

Wiring Diagrams

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OPERATING SEQUENCE

48LJ Units —

COOLING UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC) and compressor contactor no. 1 (C1) are energized and indoor-fan motor (IFM), compressor no. 1 and outdoor fan start. The outdoor-fan motor (OFM) runs continuously while unit is cooling.

HEATING UNITS WITHOUT ECONOMIZER — When thermostat calls for heating, terminal W1 is energized, induced-draft relay (IDR) is energized and burner ignition sequence begins. The IFC is energized and the IFM starts.

When the thermostat is satisfied and W1 is deenergized, the IFM stops.

COOLING UNITS WITH ECONOMIZER — When the outdoor ambient temperature is above the outdoor-air thermostat (OAT) or enthalpy control (EC) setting and the thermostat calls for cooling, terminals G and Y1 are energized. The IFC is energized and the economizer damper blade opens to the minimum position.

If the outdoor ambient temperature is below the OAT setting and the thermostat calls for cooling, the IFC is energized, the indoor fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with outdoor air. The position of the damper blade is determined by the discharge temperature sensor.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, Y2 on the thermostat is energized and compressor no. 1 starts. The damper blade opens for 5 seconds and stops for 30 seconds until fully open.

As conditioned-space temperature approaches the thermostat's cooling set point, the mechanical cooling stage cycles off. After mechanical cooling shuts off, the economizer modulates to the minimum position.

HEATING UNITS WITH ECONOMIZER — Upon a call for heat through W1, the IDR is energized to start the induced draft motor. The main burner lights, the IFC energizes to start the indoor 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 indoor fan runs.

After W1 is deenergized, the IFM stops.

As space temperature approaches the heating temperature set point, heating stage cycles off. Economizer or two-position damper returns to a fully closed position when fan shuts off.

50LJ Units —

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor-fan contactor (IFC) and compressor contactor no. 1 (C1) are energized and indoor-fan motor, compressor no. 1 and outdoor fan start. The outdoor-fan motor runs continuously while unit is cooling.

HEATING, UNITS WITHOUT ECONOMIZER — Upon a call for heating through terminal W1, IFC and heater contactor (HC) no. 1 are energized.

COOLING, UNITS WITH ECONOMIZER — When the outdoor ambient temperature is above the outdoor-air thermostat (OAT) or enthalpy control (EC) setting and the thermostat calls for cooling, terminals G and Y1 are energized. The IFC is energized and the economizer damper blade opens to the minimum position.

If the outdoor ambient temperature is below the OAT setting and the thermostat calls for cooling, the IFC is energized, the indoor fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with the outdoor air. The position of the damper blade is determined by the discharge-temperature sensor.

If outdoor air alone cannot satisfy the cooling requirements of the conditioned space, Y2 on the thermostat is energized and compressor no. 1 starts. The damper blade opens for 5 seconds and stops for 30 seconds until fully open.

As conditioned-space temperature approaches the thermostat's cooling set point, the mechanical cooling stage cycles off. After mechanical cooling shuts off, the economizer modulates to the minimum position.

HEATING, UNITS WITH ECONOMIZER — Upon a call for heat through W1, the IFC energizes to start the indoor 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 indoor fan runs.

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

50LJQ Units —

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, the indoor-fan contactor (IFC) is energized and starts indoor-fan motor. Compressor contactor is energized to start compressor and outdoor fan. Reversing valve solenoid (RVS) is energized.

As conditioned space temperature approaches thermostat's cooling set point, the indoor fan, compressor and outdoor fan shut off.

HEATING, UNITS WITHOUT ECONOMIZER — When the thermostat calls for heat, the IFC, outdoor-fan contactor and compressor contactor are energized. The RVS is deenergized and switches position, and the indoor fan, outdoor fan and compressor are energized.

If the thermostat calls for a second stage of heat, the heater contactor (HC) is energized and starts the electric heaters.

When the space temperature approaches the heating temperature set point, heating stages cycle off. The reversing valve solenoid is reenergized.

COOLING, UNITS WITH ECONOMIZER — When the outdoor ambient temperature is above the outdoor-air thermostat (OAT) or optional enthalpy control (EC) setting, sequence of operation is identical to units without economizer. Economizer blade is in minimum position.

When the outdoor ambient temperature is below the OAT or optional EC setting and the thermostat calls for cooling, the IFC is energized, the indoor fan is started and the economizer modulates open. The economizer acts as the first stage of cooling, providing free cooling with outdoor air. If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling. Compressor contactor is energized to start the compressor and outdoor fan.

As conditioned space temperature approaches the thermostat's cooling set point, the mechanical cooling stages cycle off last stage first.

HEATING, UNITS WITH ECONOMIZER — Units with accessory economizer operate the same as units without economizer, except the economizer blade will move into the minimum position after the indoor and outdoor fans and the compressor are energized.

DEFROST — As frost builds up on the outdoor coil, the coil temperature drops below 28 F. When this outdoor-coil temperature drop is sensed by the defrost thermostat (DFT) and the defrost timer is at the end of a timed period (adjustable at 30, 50 or 90 minutes), the unit operates in a defrost cycle controlled by the defrost timer or thermostat. During this cycle, the RVS is energized and the outdoor fans shut off. The electric heaters (if installed) will be energized. On units with economizer, the economizer will move to the fully closed position.

The unit continues to defrost until the coil temperature as measured by the DFT reaches 65 F, or the duration of defrost cycle completes a 10-minute period.

At the end of the defrost cycle, the electric heaters (if installed) and the reversing valve will be deenergized, and the outdoor-fan motor will be energized. The unit will now operate in the heating mode. On units with economizer, the economizer blade will move to the minimum position.

If the thermostat is satisfied during a defrost cycle, the unit will continue in the defrost mode until the time or temperature constraints are satisfied.

NOTES

1. If any of the original wire furnished must be replaced, it must be replaced with type 90 C or its equivalent.
2. Three-phase motors are internally protected against single phasing condition.
3. Thermostat: HH07AT170, 172, 174 and P272-2783
Subbase: HH93AZ176, 178 and P272-1882, 1883
4. On 48LJ units, set heat anticipator at 1.0 amps. On 50LJ, LJQ units, set heat anticipator settings at 0.8 amp for 1st stage and 0.3 amp for 2nd stage.
5. Must trip current circuit breaker protecting 24-v control circuit is 3.2 amps.
6. Use copper, copper clad aluminum or aluminum conductors.
7. Outdoor-fan motors are protected with internal thermal overloads.
8. Economizer can be driven open by installing a jumper between terminals EMO/EMFO and GND or driven closed by installing a jumper between terminals EMC/EMFC and GND.
9. Two-position damper can be driven closed by installing a jumper between terminals EMFC.L and GND.
10. Electric heater (50LJ, LJQ) ratings are based on 240 and 480 v. Adjust amperage and kW for other operating voltages.

LEGEND (Fig. 1–23 and 25)

AHA	— Adjustable Heat Anticipator	P	— Plug
AWG	— American Wire Gage	PL	— Plug Assembly
APS	— Air Pressure Switch	QT	— Quadruple Terminal
AUX	— Auxiliary	RES	— Resistor
BAT	— Battery	RS	— Rollout Switch
C	— Contactor, Compressor	RVS	— Reversing Valve Solenoid
CAP	— Capacitor	SC	— Start Capacitor
CB	— Circuit Breaker	SEN	— Sensor
CC	— Cooling Compensator	STAT	— Thermostat
CH	— Crankcase Heater	SW	— Switch
CLO	— Compressor Lockout	SW1	— Switch, Fully Open
COM	— Common	SW2	— Switch, Fully Closed
COMP	— Compressor Motor	SW3	— Switch, Minimum Vent Position
CS	— Centrifugal Switch	SW4	— Switch, Maximum Vent Position
CV	— Constant Volume	TB	— Terminal Block
DAT	— Discharge-Air Thermistor	TC	— Thermostat, Cooling
DB	— Defrost Board	TL	— Timer Logic
DFT	— Defrost Thermostat	TH	— Thermostat, Heating
DR	— Defrost Relay	TRAN	— Transformer
EC	— Enthalpy Control		
ECON	— Economizer		Circuit Board Run
EM	— Emergency		Field Splice
EMC/EMFC	— Energy Management Closed (Economizer)		Marked Wire
EMFC.L	— Energy Management Fully Closed (Two-Position Damper)		Terminal (Marked)
EMO/EMFO	— Energy Management Open		Terminal (Unmarked)
EQUIP	— Equipment		Terminal Block
FP	— Flame Prove		Terminal Econ 2 Position Board
FPT	— Freeze Protection Thermostat		Terminal CV Board
FU	— Fuse		Splice
GND	— Ground		Splice (Marked)
HC	— Heater Contactor		Factory Wiring
HP	— Heat Pump		Field Control Wiring
HPS	— High-Pressure Switch		Field Power Wiring
HR	— Heater Relay		Accessory or Optional Wiring
HT	— Heat		To indicate common potential only; not to represent wiring
I	— Ignitor		
ICP	— Ignitor Control Pack		
IDM	— Induced-Draft Motor		
IDR	— Induced-Draft Relay		
IFC	— Indoor-Fan Contactor		
IFM	— Indoor-Fan Motor		
IFR	— Indoor-Fan Relay		
LED	— Light-Emitting Diode		
LPS	— Low-Pressure Switch		
LS	— Limit Switch		
LSM	— Limit Switch (Manual Reset)		
MGV	— Main Gas Valve		
MTR	— Motor		
MV	— Main Valve		
NEC	— National Electrical Code		
OAT	— Outdoor-Air Thermostat		
OFM	— Outdoor-Fan Motor		

