

# Intech Micro 2300-RO4 analogue input station MODBUS RTU slave application supplementary manual

## ***MODBUS supplementary manual to the 2300-RO4 Installation Guide.***

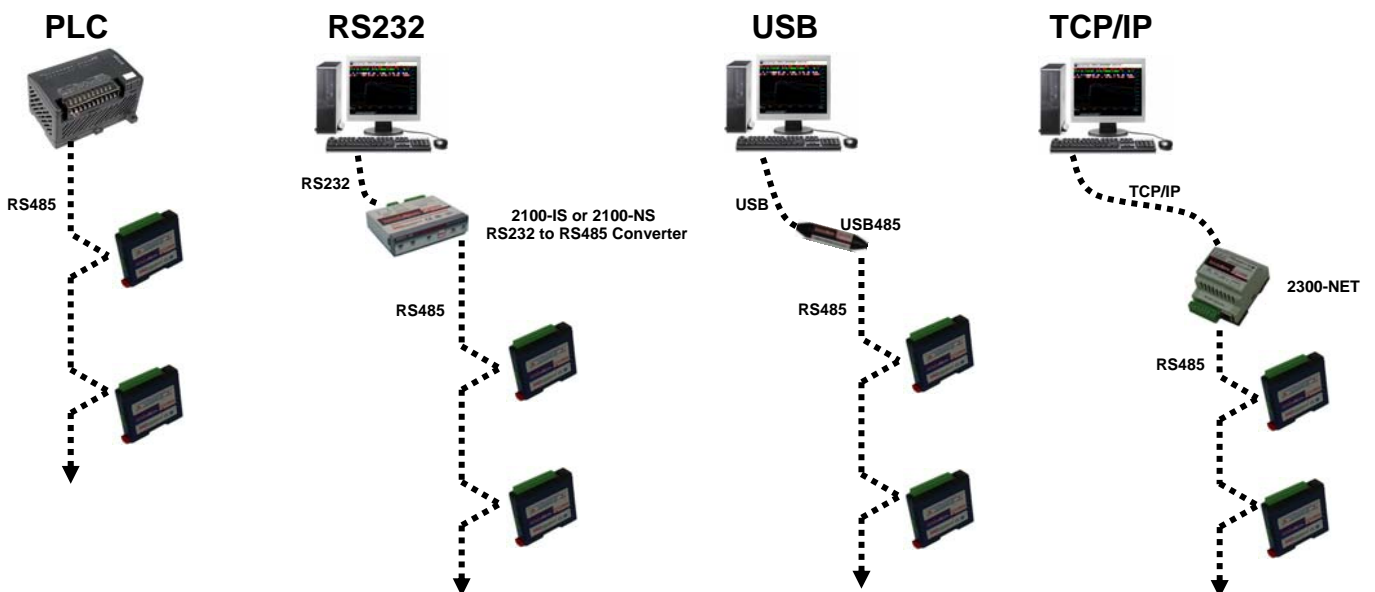
The 2300 series stations are designed to connect as slaves to MODBUS RTU masters such as PC's or PLC's to offer an economical I/O solution.

### **Intech Micro 2300 series:**

- 2300-A8I : 8 Current Inputs.
- 2300-A8II : 8 Isolated Current Inputs.
- 2300-A8VI : 8 Isolated Voltage Inputs.
- 2300-Tc8 : 8 Isolated Thermocouple Inputs.
- 2300-RTD6 : 6 RTD Inputs.
- 2300-MULTI : 2 RTD, 2 AI, 1 AO, 4 DI, 2 DO.
- 2300-D16 : 16 Digital Inputs.
- 2300-RO4 : 4 Relay Outputs.



