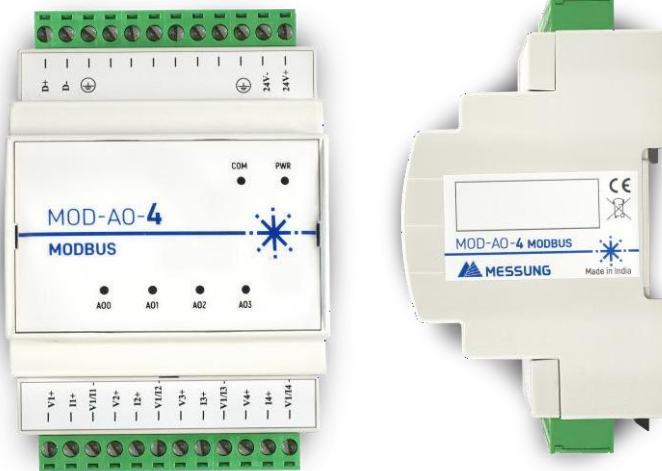


4 CH Analog Output Module-Modbus RTU

Technical Documentation

# MOD-AO-4



## Features:

- 4 Channel Analog Output – (12bit-0-10v/4-20mA/0-20mA)
- LED indication for each Output status, error, communication port and powerON
- Din rail mount assembly
- DIP switch for Modbus RTU slave configuration
- No configuration software needed
- CE Mark

### General Product Specifications: MOD-AO-4

| Application                        | Industrial Automation                                                      |                     |
|------------------------------------|----------------------------------------------------------------------------|---------------------|
| Supply                             | Voltage (Typical)                                                          | 24VDC               |
|                                    | Voltage Range                                                              | 18-30VDC            |
|                                    | Connection Type                                                            | Pluggable Connector |
| Communication Interface & Protocol | RS 485 & Modbus RTU                                                        |                     |
| No. of Analog Output Channels      | 4                                                                          |                     |
| Analog Output Type                 | Voltage & Current                                                          |                     |
| Signals per Output                 | 0V – 10V                                                                   |                     |
|                                    | 4 – 20mA                                                                   |                     |
| Analog Output Field Connection     | 2-Wire                                                                     |                     |
| Configuration                      | Individual Output Configuration                                            |                     |
| Resolution                         | 12 bit                                                                     |                     |
| Accuracy                           | 0.1% of Full scale @25°C                                                   |                     |
| Temperature Coefficient            | 0.0005% of full scale rating per °C                                        |                     |
| Calibration                        | Factory and Field                                                          |                     |
| External Supply                    | 18V to 30VDC                                                               |                     |
| Current                            | Max 150mA                                                                  |                     |
| IP Level                           | IP20                                                                       |                     |
| Temperature Range                  | 0-60°C operating                                                           |                     |
| Humidity                           | 5 – 95%, non-condensing                                                    |                     |
| Isolation                          | Output to Digital                                                          |                     |
| Diagnostics                        | Communication error                                                        |                     |
| Operation Indication               | LED (Red) for DC power ON, Flickering Yellow LED to indicate communication |                     |
| Certification                      | CE                                                                         |                     |
| Dimension                          | 71 (L) X 90.5 (H) X 62 (D) mm [4DIN Units]                                 |                     |

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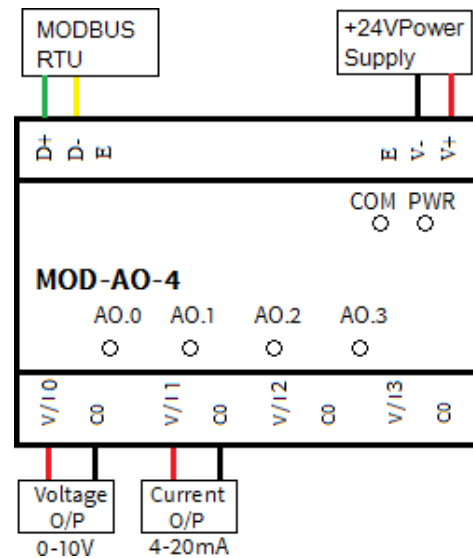
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| MOD-AO-4 – Voltage Mode |                    |
|-------------------------|--------------------|
| Output Range            | 0 – 10V            |
| Scanning Time           | 1mSec              |
| Settling Time           | 100µs for Voltage  |
| Load                    | > 1 kohm           |
| Max Output              | 10.5V              |
| MOD-AO-4 – Current Mode |                    |
| Output Range            | 0 – 20mA, 4 – 20mA |
| Scanning Time           | 1mSec              |
| Settling Time           | 10µs               |
| Load                    | <600 ohms          |
| Max Output              | 21mA               |

