

**48HJD,HJE,HJF008-014****50HJ008-014****Single Package Rooftop Heating/Cooling Units****50/60 Hz**

Wiring Diagrams

NOTE: This Literature applies to units produced before April 3, 1995.

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	575-3-60	Schematic/Component Arrangement	50HJ500516	3
50HJ008-012	208/230-3-60	Schematic/Component Arrangement	50HJ500530	4
	460-3-60	Schematic/Component Arrangement	50HJ500530	4
	575-3-60	Schematic/Component Arrangement	50HJ500572	5
50HJ014	208/230-3-60	Schematic/Component Arrangement	50HJ500571	6
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ELECTRIC HEAT

UNIT (VOLTAGE-PHASE)	UNIT SIZE	ELECTRIC HEATER (KW)	LABEL	FIG. NO.
208/230-3	50HJ008,009	18.6/24.8	3-05626	9
	50HJ008-014	7.8/10.4 12.0/16.0	3-05623	10
		24.0/32.0 31.8/42.4	3-05626	9
	50HJ012,014	37.5/50.0	3-05626	9
460-3	50HJ008,009	13.9	3-05624	11
	50HJ008-014	16.5	3-05624	11
		27.8 33.0 41.7	3-05625	12
	50HJ012,014	50.0	3-05625	12
575-3	50HJ008-014	18.0	3-05624	11
		36.0	3-05625	12
	50HJ012,014	54.0	3-05625	12

ACCESSORIES

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Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

OPERATING SEQUENCE FOR 48HJ008-014 UNITS

Cooling, Units Without Economizer — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC) and compressor contactor no. 1 (C1) are energized, and indoor (evaporator) fan motor (IFM), compressor no. 1, and condenser fan start. The outdoor (condenser) fan motor (OFM) runs continuously while unit is cooling. For units with 2 stages of cooling, if the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

When thermostat is satisfied, C1 and C2 are deenergized and the compressors and OFM shut off. After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the ON position, the evaporator motor will run continuously.

Cooling, Units With Economizer — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. Upon further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisfied and the IFM is deenergized, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. Compressor no. 1 and outdoor fan will be energized, and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and outdoor (condenser) fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage is satisfied, the IFM shuts off after a 30-second delay. The damper then moves to fully closed position.

Heating, Units Without Economizer — When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked

into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor (IDM) is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. When additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 and W2 are deenergized, the IFM stops after a 45-second time-off delay.

Heating, Units With Economizer/Two-Position Damper — When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited and the damper moves to the minimum position. If the two-position damper is used, the outdoor-air damper opens to the minimum position whenever the evaporator fan runs. When additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 and W2 are deenergized, the IFM stops after a 45-second time-off delay. The economizer damper then moves to the fully closed position. When using continuous fan, the damper will remain in the minimum position.

OPERATING SEQUENCE FOR 50HJ008-014 UNITS

Cooling, Units Without Economizer — When the thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), and compressor contactor no. 1 (C1) are energized and the indoor (evaporator) fan motor (IFM), compressor no. 1, and outdoor (condenser) fan start. The outdoor (condenser) fan motor (OFM) runs continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

Cooling, Units With Economizer — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisfied and the IFM is deenergized, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G (cooling), the economizer damper moves to the minimum position when the indoor (evaporator) fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to

modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. Compressor no. 1 and outdoor fan will be energized, and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and OFM will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the damper will move to fully closed position.

Heating, Units Without Economizer — Upon a call heating through terminal W1, indoor (evaporator) fan contactor (IFC) and heater contactor no. 1 (HC1) are energized. On units equipped for 2 stages of heat, when additional heat is needed, HC2 is energized through W2.

Heating, Units With Economizer — When the room thermostat calls for heat through terminal W1, the indoor (evaporator) fan contactor and heater contactor no. 1 are energized. On units equipped for 2 stages of heat, when additional heat is needed, heater contactor no. 2 is energized through W2. The economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

NOTES FOR FIG. 1-3

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single-phasing conditions.
3. Thermostat:
HH07AT170, 172, 174 and P272-2783
Subbase:
HH93AZ176, 178 and P272-1882, 1883
4. Set heat anticipator for first stage at 0.14 amp, second stage at 0.2 amp; except for 48HJ008 and 009 low heat, set both first and second stage at 0.14 amp.
5. Use copper conductors only.
6. **For 208/230 V Units Only:**
TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (ORN) and connect to 200 v (RED). Insulate end of 230 v tap.

NOTES FOR FIG. 4-8

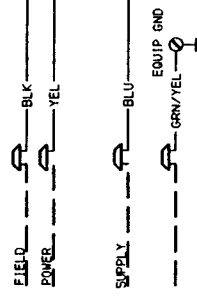
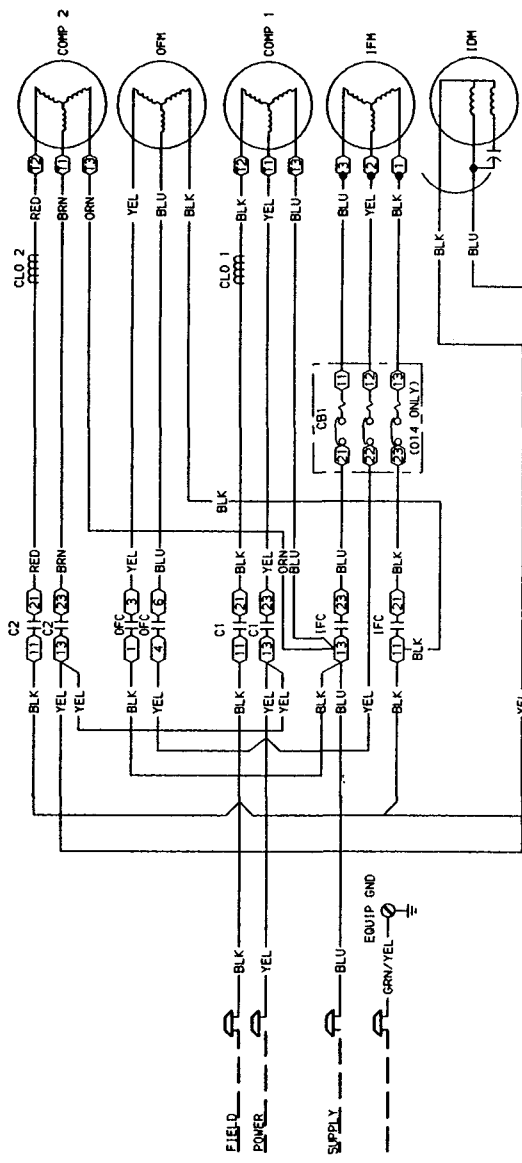
1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent.
2. Three-phase motors are protected under primary single-phasing conditions.
3. Thermostat:
HH07AT170, 172
Subbase:
HH93AZ176, 177, 178 and 179
4. Set heat anticipator at 1 amp.
5. Use copper conductors only.
6. Use copper, copper-clad aluminum, or aluminum conductors.
7. **For 208/230 V Units Only:**
TRAN is wired for 230 v unit. If unit is to be run with 208 v power supply, disconnect BLK wire from 230 v tap (ORN) and connect to 200 v tap (RED). Insulate end of 230 v tap.

LEGEND FOR FIG. 1-8

AHA — Adjustable Heat Anticipator
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
COMP — Compressor Motor
D — Diode
EC — Enthalpy Control
ECON — Economizer
EPS — Emergency Power Supply (9-volt battery)
EQUIP — Equipment
ER — Economizer Relay
FPT — Freeze-Up Protection Thermostat
FSS — Filter Status Switch
FU — Fuse
GND — Ground
HPS — High-Pressure Switch
HS — Hall Effect Sensor
I — Ignitor
IDM — Induced-Draft Motor
IFC — Indoor (Evaporator) Fan Contactor
IFM — Indoor (Evaporator) Fan Motor
IFR — Indoor (Evaporator) Fan Relay

