



48/50HJ008-014 Single-Package Cooling/Heating Units



Wiring Diagrams

NOTE: This literature applies to units manufactured on or after July 1, 1993

INDEX

UNIT LABEL DIAGRAM				
Unit Model	Unit Voltage (3 Ph, 60 Hz)	Type	Number	Figure No.
48HJ008-014	All	Component Arrangement	50HJ500750	1
50HJ008-014	All	Component Arrangement	50HJ500400	2
48HJ008-014	208/230	Schematic	50HJ500747	3
48HJ008-014	460	Schematic	50HJ500748	4
48HJ008-014	575	Schematic	50HJ500749	5
50HJ008-012	208/230	Schematic	50HJ500380	6
50HJ008-014	460	Schematic	50HJ500380	6
50HJ014	208/230	Schematic	50HJ500379	7
50HJ008-014	575	Schematic	50HJ500381	8

ELECTRIC HEAT				
Unit Voltage (3 Ph, 60 Hz)	Unit Size	Label, Electric Heater (kW)	Number	Figure No.
208/230	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
		37.5/50.0	3-05626	9
460	50HJ008,009	13 9	3-05624	11
	50HJ008-014	16 5	3-05624	11
		27 8 33 0	3-05625	12
		41 7		
575	50HJ012,014	50 0	3-05625	12
	50HJ008-014	18 0	3-05624	11
		36 0	3-05625	12
		54 0	3-05625	12

ACCESSORY WIRING		
Unit Model	Component	Figure No.
48/50HJ008-014	Solid-State Enthalpy Control	13
	Differential Enthalpy Control	14
	Remote Control Panel	15
	Electronic Thermostat	16
	Time Guard® II Control Circuit	17

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

OPERATING SEQUENCE

48HJ 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 evaporator-fan motor, compressor no. 1, and condenser fan start. The condenser-fan motor 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.

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

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.

COOLING, UNITS WITH ECONOMIZER — When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and the 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, the damper moves to the fully closed position when using an automatic fan or to the minimum position when using a continuous fan.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 57 F, the damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 52 F.

When the supply-air temperature falls to between 57 F and 52 F, the damper will remain at an intermediate open position. If the supply-air temperature falls below 52 F, the damper will modulate closed until it reaches the minimum position or until the supply-air temperature is above 52 F. When the thermostat is satisfied, the damper will move to the fully closed position when using an automatic fan or to the minimum position when using a continuous fan.

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 the condenser 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.

After a 30-second delay, the IFM shuts off. If the thermostat fan selector switch is in the ON position, the IFM will run continuously.

HEATING, UNITS WITH 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 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. 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.

50HJ 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 evaporator-fan motor, compressor no. 1, and condenser fan start. The condenser-fan motor 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.

HEATING, UNITS WITHOUT ECONOMIZER (If Optional or Accessory Heater is Installed) — Upon a call for heating through terminal W1, 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.

COOLING, UNITS WITH ECONOMIZER — When the outdoor-air temperature is above the OAT (outdoor-air thermostat) setting and the room thermostat calls for cooling, compressor contactor no. 1 is energized to start compressor no. 1 and the condenser-fan motor. The evaporator-fan motor is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 is energized, starting compressor no. 2. After the thermostat is satisfied, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer dampers move to the minimum position. If the supply-air temperature is above 57 F, the damper continues to open until it reaches the fully open position or until the supply-air temperature drops below 57 F.

When the supply-air temperature falls to between 57 F and 52 F, the damper remains at an intermediate open position. If the supply-air temperature falls below 52 F, the damper modulates closed until it reaches the minimum position or until the supply-air temperature is above 52 F.

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

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

When the first stage of cooling is satisfied and the indoor (evaporator) fan motor (IFM) is deenergized, the damper moves to the fully closed position.

HEATING, UNITS WITH ECONOMIZER (If Optional or Accessory Heater is Installed) — When the room thermostat calls for heat through terminal W1, the evaporator-fan contactor and heater contactor no. 1 are energized. When additional heat is needed, heater contactor no. 2 is ener-

gized through W2. The evaporator-fan motor is energized with W2, and the economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

LEGEND (FIG. 1 — 8 and 15)

AHA	— Adjustable Heat Anticipator	OFC	— Outdoor (Condenser) Fan Contactor
APS	— Auxiliary Power Supply	OFM	— Outdoor (Condenser) Fan Motor
AWG	— American Wire Gage	P, PL	— Plug
C	— Contactor, Compressor	R	— Relay
CB	— Circuit Breaker	RS	— Rollout Switch
CC	— Cooling Compensator	SAT	— Supply-Air Thermostat
CLO	— Compressor Lockout	SEN	— Sensor
COM	— Common	SW	— Switch
COMP	— Compressor Motor	SW1	— Switch, Fully Open
CR	— Control Relay	SW2	— Switch, Fully Closed
D	— Diode	SW3	— Switch Minimum Vent Position
EC	— Enthalpy Control	SW4	— Switch Maximum Vent Position
ECON	— Economizer	TB	— Terminal Block
EPS	— Emergency Power Supply	TC	— Thermostat, Cooling
EQUIP	— Equipment	TG	— Time Guard®
ER	— Economizer Relay	TH	— Thermostat, Heating
FP	— Flame Prove	TRAN	— Transformer
FPT	— Freeze Protection Thermostat		Field Splice
FSS	— Filter Status Switch		Marked Wire
FU	— Fuse		Terminal (Marked)
GND	— Ground		Terminal (Unmarked)
HC	— Heater Contactor (Electric Heater)		Terminal Block
HPS	— High-Pressure Switch		Splice
HR	— Holding Relay		Splice (Marked)
HS	— Hall Effect Sensor		Factory Wiring
I	— Ignitor		Field Control Wiring
IDM	— Induced-Draft Motor		Field Power Wiring
IFC	— Indoor (Evaporator) Fan Contactor		Accessory or Optional Wiring
IFM	— Indoor (Evaporator) Fan Motor		To indicate common potential only, not to represent wiring
IGC	— Integrated Gas Controller		
LPS	— Low-Pressure/Loss-of-Charge Switch		
LS	— Limit Switch		
LSM	— Limit Switch (Manual Reset)		
MCA	— Minimum Circuit Amps		
MGV	— Main Gas Valve		
MTR	— Motor		
MV	— Main Valve		
NEC	— National Electrical Code		
OAT	— Outdoor-Air Thermostat		

NOTES FOR FIG. 1-9

- 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: HH07AT172
Subbase: HH93AZ177 and HH93AZ179
- 4 For 48HJ units, set heat anticipator at 0.14 amp for first stage and 0.14 amp for second stage
For 50HJ units, set heat anticipator settings as shown below:

UNIT MODEL	UNIT VOLTAGE											
	208/230				460				575			
	Heater kW	Configuration			Heater kW	Configuration			Heater kW	Configuration		
		1 Stage	2 Stage			1 Stage	2 Stage			1 Stage	2 Stage	
		Stage 1	Stage 1	Stage 2		Stage 1	Stage 1	Stage 2		Stage 1	Stage 1	Stage 2
50HJ	10.4, 16.0	0.3	NA	NA	13.9, 16.5	0.3	NA	NA	18.0, 36.0	0.3	NA	NA
	24.8, 32.0	0.6	0.3	0.3	27.8, 33.0	0.6	0.3	0.3	54.0	0.6	0.3	0.3
	42.4, 50.0	0.9	0.6	0.3	41.7, 50.0	0.6	0.3	0.3				

VOLTAGE RATING	CB	MUST TRIP AMPS
	Mfg. Pt. No. Potter & Brumfield	
24 V	W28X-1024-3 2	3.2

