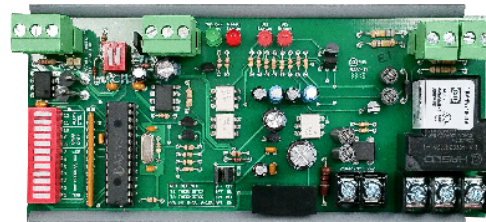




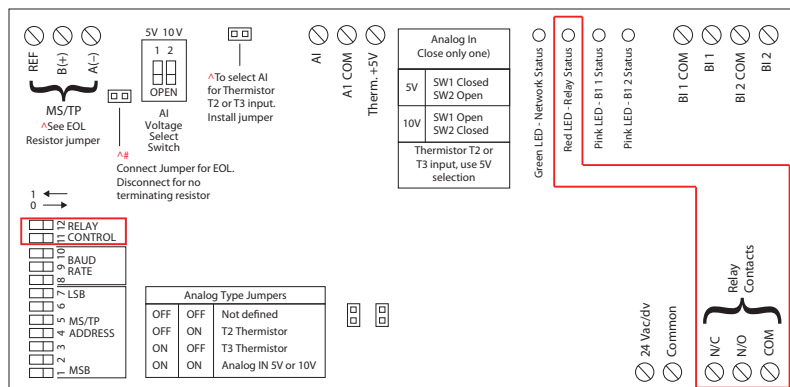
RIBTW24B-BCAI



RIBMNW24B-BCAI

One Binary Output (20 Amp Relay SPDT + Override)

- Contact Ratings:**
 20 Amp Resistive @ 277 Vac
 20 Amp Magnetic 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





- Relay Override is selected via DIP Sw 11 & 12:

DIP Switches *		Relay State **
11	12	
1	0	Auto
X	1	Override on
0	0	Override off

* 0 = Open ; 1 = Closed
 ** Device must be powered for override

- Red LED is on when Relay is on.
- Connect to terminals N/O, N/C, COM

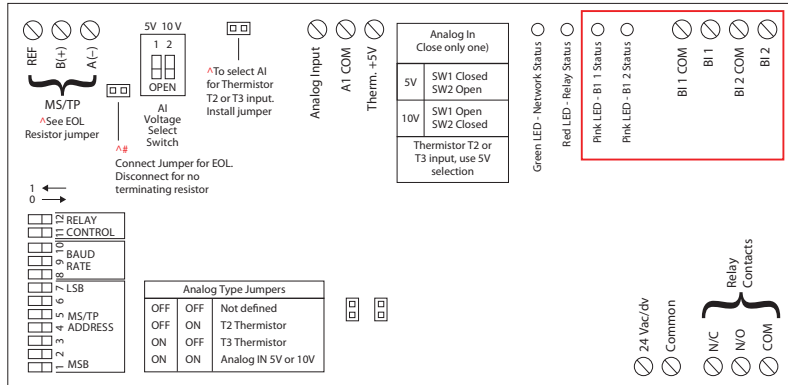



ENERGY MANAGEMENT EQUIPMENT

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).

Two Binary Inputs (Dry Contact, Class 2)



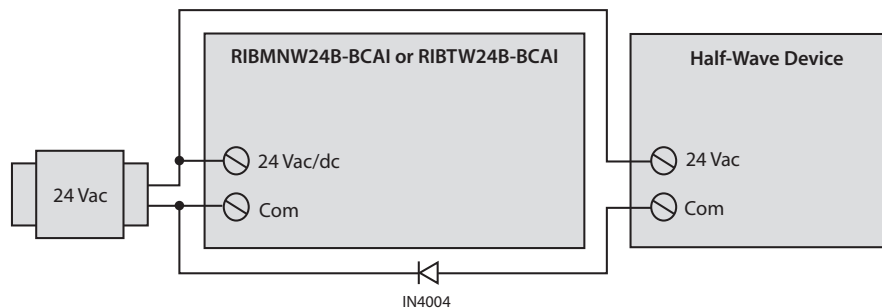
- Connect to terminal pair BI 1 COM & BI 1 or BI 2 COM & BI 2
- Contact rating ~ 24 Vdc @ 20 mA
- Pink LED is on when respective Binary Input is closed

24 Vac/dc Power Input

- Connect to terminal pair 24Vac/dc Input
- When connecting 24Vac to both the RIB(s) and a halfwave device, damage to device can occur.

Option 1: Use separate transformer for each device, or an isolated 24Vdc power supply.

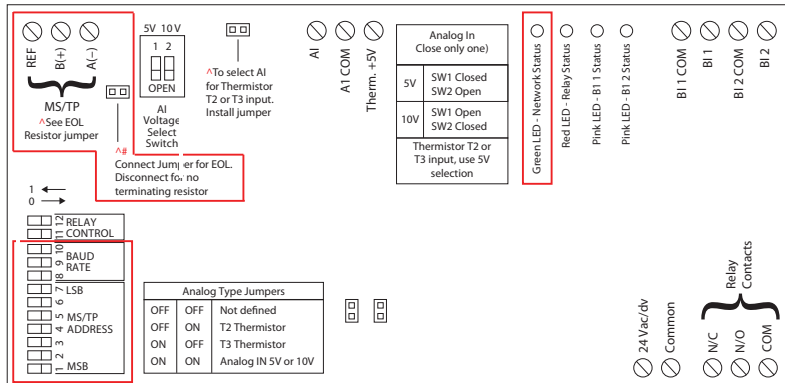
Option 2 Add diode between devices, see diagram.