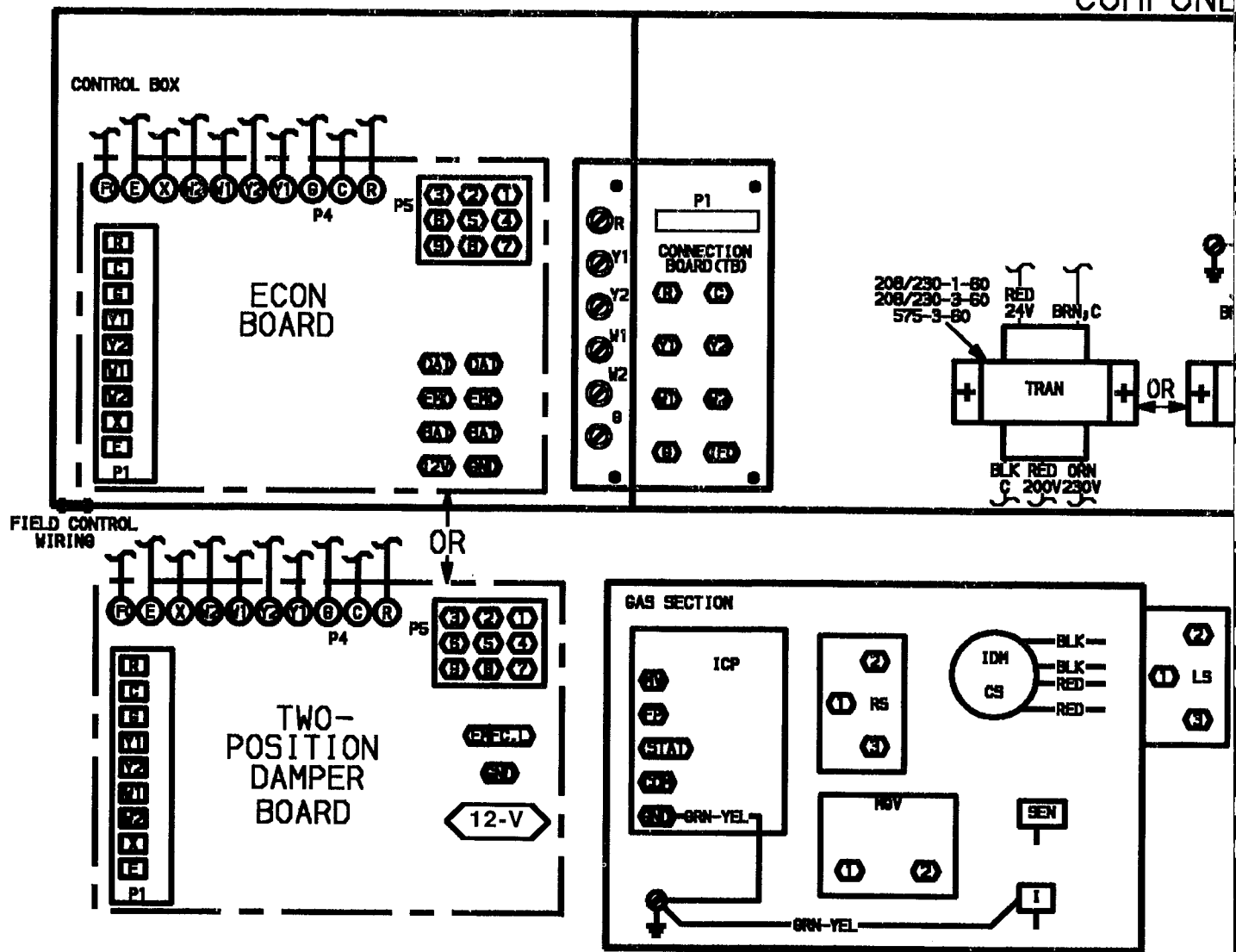


Fig. 1 — Component A

Arrangement, 48LJ004-007

COMPONENT

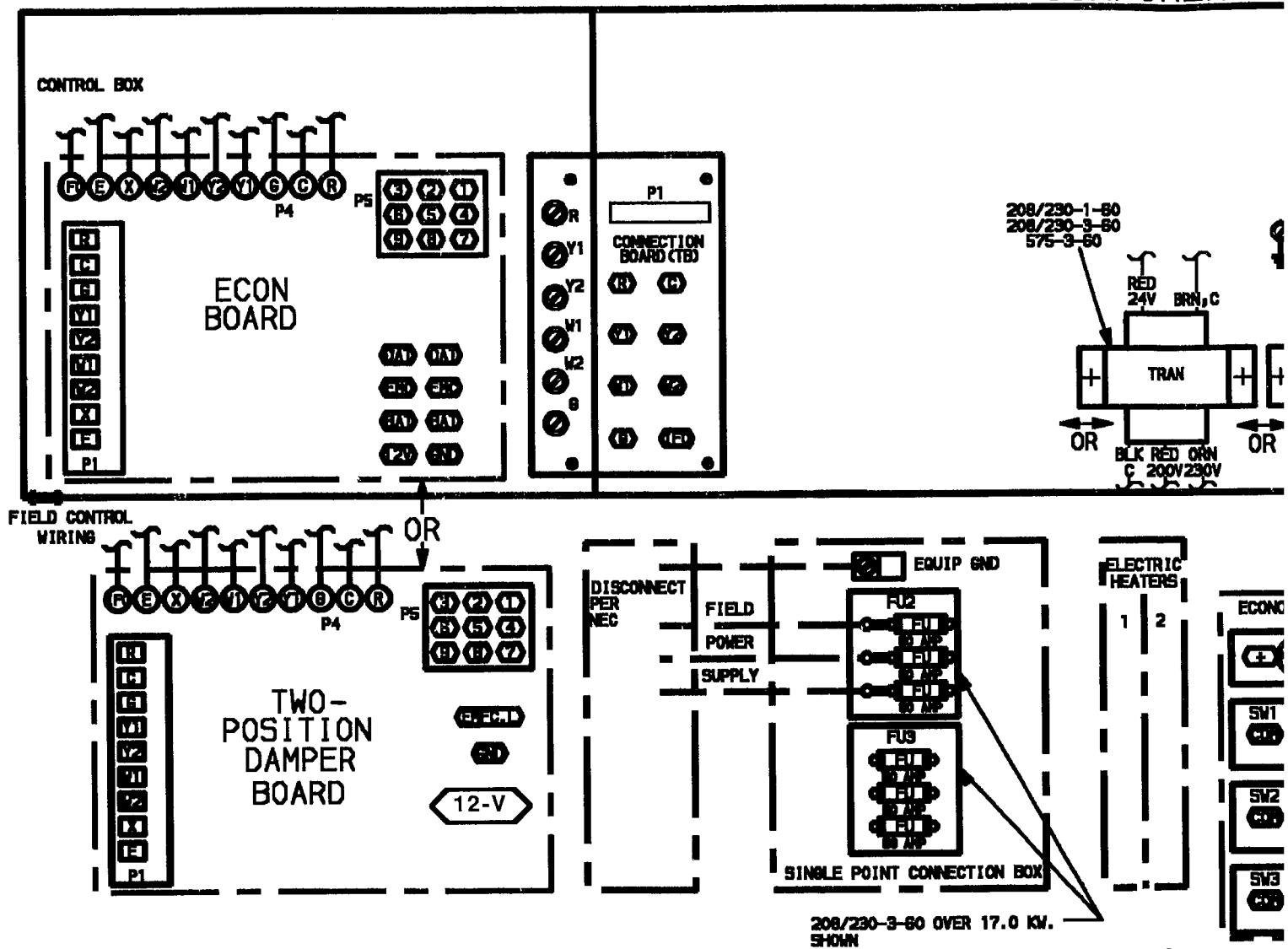
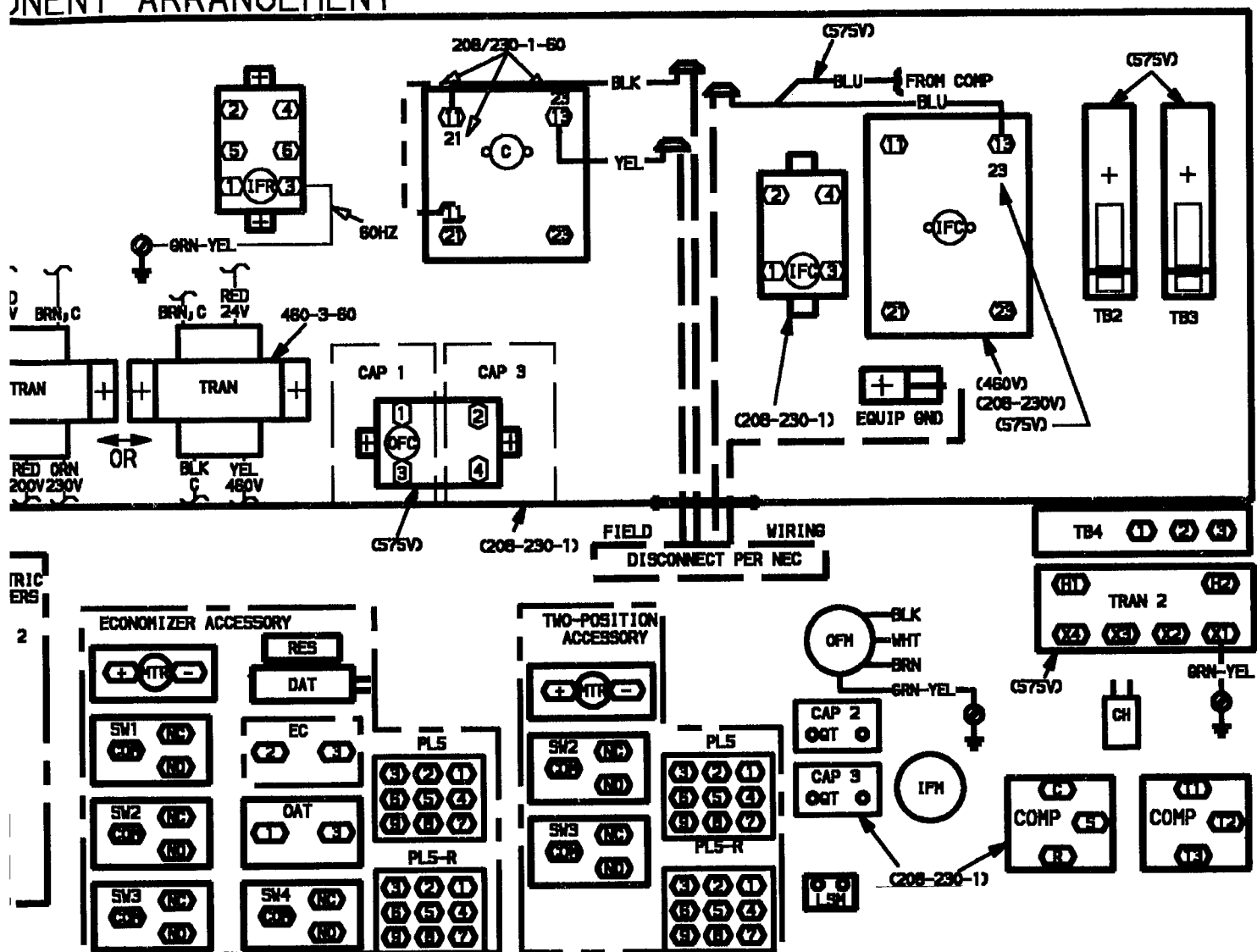


Fig. 2 - Component Arrangement

COMPONENT ARRANGEMENT



t Arrangement, 50LJ004-007

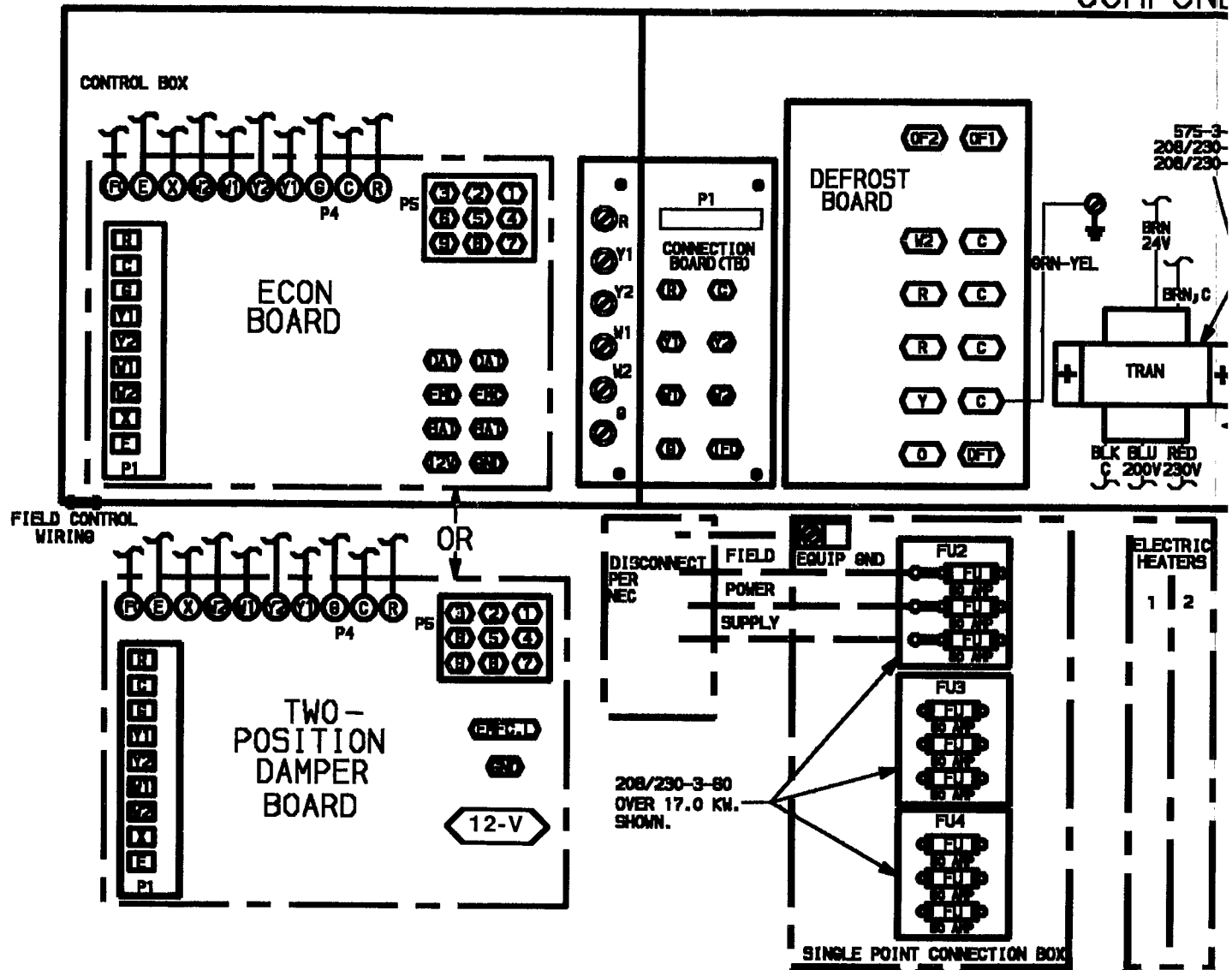
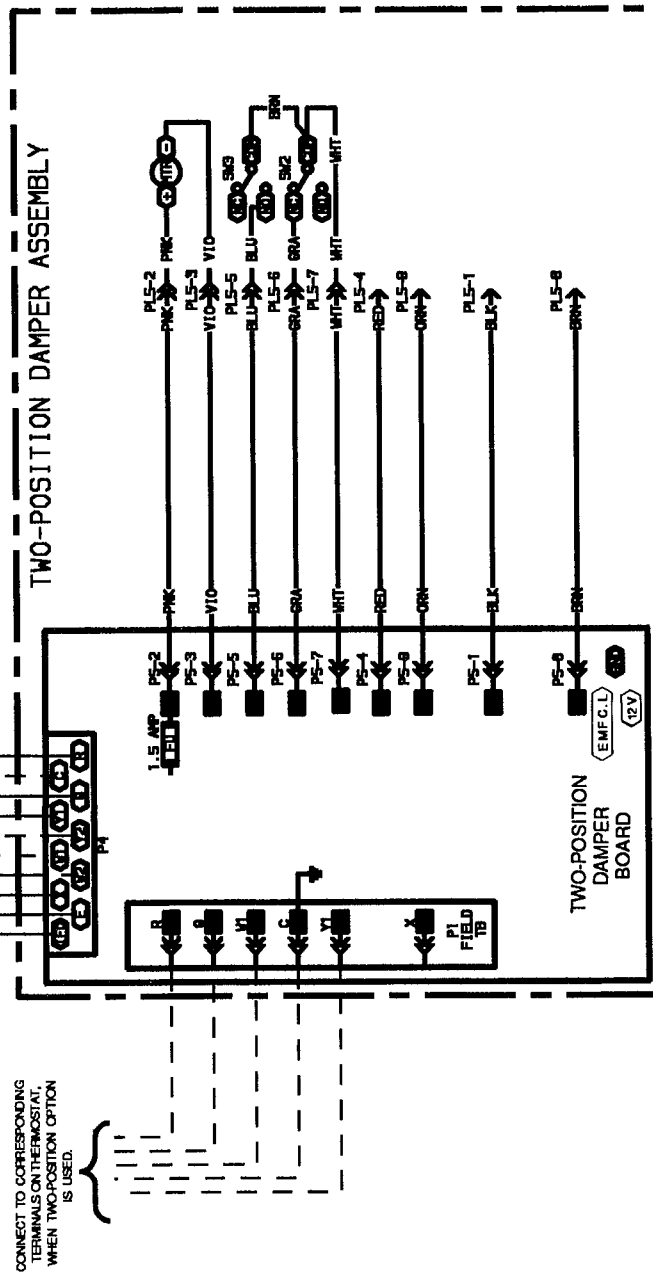


Fig. 3 — Component Ar

Component Arrangement, 50LJQ004-006

Wiring diagram for a 208/230V 3-ton air conditioning unit. The diagram illustrates the electrical connections from a power supply through a fuse and switch to various components including a fan motor, compressor, and three tonnage motors (1FR, 2FR, 3FR). It also includes a detailed view of the control circuit with a thermostat, pressure switches, and a relay. A connection board is shown at the bottom with terminals for field wiring and common connections.