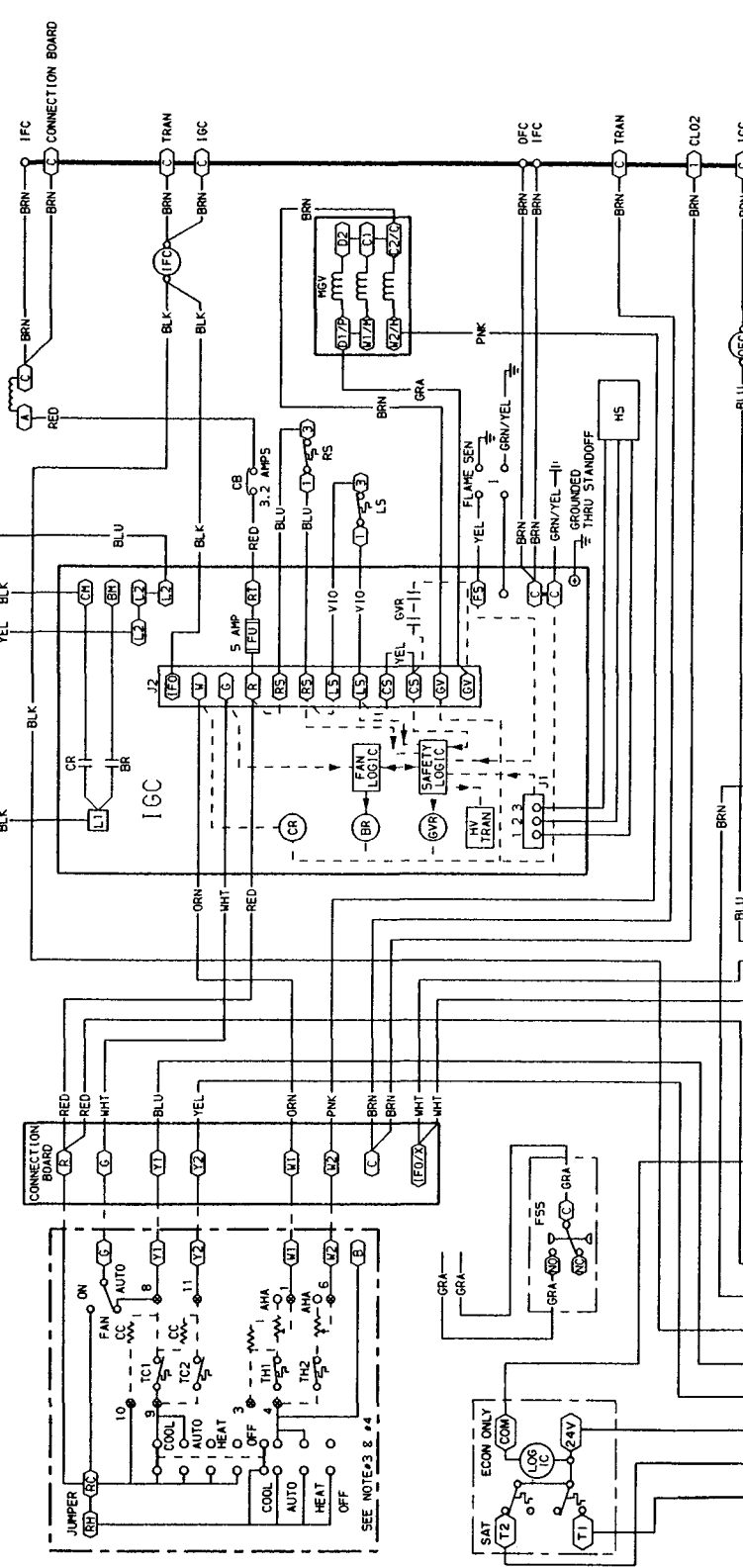
IGC — Integrated Gas Unit Controller
LPS — Low-Pressure/Loss-of-Charge Switch
LS — Limit Switch
LSM — Limit Switch (Manual Reset)
MGV — Main Gas Valve
MTR — Motor
OAT — Outdoor-Air Thermostat
OFC — Outdoor (Condenser) Fan Contactor
OFM — Outdoor (Condenser) Fan Motor
P — Plug
PL — Plug Assembly
QT — Quadruple Terminal
R — Relay
RS — Rollout Switch
SAT — Supply-Air Thermostat
SEN — Sensor
SW1 — Switch Fully Open
SW2 — Switch Fully Closed
SW3 — Switch Minimum Vent Position
SW4 — Switch Maximum Vent Position
TB — Terminal Block
TC — Thermostat Cooling
TDR — Time-Delay Relay
TG — Time Guard
TH — Thermostat Heating
TRAN — Transformer

 Terminal (Marked)
 Terminal (Unmarked)
 Terminal Block
 Splice
 Splice (Marked)
 Factory Wiring
 Field Control Wiring
 Field Power Wiring
 Accessory Wiring or Optional Wiring
 Accessory
 To indicate common potential only, not to represent wiring



SEE NOTE #5

TERMINAL BREAKER	VOLTS	MFG. PT. NO.	TRUST
CB	24V	POLTER & BRUMFIELD	3.2
CB1 014	208/230-3-60	HEINEMANN	17.3
CB1 014	208/230-3-60	CF3-2204-15	208-3-2595-485



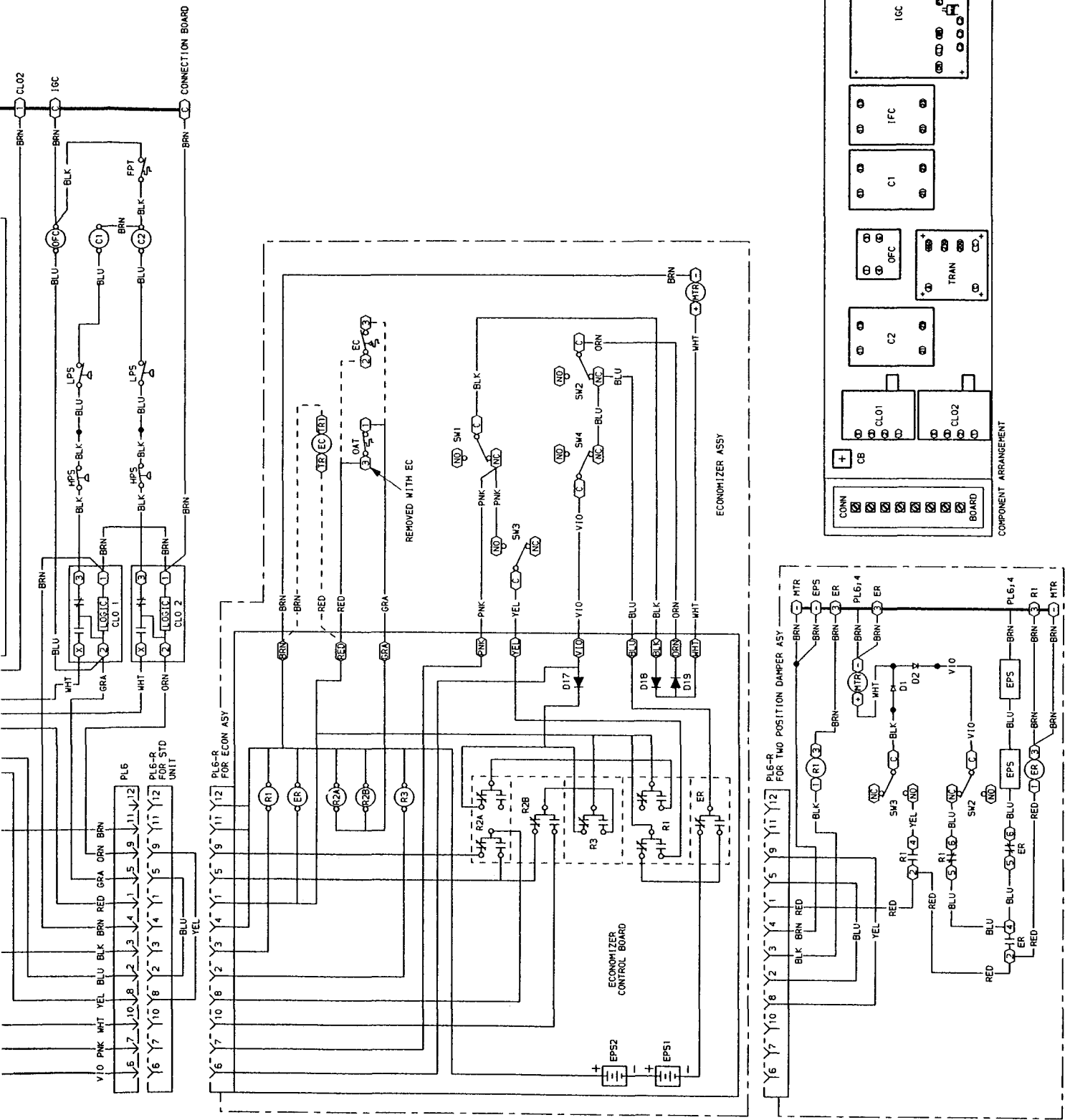


Fig. 1 — Label Diagram, Schematic and Component Arrangement; 48HJ008-014; 208/230-3-60