^^ Option 2:
Add diode on 24 Vac power (Com)
interconnection between devices.
Band on diode faces towards RIB(s).

BACnet® MS/TP Network

- Optional End of Line Resistor (EOL) Included.
- Basic Data
 - **Network Media:** Twisted Pair 22-24AWG, shielded recommended
 - **Terminations:** Functional Devices product installed at both ends of the MS/TP network – Use 120 Ω end of line resistors. All other cases – Follow instructions from the device installed at the end of the MS/TP network.
 - **Polarity:** Network is polarity sensitive
 - **Baud Rate:** 9600, 19200, 38400, 57600, 76800, 115200 (DIP Switch Selectable)



- **MS/TP Addressing, Baud Rate, and ID**
 - MS/TP Address & Baud Rate must be set prior to power up via DIP switches.
 - Device ID will default to 277XXX where XXX is the MS/TP Address.
 - Examples:
 - MS/TP Address - 004 Device ID - 277004
 - MS/TP Address - 121 Device ID - 277121
 - Device ID can be changed via network command. Once changed, it will no longer default to 277XXX. (Each MS/TP Address & Device ID must be unique.)
 - Device Instance is changed via Object-Identifier Property of the Device Object

DIP Switches*			Baud Rate
8	9	10	
0	0	0	9600
0	0	1	19200
0	1	0	38400
0	1	1	57600
1	0	0	76800
1	0	1	115200

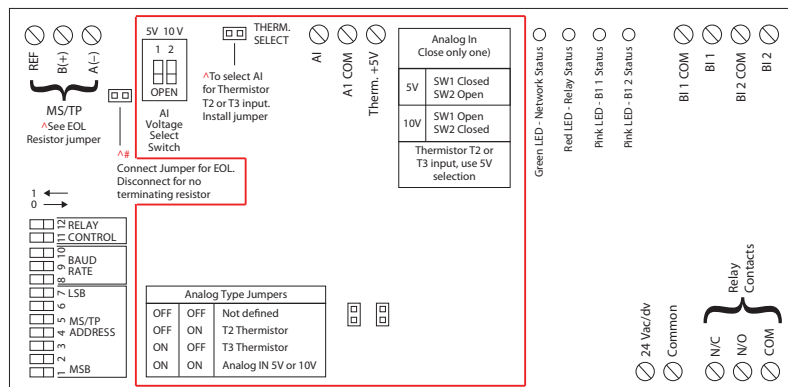
* 0 = Open ; 1 = Closed

All other combinations = 9600 Baud

- This model utilizes:
 - BO 1 (Relay output),
 - AI 1 (Analog input),
 - BI 1, BI 2 (Dry contact Binary inputs),
 - AV 1 (Set Point),
 - AV 2 (Differential),
 - BV 1 (Set Point Function Enable),
 - BV 2 (Set Point Mode),
 - BV 3 (Set Point Function Status)
- Address selected via DIP Sw 1 – 7 , see Bulletin B2028

One Analog Input (T2/T3 Thermistor or 0-5 Vdc or 0-10 Vdc)

- Utilized for optional Set Point Function if enabled (see next page).



• T2/T3 Thermistor

- Install THERM SELECT Jumper
- Install Analog Type Jumpers per Type Select Table
- Close Sw 1 (5V)
- Open Sw 2 (10V)
- Connect to Terminals AI & THERM +5V
- Thermistor Specifications
 - Thermistor Type 2 (T2) Precon 10 K @ 77°F (25°C) PN ST-R24, Model 24, (or equivalent.)
 - Thermistor Type 3 (T3) Precon 10 K @ 77°F (25°C) Model 3, (or equivalent.)
 - Thermistor not included.
- For both T2 and T3:
 - MIN_PRES_VAL must be set to -36 Celcius or -32.8 Fahrenheit (real value)
 - MAX_PRES_VAL must be set to 66.3 Celcius or 151.34 Fahrenheit (real value).
- Temperature Range/Resolution:
 - 35 to 10°C range in 1° steps / -31 to 50°F range in 1.8° steps
 - 10 to 32°C range in 0.1° steps / 50 to 90°F range in 0.18° steps
 - 32 to 100°C range in 1° steps / 90 to 212°F range in 1.8° steps

• Input (0-5 Vdc)

- Uninstall THERM SELECT Jumper
- Install Analog Type Jumpers per Type Select Table
- Close Sw 1 (5V)
- Open Sw 2 (10V)
- Connect to Terminals AI & AI COM

• Input (0-10 Vdc)

- Uninstall THERM SELECT Jumper
- Install Analog Type Jumpers per Type Select Table
- Open Sw 1 (5V)
- Close Sw 2 (10V)
- Connect to Terminals AI & AI COM

- Raw analog default settings are 0 and 1023 (real), respectively. Units default to 95 (no units).