Fig. 4 – Label Diagram, Schematic; 48



SCHEMATIC

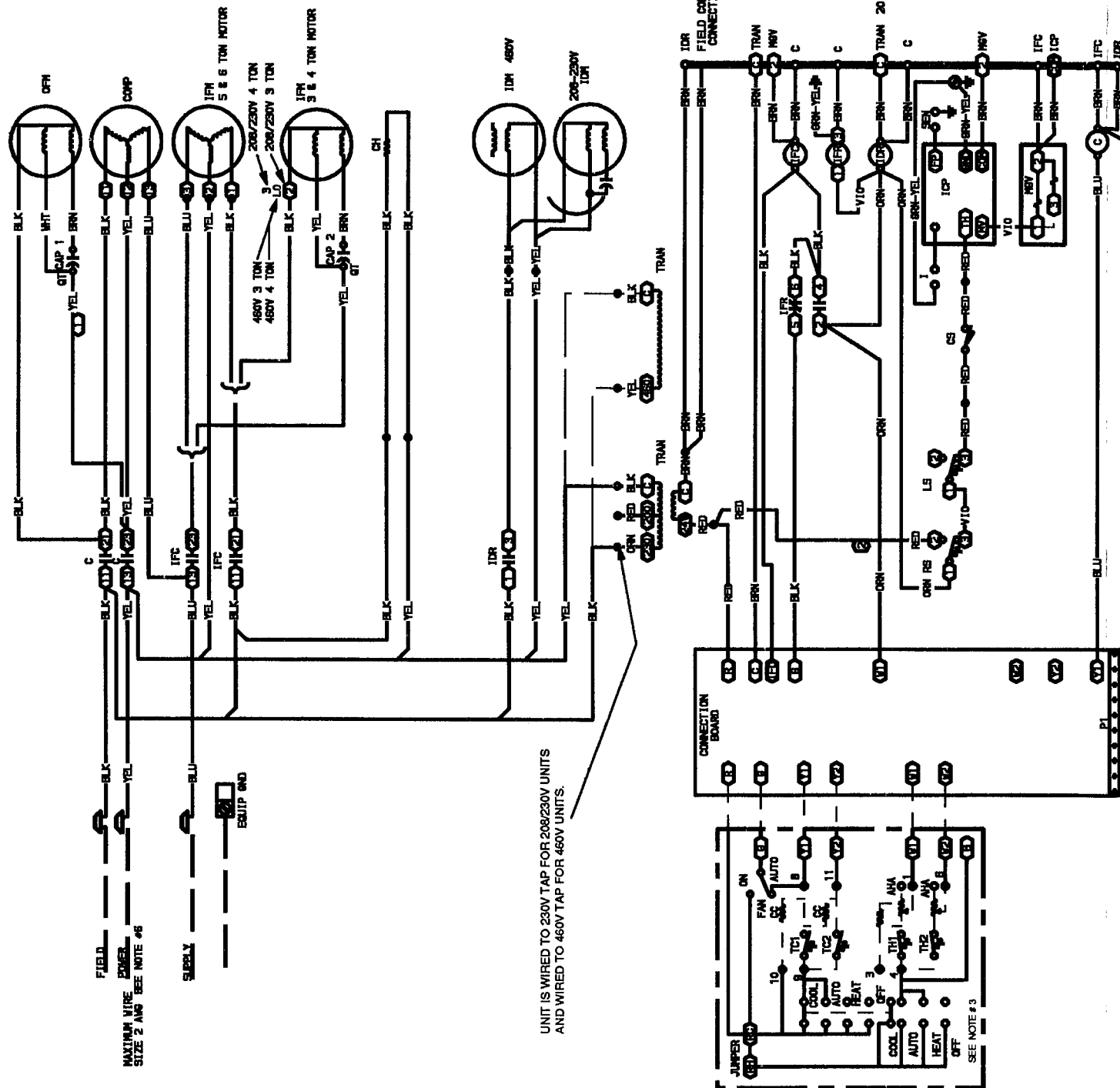
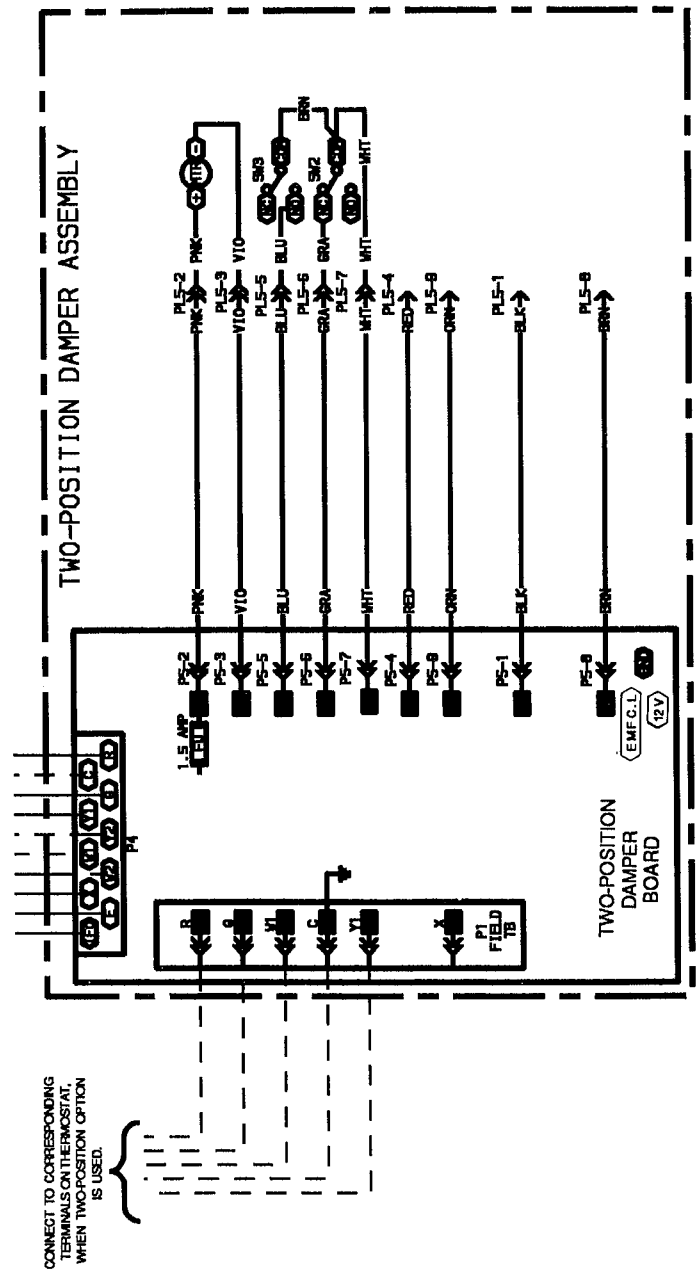
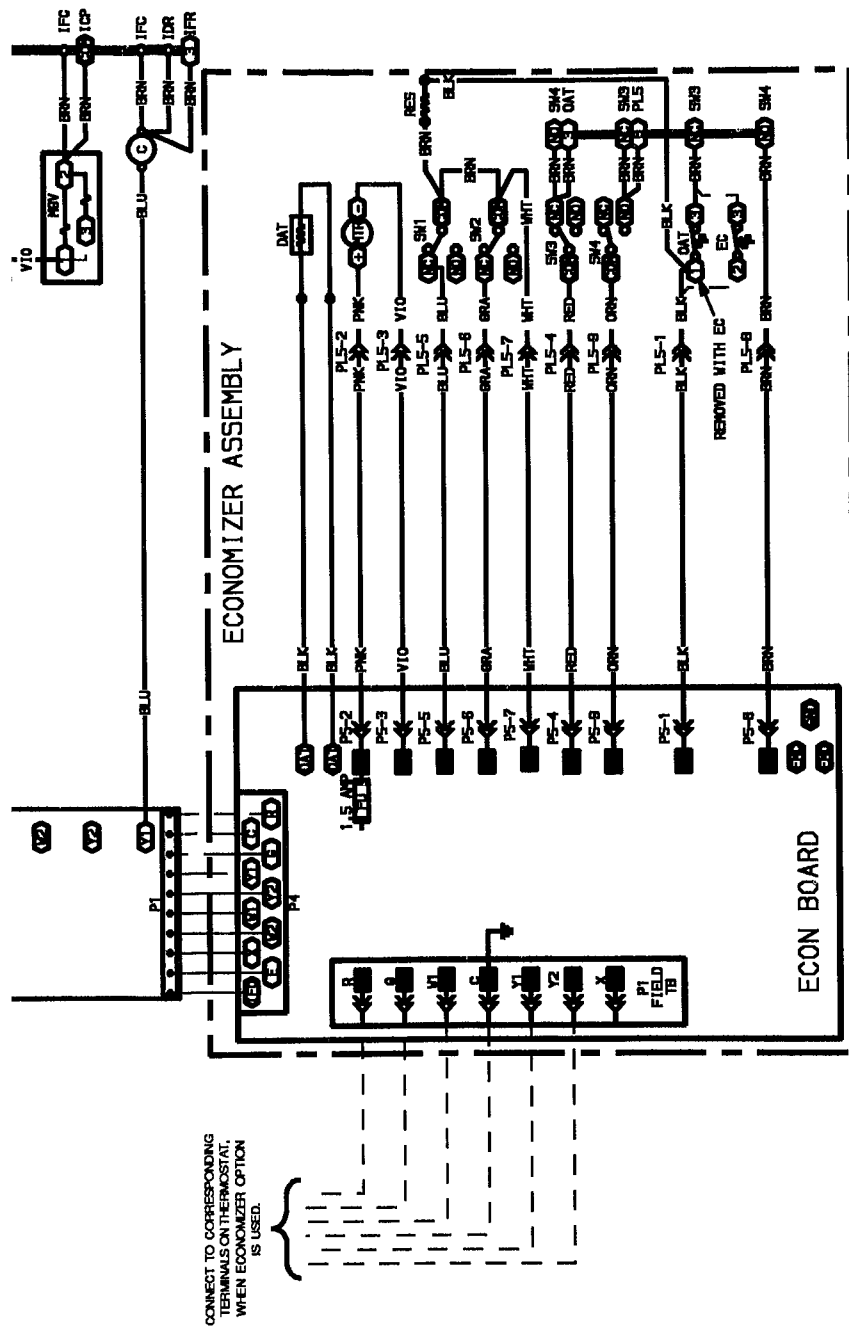


Fig. 5 — Label Diagram, Schematic;



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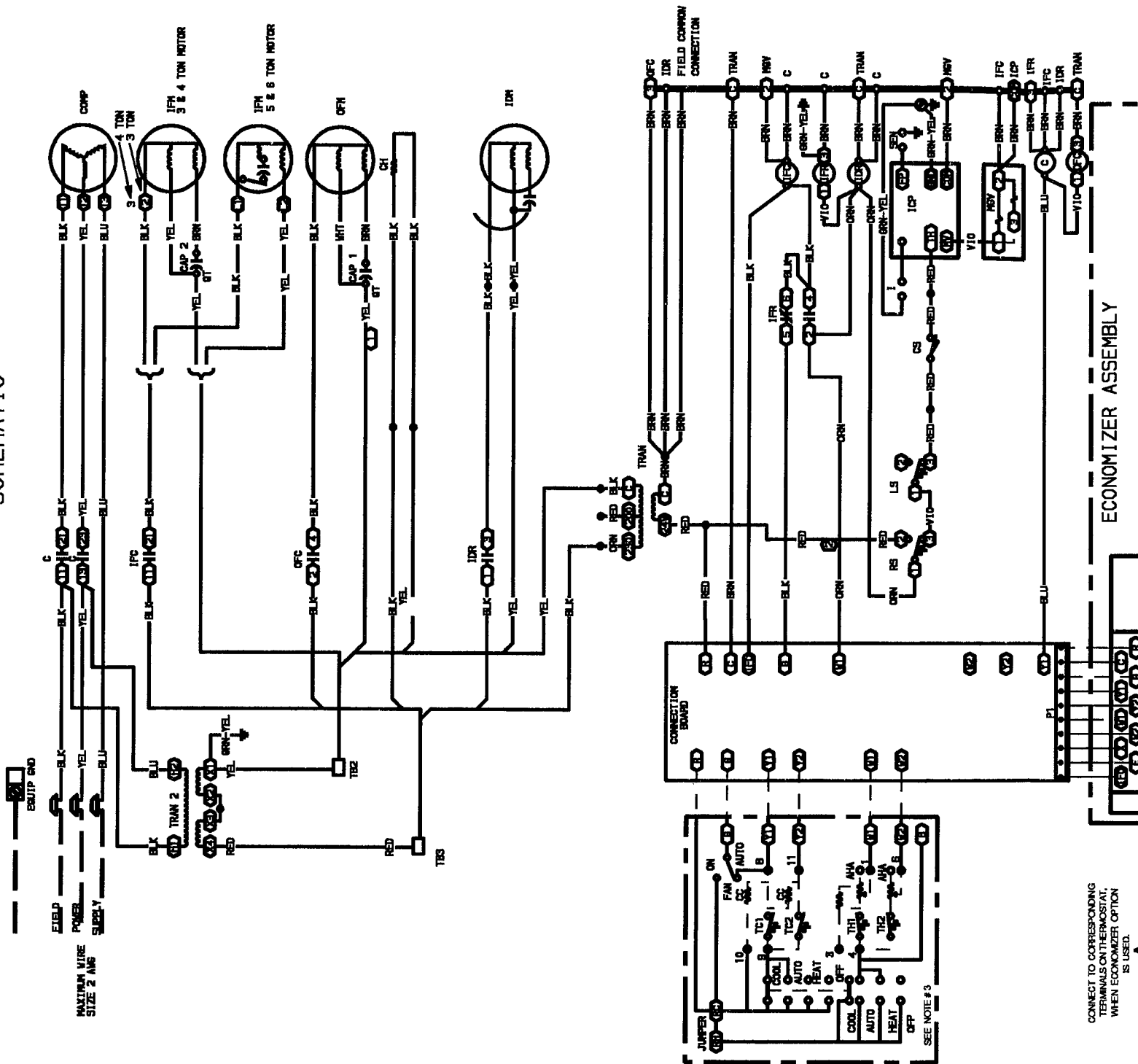
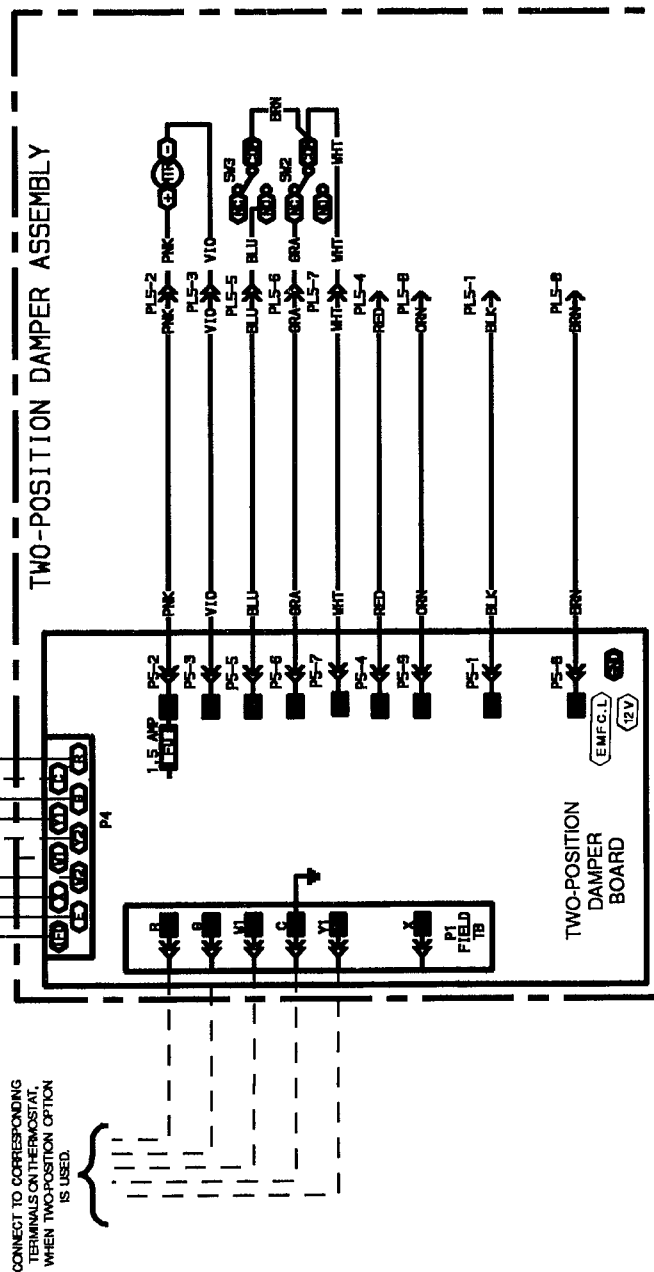
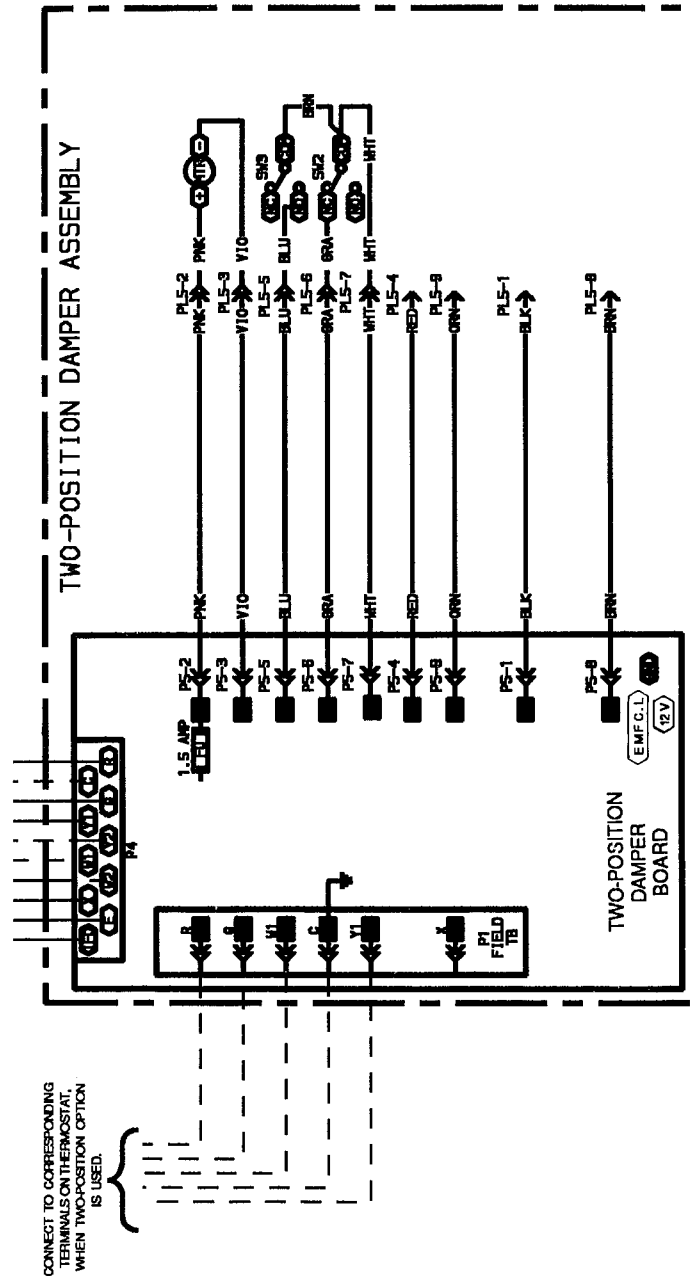
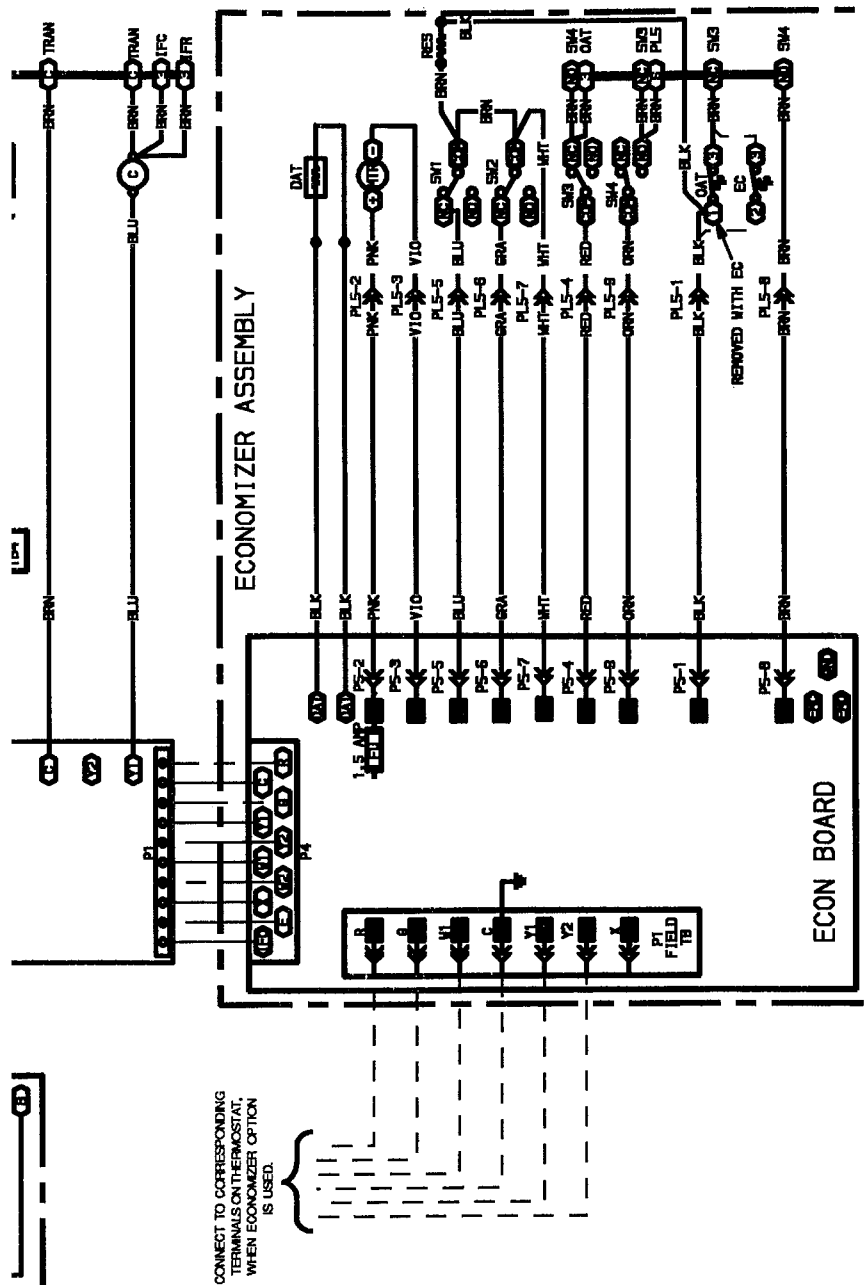