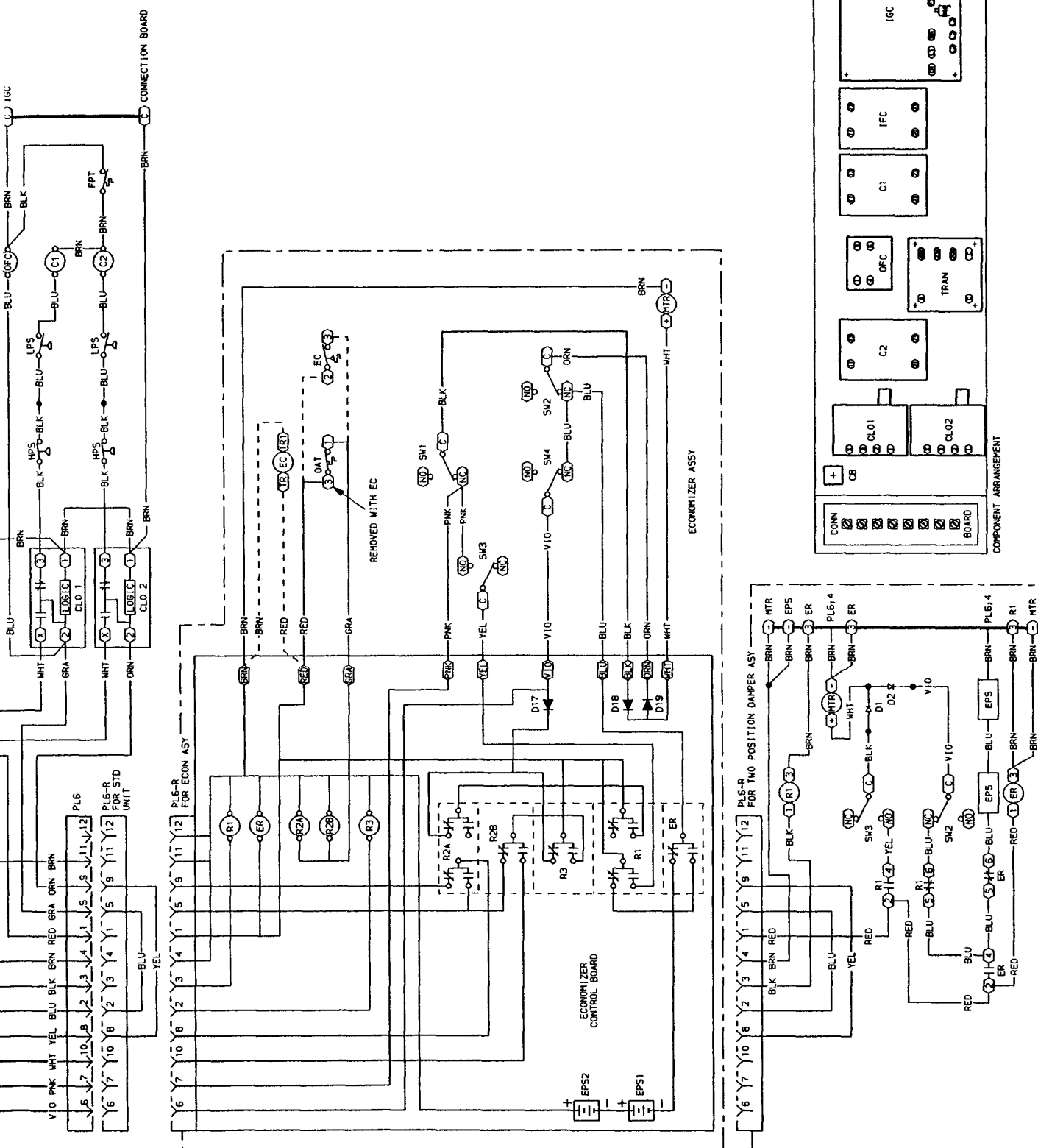
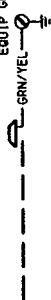
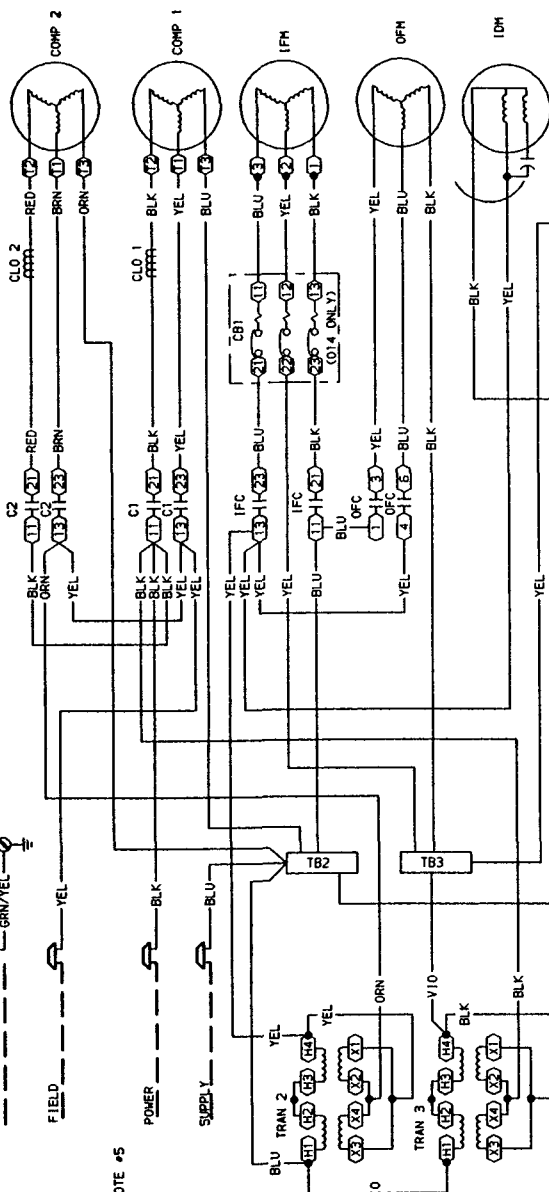


Fig. 2 — Label Diagram, Schematic and Component Arrangement; 48HJ008-014; 460-3-60

