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# INSTALLATION INSTRUCTIONS

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## LOW VOLTAGE CONTROL CIRCUIT WIRING

Models:

W\*\*A2 W\*\*A2D WA\*S\* W\*\*L2 WL\*S\*



*Climate Control Solutions*

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Supersedes: 2100-582A  
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**TABLE 1 — DIAGRAM TO USE WITH UNIT AND VENTS**

|                                             | Vent             | None         |     | CRV, ERV, MFAD |     | CRVMP | EIFM         |     | ECONWM* | CS2000A* |
|---------------------------------------------|------------------|--------------|-----|----------------|-----|-------|--------------|-----|---------|----------|
|                                             | Vent Code        | X            |     | R,M,V,P        |     | C     | E            |     | T,W     |          |
|                                             | Thermostat       | Programmable |     | Programmable   |     | ALL   | Programmable |     | ALL     | ALL      |
| System Type                                 | Model            | No           | Yes | No             | Yes | All   | No           | Yes | All     | All      |
| Air Conditioner                             | W**A, W**L       | 1            | 1   | 3              | 2   | N/A   | 4            | 4   | 17      | 11       |
| Air Conditioner w/Dehumidification Sequence | W**A*D<br>W**L*D | 6            | 5   | 8              | 7   | N/A   | 9            | 10  | N/A     | 11       |
| 2-Stage Air Conditioner                     | WA*S*<br>WL*S*   | 12           | 12  | 13             | 14  | 16    | 15           | 15  | 18      | 11       |

## WIRING – LOW VOLTAGE WIRING

All 230/208V, 1 phase and 3 phase units are equipped with dual primary voltage transformers. All equipment leaves the factory wired on 240V tap. For 208V operation, reconnect from 240V to 208V tap. The acceptable operating voltage range for the 240V and 208V taps are:

An 18 gauge copper, color-coded thermostat cable is recommended. The connection points are shown in this Manual. See Table below.

**TABLE 2 – OPERATING VOLTAGE RANGE**

| TAP  | RANGE     |
|------|-----------|
| 240V | 253 – 216 |
| 208V | 220 – 187 |

**NOTE:** The voltage should be measured at the field power connection point in the unit and while the unit is operating at full load (maximum amperage operating condition).

## Low Voltage Connection

These units use a 24-volt AC low voltage circuit. The “RT” terminal is the 24V transformer output, and the “R” terminal is the 24VAC *hot* terminal for the operation of the equipment. “RT” and “R” are connected with brass jumper bar which can be removed and “RT” and “R” connected to external NC (normally closed) contact such as a fire/smoke detector that will cause immediate shutdown of the equipment upon activation.

“C” terminal is *grounded*.

“G” terminal is the *fan input*.

“Y” terminal is the *compressor input for cooling* 1-Stage units only or 2-Stage units with ECONWM\*

“Pink Wire” is *2nd Stage cooling* 2-Stage units only with ECONWM\*

“Y1” terminal is the *1st Stage compressor input for cooling* 2-Stage units only — No ECONWM\*

“Y2” terminal is the *2nd Stage compressor input for cooling* 2-Stage units only — No ECONWM\*

“W1” terminal is the *1st stage electric heat*.

“W2” terminal is the *2nd stage heat* (if equipped).

“A” terminal is the *ventilation input*. This terminal energizes any factory installed ventilation option.

“D” terminal is the *dehumidification input*. If installed, this terminal energizes any factory installed dehumidification option.

## LOW VOLTAGE CONNECTIONS FOR DDC CONTROL

|                                 | <u>1-Stage Units</u> | <u>2-Stage Units</u> | <u>2-Stage Units w/ECONWM*</u> |
|---------------------------------|----------------------|----------------------|--------------------------------|
| Fan Only                        | Energize G           | Energize G           | Energize G                     |
| 1st Stage Cooling Mode          | Energize Y, G        | Energize Y1, G       | Energize G, Y                  |
| 2nd Stage Cooling Mode          |                      | Energize Y1, Y2, G   | Energize G, Y, Pink            |
| 1st Stage Heating               | Energize W1          | Energize W1          | Energize W1                    |
| 2nd Stage Heating (if employed) | Energize W1, W2      | Energize W1, W2      | Energize W1, W2                |
| Ventilation                     | Energize G, A        | Energize G, A        | Energize G, A                  |
| Dehumidification (if employed)  | Energize D           | Energize D           | Energize D                     |

**TABLE 3  
WALL THERMOSTAT**

| <b>Part Number</b>        | <b>Predominate Features</b>                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8403-057<br>(TH3110D1040) | 1 stage Cool, 1 stage Heat<br>Electronic Non-Programmable<br>Auto or Manual changeover                                                               |
| 8403-058<br>(TH5220D1151) | 2 stage Cool, 2 stage Heat<br>Electronic Non-Programmable<br>HP or Conventional<br>Auto or Manual changeover                                         |
| 8403-060<br>(1120-445)    | 3 stage Cool; 3 stage Heat<br>Programmable/Non-Programmable Electronic<br>HP or Conventional<br>Auto or Manual changeover<br>Dehumidification Output |

**TABLE 4  
HUMIDITY CONTROLS**

| <b>Part Number</b>          | <b>Predominate Features</b>                                                               |
|-----------------------------|-------------------------------------------------------------------------------------------|
| 8403-038<br>(H600A1014)     | SPDT switching, pilot duty 50VA @ 24V<br>Humidity range 20-80% RH                         |
| 8403-047<br>(H200-10-21-10) | Electronic dehumidstat SPST closes-on-rise<br>Humidity range 10-90% with adjustable stops |

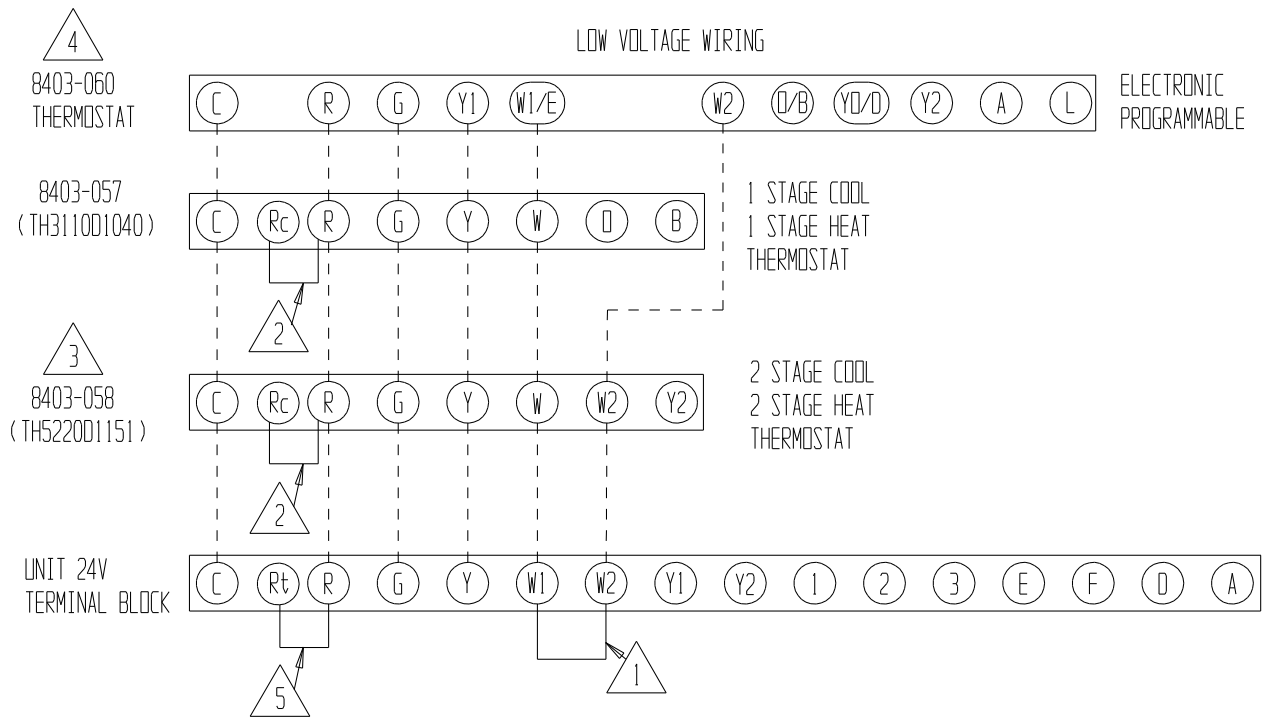
**TABLE 5  
CO2 CONTROLLER**

| <b>Part Number</b> | <b>Predominate Features</b>                                                                                                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8403-067           | Normally Open SPST relay closes-on-rise<br>24V dual wave length sensor. Default setting<br>950ppm, adjustable to 0-2000ppm<br>Default off setting 1000ppm, adjustable to<br>0-200 ppm can be calibrated |

**TABLE 6  
THERMOSTAT WIRE SIZE**

| <b>Transformer<br/>VA</b> | <b>FLA</b> | <b>Wire Gauge</b> | <b>Maximum<br/>Distance<br/>In Feet</b> |
|---------------------------|------------|-------------------|-----------------------------------------|
| 55                        | 2.3        | 20 gauge          | 45                                      |
|                           |            | 18 gauge          | 60                                      |
|                           |            | 16 gauge          | 100                                     |
|                           |            | 14 gauge          | 160                                     |
|                           |            | 12 gauge          | 250                                     |

**FIGURE 1**  
**BASIC A/C with OPTIONAL ELECTRIC HEAT**  
**NO ECONOMIZER or VENTILATION PACKAGES**



REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW



FACTORY INSTALLED JUMPER



CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).



