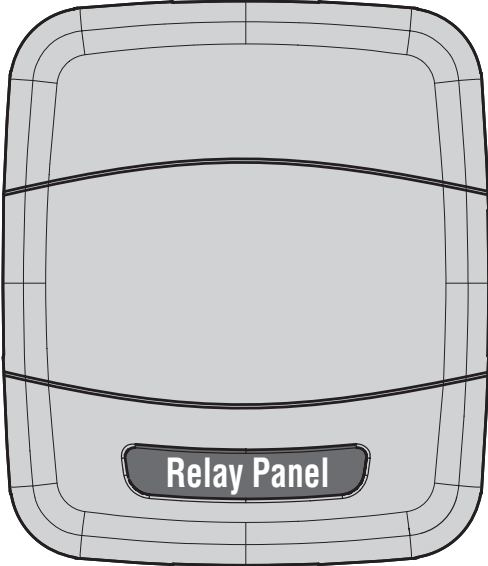


Installation Guide

Other Installation Guides may be necessary, based on system configuration.
A list of other system components is shown below.



BAY24VRPAC52DC

1	Control (required) *ZONE950, *ZON1050 or *CONT850
2	Relay Panel For use with Communicating Controls and 24V or Hybrid Systems
3	Zone Panel (optional)
4	Zone Sensor with Display (optional)
5	Zone Sensor (optional)
6	Zone Dampers (optional)

* A or T

ALL phases of this installation must comply with NATIONAL, STATE AND LOCAL CODES

IMPORTANT — This Document is customer property and is to remain with this unit.

These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

Section 1. Safety

⚠ WARNING

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage. The manufacturer or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

⚠ WARNING

LIVE ELECTRICAL COMPONENTS!
During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Table of Contents

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Section 7. Troubleshooting.....25

Section 2. General Information

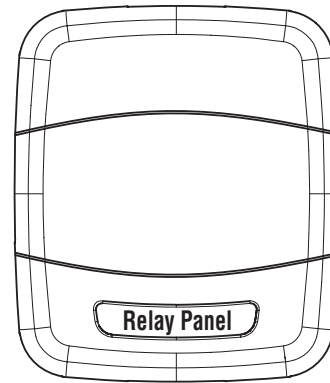
2.1 Overview

The Relay Panel is a wall mounted low voltage panel that enables communicating controls to operate with 24 VAC HVAC equipment. Only three wires are required from the control to the Relay Panel.

This Relay Panel controls the operation of heating, cooling, heat pump and dual fuel systems.

For specific wiring applications, see Field Wiring Diagrams.

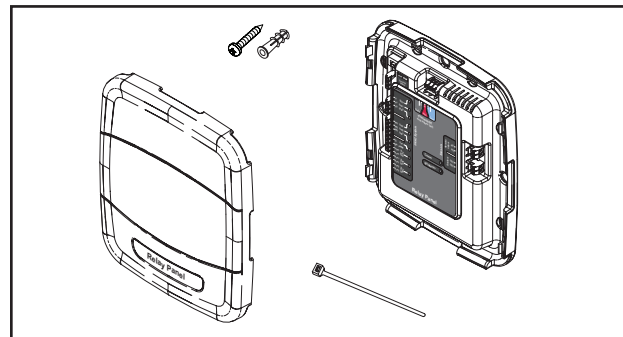
*A or T



2.2 Contents in Box

The following parts are included in product model BAY24VRPAC52DC:

- 1 - Relay Panel cover
- 1 - Relay Panel base
- 4 - Mounting screws/anchors
- 4 - Wire ties
- 1 - Installation Guide



2.3 Optional Accessories

Sensor	Description
ZZSENSAL0400AA	Indoor Temperature Sensor
BAYSEN01ATEMPA	Outdoor Temperature Sensor

2.4 Specifications

Specification	Description
Product Model:	BAY24VRPAC52DC
Product:	Relay Panel for use with 24V indoor systems
Size:	8.0" width x 9.3" height x 1.9" depth
Storage Temperature:	-40° to 175°F, 5% - 95% RH non-condensing
Operating Temperature:	-40° to 150°F, 5% - 95% RH non-condensing
Input Power:	24 VAC from HVAC System (Range: 18-32 VAC)
Power Consumption:	4VA* (See the following table for system transformer sizing guidelines.)
Wire usage:	Minimum 18 gauge NEC approved control wiring
HVAC System Type Compatible:	Standard (gas/electric), Heat Pump, Dual Fuel
Multistage System Compatible:	Standard HVAC Systems: 3-stage heating, 2-stage cooling Heat Pump Systems: 5-stage heating (2-compressor, 3 aux heat), 2-stage cooling
LEDs:	11 green, 1 amber
Communications:	12 VDC
AUX Contacts:	Dry contacts, 18–30 VAC, 2A max

2.5 System Transformer Sizing Guidelines

OD Unit Type	Indoor Unit Type			
	Comm Furnace	Comm Air Handler	24V Furnace	24V Air Handler
	Minimum Indoor 24V Control Power Transformer Size, VA*			
Communicating Heat Pump	35	35	See Below	
Communicating Air Conditioner	35	35		
24Volt-Controlled Single Stage Heat Pump	35	40	35	40
24Volt-Controlled Single Stage Air Conditioner	35	40	35	40
24Volt-Controlled 2-Stage Single Compressor Heat Pump	65	75	65	75
24Volt-Controlled 2-Stage Single Compressor Air Conditioner	50	40	50	40
24Volt-Controlled 2-Stage Dual Compressor Heat Pump	50	75	50	75
24Volt-Controlled 2-Stage Dual Compressor Air Conditioner	35	40	35	40

*Note: The VA rating of all 24V field-installed accessories must be added to the above for sizing indoor unit control transformers or the accessories must be powered separately.

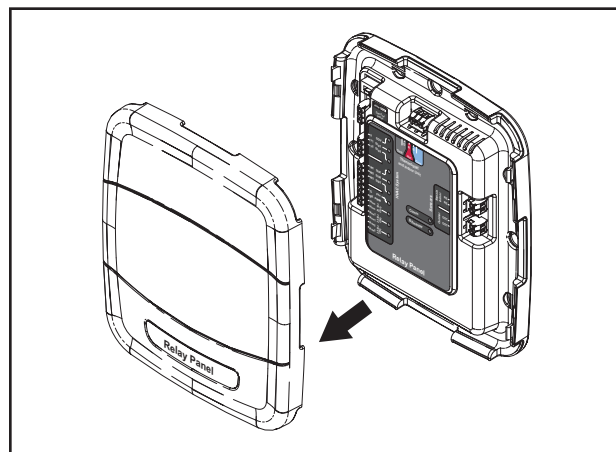
Section 3. Installation

Unit Location Considerations

The unit's rugged design allows installation in closet, attic or other non-condensing locations free from obstructions or other hazards.

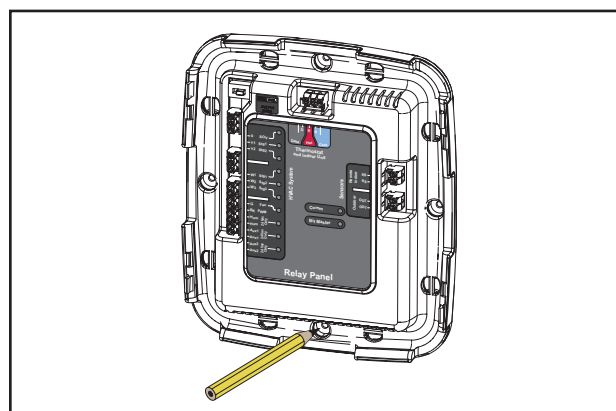
1 Remove Cover

Remove cover by grasping at edges and gently pulling the cover straight towards you. It should release without much effort.

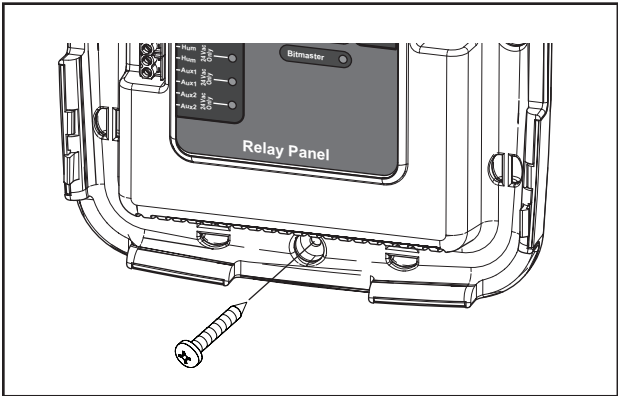
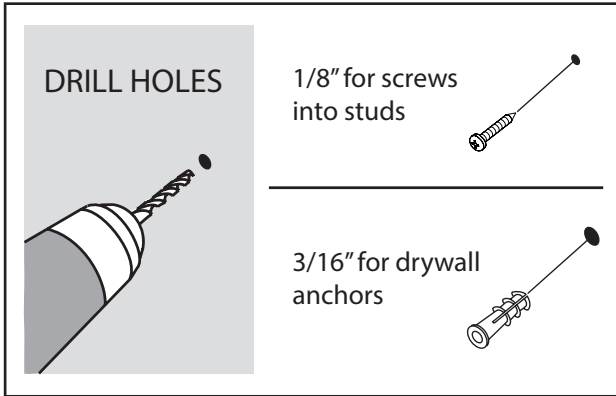


2 Mark Mounting Location

Mark four holes on the wall using the base as a template. A level may be used to ensure accuracy.



3 Mount Panel



Mounting to studs: Drill 1/8" pilot holes in the four locations marked above.

Attach base to wall using four screws provided. Do not overtighten.

Mounting to drywall:
If mounting to drywall with no studs behind it, enlarge pilot holes to 3/16" for anchors (included with the relay panel).

Gently tap anchors into the holes.

4 General Wiring Information

⚠ WARNING

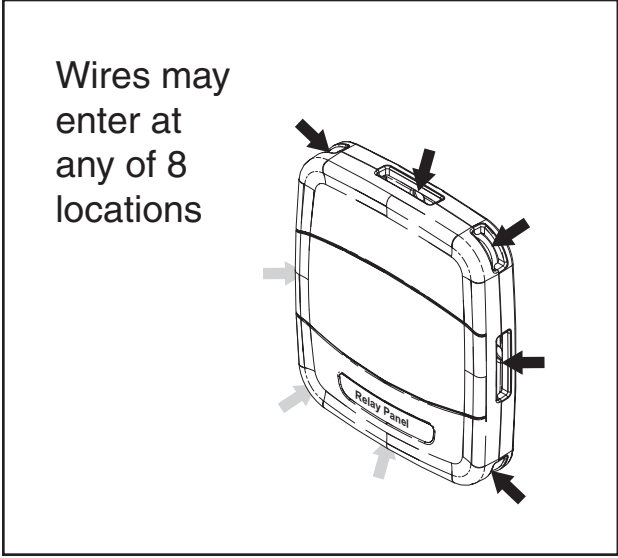
LIVE ELECTRICAL COMPONENTS!
During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

⚠ CAUTION

CAUTION: EQUIPMENT DAMAGE HAZARD - Improper wiring can lead to equipment damage. Follow the terminal connection information carefully to ensure the control is wired properly. After wires are secure, bare wires **MUST NOT** touch each other. See the Field Wiring Diagrams for specific system applications.

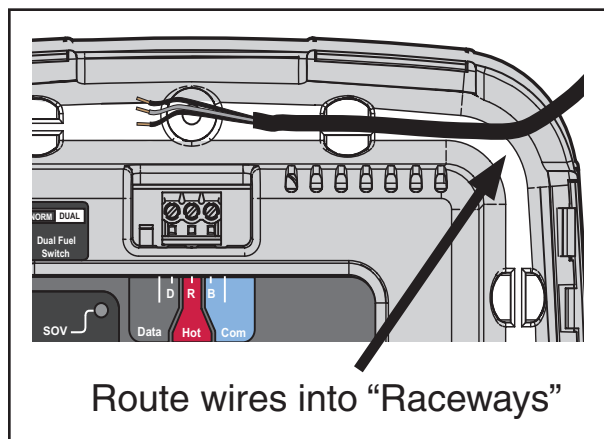
Wires may enter the Relay Panel through openings on each corner and at the center of each side.

Necessary wire lengths should be considered when determining entry points.



5 Routing Wires

Run wires within the recessed wire “raceway”. Be sure there is ample length to reach the connectors.

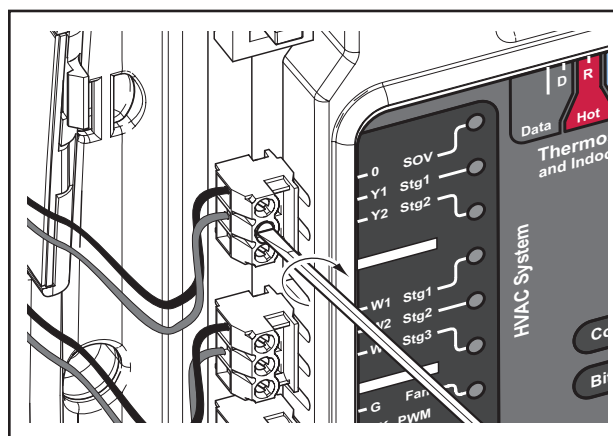


6 Attaching Wires

Using 1/8” blade screwdriver, attach all wires securely to the proper terminals on the Relay Panel.

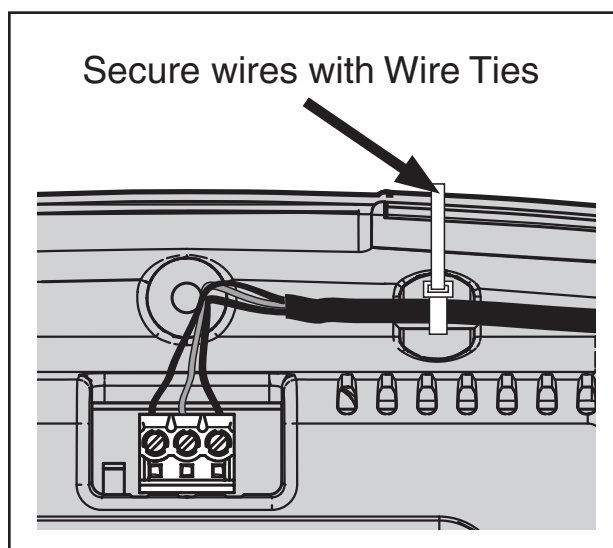
Refer to the following section for detailed terminal information.

(See the Field Wiring Diagrams section for common system configurations.)



