



48/50HJ004-007 Single-Package Cooling/Heating Units



Wiring Diagrams

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

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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

48HJ Units

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 and the compressor contactor (C) are energized. The indoor (evaporator) fan motor (IFM), compressor, and outdoor (condenser) fan motor (OFM) start. The OFM runs continuously while the unit is in cooling. When the thermostat is satisfied, C is deenergized and the compressor 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.

HEATING, UNITS WITHOUT ECONOMIZER — When the thermostat calls for heating, terminal W1 is energized. The induced-draft motor is energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, 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 is deenergized, the IFM stops after a 45 second time-off delay.

COOLING, UNITS WITH ECONOMIZER — When the outdoor-air temperature is above the outdoor-air thermostat (OAT) setting and the room thermostat calls for cooling, compressor contactor is energized to start compressor and the outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper moves to the minimum position. After the thermostat is satisfied, there is a 30-second delay before the evaporator fan turns off. The damper then moves to the fully closed position. When using continuous fan, the damper moves to the minimum position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for cooling, the economizer damper moves 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 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 moves to the fully closed position when using AUTO. fan or to the minimum position when using continuous fan.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing 2 stages of cooling. Compressor and the condenser fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. 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, there is a 30-second delay before the evaporator fan shuts off. The damper then moves to the fully closed position. When using a continuous fan, the damper moves to the minimum position.

HEATING, UNITS WITH ECONOMIZER — When the thermostat calls for heating, terminal W1 is energized. The induced-draft motor is 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. On units equipped for 2 stages of heat, when additional heat is needed, W2 and the high-fire solenoid on the main gas valve (MGV) are energized. When the thermostat is satisfied and W1 is 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 thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), compressor contactor no. 1 (C1), and outdoor (condenser) fan contactor (OFC) are energized and the evaporator-fan motor, compressor no. 1, and condenser fan start. The condenser-fan motor runs continuously while unit is cooling.

HEATING, UNITS WITHOUT ECONOMIZER — 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 ambient temperature is above the outdoor-air thermostat (OAT) setting and the thermostat calls for cooling, compressor contactor is energized to start compressor and the outdoor (condenser) fan motor (OFM). The indoor (evaporator) fan motor (IFM) is energized and the economizer damper blade opens to the minimum position. After the thermostat is satisfied, the evaporator fan turns off, and the damper moves to the fully-closed position. When using continuous fan, the damper moves to the minimum position.

If the outdoor ambient temperature is below the OAT setting and the thermostat calls for cooling, the economizer damper moves 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 moves to the fully closed position when using AUTO. fan or to the minimum position when using continuous fan.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing 2 stages of cooling. Compressor and the condenser fan will be energized and the position of the economizer damper will be determined by the supply-air temperature. 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 evaporator fan shuts off. The damper then moves to the fully-closed position. When using a continuous fan, the damper moves to the minimum position.

HEATING, UNITS WITH ECONOMIZER — Upon a call for heat through W1, the IFC energizes to start the evaporator fan and the economizer damper blade opens 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. If unit is equipped with 2 stages of heat, when additional heat is needed a call is made through W2.

As space temperature approaches the heating temperature set point, heating stages cycle off. Economizer or two-position damper returns to fully closed position.

LEGEND (FIG. 1 – 12 and 22)

AHA	— Adjustable Heat Anticipator	OFC	— Outdoor (Condenser) Fan Contactor
APS	— Auxiliary Pressure Switch	OFM	— Outdoor (Condenser) Fan Motor
ASY, ASSY	— Assembly	P	— Plug
AUX	— Auxiliary	PL	— Plug Assembly
AWG	— American Wire Gage	QT	— Quadruple Terminal
C	— Contactor, Compressor	R	— Relay
CAP	— Capacitor	RS	— Rollout Switch
CB	— Circuit Breaker	SAT	— Supply-Air Thermostat
CC	— Cooling Compensator	SEN	— Sensor
CH	— Crankcase Heater	ST	— Thermistor Starter
CLO	— Compressor Lockout	SW	— Switch
COM	— Common	SW1	— Switch, Fully Open
COMP	— Compressor Motor	SW2	— Switch, Fully Closed
CR	— Control Relay	SW3	— Switch Minimum Vent Position
D	— Diode	SW4	— Switch Maximum Vent Position
EC	— Enthalpy Control	TB	— Terminal Block
ECON	— Economizer	TC	— Thermostat, Cooling
EPS	— Emergency Power Supply	TDR	— Time-Delay Relay
EQUIP	— Equipment	TG	— Time Guard® Device
ER	— Economizer Relay	TH	— Thermostat, Heating
FPT	— Freeze Protection Thermostat	TRAN	— Transformer
FSS	— Filter Status Switch		Field Splice
FU	— Fuse		Marked Wire
GND	— Ground Connection		Terminal (Marked)
HC	— Heater Contactor		Terminal (Unmarked)
HPS	— High-Pressure Switch		Terminal Block
HS	— Hall Effect Sensor		Splice
I	— Ignitor, Electrode		Splice (Marked)
IDM	— Induced-Draft Motor		Factory Wiring
IFC	— Indoor-Fan Contactor		Field Control Wiring
IFM	— Indoor-Fan Motor		Field Power Wiring
IGC	— Integrated Gas Controller		Accessory or Optional Wiring
LPS	— Low-Pressure/Loss-of-Charge Switch		To indicate common potential only, not to represent wiring
LS	— Limit Switch		
LSM	— Limit Switch (Manual Reset)		
MGV	— Main Gas Valve		
MTR	— Motor		
NC	— Normally Closed		
NEC	— National Electrical Code		
NO	— Normally Open		
OAT	— Outdoor-Air Thermostat		

NOTES

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C wire or its equivalent
2. Electric heater ratings are based on 208, 240, and 480 v. Adjust amperage and kW for other operating voltages
3. Three-phase motors are protected under primary single-phasing conditions
4. Thermostat: HH07AT170, 172, 174
Subbase: HH93AT177, 179
5. On 48HJ units, set heat anticipator at 0.14 amp for each stage
On 50HJ units, set heat anticipator settings at 0.8 amp for 1st stage and 0.3 amp for 2nd stage.
6. Must Trip Current for circuit breaker protecting 24-v control circuit is 3.2 amps
7. Use copper, copper-clad aluminum or aluminum conductors.
8. Condenser-fan motors are protected with internal thermal overloads.