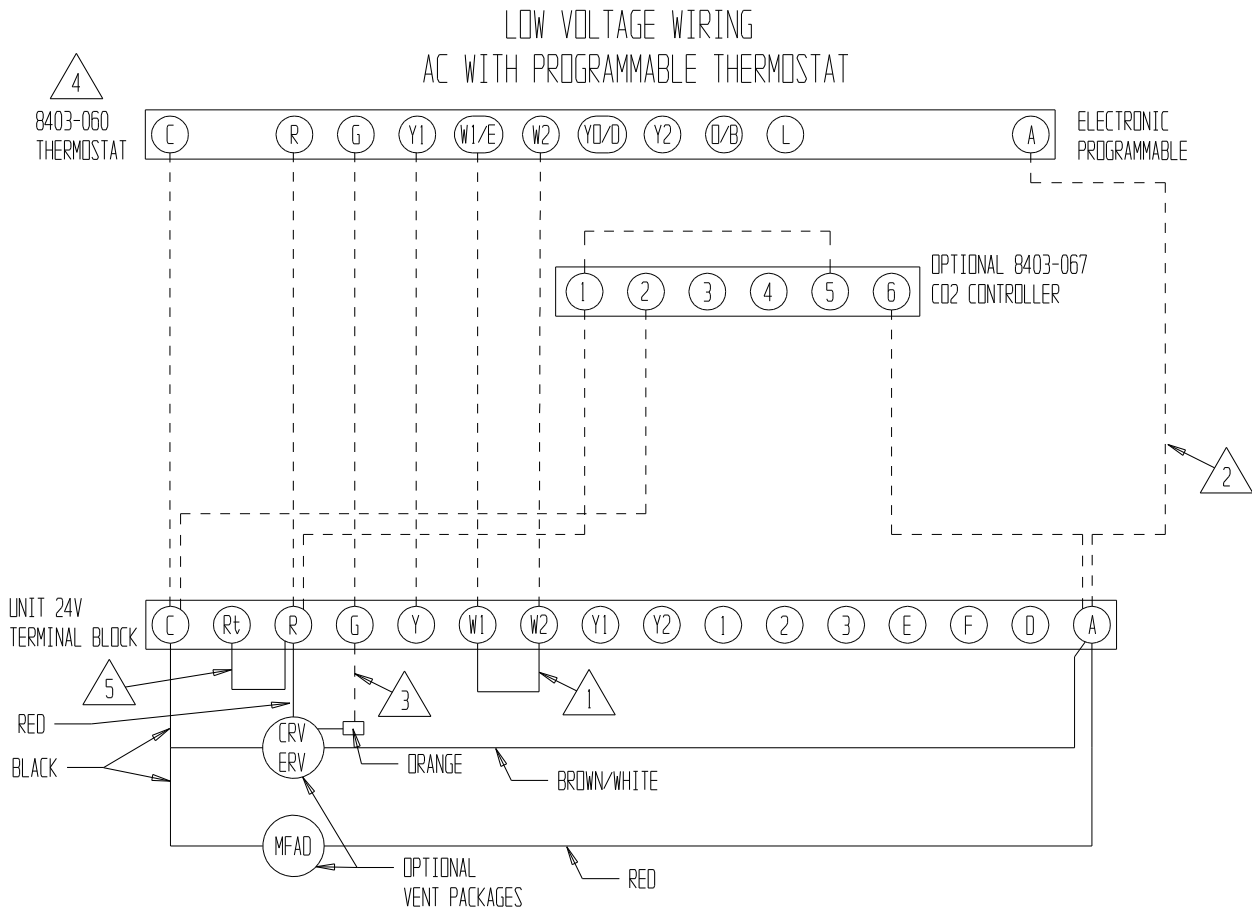
CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL.



FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

MIS-3138

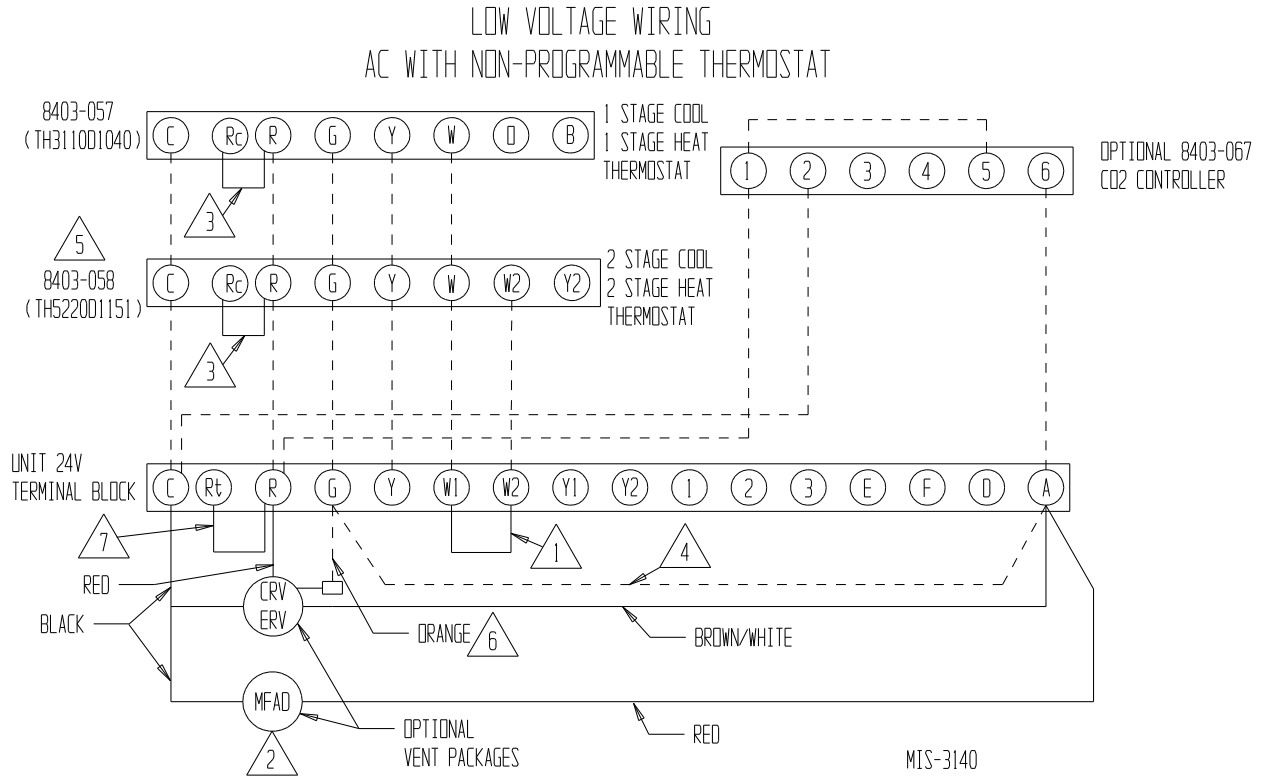
**FIGURE 2**  
**OPTIONAL MFAD, CRV or ERV VENTILATION PACKAGES**  
**with PROGRAMMABLE THERMOSTAT (RECOMMENDED)**



MIS-3139 A

- 1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2 DO NOT CONNECT "A" FROM 8403-060 IF OPTIONAL CO<sub>2</sub> CONTROLLER IS USED
- 3 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO<sub>2</sub> CONTROLLER IS USED
- 4 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL. MUST BE CONFIGURED TO PROGRAMMABLE AND FAN SET TO PROGRAMMED FAN FOR THE "A" OUTPUT TO FUNCTION DURING SCHEDULED OCCUPIED PERIODS.
- 5 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