7 Securing Wires

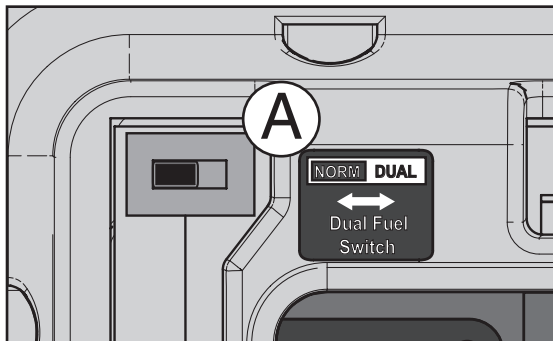
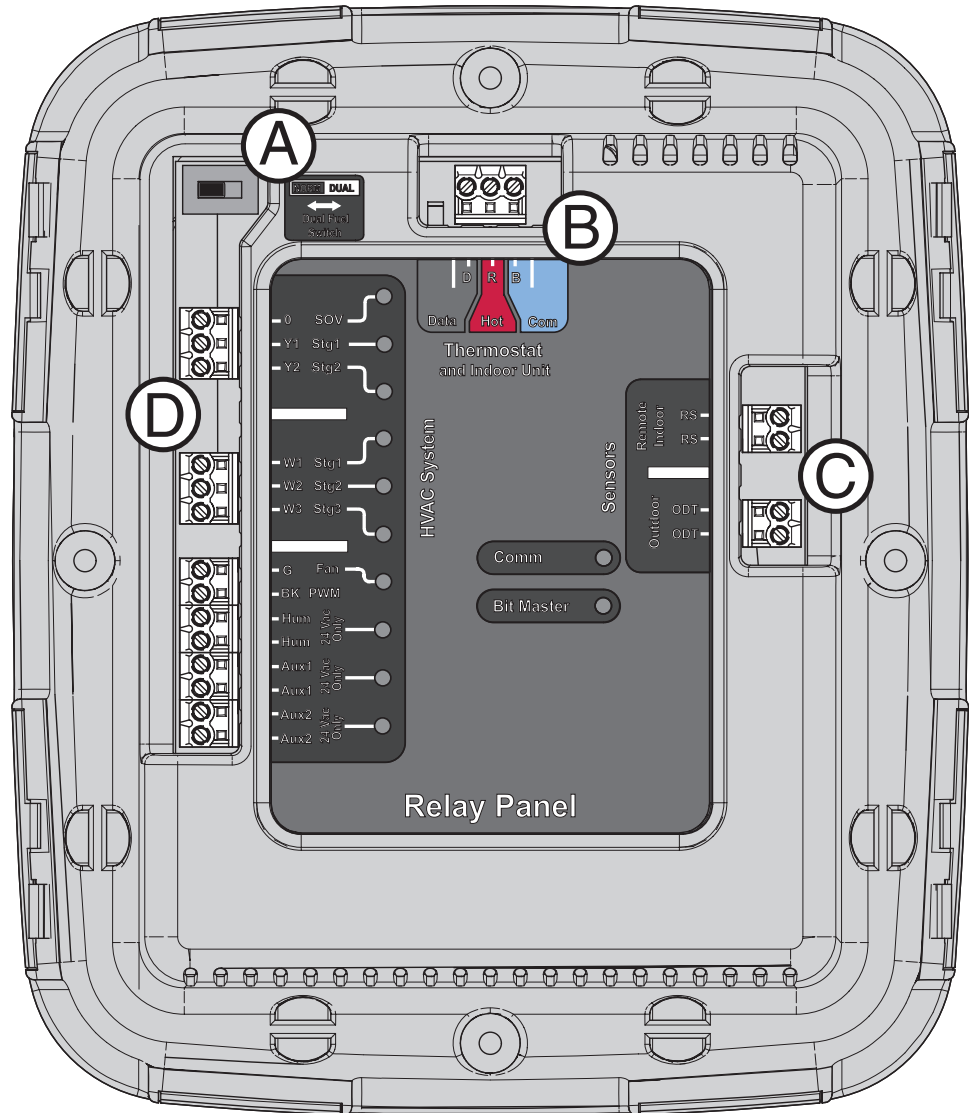
Secure all wires with the supplied wire ties to ensure that wires are kept in place and not strained.



Section 4. Terminal Locations and ID

Refer to the following diagrams for descriptions of each terminal.

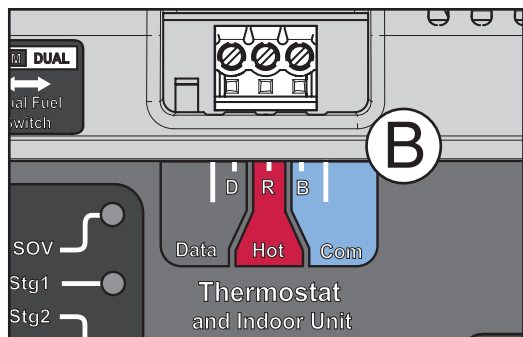
KEY	Terminal Identification
(A)	Dual Fuel Switch
(B)	Thermostat + 24VAC Input
(C)	Optional Sensors
(D)	HVAC System



(A) Dual Fuel Switch	
Switch Position	Description
NORM	For HP or conventional Heat/Cool systems.
DUAL	For dual fuel systems.

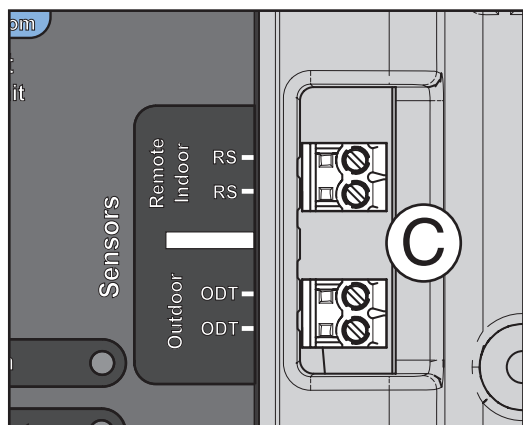
This switch ships in the NORM position by default. Refer to the following section for complete Field Wiring Diagrams.

For convenience, you may record the color of each wire used in the blanks provided.



B Thermostat and Indoor Unit Connections		
Terminal Name	Description	Color Used:
D - Data	Data	
R - Hot	24 V hot	
B - Com	24 V common	

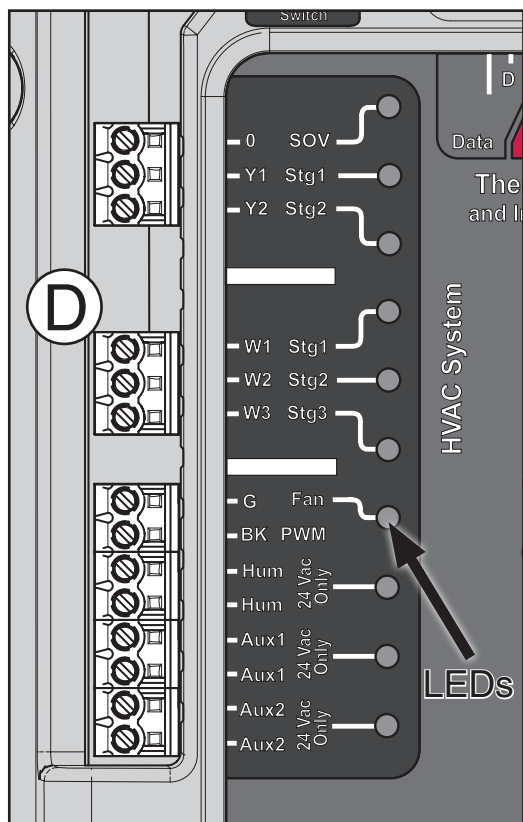
Note: R & B must receive 24 volts from the indoor unit transformer.



C Optional Remote Sensor Connections		
Terminal Name	Description	Color Used:
Remote Indoor	RS	Remote Indoor temp sensor ZZSENSAL0400AA
	RS	
Outdoor	ODT	① Outdoor temp sensor BAYSEN01ATEMPA
	ODT	

Note: The Relay Panel uses 5 VDC to obtain temperature feedback from remote sensors. Do not run these sensors in a wiring bundle that contains 24 volts AC. See remote sensor literature for troubleshooting.

① Wired outdoor temperature sensor must be enabled at the Control.



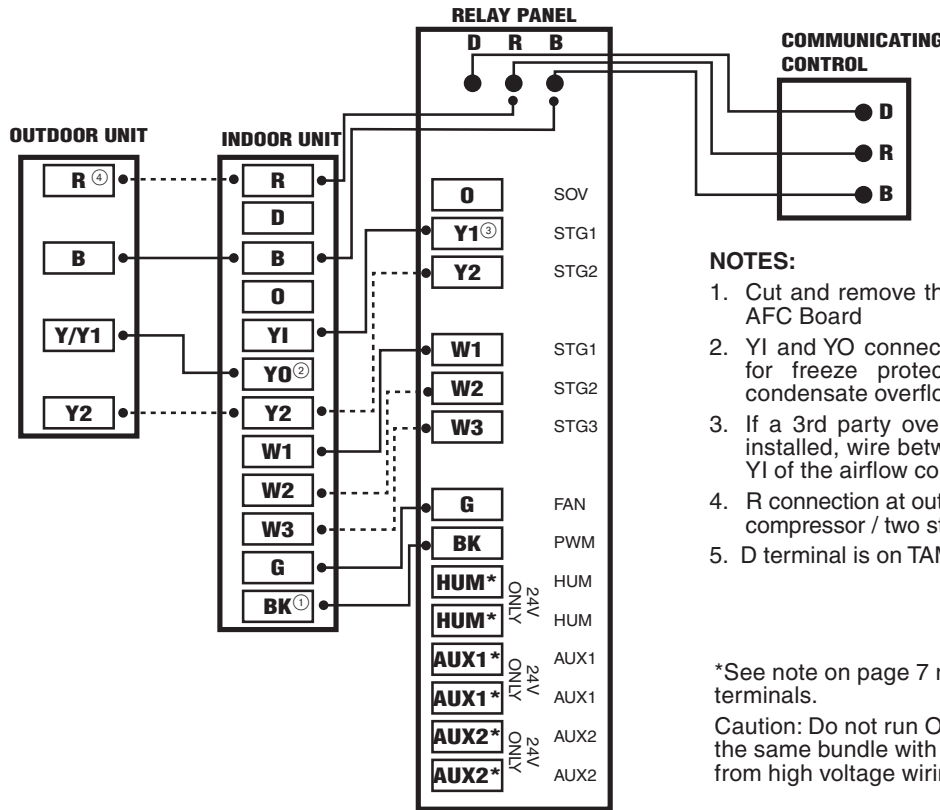
D HVAC System Connections		
Terminal Name	Description	Color Used:
O - SOV	Switch Over Valve	
Y1 - Stg1	First Stage Compressor	
Y2 - Stg2	Second Stage Compressor	
W1 - Stg1	First Stage ID Heating	
W2 - Stg2	Second Stage ID Heating	
W3 - Stg3	Third Stage ID Heating	
G - Fan	Indoor Blower	
BK - PWM	PWM Signal for indoor blower modulation	
Hum*	Humidifier Contact	
Hum*	Humidifier Contact	
Aux 1*	Dehumidifier/Ventilation	---
Aux 1*	Dehumidifier/Ventilation	---
Aux 2*	Dehumidifier/Ventilation	---
Aux 2*	Dehumidifier/Ventilation	---

***Note:** Hum & Aux terminals are dry contacts only. Input voltage will need to be supplied. Refer to humidifier's installer's guide. If the output of these contacts is being used as an input to a non electro-mechanical device, a field-supplied 10K Ohm resistor should be placed between the top terminal of each pair of contacts and the Common (B) terminal of the Relay Panel.

Section 5. Field Wiring Diagrams

AC Applications

Diagram 1 - 1 or 2 Stage Cooling w/TAM7 or TAM9 in 24 volt mode Model Air Handler



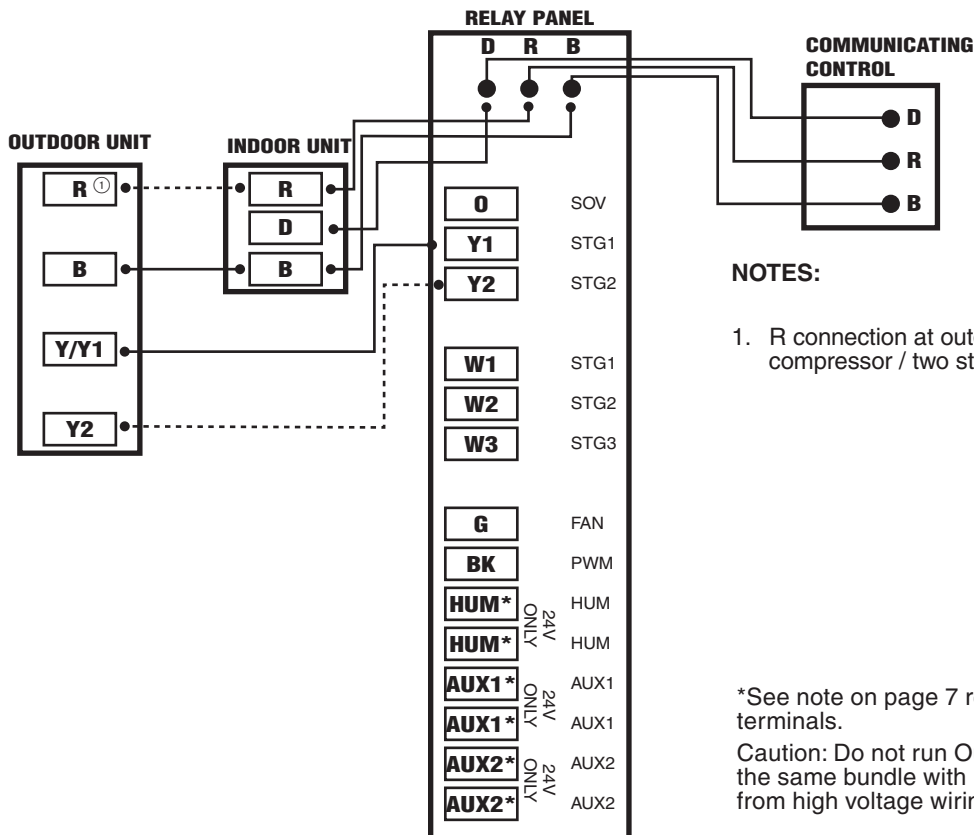
NOTES:

1. Cut and remove the BK jumper at the indoor unit AFC Board
2. Y1 and Y0 connections must be made as shown for freeze protection and internally mounted condensate overflow circuits to function properly
3. If a 3rd party overflow condensate switches are installed, wire between Y1 of the Relay Panel and Y1 of the airflow control board
4. R connection at outdoor unit is required only for two compressor / two stage units
5. D terminal is on TAM9 ONLY.

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 2 - 1 or 2 Stage Cooling w/TAM9 in communication mode Air Handler



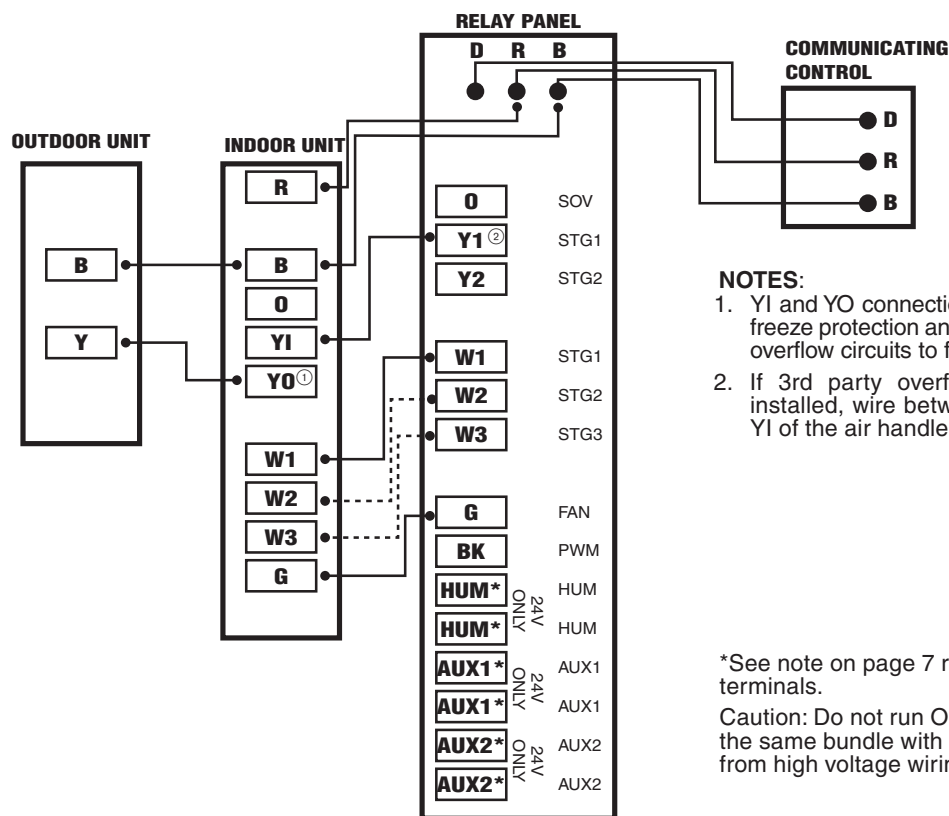
NOTES:

1. R connection at outdoor unit is required only for two compressor / two stage units

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 3 - 1 Stage Cooling w/GAM5A or TAM4 Model Air Handler

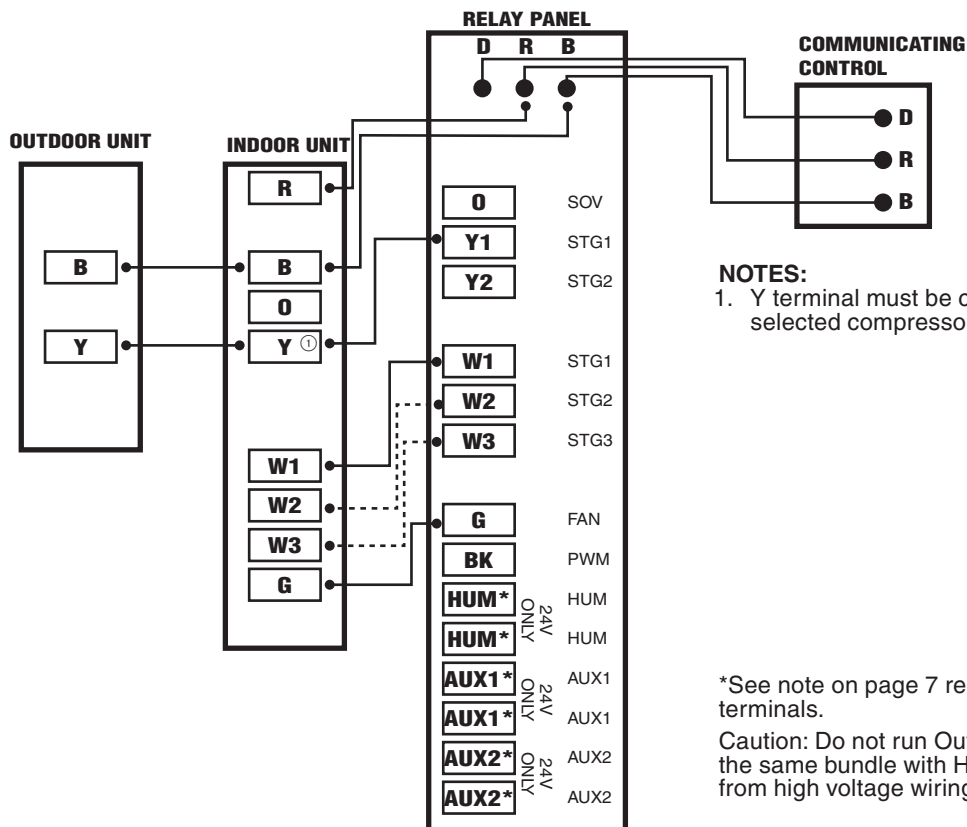


- NOTES:**
1. Y1 and Y0 connections must be made as shown for freeze protection and internally mounted condensate overflow circuits to function properly
 2. If 3rd party overflow condensate switches are installed, wire between Y1 of the Relay Panel and Y1 of the air handler

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 4 - 1 Stage Cooling w/GAM5B Model Air Handler



- NOTES:**
1. Y terminal must be connected at indoor unit for selected compressor air flow

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 5 - 2 Stage Cooling w/GAM5B Model Air Handler

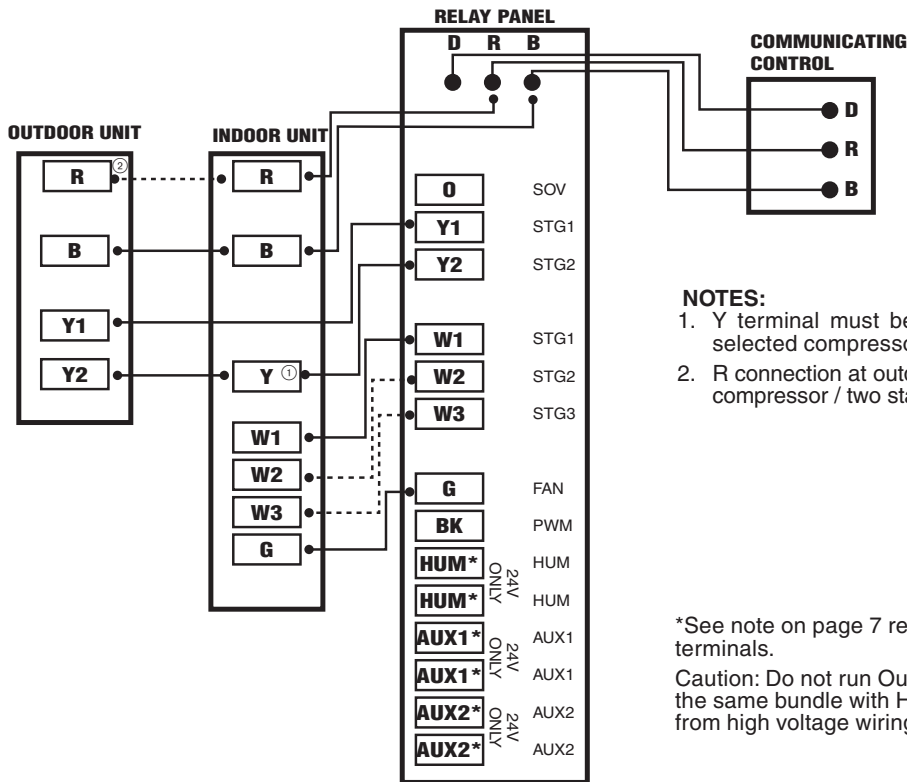


Diagram 6 - 1 Stage Cooling w/GAF2-S Model Air Handler

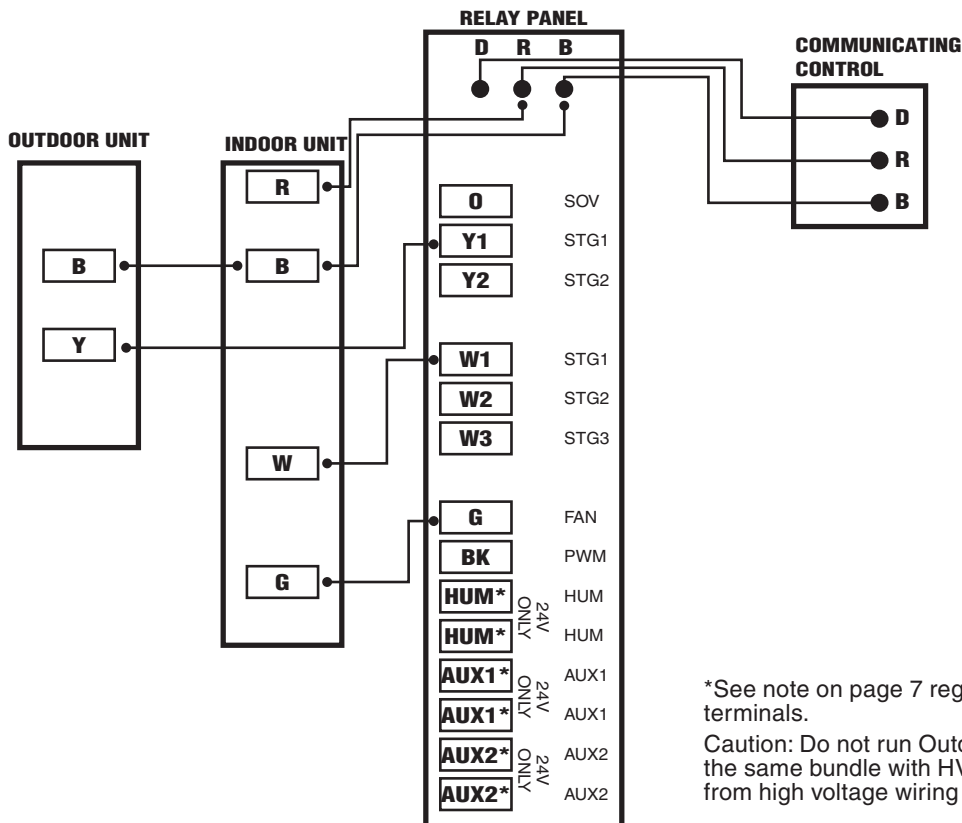
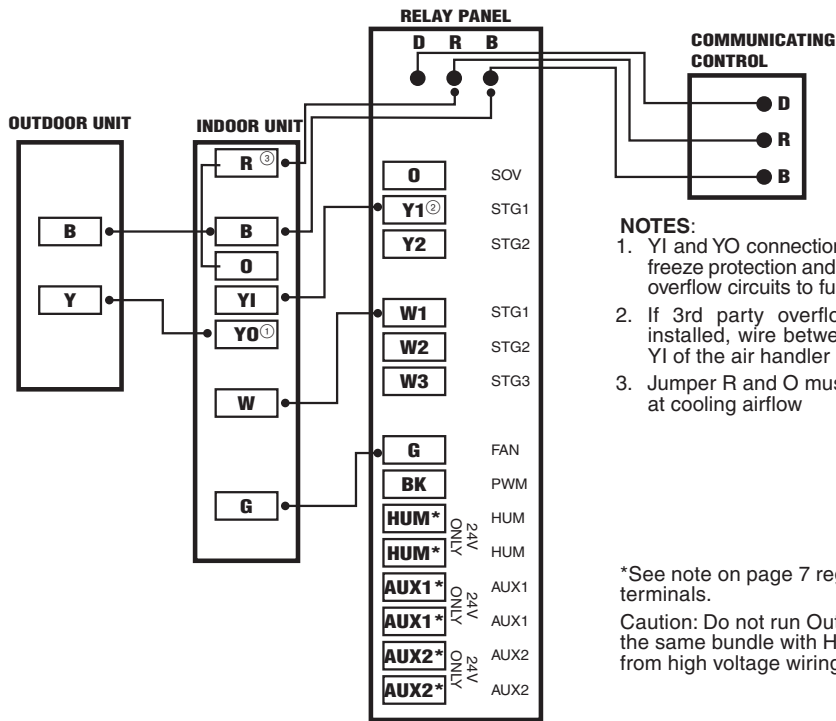


Diagram 7 - 1 Stage Cooling w/GAF2-36M Model Air Handler

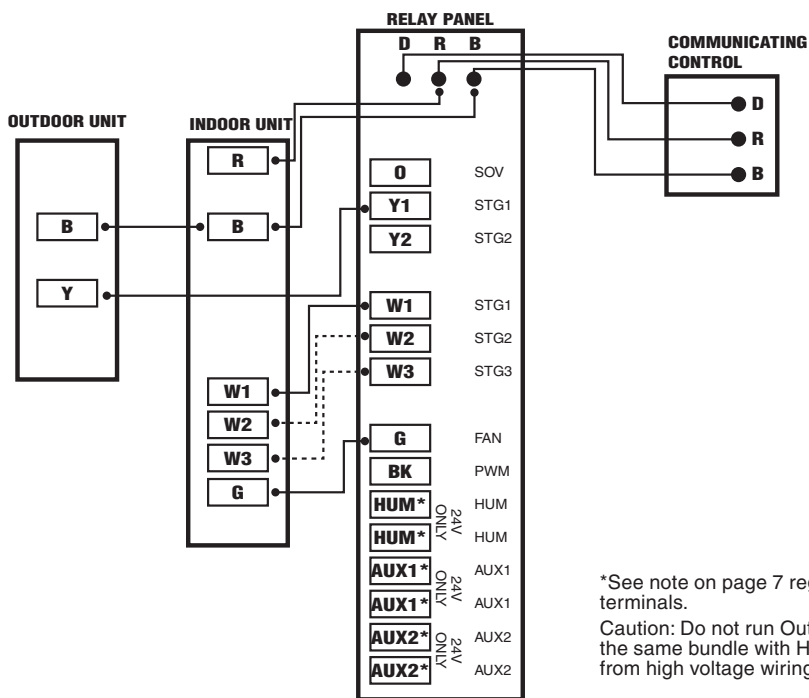


- NOTES:**
1. Y1 and Y0 connections must be made as shown for freeze protection and internally mounted condensate overflow circuits to function properly
 2. If 3rd party overflow condensate switches are installed, wire between Y1 of the Relay Panel and Y1 of the air handler
 3. Jumper R and O must be installed for blower to run at cooling airflow

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

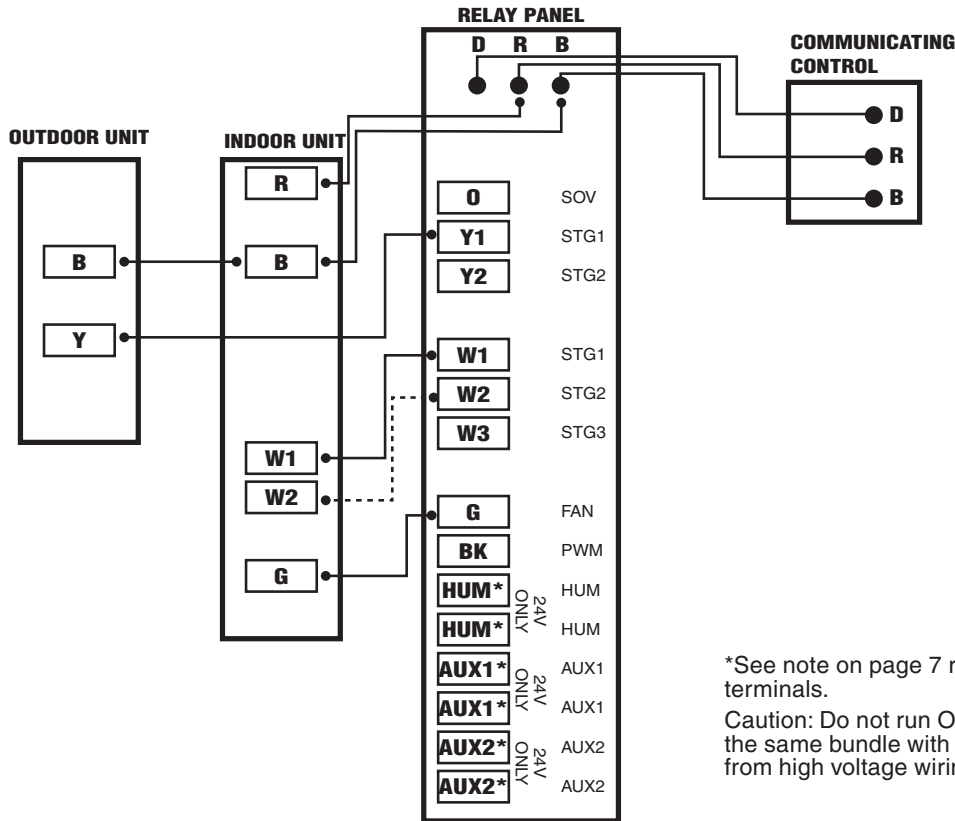
Diagram 8 - 1 Stage Cooling w/GAT2 & GAM2 Model Air Handler



