

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 DO + 4 DI + 4 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	12 Pin 5.08 mm pitch pluggable screw Terminal Block, 2 Pin 5.08 mm pitch pluggable screw terminals.
Dimensions	110 mm L x 110 mm B x 50 mm H
Power	Input Power – 12 - 24 VDC or 24 V AC/DC Typical – 12V DC @ 120mA
Operating Temperature	0 – 60° C (32 ~ 140°F)
Storage Temperature	-20 - 70° C (-4 ~ 158°F)

Storage Humidity 5 ~ 95 % RH, non – Condensing

Certifications



DO with Relay Output –

Channels	4
Contact Form	1A, 1C
Contact Material	Ag Alloy
Contact Capacity	10A @ 240VAC, 10A @ 28VDC
Coil Voltage	5 – 48 VDC
Coil Power	0.36 W
Insulation Resistance	250MΩ
Electrical Life	1 x 10 ⁵
Mechanical Life	1 x 10 ⁷
Operating Time	7 msec, Max 15 msec
Release Time	2 msec, Max 6 msec

DI Inputs –

Channels	4
Sense Voltage	3.3 – 30 VDC
Sense Logic	Logic '0' = <1 VDC, Logic '1' = >3.3 VDC
Isolation	Optically isolated
Response Time	2 msec, Max 6 msec

AI Inputs –

Channels	4
Input Signal	4 – 20 mA / 0 – 20 mA / 0 – 5 VDC / 0 – 10VDC (jumper)
Accuracy	± 2% Full scale
Input Resolution	10 bits / 12 bits options
Isolation	Optically Isolated
External Loop Voltage	+ 12 VDC min
AI input impedance	120Ω

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 (DIP SW selectable)
- Data Bits 8
- Parity None
- Stop bit 1
- CRC Yes
- Slave ID Configurable with DIP Switch
- Function code DO 0x05 and 0x0F (5 Single coil & 15 multiple coil)
- DO Register Address 4,5,6,7.
- Function code DI 0x02 Read discrete Input
- DI Register Address 0,1,2,3.
- Function Code AI 0x03 Read Holding Registers
- AI Register Address **10 Bit** - 2,3,4,5 / **12 Bit** – 6,7,8,9.

ID	Function Description	Register Description	Modbus Function Code	Protocol	Data Type
1	DO 1	00004	0X05,0X0F	RS485	1 Bit Boolean
2	DO 2	00005	0X05,0X0F	RS485	1 Bit Boolean
3	DO 3	00006	0X05,0X0F	RS485	1 Bit Boolean
4	DO 4	00007	0X05,0X0F	RS485	1 Bit Boolean
5	DI 1(With & Without Potential)	10001	0X02	RS485	1 Bit Boolean
6	DI 2(With & Without Potential)	10002	0X02	RS485	1 Bit Boolean
7	DI 3(With & Without Potential)	10003	0X02	RS485	1 Bit Boolean
8	DI 4(With & Without Potential)	10004	0X02	RS485	1 Bit Boolean
9	AI 1 – 10 Bit	40002	0X03	RS485	16 Bit Unsigned int
10	AI 2 – 10 Bit	40003	0X03	RS485	16 Bit Unsigned int

11	AI 3 – 10 Bit	40004	0X03	RS485	16 Bit Unsigned int
12	AI 4 – 10 Bit	40005	0X03	RS485	16 Bit Unsigned int
13	AI – 1 12 Bit	40006	0x03	RS485	16 Bit Unsigned int
14	AI – 2 12 Bit	40007	0x03	RS485	16 Bit Unsigned int
15	AI – 3 12 Bit	40008	0x03	RS485	16 Bit Unsigned int
16	AI – 4 12 Bit	40009	0x03	RS485	16 Bit Unsigned int

