Carrier Corporation • Syracuse N Y 13221

Single-Package Cooling Units

INDEX

MODEL 50	VOLTS-PH-HZ	ELECTRIC HEAT kW	ELECTRIC HEAT MODE	HEATING LABEL DIAGRAM	FIG.
DF024	208/230-3-60	30-37 45-55	Low Medium	50DD506684 50DD506694	3 4
	460-3-60	37 55	Low Medium	50DD506714 50DD506724	5 6
	575-3-60	—	—	—	—
DF028	208/230-3-60	45-55 60-73	Low Medium	50DD501594 50DD506574	7 8
	460-3-60	55 73	Low Medium	50DD503364 50DD506604	9 10
	575-3-60	—	—	—	—
DF034	208/230-3-60	45-55 75-92	Low Medium	50DD506744 50DD501824	11 12
	460-3-60	55 92	Low Medium	50DD506774 50DD503344	13 14
	575-3-60	—	—	—	—
DL044	208/230-3-60	55 73	Low Medium	50DD508204 50DD508214	15 16
	460-3-60	55 73	Low Medium	50DD508234 50DD508224	17 18
	575-3-60	—	—	—	—
DL054	208/230-3-60	73 92	Low Medium	50DD508214 50DD508244	16 19
	460-3-60	73 92	Low Medium	50DD508224 50DD508254	18 20
	575-3-60	—	—	—	—
DL064	208/230-3-60	73 92	Low Medium	50DD508214 50DD508244	16 19
	460-3-60	73 92	Low Medium	50DD508224 50DD508254	18 20
	575-3-60	—	—	—	—

MODEL 50	VOLTS-PH-HZ	COOLING WIRING DIAGRAMS					
		Control Wiring				Power Wiring and Components	Fig.
		Standard Fan	Fig.	2-Speed Fan	Fig.		
DF024	208/230-3-60	50DD507644	43	50DD507654	46	50DD507704	21,32
	460-3-60	50DD507664	44	50DD507674	47	50DD507714	22,33
	575-3-60	50DD507664	44	—	—	50DD507714	22,33
DF028	208/230-3-60	50DD507684	45	50DD507694	48	50DD507734	23,34
	460-3-60	50DD507684		50DD507694		50DD508414	24,35
	575-3-60	50DD507684		—	—	50DD508414	24,35
DF034	208/230-3-60	50DD507684	45	50DD507694	48	50DD507754	25,36
	460-3-60	50DD507684		50DD507694		50DD508424	26,37
	575-3-60	50DD507684		—	—	50DD508424	26,37
DL044	208/230-3-60	50DD507684	45	50DD507694	48	50DD507774	27,38
	460-3-60	50DD507684		50DD507694		50DD508434	28,39
	575-3-60	50DD507684		—	—	50DD508434	28,39
DL054	208/230-3-60	50DD507684	45	50DD507694	48	50DD507794	29,40
	460-3-60	50DD507684		50DD507694		50DD508444	30,41
	575-3-60	50DD507684		—	—	50DD508444	30,41
DL064	208/230-3-60	50DD507684	45	50DD507694	48	50DD507844	31,42
	460-3-60	50DD507684		50DD507694		50DD507844	31,42
	575-3-60	—	—	—	—	—	—

INDEX (cont)

NOTES

1. Compressors and/or fan motors are thermally protected. Three-phase motors are protected under primary single-phasing conditions.
2. Screw terminals of printed-circuit board are suitable for connection of NEC Class 2 control circuit, 24 volts.
3. For replacement wire, use Type 90 C wire or equivalent.
4. Fuses must be supplied for field power supply.
5. All circuit breaker must-trip amps are equal to or less than 140% FLA.
6. Compressor #1 location is on unit right side, facing control box and bottom portion of indoor coil.
7. Transformers 1 and 2 are wired for 460 v on 460-v unit, and for 208 v on 208/230-v unit. Transformer 1 is wired to terminals marked as follows:
   460-v unit — wired to H4 (460-v) terminal
   208/230-v unit — wired to H2 (208-v) terminal
8. No connections between CCB and IFC when unit is equipped with optional 7-1/2 hp indoor fan motor.
9. TB4 terminals [9] and [10] are used only with fan switching subbase. TB4 terminals [6] and [8] are used only with energy management (night set-back) option.
10. Refer to label diagram on unit control box for cooling control circuit wiring, component connections and complete legend.

SAFETY CONSIDERATIONS

The 50DF,DL Single-Package Cooling Units are designed to provide safe and reliable service when operated within design specifications. However, due to system pressures, electrical components and equipment location, some aspects of installation, start-up and service can be hazardous.

Only trained, qualified installers and service mechanics should install, start-up and service this equipment.

When working on the equipment, observe all precautions on tags or labels attached to the unit, safety notes in the literature and any other safety precautions that apply.

- Follow all safety codes.
- Wear safety glasses and work gloves.
- Use care in handling, rigging and placing bulky equipment.