### ***Intech Micro 2300 Series - Connection Examples.***



## 2300-RO4 Specifications.

<b>Relay Outputs:</b>	-Output Points	4
	-Maximum Current	0.5A @ 240Vac / 1A @ 28Vdc
	-Isolation	1000Vrms between field and logic 1000Vrms between outputs
<b>Connectors:</b>	-Power and Comms	4 Pin plug-in connector on side of station
	-Inputs	18 Way screw plug-in connector on top of station
<b>Comms:</b>	-Protocols	RS485, Modbus RTU
	-Baud Rate	2400, 4800, 9600, 19200, 38400, 57600, 115200
	-Format	Parity: 0 = none, 1 = even, 2 = odd Stop Bits: 1 = 1 stop bit, 2 = 2 stop bits
<b>Power Supply:</b>	-Logic Supply Voltage	24Vdc
	-Logic Supply Current	42mA

### Safety and EMC Compliances:

EMC Compliance	89/336/EEC and Low Voltage Equipment Directive 73/23/EEC
Safety Compliance	IEC 950

### General Specifications: (Unless otherwise stated in other input specifications).

Operating Temperature	-10~50°C
Storage Temperature	-40~85°C
Operating Humidity	Up to 95% non condensing
Housing	-Dimensions L=97.5, W=22.6, H=109mm
	-Mounting 35mm Symmetrical Mounting Rail.

Note 1. Contact INTECH INSTRUMENTS for more detailed programming information.

**Product Liability.** This information describes our products. It does not constitute guaranteed properties and is not intended to affirm the suitability of a product for a particular application. Due to ongoing research and development, designs, specifications, and documentation are subject to change without notification. Regrettably, omissions and exceptions cannot be completely ruled out. No liability will be accepted for errors, omissions or amendments to this specification. Technical data are always specified by their average values and are based on Standard Calibration Units at 25C, unless otherwise specified. Each product is subject to the 'Conditions of Sale'.

**Warning: These products are not designed for use in, and should not be used for patient connected applications. In any critical installation an independent fail-safe back-up system must always be implemented.**

## Modbus Register Types.

There are 4 types of variables which can be accessed from the station. Each station has one or more of these data variables.

Type	Start Address	Variable	Access
1	00001	Digital Outputs	Read & Write
2	10001	Digital Inputs	Read Only
3	30001	Input registers (Analog)	Read Only
4	40001	Output registers (Analog)	Read & Write (Holding type)

**Note:** The Modbus message length must be limited to 100 consecutive read or write registers. If more registers are required then a new poll group must be added for the next xxx registers.

The 2300-RO4 station has 4 normally open/ normally closed relay outputs. These stations may be used when a higher drive capability is required, or when isolation between outputs are required.

When switch 9 is off, the station is configured as a slave station for the Modbus master device such as a PC / PLC / HMI. When used as a slave station, the outputs are written to by the Modbus master device such as a PC/PLC/HMI. Each output can be individually switched on or off, or all outputs can be set up at the same time by writing a single number to the output register which represents the status of all outputs.

An output watchdog timer can be configured to switch off all the outputs if there has been no communications with the station for up to 255 seconds. A value of 0 seconds will disable this timer and the outputs will remain in the last programmed state.

**Communications Settings.**

The data in the stations is stored in 16 bit registers. These registers are accessed over the network using the MODBUS RTU communication protocol.

**Communications Settings with DIP Switch 10 OFF (Default)**

BAUD RATE        9600  
 DATA BITS       8  
 PARITY            NONE  
 STOP BITS        1

**Communications Settings with DIP Switch 10 ON (Programmed Baud Rate)**

BAUD RATE        2400, 4800, 9600, 19200, 38400, 57600, 115200  
 DATA BITS       8  
 PARITY            None, Even, Odd  
 STOP BITS        1, 2

Note: To change these settings, download the free MicroScan IOStudio 2300 series MODBUS configuration software via the link from the Intech website: [www.intech.co.nz/2300](http://www.intech.co.nz/2300)

During this mode, DIP Switch 10 should be OFF so that the PC can communicate with the 2300 station using the default communication settings. Once the Communications Settings are programmed, power down the 2300 station and change DIP Switch 10 to the ON position. Restore the power to the 2300 station and the configured Communications Settings will be ready for use.

Warning: Only program ONE 2300 station at a time!