6. Use copper, copper-clad aluminum, or aluminum conductors

COMPONENT ARRANGEMENT

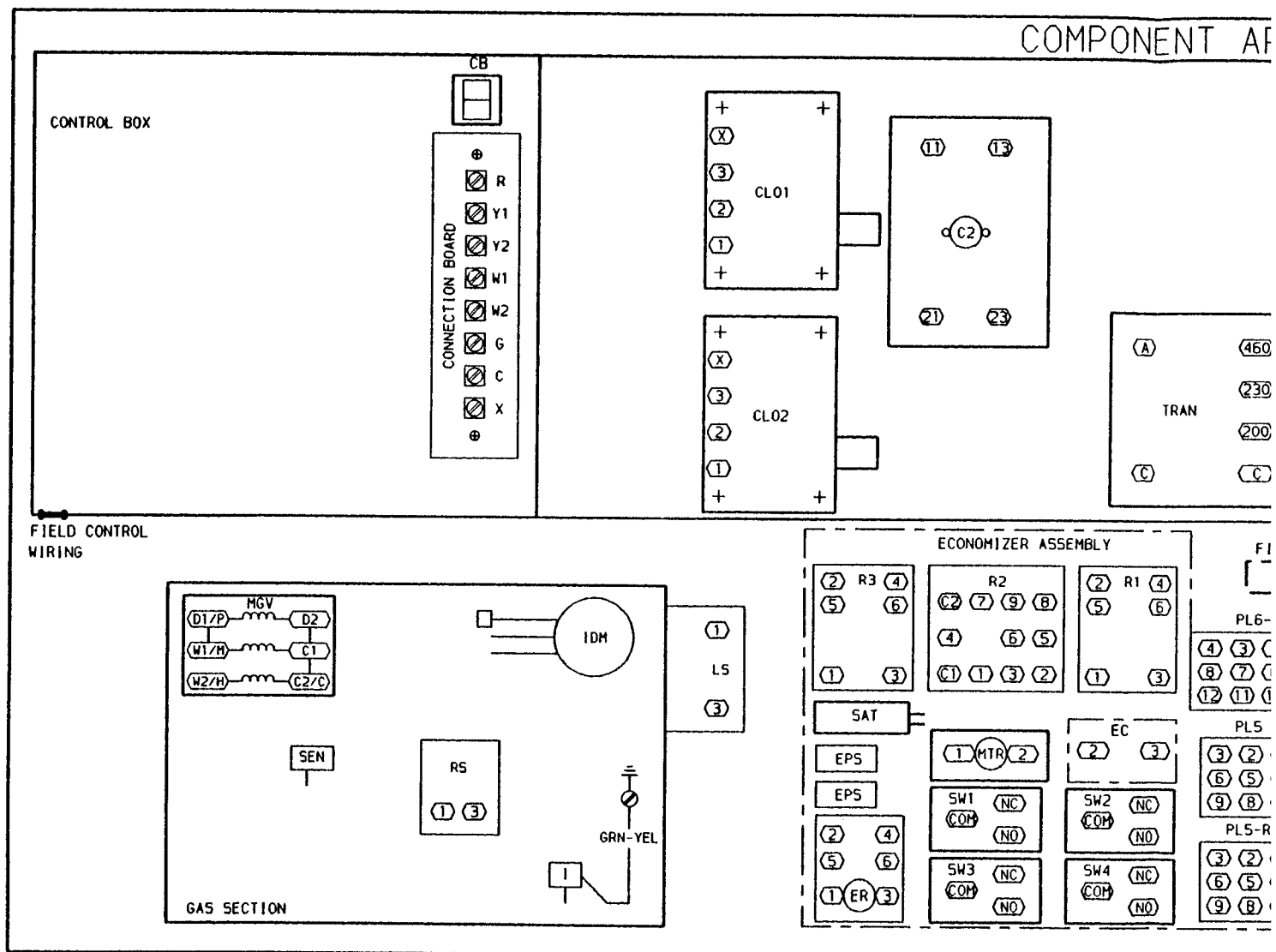


Fig. 1 — Label Diagram, Component Arrangement