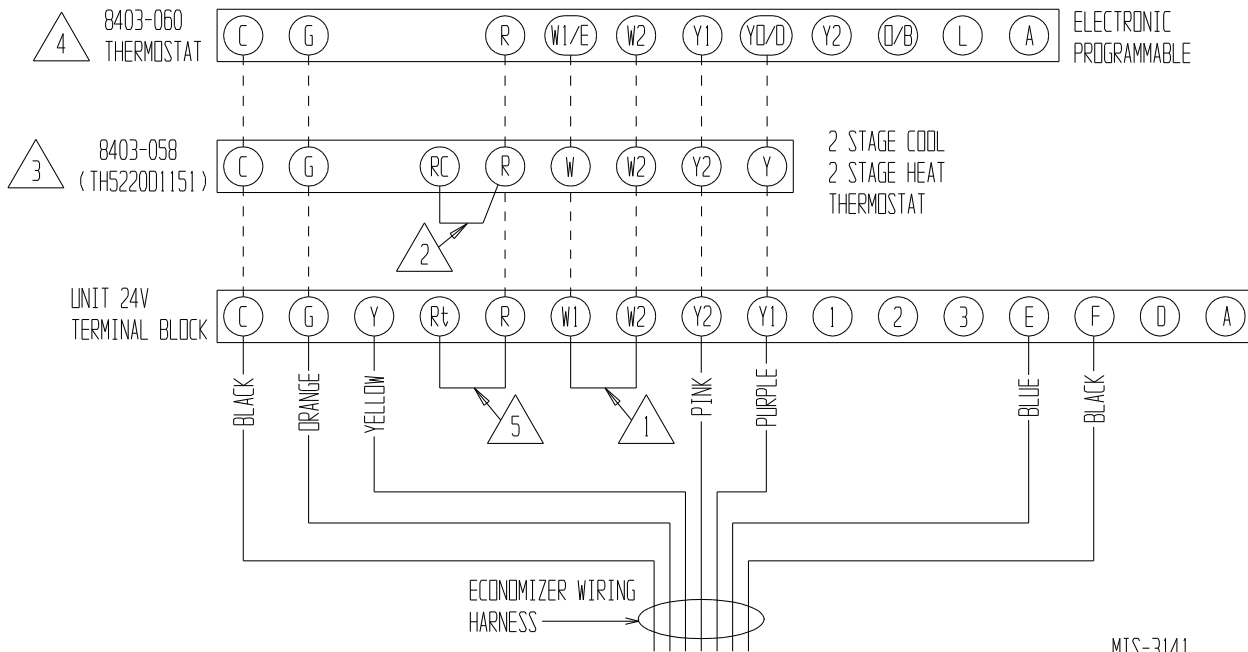
**FIGURE 3**  
**OPTIONAL MFAD, CRV or ERV VENTILATION PACKAGES**  
**with NON-PROGRAMMABLE THERMOSTAT**



-  REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
-  OPTIONAL VENT OPTION SUGGESTED HOOK UP
-  FACTORY INSTALLED JUMPER
-  ADD JUMPER IF OPTIONAL CO2 CONTROLLER IS NOT USED, VENT WILL RUN WHILE BLOWER IS ENERGIZED. DO NOT INSTALL JUMPER IF OPTIONAL CO2 CONTROLLER IS INSTALLED, AND SEE NOTE 6.
-  CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).
-  CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS INSTALLED.
-  FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND R<sub>t</sub> TERMINALS.

**FIGURE 4**  
**A/C with EIFM**

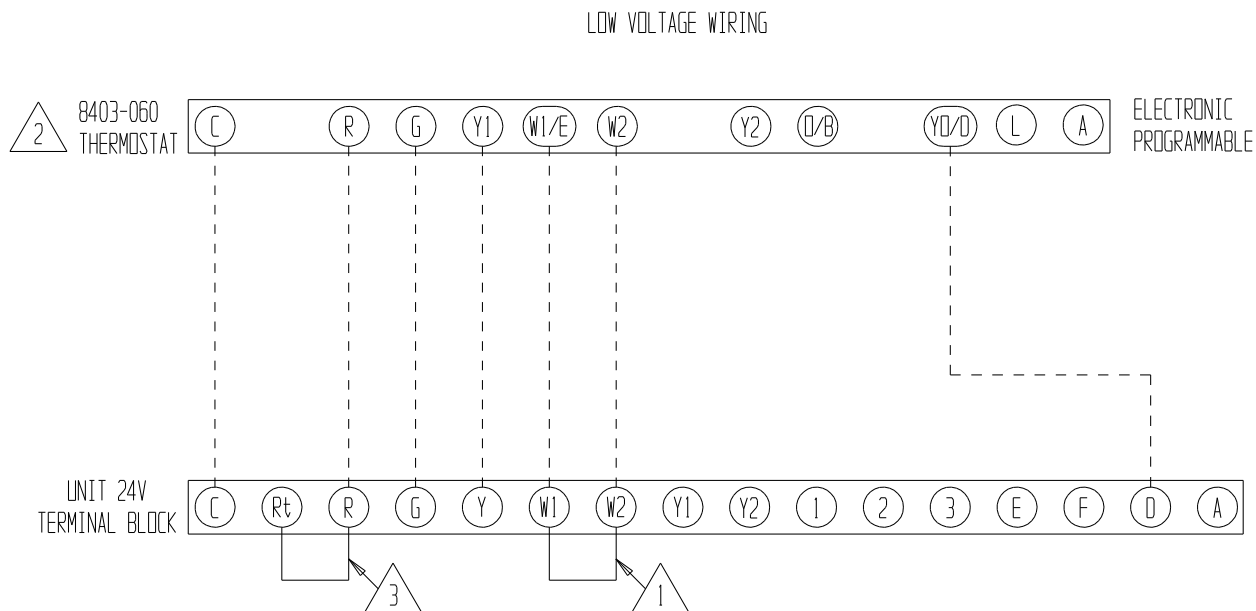
OPTIONAL ECONOMIZER LOW VOLTAGE WIRING



MIS-3141

- 1** REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2** FACTORY INSTALLED JUMPER
- 3** CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).
- 4** CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR ECONOMIZER FOR YD/D OUTPUT TO BE ACTIVE AS FIRST STAGE COOLING.
- 5** FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

**FIGURE 5**  
**A/C with DEHUMIDIFICATION SEQUENCE**  
**& NO VENTILATION PACKAGE USING**  
**8403-060 COMBINATION TEMPERATURE and HUMIDITY CONTROLLER**



REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

MIS-3142



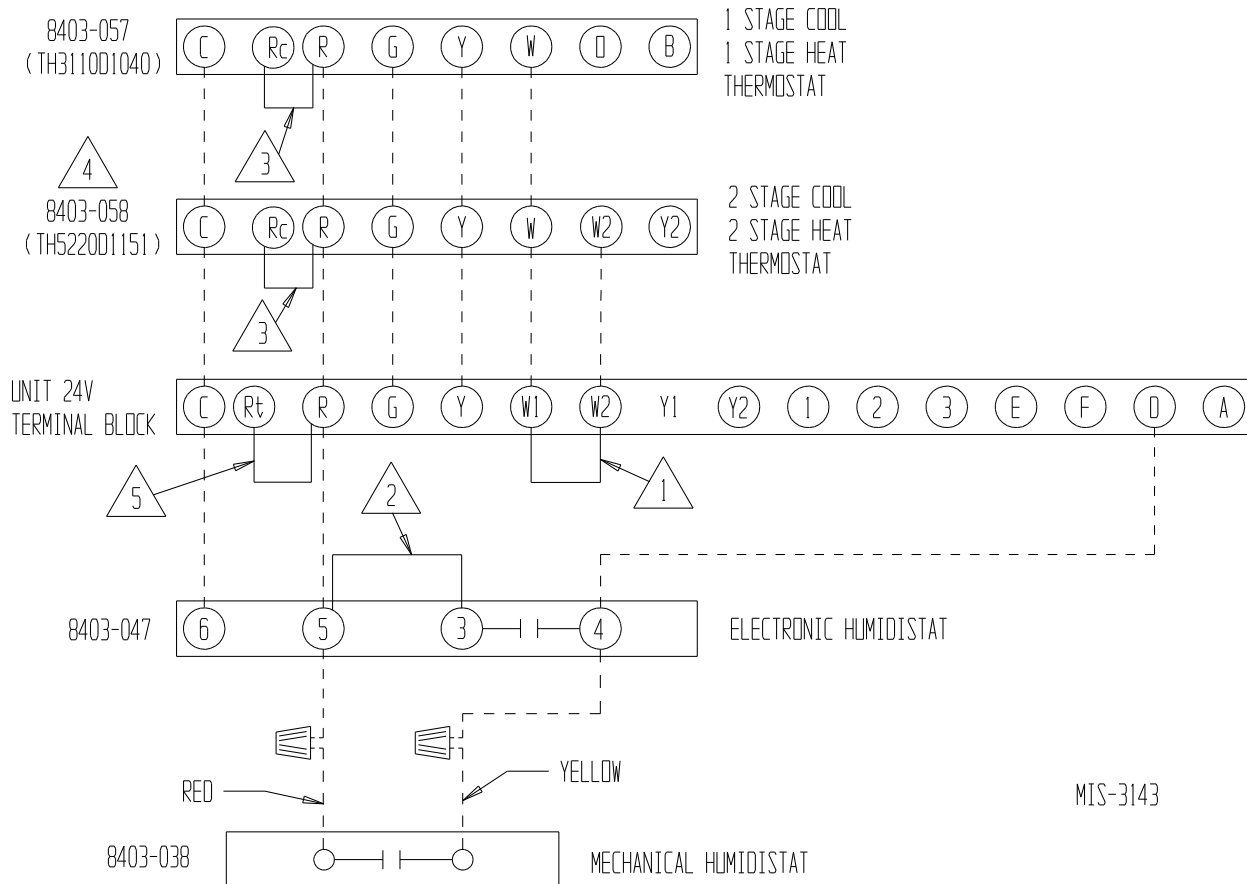
CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR "NO ECONOMIZER" TO MAKE YD/D OUTPUT ACTIVE FOR HUMIDITY CONTROL



FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

**FIGURE 6**  
**A/C with DEHUMIDIFICATION SEQUENCE**  
**& NO VENTILATION PACKAGE USING SEPARATE**  
**TEMPERATURE and HUMIDITY CONTROLS**

LOW VOLTAGE WIRING



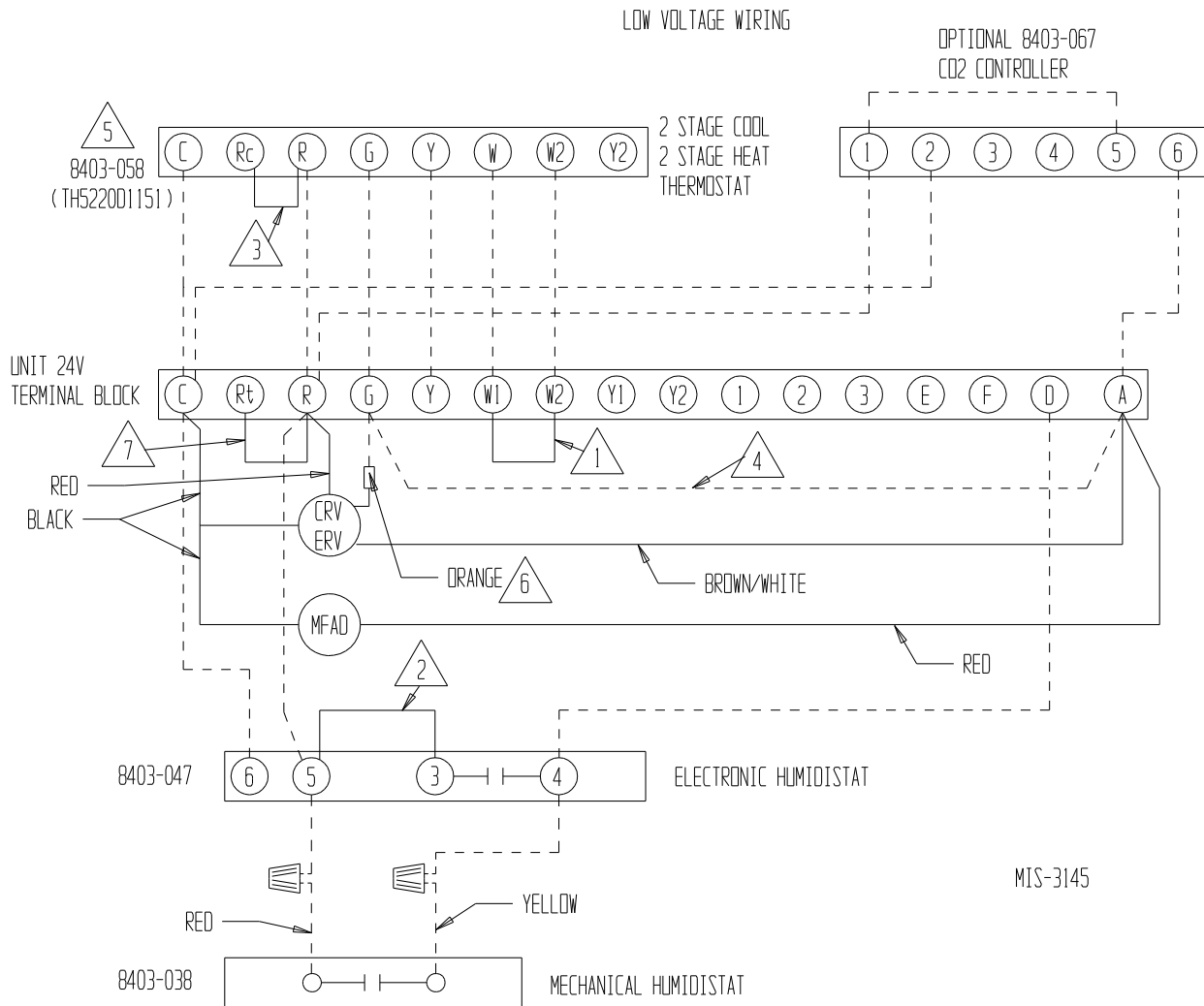
MIS-3143

-  REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
-  JUMPER NEEDS TO BE ADDED
-  FACTORY INSTALLED JUMPER
-  CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).
-  FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

