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 AI Module: -

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.

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
	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

AI Inputs –

Channels	4
Input Signal	4 – 20 mA / 0 – 20 mA / 0 – 10 V (jumper selectable)
Accuracy	± 2% Full scale
Input Resolution	10-bit /12-bit resolution (optional)
Isolation	Optically Isolated
External Loop Voltage	+ 12 VDC min
AI input impedance	120Ω

Additional Features: -

All inputs and communication port 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 – 19200 Kbps (DIP SW Selectable)
Data Bits	8
Parity	None
Stop bit	1
CRC	Yes
Slave ID	Configurable with DIP Switch
Function Code AI	0x03 Read Holding Registers
AI 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	**AI 1 – 10 Bit**	40002	0X03	RS485	16 Bit Unsigned int
2	**AI 2 – 10 Bit**	40003	0X03	RS485	16 Bit Unsigned int

3	**AI 3 – 10 Bit**	40004	0X03	RS485	16 Bit Unsigned int
4	**AI 4 – 10 Bit**	40005	0X03	RS485	16 Bit Unsigned int
5	**AI – 1 12 Bit**	40006	0x03	RS485	16 Bit Unsigned int
6	**AI – 2 12 Bit**	40007	0x03	RS485	16 Bit Unsigned int
7	**AI – 3 12 Bit**	40008	0x03	RS485	16 Bit Unsigned int
8	**AI – 4 12 Bit**	40009	0x03	RS485	16 Bit Unsigned int

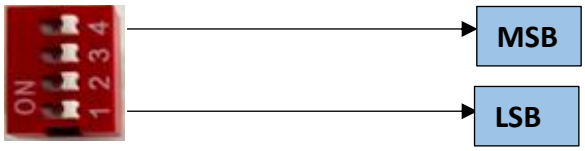
Note: -

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

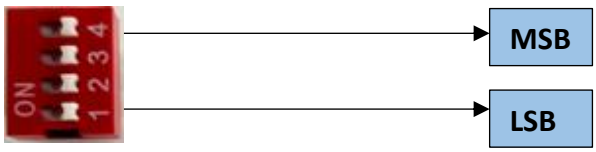
BAUD RATE DESCRIPTION



- **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, please press the reset button to get Change to affect.**

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

SLAVE ID DESCRIPTION

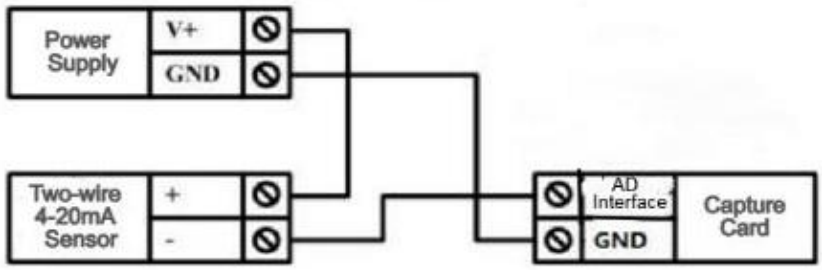


- For Slave ID Selection SW is used to Set The SLAVE ID .
- For Slave ID DIP Switch LSB is “1” follow through “4” is MSB.
- Slave ID Confirmed through below Device ID table .
- IF Eg. Slave ID 1 is Needed to be selected Switch number 1 should pulled up other three should be selected down side. So”1 0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

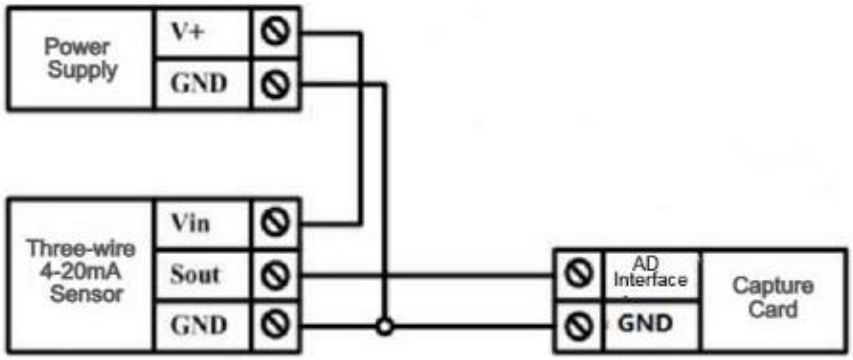
Slave ID	DIP SWITCH				OUTPUT (Binary)	OUTPUT (Decimal)
	1	2	3	4		
0	OFF(0)	OFF(0)	OFF(0)	OFF(0)	0 0 0 1	1
1	ON(1)	OFF(0)	OFF(0)	OFF(0)	0 0 0 1	1
2	OFF(0)	ON(1)	OFF(0)	OFF(0)	0 0 1 0	2
3	ON(1)	ON(1)	OFF(0)	OFF(0)	0 0 1 1	3
4	OFF(0)	OFF(0)	ON(1)	OFF(0)	0 1 0 0	4
5	ON(1)	OFF(0)	ON(1)	OFF(0)	0 1 0 1	5
6	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