[illegible]

at Arrangement; 48HJ008-014

COMPONENTS

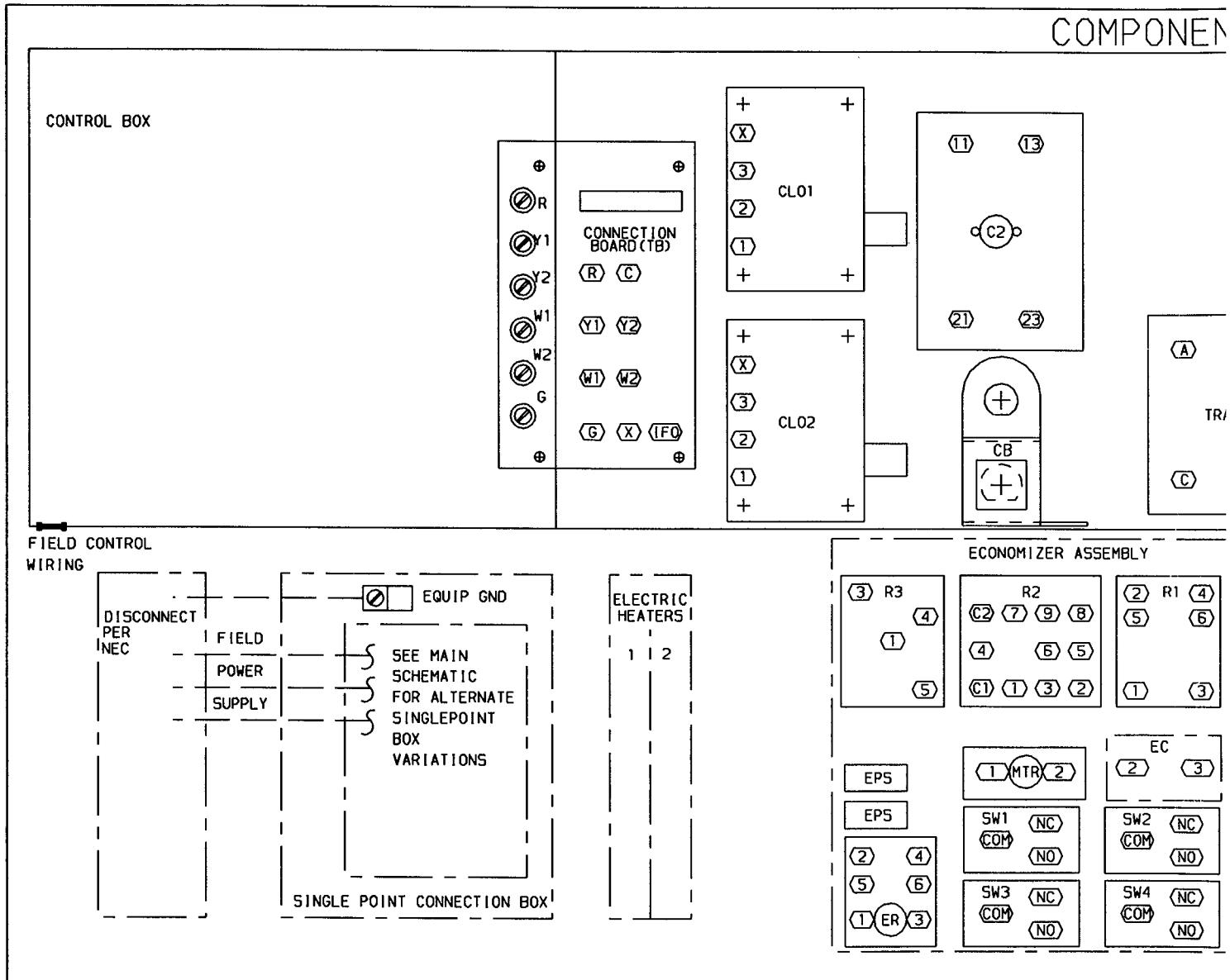
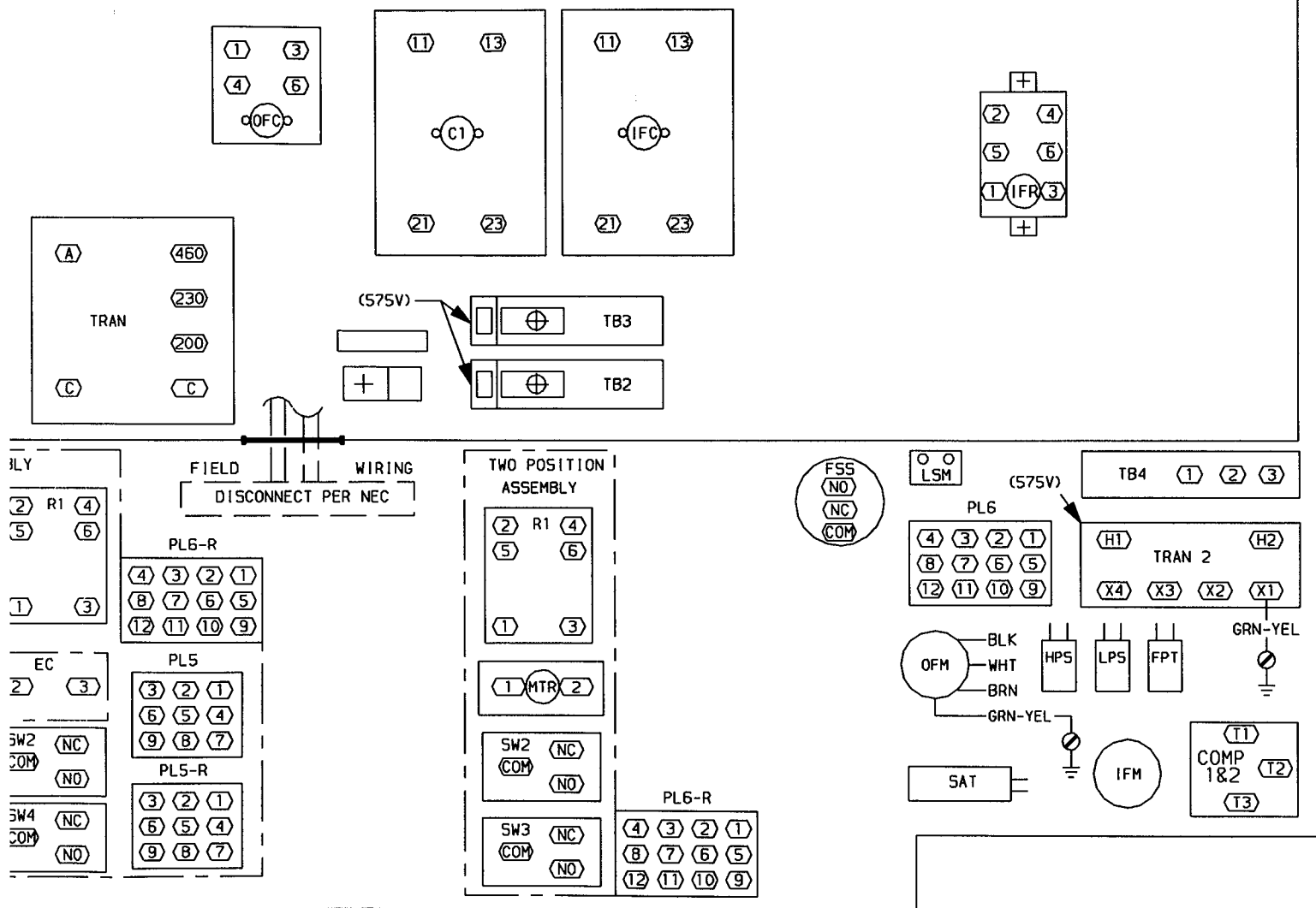
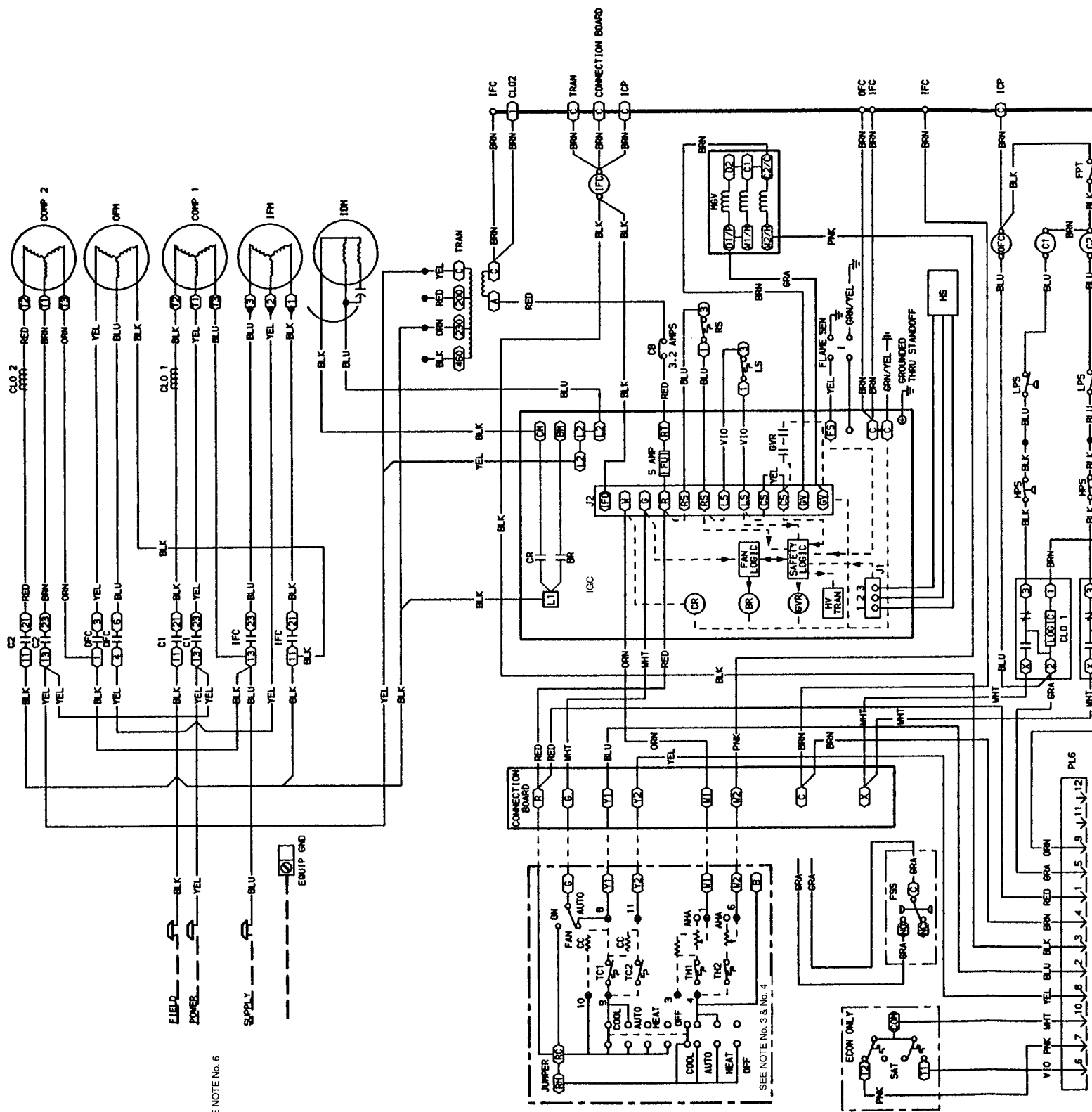


