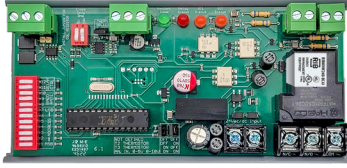


## RIBMNW24B-MBAI

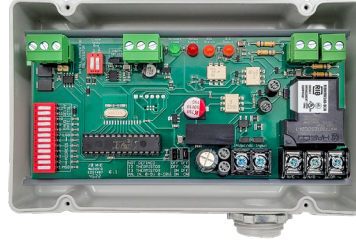
2.75" Track Mount Modbus® RTU Network Relay Device; One Binary Output (20 Amp Relay SPDT + Override); Two Binary Inputs (Dry Contact, Class 2); One Analog Input (T2 Thermistor / 0-5 Vdc / 0-10 Vdc); 24 Vac/dc Power Input; Optional End of Line Resistor (EOL) Included.



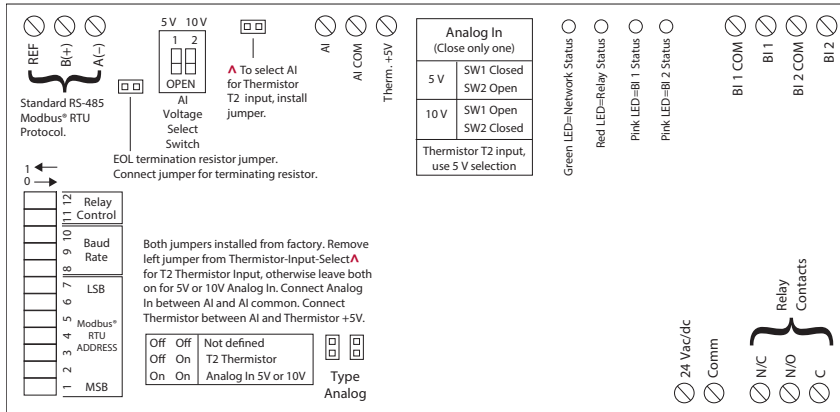
Code Version 1.1

## RIBTW24B-MBAI

Enclosed Modbus® RTU Network Relay Device; One Binary Output (20 Amp Relay SPDT + Override); Two Binary Inputs (Dry Contact, Class 2); One Analog Input (T2 Thermistor / 0-5 Vdc / 0-10 Vdc); 24 Vac/dc Power Input; Optional End of Line Resistor (EOL) Included.



Code Version 1.1



### Bulletin B1676 393208H

**ENERGY MANAGEMENT EQUIPMENT**

**CAUTION: RISK OF ELECTRIC SHOCK - MORE THAN ONE DISCONNECT MAY BE REQUIRED TO DEENERGIZE THE DEVICE BEFORE SERVICING.**

**FOR SUPPLY CONNECTIONS USE #12AWG WIRES OR LARGER RATED FOR AT LEAST 75°C(167°F).**

- # Relays & Contact Type:** One (1) SPDT Continuous Duty Coil
- Expected Relay Life:** 10 million cycles minimum mechanical
- Operating Temperature:** -30 to 140° F
- Humidity Range:** 5 to 95% (noncondensing)
- Operate Time:** 18ms
- Network Communication:** Green LED
- Relay Status:** Red LED On = Activated
- Current Sensor Status:** Pink LED On = Activated
- Binary Input Status:** Pink LED On = Activated
- Dimensions:** 6.25" x 2.75" x 1.75" (RIBMNW24B-MBAI)  
4.28" x 7.00" x 2.00" with .75" NPT Hub (RIBTW24B-MBAI)
- Track Mount:** MT212-6 Mounting Track Provided
- Approvals:** CE, UL Listed, UL916, C-UL, RoHS
- Housing Rating:** UL Listed, NEMA 1, C-UL, CE Approved, UL Accepted for Use in Plenum, Also available NEMA 4 / 4X
- Gold Flash:** No
- Relay Override Switch:** DIP Switch Control