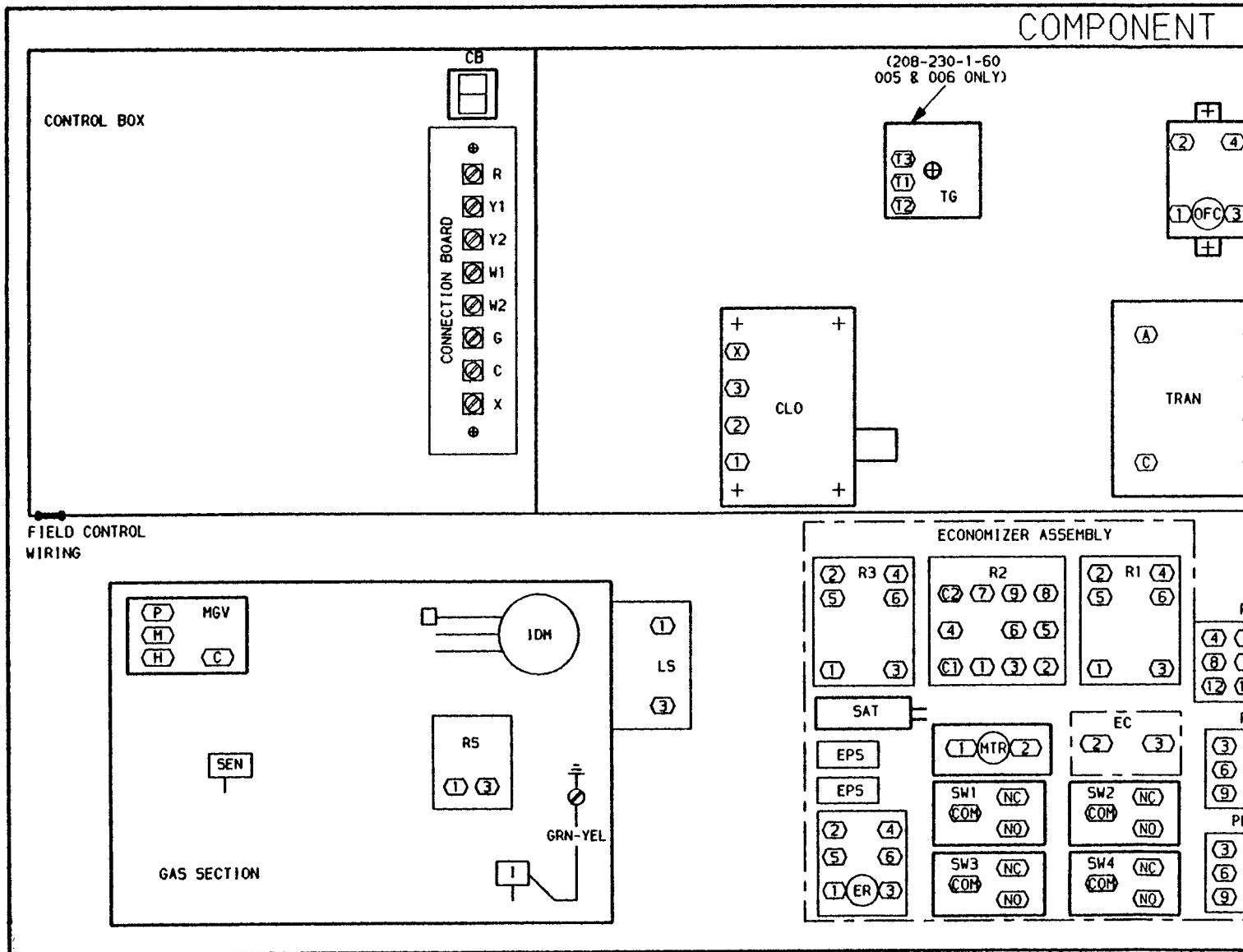


Fig. 1 – Component Ar

Component Arrangement, 48HJ004-007

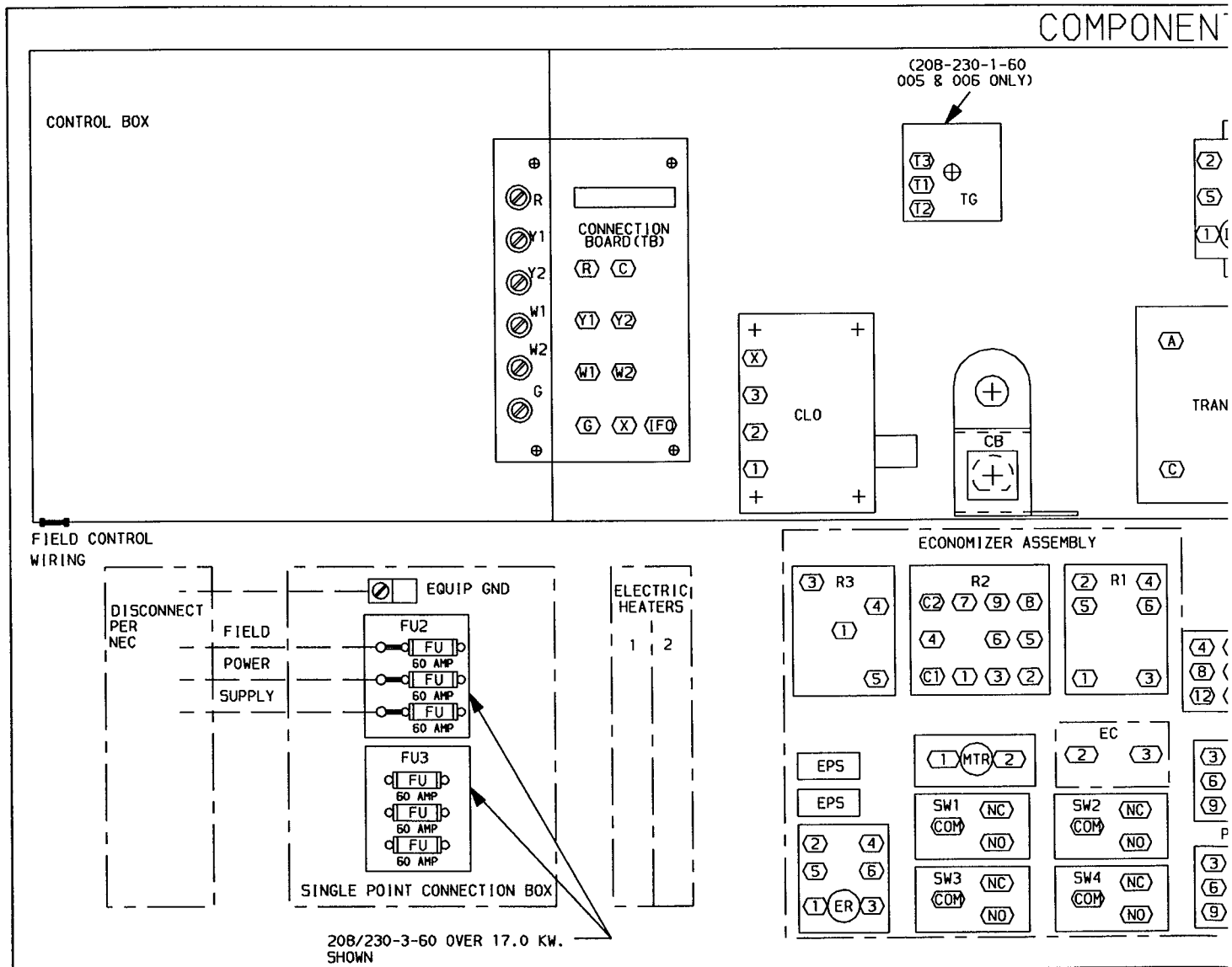
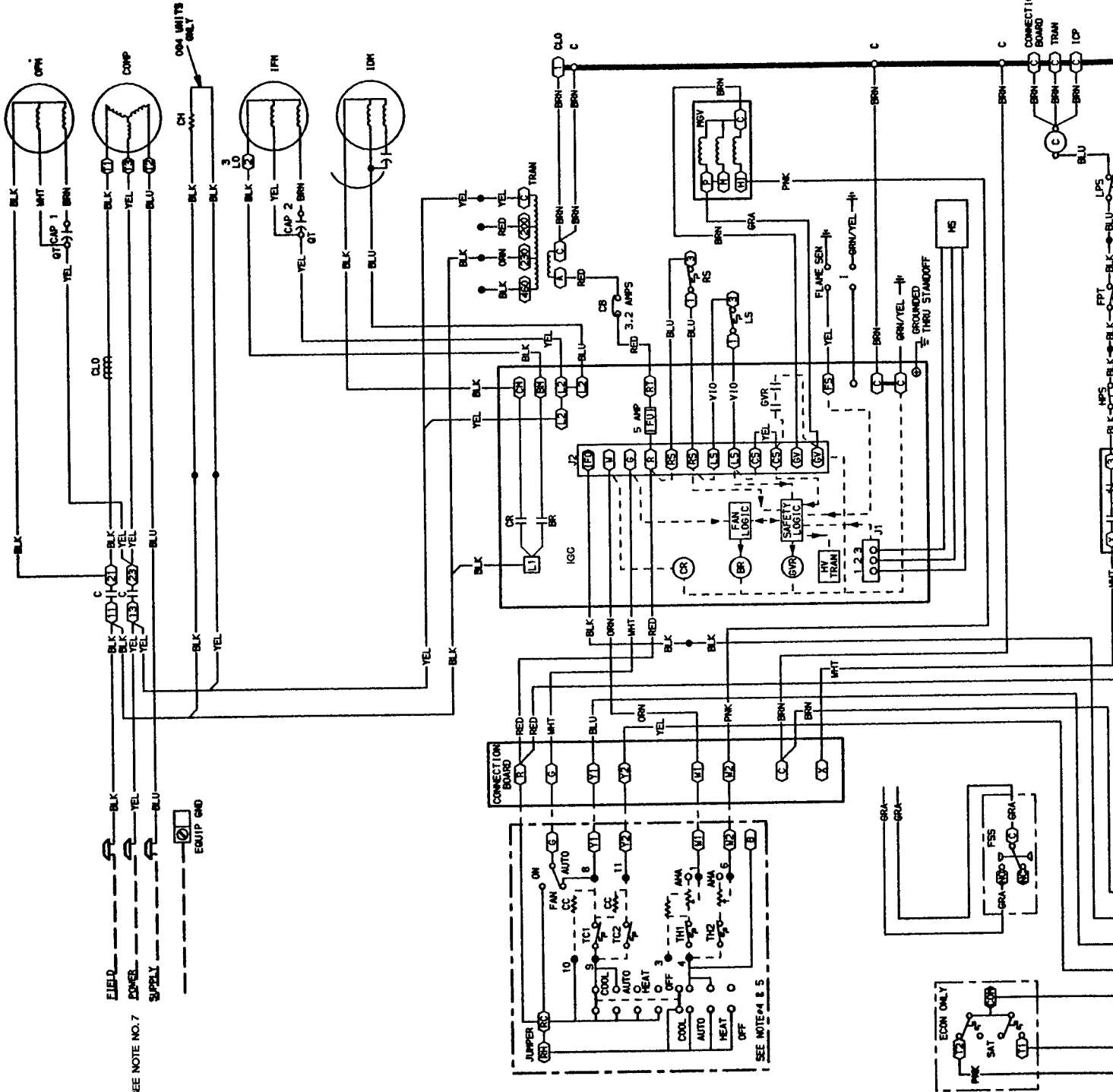