*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

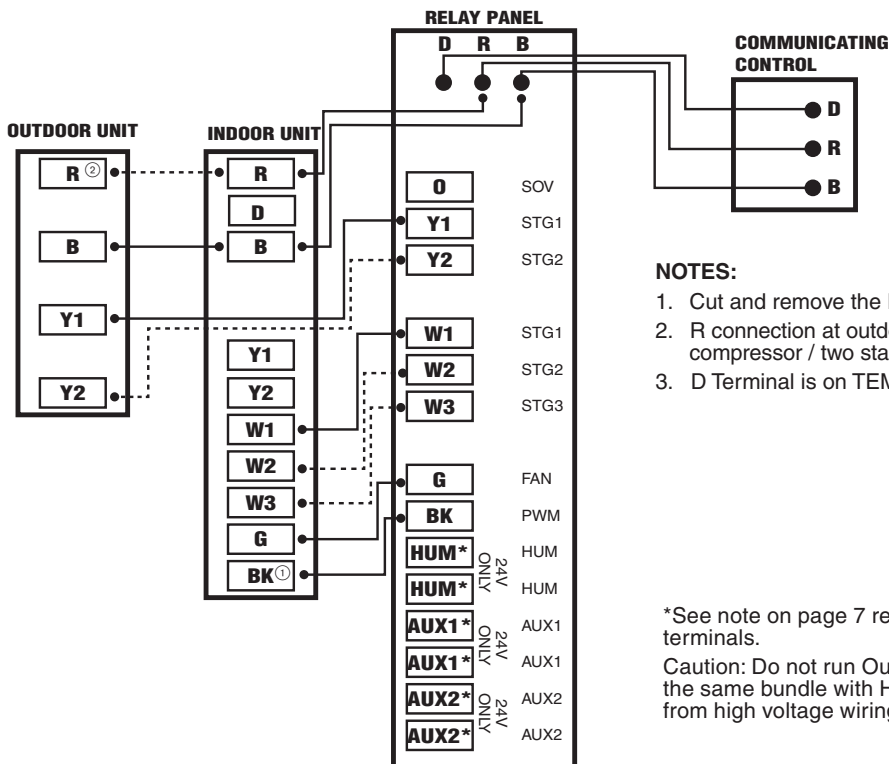
Diagram 9 - 1 Stage Cooling w/TEM3 & TEM4 Air Handler



*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 10 - 1 or 2 Stage Cooling w/TEM6 or TEM8 Model Air Handler 24 volt mode



NOTES:

1. Cut and remove the BK jumper at the indoor unit
2. R connection at outdoor unit is required only for two compressor / two stage units
3. D Terminal is on TEM8 ONLY

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 11 - 1 or 2 Stage Cooling w/TEM8 Air Handler communicating mode

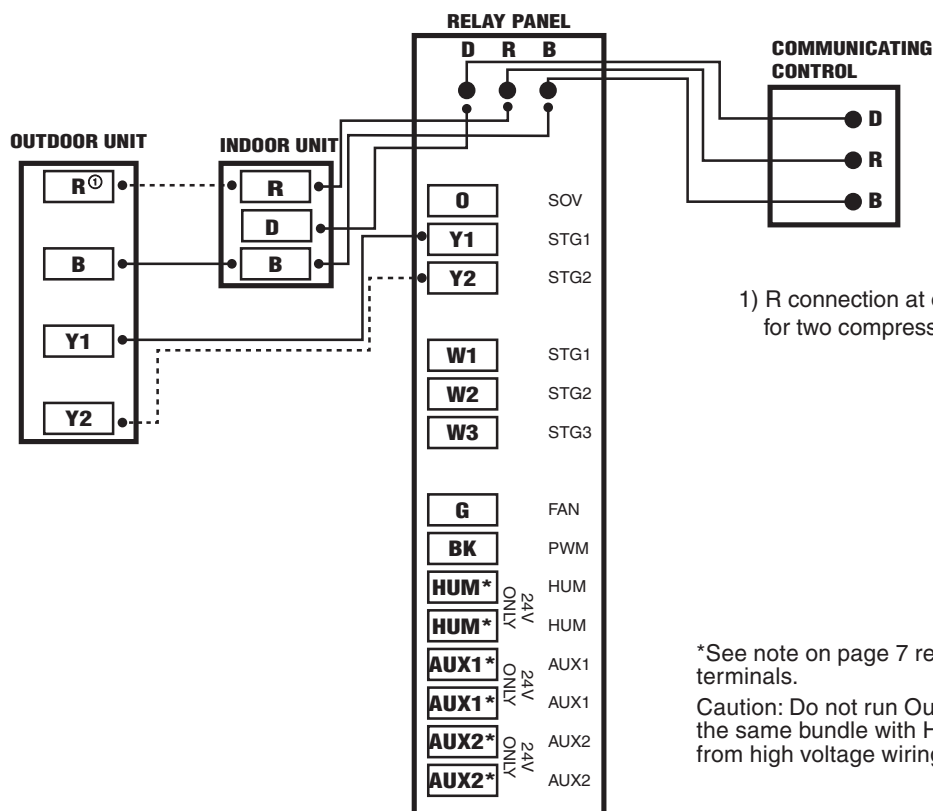


Diagram 12 - 1 Stage Cooling w/Gas Furnace

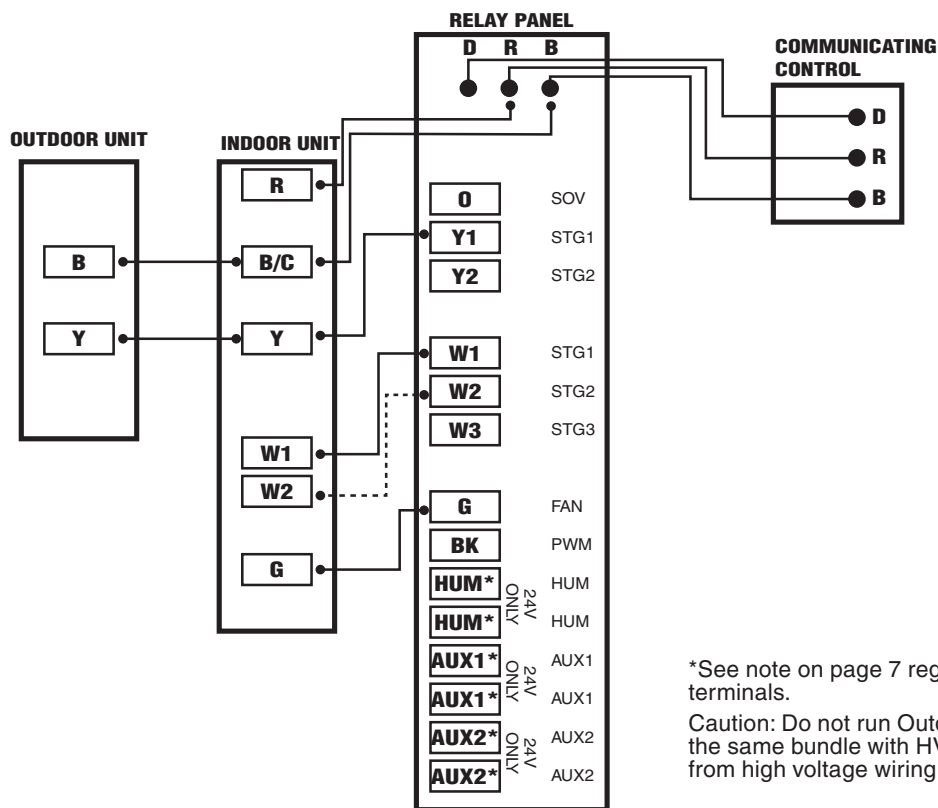


Diagram 13 - 1 or 2 Stage Cooling w/Variable Speed Gas Furnace (16-pin VSPD Motor)

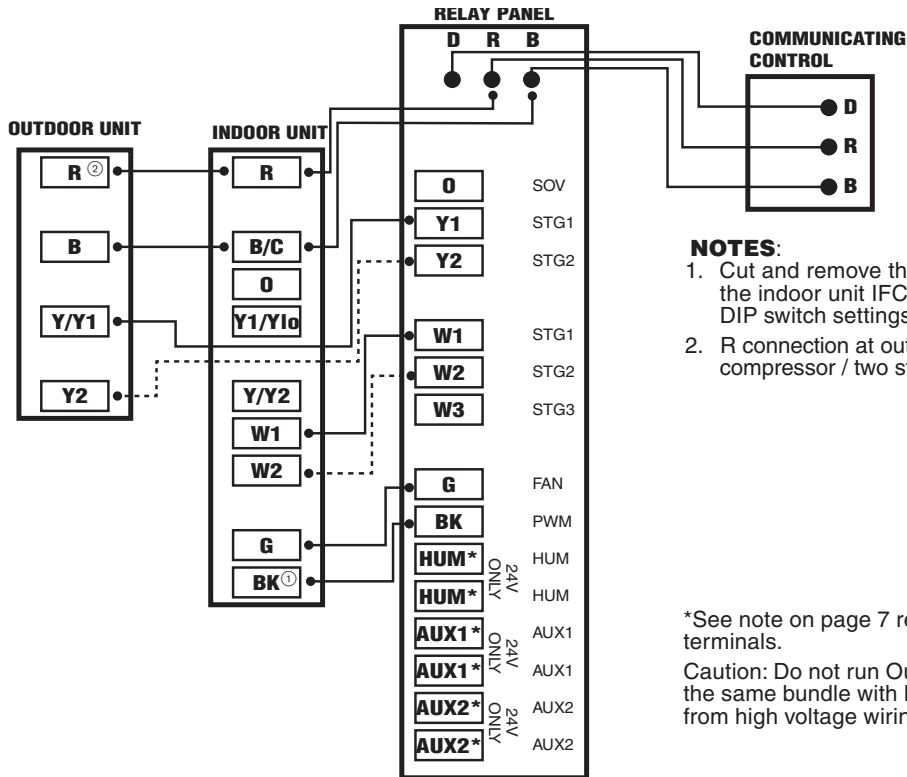


Diagram 14 - 1 or 2 Stage Cooling w/Variable Speed S9V2 (4-pin VSPD Motor)

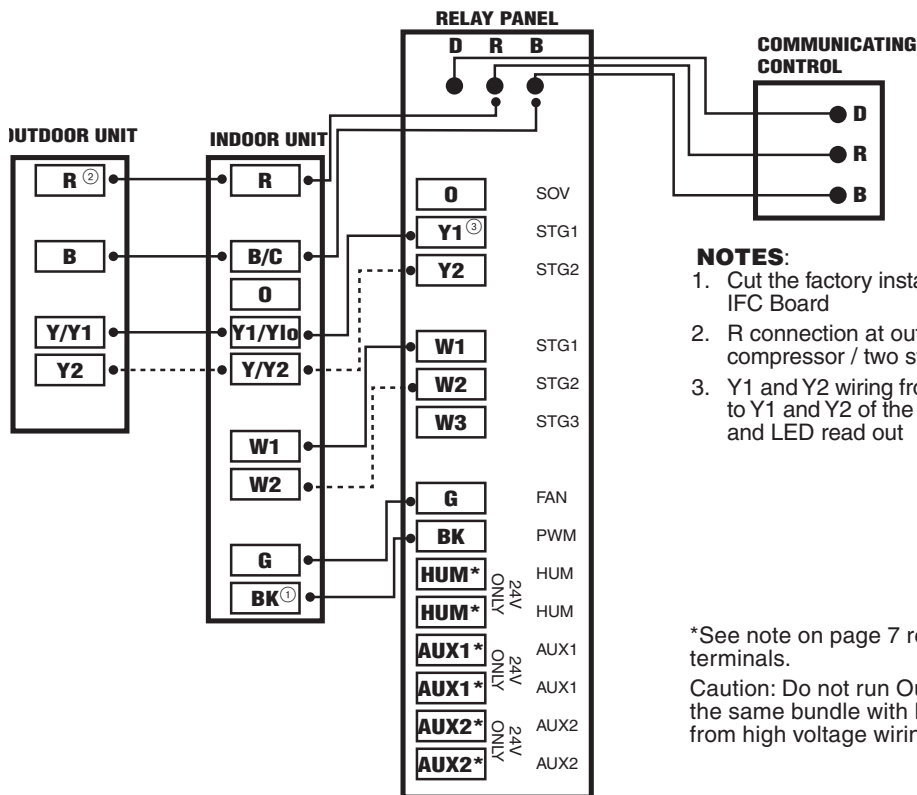


Diagram 15 - Communicating VS Cooling w/Non-Communicating S9V2 Furnace (4-pin VSPD Motor)