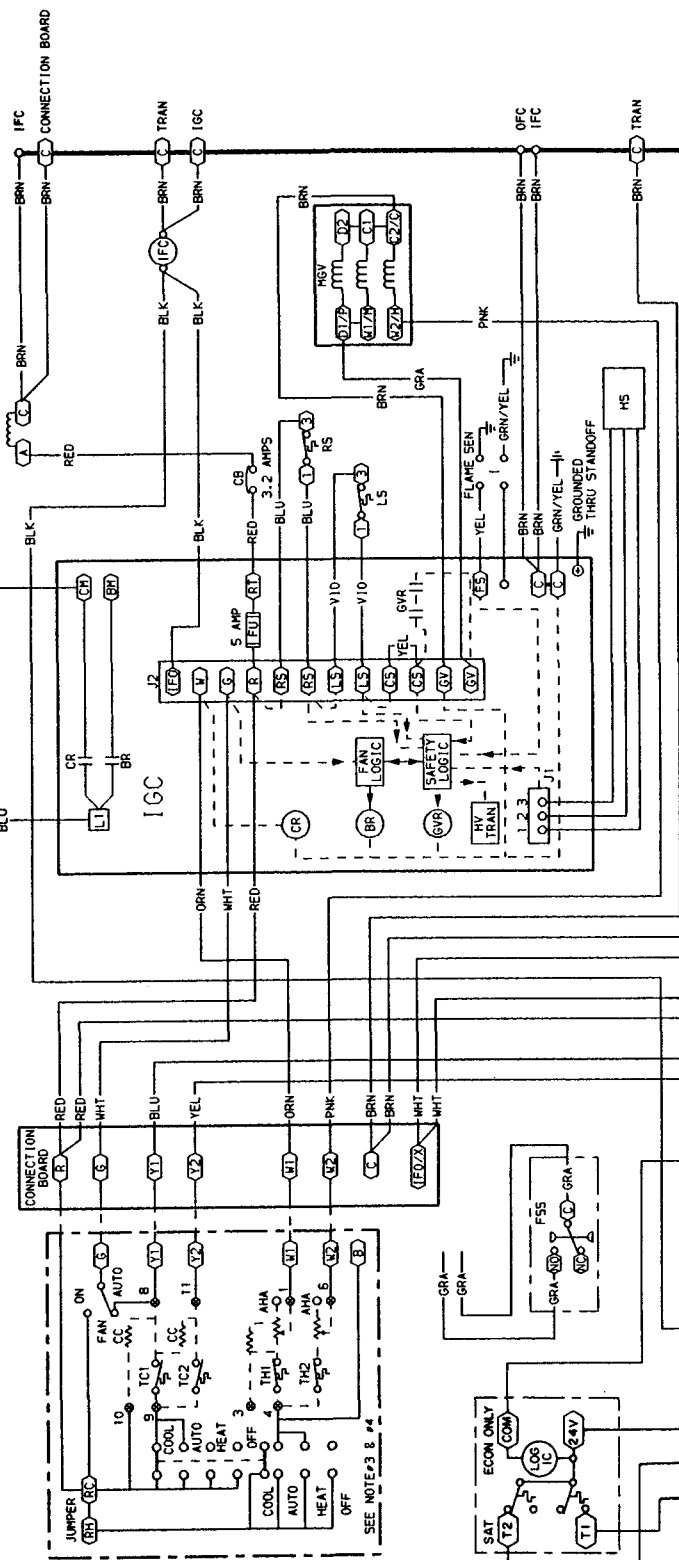
EQUIP GND



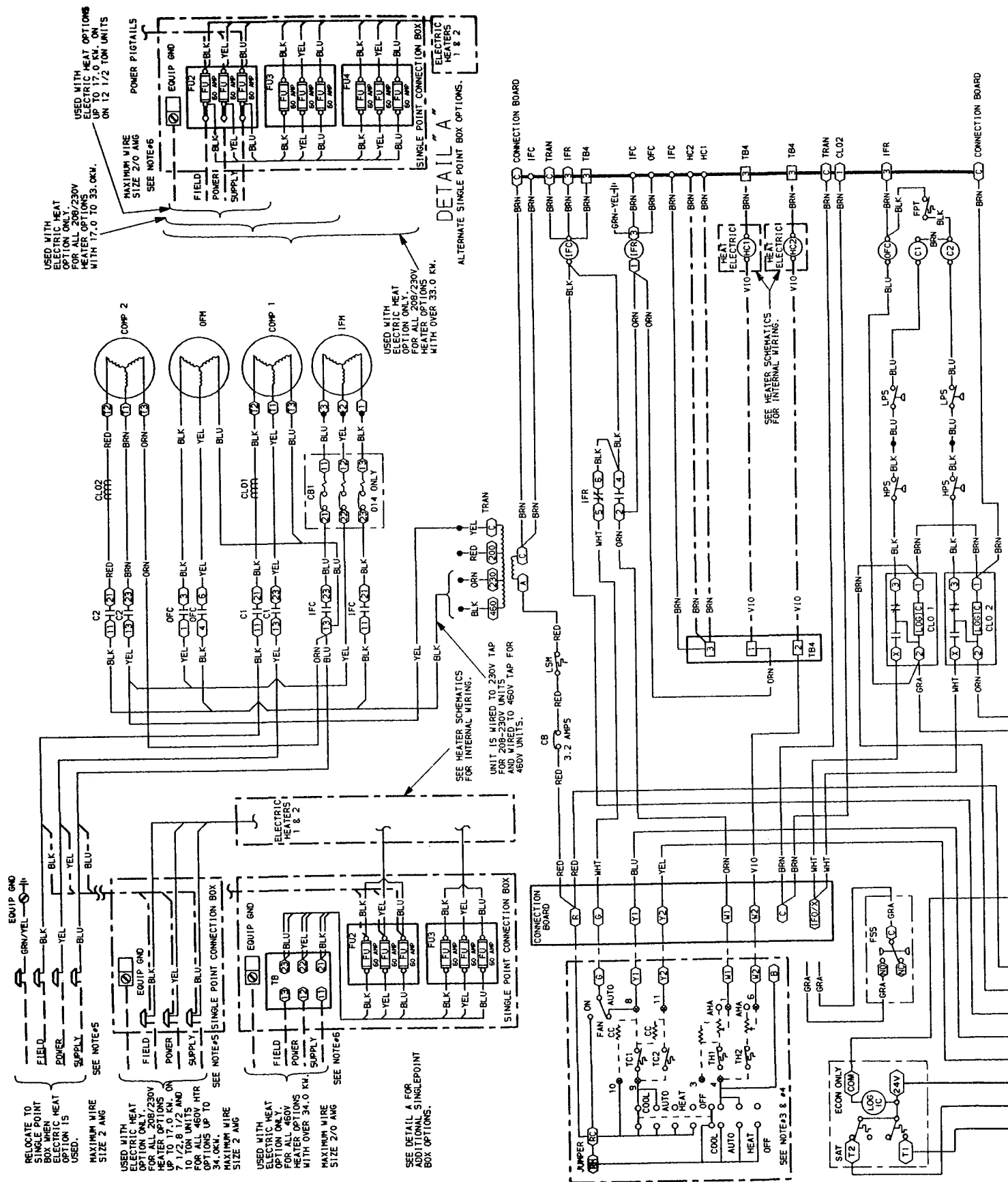
SEE NOTE #5



CIRCUIT BREAKER	VOLTS	MFG. PT. NO.	MUST TRIP
CB	24V	POTTER & BRUMFIELD	3.2
CB1 014	460-3-60	HEINEMANN	6.5
		CE 3-2228-11	2132-2600-485







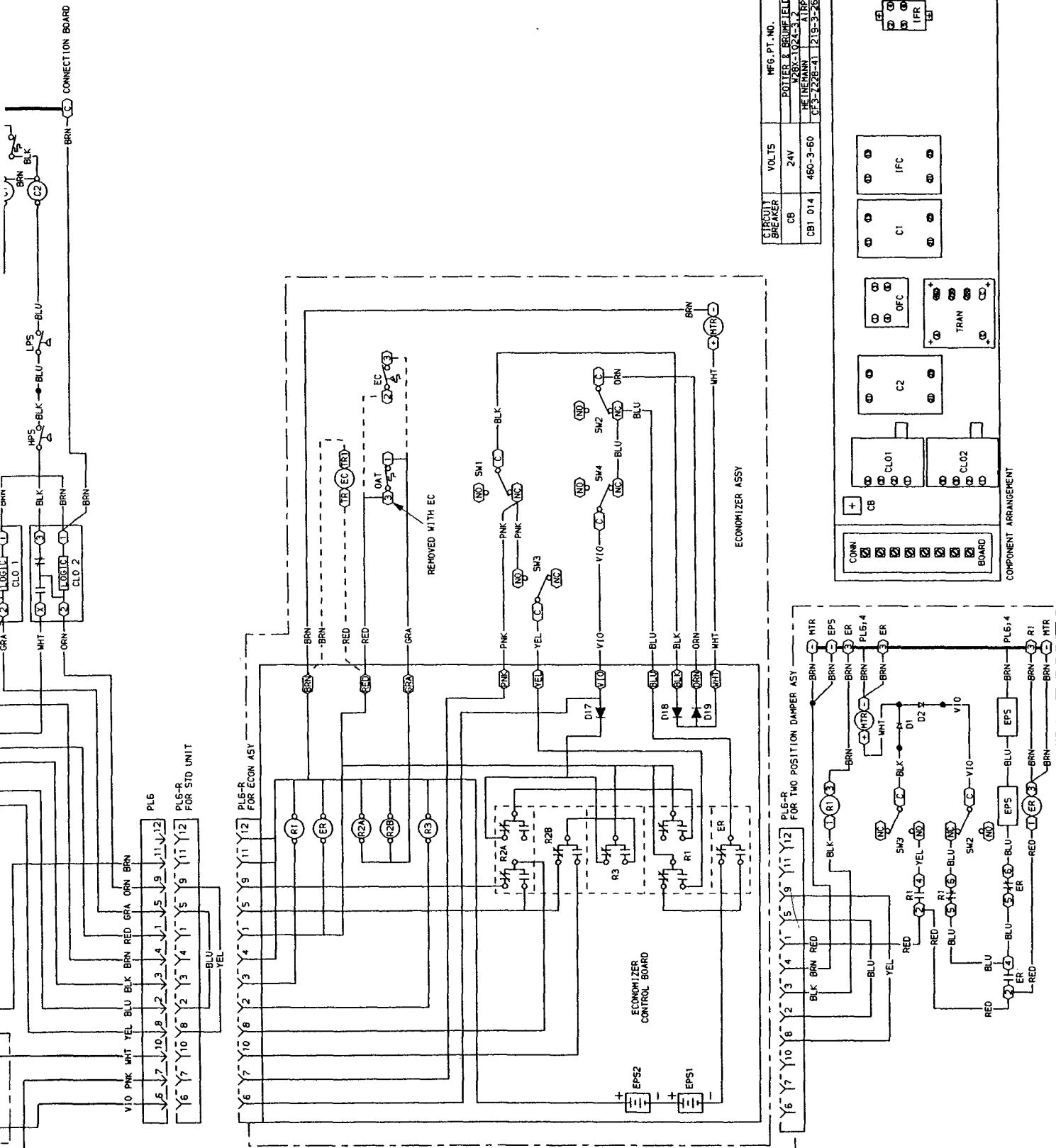
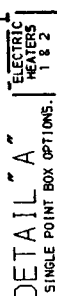


Fig. 4 — Label Diagram, Schematic and Component Arrangement; 50HJ008-012; 208/230-3-60 and 50HJ008-014; 460-3-60





CIRCUIT BREAKER	VOLTS	MF6, PT. NO.	MUST TRIP AMPS
CB	24V	POTTER & BRUMFIELD 4283-1024-3, 2	3.2
CB1 014	208/230-3-60	HEINEMANN AIRPAX CF3-2204-15 209-3-2559-485	17.3

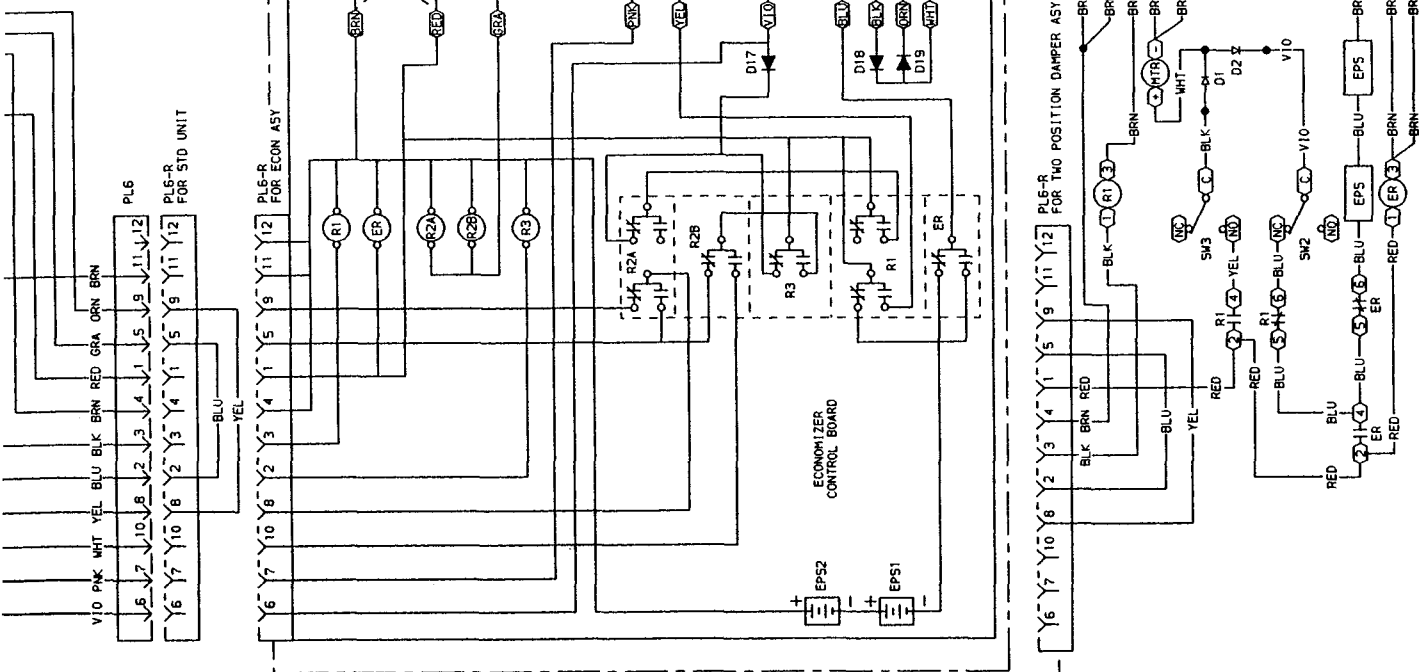


Fig. 6 – Label Diagram, Schematic and Component Arrangement; 50HJ014; 208/230-3-60