Fig. 2 – Component Arrangement

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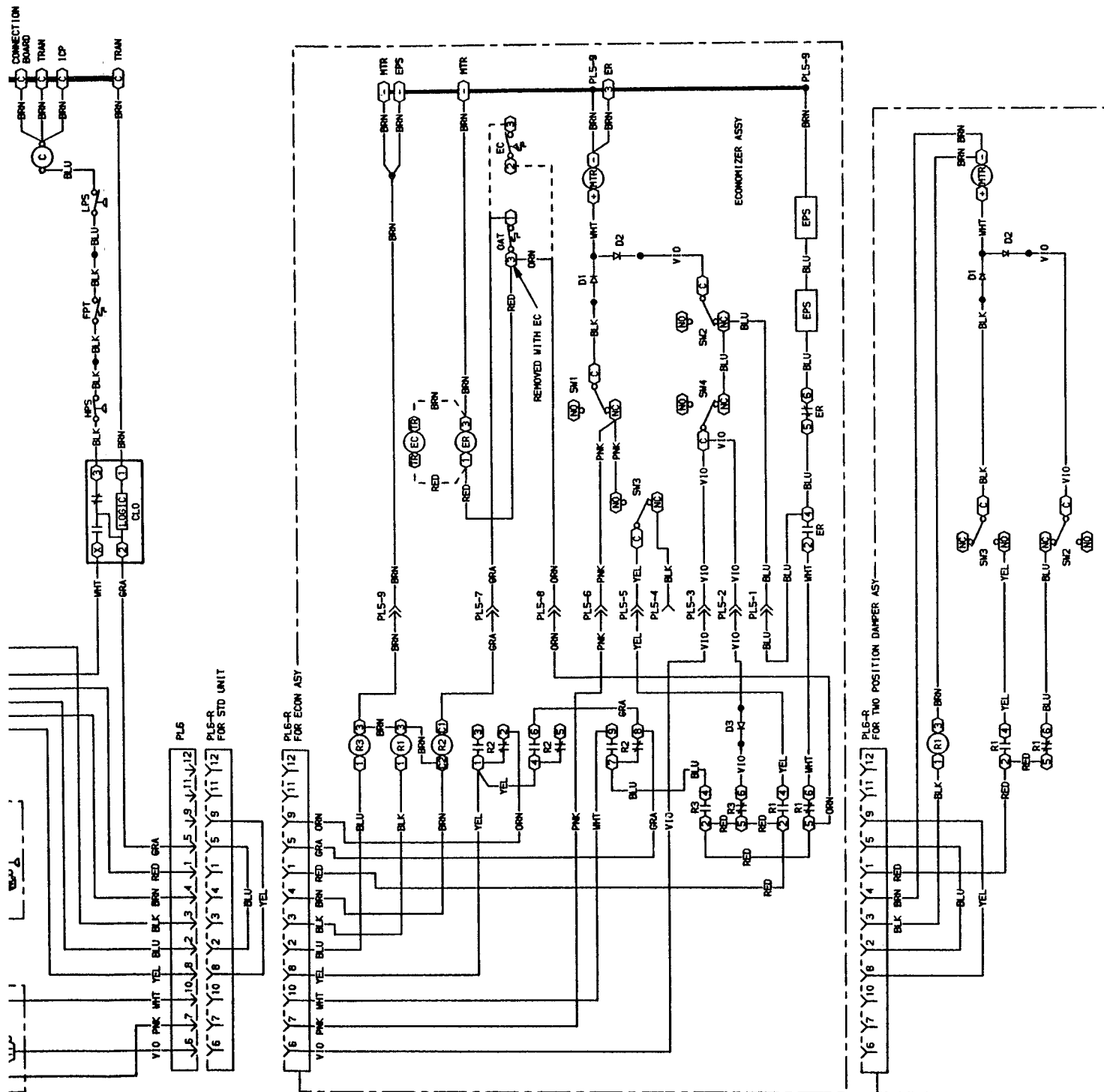


