



Wiring Diagrams

INDEX

| TYPE | UNIT | NUMBER | FIG. NO. |
|---|-------------------------|------------|----------|
| Component Arrangement | 48/50AJ,AK,AW,AY020-035 | 48EJ502489 | 1 |
| | 48/50AJ,AK,AW,AY040-060 | 48EJ502490 | 2 |
| Power Schematic | 48/50AJ,AK,AW,AY020-027 | 48EJ503085 | 3 |
| | 48/50AJ,AK,AW,AY030-035 | 48EJ503084 | 4 |
| | 48/50AJ,AK,AW,AY040 | 48EJ503083 | 5 |
| | 48/50AJ,AK,AW,AY050 | 48EJ503082 | 6 |
| | 48/50AJ,AK,AW,AY060 | 48EJ503081 | 7 |
| Main Control Box Circuit | 48/50AJ,AK,AW,AY020-060 | 48EJ503075 | 8 |
| Auxiliary Control Box Wiring | 48/50AJ,AK,AW,AY020-060 | 48EJ503076 | 9 |
| Accessory Board Wiring | 48/50AJ,AK,AW,AY020-060 | 48EJ503086 | 10 |
| Gas Heat Control Circuit (2-Stage Heat) | 48AJ,AK,AW,AY020-050 | 48EJ503079 | 11 |
| | 48AJ,AK,AW,AY060 | 48EJ503077 | 12 |
| Gas Heat Control Circuit (Staged Gas Heat) | 48AJ,AW020-050 | 48EJ502488 | 13 |
| | 48AJ,AW060 | 48EJ503078 | 14 |
| Electric Heat Control Circuit | 50AJ,AK,AW,AY020-050 | 48EJ503080 | 15 |
| | 50AJ,AK,AW,AY060 | 48EJ503087 | 16 |

ACCESSORIES

| ACCESSORY | UNIT | FIG. NO. |
|--|-------------------------|----------|
| Motormaster® V Low Ambient Controller | 48/50AJ,AK,AW,AY020-035 | 17 |
| | 48/50AJ,AK,AW,AY040-060 | 18 |
| Space Sensor Temperature Averaging | 48/50AJ,AK,AW,AY020-060 | 19 |

NOTE: Accessory wiring is shown on the unit wiring diagrams. Refer to the appropriate drawing for accessory wiring. The following accessories are shown on the main control box circuit drawing (Fig. 8): thermostat, remote economizer position override, remote economizer minimum position set point, remote 4-20 mA economizer position, and space IAQ sensor. The following accessories are shown on the auxiliary control box circuit drawing (Fig. 9): outdoor enthalpy

changeover sensor and differential enthalpy changeover sensor. The following accessories are shown on the accessory board wiring drawing (Fig. 10): outdoor air quality sensor, remote supply air set point, demand limit controller, outdoor inlet cfm sensor, fan status switch, demand limit-redline, demand limit-loadshed, fire pressurization, fire evacuation, fire smoke purge, and IAQ override switch.

ELECTRIC HEAT POWER DIAGRAMS









| UNIT SIZES | ELEC CHARACTERISTICS | NOMINAL kW | | FIG. NO. | QTY PER UNIT |
|------------|----------------------|------------|---------|----------|--------------|
| | | Lo Heat | Hi Heat | | |
| 020-050 | 208/230-3-60 | 36 | 72 | 20 | 2 |
| | 460-3-60 | 36 | 72 | 20 | 2 |
| | 380-3-60 | 24 | 49 | | |
| | 400-3-50 | 27 | 54 | | |
| 060 | 575-3-60 | 36 | 72 | 20 | 2 |
| | 208/230-3-60 | 54 | 108 | 20 | 3 |
| | 460-3-60 | 54 | 108 | 20 | 3 |
| | 380-3-60 | 37 | 74 | | |
| | 400-3-50 | 41 | 82 | | |
| | 575-3-60 | 54 | 108 | 20 | 3 |

NOTE: All power leads connect to (single) TB7 power terminal block – 2 or 3 conductors per terminal.

LEGEND AND NOTES FOR FIG. 1-16

LEGEND

| | | |
|--------------|---|---|
| BP | — | Building Pressure |
| C | — | Contact, Compressor |
| CAP | — | Capacitor |
| CB | — | Circuit Breaker |
| CCB | — | Control Circuit Breaker |
| CCH | — | Crankcase Heater |
| CCN | — | Carrier Communication Network |
| COMP | — | Compressor Motor |
| CR | — | Control Relay |
| CS | — | Compressor Safety |
| CSB | — | Current Sensing Board |
| DP | — | Duct Pressure |
| DS | — | Disconnect Switch |
| EC | — | Enthalpy Control |
| ECB | — | Economizer Control Board |
| EDT | — | Evaporator Discharge Temperature Sensor |
| EMM | — | Controls Option Board |
| EQUIP | — | Equipment |
| FIOP | — | Factory-Installed Option |
| FU | — | Fuse |
| GND | — | Ground |
| HC | — | Heater Contactor |
| HIR | — | Heat Interlock Relay |
| HPS | — | High-Pressure Switch |
| HS | — | Hall Effect Sensor |
| IAQ | — | Indoor Air Quality |
| IDM | — | Induced Draft Motor |
| IFC | — | Indoor Fan Contactor |
| IFCB | — | Indoor Fan Circuit Breaker |
| IFM | — | Indoor Fan Motor |
| IFR | — | Indoor Fan Relay |
| IGC | — | Integrated Gas Unit Controller |
| IP | — | Internal Protector |
| L | — | Light |
| LAT | — | Leaving Air Temperature Sensor |
| LPT | — | Low Pressure Transducer |
| LS | — | Limit Switch |
| MBB | — | Main Base Board |
| MGV | — | Main Gas Valve |
| NEC | — | National Electrical Code |
| OARH | — | Outdoor-Air Relative Humidity |
| OAT | — | Outdoor-Air Temperature Sensor |
| OFC | — | Outdoor Fan Contactor |
| OFM | — | Outdoor Fan Motor |
| PEC | — | Power Exhaust Contactor |
| PEM | — | Power Exhaust Motor |
| PL | — | Plug Assembly |
| PRI | — | Primary |
| R | — | Relay |
| RARH | — | Return Air Relative Humidity |
| RAT | — | Return Air Temperature Sensor |
| RS | — | Rollout Switch |
| SCB | — | Staged Gas Board |
| SCT | — | Saturated Condensing Temperature Sensor |
| SGC | — | Staged Gas Controller |
| SST | — | Saturated Suction Pressure Transducer |
| TB | — | Terminal Block |
| TC | — | Thermostat Cooling |
| TH | — | Thermostat Heating |
| TRAN | — | Transformer |
| VFD | — | Variable Frequency Drive |

| | |
|---|---|
|  | Terminal Block |
|  | Terminal (Unmarked) |
|  | Terminal (Marked) |
|  | Splice |
|  | Factory Wiring |
|  | Field Wiring |
|  | To indicate common potential only, not to represent wiring. |
|  | To indicate FIOP or Accessory |

PLUG LOCATION REFERENCE

| NAME | LOCATION | DESCRIPTION |
|-------------|------------------|--|
| PL1 | MAIN CB | Communications from MMB to PL5/PL4 |
| PL2 | MAIN CB | Smoke Detector & 24V from TB5 to AUX CBOX |
| PL3 | MAIN CB | Heat Control & 24V from MBB to PL9 |
| PL4 | MAIN CB | Communications from OL1 to SCB/EMM |
| PL5 | AUX CB | Communications from PL1 to ECB1 & ECB2 |
| PL6 | AUX CB | REM/OCC from PL7 to ECB1 |
| PL7 | MAIN CB | REM/OCC from TB5/6 to PL6/12 |
| PL8 | AUX CB | ECM Control from PL12 to ECB1 |
| PL9 | ELEC HEAT | Control from PL3 to IGC/HR/PL14 |
| PL10 | GAS HEAT | IDM Line Voltage from PL11 to IDM(CAP) |
| PL11 | MAIN CB | Line Voltage from OFC2 to PL10 (IDM) |
| PL12 | AUX CB | Branch from PL2,7,8 to PL13,18,19,20 |
| PL13 | AUX CB | Smoke Det. Control from PL12 to Smoke Det. |
| PL14 | ELEC HEAT | Control Power to Heater Box 1 |
| PL15 | ELEC HEAT | Control Power to Heater Box 2 |
| PL16 | ELEC HEAT | Control/Signal from PL12 to Economizer |
| PL18 | AUX CB | Control/Signal from PL12 to CO2 Sensor |
| PL19 | AUX CB | Control/Signal from PL12 to Economizer |
| PL20 | AUX CB | 24V Power from PL12 to ECB1/ECB2 |
| PL21 | AUX CB | 24V Power from PL20 to ECB1/PEC |
| PL22 | MAIN CB | Line Voltage from CCB to PEC |
| PL23 | AUX CB | Pwr. Exh. from PEC to PL24,25,26,27 |
| PL24 | AUX CB | PEM Pwr. from PL23 |
| PL25 | AUX CB | PEM Pwr. from PL23 |
| PL26 | AUX CB | PEM Pwr. from PL23 |
| PL27 | AUX CB | PEM Pwr. from PL23 |
| PL28 | MAIN CB | Thermistor Input from MMB to PL29/PL30 |
| PL29 | EVAP SECT | SAT Harness |
| PL30 | AUX CB | OAT/RAT Harness |
| PL31 | MAIN CB | HPS/SST |
| PL33 | MAIN CB | Crankcase Heaters |
| PL34 | MAIN CB | SCT |
| PL35 | EVAP SECT | Hot Gas By-Pass Harness |

NOTES:

1. Factory wiring is in accordance with the national electrical codes. Any field modifications or additions must be in compliance with all applicable codes.
2. Use 75° C min wire for field power supply, use copper wires for all units.
3. All circuit breakers "Must Trip Amps" are equal to or less than 156% RLA.
4. Compressor and fan motors are thermally protected — three phase motors protected against primary single phase conditions.
5. Red jumper wire must be added between R and WI for Space Temperature mode and temporarily during Service-Test mode when the heaters need to operate.

SEQUENCE OF OPERATION

Constant Volume (CV) Units — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the Scrolling Marquee display.

The unit can be configured with two different control types: thermostat control or space temperature sensor control.

THERMOSTAT CONTROL — If the unit is equipped with a thermostat with Y1, Y2, W1, W2 and G connections, then the control will perform the following sequence.

When terminal G is energized, the indoor fan will turn on. The fan must be running for heating or cooling to occur. If Y1 is closed (first stage of cooling is energized), then the unit control will first check the ability to use the economizer. If the economizer can be used, then the unit control will modulate the damper open to maintain the low-load economizer leaving air temperature set point.

If Y2 closes (second stage of cooling is energized), then the unit control will lower the leaving air temperature set point to the configured set point. If the economizer cannot satisfy the load, then the compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer cannot be used or the enable control disables the economizer, then the control will sequence the compressors based on the Y1 and Y2 signals.

If two-stage control has been selected, then the unit control will map the compressors to the Y1 and Y2 inputs (first and second stage cooling) as defined in the loading sequence. If Adaptive mode has been selected, then the control will add and remove compressor stages to maintain the high and low demand set points. If Y1 is closed (first stage of cooling energized), at least one compressor stage will be turned on.

If W1 closes (first stage of heating is energized), then the unit will be in the Heating mode. The economizer will be closed to the minimum position. If the unit is equipped with gas or electric heat, then the first stage of heat will be energized. If W2 closes, then the unit control will turn on the second stage of heat. If the unit is equipped with a staged gas heat control option, then the W1 and W2 signal will be used to control the gas heat to the configurable low and high heat load leaving air temperature set points. If the unit is equipped with gas heat, then the IGC board will control the operation of the gas heat. See the Gas Heat Unit Operation section for the IGC board sequence of operation.

SPACE TEMPERATURE SENSOR CONTROL — If space temperature operation has been selected using a T55, T56, or T58 sensor, then a wire jumper must be added between R, W1, and W2. If a remote occupancy control method has been selected, then the remote occupancy input must first be closed for the unit to go into heat, vent, or cooling modes. If the internal timeclock is used, the unit control module determines the occupancy state based on the system time schedules.

If Temperature Compensated Start is active, the unit will be controlled as in the occupied mode. The Temperature Compensated Start function will start the unit before the scheduled occupied time (as determined by prior operation) to bring the space to the set point temperature when occupied time starts. As an example, if the unoccupied set point is 60 F, the occupied set point is 72 F, and the occupied time period starts at 8:00 AM, the Temperature Compensated Start function will bring on the unit at 7:45 AM (as determined from previous

operation) so the room temperature will be at 72 F when the occupied time starts.

If the unit has been configured for a pre-occupancy purge, then the control will start the unit in Vent mode prior to the occupancy time to vent the space. If an IAQ (indoor air quality) sensor is being used and the low IAQ set point is satisfied, then the occupancy Purge mode will be terminated.

The set points for heat and cooling are configurable through the Scrolling Marquee display.

NOTE: If a T56 sensor is being used, then the slide bar on the sensor can offset the set point by as much as 5 degrees.

If the space temperature rises above the cooling set point, then the unit will go into Cooling mode. If the economizer can be used, the control will first try to control to the Leaving Air Temperature set point. The set point will depend on the space temperature. If the temperature is above the Low Demand set point, then the Low Economizer Load Discharge Air Temperature set point will be used. If the temperature is above the High Load Space Temperature set point, then the High Load Leaving Air Temperature set point will be used. If the economizer cannot satisfy the load the compressors will be sequenced on to maintain either the low or high load temperature set points. If the economizer cannot be used or the unit control disables the economizer, then the unit control will sequence the compressors based on the low and high load space temperature variables. If two-stage control has been selected then the control will map the compressors to the low and high loads as defined in the loading sequence. If Adaptive mode has been selected then the control will add and remove compressor stages to maintain the low and high demand leaving air set points.