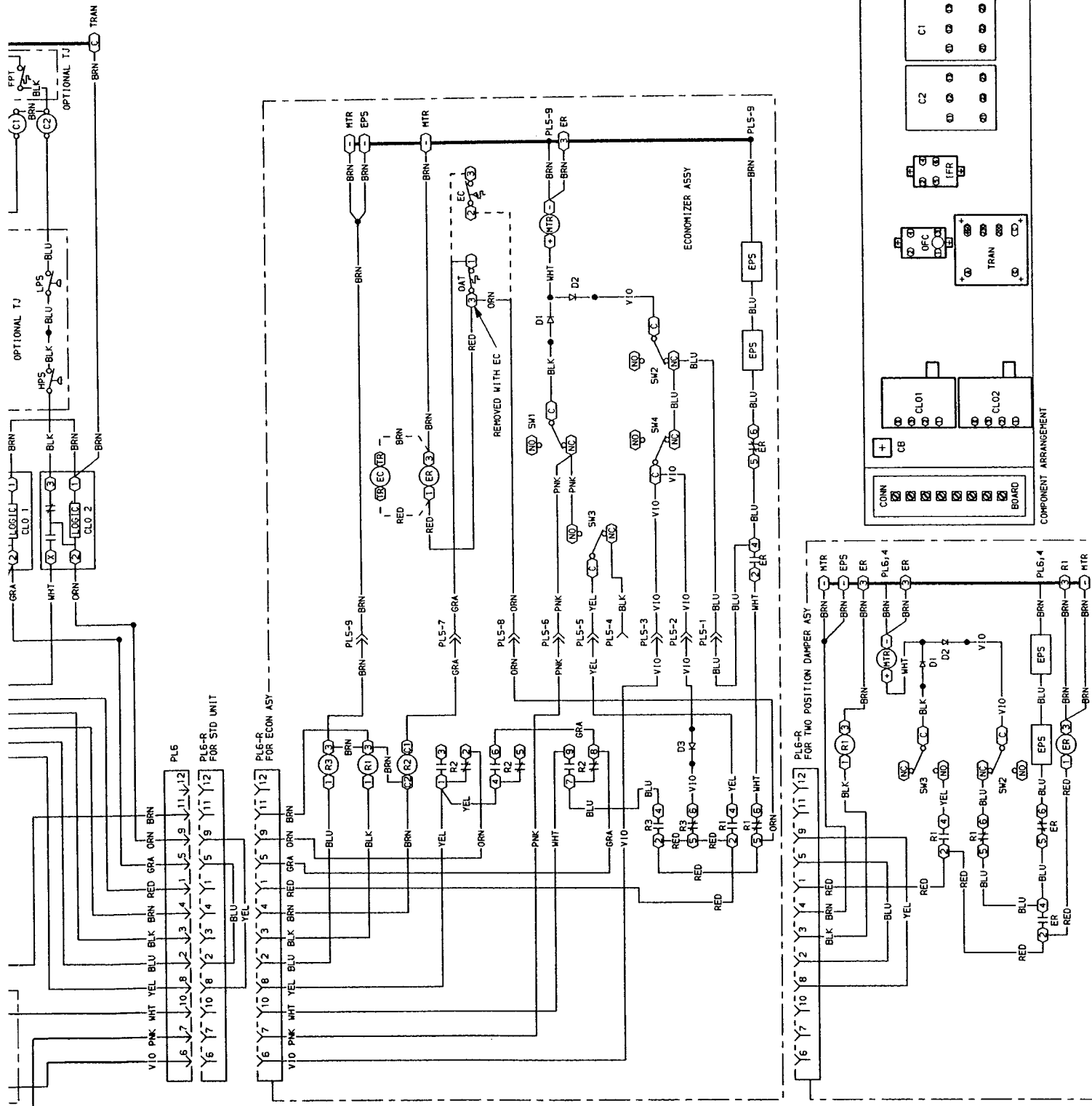
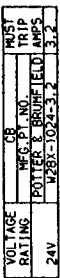


Fig. 7 — Label Diagram, Schematic and Component Arrangement; 50HJ008-014; 220-3-50



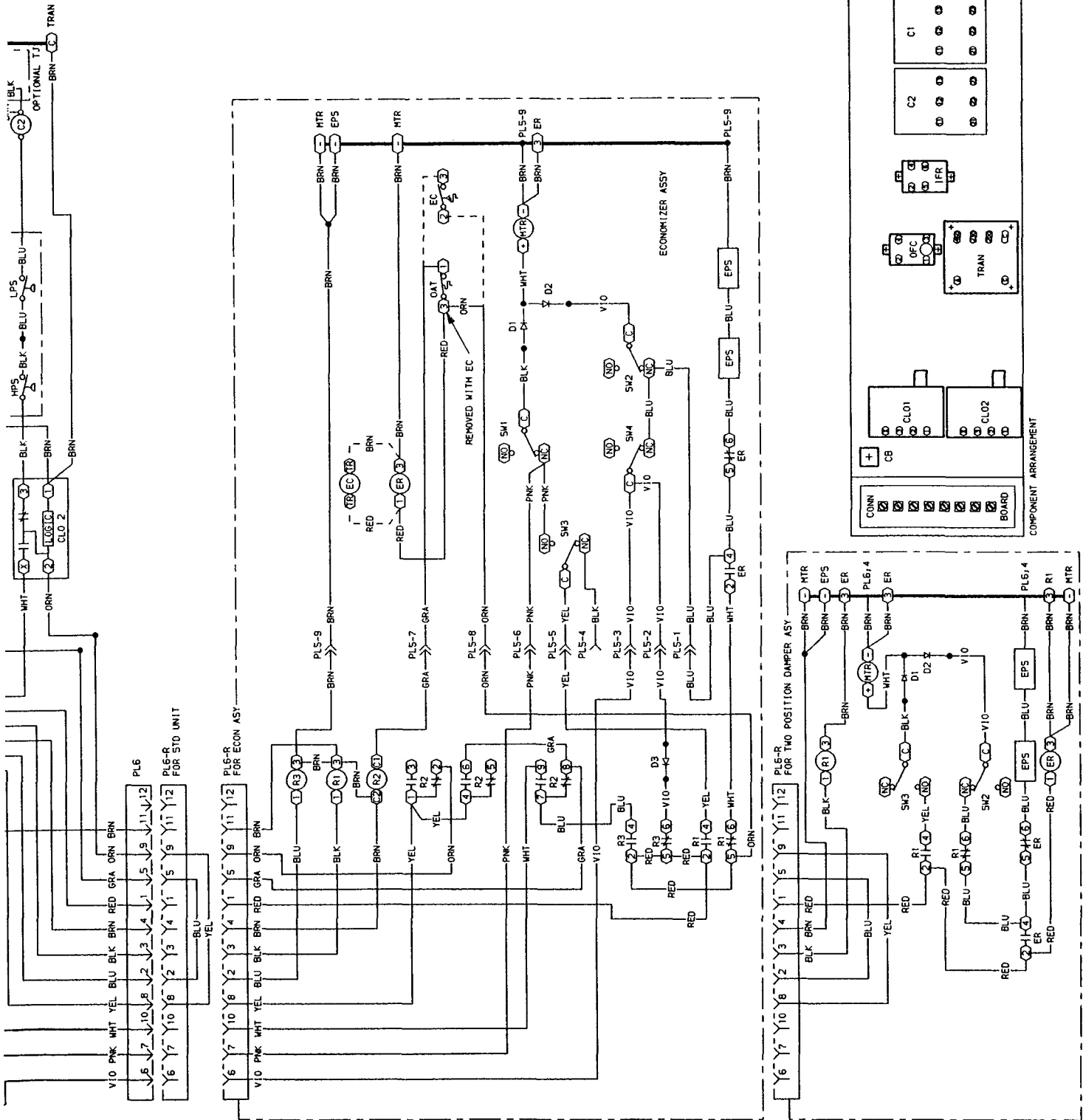
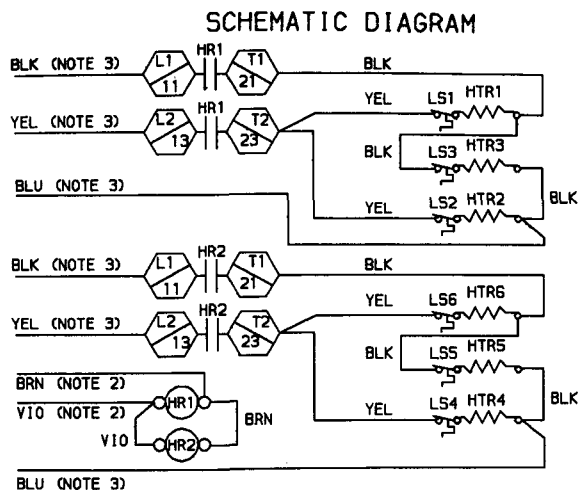
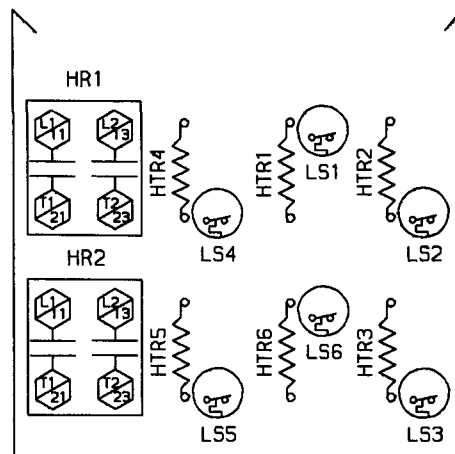


