# Technical Datasheet Input / Output Modules with Modbus RTU Protocol with RS485 Interface

The IO modules communicate via RS485. The port can drive distances up to max 700 meters without the use of any repeater (*this feature however also depends on the signal strength of the Modbus Master Device).*
The RS485 Digital IO module is sturdy, low power usage and easy to use.

## 4 Port AO Module with 4-20mA Output: -


The IO modules are mounted on DIN rail mountable casing and with exposed connectors and LED indicators. The DIP switch for Slave ID and Baud rate are placed inside the enclosure. (Soft setting option is also available)

The design of the modules incorporates '**resettable Fuses**' to safeguard against reverse polarity connection both for **Power** and **Communication** port.

## Specifications

### General –

| | |
|---|---|
| **I/O Connectors** | 2 Pin 5.08 mm pitch pluggable screw terminals. |
| **Dimensions** | 70 mm L x 110 mm B x 50 mm H |
| **Power** | Input Power – 12 – 24 VDC or 24 V AC/DC<br>Typical – 12V DC @ 80mA |
| **Operating Temperature** | 0 – 60° C (32 ~ 140°F) |
| **Storage Temperature** | -20 - 70° C (-4 ~ 158°F) |
| **Storage Humidity** | 5 ~ 95 % RH, non – Condensing |

**Certifications**

- AO MC (Analog Output Module with Current Output) module that outputs signals in two formats: a 0-10V voltage output and a 4-20 mA current output. These are standard outputs often used in industrial control systems to represent a range of values in a form that can be easily read by controllers, displays, or other monitoring equipment.

## AO Outputs –

| | |
|---|---|
| **Channels** | 4 |
| **Inputs Resolution** | 10 Bit (12 bit optional) |
| **Current Range** | 4 – 20mA |
| **Voltage Range** | 0 – 10V |
| **Accuracy** | ± 2 % of Full scale |
| **Linearity Error** | 0.1 % |
| **Conversion Time** | 20 msec |

## Additional Features: -

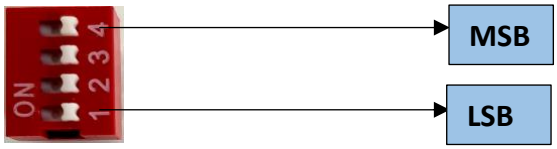
**All inputs and communication Ports isolated**
**Input power reverse polarity safety**
**ESD Safety IEC 61000-4-2, ± 30KV contact, ± 30KV air**
**EFT IEC 61000-4-4, 50A (5/50ms)**
**750V isolation.**
**CRC Error check.**
**No configuration needed on the IO board.**

## Configuration Settings: -

| | |
|---|---|
| **Communication Speed** | 9600 – 115200 bps (DIP SW selectable) |
| **Data Bits** | 8 |
| **Parity** | None |
| **Stop bit** | 1 |
| **CRC** | Yes |
| **Slave ID** | Configurable with DIP Switch. |
| **Function code AO** | 0x10 Write Multiple registers |
| **AO Register Address** | 10 Bit – 1,2,3,4/ 12 bit – 5,6,7,8 |

| ID | Function Description | Register Description | Modbus Function Code | Protocol | Data Type |
|---|---|---|---|---|---|
| 1 | AO 1 – 10 Bit | 40001 | 0X10 | RS485 | 16 Bit Unsigned int |
| 2 | AO 2 – 10 Bit | 40002 | 0X10 | RS485 | 16 Bit Unsigned int |
| 3 | AO 3 – 10 Bit | 40003 | 0X10 | RS485 | 16 Bit Unsigned int |
| 4 | AO 4 – 10 Bit | 40004 | 0X10 | RS485 | 16 Bit Unsigned int |
| 5 | AO 1 - 12 Bit | 40005 | 0x10 | RS485 | 16 Bit Unsigned int |
| 6 | AO 2 - 12 Bit | 40006 | 0x10 | RS485 | 16 Bit Unsigned int |
| 7 | AO 3 - 12 Bit | 40007 | 0x10 | RS485 | 16 Bit Unsigned int |
| 8 | AO 4 - 12 Bit | 40008 | 0x10 | RS485 | 16 Bit Unsigned int |