Fig. 6 - Label Diagram, Schematic; 48L.



[illegible]

Fig. 7 – Label Diagram, Schema



agram, Schematic; 50LJ004-006, 208/230-1-60

SCHEMATIC

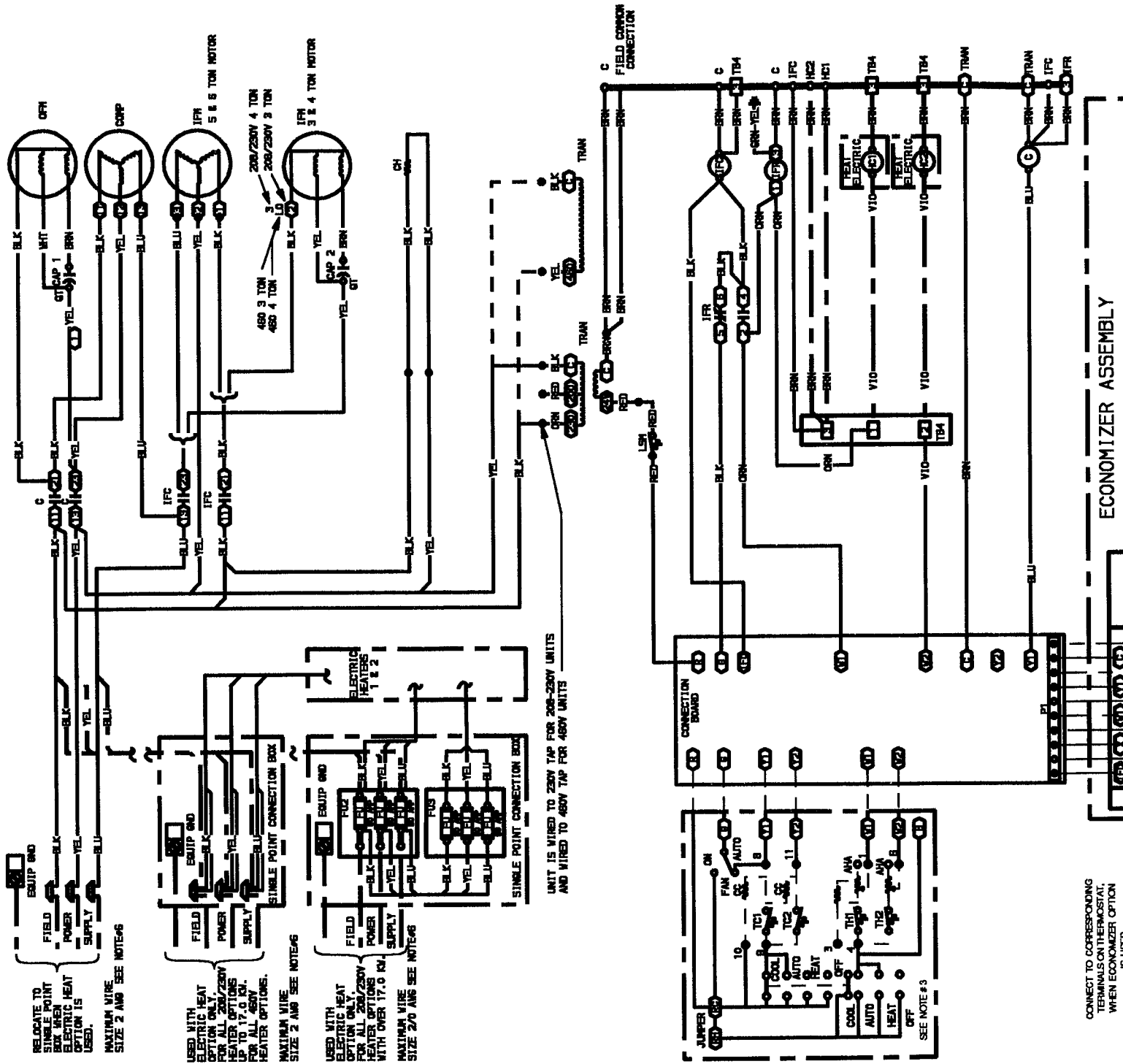
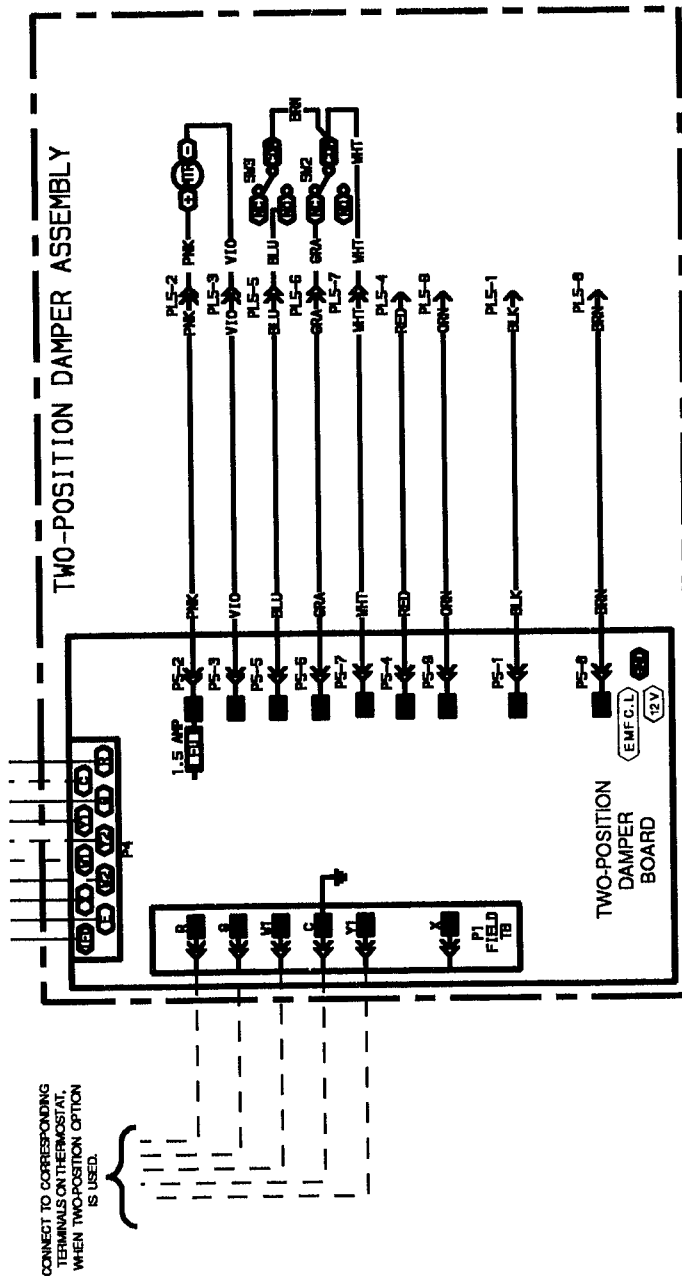
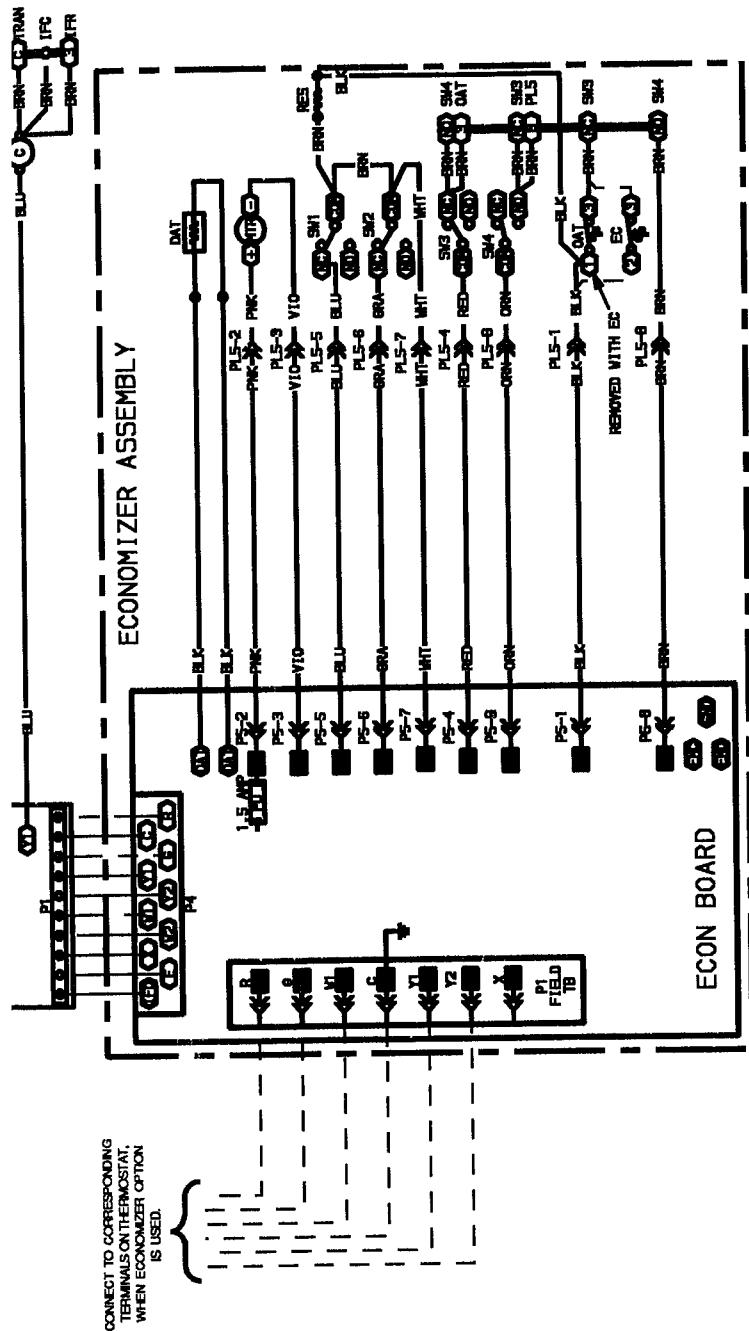