If the load goes below the heating space temperature set points, the Heating mode will initiate. The economizer will be closed to the minimum position and (if the unit is equipped with gas or electric heat) the first stage of heat will be energized. If the space temperature goes below the High Load Space Temperature set point then the control will turn on the second stage of heat. If the unit is equipped with a staged gas heat control option then the low load and high load demand signal will control the Leaving Air Temperature set point and will turn on heating stages to maintain the Leaving Air Temperature set points.

If the unit is configured for unoccupied free cooling, mechanical cooling, or heating and the room temperature goes above or below the unoccupied configuration set points, then the unit control will turn on free cooling, mechanical cooling, or heat as needed to return room temperature within the unoccupied set points. When in this mode, the economizer dampers will be maintained fully closed or to the minimum unoccupied ventilation set point.

Variable Air Volume Control — On power up, the control module will activate the initialization software. The initialization software will determine the unit configuration and also initialize any controls loops and input/output devices. All alarms and configurations are saved in memory and maintained during power outages. All alarms will be maintained in memory and must be cleared through the Scrolling Marquee display.

The unit will first determine the mode of operation. If the unit has been configured for space temperature demand then the control will determine, based on the configurable set points, if the unit should be in the Heat mode, Vent mode or Cooling mode. If the unit is configured for return air temperature control, then the unit control will start the fan and monitor the return air temperature against the configurable set point to determine if the unit should be in cooling, vent or heating mode.

If the control is connected to a ComfortID™ system, the room terminals are equipped with microprocessor controls that give commands to the base module. If linkage is active, the control module will replace local *ComfortLink*™ set points and occupancy data with linkage supplied data.

If Temperature Compensated Start is active, then the unit control will start the unit in advance of the occupied time to pre-cool or heat the space. If the unit is configured to use a pre-purge cycle, then the control will start the unit in vent mode based on a pre-start time interval. If an IAQ (indoor air quality) sensor is being used and the low IAQ control point is satisfied then the mode will be terminated. The mode terminates when the occupied period starts.

If Cooling mode is required, then the controlling set point will be the Leaving Evaporator Air Temperature set point. If an economizer is present and the changeover control allows the economizer to be used, then the control will first attempt to control the leaving evaporator air temperature using free cooling. If this cannot satisfy the load then additional compressor stages will be turned on to maintain the leaving air temperature. When both compressors and the economizer are being used, the unit control will use the economizer dampers to maintain better control of the leaving air and to prevent high compressor cycling. If the economizer cannot be used, then it will be set to the minimum vent position.

If the unit is equipped with an optional hot gas bypass valve, then the unit control will use hot gas as an additional stage of capacity. When the first stage of cooling is required, the unit control will turn on the circuit A compressor and the hot gas bypass valve. When additional cooling is called for, the unit control will turn off the hot gas bypass valve. The valve will also be used for additional freeze protection of the coils when low evaporator refrigerant temperatures are detected using the suction pressure transducers.

The unit control will also monitor the supply duct pressure and send a 4 to 20 mA signal to the factory supplied inverter to control the speed of the fan to maintain the user-configured supply duct status pressure. If the *ComfortLink* control is on the CCN (Carrier Comfort Network) or a building linkage system, then the control also supports static pressure reset based on the needs of the zones.

If the unit has been enabled for occupied heat and if the space temperature sensor (SPT), return air temperature sensor (RAT), or CCN (in a building linkage system) demand requires that the unit be in Heating mode, then the unit control will energize the electric or gas heat to warm the space. In this mode, the unit control will energize the heat interlock relay (HIR). Note that for the linkage systems the interlock relay connection is not required. Once the mode is enabled, the unit control will use up to 2 stages of heat to control to the return air temperature set point. Heating will continue until the return temperature set point is satisfied. If the unit is configured for morning warm-up and the heating demand is below the set point during the first 10 minutes of operation, then the unit control will energize full heating capacity until the return air temperature set point is satisfied.

Gas Heat Unit Operation — The gas heat units incorporate 2 (3 on size 060) separate systems to provide gas heat. Each system incorporates its own induced-draft motor, Integrated Gas Control (IGC) board, 2-stage gas valve, manifold, and safeties. The systems are operated in parallel. For example, when there is a call for first stage heat, both induced-draft motors operate, both gas valves are energized, and both IGC boards initiate spark. All of the gas heating control is performed through the IGC boards (located in the heating section).

The MBB (Main Base Board) module board initiates and terminates heating operation and monitors the status of the requirements for indoor fan operation. The fan will be controlled directly by the MBB board.

When the thermostat or room sensor calls for heating, the MBB board will close heating relays and send power to W on each of the IGC boards. An LED on the IGC board will be on during normal operation. A check is made to ensure that the rollout switches and limit switches are closed and the induced-draft motors are not running. After the induced-draft motors are energized and speed is proven with the Hall Effect sensor on the motor, the ignition activation period begins. The burners will ignite within 5 seconds. When ignition occurs the IGC board will continue to monitor the condition of the rollout and limit switches, the Hall Effect sensor and the flame sensor.

If the unit is controlled through a room thermostat set for fan auto., 45 seconds after ignition occurs the indoor-fan motor will be energized and the outdoor-air dampers will open to their minimum position. If the over-temperature limit opens prior to the start of the indoor-fan blower, on the next attempt the 45-second delay will be shortened to 5 seconds less than the time from initiation of heat to when the limit tripped. Gas will not be interrupted to the burners and heating will continue. Once modified, the fan on delay will not change back to 45 seconds unless power is reset to the control.

If the unit is controlled through a room sensor, the indoor fan will operate in the occupied mode and the outdoor-air dampers will be at the minimum position. In the unoccupied mode, the indoor fan will be energized through the IGC board with a 45-second delay and the outside-air dampers will move to the minimum unoccupied set point.

When additional heat is required, the second stage MBB output relay closes and initiates power to the second stage of all main gas valves in all sections. When the demand is satisfied, MBB heat output relays will open and the gas valves close interrupting the flow of gas to the main burners.

If the call for stage 1 heat lasts less than 1 minute, the heating cycle will not terminate until 1 minute after W1 became active. If the unit is configured for intermittent fan then the indoor-fan motor will continue to operate for an additional 45 seconds then stop and the outdoor-air dampers will close. If the over temperature limit opens after the indoor motor is stopped within 10 minutes of W1 becoming inactive, on the next cycle the time will be extended by 15 seconds. The maximum delay is 3 minutes. Once modified, the fan off delay will not change back to 45 seconds unless power is reset to the control.

Indoor Air Quality — The Indoor Air Quality (IAQ) function provides a demand-based control for ventilation air quantity, by providing a modulating outside air damper position that is proportional to space CO₂ level. The ventilation damper position is varied between a minimum ventilation level (based on internal sources of contaminants and CO₂ levels other than the effect of people) and the maximum design ventilation level (determined at maximum populated status in the building). During a less-than-fully populated space period, the CO₂ level will be lower than maximum design ventilation level at full-load design condition, thus less ventilation air will be required. Reduced quantities of ventilation air will result in reduced operating costs. Space CO₂ level is monitored and compared to user-configured set points. An accessory CO₂ sensor for space (or return duct mounting) is required. The IAQ routine can be enhanced by also installing a sensor for Outdoor Air Quality (OAQ).

During the occupied period in the absence of a demand for cooling using outside air, if CO₂ level is below the set point for the minimum ventilation level, the outside-air damper will be opened to and maintained at the minimum ventilation level damper position set point.

When the space CO₂ level exceeds set point for the minimum ventilation level condition, the *ComfortLink*[™] control will begin to open the outside air damper position to admit more ventilation air and remove the additional contaminants. As the space CO₂ level approaches the set point for maximum design ventilation level condition, the outside air damper position will reach the maximum ventilation level damper position set point limit. Damper position will be modulated in a directly proportional relationship between these two CO₂ set point limits and their corresponding damper position limits.

In most applications a fixed reference value can be set for the outdoor air quality level, but the control also supports the addition of an outside air quality sensor that will then be compared to the indoor or return IAQ sensor. If an OAQ sensor is connected, the demand set point levels will be adjusted automatically as the outdoor CO₂ levels vary. Also, if the outdoor CO₂ level exceeds a user-configured maximum limit value, then outside air damper position will be limited to the minimum ventilation damper set point value. The unit control can also receive these signals through the Carrier Comfort Network (CCN).

The IAQ and OAQ measurement levels are displayed by the *ComfortLink*[™] control in parts per million (PPM).

INPUT/OUTPUT CHANNEL DESIGNATIONS — MAIN BASE BOARD (MBB)

| POINT NAME | POINT DESCRIPTION | TYPE OF I/O | I/O POINT NAME | CONNECTOR PIN NO. | SIGNAL PIN(S) | STATE vs CONTROL | PORT DESIGNATION | POINT INTERPRETATION |
|----------------|---|------------------|----------------|-------------------|--|----------------------------|------------------|--|
| INPUTS | | | | | | | | |
| GAS/FAN | YAC Indoor Fan relay (fan request from YAC) | Switch Input | D11 | J6, 3-4 | 4 | 0 = 24vac, 1 = 0vac | P7.1 | 0vac=YAC fan OFF 24vac=YAC fan ON |
| FSD | Fire Shutdown switch input | Switch Input | D12 | J6, 5-6 | 6 | 0 = 24vac, 1 = 0vac | P7.2 | switch, programmable sense |
| G | Thermostat 'G' input / Remote Occupied | Switch Input | D13 | J7, 1-2 | 2 | 0 = 24vac, 1 = 0vac | P7.3 | 0vac=no G, unoccupied 24vac=G, occupied |
| W1 | Thermostat 'W1' input | Switch Input | D14 | J7, 3-4 | 4 | 0 = 24vac, 1 = 0vac | P7.4 | 0vac=no W1 24vac=W1 |
| W2 | Thermostat 'W2' input | Switch Input | D15 | J7, 5-6 | 6 | 0 = 24vac, 1 = 0vac | P7.5 | 0vac=no W2 24vac=W2 |
| Y1 | Thermostat 'Y1' input | Switch Input | D16 | J7, 7-8 | 8 | 0 = 24vac, 1 = 0vac | P7.6 | 0vac=no Y1 24vac=Y1 |
| Y2 | Thermostat 'Y2' input | Switch Input | D17 | J9, 9-10 | 10 | 0 = 24vac, 1 = 0vac | P7.7 | 0vac=no Y2 24vac=Y2 |
| CSB_A1 | Compressor A1 current sensor | Switch Input | DIG1 | J9, 10-12 | 10=5v, 11=Vin, 12=GND | 0 = 5vdc, 1 = 0vdc | PA.6 | low=no current, 50/60Hz pulse=current, high=bad sensor |
| CSB_A2 | Compressor A2 current sensor | Digital Input | DIG2 | J9, 7-9 | 7=5v, 8=Vin, 9=GND | 0 = 5vdc, 1 = 0vdc | PA.5 | low=no current, 50/60Hz pulse=current, high=bad sensor |
| CSB_B1 | Compressor B1 current sensor | Digital Input | DIG3 | J9, 4-6 | 4=5v, 5=Vin, 6=GND | 0 = 5vdc, 1 = 0vdc | PA.4 | low=no current, 50/60Hz pulse=current, high=bad sensor |
| CSB_B2 | Compressor B2 current sensor | Digital Input | DIG4 | J9, 1-3 | 1=5v, 2=Vin, 3=GND | 0 = 5vdc, 1 = 0vdc | PA.7 | low=no current, 50/60Hz pulse=current, high=bad sensor |
| DP_A / SCTA | Circuit A saturated condensing temperature | 5 K Thermistor | AN1 | J8, 21-23 | 21=5v, 22=Vin, 23=GND (thermistor 21-22) | (0-5VDC, thermistor, ohms) | AIN 0 | 0-5VDC transducer |
| DP_B / SCTB | Circuit B saturated condensing temperature | 5 K Thermistor | AN2 | J8, 24-26 | 24=5v, 25=Vin, 26=GND (thermistor 24-25) | (0-5VDC, thermistor, ohms) | AIN 1 | 0-5VDC transducer |
| SP_A / SSTA | Circuit A saturated suction pressure | Press Transducer | AN3 | J8, 15-17 | 15=5v, 16=Vin, 17=GND (thermistor 15-16) | (0-5VDC, thermistor, ohms) | AIN 2 | 10K thermistor |
| SP_B / SSTB | Circuit B saturated suction pressure | Press Transducer | AN4 | J8, 18-20 | 18=5v, 19=Vin, 20=GND (thermistor 18-20) | (0-5VDC, thermistor, ohms) | AIN 3 | 10K thermistor |
| RAT | Return air temperature | 10K Thermistor | AN5 | J8, 9-10 | 9 | (thermistor, ohms) | AIN 4 | 10K thermistor |
| EDT | Evaporator Discharge Air Temperature | 10K Thermistor | AN6 | J8, 11-12 | 11 | (thermistor, ohms) | AIN 5 | 10K thermistor |
| OMT | Outdoor air temperature | 10K Thermistor | AN7 | J8, 13-14 | 13 | (thermistor, ohms) | AIN 6 | 10K thermistor |
| SPT | Space temperature (T55/56) | 10K Thermistor | AN8 | J8, 1-2 | 1 | (thermistor, ohms) | AIN 7 | 10K thermistor (T55 curve) |
| SPTO | Space temperature offset (T56) | 10K Thermistor | AN9 | J8, 3-4 | 3 | (thermistor, ohms) | AIN 8 | 100K Pot (T56 slider) |
| IAQ_IAGMINOV | IAQ analog input | 4-20 ma | AN10 | J8, 5-6 | 5 | (thermistor, ohms) | AIN 9 | multi-use 4-20mA with resistor |
| FLTS | Filter Status | Switch Input | AN11 | J8, 7-8 | 7 | (thermistor, ohms) | AIN 10 | gold-plated switch, programmable sense |
| OUTPUTS | | | | | | | | |
| CMPB2 | Compressor B2 | Relay | RLY 1 | J10, 20-21 | 20 = RLY1A (=RLY2A), 21 = RLY1B | 1 = Closes RLY1A / RLY1B | P6.0 | 0-compressor OFF 1-compressor ON |
| CMPB1 | Compressor B1 | Relay | RLY 2 | J10, 22-23 | 22 = RLY2A (=RLY1A), 23 = RLY2B | 1 = Closes RLY2A / RLY2B | P6.1 | 0-compressor OFF 1-compressor ON |
| CMPA2 | Compressor A2 | Relay | RLY 3 | J10, 24-25 | 24 = RLY3A (=RLY4A), 25 = RLY3B | 1 = Closes RLY3A / RLY3B | P6.2 | 0-compressor OFF 1-compressor ON |
| CMPA1 | Compressor A1 | Relay | RLY 4 | J10, 26-27 | 26 = RLY4A (=RLY3A), 27 = RLY4B | 1 = Closes RLY4A / RLY4B | P6.0 | 0-compressor OFF 1-compressor ON |
| COND/FANB | Condenser fan B | Relay | RLY 5 | J10, 10-11 | 10 = RLY5A (=RLY6A), 11 = RLY5B | 1 = Closes RLY5A / RLY5B | PB.1 | 0=fan OFF 1=fan ON |
| COND/FANA | Condenser fan A | Relay | RLY 6 | J10, 12-13 | 12 = RLY6A (=RLY5A), 13 = RLY6B | 1 = Closes RLY6A / RLY6B | PB.2 | 0=fan OFF 1=fan ON |
| HS2 | Heat stage 2 | Relay | RLY 7 | J10, 14-16 | 14 = 15 = RLY7A, 16 = RLY7B | 1 = Closes RLY7A / RLY7B | PB.3 | 0=stage OFF 1=stage ON |
| HS1 | Heat stage 1 | Relay | RLY 8 | J10, 17-19 | 17 = 18 = RLY8A, 19 = RLY8B | 1 = Closes RLY8A / RLY8B | PB.4 | 0=stage OFF 1=stage ON |
| HIR | Heat interlock relay | Relay | RLY 9 | J10, 4-6 | 4 = 5 = RLY9A, 6 = RLY9B | 1 = Closes RLY9A / RLY9B | PB.5 | 0=relay OFF 1=relay ON |
| SF | Supply fan | Relay | RLY 10 | J10, 7-9 | 7 = 8 = RLY10A, 9 = RLY10B | 1 = Closes RLY10A / RLY10B | PB.6 | 0=fan OFF 1=fan ON |
| ALRM | Alarm output relay | Relay | RLY 11 | J10, 1-3 | 1 = 2 = RLY11A, 3 = RLY11B | 1 = Closes RLY11A / RLY11B | PB.7 | 0=relay OFF 1=relay ON |