Fig. 8 — Label Diagram, Schematic and Component Arrangement; 50HJ008-014; 400-3-50



COMPONENT ARRANGEMENT



⚠ WARNING

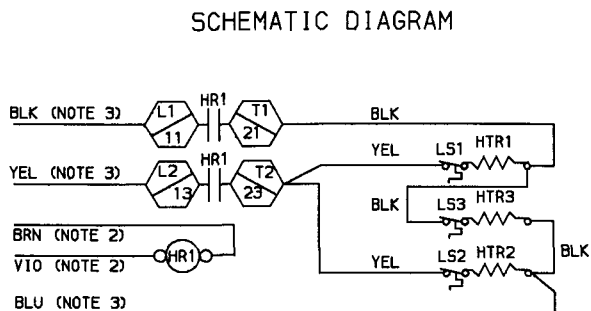
Electric shock hazard — disconnect all branch circuits before removing this cover

NOTES:

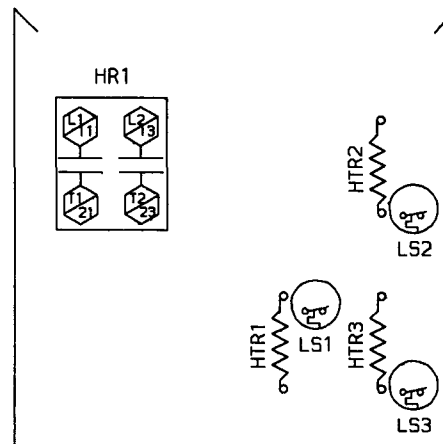
- 1 To be wired in accordance with NEC and local codes.
- 2 Brown and violet 24-vac wires are supplied with heater and connected at installation to base unit as shown on base unit wiring diagram.
- 3 Power wires are supplied with heater and connected at installation to base unit field power connection box as shown on base unit wiring diagram. For field installation of electric heaters, field power connection box shown on equipment nameplate must be used

- LEGEND**
- Sylvania Marked Terminal
 - Elmwood Unmarked Terminal
 - HTR** — Heater
 - HR** — Heater Relay
 - LS** — Limit Switch
 - NEC** — National Electrical Code

Fig. 9 — Accessory Electric Heater Label Diagram, 18.6/24.8 kW, 24.0/32.0 kW, 31.8/42.4 kW and 37.5/50.0 kW, 208/230 V



COMPONENT ARRANGEMENT



⚠ WARNING

Electric shock hazard — disconnect all branch circuits before removing this cover.

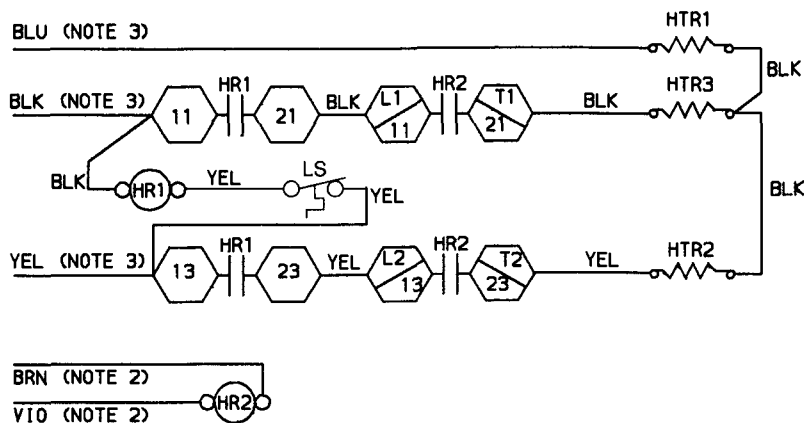
NOTES:

- 1 To be wired in accordance with NEC and local codes
- 2 Brown and violet 24-vac wires are supplied with heater and connected at installation to base unit as shown on base unit wiring diagram.
- 3 Power wires are supplied with heater and connected at installation to base unit field power connection box as shown on base unit wiring diagram. For field installation of electric heaters, field power connection box shown on equipment nameplate must be used.

- LEGEND**
- Sylvania Marked Terminal
 - Elmwood Unmarked Terminal
 - HTR** — Heater
 - HR** — Heater Relay
 - LS** — Limit Switch
 - NEC** — National Electrical Code

Fig. 10 — Accessory Electric Heater Label Diagram, 7.8/10.4 kW and 12.0/16.0 kW, 208/230 V

SCHEMATIC DIAGRAM



WARNING

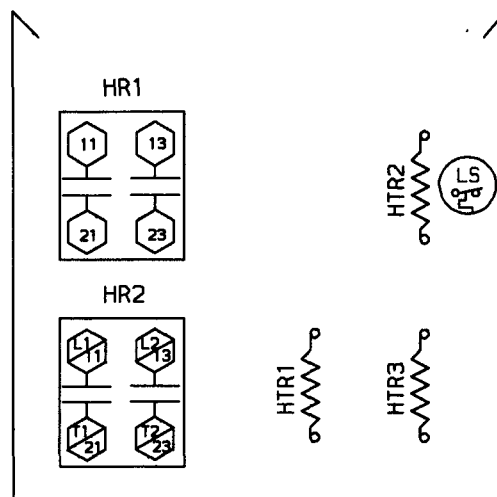
Electric shock hazard — disconnect all branch circuits before removing this cover.

NOTES:

1. To be wired in accordance with NEC and local codes
2. Brown and violet 24-vac wires are supplied with heater and connected at installation to base unit as shown on base unit wiring diagram
3. Power wires are supplied with heater and connected at installation to base unit field power connection box as shown on base unit wiring diagram. For field installation of electric heaters, field power connection box shown on equipment nameplate must be used

Fig. 11 — Accessory Electric Heater Label Diagram, 13.9 kW and 16.5 kW, 460 V; 18.0 kW, 575 V

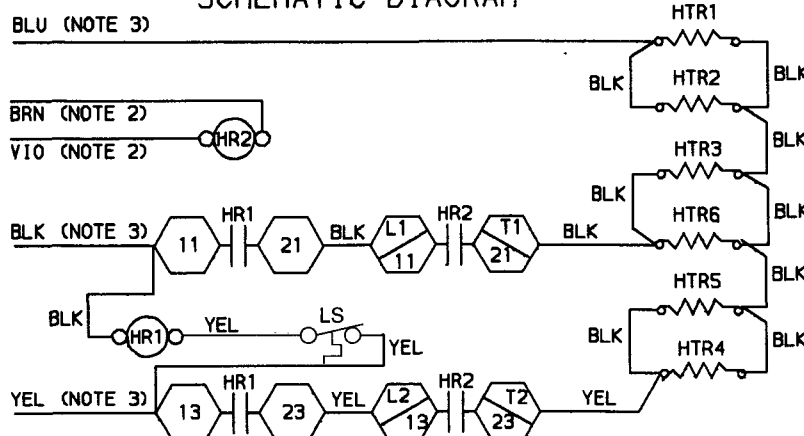
COMPONENT ARRANGEMENT



LEGEND

- Sylvania
- Marked Terminal HR2 Only
- Elmwood
- Unmarked Terminal
- HTR** — Heater
- HR** — Heater Relay
- LS** — Limit Switch
- NEC** — National Electrical Code

SCHEMATIC DIAGRAM



WARNING

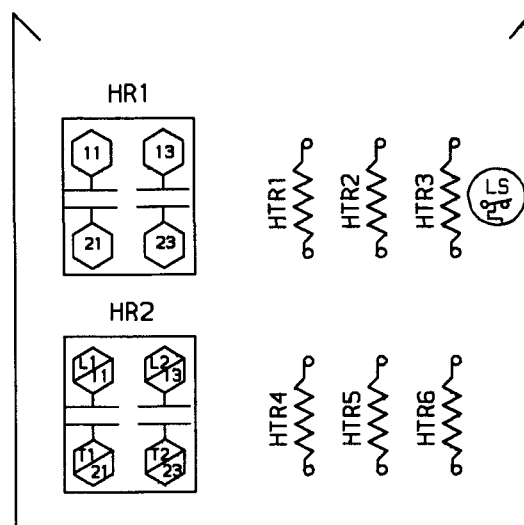
Electric shock hazard — disconnect all branch circuits before removing this cover.