Fig. 2 — Label Diagram, Componer

COMPONENT ARRANGEMENT



Component Arrangement; 50HJ008-014



SEE NOTE No. 6

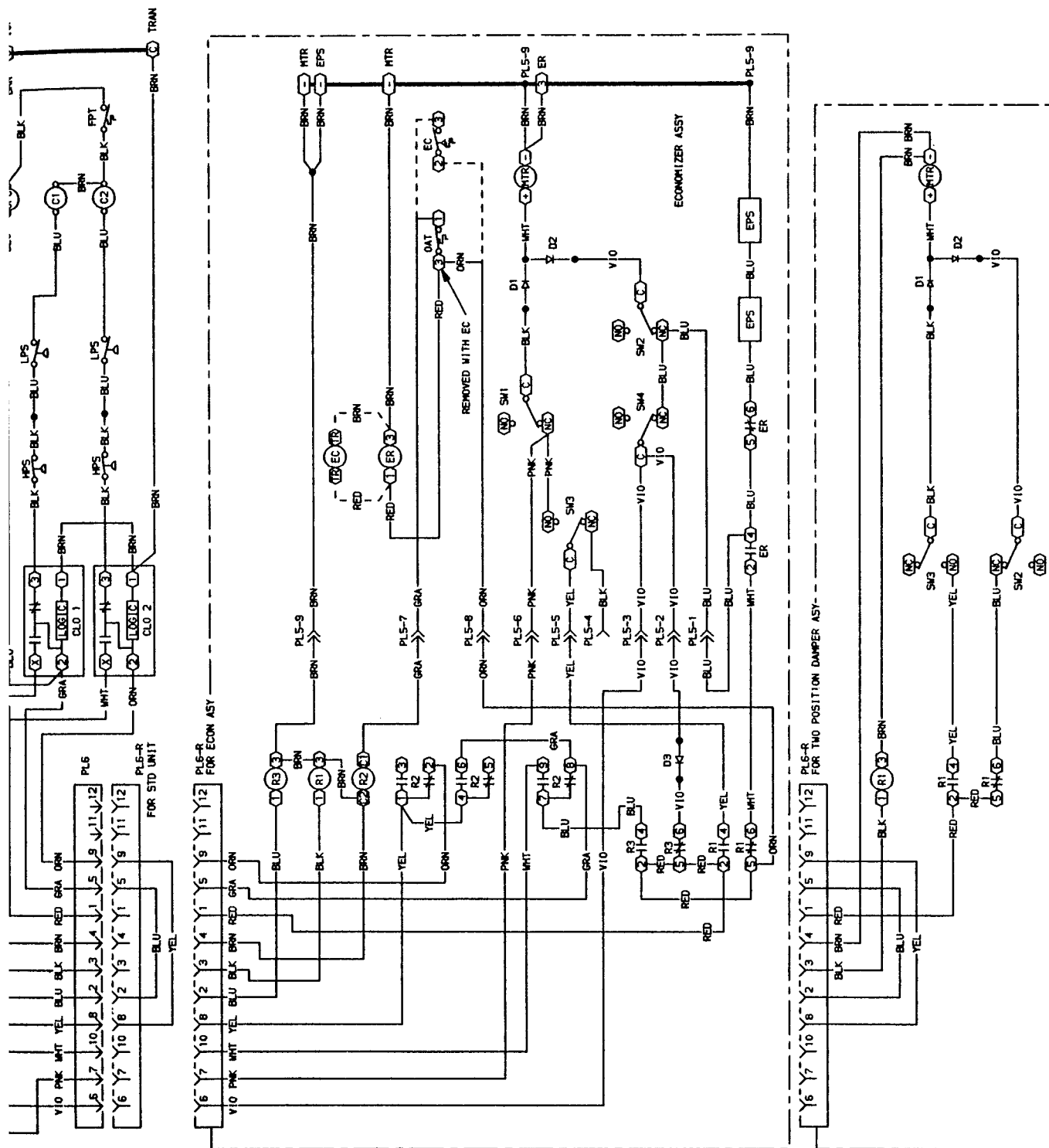


Fig. 3 — Label Diagram, Schematic; 48HJ008-014, 208/230-3-60



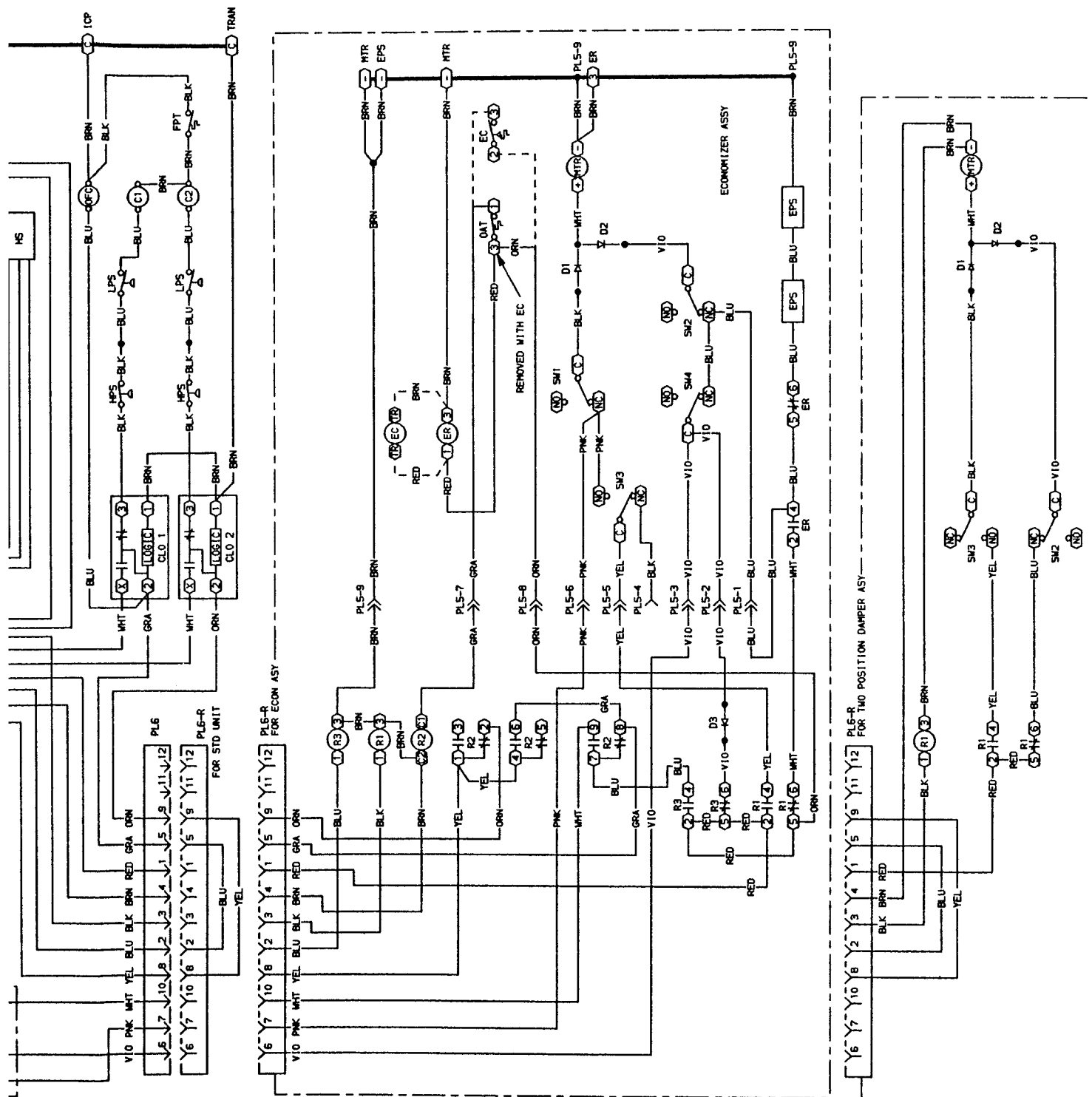
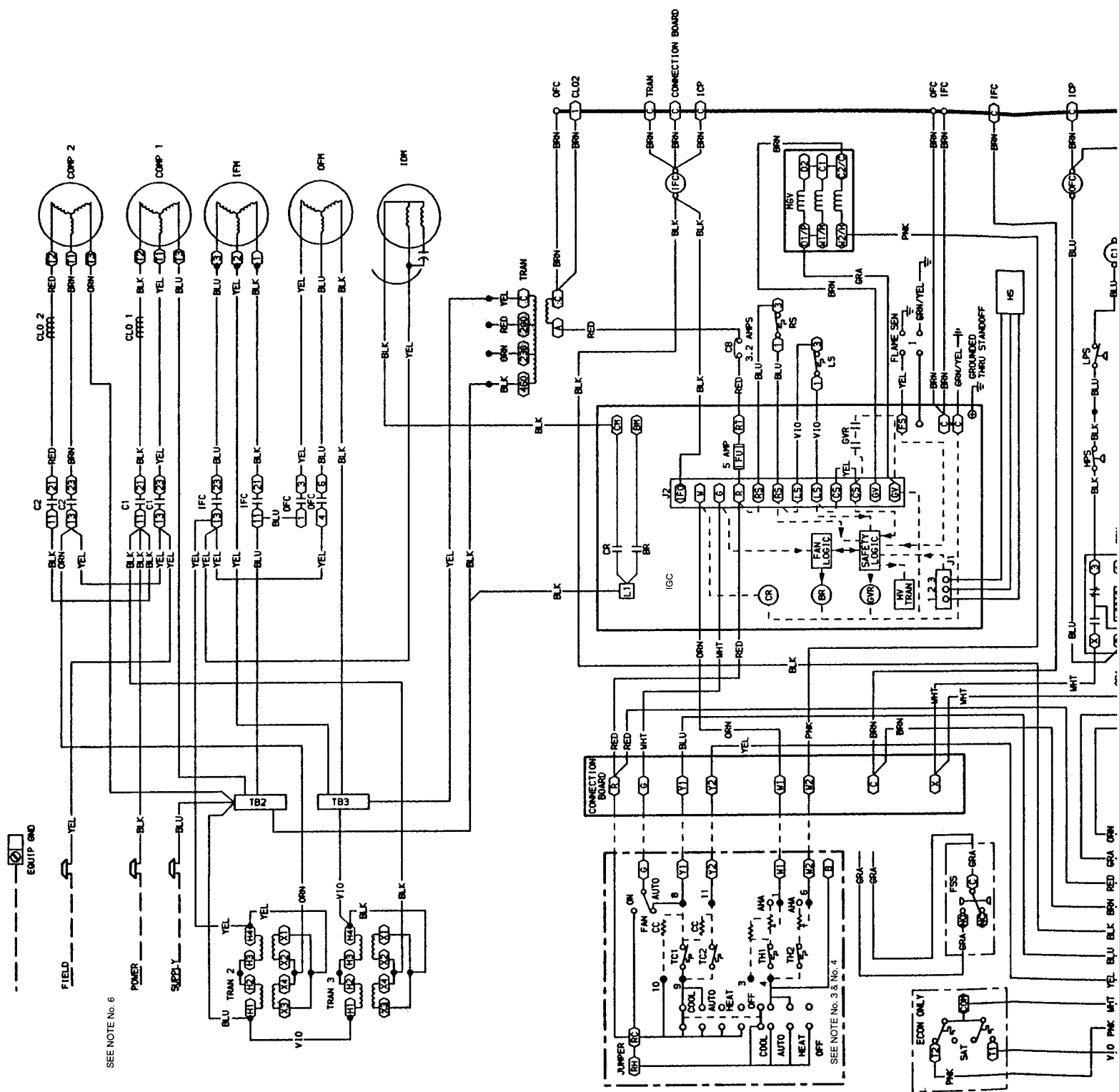