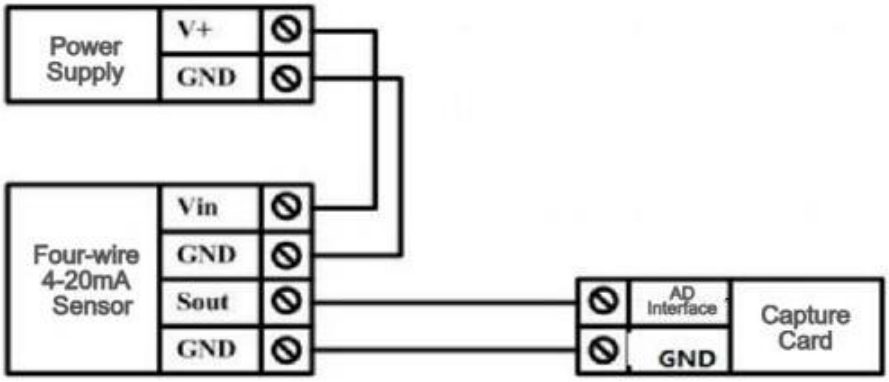
Two-wire Sensor Wiring Diagram

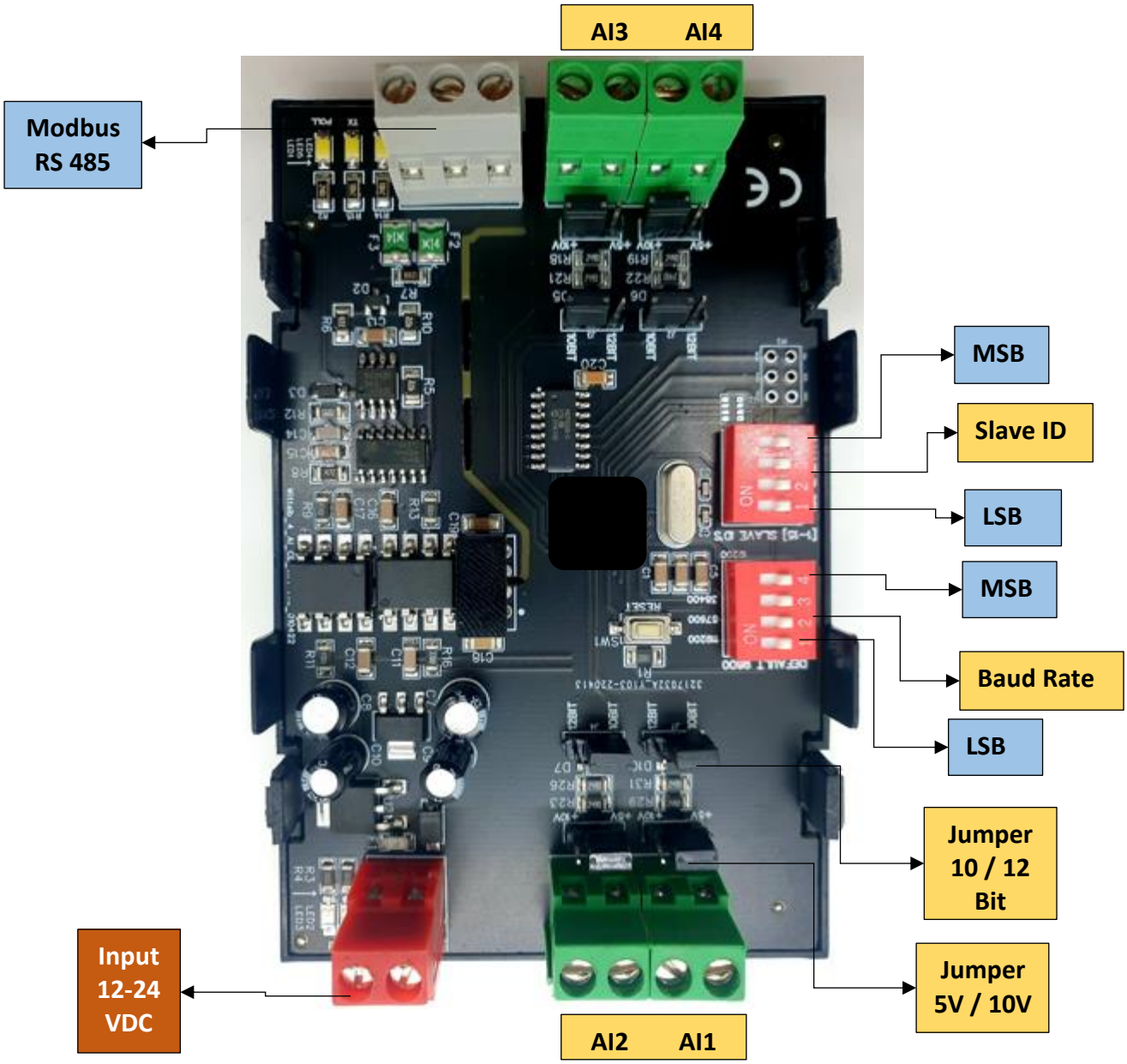


Three-wire Sensor Wiring Diagram



Four-wire 4-20mA Sensor





NOTE – By default the Jumper setting on the board is 10 V and 10 Bit

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