Fig. 4 — Label Diagram, Schematic; 48HJ004-006, 208/230-3-60



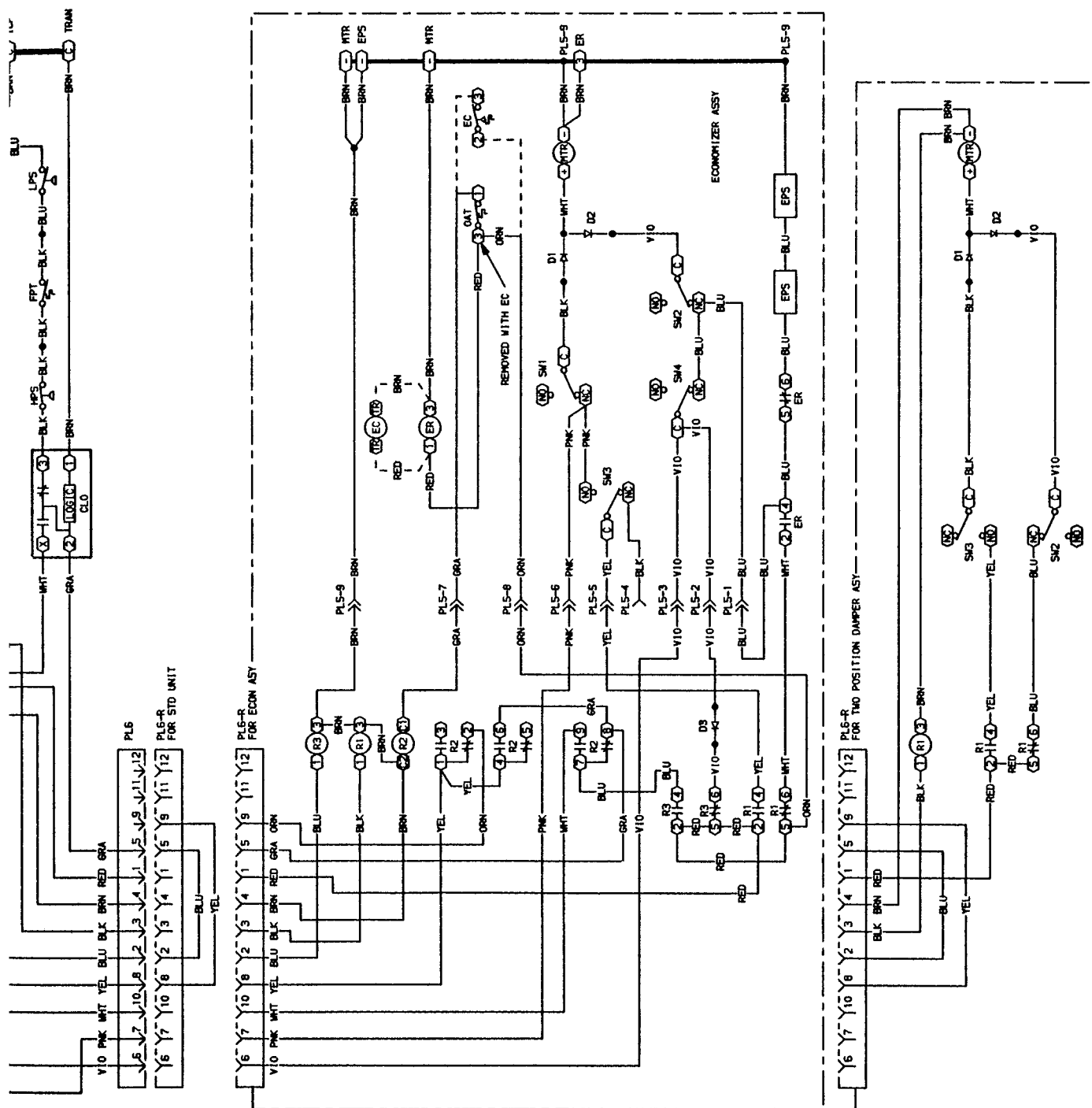
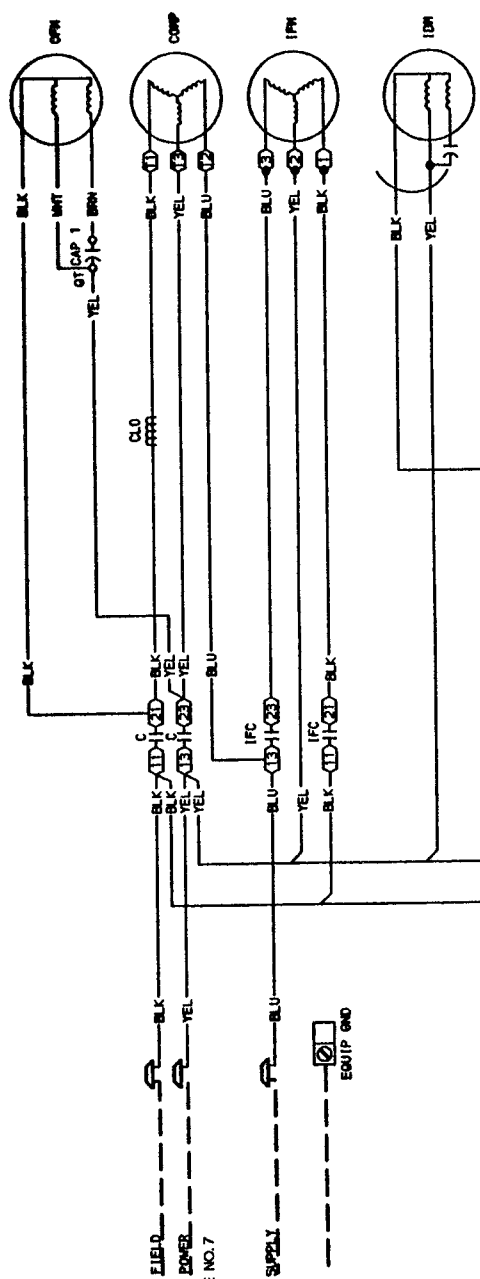