Fig. 4 — Label Diagram, Schematic: 48HJ008-014, 460-3-60



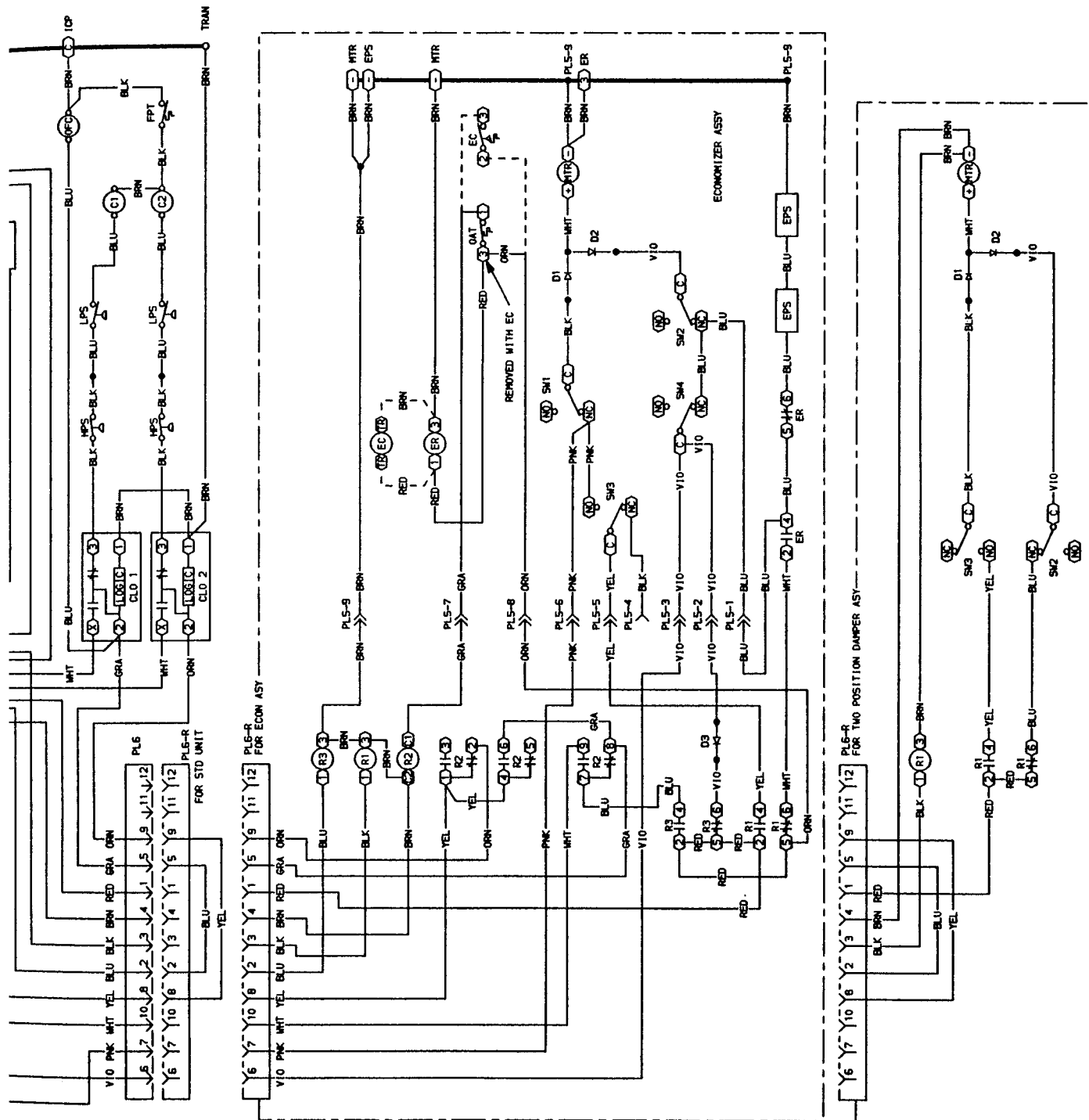


Fig. 5 — Label Diagram, Schematic; 48HJ008-014, 575-3-60

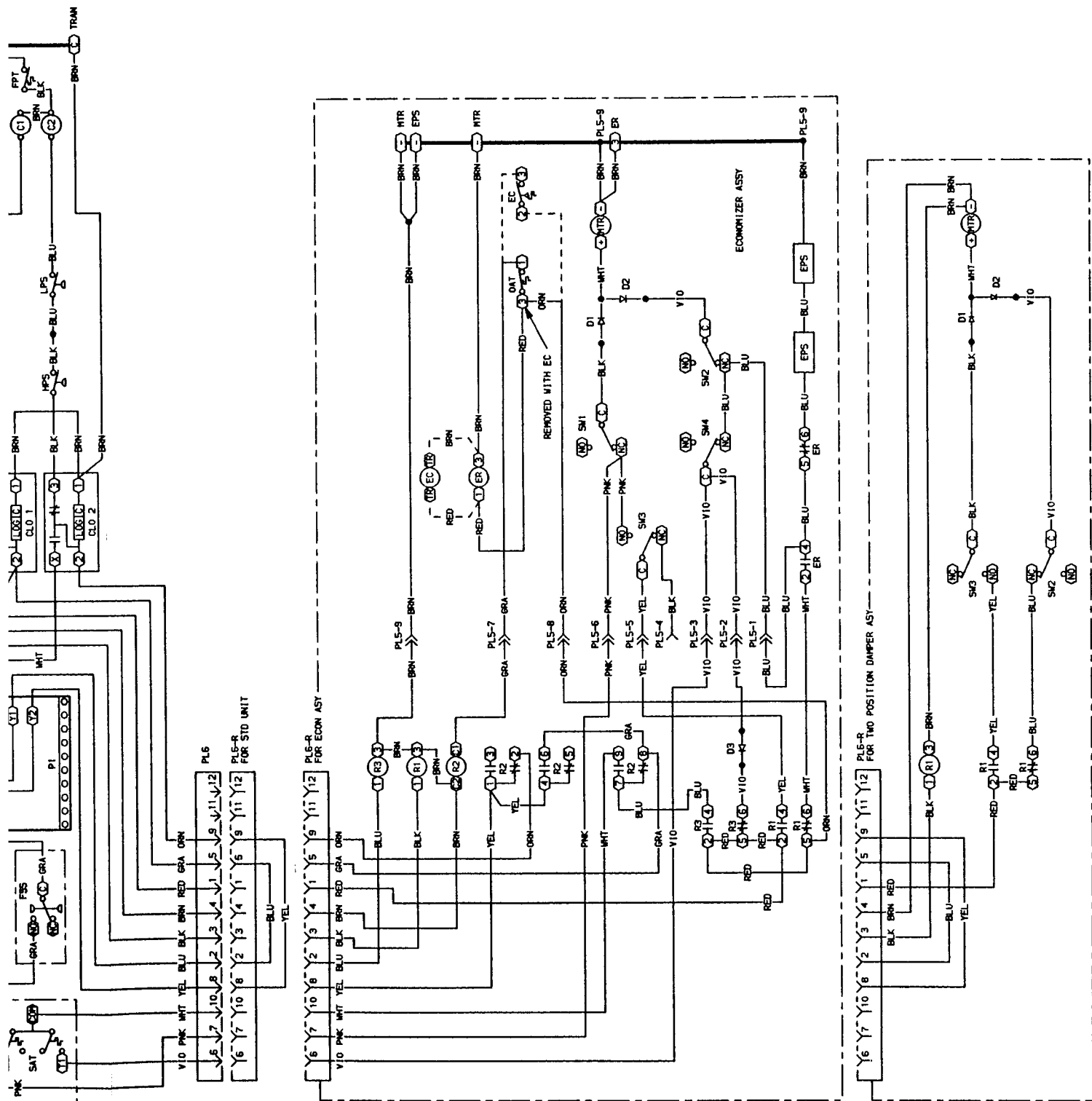
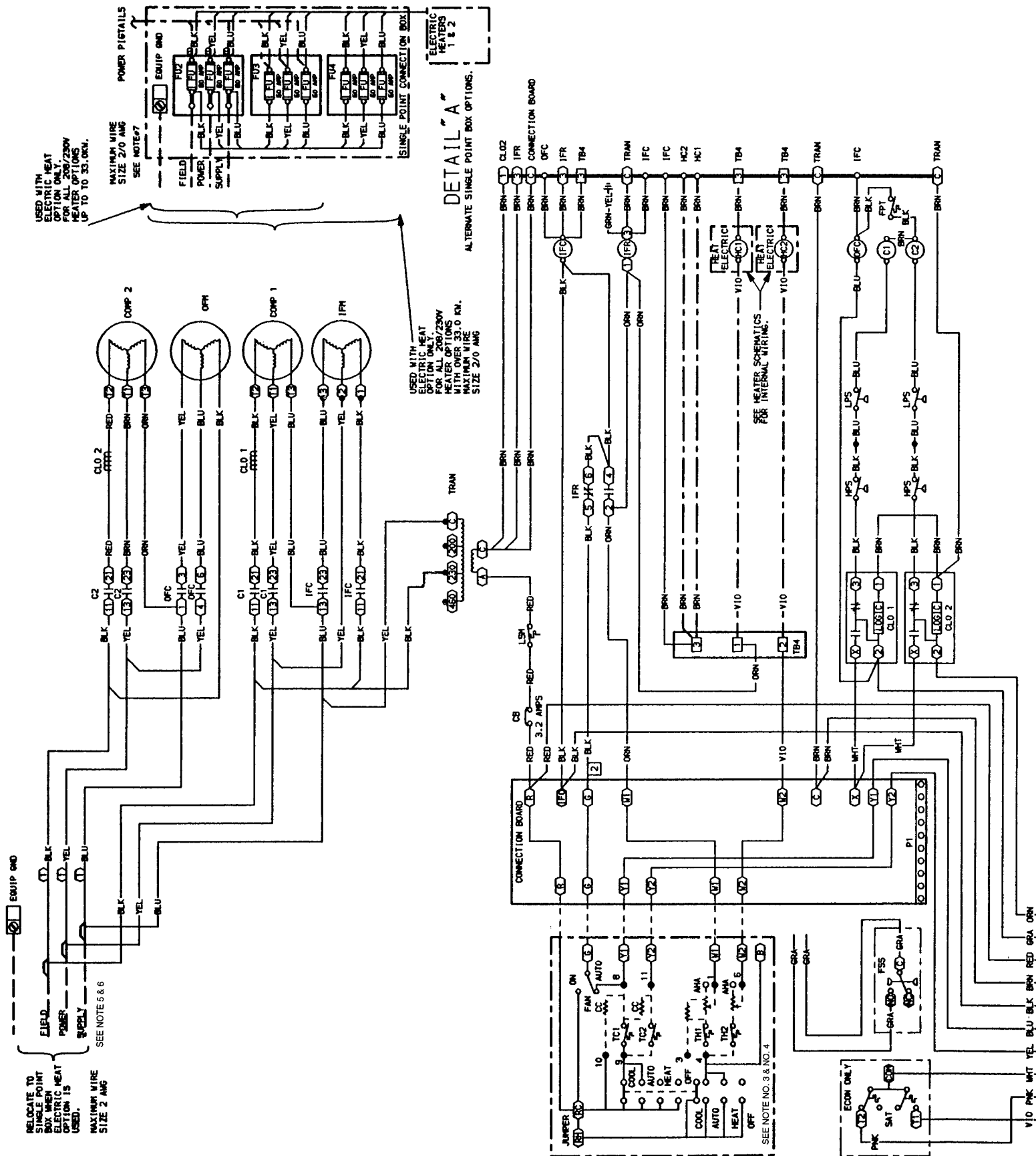