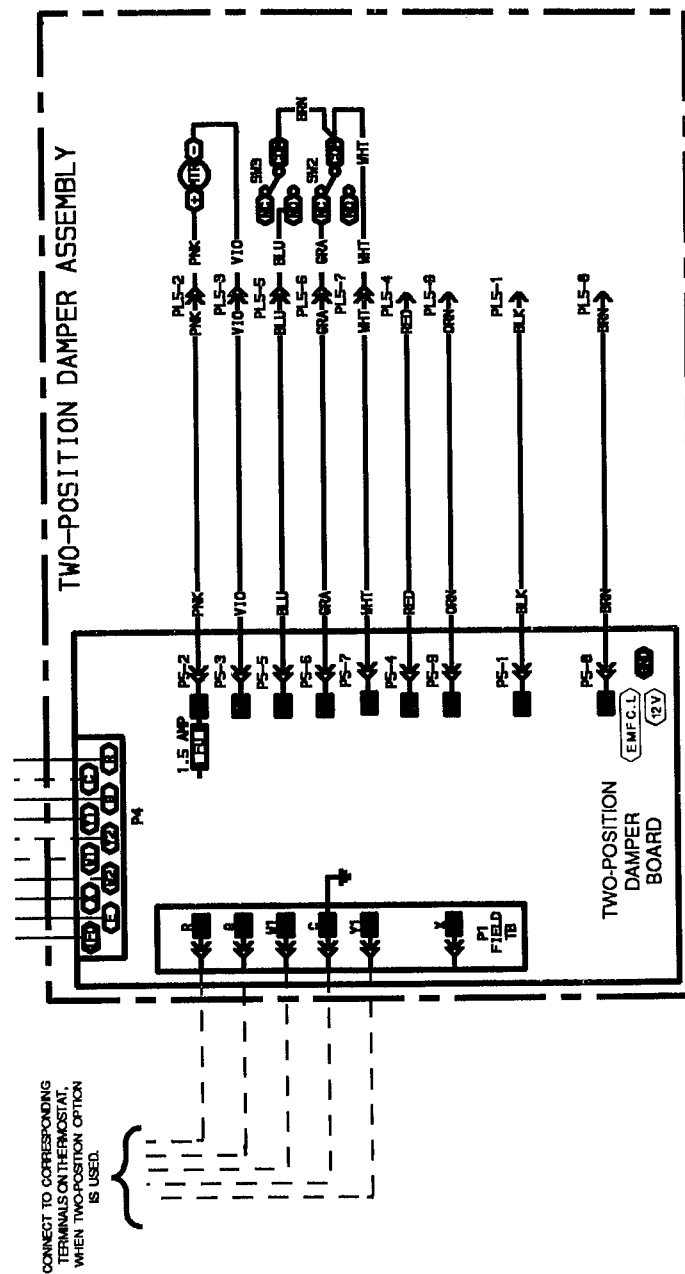
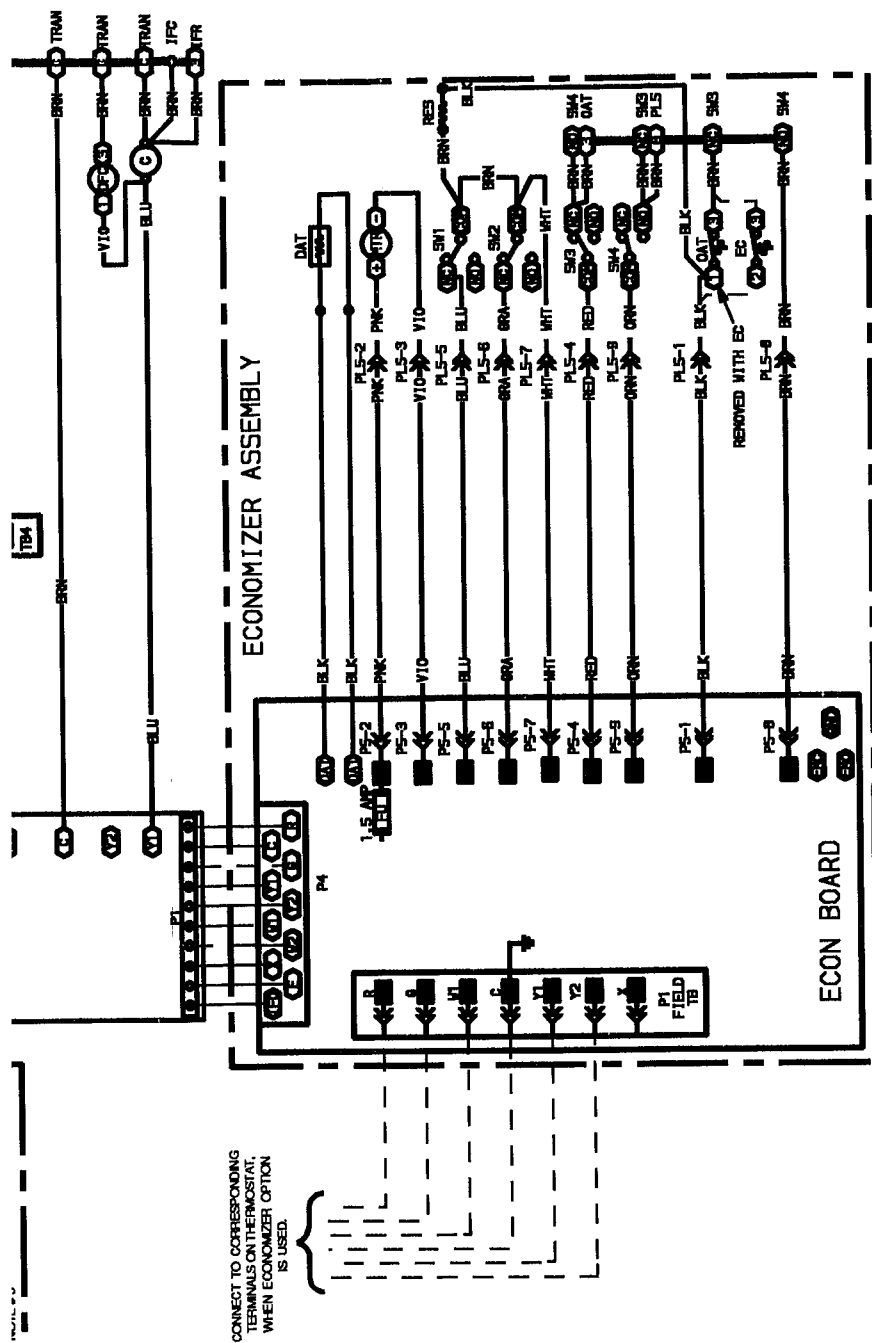
Fig. 8 — Label Diagram, Schematic; 50LJ00



atic; 50LJ004-007, 208/230, 460-3-60

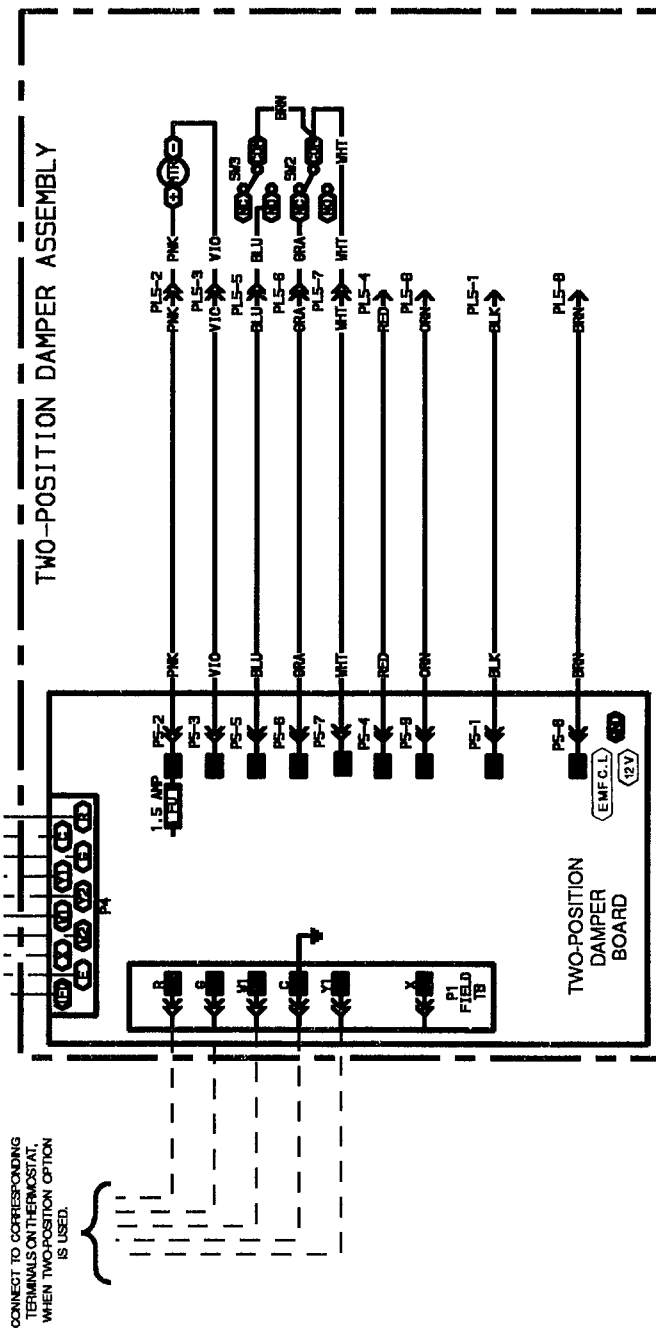
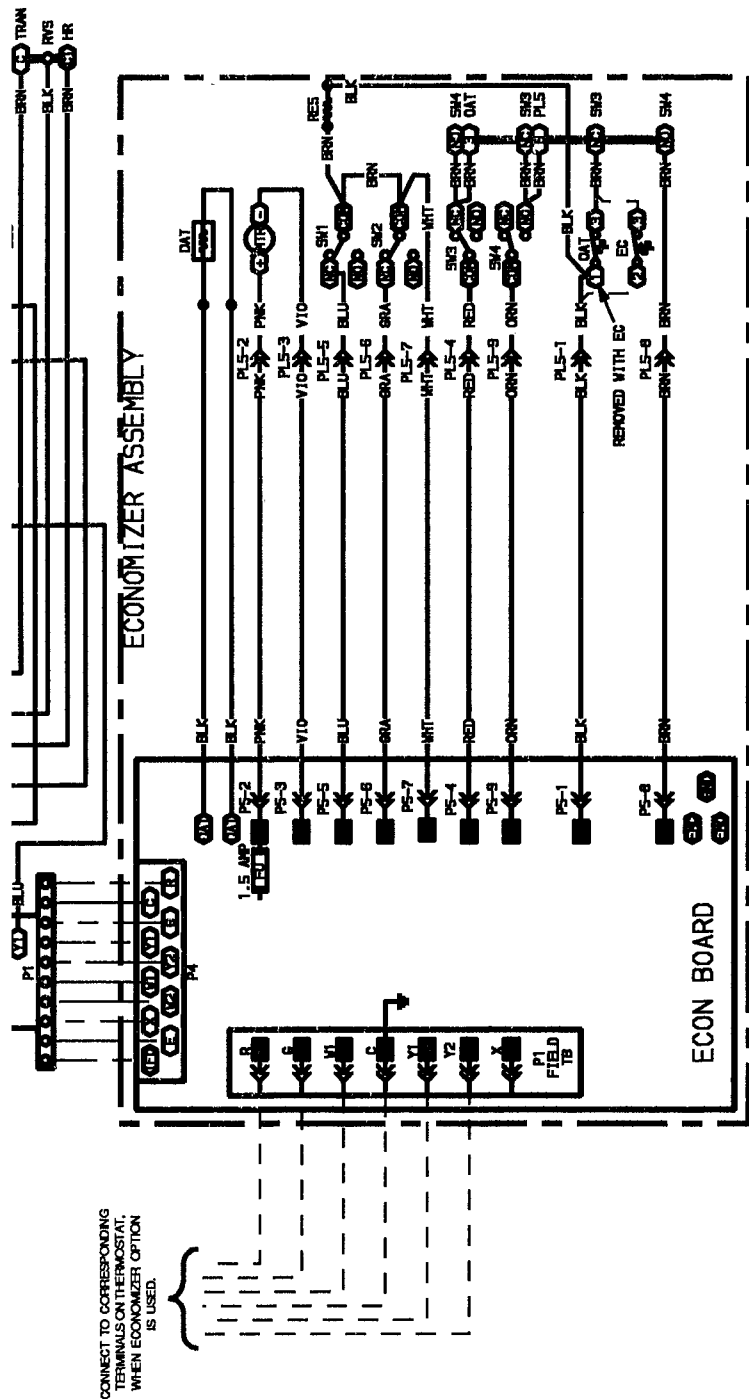
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Fig. 9 – Label Diagram, Schema:



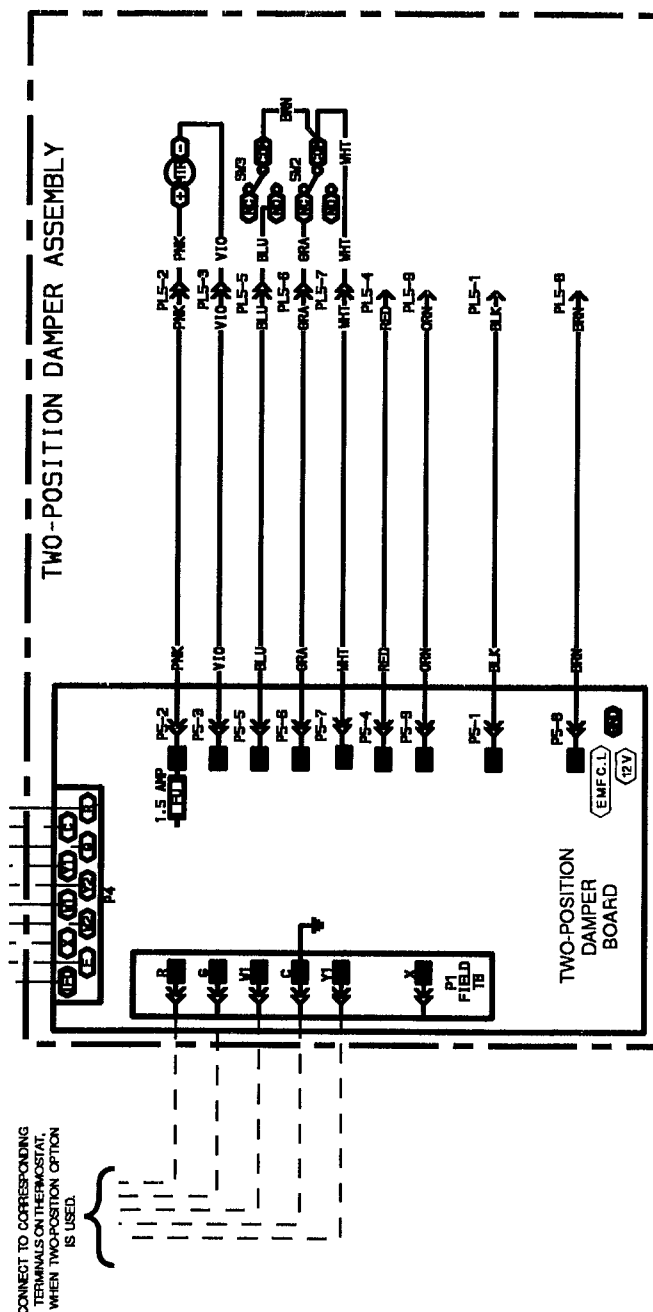
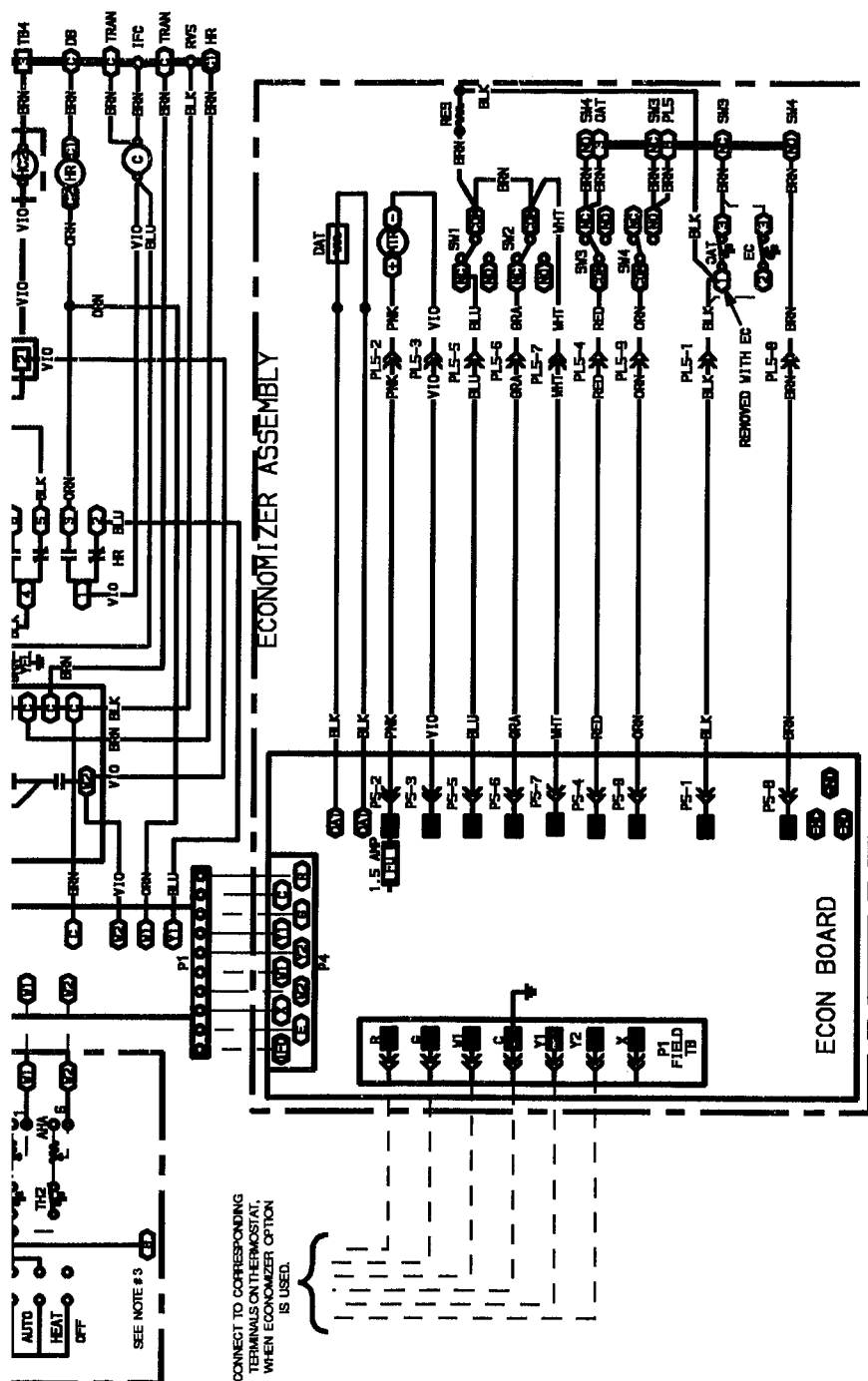
Diagram, Schematic; 50LJ004-006, 575-3-60