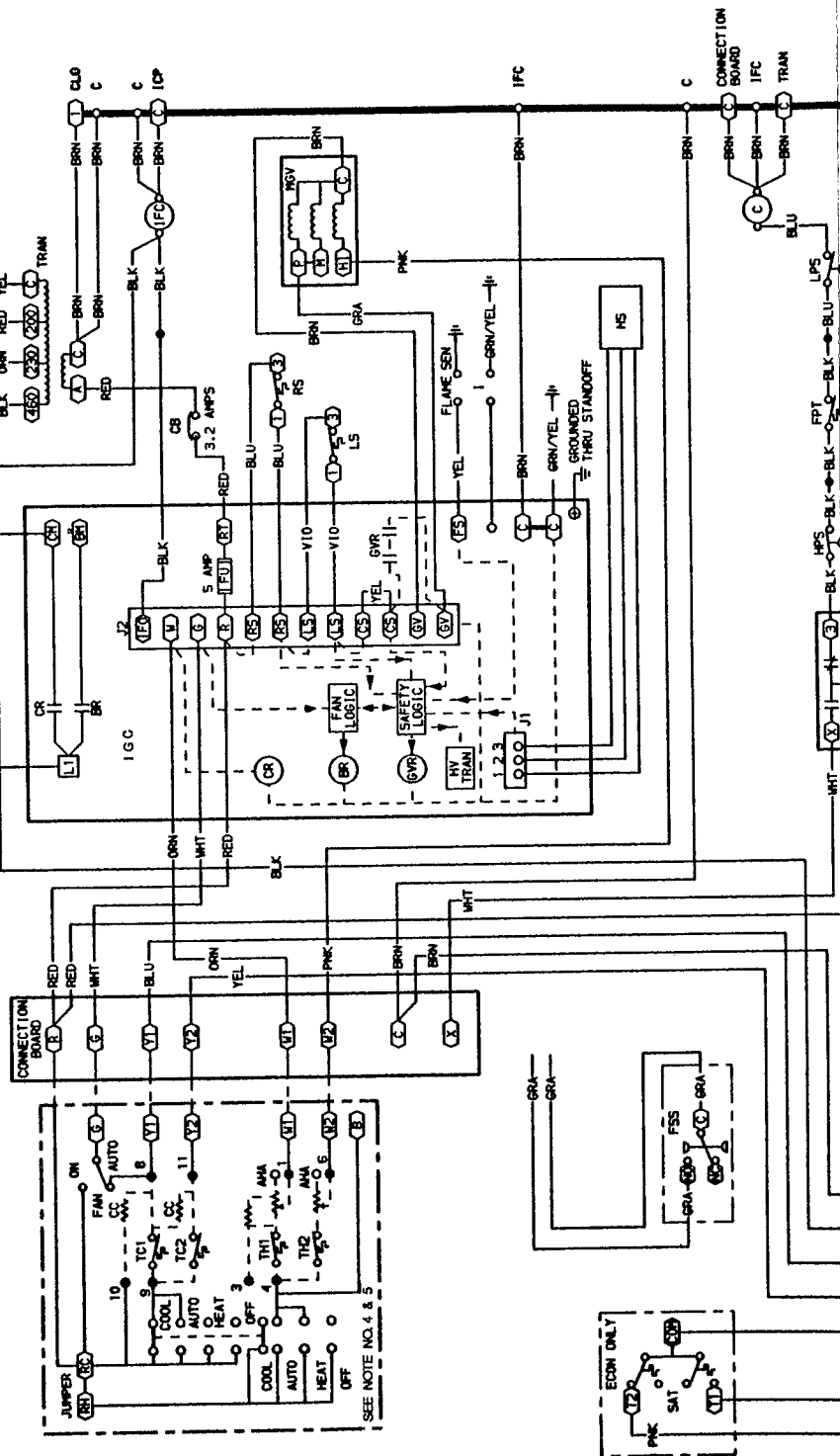
Fig. 5 — Label Diagram, Schematic; 48HJ004-006, 460-3-60