Fig. 6 — Label Diagram, Schematic; 50HJ008-012, 208/230-3-60 and 50HJ008-014, 460-3-60



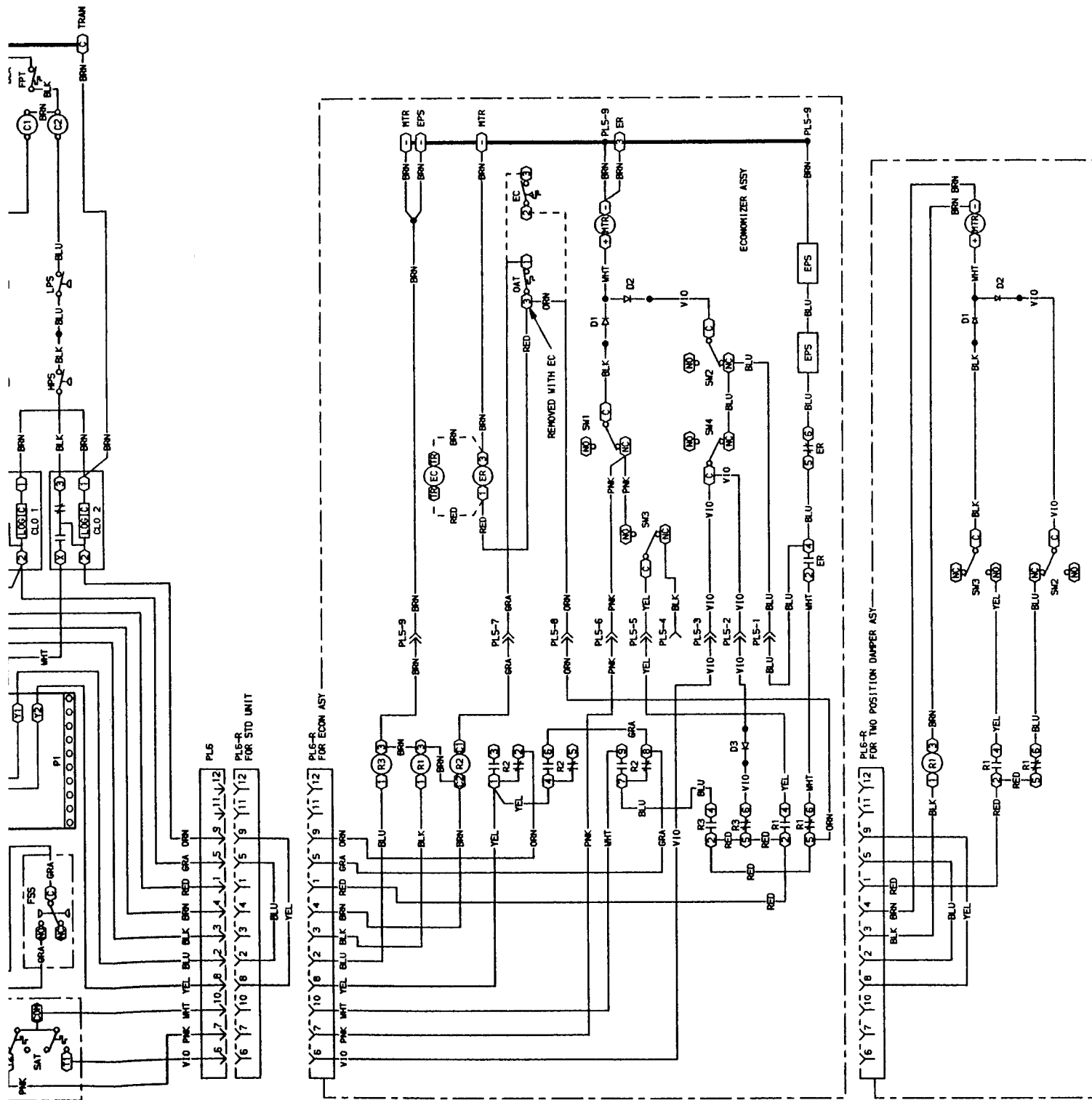
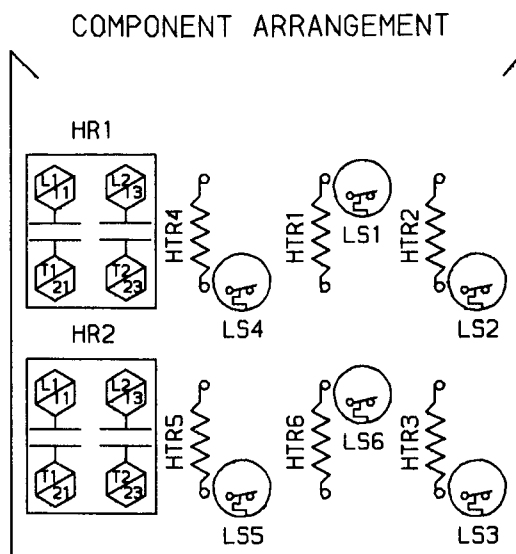
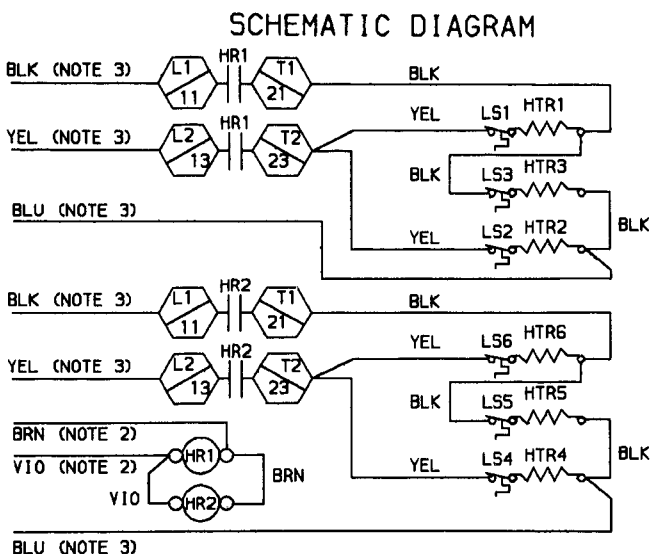


Fig. 8 — Label Diagram, Schematic; 50HJ008-014, 575-3-60



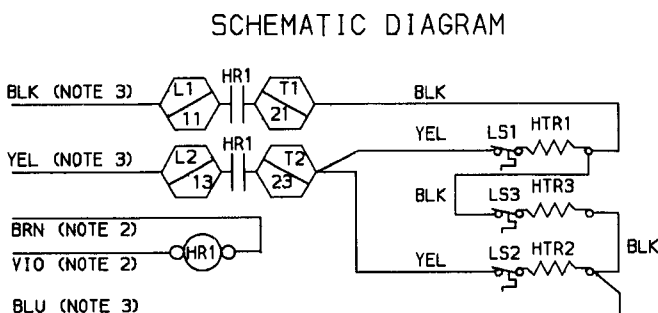
⚠ WARNING

Electric shock hazard. Disconnect all branch circuits before removing this cover.