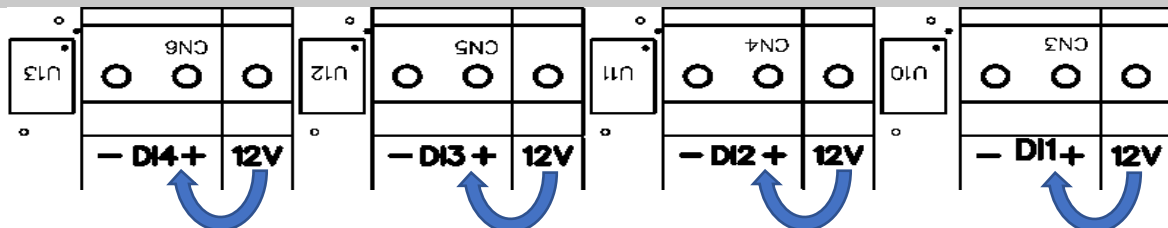
Note: -

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

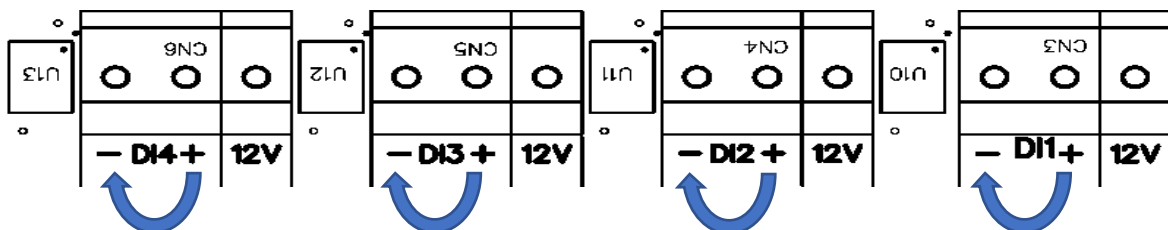
Recommended Cable Electrical Characteristics: -

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

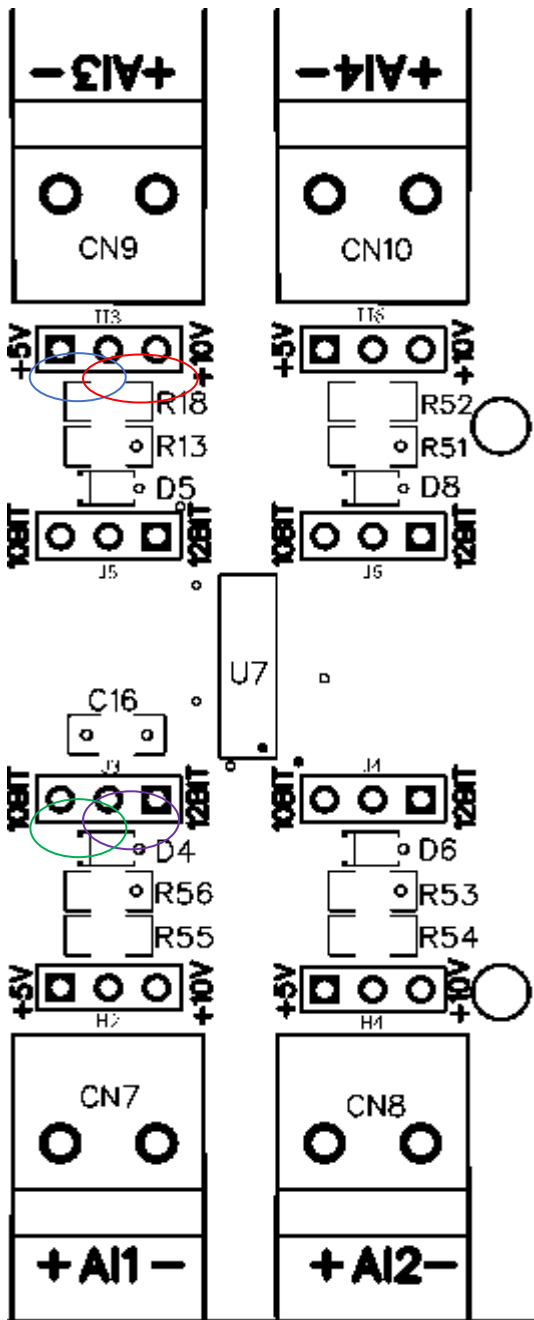
Connection Instruction FOR WIN - IO – 4DDAM CE



- For Digital Input Potential Free Contact Detection 12V & + terminals should be connected to the WIN - IO – 4DDAM - CE Module DI Pins.



- For Digital Input with Potential (3V to 30V) Contact + & - terminals should be connected to WIN - IO – 4DDAM - CE Module DI Pins.