Set Point Function – RIB[*]24B-BCAI

The Set Point Function of this product monitors the Analog Input (AI1) and controls the Binary Output (BO1) based on a Set Point and Differential set by the user. The Set Point Function will continue to operate even if network communication is lost. The function has two modes, Increasing or Decreasing, which are shown in the table below.

Set Point Function Mode	Analog Input	Binary Output
Increasing	< Set Point – Differential	ON @ Priority 16
Increasing	> Set Point + Differential	OFF @ Priority 16
Decreasing	< Set Point – Differential	OFF @ Priority 16
Decreasing	> Set Point + Differential	ON @ Priority 16

Inputs

Set Point Function Enable (BV1)

- Enables or disables the set point function.

Set Point Mode (BV2)

- Sets the set point function operation mode to either increasing or decreasing.

Set Point (AV1)

- The desired set point to be maintained.

Set Point Differential (AV2)

- The difference above and below the set point needed to trigger a state change.

Analog Input (AI1)

- Analog Input for the set point function.

Outputs

Set Point Function Status (BV3)

- Status feedback of the input settings for the set point function. See Set Point Function Status Conditions section.

Relay (BO1)

Setup

The set point function software running on the RIB[*]24B-BCAI requires multiple hardware and software settings to be configured for the logic to execute correctly. Please follow the steps outlined below to ensure proper functionality.

Hardware Setup

Follow steps on pg. 4 to setup hardware for desired Analog Input (T2/T3 Thermistor, 0-5 Vdc, 0-10 Vdc)

Note: Hardware setup should be performed before powering on the device.

Software Setup

Follow Voltage Input steps when using a 0-5V or 0-10V analog input. Follow Thermistor Input steps when using a T2 or T3 thermistor analog input.

Voltage Input

1. Update BACnet object AI1's Units property to desired units.
2. Update the MIN_PRES_VAL property of AI1 to 0 (default), and update the MAX_PRES_VAL property of AI1 to 1023 (default).
3. Read AI1's Present Value to verify the Input is being measured and converted correctly (Present Value is a 0-1023 value, proportional to the input voltage).
4. Update BACnet object AV1's and AV2's Units property to match the units of AI1.
5. Update BACnet object BV2's Present Value to select the desired set point function mode.
 - a. 0 = Increasing Mode
 - b. 1 = Decreasing Mode

Note: Set Point and Differential set in Steps 6 and 7 are on a 0-1023 scale.

6. Update BACnet object AV1's Present Value to the desired set point.
7. Update BACnet object AV2's Present Value to the desired differential.

8. Read BACnet object BV3's Present Value to verify the Set Point Function Status. This value should be 1 (Valid). If it is 0 (Invalid), please verify the Set Point Function Status Conditions are satisfied – see below.
9. Update BACnet object BV1's Present Value to 1 (On) to enable the set point function.

Thermistor Input

1. Update BACnet object AI1's Units property to either (62) Celsius or (64) Fahrenheit.
2. Based on the Units property configured in step 1, update the MIN_PRES_VAL and MAX_PRES_VAL properties of AI1 accordingly – see "For both T2 and T3" on pg. 4.
3. Read AI1's Present Value to verify the temperature is being measured and converted correctly.
4. Update BACnet object AV1's and AV2's Units property to match the units of AI1.
5. Update BACnet object BV2's Present Value to select the desired set point function mode.
 - a. 0 = Increasing Mode (Heat)
 - b. 1 = Decreasing Mode (Cool)
6. Update BACnet object AV1's Present Value to the desired set point.
7. Update BACnet object AV2's Present Value to the desired differential.
8. Read BACnet object BV3's Present Value to verify the Set Point Function Status. This value should be 1 (Valid). If it is 0 (Invalid), please verify the Set Point Function Status Conditions are satisfied – see below.
9. Update BACnet object BV1's Present Value to 1 (On) to enable the set point function.

Set Point Function Status Conditions

The following conditions must be satisfied for the set point function to operate properly.

1. Hardware jumpers and DIP switches must be set for the type of analog input being utilized.
2. The units of AI1 and AV1 must be the same
3. The MIN and MAX Present Value properties of AI1 must be set to match the units
4. For a Voltage Input:
 - a. (set point – differential) > 0
 - b. (set point + differential) < 1023
5. For a Thermistor Input
 - a. (set point – differential) > minimum measurable temperature (dependent on units) – see Measurable Temperature Range below.
 - b. (set point + differential) < maximum measurable temperature (dependent on units) – see Measurable Temperature Range below.

Measurable Temperature Range

- Celsius with T2 or T3 Thermistor:
 - o Minimum = -35 °C
 - o Maximum = 100 °C
- Fahrenheit with T2 or T3 Thermistor:
 - o Minimum = -31 °F
 - o Maximum = 212 °F

Short Cycle Protection for HVAC Applications

The Minimum_On_Time and Minimum_Off_Time properties of BO1 can be used to ensure short cycling of the relay load is not possible.