INPUT/OUTPUT CHANNEL DESIGNATIONS — ECONOMIZER CONTROL BOARD (ECB1)

| POINT NAME | POINT DESCRIPTION | I/O TYPE | I/O POINT NAME | CONNECTOR PIN NO. | SIGNAL PIN(S) | PORT STATE DETAIL | PORT DESIGNATION | POINT INTERPRETATION |
|----------------|---------------------------------------|----------|----------------|-------------------|------------------------------|--------------------------|------------------|------------------------------|
| INPUTS | | | | | | | | |
| RMITIN | Remote occupancy | Switch | D11 | J4, 1-2 | 2 | 24VAC = 1, 0VAC = 0 | P4.5 | programmable sense |
| ENTH | Economizer enable | Switch | D12 | J4, 3-4 | 4 | 24VAC = 1, 0VAC = 0 | P4.4 | programmable sense |
| RARH | Return air relative humidity | 4-20ma | AN1 | J5, 1-3 | 1=24VDC, 2=0-20mA in, 3=GND | 0-20mA | AN5 | 4-20mA sensor |
| QARH | Outdoor air relative humidity | 4-20ma | AN2 | J5, 4-6 | 4=24VDC, 5=0-20mA in, 6=GND | 0-20mA | AN4 | 4-20mA sensor |
| OUTPUTS | | | | | | | | |
| ECONOCMD | Economizer actuator (analog control) | 4-20 ma | A01 | J9, 1-2 | 1=0-20mA, 2=GND | 0-20mA OUT | P7.7/DA1 | 4mA=0%, 20mA=100% |
| ECONOCMD | Economizer actuator (digital control) | digital | PP/MP | J7, 1-3 | 1=PP/MP Data, 2=24VAC, 3=GND | Belimo PP/MP Protocol | | actuator control via PP |
| PE_A | Power Exhaust stage A | relay | RLY1 | J8, 1-3 | 1 = 2 = RLY1A, 3 = RLY1B | 1 = Closes RLY1A / RLY1B | P2.0 | 0=stage OFF 1=stage ON |
| PE_B | Power Exhaust stage B | relay | RLY 2 | J8, 4-6 | 4 = 5 = RLY2A, 6 = RLY2B | 1 = Closes RLY2A / RLY2B | P2.1 | 0=stage OFF 1=stage ON |
| PE_C | Power Exhaust stage C | relay | RLY 3 | J8, 7-9 | 7 = 8 = RLY3A, 9 = RLY3B | 1 = Closes RLY3A / RLY3B | P2.2 | 0=stage OFF 1=stage ON |
| ECON_PWR | Economizer Power | relay | RLY 6 | J8, 16-18 | 16 = 17 = RLY6A, 18 = RLY6B | 1 = Closes RLY6A / RLY6B | P2.5 | 0=actuator OFF 1=actuator ON |

INPUT/OUTPUT CHANNEL DESIGNATIONS — VAV CONTROL BOARD (ECB2)

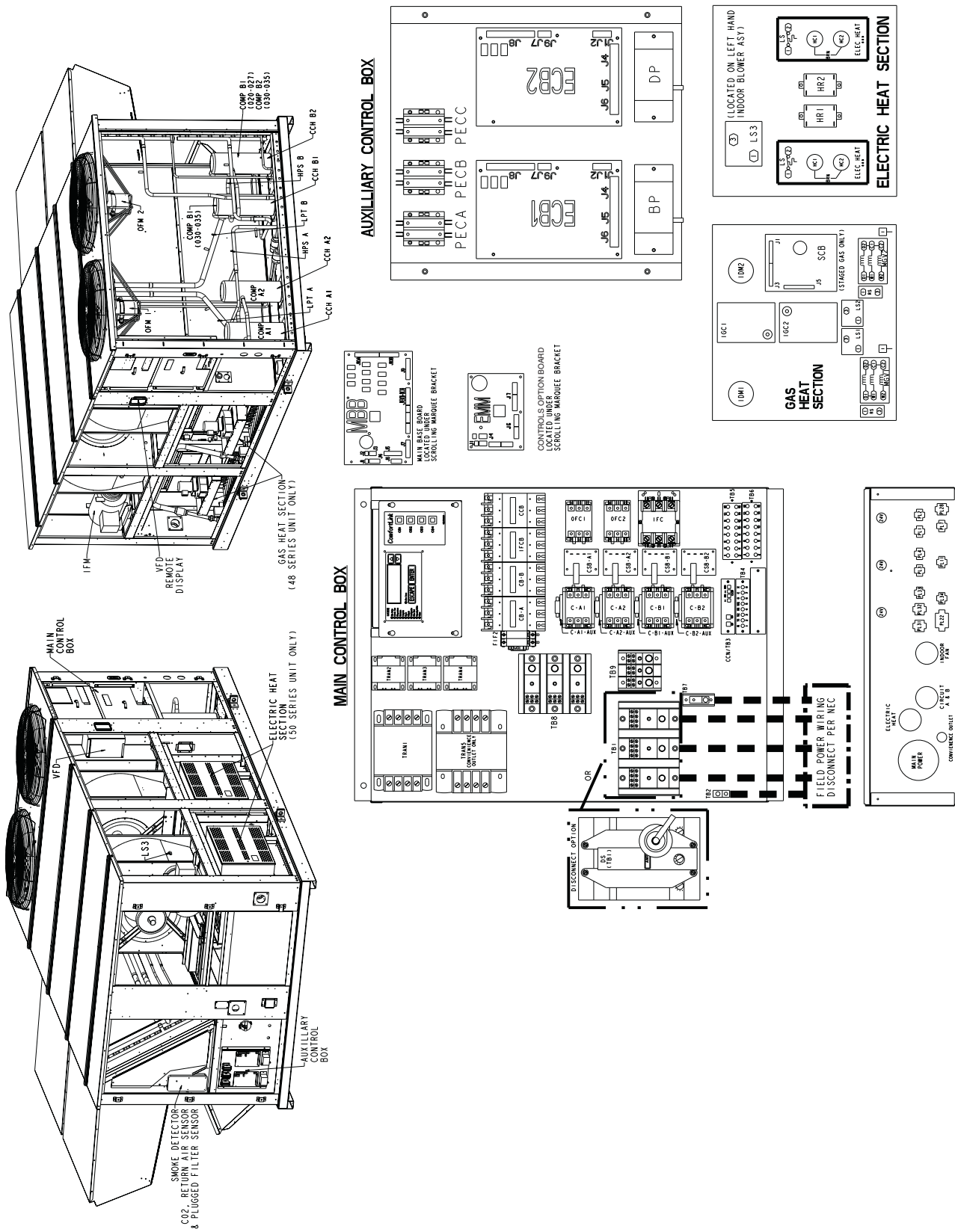
| POINT NAME | POINT DESCRIPTION | I/O TYPE | I/O POINT NAME | CONNECTOR PIN NO. | SIGNAL PIN(S) | PORT STATE DETAIL | PORT DESIGNATION | POINT INTERPRETATION |
|-----------------------------|-------------------|----------|----------------|-------------------|------------------------------|--------------------------|------------------|----------------------------------|
| INPUTS | | | | | | | | |
| not used | | | DI1 | J4, 1-2 | 2 | 24VAC = 1, 0VAC = 0 | P4.5 | |
| not used | | | DI2 | J4, 3-4 | 4 | 24VAC = 1, 0VAC = 0 | P4.4 | |
| Building static pressure | | 4-20 ma | AN1 | J5, 1-3 | 1=24VDC, 2=0-20mA in, 3=GND | 0-20mA | AN5 | 4-20mA pressure transmitter |
| Supply Duct static pressure | | 4-20 ma | AN2 | J5, 4-6 | 4=24VDC, 5=0-20mA in, 6=GND | 0-20mA | AN4 | 4-20mA pressure transmitter |
| OUTPUTS | | | | | | | | |
| Supply Fan Inverter speed | | 4-20 ma | AO1 | J9, 1-2 | 1=0-20mA, 2=GND | 0-20mA OUT | P7.7/DA1 | 4mA=0Hz 20mA=max Hz |
| not used | | | PP/MP | J7, 1-3 | 1=PP/MP Data, 2=24VAC, 3=GND | Belimo PP/MP Protocol | | |
| not used | | | RLY1 | J8, 1-3 | 1 = 2 = RLY1A, 3 = RLY1B | | P2.0 | 0=PE stage 4 OFF 1=PE stage 4 ON |
| not used | | | RLY2 | J8, 4-6 | 4 = 5 = RLY2A, 6 = RLY2B | 1 = Closes RLY2A / RLY2B | P2.1 | 0=PE stage 5 OFF 1=PE stage 5 ON |
| not used | | | RLY3 | J8, 7-9 | 7 = 8 = RLY3A, 9 = RLY3B | 1 = Closes RLY3A / RLY3B | P2.2 | 0=PE stage 6 OFF 1=PE stage 6 ON |
| Hot Gas Bypass Valve | | relay | RLY 6 | J8, 16-18 | 16 = 17 = RLY6A, 18 = RLY6B | 1 = Closes RLY6A / RLY6B | P2.5 | |