SEE NOTE NO. 7



SEE NOTE NO. 4 & 5

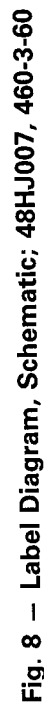








Fig. 10 – Label Diagram, Schematic; 50HJ004-006, 208/230-1-60



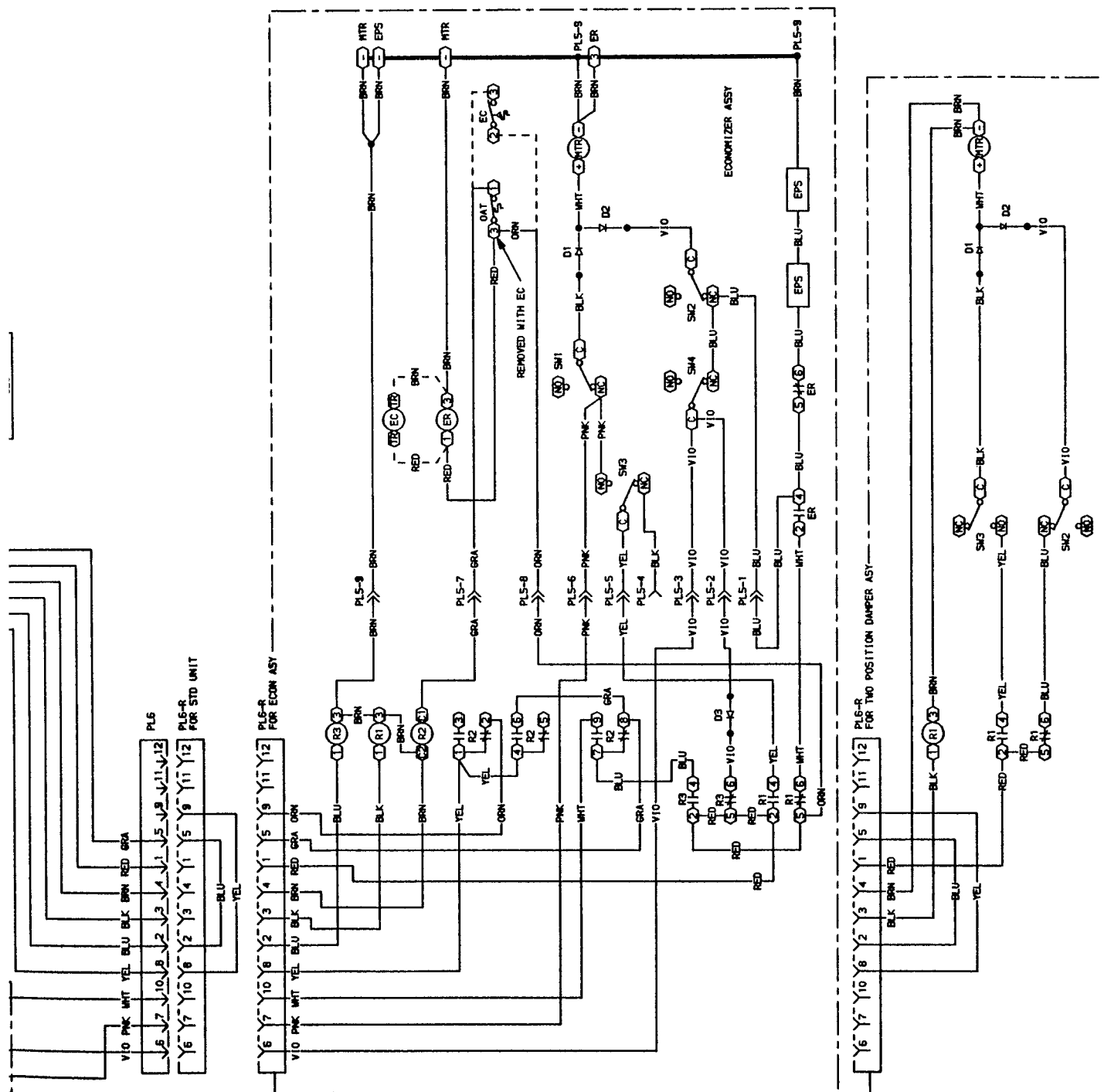


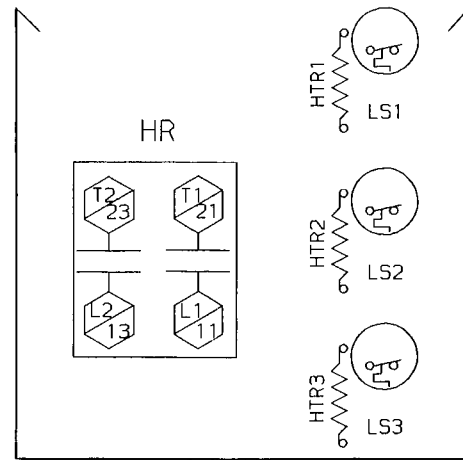
Fig. 11 — Label Diagram, Schematic; 50HJ004-007, 208/230-3-60 and 460-3-60





Fig. 12 – Label Diagram, Schematic; 50HJ004-007, 575-3-60

COMPONENT ARRANGEMENT



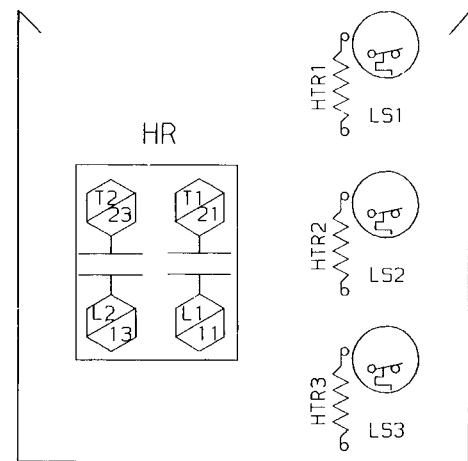
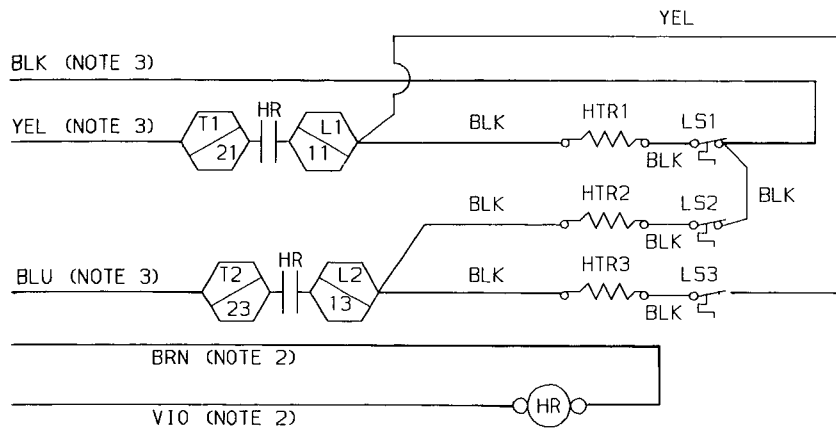
LEGEND

 Sylvania Marked Terminal
 Elmwood Unmarked Terminal
 HR — Heater Relay
 HTR — Heater
 LS — Limit Switch
 NEC — National Electrical Code
 SC — Splice Connector

	E m
NO1	
1	T
2	E n d
3	F t u p u

- Fig. 13 – Label Diagram, Electric Heater; 50HJ004-007, 208/240-1-60**

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.

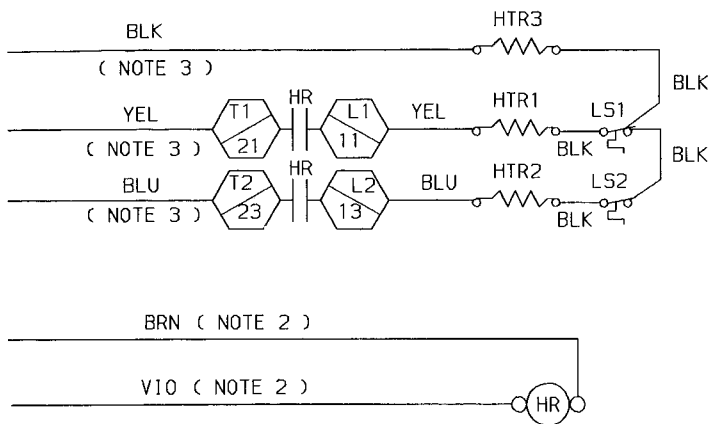
LEGEND



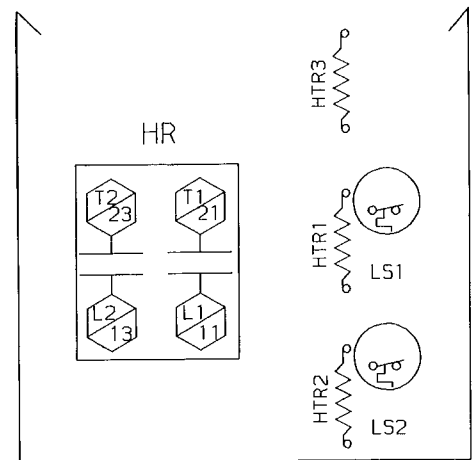
- | | |
|---|------------------------------|
|  | Sylvania
Marked Terminal |
|  | Elmwood
Unmarked Terminal |
| HR | — Heater Relay |
| HTR | — Heater |
| LS | — Limit Switch |
| NEC | — National Electrical Code |

Fig. 14 — Label Diagram, Electric Heater; 50HJ004-007, 208/240-3-60

SCHEMATIC DIAGRAM



COMPONENT ARRANGEMENT



⚠ WARNING

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

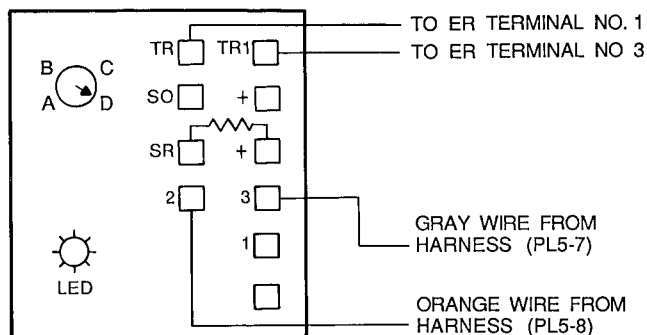
NOTES:

- 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
- HR — Heater Relay
- HTR — Heater
- LS — Limit Switch
- NEC — National Electrical Code

Fig. 15 — Label Diagram, Electric Heater; 50HJ004-007, 480-3-60

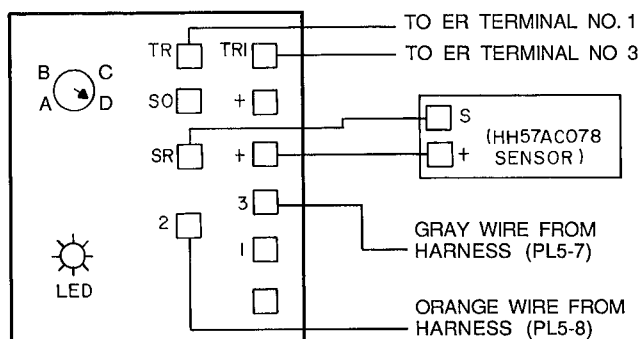


LEGEND

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

NOTE: Remove factory-installed jumper across SR and + before connecting wires from HH57AC078 sensor (See Fig. 17).