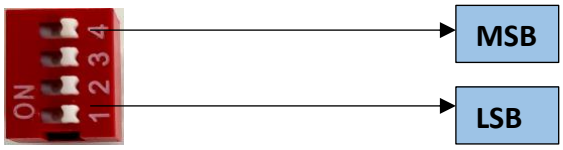
## BAUD RATE DESCRIPTION




- **For Baud rate Selection, DIP SW is used as per the diagram.**
- **Pulling up the switch will make Baud rate active.**
- **If no selection is made 9600 will be default Baud rate.**
- **When u change the Baud rate in the Module power 'ON' condition, pls press the reset button to get Change to affect.**

| Baud Rate | DIP SWITCH | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 9600 | OFF | OFF | OFF | OFF |
| 19200 | ON | OFF | OFF | OFF |
| 38400 | OFF | ON | OFF | OFF |
| 57600 | OFF | OFF | ON | OFF |
| 115200 | OFF | OFF | OFF | ON |

## SLAVE ID DESCRIPTION




- **For Slave ID Selection SW is used to Set The SLAVE ID .**
- **For Slave ID DIP Switch LSB is "1" follow through "4" is MSB.**
- **Slave ID Confirmed through below Device ID table.**
- **IF Eg. Slave ID 1 is Needed to be selected Switch number 1 should pulled up other three should be selected downside. So"1 0 0 0" will be selected as Slave ID 1.**