INPUT/OUTPUT CHANNEL DESIGNATIONS — STAGED HEAT CONTROL BOARD

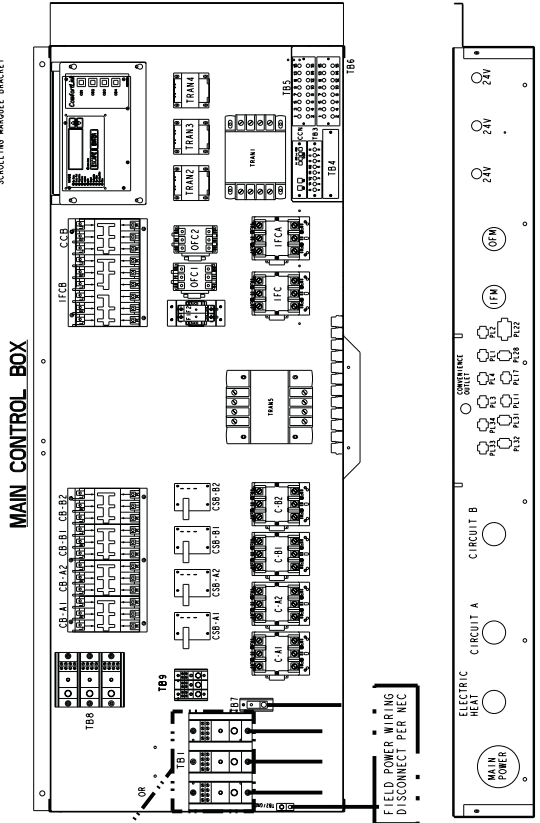
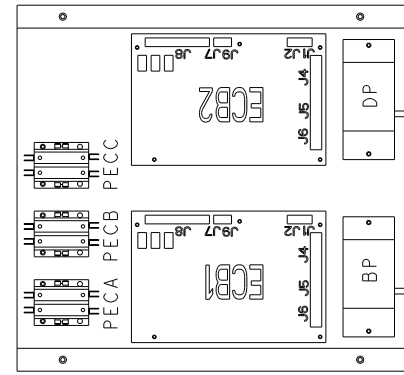
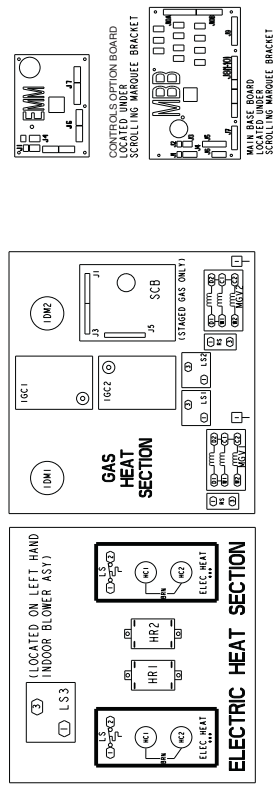
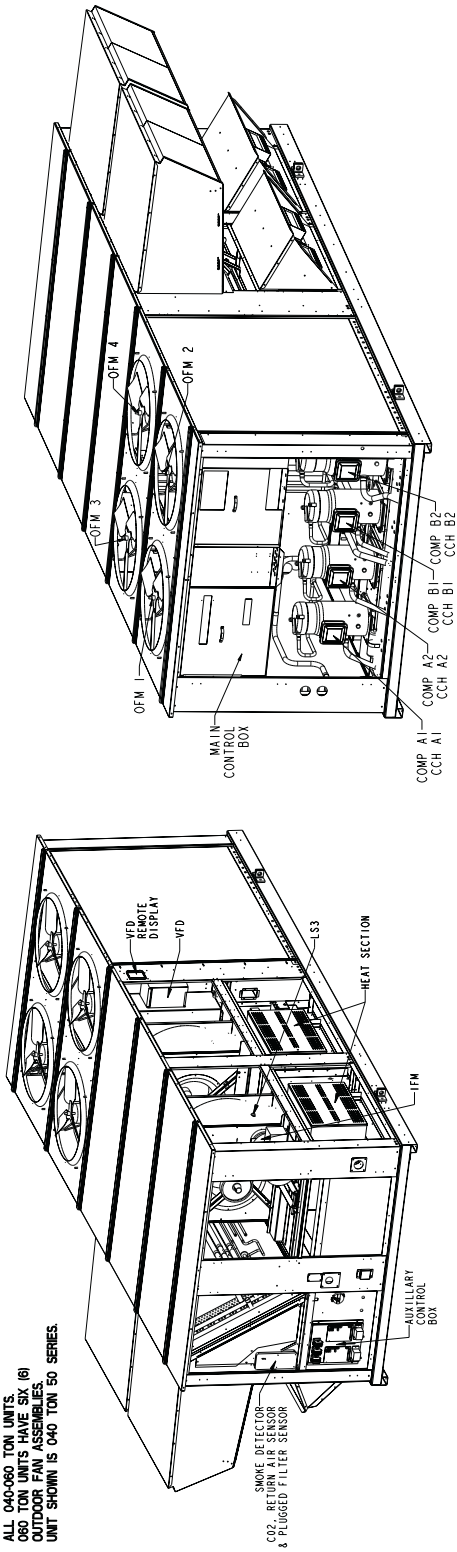
| POINT NAME | POINT DESCRIPTION | I/O TYPE | I/O POINT NAME | CONNECTOR PIN NO. | SIGNAL PIN(S) | PORT STATE DETAIL | PORT DESIGNATION | POINT INTERPRETATION |
|--------------------------|-------------------|----------------|----------------|-------------------|--|----------------------------|------------------|------------------------|
| INPUTS | | | | | | | | |
| not used | | | AN1 | J5, 1-3 | 1=5v, 2=Vin, 3=GND (thermistor 1-2) | (0-5VDC, thermistor, ohms) | U12.AIN0 | |
| not used | | | AN2 | J5, 4-6 | 4=5v, 5=Vin, 6=GND (thermistor 4-5) | (0-5VDC, thermistor, ohms) | U12.AIN1 | |
| Supply air temperature 1 | | 10K thermistor | AN3 | J5, 7-9 | 7=5v, 8=Vin, 9=GND (thermistor 7-8) | (0-5VDC, thermistor, ohms) | U12.AIN2 | 10K thermistor |
| Supply air temperature 2 | | 10K thermistor | AN4 | J5, 10-12 | 10=5v, 11=Vin, 12=GND (thermistor 10-11) | (0-5VDC, thermistor, ohms) | U12.AIN3 | 10K thermistor |
| Supply air temperature 3 | | 10K thermistor | AN5 | J5, 13-15 | 13=5v, 14=Vin, 15=GND (thermistor 13-14) | (0-5VDC, thermistor, ohms) | U12.AIN4 | 10K thermistor |
| not used | | | AN6 | J6, 1-3 | 1=5v, 2=Vin, 3=GND (thermistor 1-2) | (0-5VDC, thermistor, ohms) | U12.AIN5 | |
| not used | | | AN7 | J6, 4-6 | 4=5v, 5=Vin, 6=GND (thermistor 4-5) | (0-5VDC, thermistor, ohms) | U12.AIN6 | |
| not used | | | AN8 | J6, 7-9 | 7=5v, 8=Vin, 9=GND (thermistor 7-8) | (0-5VDC, thermistor, ohms) | U12.AIN7 | |
| not used | | | AN9 | J7, 1-2 | 1 | (thermistor, ohms) | U12.AIN8 | |
| not used | | | AN10 | J7, 3-4 | 3 | (thermistor, ohms) | U12.AIN9 | |
| OUTPUTS | | | | | | | | |
| not used | | | AO1 | J8, 1-2 | 1=0-20mA, 2=GND | 0-20mA OUT | U7, P1-4 | |
| not used | | | AO2 | J8, 3-4 | 3=0-20mA, 4=GND | 0-20mA OUT | U7, P7-6 | |
| Heat Stage 3 | | Relay | RLY1 | J9, 1-3 | 1 = 2 = RLY1A, 3 = RLY1B | 1 = Closes RLY1A / RLY1B | U7, P8-5 | 0=stage OFF 1=stage ON |
| Heat Stage 4 | | Relay | RLY 2 | J9, 4-6 | 4 = 5 = RLY2A, 6 = RLY2B | 1 = Closes RLY2A / RLY2B | U7, P8-4 | 0=stage OFF 1=stage ON |
| Heat Stage 5 | | Relay | RLY 3 | J9, 7-9 | 7 = 8 = RLY3A, 9 = RLY3B | 1 = Closes RLY3A / RLY3B | U7, P8-3 | 0=stage OFF 1=stage ON |
| Heat Stage 6 | | Relay | RLY 4 | J9, 10-12 | 10 = 11 = RLY4A, 12 = RLY4B | 1 = Closes RLY4A / RLY4B | U7, P8-2 | 0=stage OFF 1=stage ON |
| | | | RLY 5 | J9, 13-15 | 13 = 14 = RLY5A, 15 = RLY5B | 1 = Closes RLY5A / RLY5B | U7, P8-1 | 0=stage OFF 1=stage ON |

INPUT/OUTPUT CHANNEL DESIGNATIONS — CONTROLS OPTION BOARD

| POINT NAME | POINT DESCRIPTION | TYPE OF I/O | I/O POINT NAME | CONNECTOR PIN NO. | SIGNAL PIN(S) | STATE vs CONTROL | PORT DESIGNATION | POINT INTERPRETATION |
|---------------|------------------------------------|-------------|----------------|-------------------|----------------------|---------------------|------------------|----------------------|
| INPUTS | | | | | | | | |
| SFS | Supply Fan Status switch | Switch | DI1 | J7, 1-2 | 2 | 0 = 24vac, 1 = 0vac | P8.0 | |
| DMD SW1 | Demand Limit - Redline | Switch | DI2 | J7, 3-4 | 4 | 0 = 24vac, 1 = 0vac | P8.1 | |
| DMD SW2 | Demand Limit - Load Shed | Switch | DI3 | J7, 5-6 | 6 | 0 = 24vac, 1 = 0vac | P8.2 | |
| PRIS | Fire Pressurization | Switch | DI4 | J7, 7-8 | 8 | 0 = 24vac, 1 = 0vac | P8.3 | |
| EVAC | Fire Evacuation | Switch | DI5 | J7, 9-10 | 10 | 0 = 24vac, 1 = 0vac | P8.4 | |
| PURG | Smoke Purge | Switch | DI6 | J7, 11-12 | 12 | 0 = 24vac, 1 = 0vac | P8.5 | |
| IAGIN | Indoor Air Quality Override Switch | Switch | DI7 | J7, 13-14 | 14 | 0 = 24vac, 1 = 0vac | P8.6 | |
| OACFM | Outside Air CFM | 4-20 ma | AN7 | J6, 1-3 | 2 (1 = loop power) | (0-20mA input) | AIN 9 | |
| DMDLITMA | 4-20mA Demand Limit | 4-20 ma | AN8 | J6, 4-6 | 5 (4 = loop power) | (0-20mA input) | AIN 8 | |
| SATRESMA | 4-20mA Supply Air Setpoint | 4-20 ma | AN9 | J6, 7-9 | 8 (7 = loop power) | (0-20mA input) | AIN 7 | |
| OAQ | Outside Air CO2 Sensor | 4-20 ma | AN10 | J6, 10-12 | 11 (10 = loop power) | (0-20mA input) | AIN 6 | |
| Not used | | | AN1 | J5, 1-2 | 1 | (thermistor, ohms) | AIN 5 | |
| Not used | | | AN2 | J5, 3-4 | 3 | (thermistor, ohms) | AIN 4 | |
| Not used | | | AN3 | J5, 5-6 | 5 | (thermistor, ohms) | AIN 3 | |
| Not used | | | AN4 | J5, 7-8 | 7 | (thermistor, ohms) | AIN 2 | |
| Not used | | | AN5 | J5, 9-10 | 9 | (thermistor, ohms) | AIN 1 | |
| Not used | | | AN6 | J5, 11-12 | 11 | (thermistor, ohms) | AIN 0 | |



LOCATIONS ARE TYPICAL FOR ALL 040-060 TON UNITS. 060 TON UNITS HAVE SIX (6) OUTDOOR FAN ASSEMBLIES. UNIT SHOWN IS 040 TON 50 SERIES.



BOTTOM VIEW OF CONTROL BOX

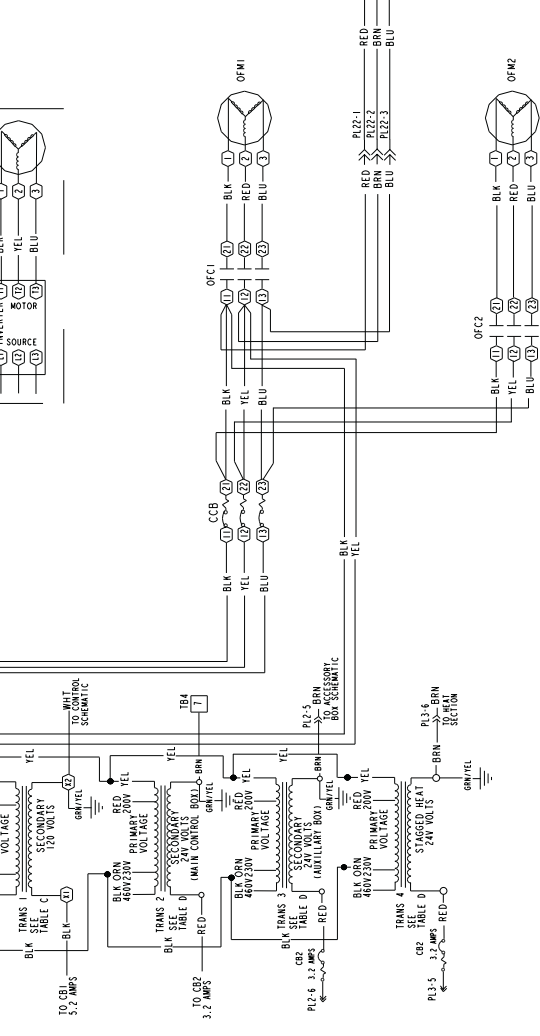
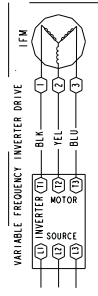
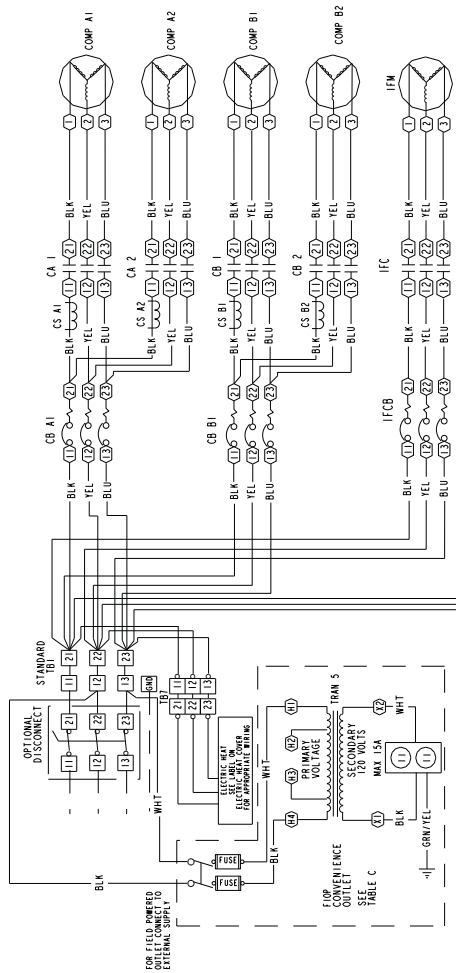
Fig. 2 — Component Arrangement — 48/50AJ,K,AW,A,Y040-060 Units

TABLE C

| 208-230/460V TRANSFORMER | CONNECT | H1 (BLK) | H2 (BLK) | H3 (BLK) | H4 (YEL) | X1 (BLK) | X2 (YEL) |
|---------------------------------------|---------|----------|----------|----------|----------|----------|----------|
| PRIMARY VOLTAGE: 460V 230V 208V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |
| 575V TRANSFORMER | | | | | | | |
| PRIMARY VOLTAGE: 575V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |
| 400V TRANSFORMER | | | | | | | |
| PRIMARY VOLTAGE: 400V 380V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |

TABLE D

| 208-230/460V TRANSFORMER | CONNECT | H1 (BLK) | H2 (BLK) | H3 (BLK) | H4 (YEL) | X1 (BLK) | X2 (YEL) |
|---------------------------------------|---------|----------|----------|----------|----------|----------|----------|
| PRIMARY VOLTAGE: 460V 230V 208V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |
| 575V TRANSFORMER | | | | | | | |
| PRIMARY VOLTAGE: 575V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |
| 400V TRANSFORMER | | | | | | | |
| PRIMARY VOLTAGE: 400V 380V | | | | | | | |
| SECONDARY VOLTAGE 24V | | | | | | | |



NOTE: 1. TRANSFORMER WIRING FOR SUPPLY VOLTAGES ARE SHOWN IN TABLE C & D. FOR 208/230 VOLT UNITS THE TRANSFORMERS ARE FACTORY WIRED FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.