## LOW VOLTAGE WIRING

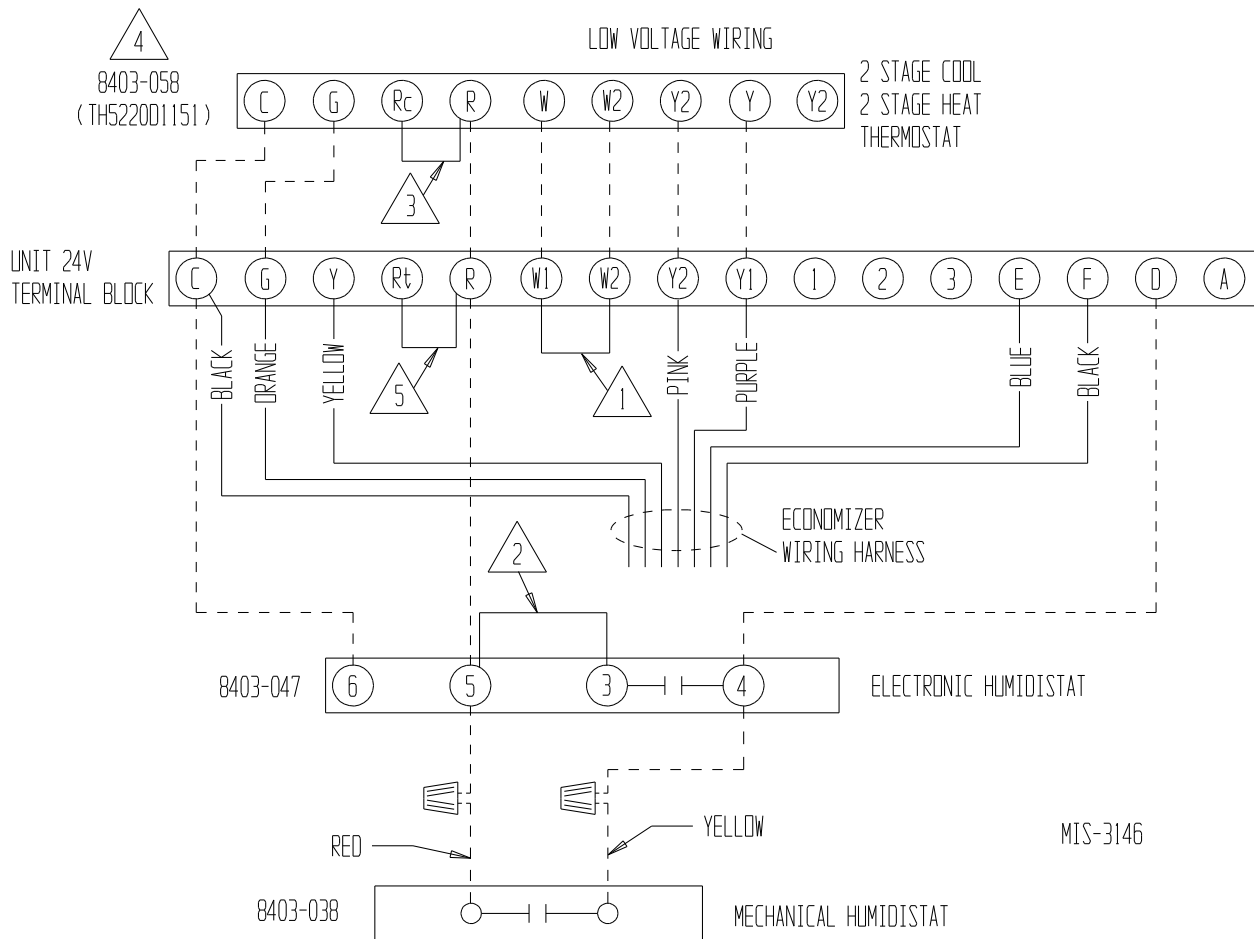


**FIGURE 8**  
**A/C with DEHUMIDIFICATION SEQUENCE**  
**with VENTILATION PACKAGE USING**  
**NON-PROGRAMMABLE THERMOSTAT**  
**and SEPARATE HUMIDITY CONTROLLER**



- 1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2 JUMPER NEEDS TO BE ADDED
- 3 FACTORY INSTALLED JUMPER
- 4 ADD JUMPER IF OPTIONAL CO2 CONTROLLER IS NOT USED. VENT WILL RUN WHILE BLOWER IS ENERGIZED, IF CO2 CONTROLLER IS INSTALLED, DO NOT ADD JUMPER AND SEE NOTE 6.
- 5 CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).
- 6 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS INSTALLED.
- 7 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND R<sub>t</sub> TERMINALS.

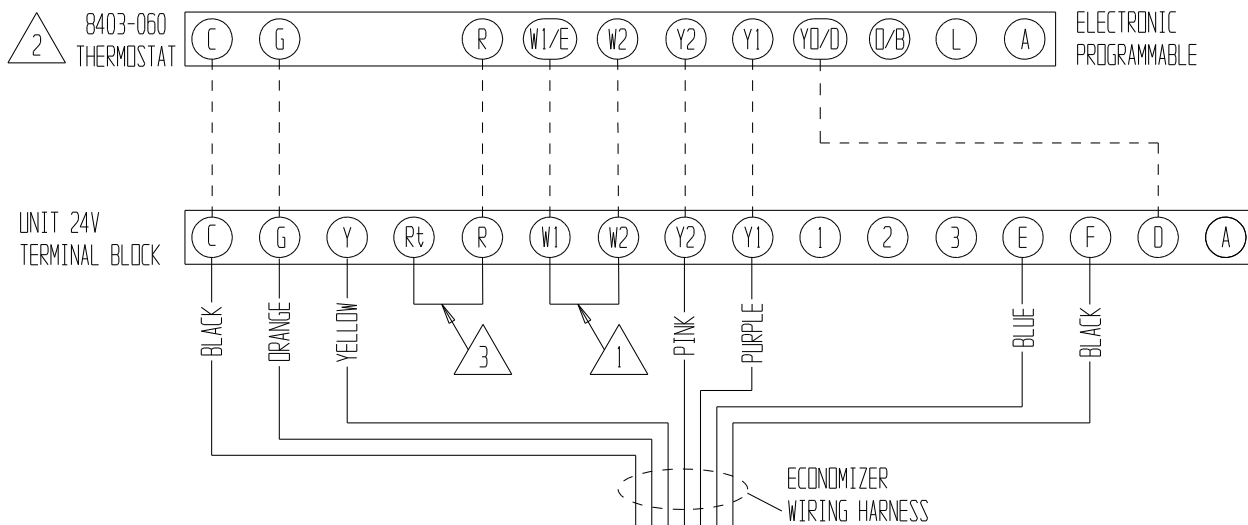
**FIGURE 9**  
**A/C with DEHUMIDIFICATION SEQUENCE**  
**& EIFM with 8403-058 THERMOSTAT**  
**and 8403-038 or 8403-047 HUMIDISTAT**



MIS-3146

**FIGURE 10**  
**A/C with DEHUMIDIFICATION SEQUENCE**  
**& EIFM with 8403-060**  
**COMBINATION TEMPERATURE and HUMIDITY CONTROL**

**LOW VOLTAGE WIRING**



MIS-3147



REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW



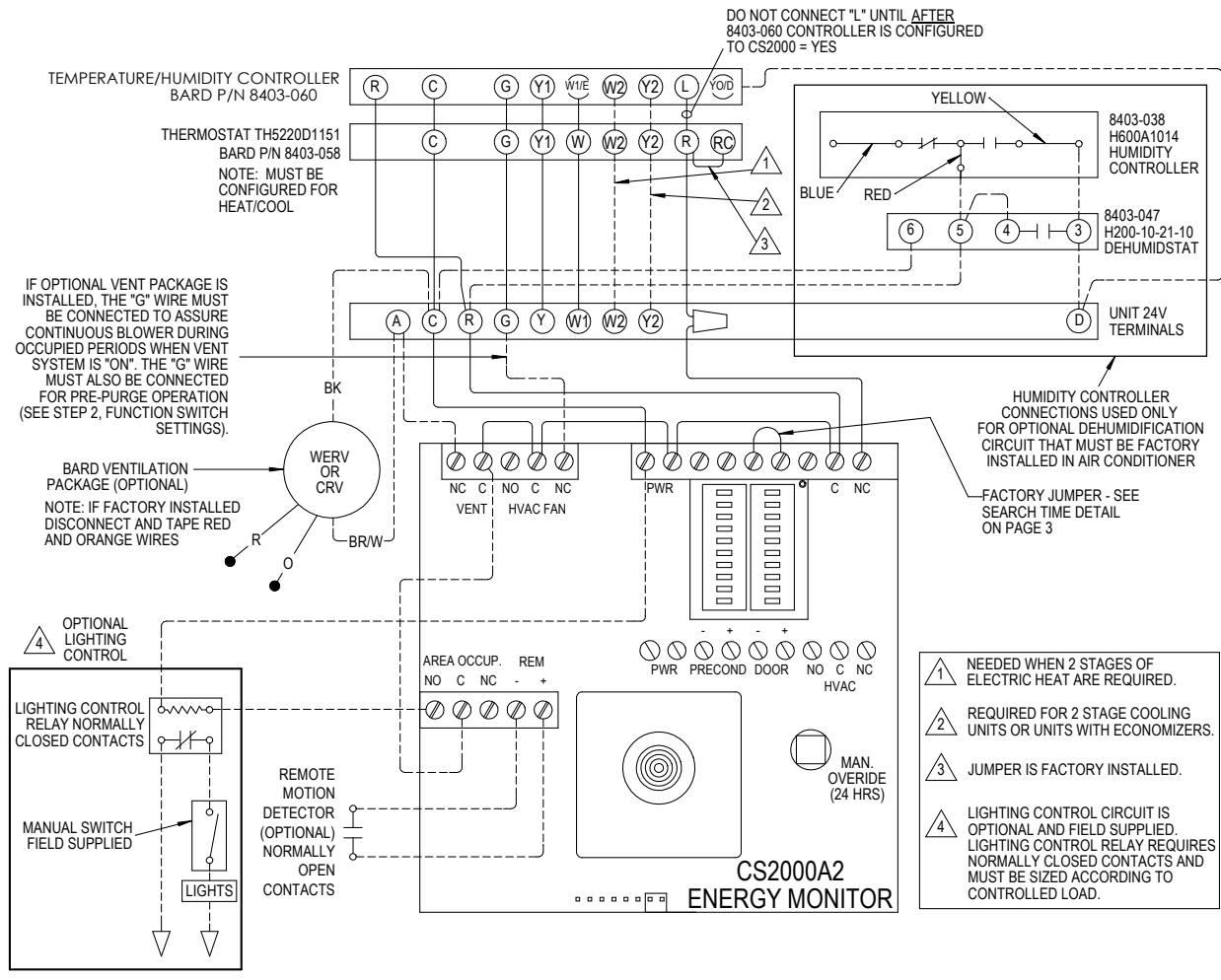
CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR NO ECONOMIZER AND MULTI-STAGE FOR Y1 OUTPUT TO BE ACTIVE AS FIRST STAGE COOLING AND YD/D TO BE ACTIVE FOR HUMIDITY CONTROL



FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

FIGURE 11

# AIR CONDITIONER WITH CS2000



## RECOMMENDED SWITCH SETTINGS SHOWN BELOW

### FUNCTION SWITCHES

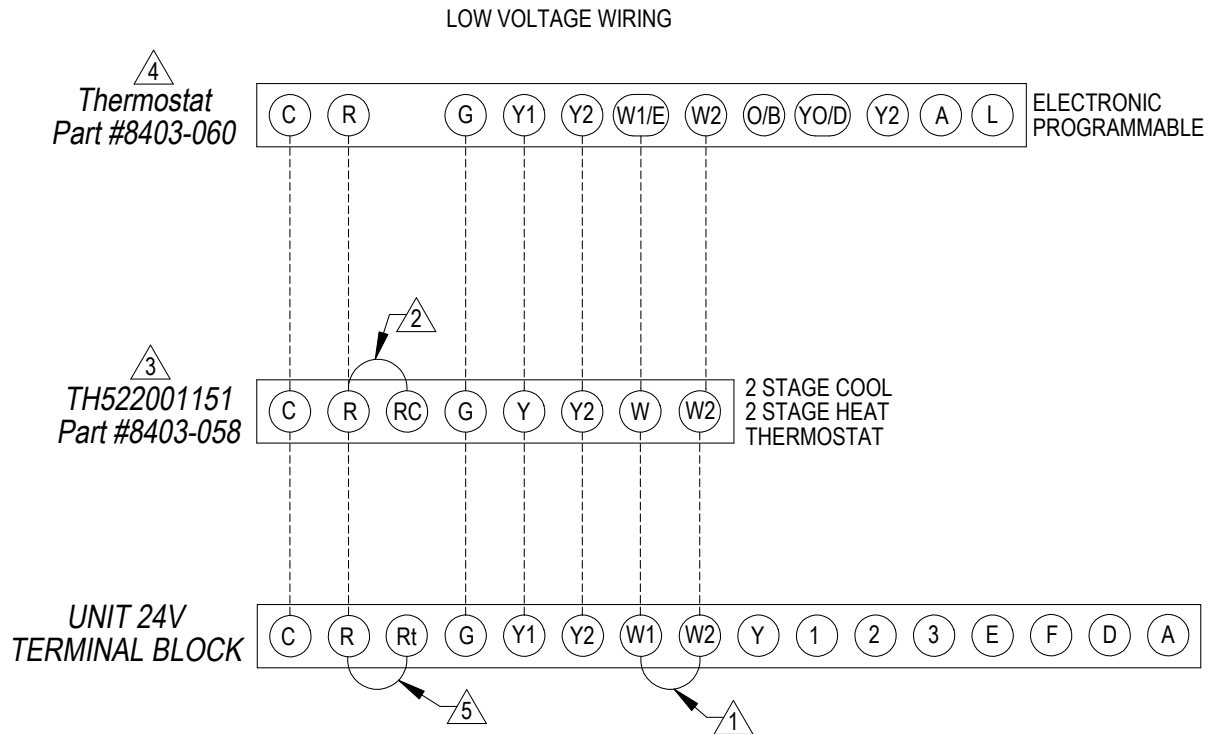
|             |  |
|-------------|--|
| LEARN       |  |
| PRE P       |  |
| MODE        |  |
| RATE        |  |
| SEARCH-TIME |  |
| N/C         |  |
| STAGE       |  |
| AUX         |  |
| DEMAND 2    |  |
| DEMAND 1    |  |

### TEMPERATURE SWITCHES

|  |    |
|--|----|
|  | 90 |
|  | 84 |
|  | 81 |
|  | 78 |
|  | 68 |
|  | 65 |
|  | 62 |
|  | 58 |
|  | 54 |
|  | 48 |