Fig. 16 — Wiring Connections for Solid-State Enthalpy Control (HH57AC077)



LEGEND

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

Fig. 17 — Wiring Connections for Differential Enthalpy Control (HH57AC077 and HH57AC078)

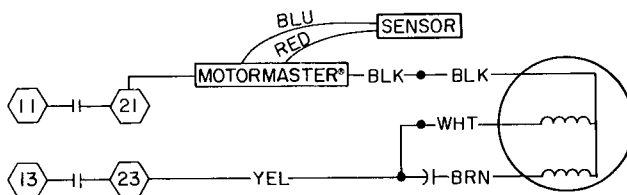
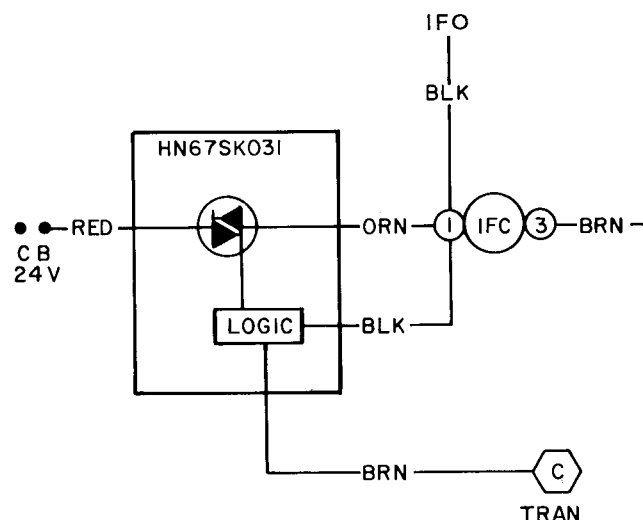


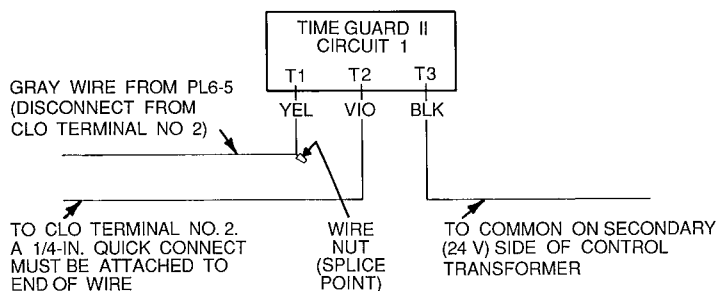
Fig. 18 — Motormaster® Head Pressure Control Wiring



LEGEND

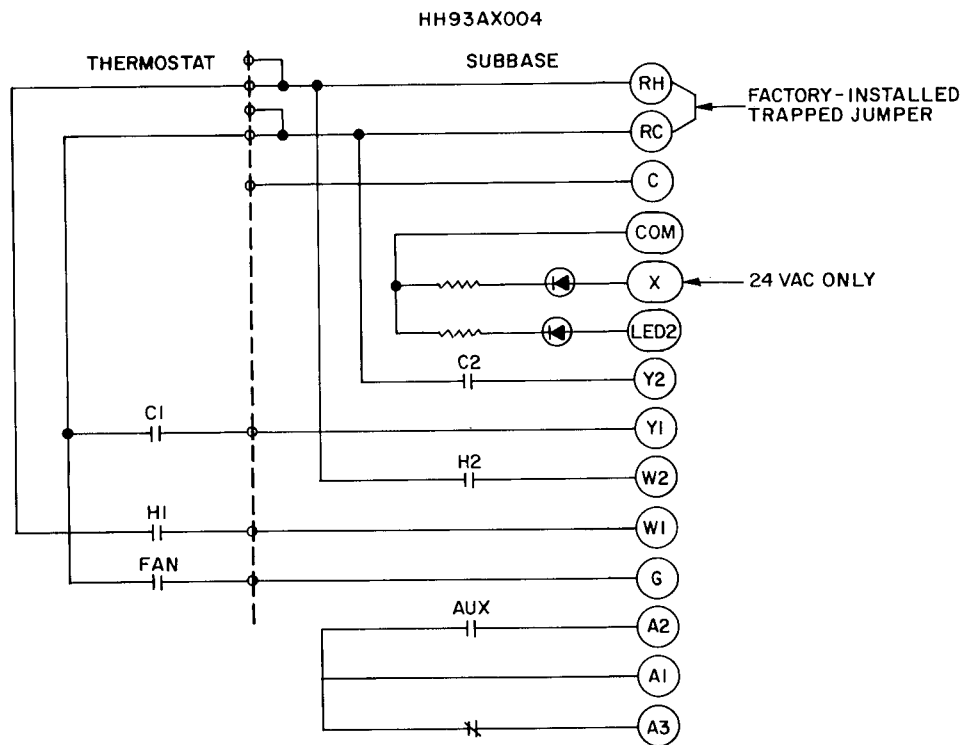
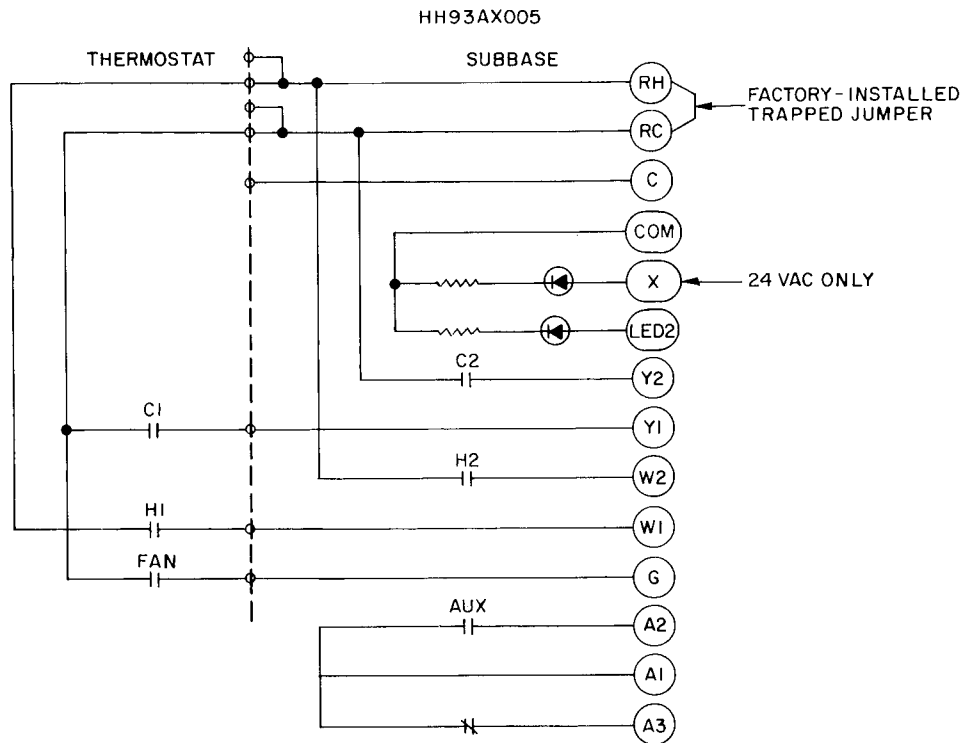
C — Contactor
CB — Circuit Breaker
IFC — Indoor (Evaporator) Fan Contactor
IFO — Indoor (Evaporator) Fan Option
TRAN — Transformer