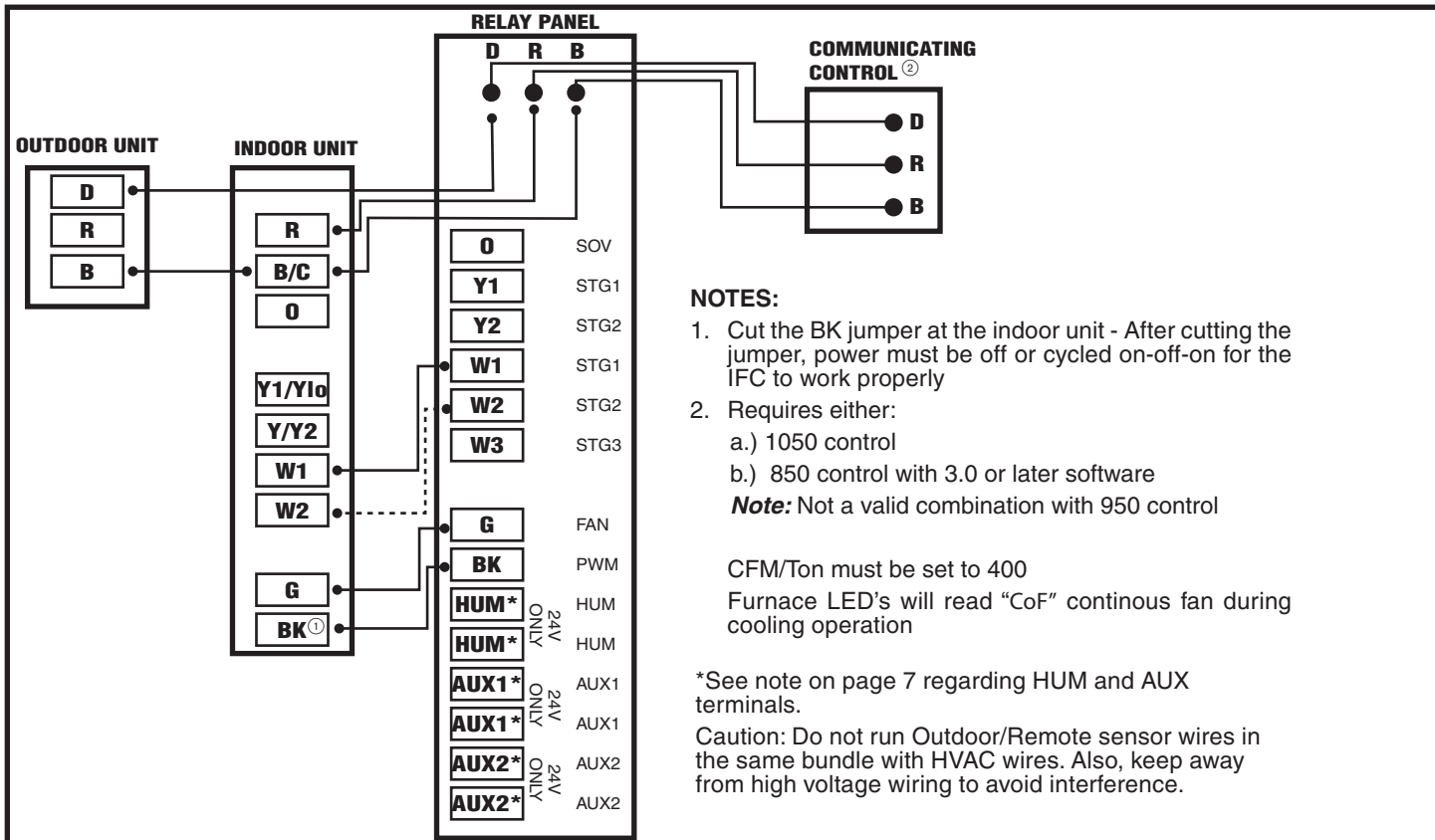


Diagram 16 - Package 1 or 2 Stage Heat/Cool w/Variable Speed Blower

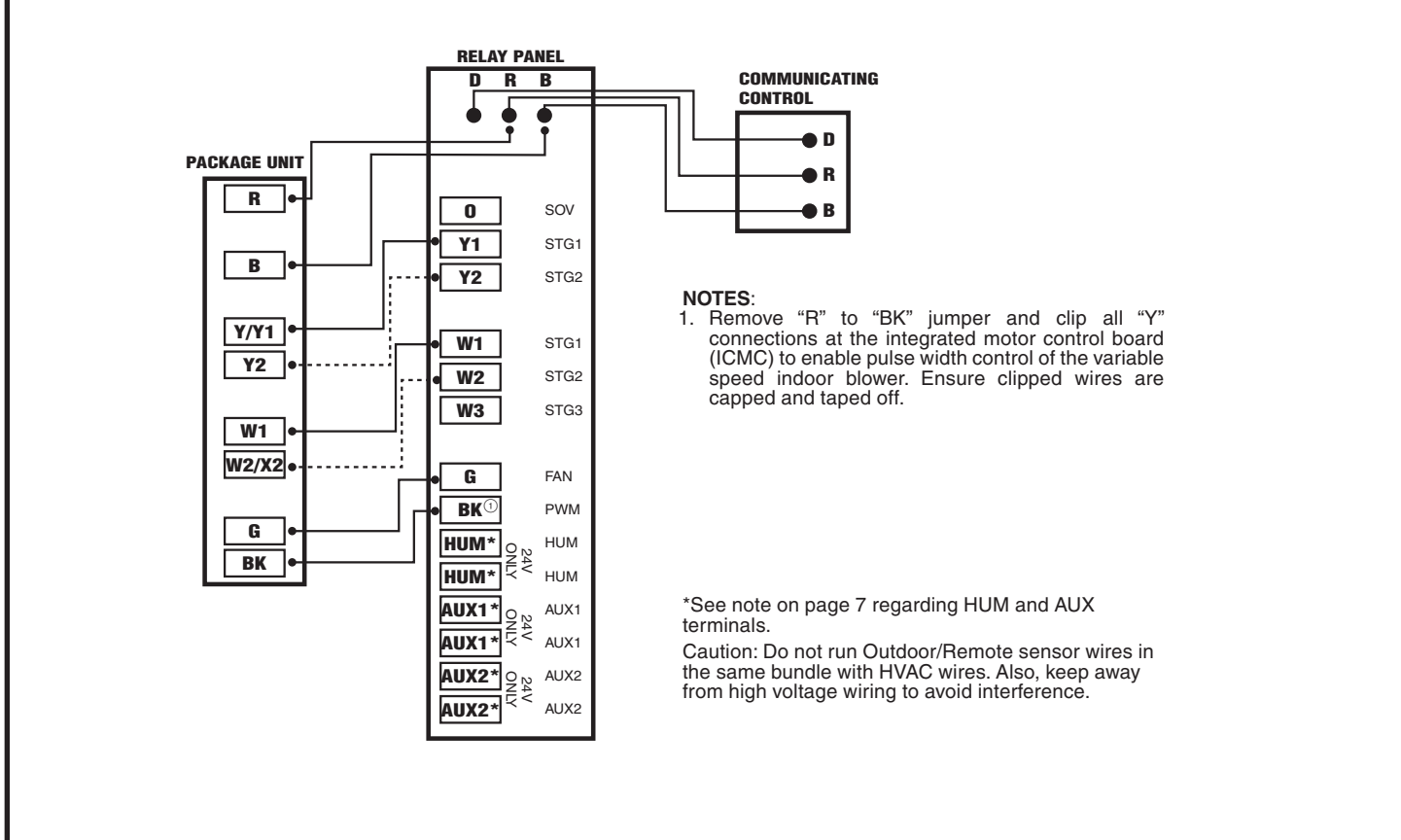


Diagram 17 - Package 1 Stage Heat/Cool w/Non-Variable Speed Blower

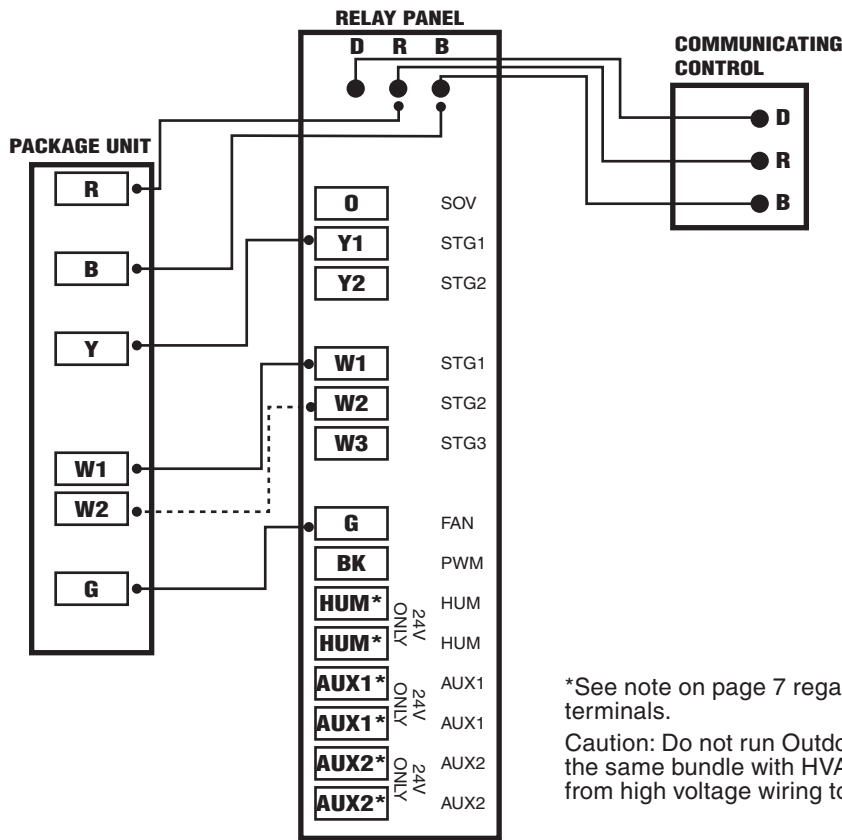
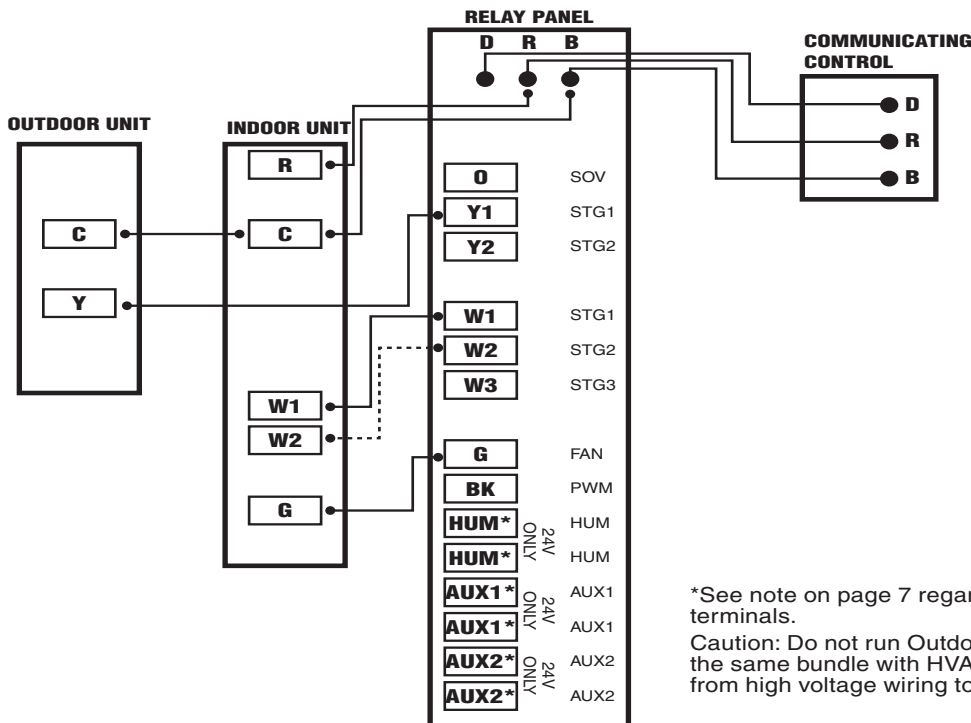


Diagram 18 - Ameristar 1 Stage Cooling



Heat Pump Applications

Diagram 1 - 1 or 2 Stage Heat Pump w/TAM7 or TAM9 in 24 volt mode Model Air Handler