4093-157

**FIGURE 12**  
**2-STAGE A/C with OPTIONAL ELECTRIC HEAT**  
**NO ECONOMIZER or VENTILATION PACKAGES**



1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

MIS-3148

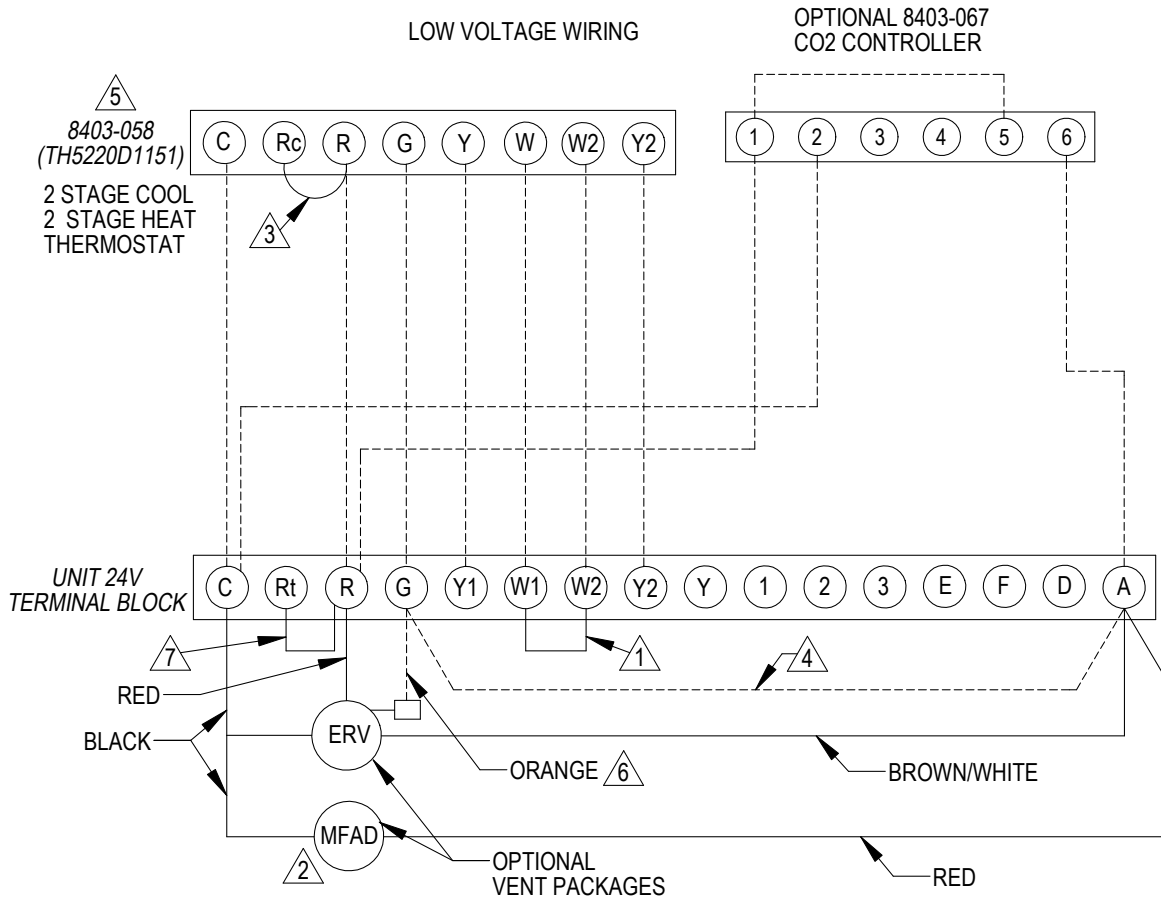
2 FACTORY INSTALLED JUMPER

3 CHANGE "SYSTEM TYPE". SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT/ 2 COOL CONVENTIONAL).

4 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL

5 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

**FIGURE 13**  
**2-STAGE A/C with OPTIONAL MFAD OR ERV VENTILATION PACKAGES**  
**with NON-PROGRAMMABLE THERMOSTAT**



1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW

MIS-3149

2 OPTIONAL VENT OPTION SUGGESTED HOOK UP

3 FACTORY INSTALLED JUMPER

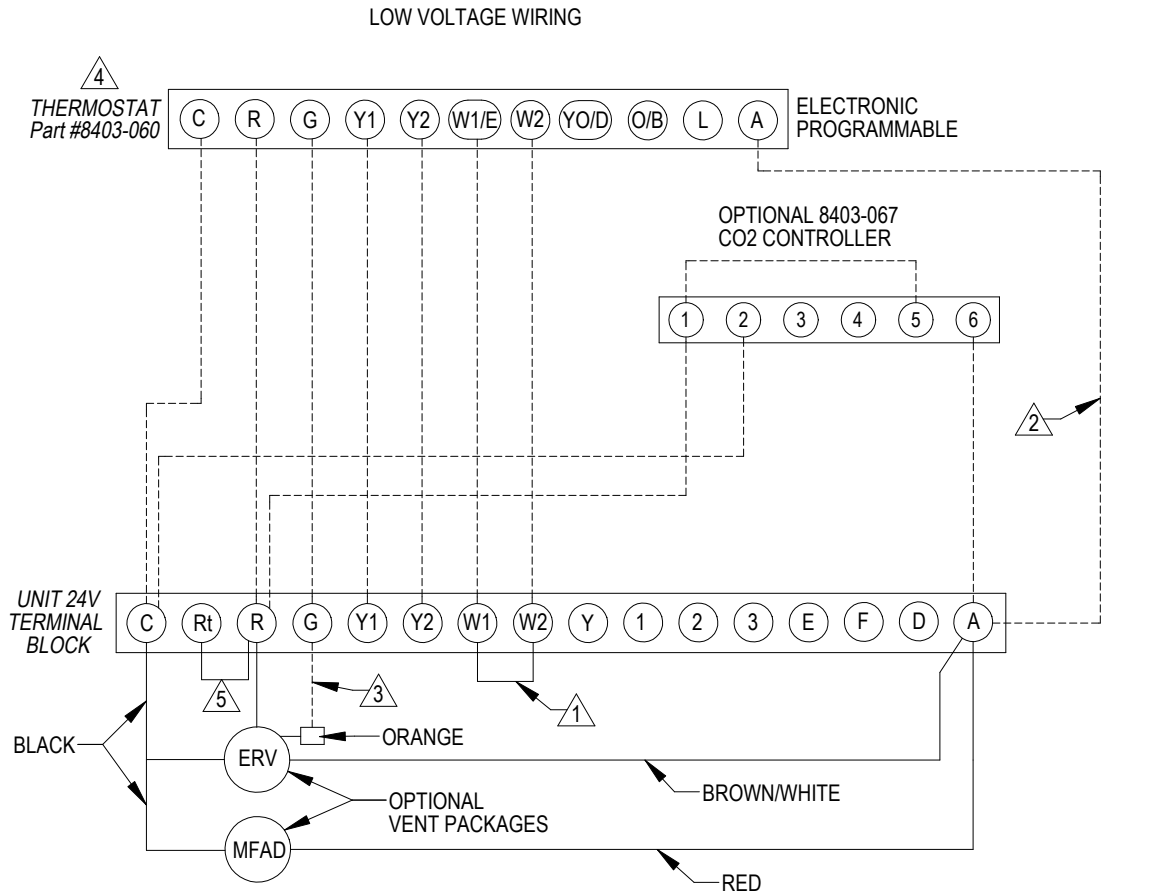
4 ADD JUMPER IF OPTIONAL CO2 CONTROLLER IS NOT USED, VENT WILL RUN WHILE BLOWER IS ENERGIZED. DO NOT INSTALL JUMPER IF OPTIONAL CO2 CONTROLLER INSTALLED, AND SEE NOTE 6.

5 CHANGE "SYSTEM TYPE", SET UP FUNCTION 1, FROM 5 (2 HEAT/ 1 COOL HEAT PUMP) TO 6 (2 HEAT / 2 COOL CONVENTIONAL).

6 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS INSTALLED.

7 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

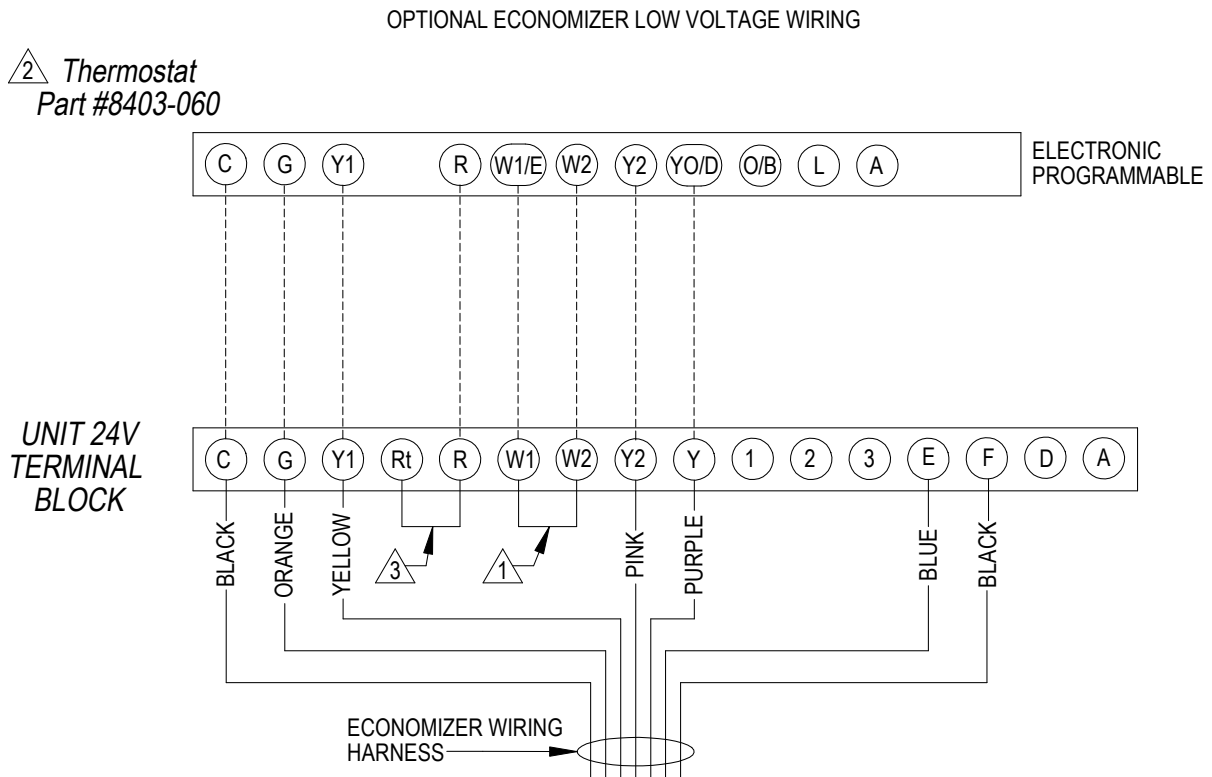
**FIGURE 14**  
**2-STAGE A/C with OPTIONAL MFAD OR ERV VENTILATION PACKAGES**  
**with PROGRAMMABLE THERMOSTAT (RECOMMENDED)**



- 1 REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2 DO NOT CONNECT "A" FROM 8403-060 IF OPTIONAL CO2 CONTROLLER IS USED
- 3 CONNECT ORANGE WIRE TO "G" ONLY IF OPTIONAL CO2 CONTROLLER IS USED
- 4 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL. MUST BE CONFIGURED TO PROGRAMMABLE AND FAN SET TO PROGRAMMED FAN FOR THE "A" OUTPUT TO FUNCTION DURING SCHEDULED OCCUPIED PERIODS.
- 5 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