- For AI there are 4 Jumpers Eg. Jumper “H3”, “H6”, “H1” & “H2” are for Selecting the Input Voltage Detection.
- + & - Terminal are used for all AI INPUT

Jumper Selection for Voltage INPUT

- For +5V Detection +5V and Middle Jumper H3(as BLUE marker in Image) should be selected as mentioned in AI3 in the Image & parallel for all AI Channels as needed.
- For +10V Detection +10V and Middle Jumper (as RED marker in Image) should be selected as mentioned in AI3 in the Image & parallel for all AI Channels as needed.

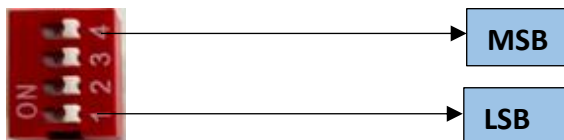
Jumper Selection For 4-20mA & 0-20 mA Current Detection

- For 4-20mA & 0-20mA Detection +5V and Middle (as BLUE marker in Image) as Jumper J5 should be selected as mentioned in AI3 in the Image & parallel for all AI Channels as needed.

Jumper Selection for Bit resolution (Current & Voltage)

- For 10 Bit Resolution, 10 Bit & Middle as Jumper J3(as green marker in Image) should be selected as mentioned in AI1 in the Image & parallel for all AI Channels as needed.
- For 12 Bit Resolution , 12 Bit & Middle as Jumper J3 (as Purple marker in Image) should be selected as mentioned in AI1 in the Image & parallel for all AI Channels as needed.

SLAVE ID DESCRIPTION

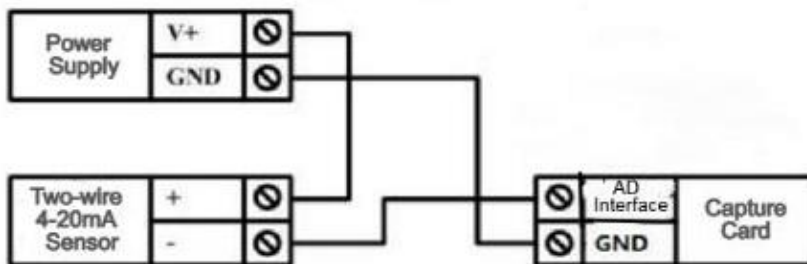


For Slave ID Selection SW is used to Set The SLAVE ID .
 For Slave ID DIP Switch **LSB is “1”** follow through **“4” is MSB**.
 Slave ID Confirmed through below Device ID table .

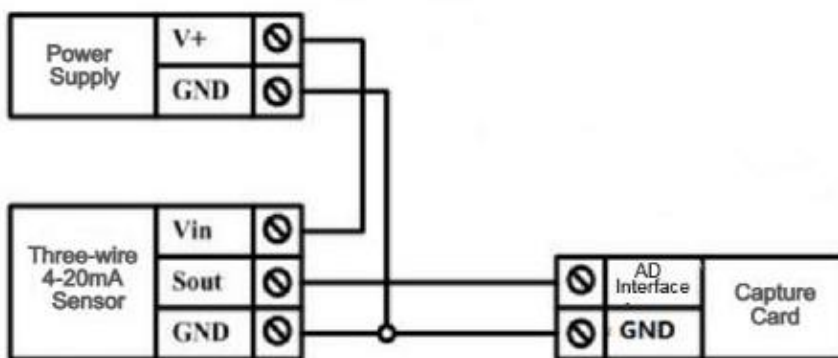
IF Eg. Slave ID 1 is Needed to be selected Switch number 1 should pulled up other three should be selected down side. So "1 0 0 0" will be selected as Slave ID 1.