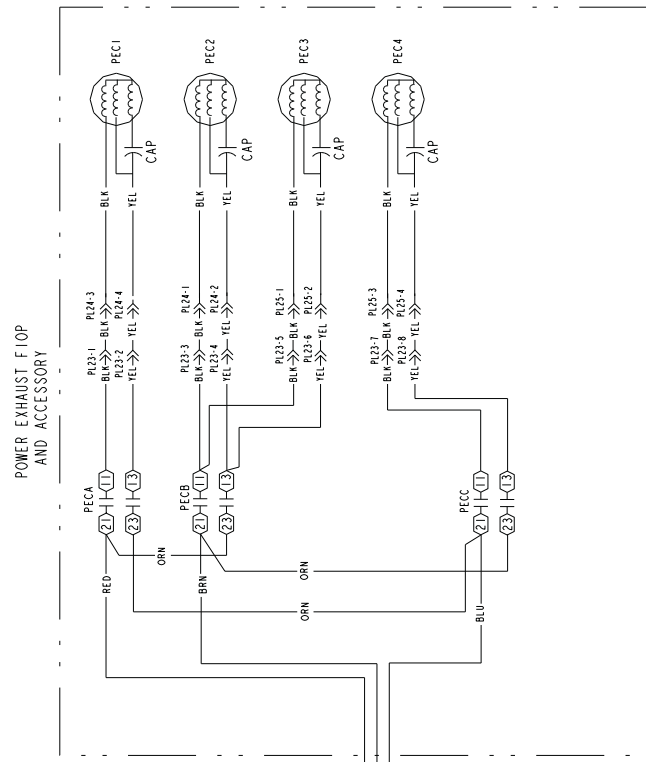


Fig. 4 — Power Schematic — 48/50AJ,AK,AW,AY030-035 Units

TABLE C

| 208-230/460V TRANSFORMER | CONNECT | 208-230/460V TRANSFORMER | CONNECT |
|--------------------------|--|--------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 208V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 230V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |

| 575V TRANSFORMER | CONNECT | 575V TRANSFORMER | CONNECT |
|------------------------|--|------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 575V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 575V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |

| 400V TRANSFORMER | CONNECT | 400V TRANSFORMER | CONNECT |
|------------------------|--|------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 400V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 400V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |

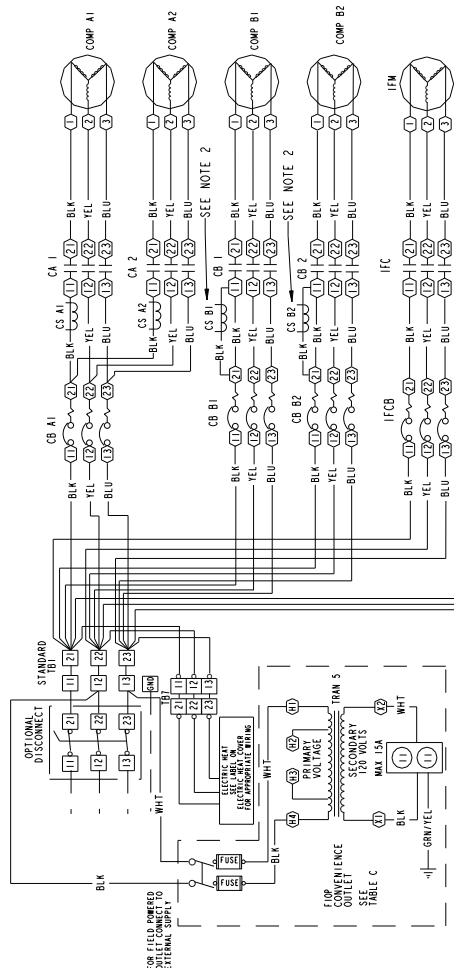
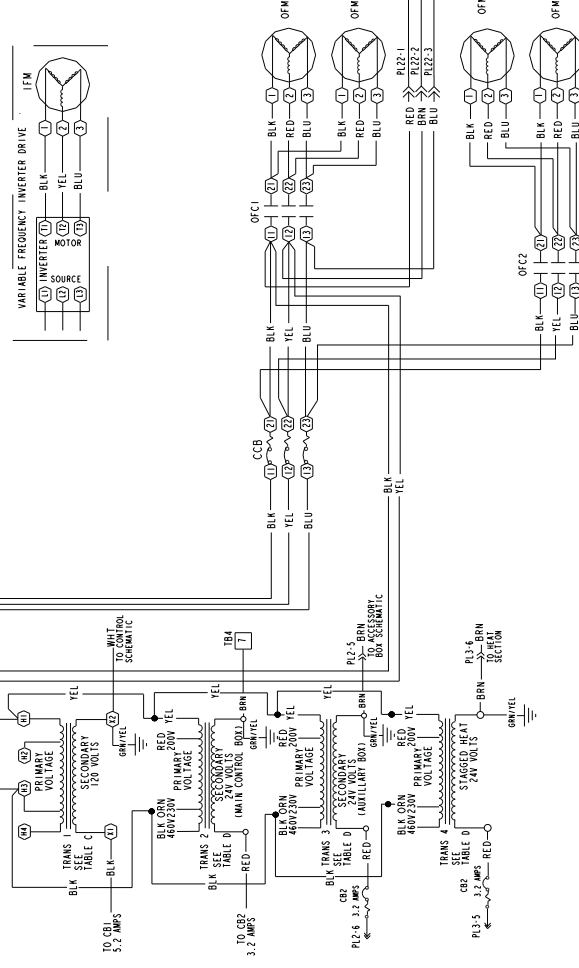


TABLE D

| 208-230/460V TRANSFORMER | CONNECT | 208-230/460V TRANSFORMER | CONNECT |
|--------------------------|--|--------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 208V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 230V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |

| 575V TRANSFORMER | CONNECT | 575V TRANSFORMER | CONNECT |
|------------------------|--|------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 575V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 575V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |

| 400V TRANSFORMER | CONNECT | 400V TRANSFORMER | CONNECT |
|------------------------|--|------------------------|-------------------------------------|
| PRIMARY VOLTAGE: 400V | H1 (BLK) H2 (BLK) H3 (BLK) H4 (YEL) | PRIMARY VOLTAGE: 400V | OR1 (ORN) OR2 (YEL) OR3 (YEL) |
| SECONDARY VOLTAGE 115V | X1 (BLK) X2 (YEL) | SECONDARY VOLTAGE 240V | X1 (BLK) X2 (YEL) |
| COMM | X3 (YEL) | COMM | X3 (YEL) |
| COMM | X4 (YEL) | COMM | X4 (YEL) |



NOTE: 1. TRANSFORMER WIRING FOR SUPPLY VOLTAGES ARE SHOWN IN TABLE C & D. FOR 208/230 VOLT UNITS THE TRANSFORMERS ARE FACTORY WIRED FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.
 2. ON 208/230 VOLT UNITS CS SENSORS SENSE CURRENT THROUGH CURRENT SENSING WIRE. CS SENSORS MUST BE WIRING TO THE BLACK WIRE. FOR OTHER VOLTAGES SENSOR WILL BE IN MAIN POWER LINE.

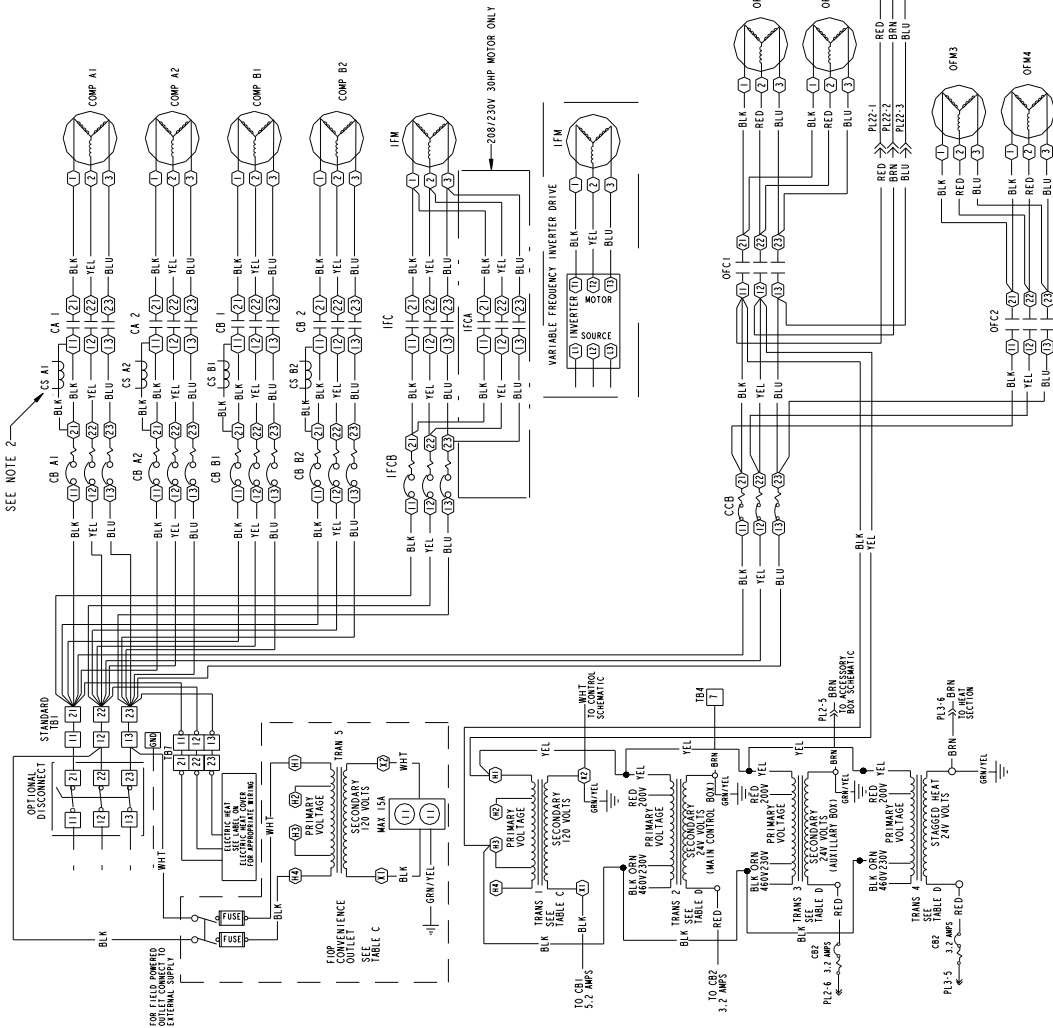
Fig. 5 — Power Schematic — 48/50AJ,AK,AW,AY040 Units

TABLE C

| | | | |
|--|---|--------------------------------------|---|
| 208-230V/460V TRANSFORMER PRIMARY VOLTAGE: 460V 208V 230V SECONDARY VOLTAGE 115V | CONNECT H1 (BLK) H2 (BLK) H3 (BLK) H4 (TEL) X1 (TEL) X2 (TEL) X3 (TEL) X4 (TEL) | 460V 230V 208V 115V COMM | CA 1 CA 2 CB 1 CB 2 IFC IFCB |
| 575V TRANSFORMER PRIMARY VOLTAGE: 575V SECONDARY VOLTAGE 24V | CONNECT H1 (BLK) H4 (TEL) X1 (BLK) X2 (TEL) X3 (TEL) | 575V 24V COMM | COMP A1 COMP A2 COMP B1 COMP B2 |
| 400V TRANSFORMER PRIMARY VOLTAGE: 400V 380V SECONDARY VOLTAGE 115V | CONNECT H1 (BLK) H2 (BLK) H3 (BLK) H4 (TEL) X1 (BLK) X2 (TEL) X3 (TEL) X4 (TEL) | 400V 380V 115V COMM | IFM VARIABLE FREQUENCY INVERTER DRIVE |

TABLE D

| | | | |
|---|--|-------------------------------------|------------------------------|
| 208-230V/460V TRANSFORMER PRIMARY VOLTAGE: 460V 208V 230V SECONDARY VOLTAGE 24V | CONNECT BLK RED YEL X1 (BLK) X2 (TEL) | 460V 230V 208V 24V COMM | PEC1 PEC2 PEC3 PEC4 |
| 575V TRANSFORMER PRIMARY VOLTAGE: 575V SECONDARY VOLTAGE 24V | CONNECT BLK YEL X1 (BLK) X3 (TEL) | 575V 24V COMM | |
| 400V TRANSFORMER PRIMARY VOLTAGE: 400V 380V SECONDARY VOLTAGE 24V | CONNECT BLK YEL X1 (BLK) X4 (TEL) | 400V 380V 24V COMM | |



NOTE: 1. TRANSFORMER WIRING FOR SUPPLY VOLTAGES ARE SHOWN IN TABLE D. FOR 208/230VOLT UNITS THE TRANSFORMERS ARE FACTORY WIRED FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.
 2. ON 208/230 VOLT UNITS CS SENSORS SENSE CURRENT THROUGH SMALLER GAGE WIRE RUN IN PARALLEL TO THE MAIN POWER BLACK WIRE. FOR OTHER VOLTAGES SENSOR WILL BE IN MAIN POWER LINE.