[illegible]



[illegible]

Fig. 11 – Label Diagram, Schematic



RELOCATE TO SINGLE POINT BOX WHEN ELECTRIC HEAT OPTION IS USED.

MAXIMUM WIRE SIZE 2 AWG

SEE NOTE#6

EQUIP GND

FIELD (BLK)

POWER (YEL)

SUPPLY (BLU)

EQUIP GND

FIELD (BLK)

POWER (YEL)

SUPPLY (BLU)

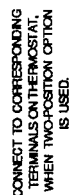
SEE NOTE#6 SINGLE POINT CONNECTION BOX

ELECTRIC HEATERS 1 & 2

WIRING DETAILS:

- IFC** (Interlocking Fan Control) motor: BLK, WHT, CAP 1, YEL, BRN
- COMP** (Compressor) motor: BLK, YEL, BLU
- IFR** (Interlocking Fan Control) 5 TON STANDARD MOTOR: BLU, YEL, BLK
- IFR** (Interlocking Fan Control) 3 TON STANDARD MOTOR / 4 TON STANDARD MOTOR: BLK, YEL, BRN, CAP 2, G1
- CH** (Condenser Heat) heaters: BLK, YEL





SCHEMATIC

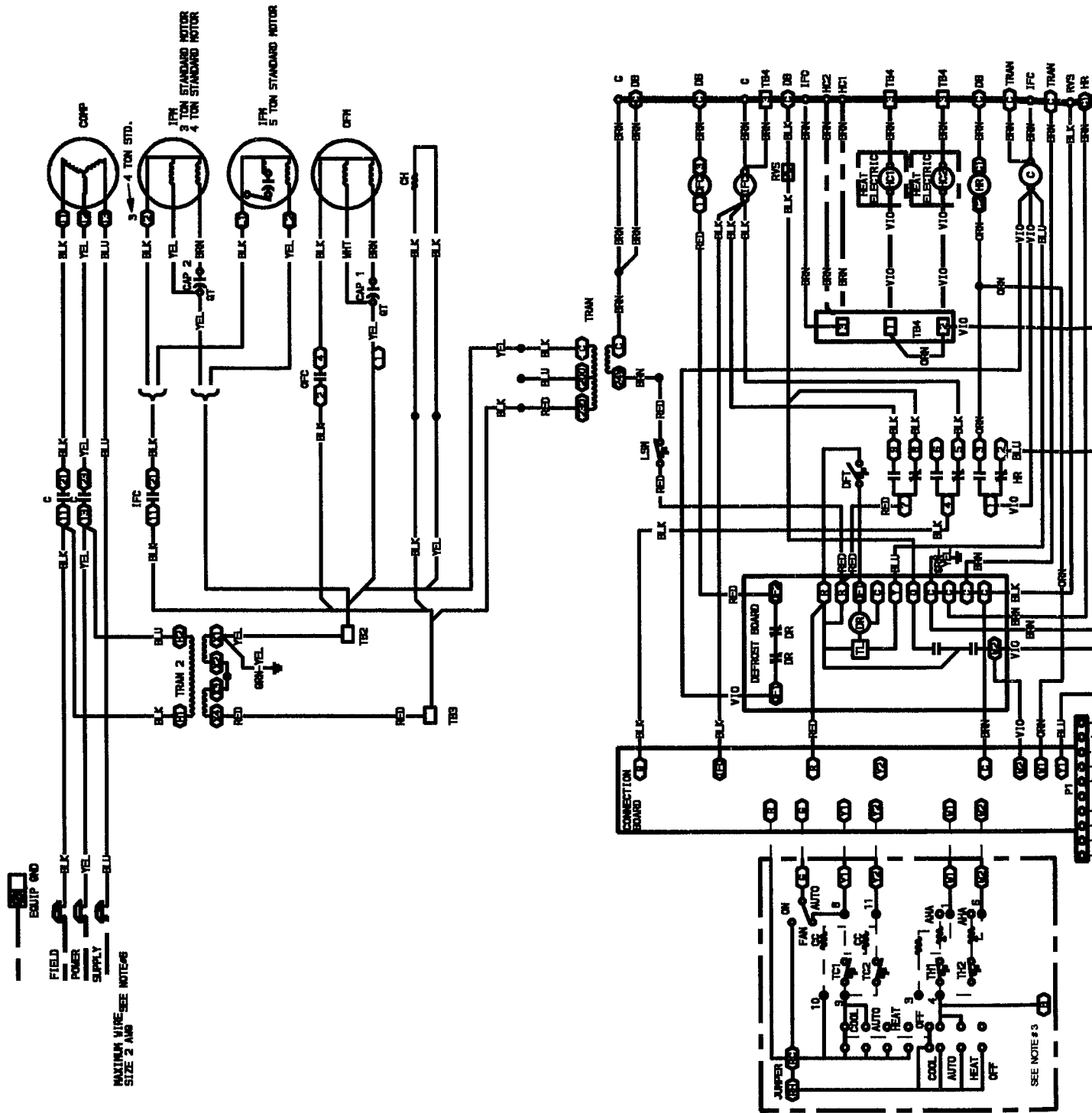
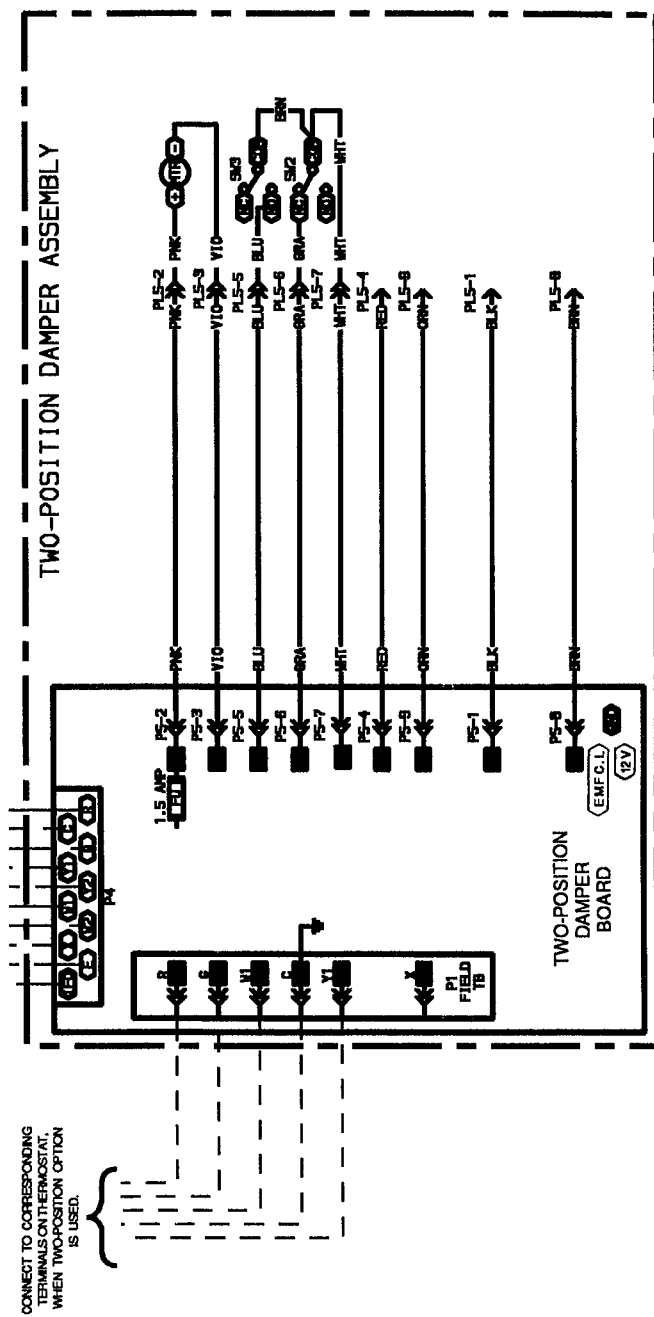
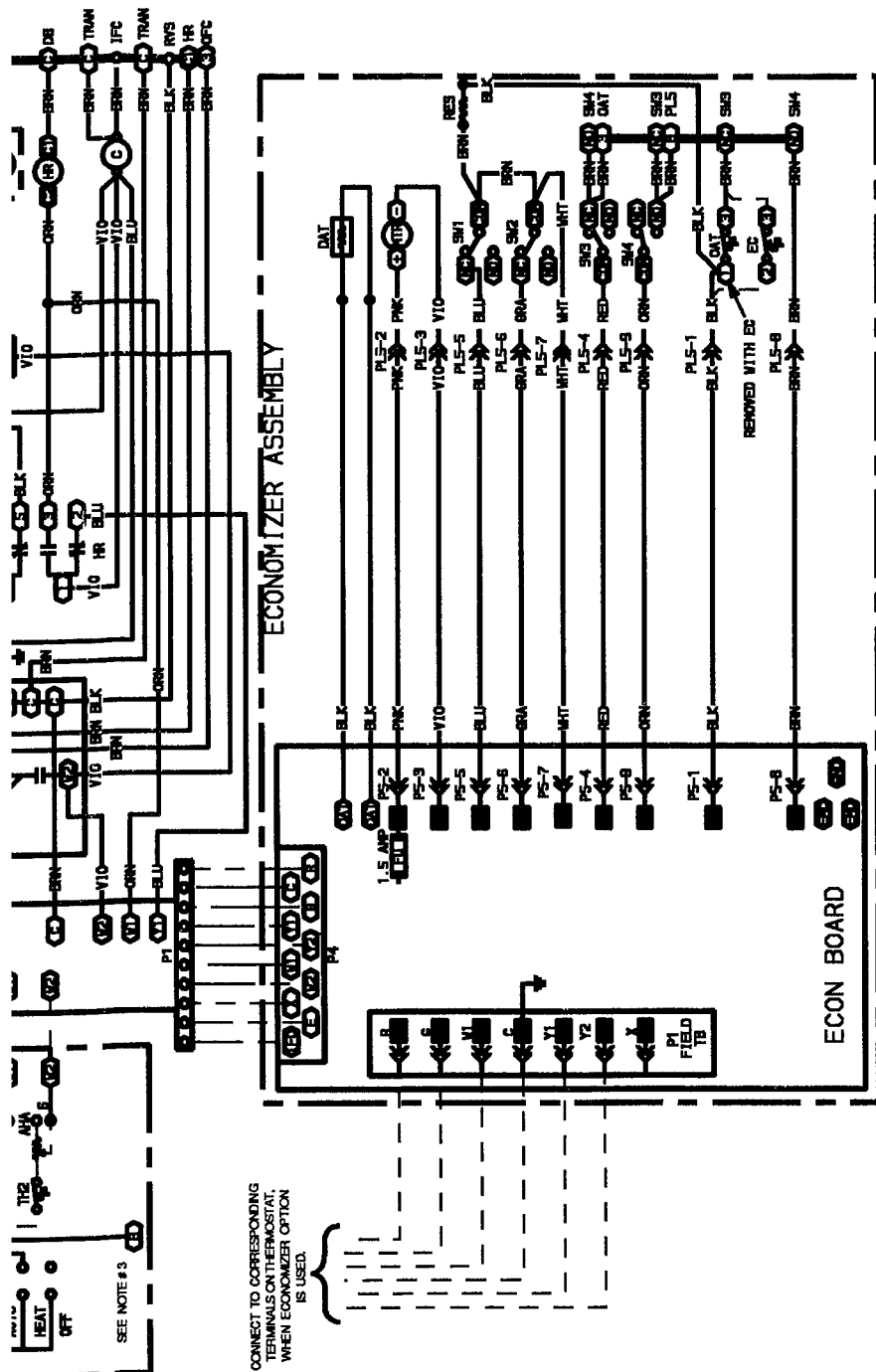
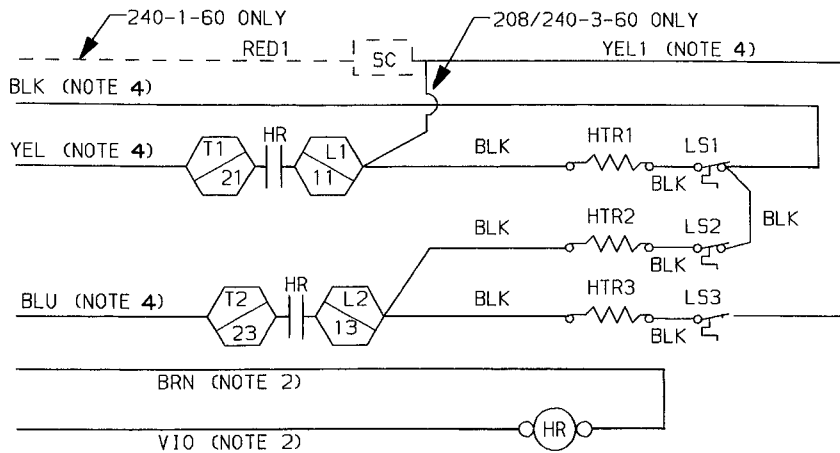