**Communications Settings Registers.**

40121	Baud Rate	2400	11520	R/W	2400, 4800, 9600, 19200, 38400, 57600, 115200
40122	Parity	0	2	R/W	0 = none, 1 = even, 2 = odd
40123	Stop Bits	1	2	R/W	1 = 1 stop bit, 2 = 2 stop bits
40124	Reply Delay	0	65535	R/W	(x10ms)

**Baud Rate Register (40121)**

The baud rate value is programmed directly into the baud rate register. The only exception is the 115200 baud rate where the value 11520 is used.

**Parity Register (40122)**

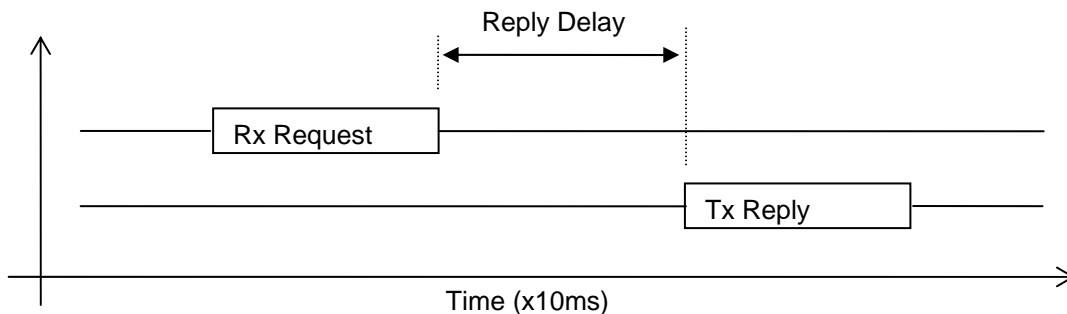
The parity can be set to none by writing a 0 to the parity register, set to even by writing a 1 to the parity Register or set to odd by writing a 2 to the parity register.

**Stop Bits Register (40123)**

The number of stop bits can be set to 1 by writing a 1 to the stop bits register or set to 2 by writing a 2 to the stop bits Register.

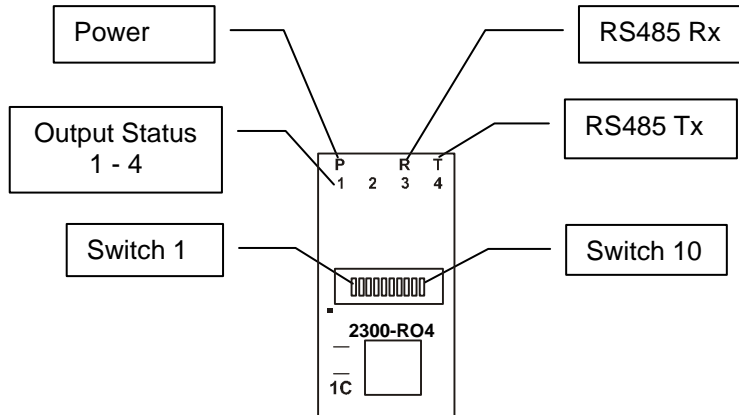
**Reply Delay Register (40124)**

The reply delay is a time delay between the Modbus message received to the reply being sent. In some applications where a modem or radio is used in the RS485 network, it may be necessary to add a reply delay due to turn around delays in the equipment.

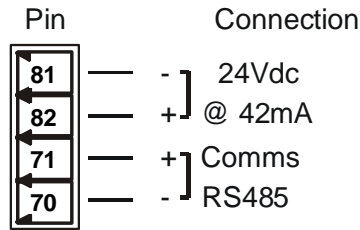


**Status Indicators.**

- Power:** Flashes to indicate the CPU is running.
- RS485 Rx:** Flashes to indicate the unit has received a valid Modbus message.
- RS485 Tx:** Flashes to indicate the unit has sent a Modbus message.
- Output Status:** "OFF" when the input is off.  
"ON" when the input is on.