POWER EXHAUST FLOP AND ACCESSORY

Fig. 6 — Power Schematic — 48/50AJ,AK,AW,AY050 Units

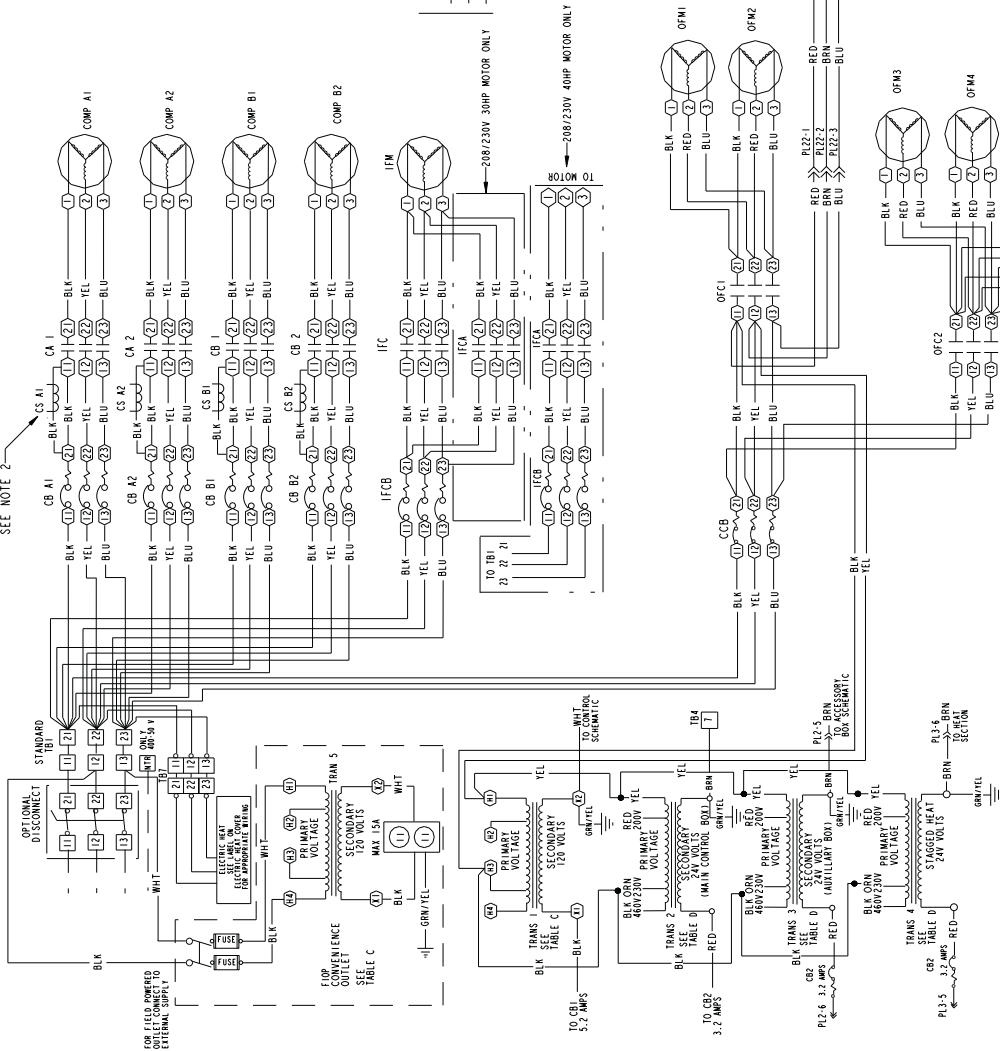
TABLE C

| 208-230V/480V TRANSFORMER | CONNECT | 480V | 115V | 01 |
|---------------------------|----------|----------|----------|----------|
| PRIMARY VOLTAGE: 480V | H1 (BLK) | 480V | H2 (BLK) | H3 (BLK) |
| SECONDARY VOLTAGE: 208V | COM1 | H4 (TEL) | H5 (BLK) | H6 (BLK) |
| SECONDARY VOLTAGE: 24V | X1 (BLK) | COM2 | H7 (TEL) | H8 (TEL) |
| | | | | COM3 |

| 575V TRANSFORMER | CONNECT | 575V | 115V | 01 |
|------------------------|----------|------|----------|----------|
| PRIMARY VOLTAGE: 575V | H1 (BLK) | 575V | H2 (BLK) | H3 (BLK) |
| SECONDARY VOLTAGE: 24V | X1 (BLK) | COM1 | H4 (TEL) | H5 (BLK) |
| | | | | COM2 |

| 400V TRANSFORMER | CONNECT | 400V | 115V | 01 |
|------------------------|----------|------|----------|----------|
| PRIMARY VOLTAGE: 400V | H1 (BLK) | 400V | H2 (BLK) | H3 (BLK) |
| SECONDARY VOLTAGE: 24V | X1 (BLK) | COM1 | H4 (TEL) | H5 (BLK) |
| | | | | COM2 |

SEE NOTE 2



POWER EXHAUST FLOP AND ACCESSORY

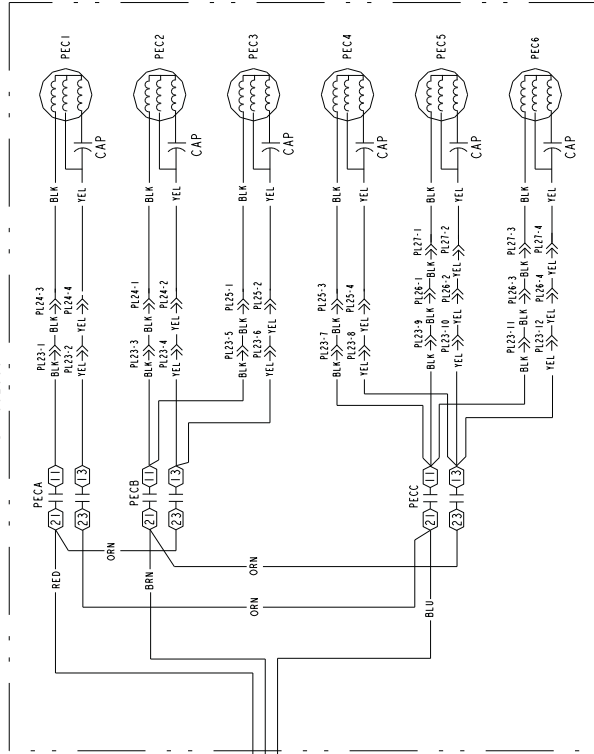
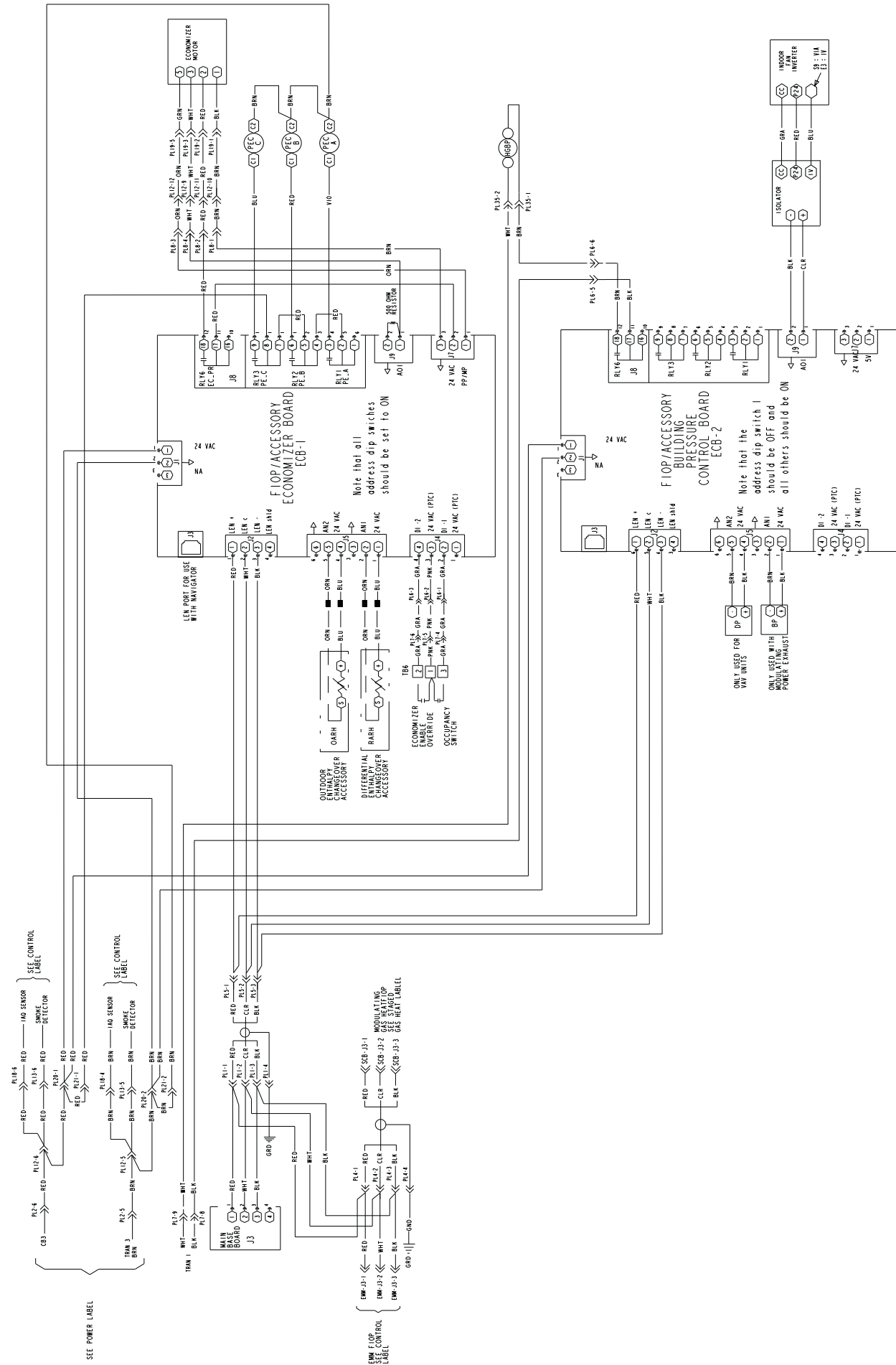


Fig. 7 — Power Schematic — 48/50AJ,AK,AW,AY060 Units

1. TRANSFORMER WINDING FOR SUPPLY VOLTAGES ARE SHOWN IN FACTORY WIRING. FOR 208/230V UNITS, WINDINGS ARE FACTORY WIRING FOR 230 VOLT AND MUST BE REWIRED IN THE FIELD FOR 208 VOLT APPLICATIONS.
2. ON 208/230 VOLT UNITS CS SENSORS SENSE CURRENT THROUGH SMALLER GAGE WIRE RUN IN PARALLEL TO THE MAIN POWER BLACK WIRE. FOR OTHER VOLTAGES SENSOR WILL BE IN MAIN POWER LINE.



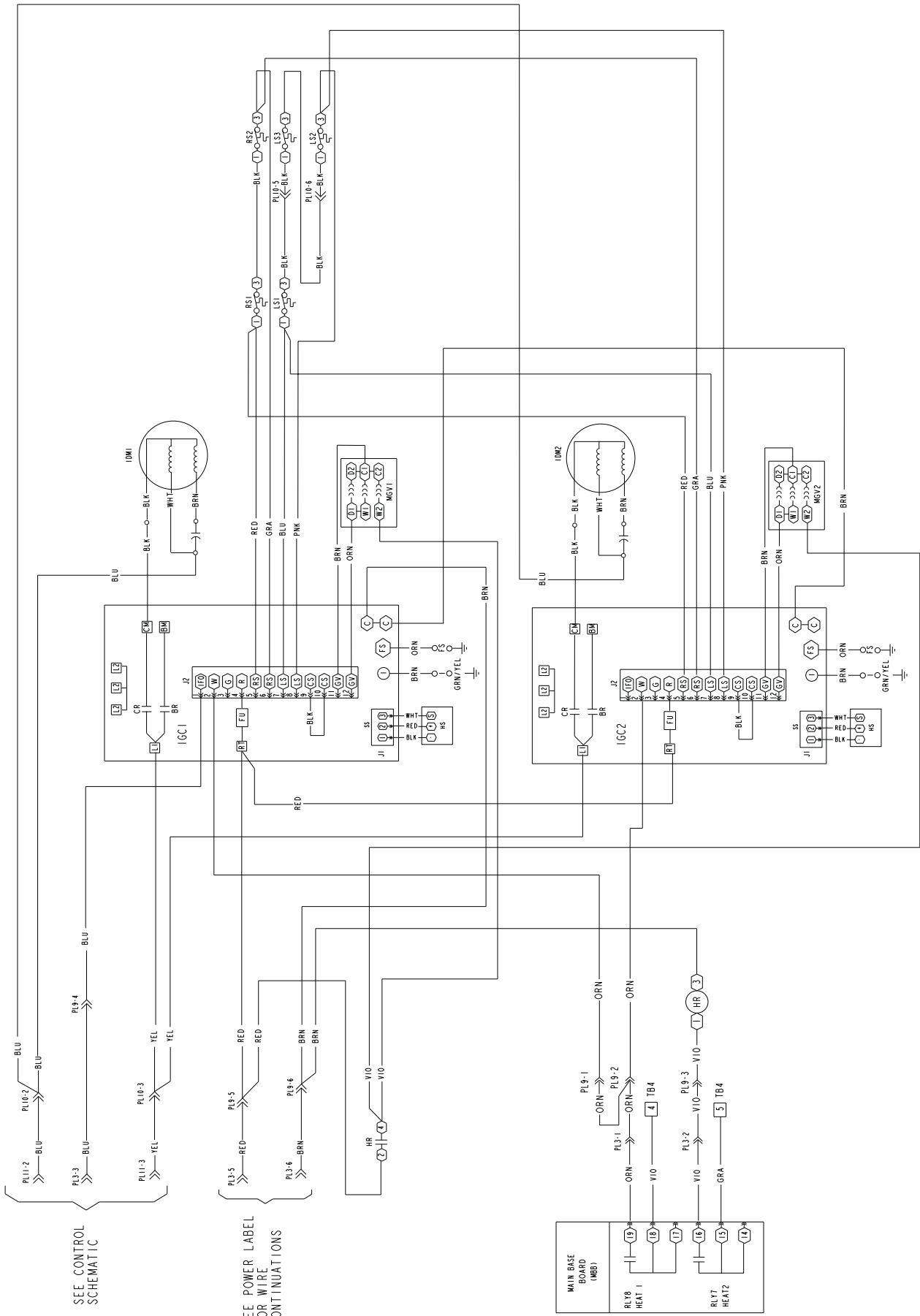


Fig. 11 — Gas Heat Control Circuit (2-Stage Heat) — 48/50AJ,A,K,AW,AY020-050 Units