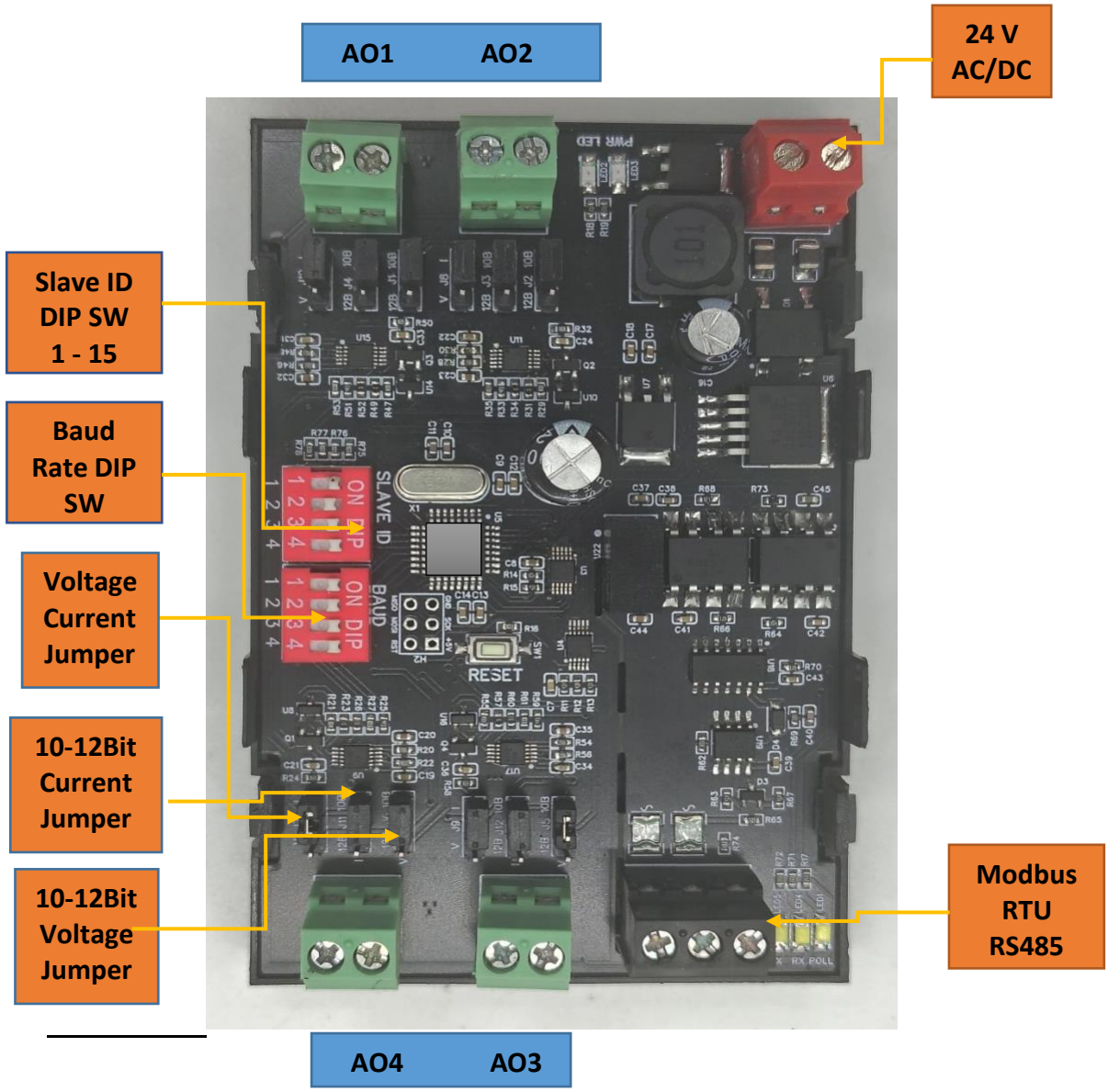
| Slave ID | DIP SWITCH | | | | OUTPUT (Binary) | OUTPUT (Decimal) |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | |
| 0 | OFF(0) | OFF(0) | OFF(0) | OFF(0) | 0 0 0 1 | 1 |
| 1 | ON(1) | OFF(0) | OFF(0) | OFF(0) | 0 0 0 1 | 1 |
| 2 | OFF(0) | ON(1) | OFF(0) | OFF(0) | 0 0 1 0 | 2 |
| 3 | ON(1) | ON(1) | OFF(0) | OFF(0) | 0 0 1 1 | 3 |
| 4 | OFF(0) | OFF(0) | ON(1) | OFF(0) | 0 1 0 0 | 4 |
| 5 | ON(1) | OFF(0) | ON(1) | OFF(0) | 0 1 0 1 | 5 |
| 6 | OFF(0) | ON(1) | ON(1) | OFF(0) | 0 1 1 0 | 6 |
| 7 | ON(1) | ON(1) | ON(1) | OFF(0) | 0 1 1 1 | 7 |
| 8 | OFF(0) | OFF(0) | OFF(0) | ON(1) | 1 0 0 0 | 8 |
| 9 | ON(1) | OFF(0) | OFF(0) | ON(1) | 1 0 0 1 | 9 |
| 10 | OFF(0) | ON(1) | OFF(0) | ON(1) | 1 0 1 0 | 10 |
| 11 | ON(1) | ON(1) | OFF(0) | ON(1) | 1 0 1 1 | 11 |
| 12 | OFF(0) | OFF(0) | ON(1) | ON(1) | 1 1 0 0 | 12 |
| 13 | ON(1) | OFF(0) | ON(1) | ON(1) | 1 1 0 1 | 13 |
| 14 | OFF(0) | ON(1) | ON(1) | ON(1) | 1 1 1 0 | 14 |
| 15 | ON(1) | ON(1) | ON(1) | ON(1) | 1 1 1 1 | 15 |

**Note: -**

For MODBUS communications, **a shielded and twisted pair cable** is used. One example of such cable is Belden 3105A.

## Recommended Cable Electrical Characteristics: -

| | |
|---|---|
| **22 AWG Cable** | Shielded and twisted pair should be used. |
| **Tinned Copper** | Recommended |
| **Nominal Conductor DCR** | 14.7 ohm / 1000 ft |
| **Nominal Capacitance** | 11 pf / feet (conductor to conductor) |
| **High Frequency Non-Insertion Loss** | 0.5db / 100ft. |

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