- Contact Ratings:**
  - 20 Amp Resistive @ 277 Vac
  - 20 Amp Ballast @ 277 Vac
  - 16 Amp Electronic Ballast @ 277 Vac (N/O)
  - 10 Amp Tungsten @ 120 Vac (N/O)
  - 1110 VA Pilot Duty @ 277 Vac
  - 770 VA Pilot Duty @ 120 Vac
  - 2 HP @ 277 Vac
  - 1 HP @ 120 Vac

- Power Input Ratings:**
  - 81 mA @ 24 Vdc
  - 111 mA @ 24 Vac

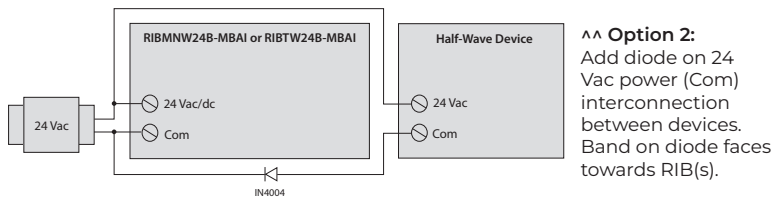
- Network Media:** Twisted Pair 22-24AWG, shielded recommended, EIA/TIA-485 (standard RS485)
- Terminations:** Functional Devices product installed at both ends of the standard RS485 Modbus® RTU network – Use 120 Ω end of line resistors. All other cases – Follow instructions from the device installed at the end of the Modbus® network.
- Polarity:** Network is polarity sensitive
- Baud Rate:** 9600, 19200, 38400, 57600 (DIP Switch Selectable)

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DIP SWITCHES*			BAUD RATE
8	9	10	
0	0	0	9600
0	0	1	19200
0	1	0	38400
0	1	1	57600

DIP SWITCHES*		RELAY STATE**
11	12	
1	0	Auto
X	1	Override on
0	0	Override off

All other combinations = 9600 baud  
Dry contact binary input is a general purpose input that is not tied to the relay internally. Can be used with any dry contact switching device, such as a current sensor, to feed back to the network.



- Notes:**
- Modbus®Address & Baud Rate must be set prior to power up via DIP switches.
  - Order NEMA 4 housing by adding "-N4" to end of model number. (RIBTW24B-MBAI-N4)
  - Order with grey lid by adding "-GY" to end of model number. (RIBTW24B-MBAI-GY)
  - Order NEMA 4 housing with grey lid by adding "-N4-GY" to end of model number. (RIBTW24B-MBAI-N4-GY)
  - This model utilizes:
    - Physical coil 1 (Relay output)
    - Physical binary input 1 (Dry contact binary input)
    - Physical binary input 2 (Dry contact binary input)
    - Physical input register AI 1 (Analog input)
    - Thermistor Type 2 (T2) Precon 10 K @ 77°F (25°C) PN ST-R24, Model 24, (or equivalent.) Thermistor not included. (Range -39 to 187°F)
  - For all versions, raw analog default settings are 0 and 1023 (real), respectively.
  - When connecting 24 Vac to both the RIB(s) and a half-wave device, damage to device can occur.
    - Option 1: Use separate transformers for each device.
    - Option 2: Add diode between devices, see Option 2

# MODBUS® RTU ADDRESS SETTING

Modbus® RTU Address	DIP Switch						
	1	2	3	4	5	6	7
0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	1
2	0	0	0	0	0	1	0
3	0	0	0	0	0	1	1
4	0	0	0	0	1	0	0
5	0	0	0	0	1	0	1
6	0	0	0	0	1	1	0
7	0	0	0	0	1	1	1
8	0	0	0	1	0	0	0
9	0	0	0	1	0	0	1
10	0	0	0	1	0	1	0
11	0	0	0	1	0	1	1
12	0	0	0	1	1	0	0
13	0	0	0	1	1	0	1
14	0	0	0	1	1	1	0
15	0	0	0	1	1	1	1
16	0	0	1	0	0	0	0
17	0	0	1	0	0	0	1
18	0	0	1	0	0	1	0
19	0	0	1	0	0	1	1
20	0	0	1	0	1	0	0
21	0	0	1	0	1	0	1
22	0	0	1	0	1	1	0
23	0	0	1	0	1	1	1
24	0	0	1	1	0	0	0
25	0	0	1	1	0	0	1
26	0	0	1	1	0	1	0