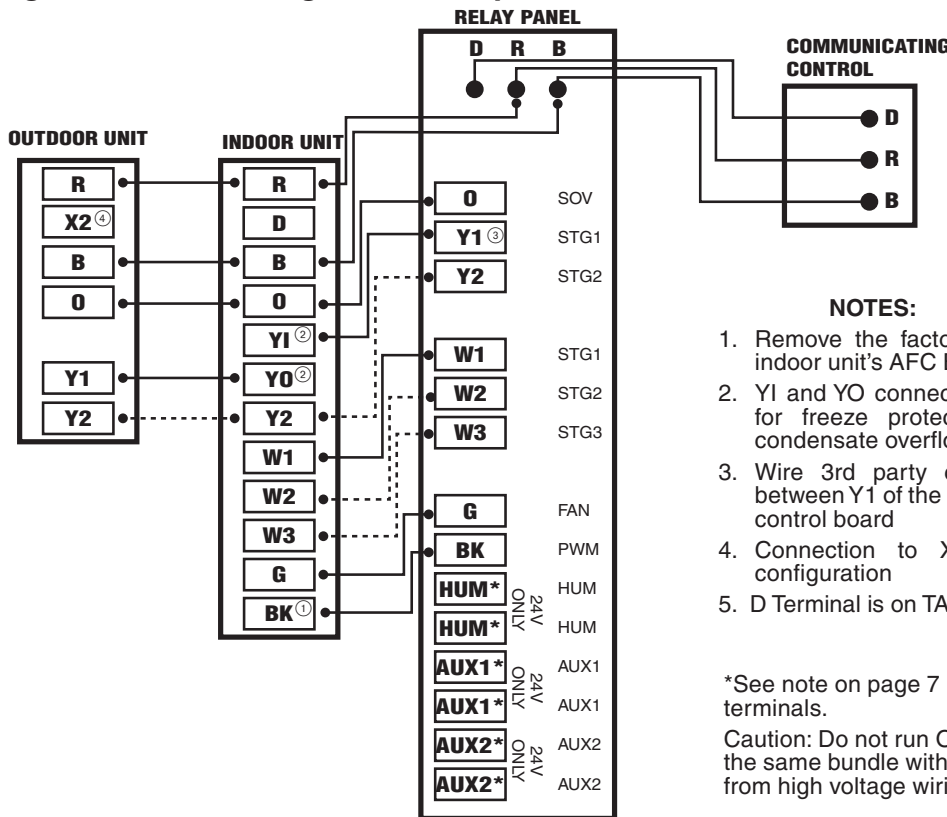


Diagram 2 - 1 or 2 Stage Heat Pump w/TAM9 in communication mode Air Handler

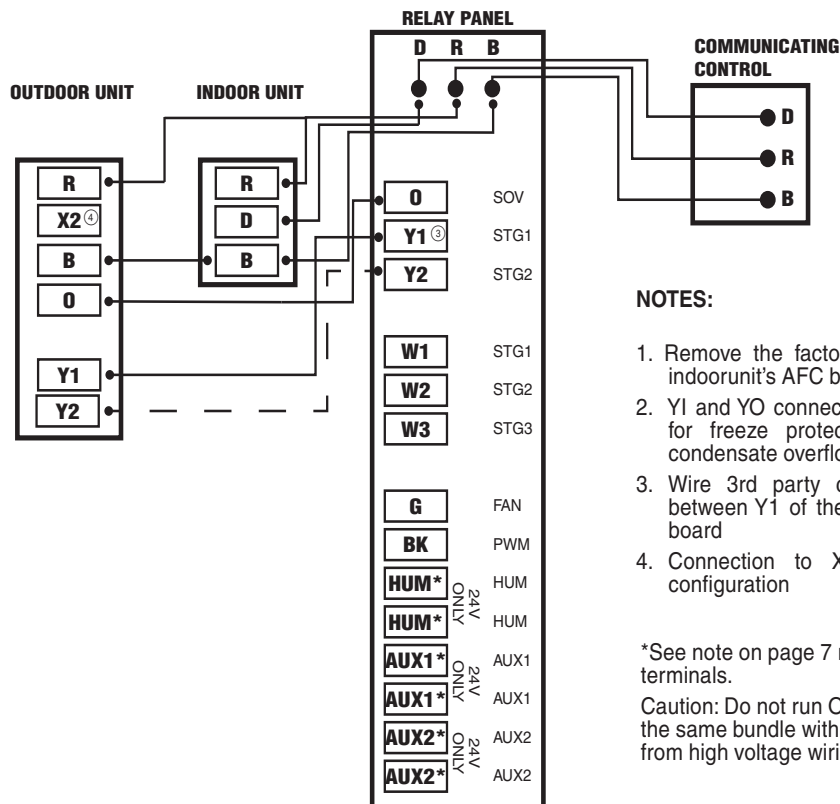


Diagram 3 - 1 Stage Heat Pump w/GAM5 or TAM4 Model Air Handler

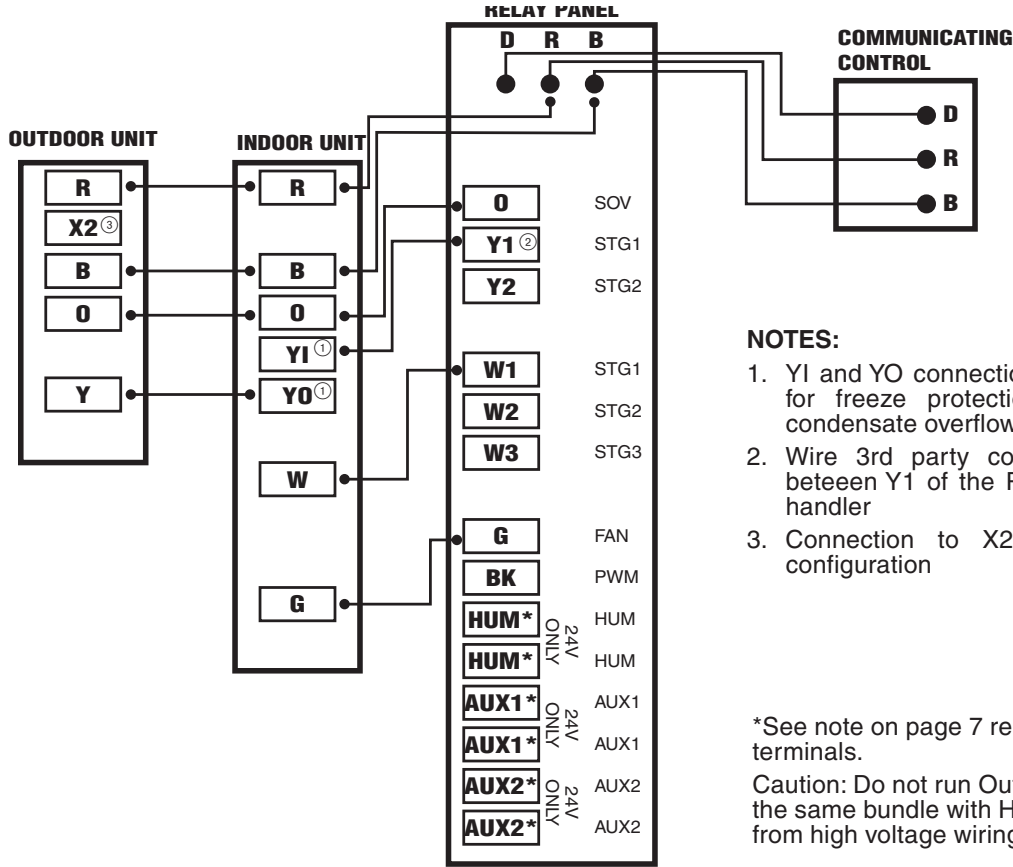


Diagram 4 - 1 Stage Heat Pump w/GAM5B Model Air Handler

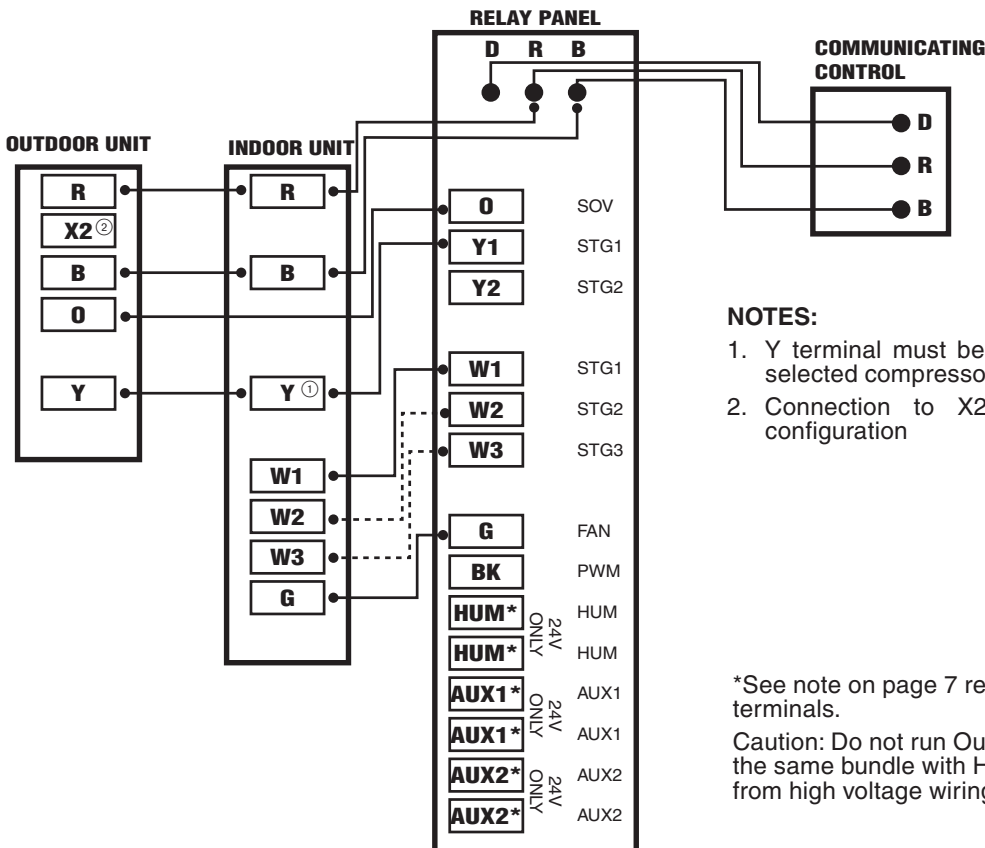


Diagram 5 - 2 Stage Heat Pump w/GAM5B Model Air Handler

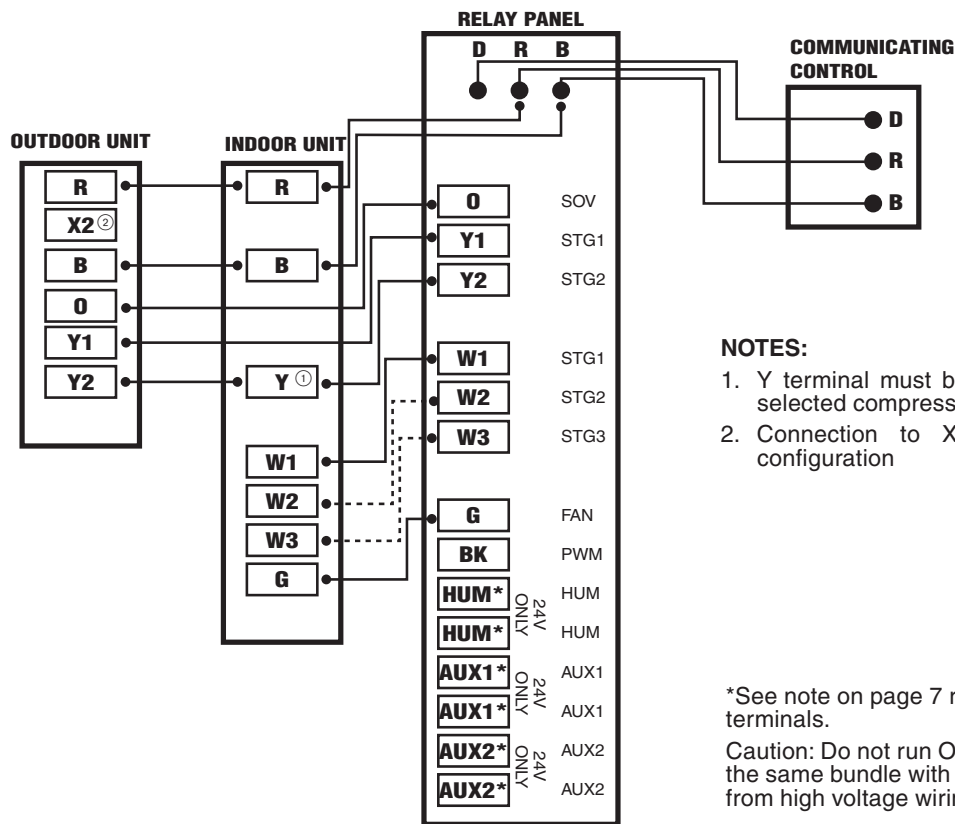


Diagram 6 - 1 Stage Heat Pump w/GAF2-S Model Air Handler

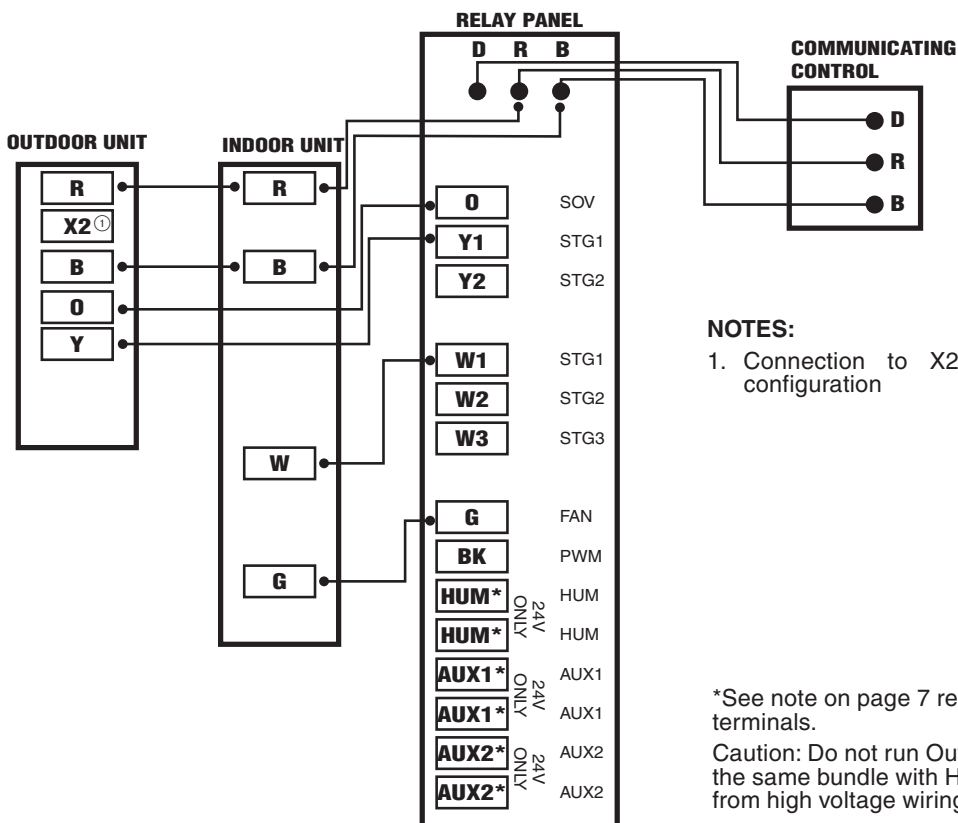


Diagram 7 - 1 Stage Heat Pump w/GAF2-36M Air Handler

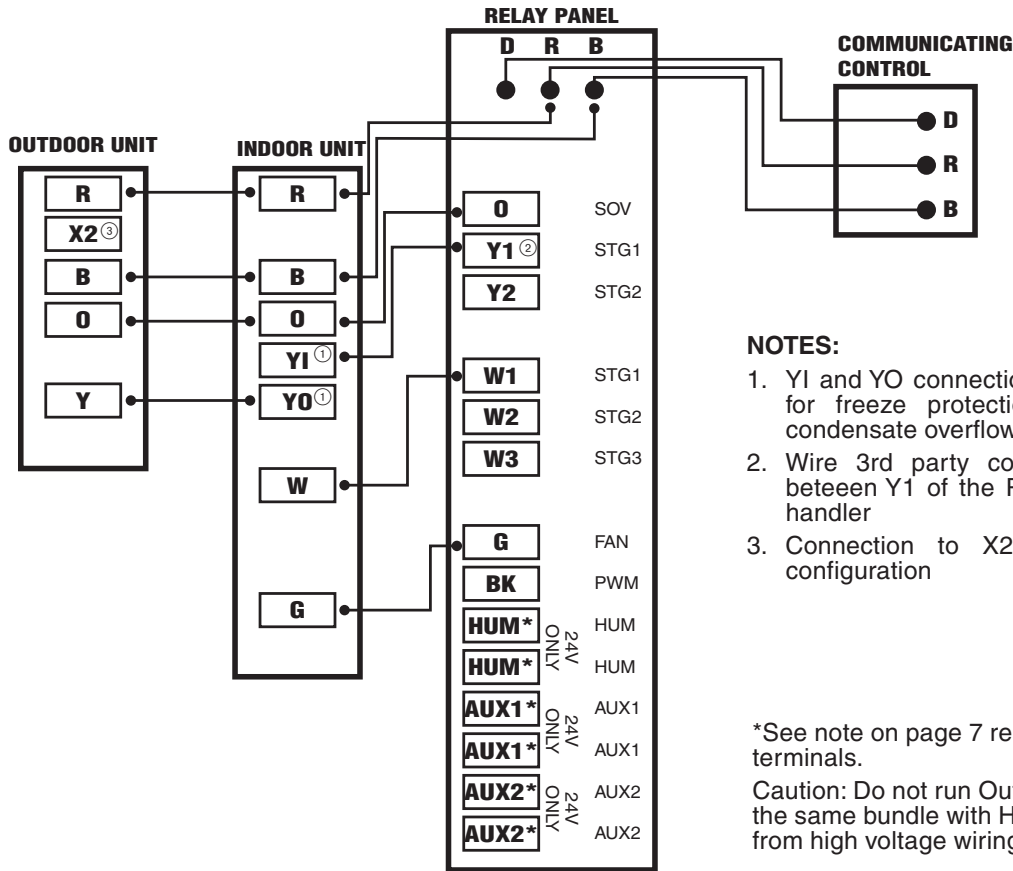


Diagram 8 - 1 Stage Heat Pump w/GAT2 & GAM2 Model Air Handler

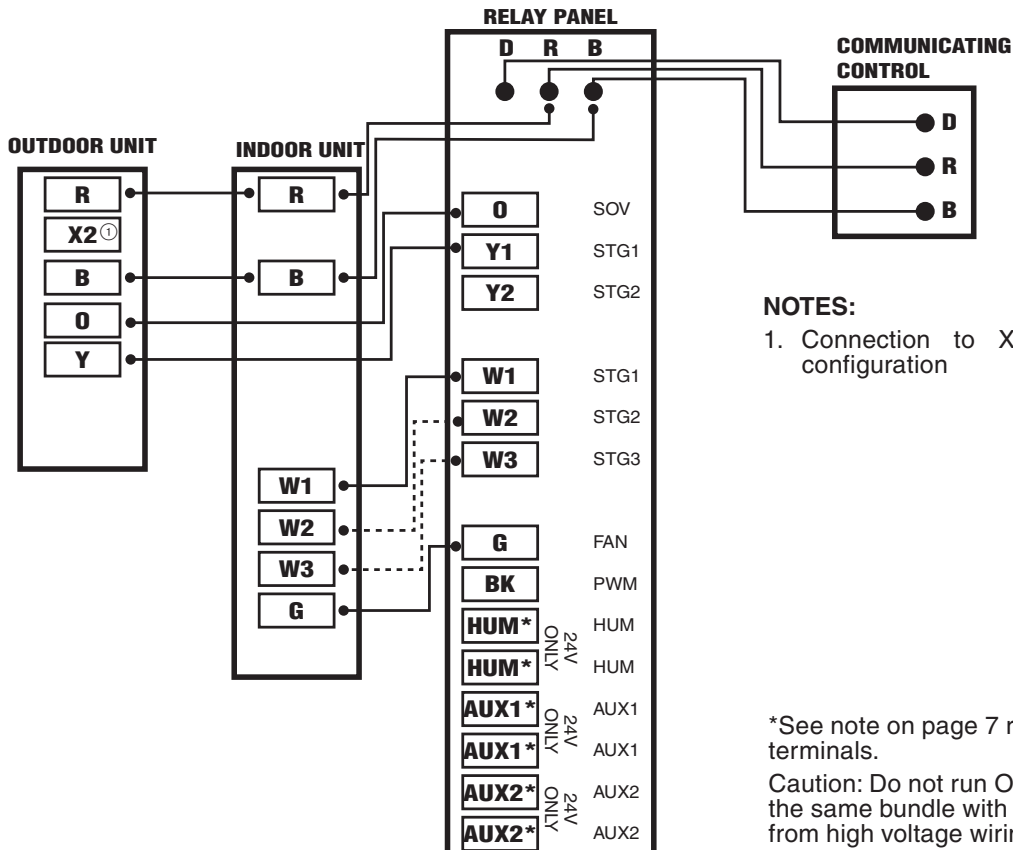


Diagram 9 - 1 Stage Heat Pump w/TEM3 Model Air Handler

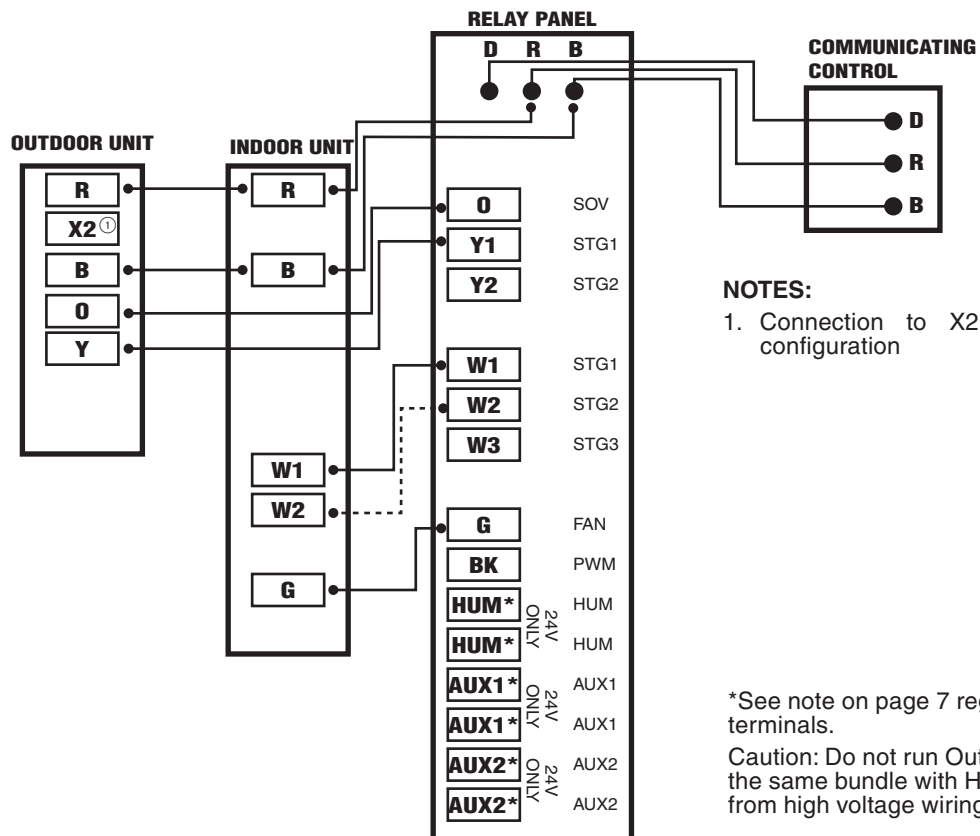