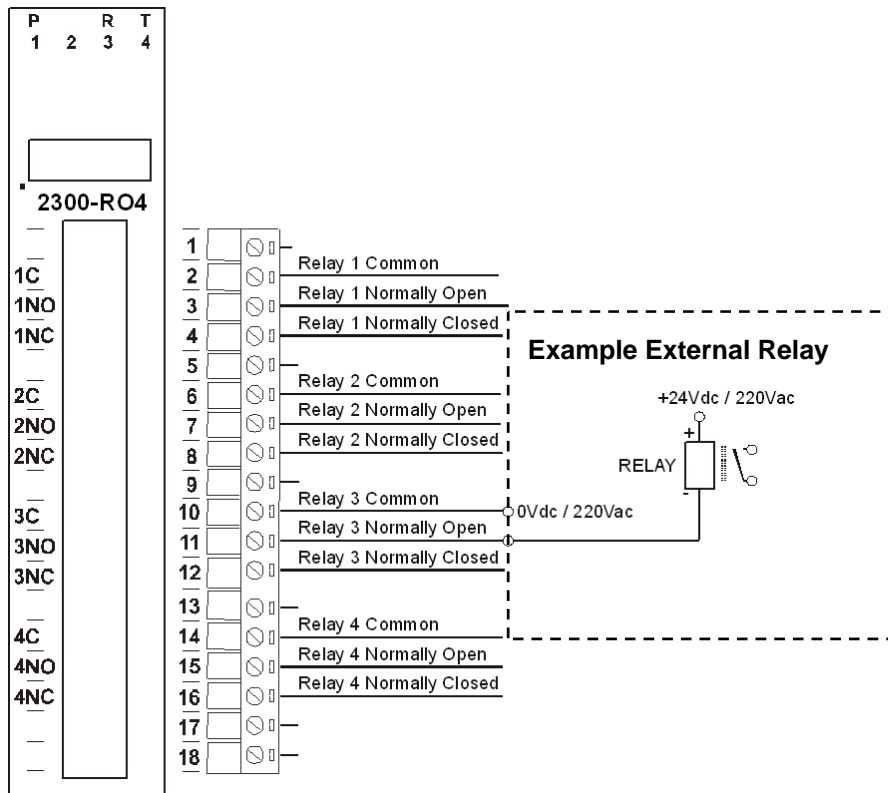
The following diagram shows the wiring for the power and RS485 communications.



**Warning:** If the power/communication connections are reversed, the remote station may become faulty.

**Wiring.**

The following diagram shows how the digital outputs are connected to the coil of a relay. The coil is connected to positive and switched to negative.



### Dip Switch Settings.

DIP SWITCH	FUNCTION	DESCRIPTION
1	STATION ID +1	Station ID's from 0 to 127 are set up using switches 1 to 7
2	STATION ID +2	"
3	STATION ID +4	"
4	STATION ID +8	"
5	STATION ID +16	"
6	STATION ID +32	"
7	STATION ID +64	"
8	-	Not Used
9	MODE	Slave (Off)
10	BAUD RATE	Selects 9600 (off) or Programmed Baud Rate (on)

Note: See Installation Guide for the Station ID Table (Dip Switch Settings).

### Data Registers.

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
00001	Relay Output 1	0	1	R/W	Status of Digital Outputs.
00002	Relay Output 2	0	1	R/W	"
00003	Relay Output 3	0	1	R/W	"
00004	Relay Output 4	0	1	R/W	"
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 113
40002	Digital Outputs	N/A	N/A	R/W	Digital Outputs in bits. 4(msb) – 1(lsb).
30100	DIP Switch	0	65535	R	Status of DIP Switch on Front Panel
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.
40121	Baud Rate	2400	11520	R/W	2400, 4800, 9600, 19200, 38400, 57600, 115200
40122	Parity	0	2	R/W	0 = none, 1 = even, 2 = odd
40123	Stop Bits	1	2	R/W	1 = 1 stop bit, 2 = 2 stop bits
40124	Reply Delay	0	65535	R/W	0 = Disable, >0 = Enable. (x10ms)

### Relay Output Register.

The relay outputs can be read /written in a single register as follows:

MSB													2300-RO4 DIGITAL OUTPUTS													LSB				ADDRESS	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2		1
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	0	40002	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	

Relay Output Number

### Output Watchdog Timer

The watchdog timer is used to switch off all of the outputs in the event of a communications failure. When set to zero (register 40101) the watchdog timer is disabled.

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