Modbus® RTU Address	DIP Switch						
	1	2	3	4	5	6	7
27	0	0	1	1	0	1	1
28	0	0	1	1	1	0	0
29	0	0	1	1	1	0	1
30	0	0	1	1	1	1	0
31	0	0	1	1	1	1	1
32	0	1	0	0	0	0	0
33	0	1	0	0	0	0	1
34	0	1	0	0	0	1	0
35	0	1	0	0	0	1	1
36	0	1	0	0	1	0	0
37	0	1	0	0	1	0	1
38	0	1	0	0	1	1	0
39	0	1	0	0	1	1	1
40	0	1	0	1	0	0	0
41	0	1	0	1	0	0	1
42	0	1	0	1	0	1	0
43	0	1	0	1	0	1	1
44	0	1	0	1	1	0	0
45	0	1	0	1	1	0	1
46	0	1	0	1	1	1	0
47	0	1	0	1	1	1	1
48	0	1	1	0	0	0	0
49	0	1	1	0	0	0	1
50	0	1	1	0	0	1	0
51	0	1	1	0	0	1	1
52	0	1	1	0	1	0	0
53	0	1	1	0	1	0	1

Modbus® RTU Address	DIP Switch						
	1	2	3	4	5	6	7
54	0	1	1	0	1	1	0
55	0	1	1	0	1	1	1
56	0	1	1	1	0	0	0
57	0	1	1	1	0	0	1
58	0	1	1	1	0	1	0
59	0	1	1	1	0	1	1
60	0	1	1	1	1	0	0
61	0	1	1	1	1	0	1
62	0	1	1	1	1	1	0
63	0	1	1	1	1	1	1
64	1	0	0	0	0	0	0
65	1	0	0	0	0	0	1
66	1	0	0	0	0	1	0
67	1	0	0	0	0	1	1
68	1	0	0	0	1	0	0
69	1	0	0	0	1	0	1
70	1	0	0	0	1	1	0
71	1	0	0	0	1	1	1
72	1	0	0	1	0	0	0
73	1	0	0	1	0	0	1
74	1	0	0	1	0	1	0
75	1	0	0	1	0	1	1
76	1	0	0	1	1	0	0
77	1	0	0	1	1	0	1
78	1	0	0	1	1	1	0
79	1	0	0	1	1	1	1
80	1	0	1	0	0	0	0

Modbus® RTU Address	DIP Switch						
	1	2	3	4	5	6	7
81	1	0	1	0	0	0	1
82	1	0	1	0	0	1	0
83	1	0	1	0	0	1	1
84	1	0	1	0	1	0	0
85	1	0	1	0	1	0	1
86	1	0	1	0	1	1	0
87	1	0	1	0	1	1	1
88	1	0	1	1	0	0	0
89	1	0	1	1	0	0	1
90	1	0	1	1	0	1	0
91	1	0	1	1	0	1	1
92	1	0	1	1	1	0	0
93	1	0	1	1	1	0	1
94	1	0	1	1	1	1	0
95	1	0	1	1	1	1	1
96	1	1	0	0	0	0	0
97	1	1	0	0	0	0	1
98	1	1	0	0	0	1	0
99	1	1	0	0	0	1	1
100	1	1	0	0	1	0	0
101	1	1	0	0	1	0	1
102	1	1	0	0	1	1	0
103	1	1	0	0	1	1	1
104	1	1	0	1	0	0	0
105	1	1	0	1	0	0	1
106	1	1	0	1	0	1	0
107	1	1	0	1	0	1	1