Fig. 13 — Label Diagram, Schem

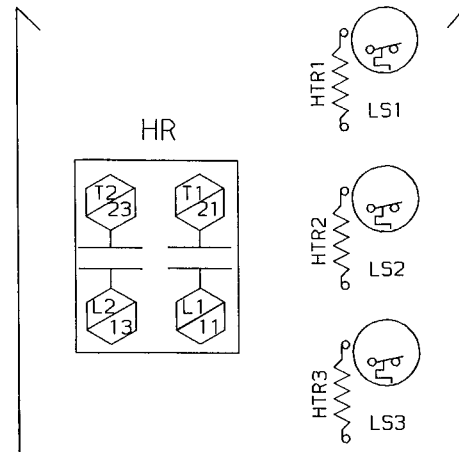


Diagram, Schematic; 50LJQ004-006, 575-3-60

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 VIO 24-vac wires are supplied with heater and connected at installation to base unit as shown on base unit wiring diagram
3. For single phase, disconnect YEL1 wire from terminal L1/11 and connect RED1 wire and splice connector to loose terminal on YEL1 as shown above.
4. 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

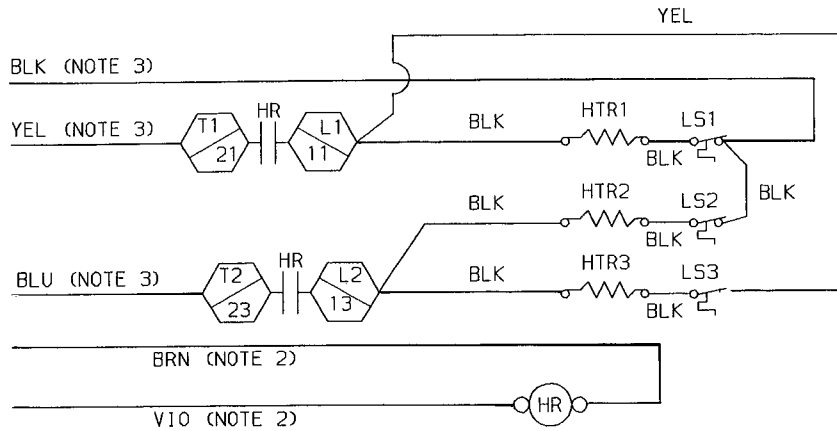
HTR — Heater
HR — Heater Relay
LS — Limit Switch
NEC — National Electrical Code
SC — Splice Connector

NOTES

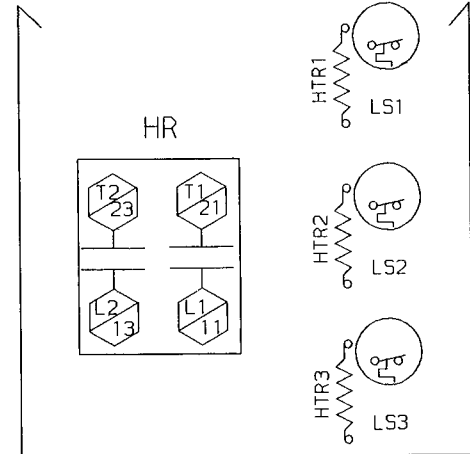
1. To b
2. Brow
as sl
3. Pow
necti
pow

Fig. 14 — Label Diagram Accessory Electric Heater; Models 50LJ004-007 and 50LJQ004-006, 208/240 v; single phase

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 VIO 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

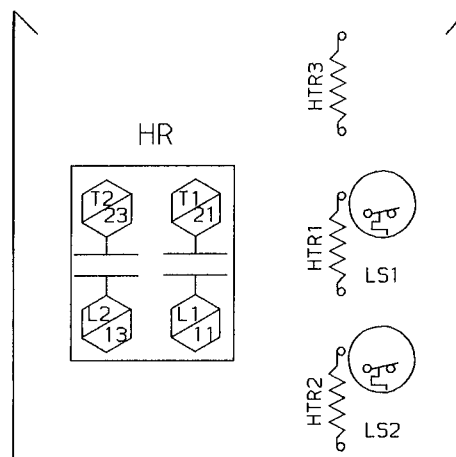
HTR — Heater

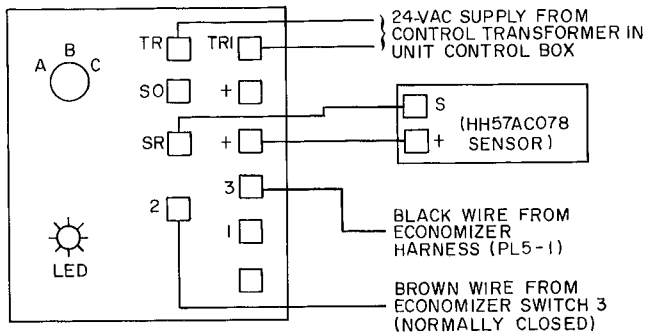
HR — Heater Relay

LS — Limit Switch

NEC — National Electrical Code

Fig. 15 — Label Diagram, Accessory Electric Heater; Models 50LJ004-007 and 50LJQ004-006, 208/240 v, 3 phase





NOTE: Remove factory-installed jumper across SR and + before connecting wires from HH57AC078 sensor.

Fig. 17 – Wiring Connections for Solid-State Enthalpy Control (HH57AC077)

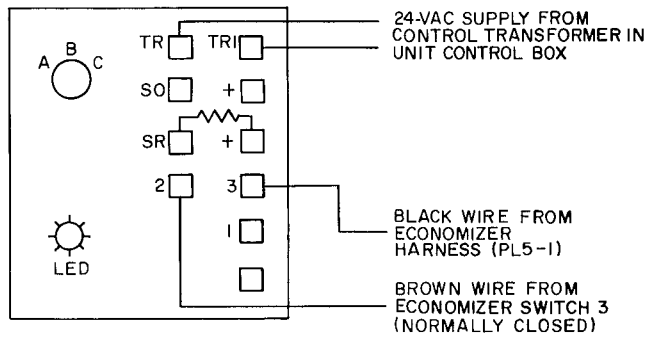
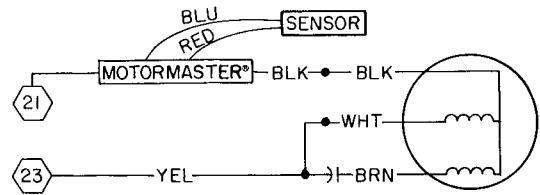
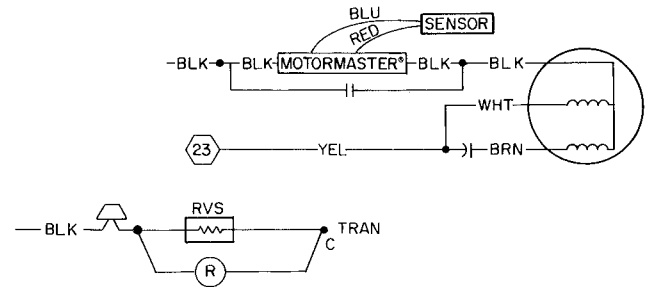


Fig. 18 – Wiring Connections for Differential Enthalpy Control (HH57AC077 and HH57AC078)



48/50LJ004-007



50LJQ004-006

Fig. 19 – Accessory Motormaster® Wiring

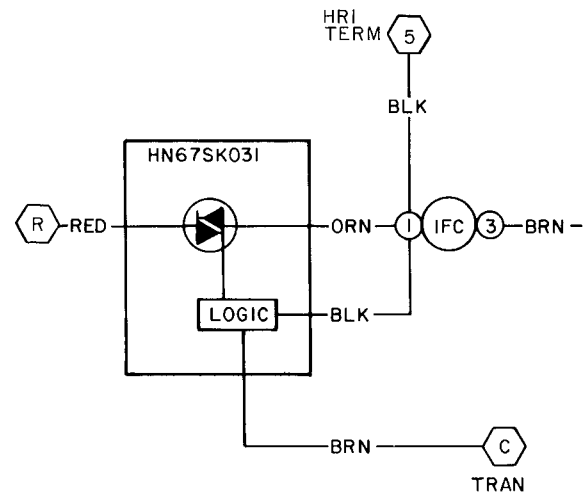


Fig. 20 – Time Delay Relay Wiring

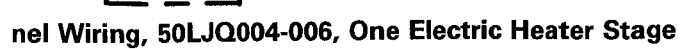
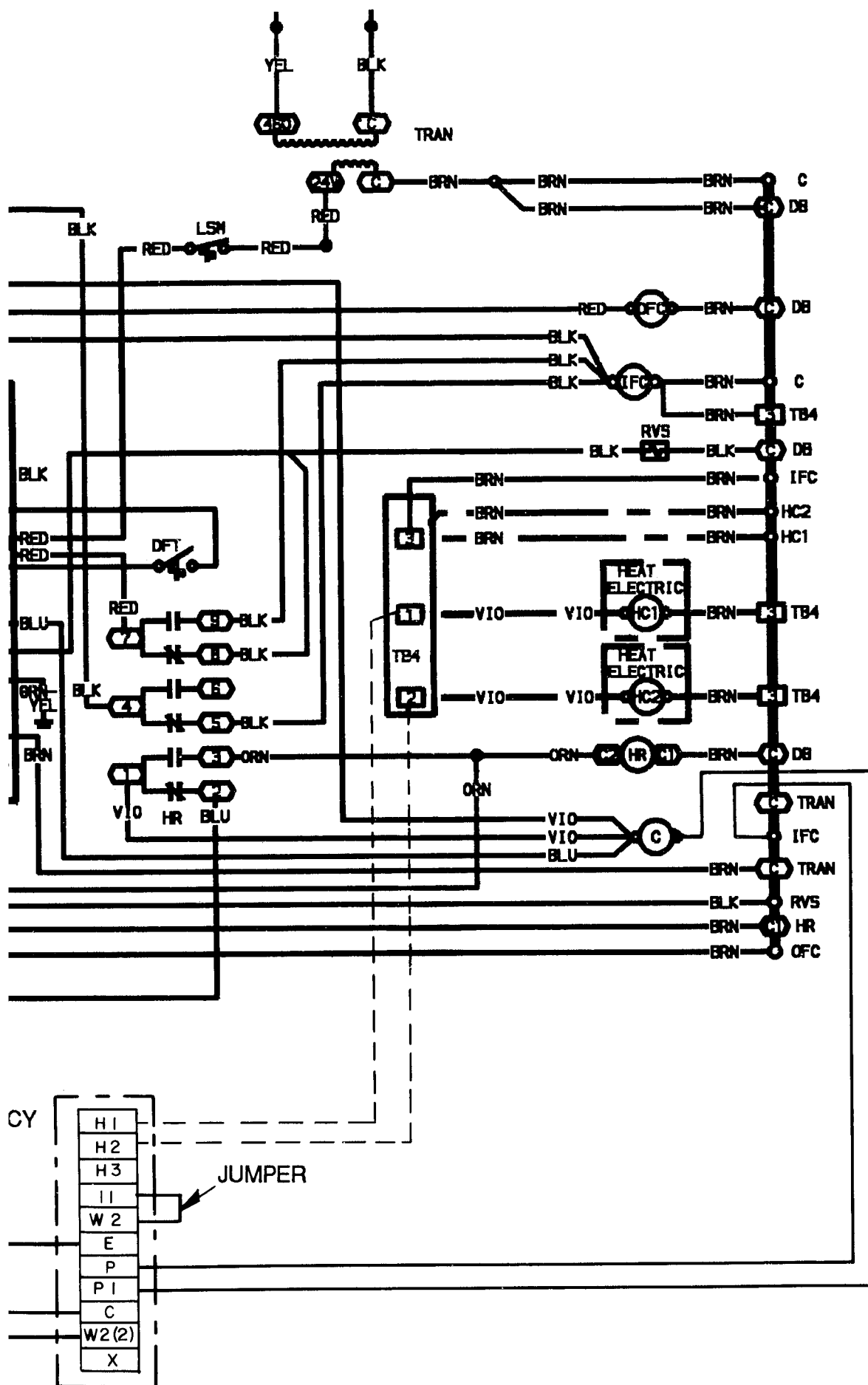




Fig. 22 — Emergency Heat Control Panel Wiring, 50LJ



Wiring, 50LJQ004-006, 2 Electric Heater Stages

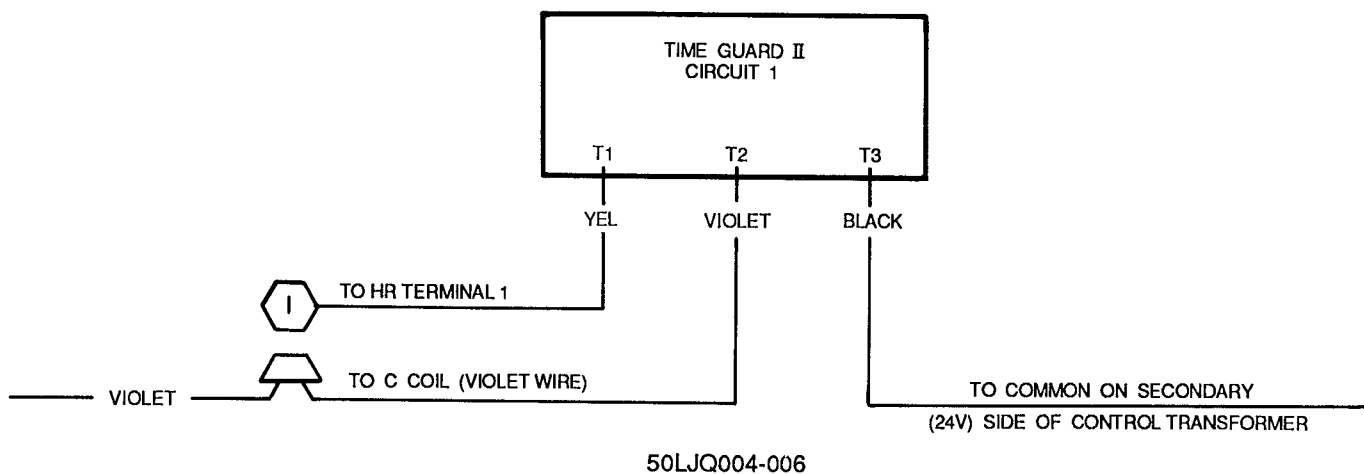
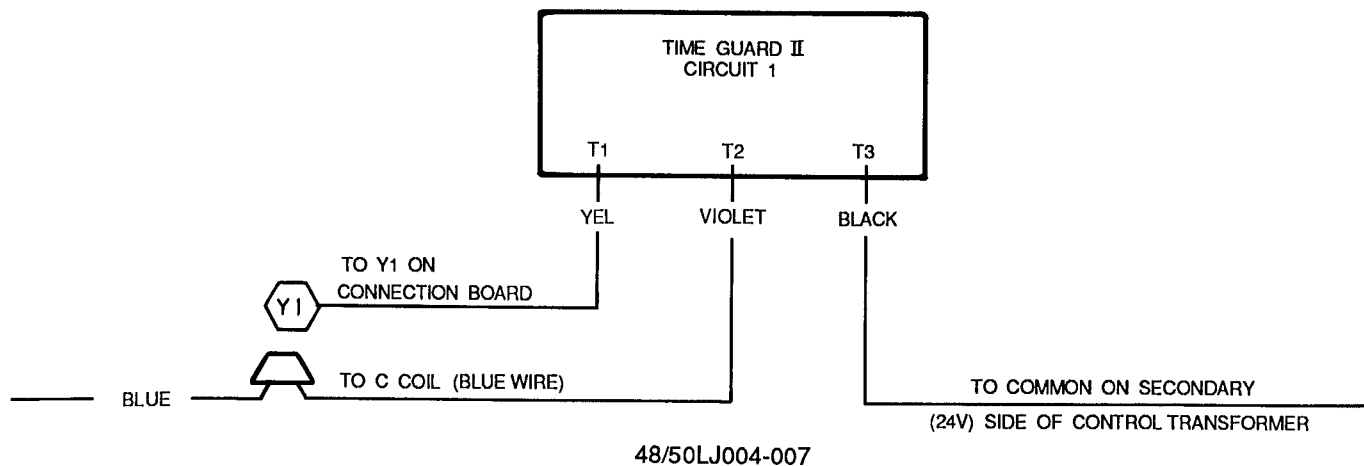