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

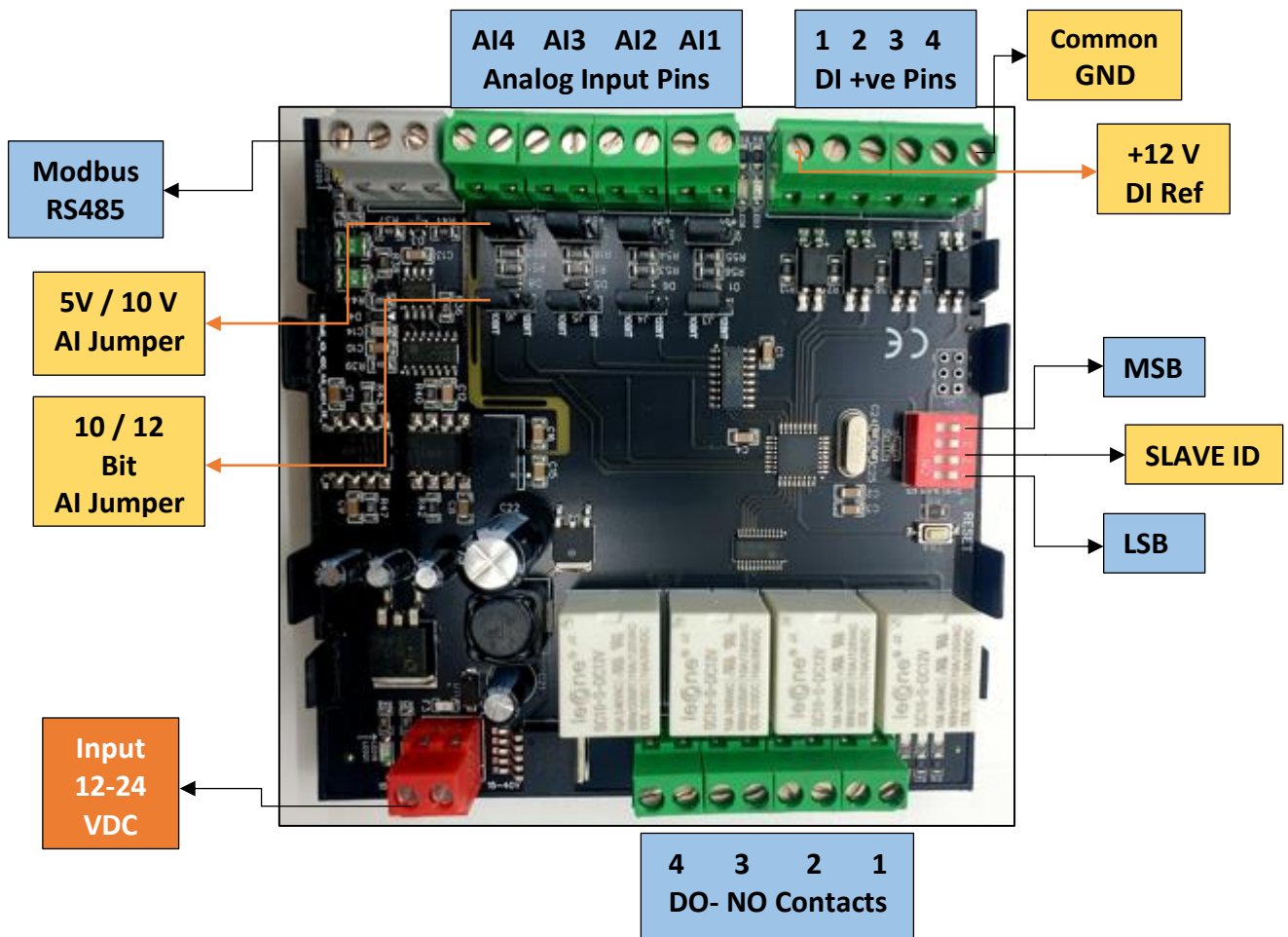
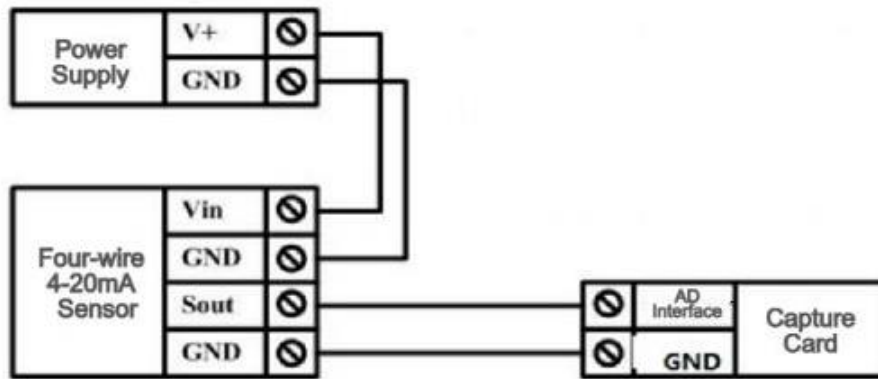
Two-wire Sensor Wiring Diagram



Three-wire Sensor Wiring Diagram



Four-wire 4-20mA Sensor



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