Diagram 10 - 1 Stage Heat Pump w/TEM4 Air Handler

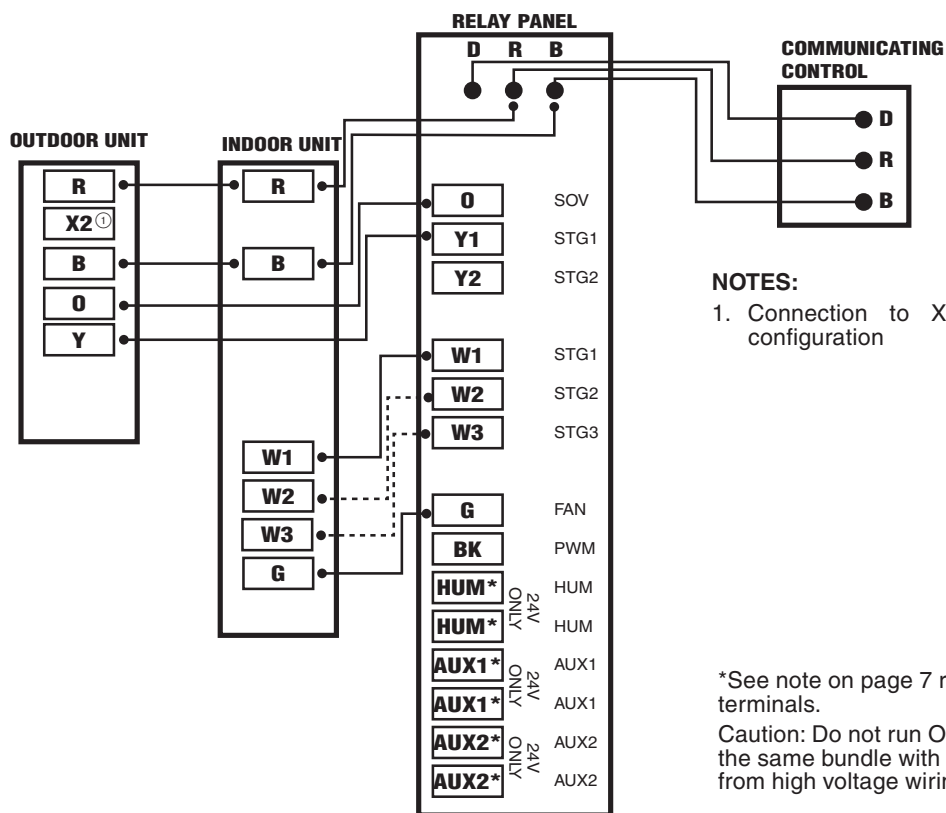
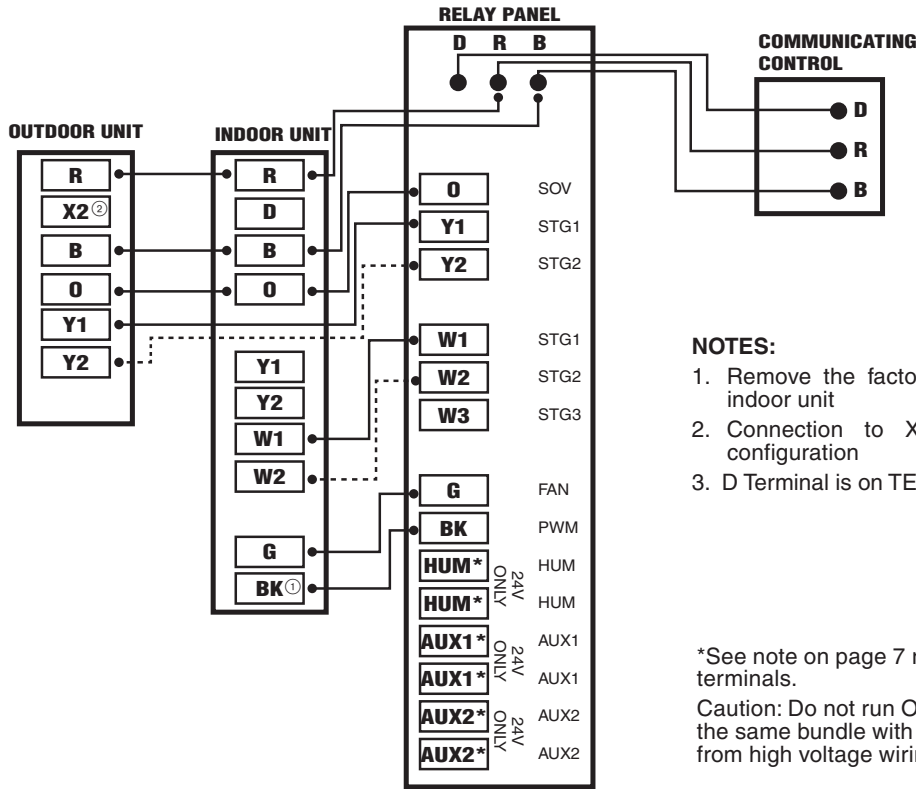


Diagram 11 - 1 or 2 Stage Heat Pump w/TEM6 or TEM8 Variable Speed Air Handler 24 volt



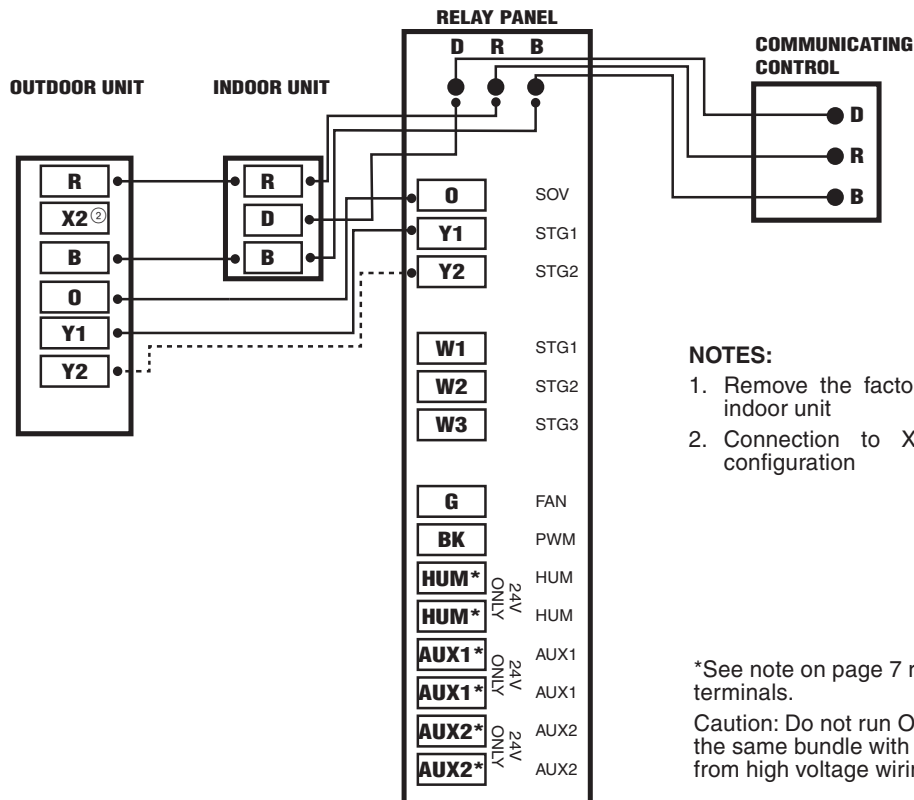
NOTES:

1. Remove the factory installed BK jumper at the indoor unit
2. Connection to X2 is not required for this configuration
3. D Terminal is on TEM8 ONLY.

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 12 - 1 or 2 Stage Heat Pump 24 volt w/TEM8 Communicating Variable Speed Air Handler



NOTES:

1. Remove the factory installed BK jumper at the indoor unit
2. Connection to X2 is not required for this configuration

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 13 - Package 1 or 2 Stage Heat Pump w/Variable Speed Blower

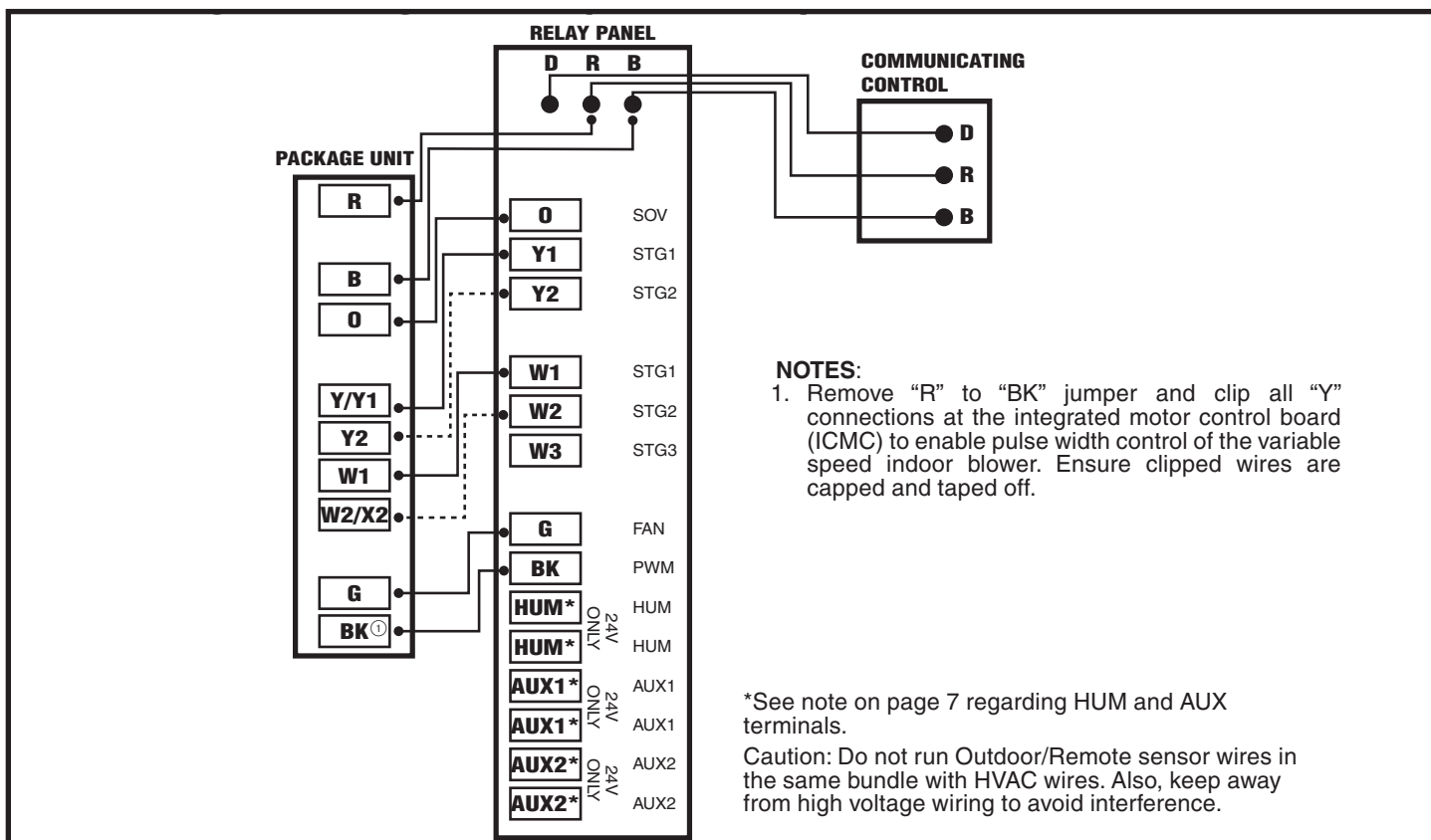
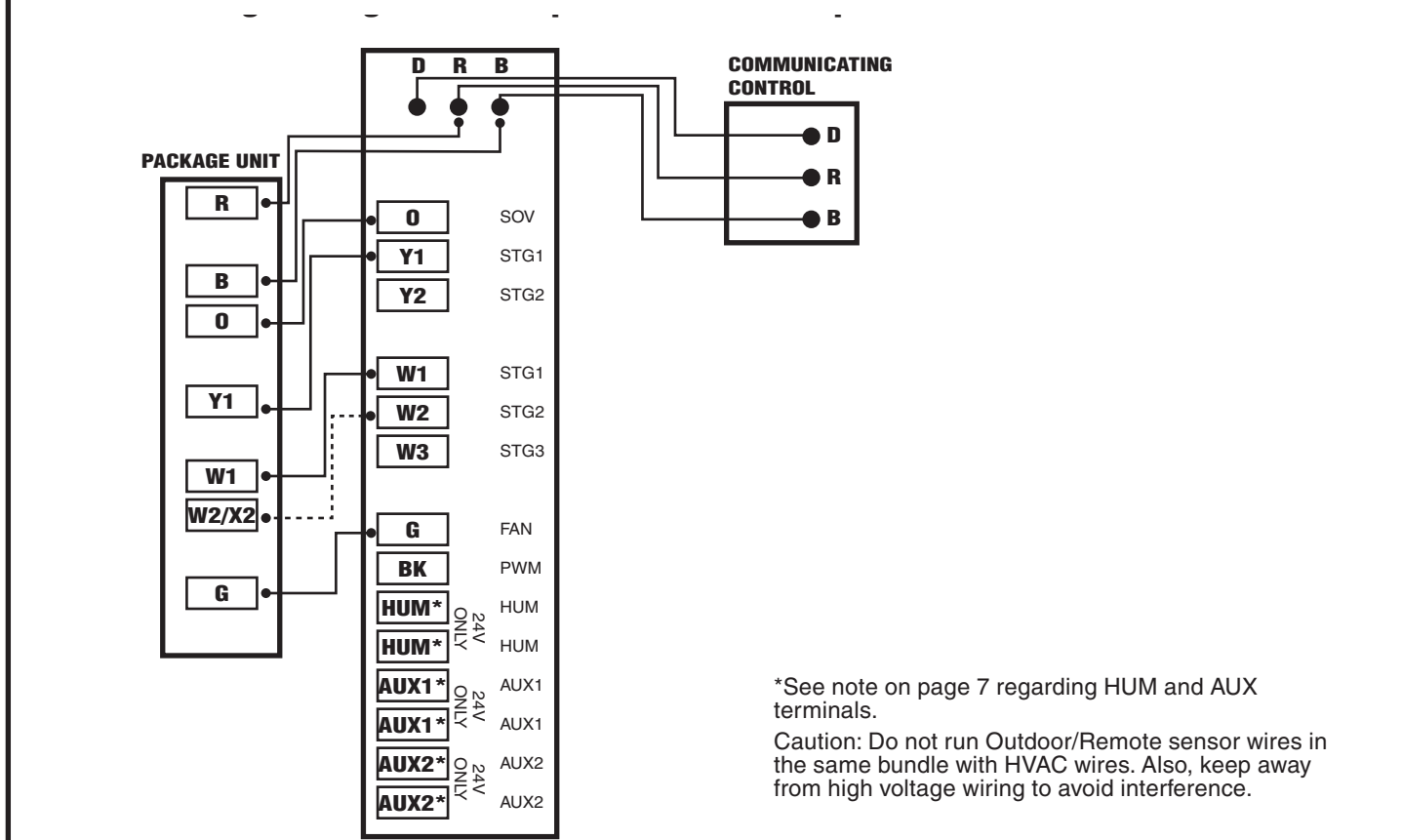