MIS-3150

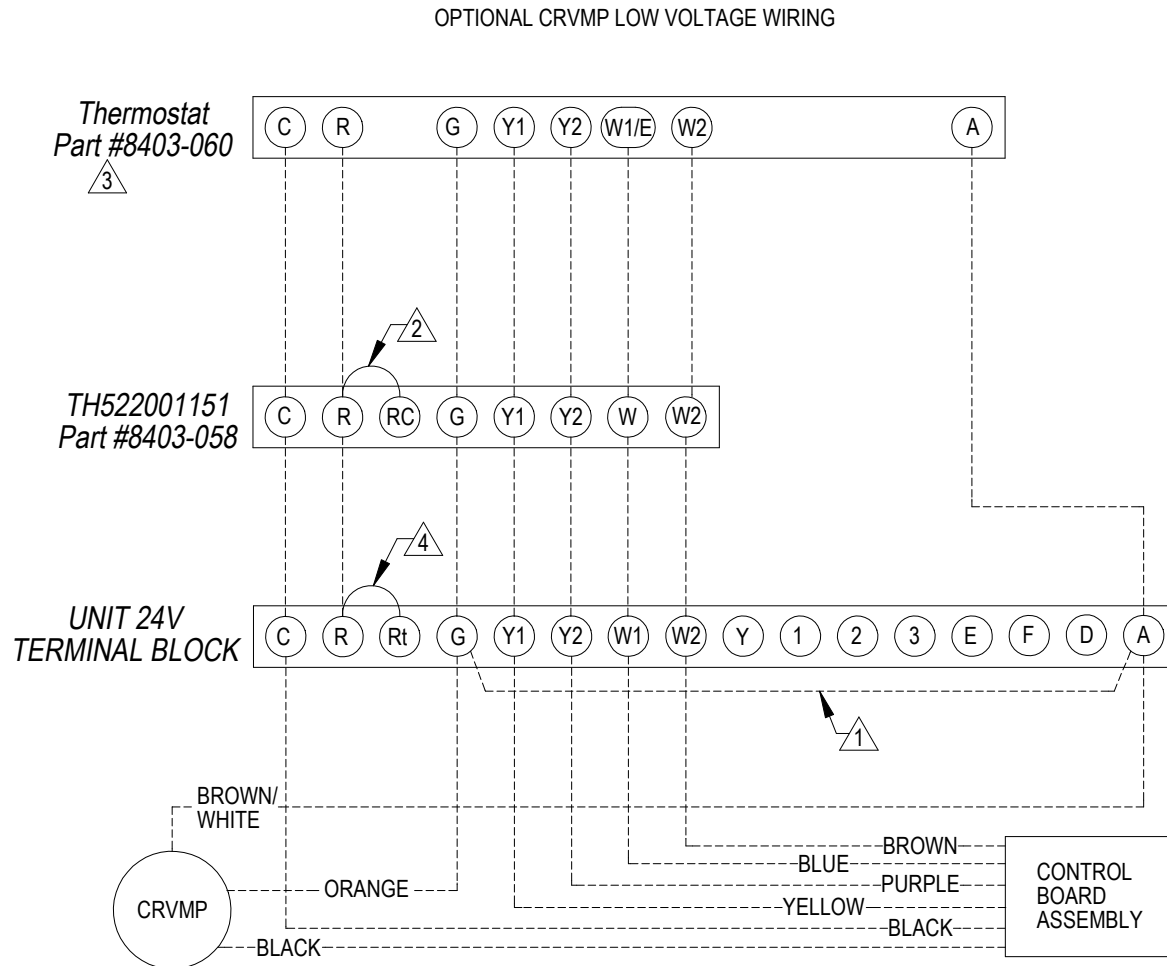
**FIGURE 15**  
**2-STAGE A/C with EIFM**



MIS-3151

- 1** REMOVE JUMPER FOR 2 STAGE ELECTRIC HEAT ON UNITS WITH 15 OR MORE KW
- 2** CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL, AND MUST BE CONFIGURED FOR ECONOMIZER FOR YO/D OUTPUT TO BE ACTIVE AS FIRST STAGE COOLING.
- 3** FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION, REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

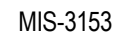
**FIGURE 16**  
**2-STAGE A/C with OPTIONAL CRVMP LOW VOLTAGE WIRING**



MIS-3152

- 1 INSTALL JUMPER WHEN USING THERMOSTAT PART #8403-058
- 2 FACTORY INSTALLED JUMPER
- 3 CHANGE MODEL CONFIGURATION FROM HEAT PUMP TO HEAT/COOL.  
MUST BE CONFIGURED TO PROGRAMMABLE AND FAN SET TO PROGRAMMED  
FAN FOR THE "A" OUTPUT TO FUNCTION DURING SCHEDULED OCCUPIED PERIODS.
- 4 FACTORY INSTALLED JUMPER. FOR IMMEDIATE EMERGENCY SHUTDOWN OF ALL HVAC OPERATION,  
REMOVE JUMPER AND CONNECT NORMALLY CLOSED (NC) CONTACT TO R AND Rt TERMINALS.

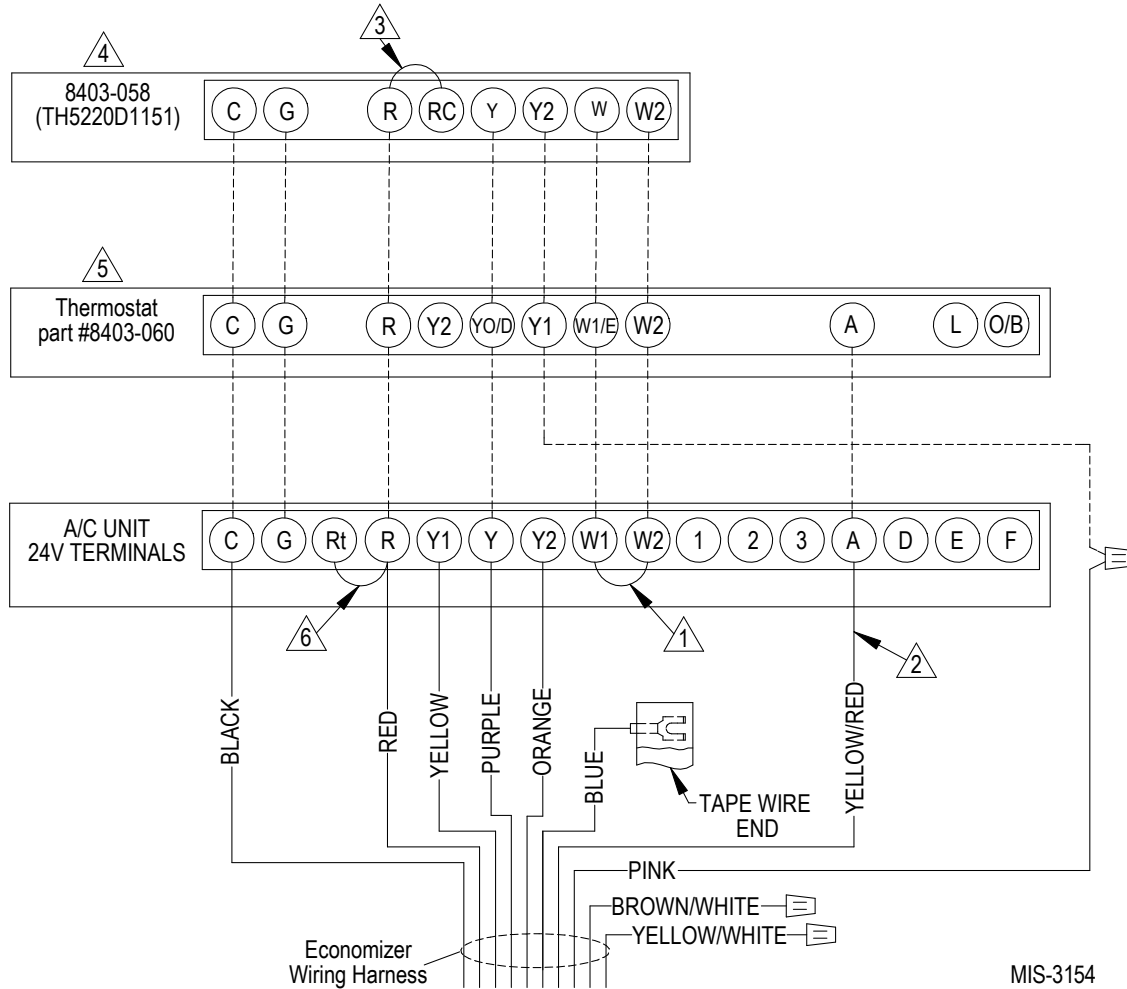
## Low Voltage Wiring Diagram



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**FIGURE 18**  
**2-STAGE A/C with OPTIONAL ELECTRIC HEAT**  
**WITH ECONWM\* STYLE ECONOMIZER**

*Low Voltage Wiring Diagram*



MIS-3154

- △1 Factory installed jumper. Remove for 2-stage operation on units with 15 or more kw.
- △2 Must be energized to enable minimum position. NOTE: Economizer Control Default Setting is 10V (100%). Depending upon application may require setting to lower value.
- △3 Factory Jumper Installed.
- △4 Change "system type", set up function 1, from 5 (2 heat/ 1 cool heat pump) to 6 (2 heat/ 2 cool conventional).
- △5 Change model configuration from heat pump to heat/cool, and must be configured for economizer for YO/D output to be active as first stage cooling.
- △6 Factory installed jumper. For immediate emergency shutdown of all HVAC operation, remove jumper and connect normally closed (NC) contact to R and Rt terminals.