## WIRING DIAGRAM

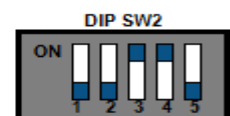
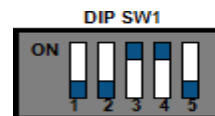
| Modbus Communication Specifications |                                  |
|-------------------------------------|----------------------------------|
| Protocol                            | Slave Modbus RTU                 |
| Baud Rate                           | 9600,19200,57600,115200          |
| Slave Address                       | 1-31                             |
| Data Bit                            | 8                                |
| Stop Bit                            | 1                                |
| Parity                              | None, Odd, Even                  |
| Response Time                       | <100ms                           |
| Termination Resistance              | 120ohm (Switchable)              |
| Control Registers                   | Holding Register& Input Register |
| Distance                            | Up to 1200m                      |



## Modbus Configuration DIP Switch Access

### Steps:

1. Open the upper fascia plate of the module.
2. DIP switch S1 for address and DIP switch S2 for baud rate parity.
3. Adjust the DIP switch according to requirements. Refer below image.



| DIP Switch 2                              |       |       |
|-------------------------------------------|-------|-------|
| Baud Rate Configuration                   |       |       |
| Baud Rate                                 | Pin 4 | Pin 5 |
| 9600                                      | OFF   | OFF   |
| 19200                                     | OFF   | ON    |
| 57600                                     | ON    | OFF   |
| 15200                                     | ON    | ON    |
| Parity Configuration                      |       |       |
| Parity                                    | Pin 3 | Pin 2 |
| NONE                                      | OFF   | OFF   |
| ODD                                       | OFF   | ON    |
| EVEN                                      | ON    | OFF   |
| Termination Resistor Configuration (120Ω) |       |       |
| Termination                               | Pin 1 |       |
| ON                                        | ON    |       |
| OFF                                       | OFF   |       |

| DIP Switch 1           |       |       |       |       |       |
|------------------------|-------|-------|-------|-------|-------|
| Slave ID Configuration |       |       |       |       |       |
| Slave ID               | Pin 1 | Pin 2 | Pin 3 | Pin 4 | Pin 5 |
| 1                      | OFF   | OFF   | OFF   | OFF   | ON    |
| 2                      | OFF   | OFF   | OFF   | ON    | OFF   |
| 3                      | OFF   | OFF   | OFF   | ON    | ON    |
| 4                      | OFF   | OFF   | ON    | OFF   | OFF   |
| 5                      | OFF   | OFF   | ON    | OFF   | ON    |
| 6                      | OFF   | OFF   | ON    | ON    | OFF   |
| ...                    | ...   | ...   | ...   | ...   | ...   |
| ...                    | ...   | ...   | ...   | ...   | ...   |
| ...                    | ...   | ...   | ...   | ...   | ...   |
| 31                     | ON    | ON    | ON    | ON    | ON    |

### Modbus Address Mapping

| Mode                 | Modbus Register          | Description                                                                                  |
|----------------------|--------------------------|----------------------------------------------------------------------------------------------|
| CH1 – Mode Selection | Holding Register – 40000 | 0 – Disable (Default)<br>1 – Voltage (0-10V)<br>2 – Current (0-20mA)<br>3 – Current (4-20mA) |
| CH2 – Mode Selection | Holding Register – 40001 |                                                                                              |
| CH3 – Mode Selection | Holding Register – 40002 |                                                                                              |
| CH4 – Mode Selection | Holding Register – 40003 |                                                                                              |
| AO – CH1             | Holding Register – 40004 | Channel 1 – Analog Output Count                                                              |
| AO – CH2             | Holding Register – 40005 | Channel 2 – Analog Output Count                                                              |
| AO – CH3             | Holding Register – 40006 | Channel 3 – Analog Output Count                                                              |
| AO – CH4             | Holding Register – 40007 | Channel 4 – Analog Output Count                                                              |
| CH1 – Multiplier     | Holding Register – 40011 | Factory Setting*                                                                             |
| CH2 – Multiplier     | Holding Register – 40012 | Factory Setting*                                                                             |
| CH3 – Multiplier     | Holding Register – 40013 | Factory Setting*                                                                             |
| CH4 – Multiplier     | Holding Register – 40014 | Factory Setting*                                                                             |

\*Do not change the settings, there are the factory calibration settings. No need to calibrate.

### SAFETY INSTRUCTIONS

- Installation should only be performed by qualified professionals according to the laws and regulations.
- Do not connect the mains voltage nor any other external voltage to any point of the Modbus connector; it would represent a risk for the entire system. The facility must have enough insulation between the mains (or auxiliary) voltage and the Modbus or the wires of other accessories, in case of being installed.
- Keep the device away from water and do not cover it with clothes, paper or any other material while in use.



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