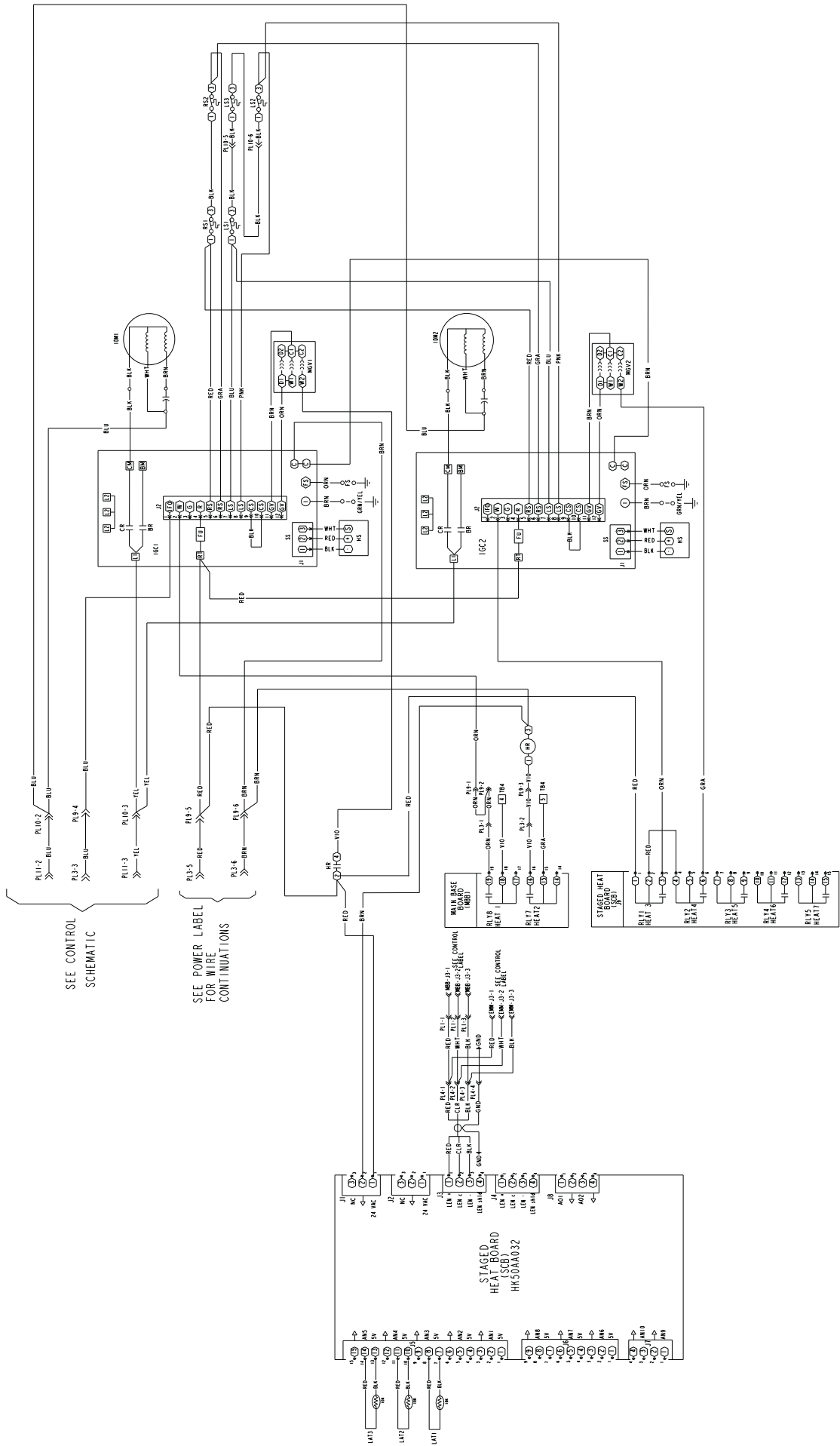
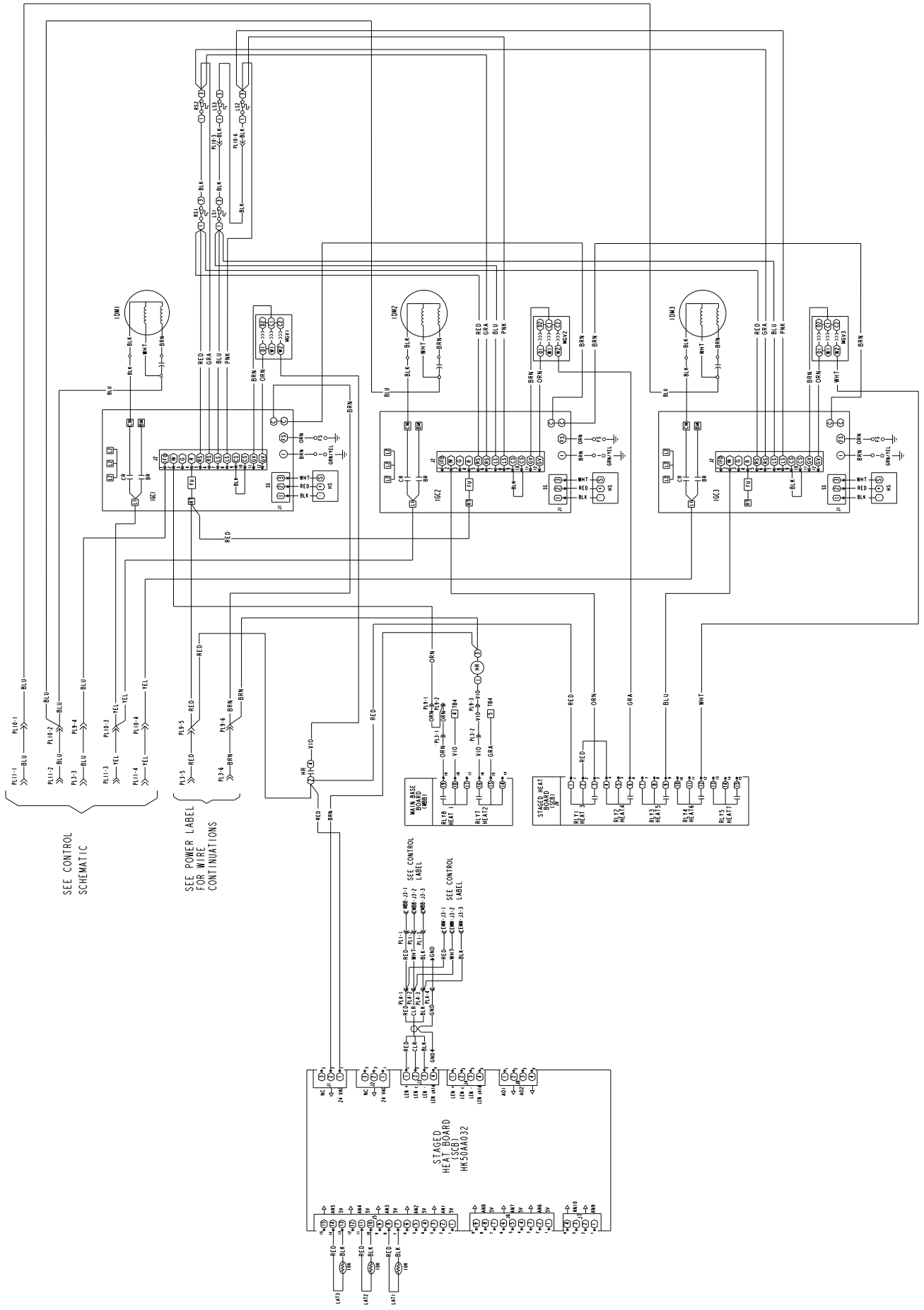


Fig. 13 — Gas Heat Control Circuit (Staged Gas Heat) — 48/50AJ,AW020-050 Units



SEE CONTROL SCHEMATIC

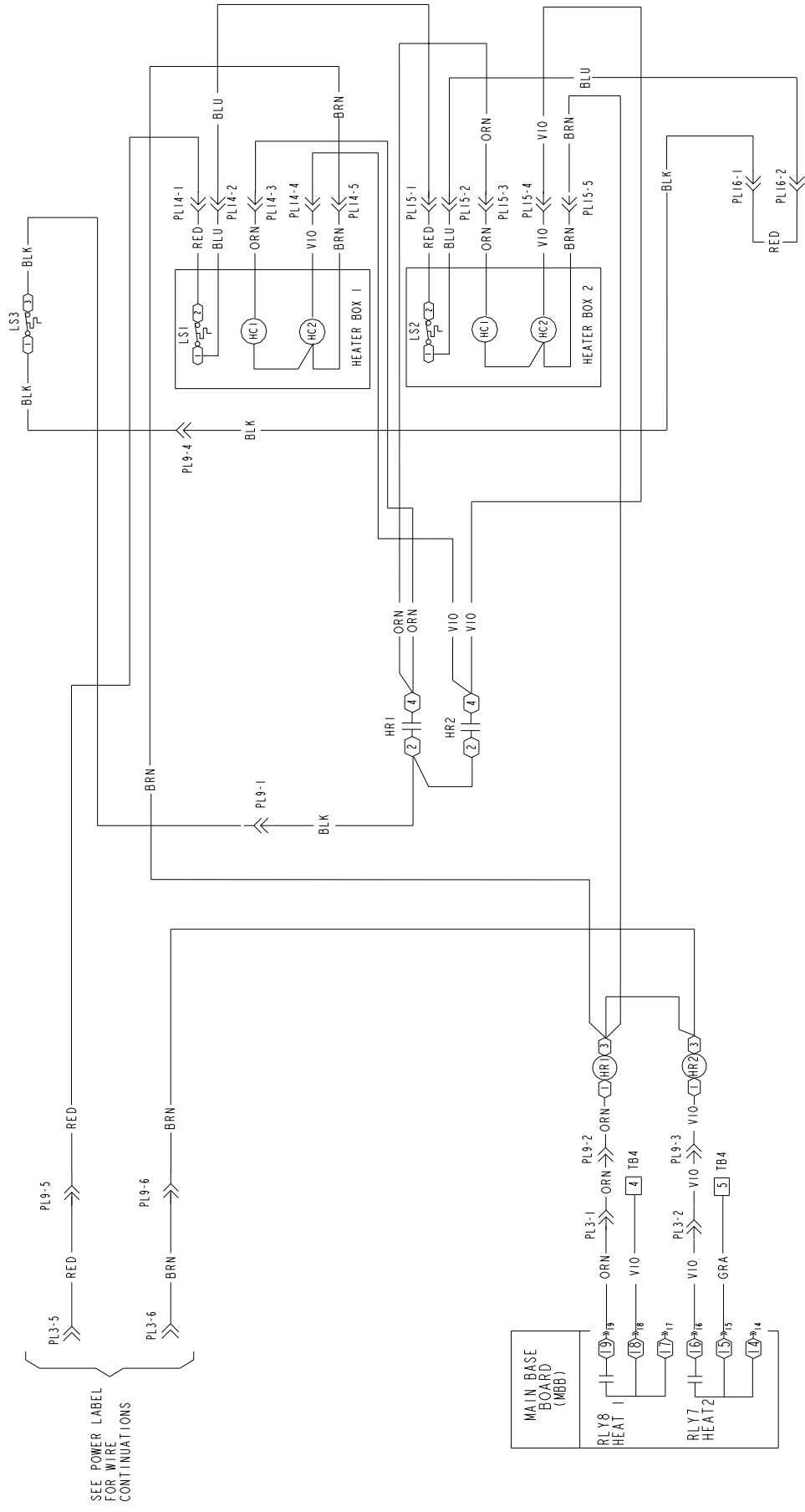
SEE POWER LABEL FOR WIRE CONTINUATIONS

MAIN RESE BOARD (MBB) R11-1 R11-2 R11-3 R11-4 R11-5 R11-6 R11-7 R11-8 R11-9 R11-10 R11-11 R11-12 R11-13 R11-14 R11-15 R11-16 R11-17 R11-18 R11-19 R11-20 R11-21 R11-22 R11-23 R11-24 R11-25 R11-26 R11-27 R11-28 R11-29 R11-30 R11-31 R11-32 R11-33 R11-34 R11-35 R11-36 R11-37 R11-38 R11-39 R11-40 R11-41 R11-42 R11-43 R11-44 R11-45 R11-46 R11-47 R11-48 R11-49 R11-50 R11-51 R11-52 R11-53 R11-54 R11-55 R11-56 R11-57 R11-58 R11-59 R11-60 R11-61 R11-62 R11-63 R11-64 R11-65 R11-66 R11-67 R11-68 R11-69 R11-70 R11-71 R11-72 R11-73 R11-74 R11-75 R11-76 R11-77 R11-78 R11-79 R11-80 R11-81 R11-82 R11-83 R11-84 R11-85 R11-86 R11-87 R11-88 R11-89 R11-90 R11-91 R11-92 R11-93 R11-94 R11-95 R11-96 R11-97 R11-98 R11-99 R11-100

STAGED HEAT BOARD (SMB) R15-1 R15-2 R15-3 R15-4 R15-5 R15-6 R15-7 R15-8 R15-9 R15-10 R15-11 R15-12 R15-13 R15-14 R15-15 R15-16 R15-17 R15-18 R15-19 R15-20 R15-21 R15-22 R15-23 R15-24 R15-25 R15-26 R15-27 R15-28 R15-29 R15-30 R15-31 R15-32 R15-33 R15-34 R15-35 R15-36 R15-37 R15-38 R15-39 R15-40 R15-41 R15-42 R15-43 R15-44 R15-45 R15-46 R15-47 R15-48 R15-49 R15-50 R15-51 R15-52 R15-53 R15-54 R15-55 R15-56 R15-57 R15-58 R15-59 R15-60 R15-61 R15-62 R15-63 R15-64 R15-65 R15-66 R15-67 R15-68 R15-69 R15-70 R15-71 R15-72 R15-73 R15-74 R15-75 R15-76 R15-77 R15-78 R15-79 R15-80 R15-81 R15-82 R15-83 R15-84 R15-85 R15-86 R15-87 R15-88 R15-89 R15-90 R15-91 R15-92 R15-93 R15-94 R15-95 R15-96 R15-97 R15-98 R15-99 R15-100