NOTES:

1. To be wired in accordance with NEC and local codes
2. Brown and violet 24-vac wires are supplied with heater and connected at installation to base unit as shown on base unit wiring diagram.
3. Power wires are supplied with heater and connected at installation to base unit field power connection box as shown on base unit wiring diagram. For field installation of electric heaters, field power connection box shown on equipment nameplate must be used.

Fig. 12 — Accessory Electric Heater Label Diagram, 27.8 kW, 33.0 kW, 41.7 kW, and 50.0 kW, 460 V; 36.0 kW and 54.0 kW, 575 V

COMPONENT ARRANGEMENT



LEGEND

- Sylvania
- Marked Terminal HR2 Only
- Elmwood
- Unmarked Terminal
- HTR** — Heater
- HR** — Heater Relay
- LS** — Limit Switch
- NEC** — National Electrical Code

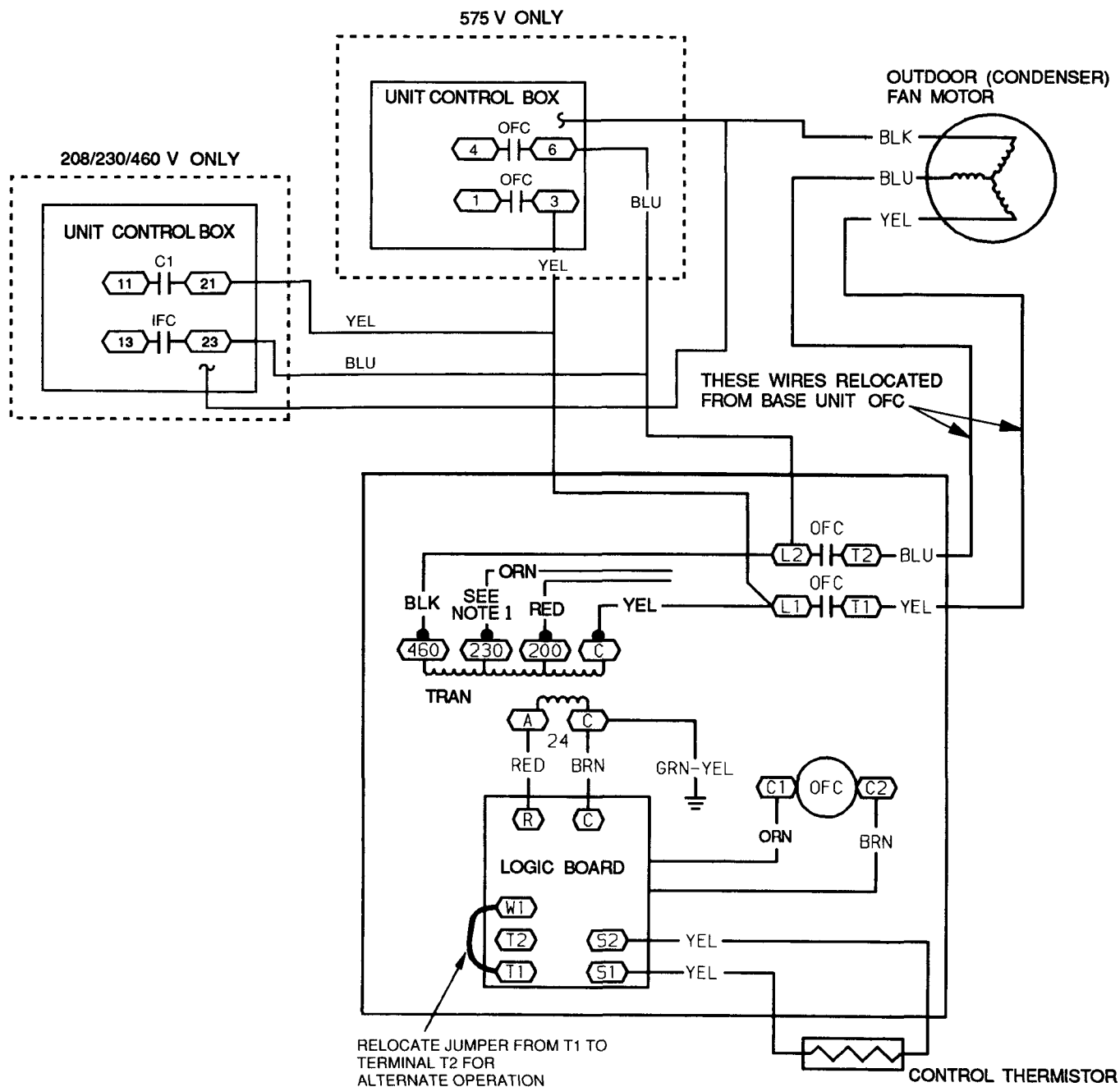
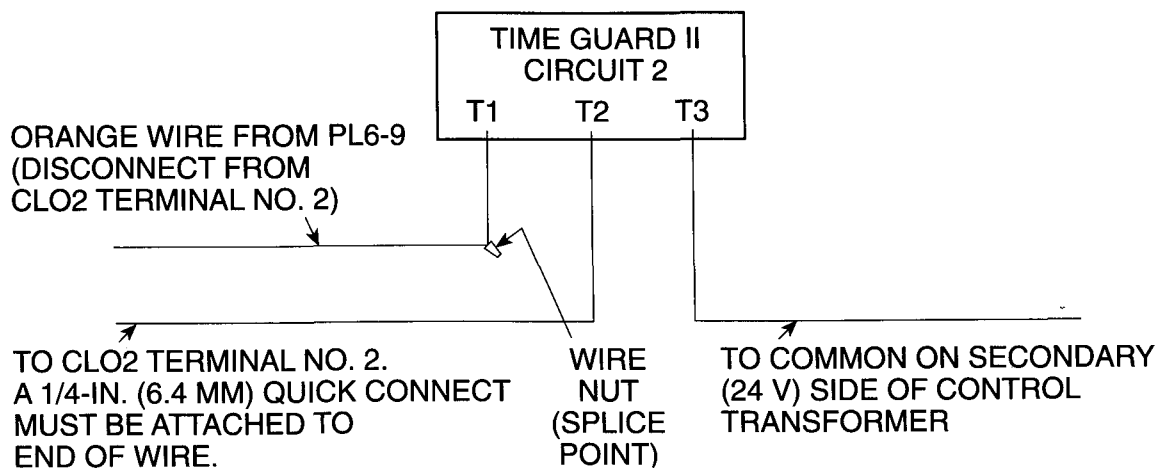
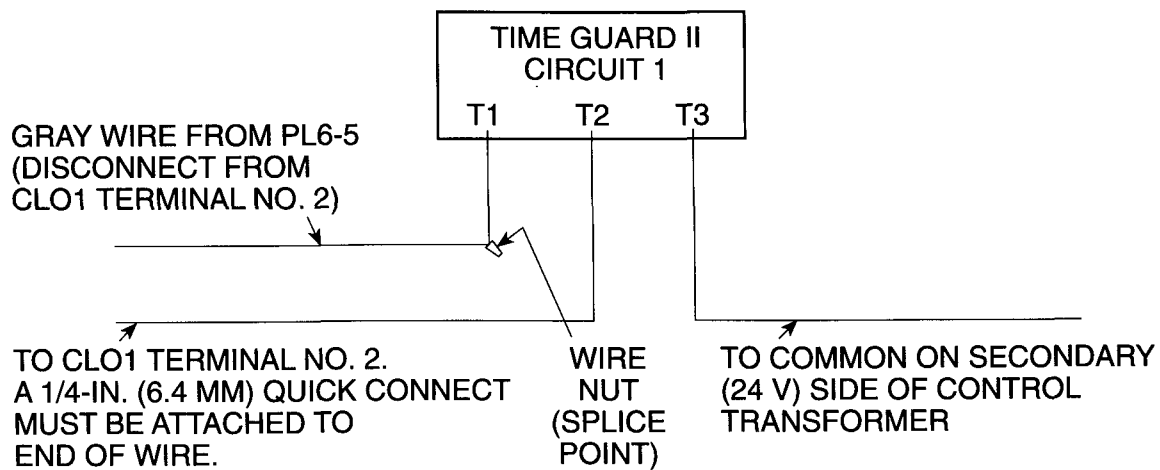


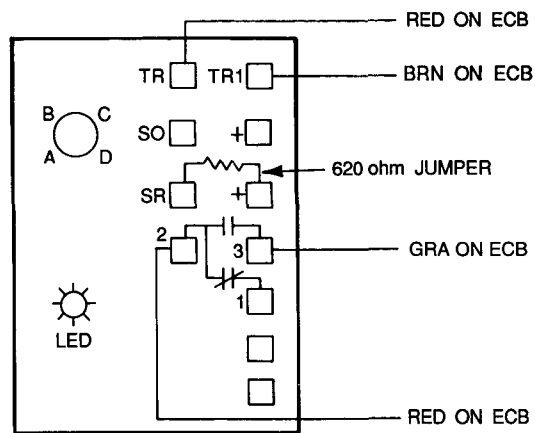
Fig. 13 — Wiring Schematic, Motormaster II Device



LEGEND

CLO — Compressor Lockout
PL — Plug
T — Terminal

Fig. 14 — Time Guard® II Control Wiring



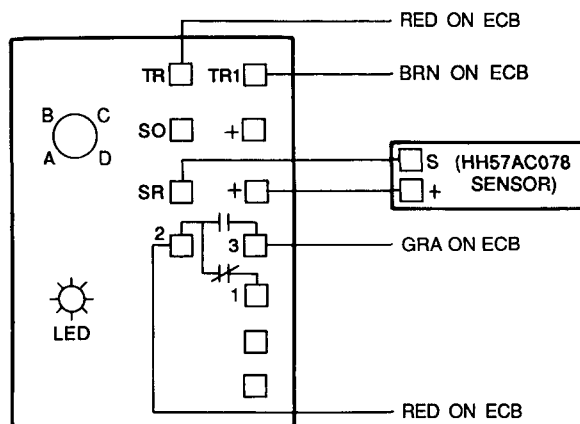
LEGEND

ECB — Economizer (Varislide™) Control Board

LED — Light-Emitting Diode

NOTE: Switches shown in high enthalpy state. Terminals 2 and 3 close on enthalpy decrease.