Fig. 19 — Time-Delay Relay Wiring



CLO — Compressor Lockout

Fig. 20 — Time Guard® II Control Circuit Wiring



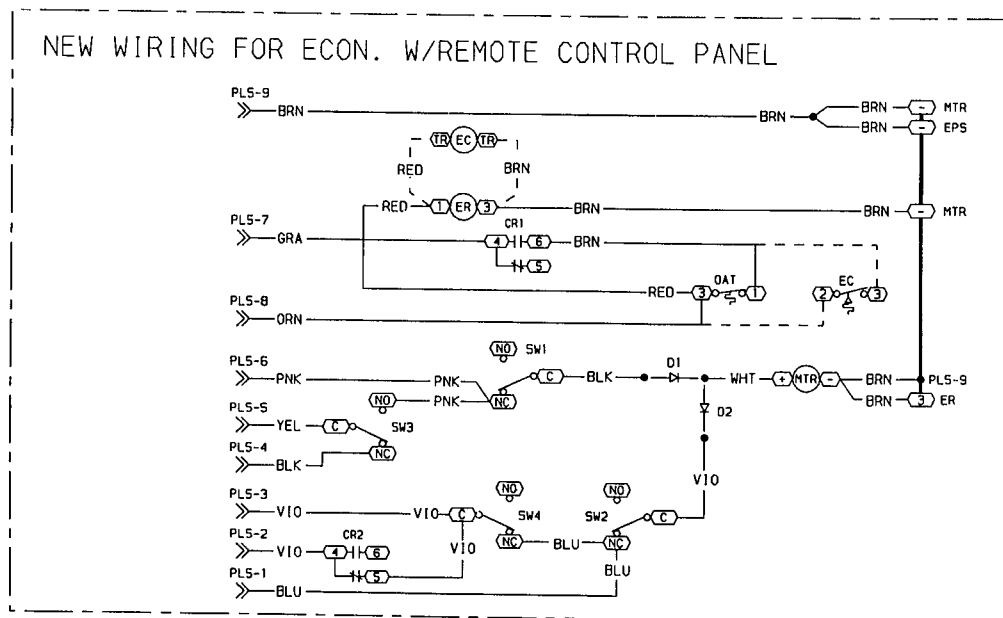
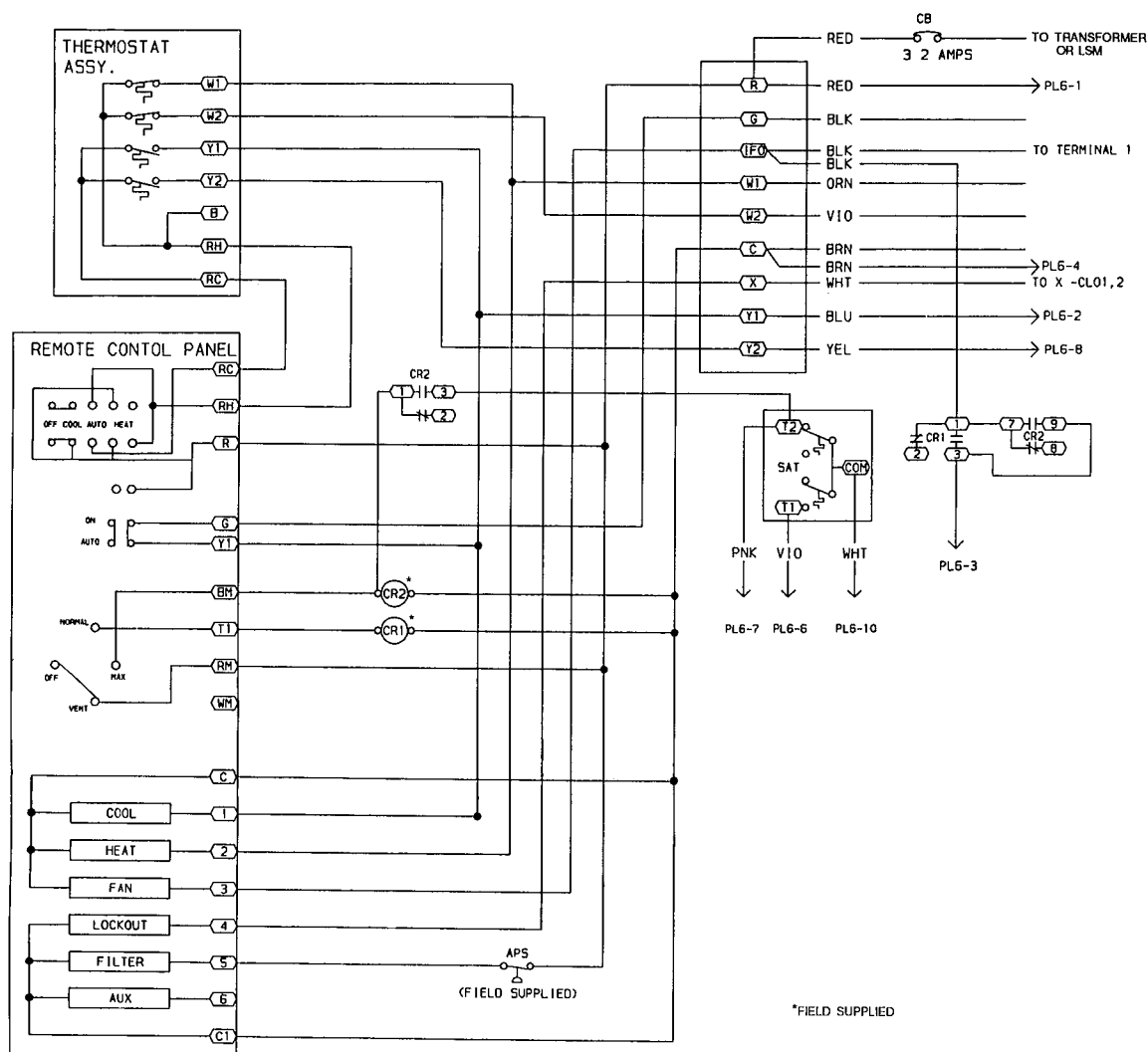
LEGEND

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

G — Fan
LED — Light-Emitting Diode
R — 24 V
W1 — Stage 1 Heat

W2 — Stage 2 Heat
X — CLO
Y1 — Stage 1 Cool
Y2 — Stage 2 Cool

Fig. 21 — Electronic Thermostat Schematic



(See Legend on page 3.)

Fig. 22 — Remote Control Panel Wiring