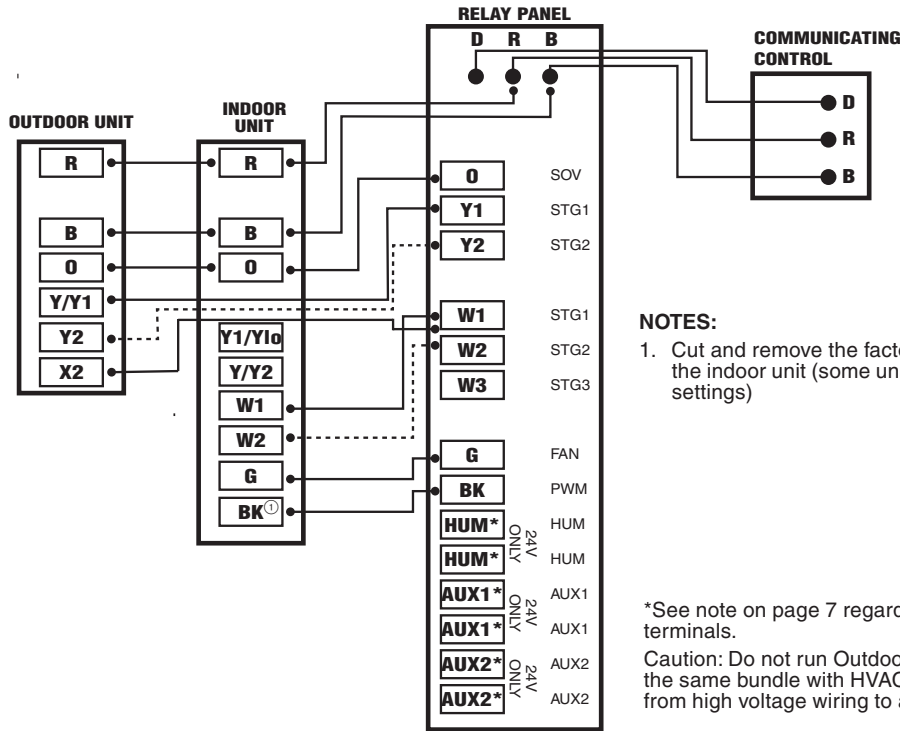
Diagram 14 - Package 1 Stage Heat Pump w/Non-Variable Speed Blower



Dual Fuel Applications

AC Applications

Diagram 1 - 1 or 2 Stage Heat Pump w/Variable Speed Gas Furnace (16-pin VSPD Motor)



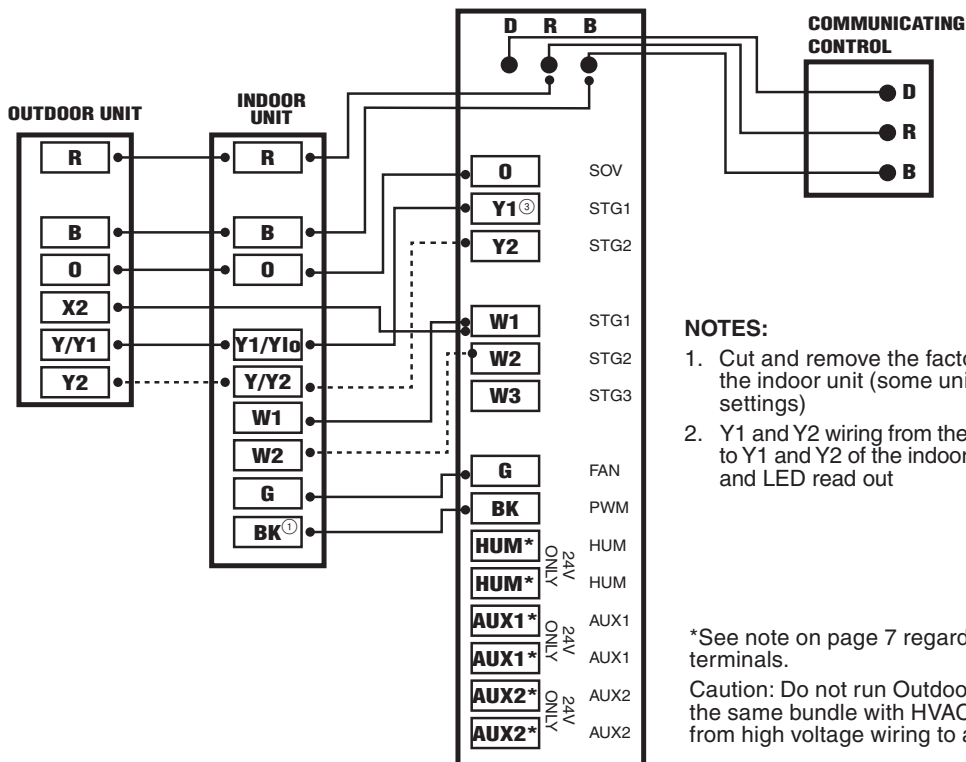
NOTES:

1. Cut and remove the factory installed BK jumper at the indoor unit (some units may require DIP switch settings)

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 2 - 1 or 2 Stage Heat Pump w/Variable Speed S9V2 Furnace (4-pin VSPD Motor)



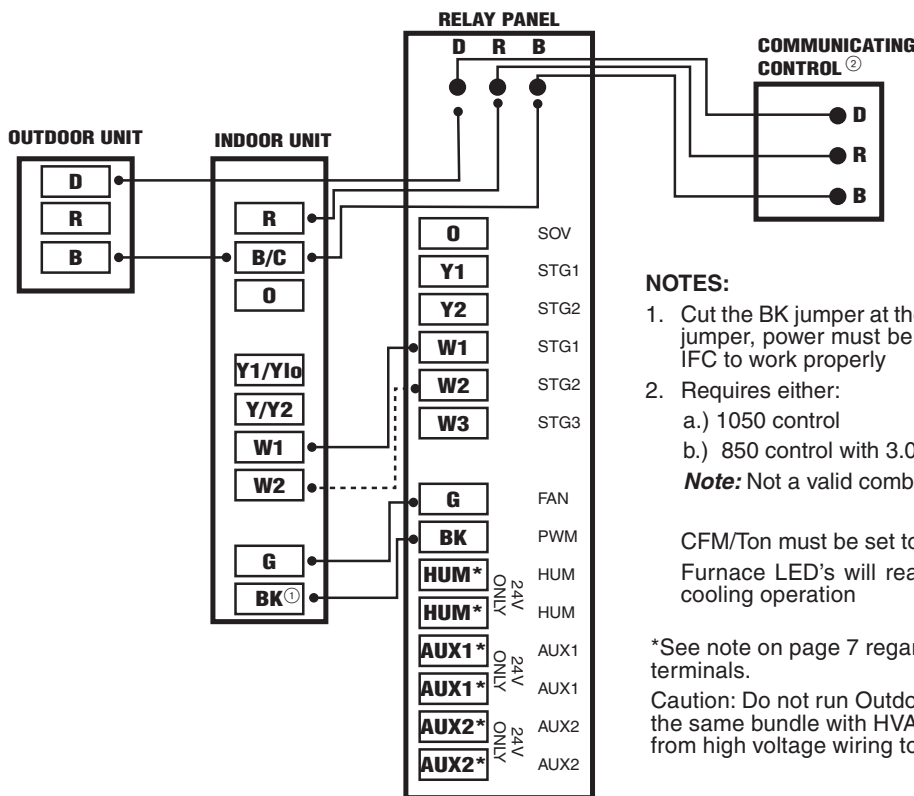
NOTES:

1. Cut and remove the factory installed BK jumper at the indoor unit (some units may require DIP switch settings)
2. Y1 and Y2 wiring from the Relay Panel must connect to Y1 and Y2 of the indoor unit IFC for proper air flow and LED read out

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 3 - 1 Communicating VS Heat Pump w/Non-Communicating S9V2 Furnace



NOTES:

1. Cut the BK jumper at the indoor unit - After cutting the jumper, power must be off or cycled on-off-on for the IFC to work properly
 2. Requires either:
 - a.) 1050 control
 - b.) 850 control with 3.0 or later software
- Note:** Not a valid combination with 950 control

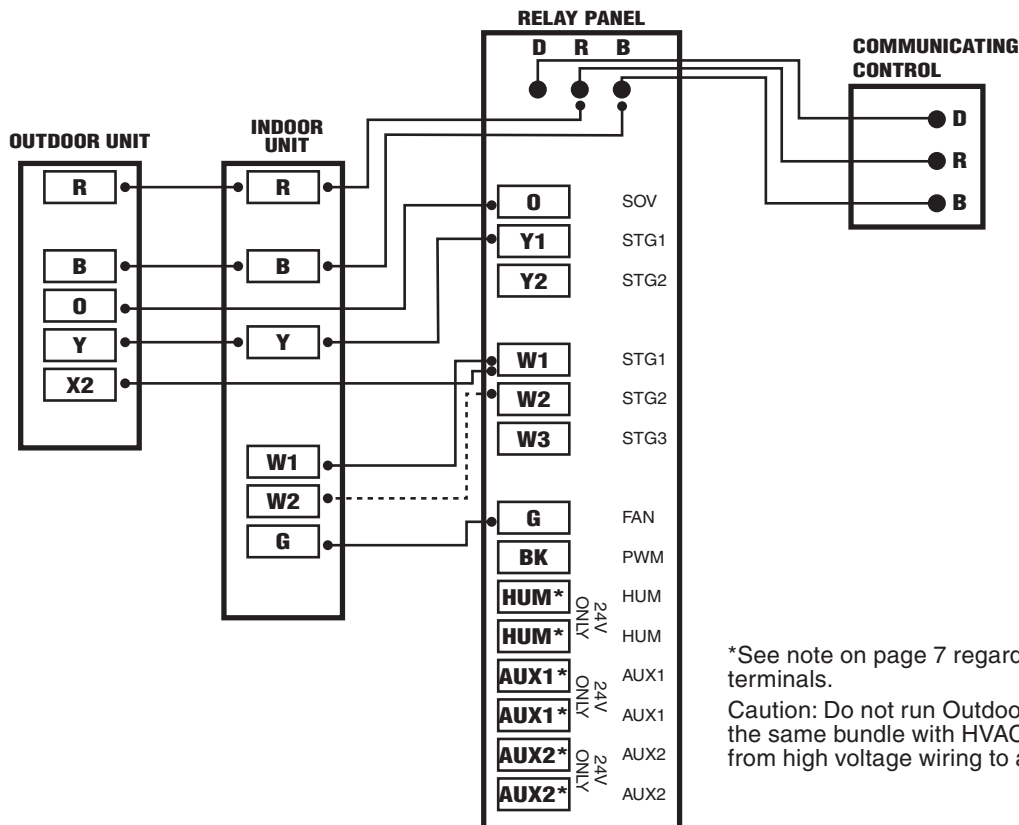
CFM/Ton must be set to 400

Furnace LED's will read "CoF" continuous fan during cooling operation

*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

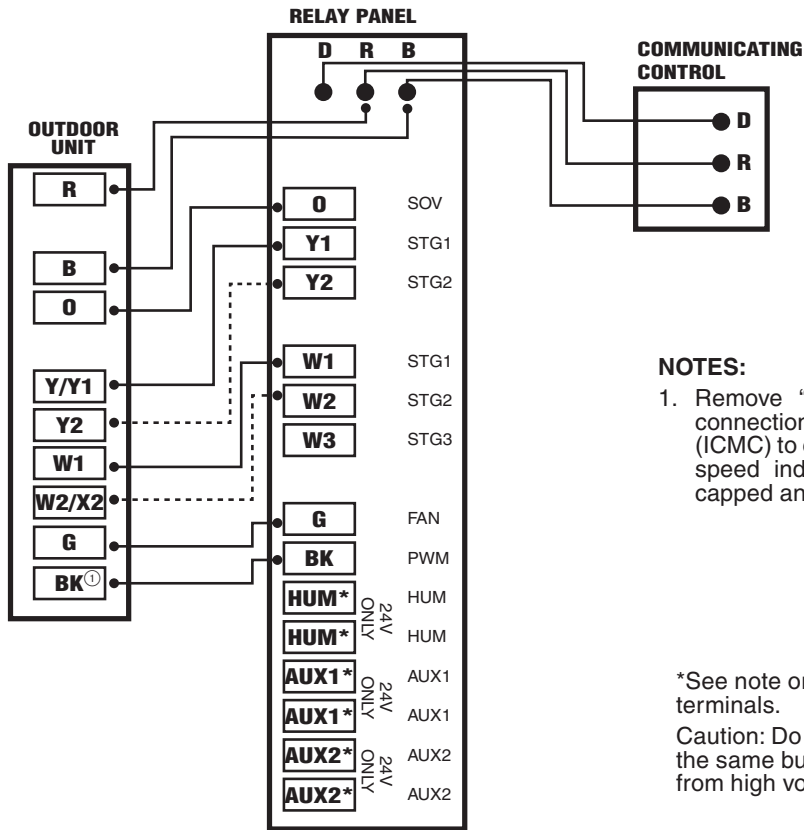
Diagram 4 - 1 Stage Heat Pump w/Non-Variable Speed Gas Furnace



*See note on page 7 regarding HUM and AUX terminals.

Caution: Do not run Outdoor/Remote sensor wires in the same bundle with HVAC wires. Also, keep away from high voltage wiring to avoid interference.

Diagram 5 - Package 1 or 2 Stage Dual Fuel w/Variable Speed Blower



Section 6. LED Indicators

Comm

Communication LED – Amber

- LED on when first powering up
- LED flashes number of communicating components in the system.
- (ex. communicating control with relay panel will equal two flashes)

Bit Master

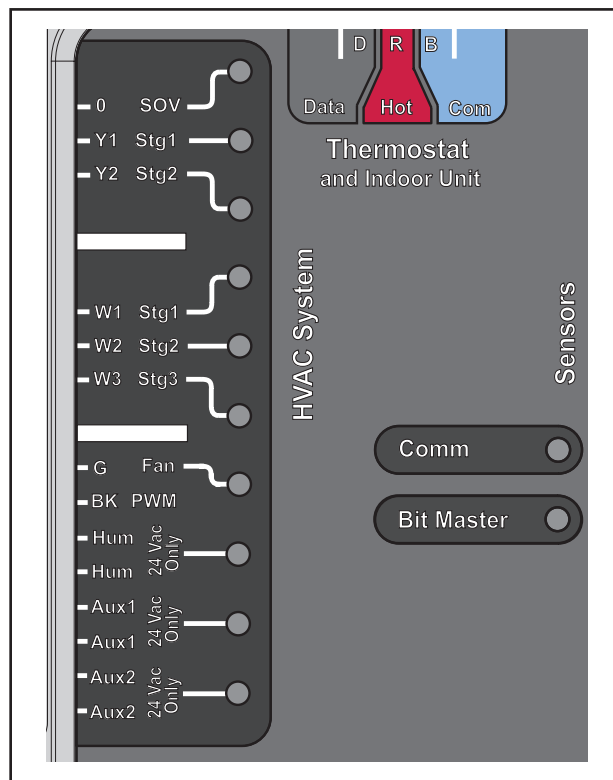
Bitmaster/Clock Signal LED – Green

- LED on when Clock is working

HVAC System

HVAC System LEDs – Green

- A Green LED will illuminate when the relay is energized.



Section 7. Troubleshooting

Troubleshooting		
Symptom	Possible Cause	Action
COMM LED is not flashing the appropriate number of devices	Loss of 24VAC between power (R) and common (B)	Check for proper incoming 24VAC power
	One or more communicating devices is not communicating <ul style="list-style-type: none"> • ~12VDC between D & B = Proper communication • ~16VDC between D & B = Loss of communication • Less than ~12VDC between D & B = shorted or no power 	Check for open or shorts in field wiring Evaluate other communicating devices and use the service facts of that device if not communicating properly
Bit Master LED is off or fluttering	Loss of 24VAC between power (R) and common (B)	Check for proper incoming 24VAC power
	Loss of communication <ul style="list-style-type: none"> • 0VDC between D & B (shorted or no power) • Less than ~12VDC between D & B (low level short) 	Check for shorted wire between data (D) and common (B) wires
HVAC System LED is not illuminating when Relay Panel is calling for a particular relay	Control is not calling	Check the System Report screen at the control to verify demand
	Relay Panel failed	Verify 24VAC between relay output terminal and common (B) **Relay output contains snubber circuits; always check with a load applied