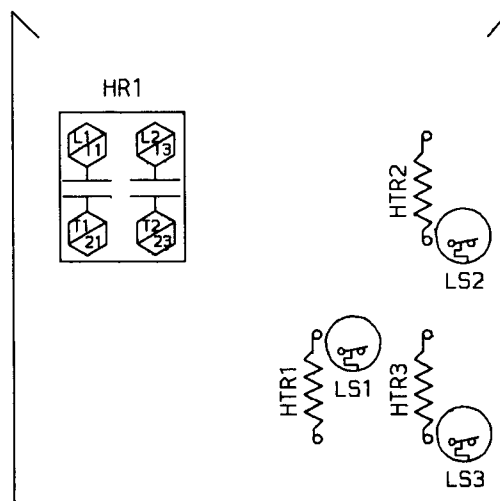
NOTES:

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. 9 — Label Diagram, Electric Heater; 18.6/24.8 kW, 24.0/32.0 kW, 31.8/42.4 kW and 37.5/50.0 kW; 208/230-3-60



COMPONENT ARRANGEMENT



⚠ WARNING

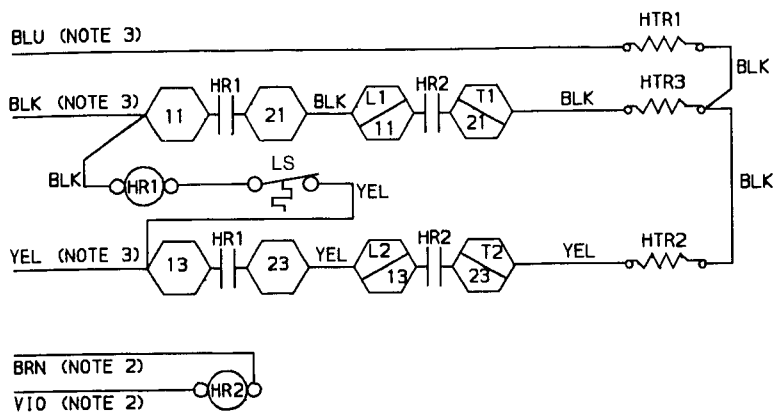
Electric shock hazard. Disconnect all branch circuits before removing this cover.

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.

Fig. 10 — Label Diagram, Electric Heater; 7.8/10.4 kW and 12.0/16.0 kW, 208/230-3-60

SCHEMATIC DIAGRAM



⚠ WARNING

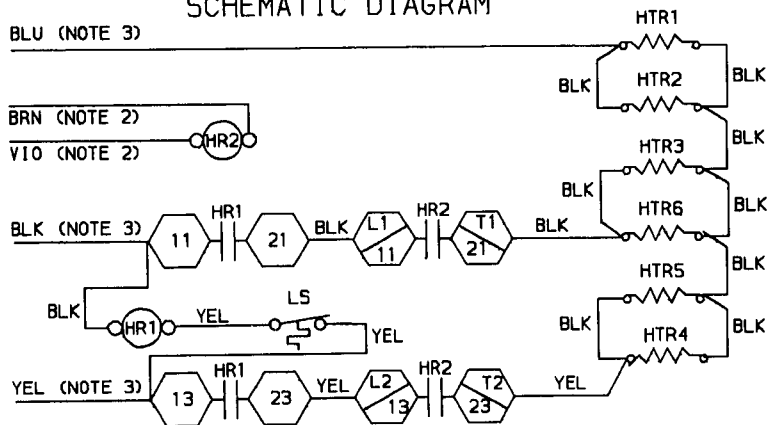
Electric shock hazard. Disconnect all branch circuits before removing this cover

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 — Label Diagram, Electric Heater; 13.9 kW and 16.5 kW, 460-3-60; 18.0 kW, 575-3-60

SCHEMATIC DIAGRAM



⚠ WARNING

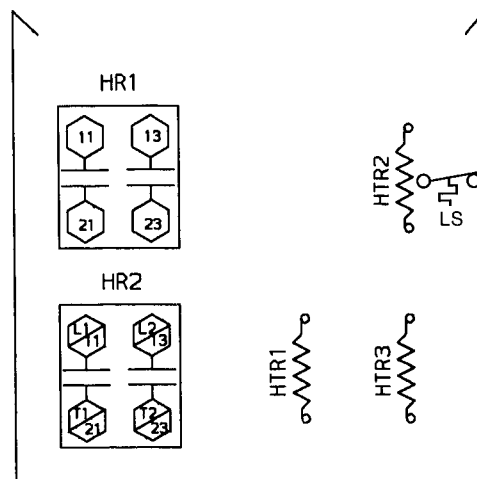
Electric shock hazard. Disconnect all branch circuits before removing this cover.

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 — Label Diagram, Electric Heater; 27.8 kW, 33.0 kW, 41.7 kW, and 50.0 kW, 460-3-60; 36.0 kW and 54.0 kW, 575-3-60

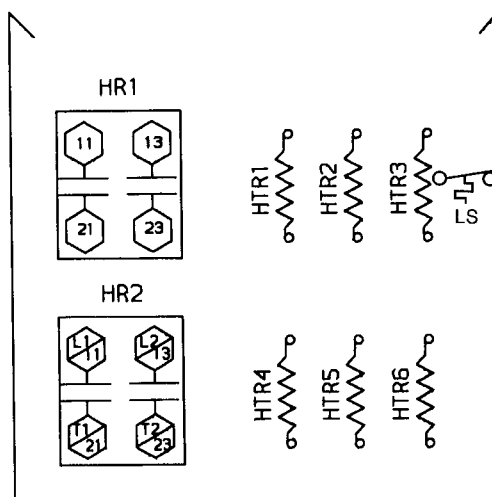
COMPONENT ARRANGEMENT



LEGEND

- Sylvania Marked Terminal
- Elmwood Unmarked Terminal
- HR — Heater Relay
- HTR — Heater
- LS — Limit Switch

COMPONENT ARRANGEMENT



LEGEND

- Sylvania Marked Terminal
- Elmwood Unmarked Terminal
- HR — Heater Relay
- HTR — Heater
- LS — Limit Switch

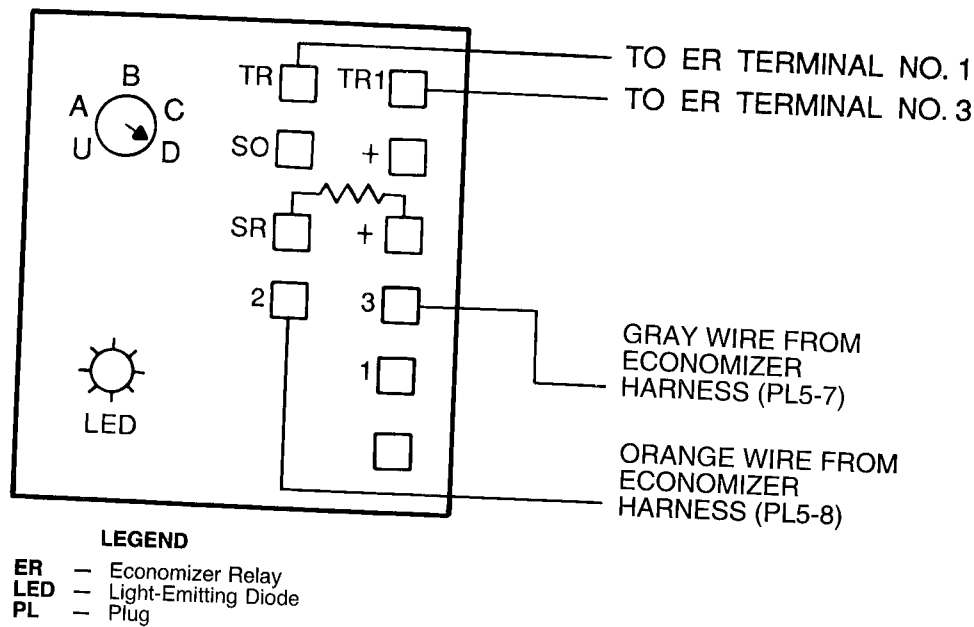
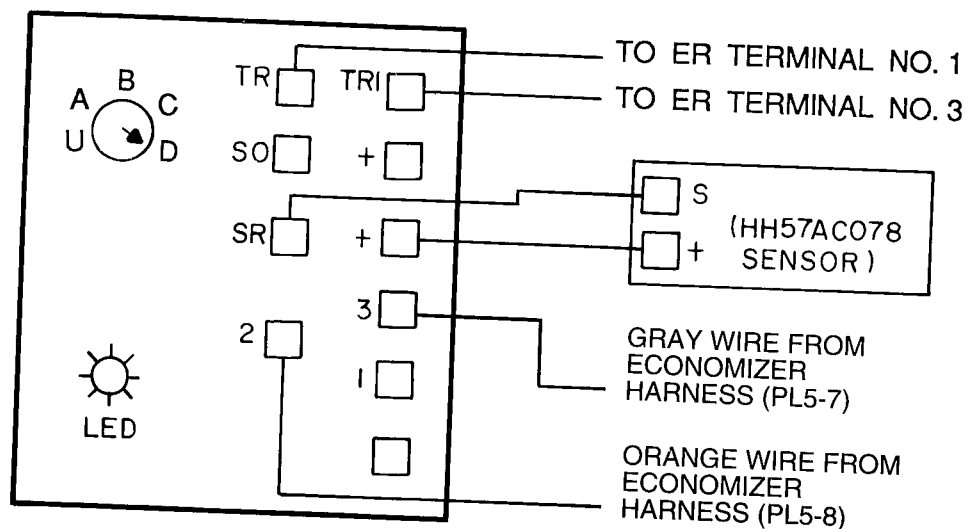


Fig. 13 — Wiring Connections for Solid-State Enthalpy Control (HH57AC077)