Fig. 23 – Time Guard® II Control Circuit Wiring

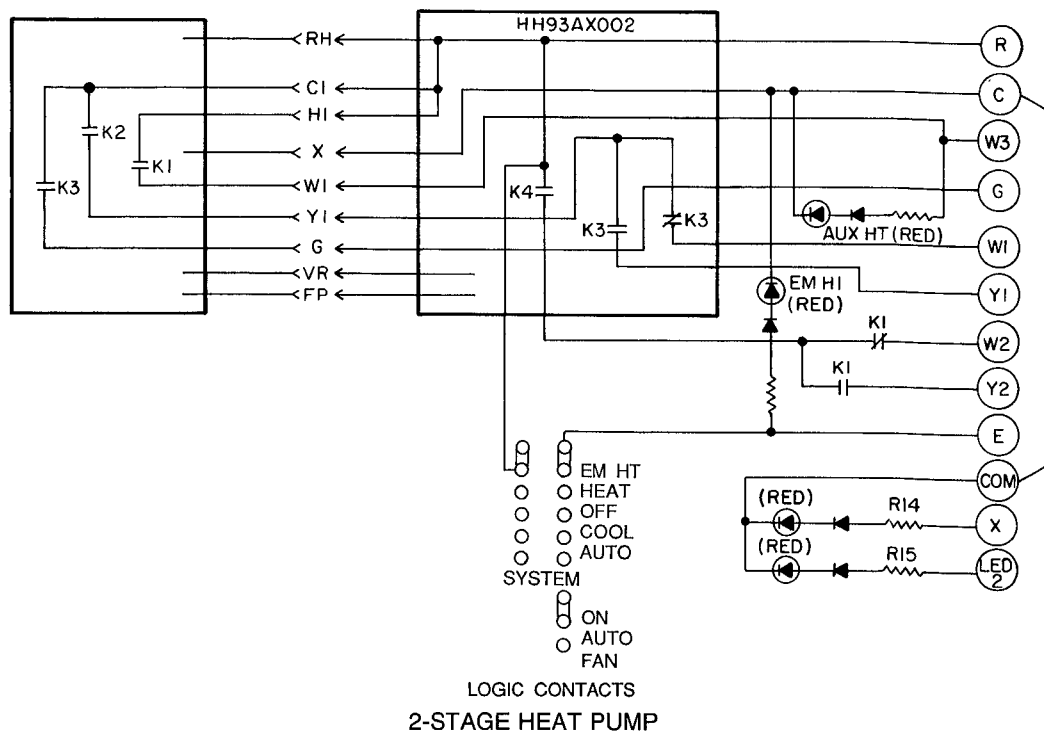
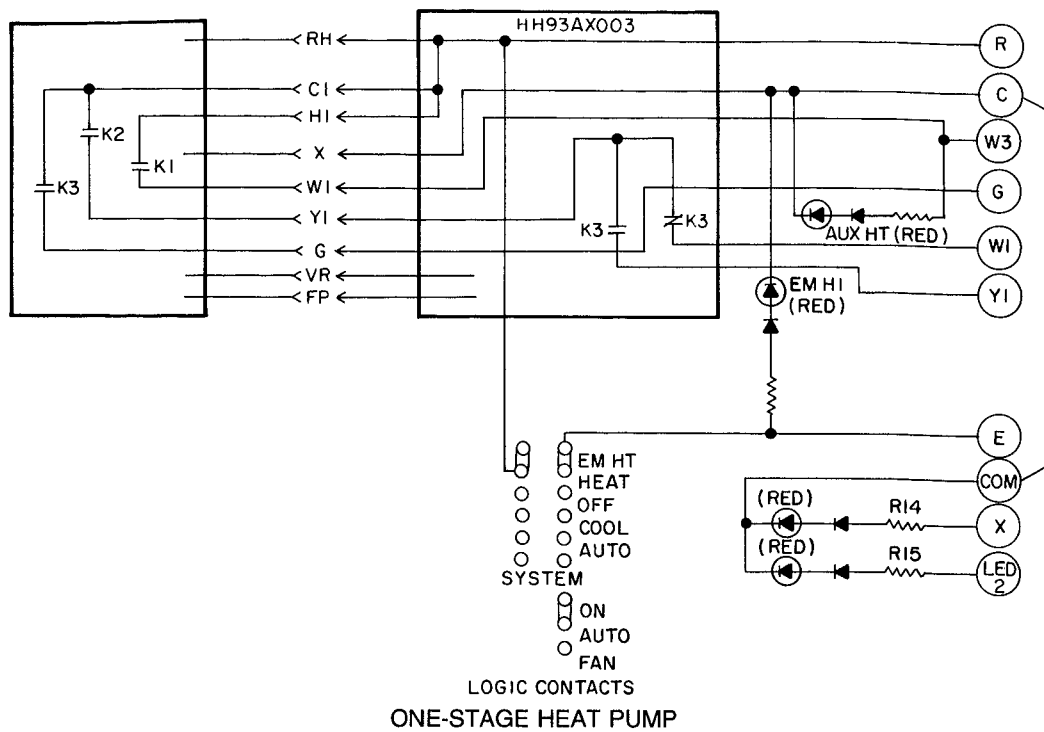
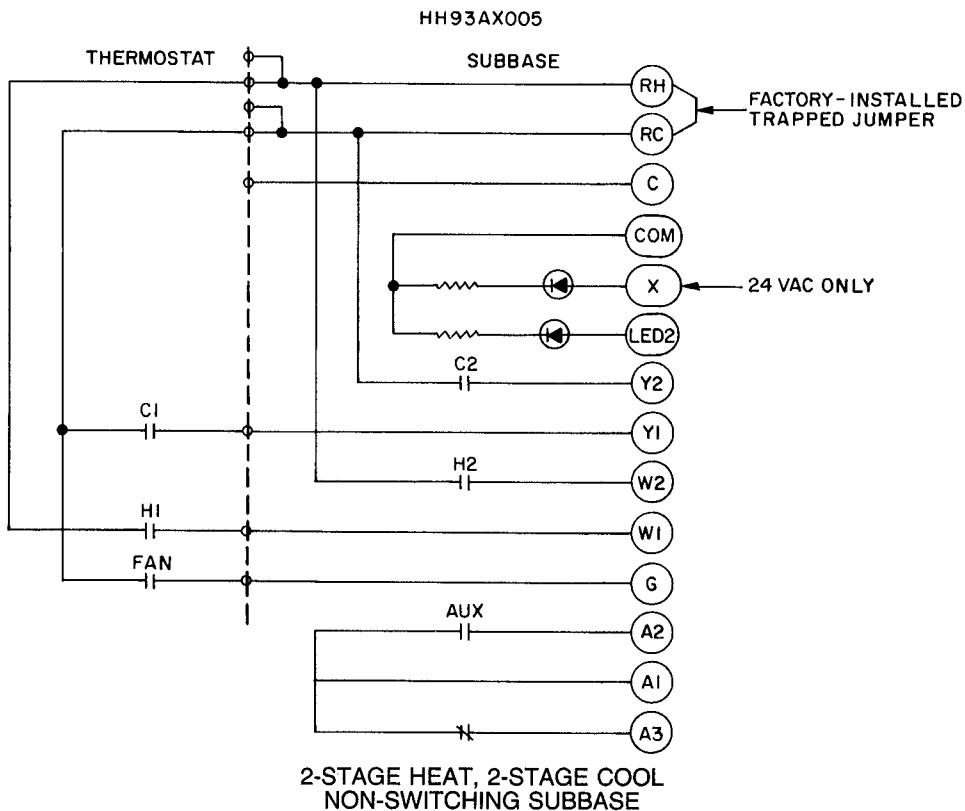
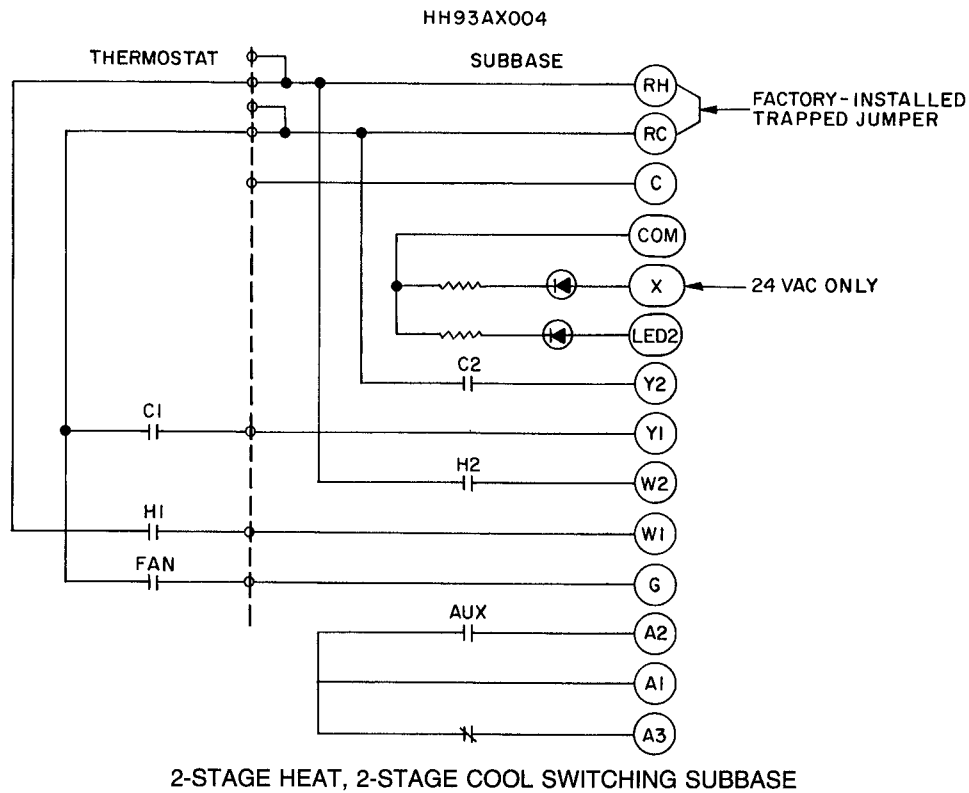


Fig. 24 – Electronic Thermostat Schematic



LEGEND

AUX — Auxiliary	LED — Light-Emitting Diode
CLO — Compressor Lockout	R — 24V
COM — Common	W1 — Stage 1 Heat
E — EM HT	W2 — Stage 2 Heat
EM — Emergency	W3 — Aux Heat
G — Fan	Y1 — Stage 1 Cool
HT — Heat	Y2 — Stage 2 Cool

Fig. 24 — Electronic Thermostat Schematic (cont)

REMOTE CONTROL PANEL WIRING

48LJD/LJE004-007
50LJ004-007
50LJQ004-006

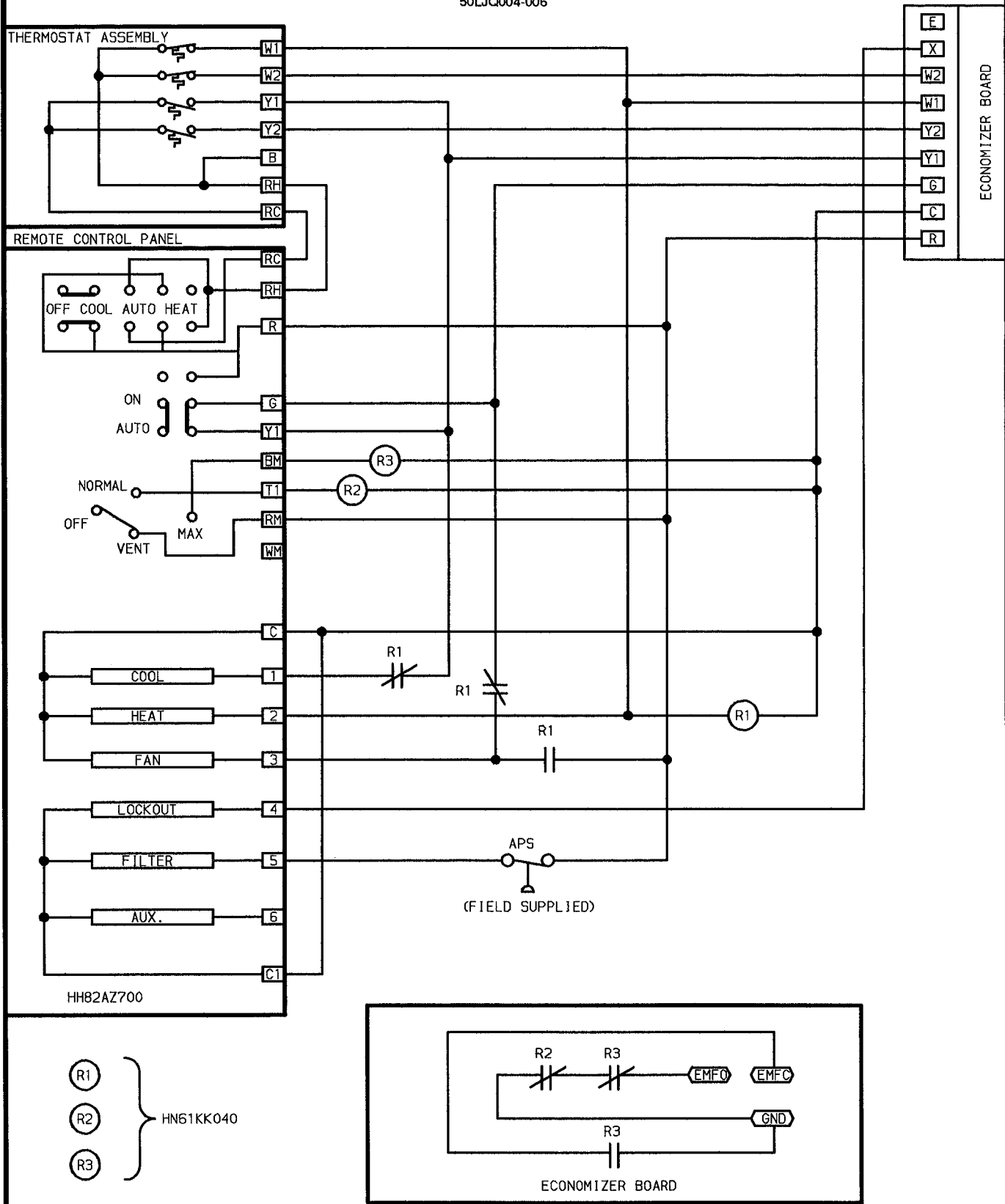


Fig. 25 — Remote Control Panel Wiring