STAGED HEAT BOARD (SMB) R18-1 R18-2 R18-3 R18-4 R18-5 R18-6 R18-7 R18-8 R18-9 R18-10 R18-11 R18-12 R18-13 R18-14 R18-15 R18-16 R18-17 R18-18 R18-19 R18-20 R18-21 R18-22 R18-23 R18-24 R18-25 R18-26 R18-27 R18-28 R18-29 R18-30 R18-31 R18-32 R18-33 R18-34 R18-35 R18-36 R18-37 R18-38 R18-39 R18-40 R18-41 R18-42 R18-43 R18-44 R18-45 R18-46 R18-47 R18-48 R18-49 R18-50 R18-51 R18-52 R18-53 R18-54 R18-55 R18-56 R18-57 R18-58 R18-59 R18-60 R18-61 R18-62 R18-63 R18-64 R18-65 R18-66 R18-67 R18-68 R18-69 R18-70 R18-71 R18-72 R18-73 R18-74 R18-75 R18-76 R18-77 R18-78 R18-79 R18-80 R18-81 R18-82 R18-83 R18-84 R18-85 R18-86 R18-87 R18-88 R18-89 R18-90 R18-91 R18-92 R18-93 R18-94 R18-95 R18-96 R18-97 R18-98 R18-99 R18-100

Fig. 14 — Gas Heat Control Circuit (Staged Gas Heat) — 48AJ,AW060 Units



SEE POWER LABEL FOR WIRE CONTINUATIONS

Fig. 15 — Electric Heat Control Circuit — 50AJ,AK,AW,AY020-050 Units

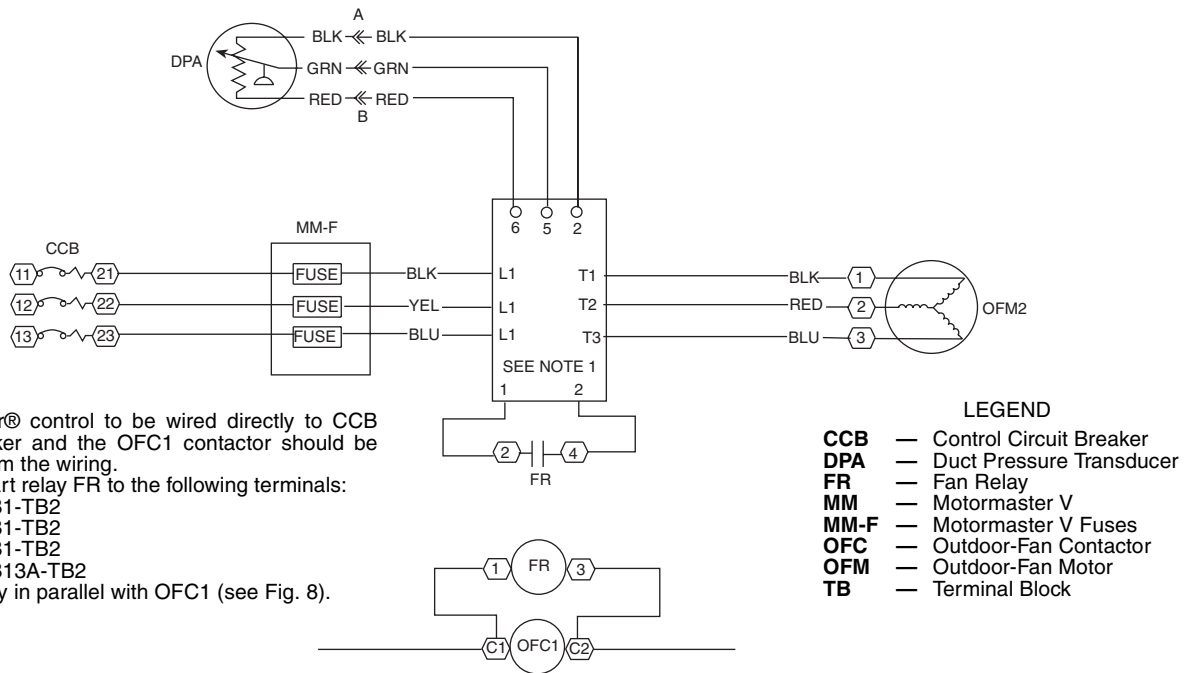


Fig. 17 — Motormaster V Accessory Wiring — 48/50AJ,AK,AW,AY020-035 Units

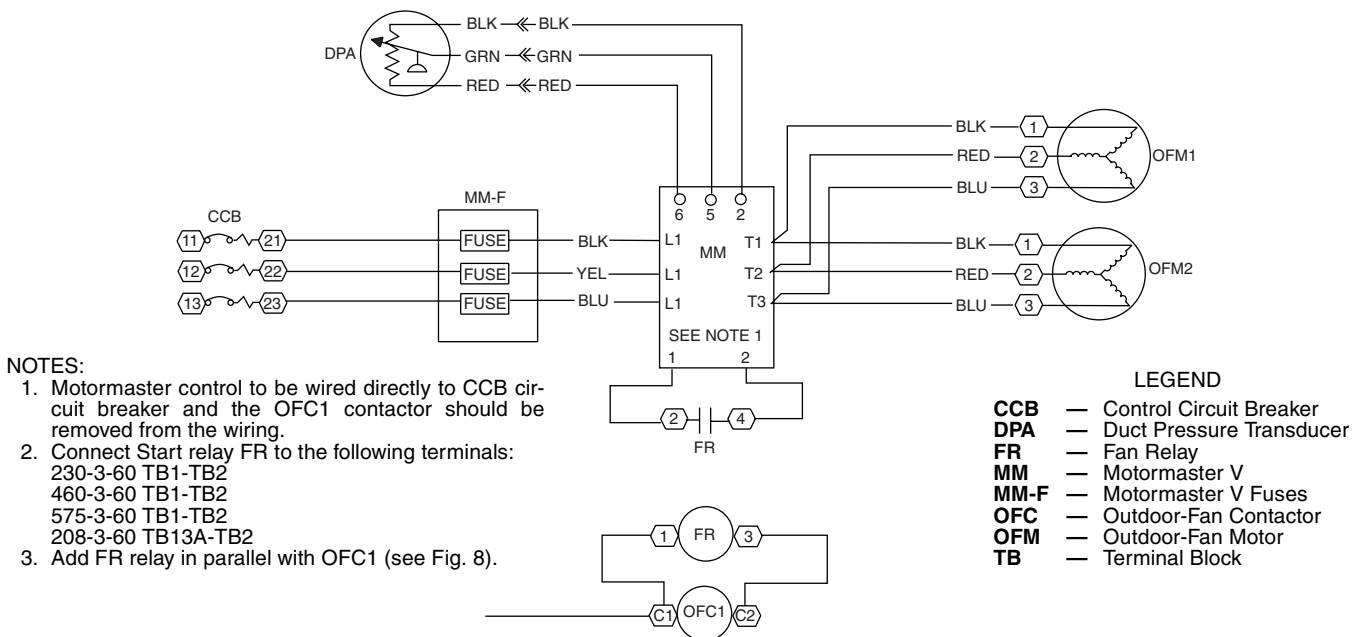
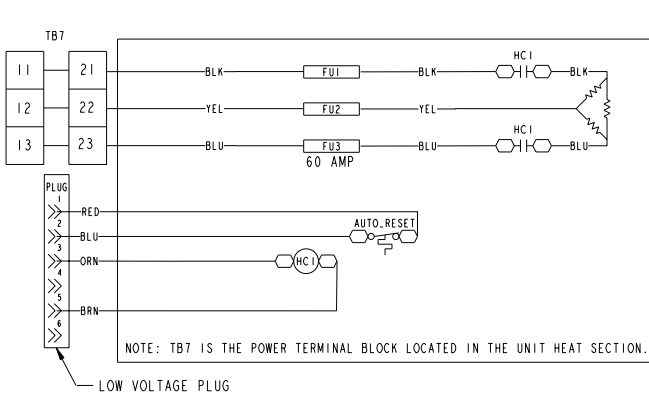
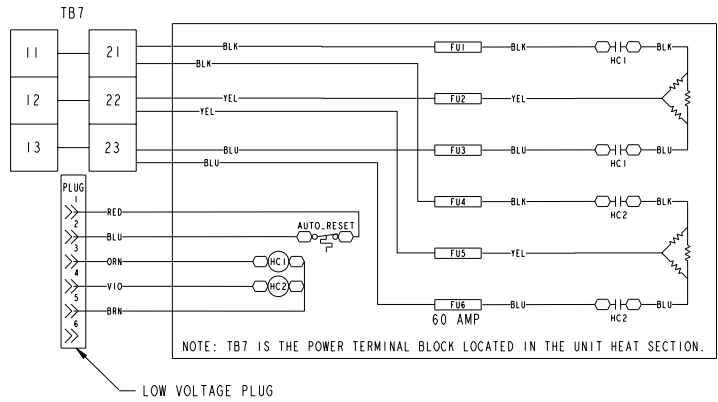


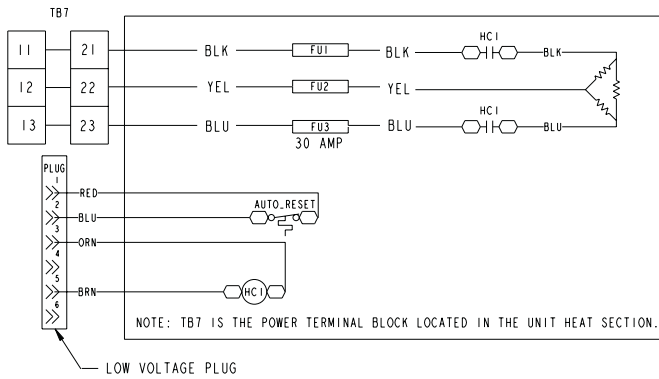
Fig. 18 — Motormaster V Accessory Wiring — 48/50AJ,AK,AW,AY040-060 Units



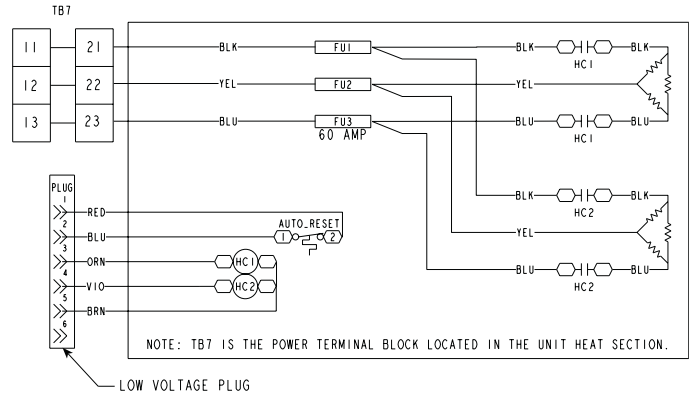
36 kW, 208/230 V, SIZES 020-050
54 kW, 208/230 V, SIZE 060



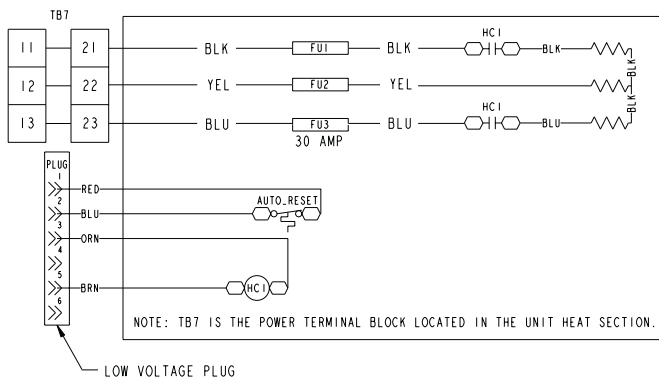
72 kW, 208/230 V, SIZES 020-050
108 kW, 208/230 V, SIZE 060



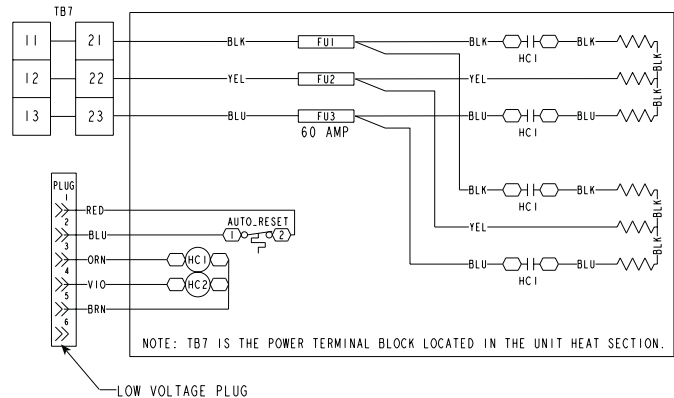
36 kW, 460 V, SIZES 020-050
24 kW, 380 V, SIZES 020-050
27 kW, 400 V, SIZES 020-050
54 kW, 460 V, SIZE 060
37 kW, 380 V, SIZE 060
41 kW, 400 V, SIZE 060



72 kW, 460 V, SIZES 020-050
49 kW, 380 V, SIZES 020-050
54 kW, 400 V, SIZES 020-050
108 kW, 460 V, SIZE 060
74 kW, 380 V, SIZE 060
82 kW, 400 V, SIZE 060



36 kW, 575 V, SIZES 020-050
54 kW, 575 V, SIZE 060



72 kW, 575 V, SIZES 020-050
108 kW, 575 V, SIZE 060

Fig. 20 — Electric Heater Power Diagrams