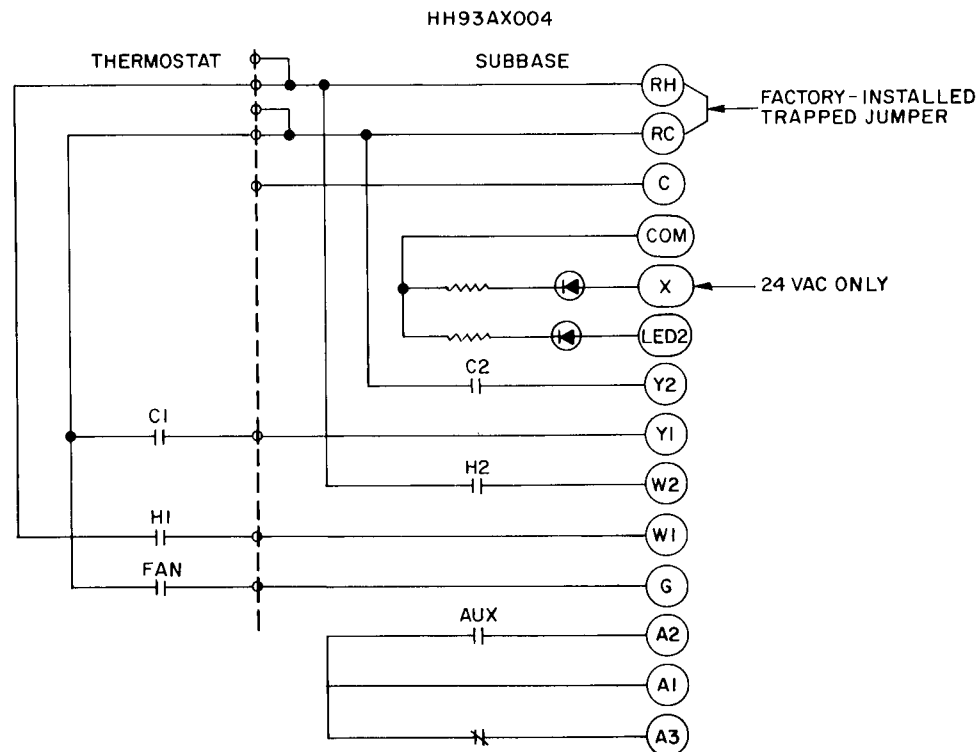
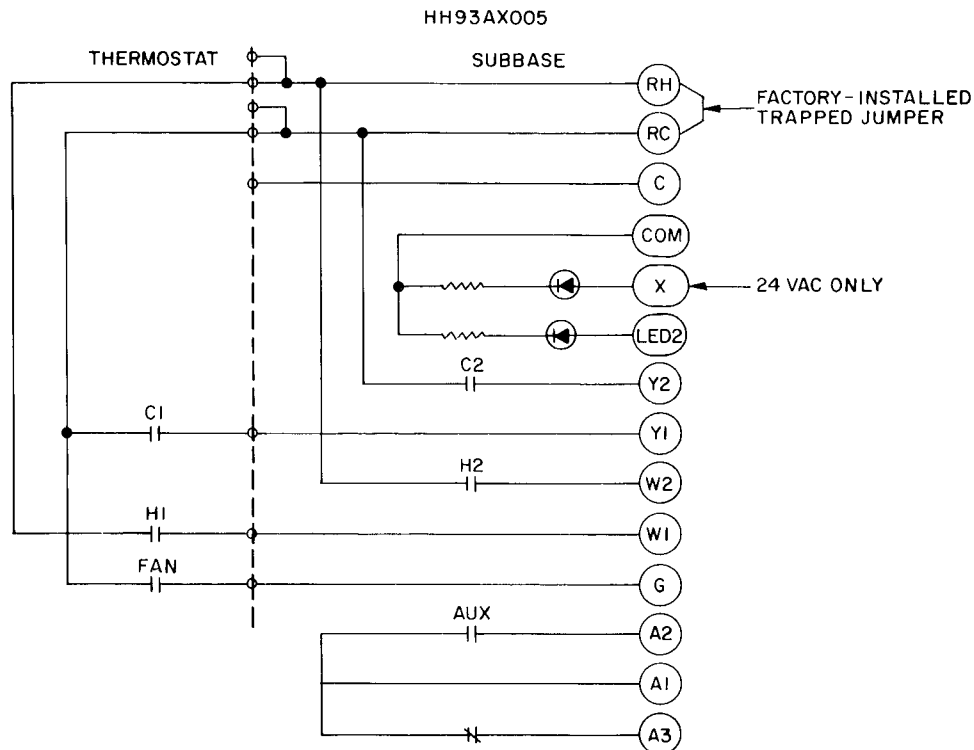


CONTROL SETTING	CONTROL POINT F (C) AT 50% RH
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)

LEGEND
ER — Economizer Relay
LED — Light-Emitting Diode
PL — Plug

NOTE: Remove factory-installed jumper across SR and + before connecting wires from HH57AC078 sensor. Turn enthalpy set point knob fully clockwise past the D setting.

Fig. 14 — Wiring Connections for Solid-State Enthalpy Control (HH57AC077 and HH57AC078)



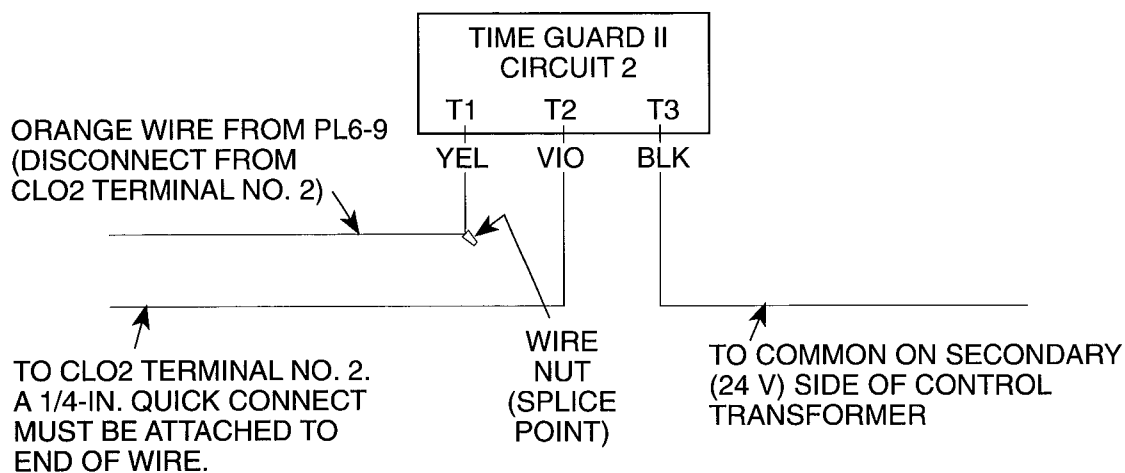
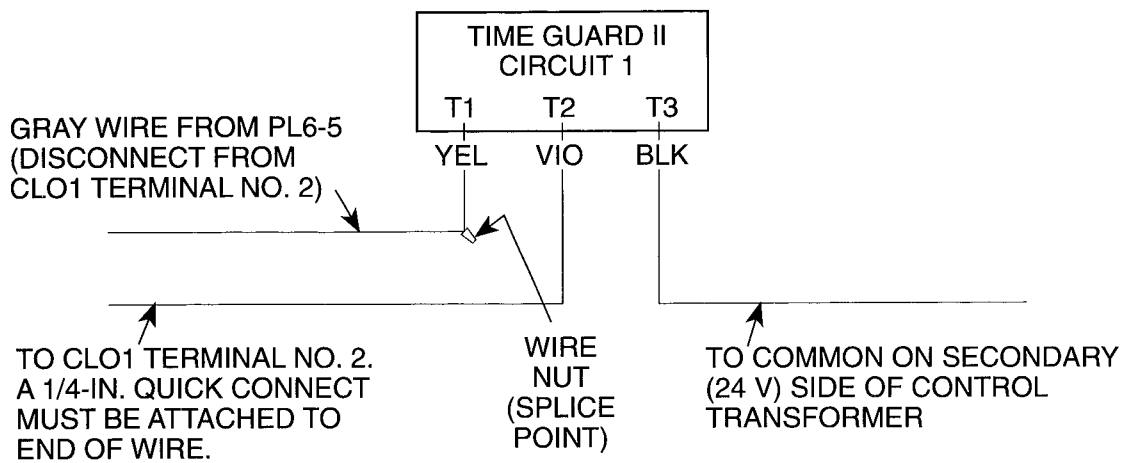
LEGEND

AUX — Auxiliary
C — Contactor
CLO — Compressor Lockout
COM — Common

G — Fan
LED — Light-Emitting Diode
W1 — Stage 1 Heat
W2 — Stage 2 Heat

X — CLO
Y1 — Stage 1 Cool
Y2 — Stage 2 Cool

**Fig. 16 — Electronic Thermostat Wiring,
48/50HJ008-014**



LEGEND
CLO - Compressor Lockout
PL - Plug
T - Terminal

Fig. 17 — Time Guard® II Control Circuit Wiring