Modbus® RTU Address	DIP Switch						
	1	2	3	4	5	6	7
108	1	1	0	1	1	0	0
109	1	1	0	1	1	0	1
110	1	1	0	1	1	1	0
111	1	1	0	1	1	1	1
112	1	1	1	0	0	0	0
113	1	1	1	0	0	0	1
114	1	1	1	0	0	1	0
115	1	1	1	0	0	1	1
116	1	1	1	0	1	0	0
117	1	1	1	0	1	0	1
118	1	1	1	0	1	1	0
119	1	1	1	0	1	1	1
120	1	1	1	1	0	0	0
121	1	1	1	1	0	0	1
122	1	1	1	1	0	1	0
123	1	1	1	1	0	1	1
124	1	1	1	1	1	0	0
125	1	1	1	1	1	0	1
126	1	1	1	1	1	1	0
127	1	1	1	1	1	1	1

Baud Rate	DIP Switch		
	8	9	10
9600	0	0	0
19200	0	0	1
38400	0	1	0
57600	0	1	1

## FUNCTION CODE

DI'S	PHYSICAL DISCRETE INPUTS	CODE	HEX	ADDRESS	DATA	TYPE	DESCRIPTION
1	Read Discrete Input 1	02	0x02	10001	1 - ON, 0 - OFF	BIT	Discrete input 1 current state/value
2	Read Discrete Input 2	02	0x02	10002	1 - ON, 0 - OFF	BIT	Discrete input 2 current state/value

## FUNCTION CODE

RELAY	PHYSICAL COILS	CODE	HEX	ADDRESS	DATA	TYPE	DESCRIPTION
1	Read Coil 1	01	0x01	00001	1 - ON, 0 - OFF	BIT	Get current value/state of RELAY 1
1	Write Single Coil 1	05	0x05	00001	1 - ON, 0 - OFF	BIT	Set current value/state of RELAY 1
1	Read Coil 2	01	0x01	00002	1 - ON, 0 - OFF	BIT	Get default relay start up state
1	Write Single Coil 2	05	0x05	00002	1 - ON, 0 - OFF	BIT	Set default relay start up state

## FUNCTION CODE

AIN	PHYSICAL INPUT REGISTER	CODE	HEX	ADDRESS	DATA	TYPE	DESCRIPTION
1	Read Input Register 1	04	0x04	30001	-39 °F, -187 °F	INT16	Thermister Temperature °F
1	Read Input Register 1	04	0x04	30001	0, 1023	UINT16	Raw Analog Input Value 0-5V or 0-10V Range
1	Read Input Register 5	04	0x04	30005		Float 32 LSB	
	Read Input Register 6			30006	1.100	Float 32 MSB	Software Revision

**2 Exception Codes Supported:**  
02 | ILLEGAL\_DATA\_ADDRESS  
03 | ILLEGAL\_DATA\_VALUE

**Baud Rates Supported:**  
9600  
19200 | Data Bits: 8 Parity: None  
38400  
57600

**INPUTS Function Code 2 - Read Physical Discrete Inputs**  
WORD Register1 - 10001 - Digital Input Status 1 - Read (BIT)  
WORD Register2 - 10002 - Digital Input Status 2 Read (BIT)

**INPUTS Function Code 4 - Read Physical Input Registers**  
WORD Register1 - 30001 - Temperature Read (Thermister Mode) -39 °F thru 187 °F (INT16)  
WORD Register1 - 30001 - Analog Input Read (Analog Input Mode) 0 thru 1023 (UINT16)

**INPUTS Function Code 1 - Read Physical Coils**  
WORD Register1 - 00001 - Get Relay State (BIT)  
WORD Register2 - 00002 - Get Default Relay Power on State (BIT)

**OUTPUTS Function Code 5 - Write Physical Coils**  
WORD Register1 - 00001 - Set Relay State (BIT)  
WORD Register1 - 00002 - Set Value for Default Relay State on power up (BIT)