**Fig. 16 — Accusensor™ II Enthalpy Control
(Part No. HH57AC077) Wiring**



LEGEND

ECB — Economizer (Varislide™) Control Board

LED — Light-Emitting Diode

NOTES:

- 1 Remove factory-installed 620-ohm jumper across SR and + before connecting wires from HH57AC078 sensor
2. Switches are shown in high outdoor-air enthalpy state. Terminals 2 and 3 close on low outdoor-air enthalpy relative to indoor-air enthalpy

**Fig. 17 — Accusensor™ III Enthalpy Control
(Part No. HH57AC077 and HH57AC078) Wiring**

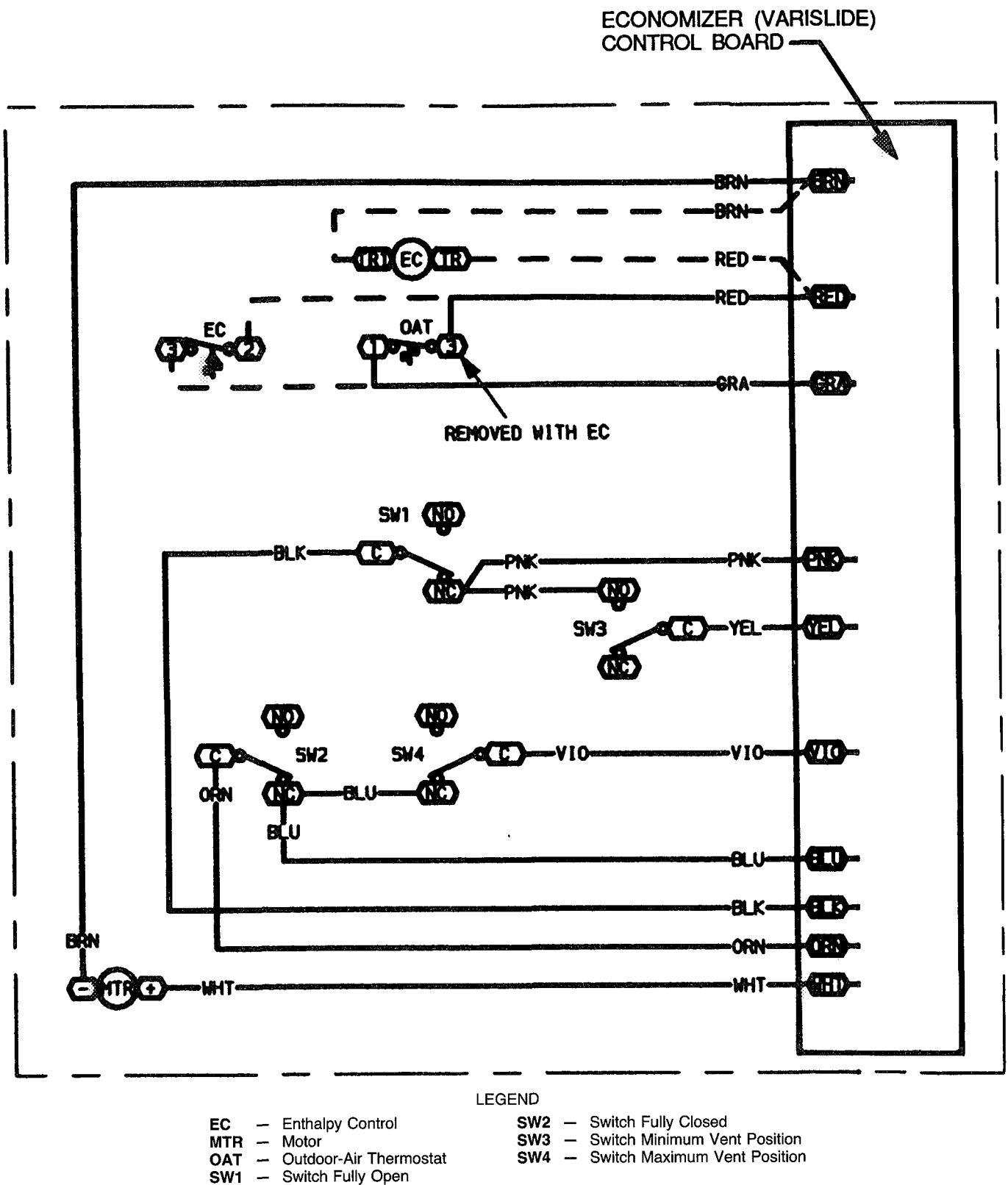
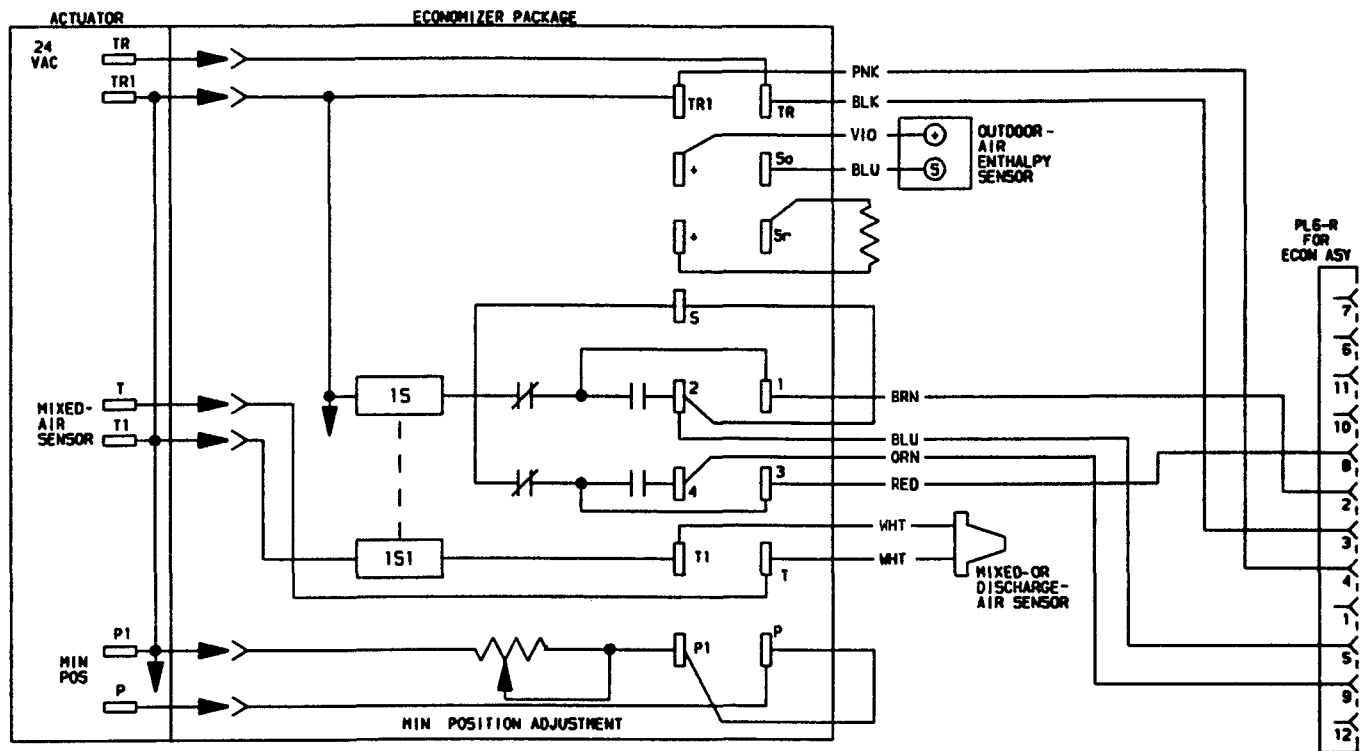


Fig. 18 — Enthalpy Control and Varislide™ Economizer Control Board Wiring



LEGEND

ECON	- Economizer	S	- Switch, Sensor
MIN	- Minimum	S _O	- Sensor, Outdoor
P	- Potentiometer	S _R	- Sensor, Return
PL	- Plug	TR	- Transformer
POS	- Position		

Fig. 19 – PARABLADE Economizer Wiring