⚠ DANGER

NEVER reach into unit when fan is running. LOCK OPEN AND TAG fan motor power disconnect before working on a fan. Remove the fuses and take them with you after noting this on tag.

⚠ WARNING

BE SURE power to equipment is shut off before performing maintenance or service.

CHECK assembly and component weights to be sure rigging equipment can handle them safely. Note also any special rigging instructions.

WHEN STEAM CLEANING COILS, be sure area is clear of personnel.

LEGEND (Fig. 1 - 52)

ATS	— Air Temperature Switch
BS	— Bypass Switch
C	— Contactor, Compressor
Cap.	— Capacitor
CB	— Circuit Breaker, Compressor
CCB	— Circuit Breaker, Control
CCSV	— Capacity Control Solenoid Valve
CH	— Crankcase Heater
CK	— Clock
Clg	— Cooling
CO	— Convenience Outlet
Comp	— Compressor Motor
CR	— Control Relay
CS	— Centrifugal Switch
DM	— Damper Motor (Day Mode — Fig 27,29,44,45,46)
DMAS	— Damper Motor Auxiliary Switch
DR	— Day Relay
DU	— Dummy Terminal
Econ	— Economizer
EMC	— Exhaust Motor Contactor
ENTH or EC	— Enthalpy Control
Equip Gnd	— Equipment Ground
Exh	— Exhaust
FL	— Fuse Link
FPT	— Freeze-Up Protection Thermostat
FTDR	— Fan Time-Delay Relay
Fu	— Fuse
HC	— Heater Contactor
HCB	— Heater Circuit Breaker
HPCT	— Head Pressure Control Thermostat
HPS	— High-Pressure Switch
HR	— Heater Relay
Htg	— Heating
HTR	— Heater
IFC	— Indoor Fan Contactor
IFCB	— Indoor Fan Circuit Breaker
IFM	— Indoor Fan Motor
IFR	— Indoor Fan Relay
IP	— Internal Protector
IR	— Interlock Relay
LAL	— Low Ambient Lockout
LPS	— Low-Pressure Switch
LS	— Limit Switch
MW	— Morning Warm-Up
NM	— Night Mode
NR	— Night Relay
OFC	— Outdoor Fan Contactor
OFM	— Outdoor Fan Motor
PCB	— Printed-Circuit Board
PER	— Power Exhaust Relay
PETC	— Power Exhaust Temperature Controller
PI	— Plug
Pri	— Primary
QT	— Quad Terminal
Sec	— Secondary
SSM	— Setup — Set-back Module
TB	— Terminal Board (Block)
TDR	— Time-Delay Relay
TM	— Timer Motor
TR	— Timer Relay
Tran	— Transformer, Potential
U	— Unloader
UR	— Unloader Relay
WR	— Warm-Up Relay

Terminal Block
Terminal (unmarked)
Terminal (marked)
Terminal (circuit board, factory connected)
Terminal (circuit board, field or accessory connected)
Factory Wiring
Circuit Board Run
Option Wiring
Field Wiring
Splice
Splice (marked)
To Indicate Common Potential Only; Not to represent wire
Plug
Receptacle

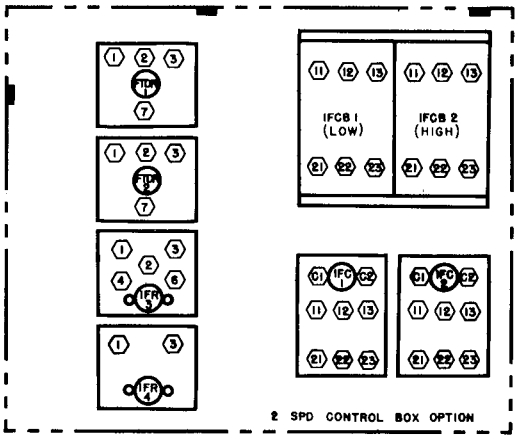
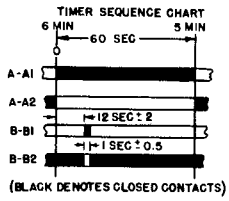


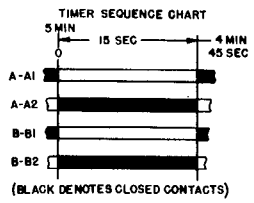
Fig. 1 — Component Arrangement; 2-Speed Fan Option

TM 1



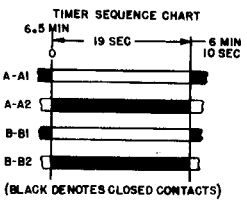
50DF024; 208/230-3-60

TM 1



50DF024; 460-, 575-3-60
50DF028 and 034; 50DL044,054,064; All Voltages

TM 2



50DF028 and 034; 50DL044,054,064; All Voltages

Fig. 2 — Time Guard® Control Sequence

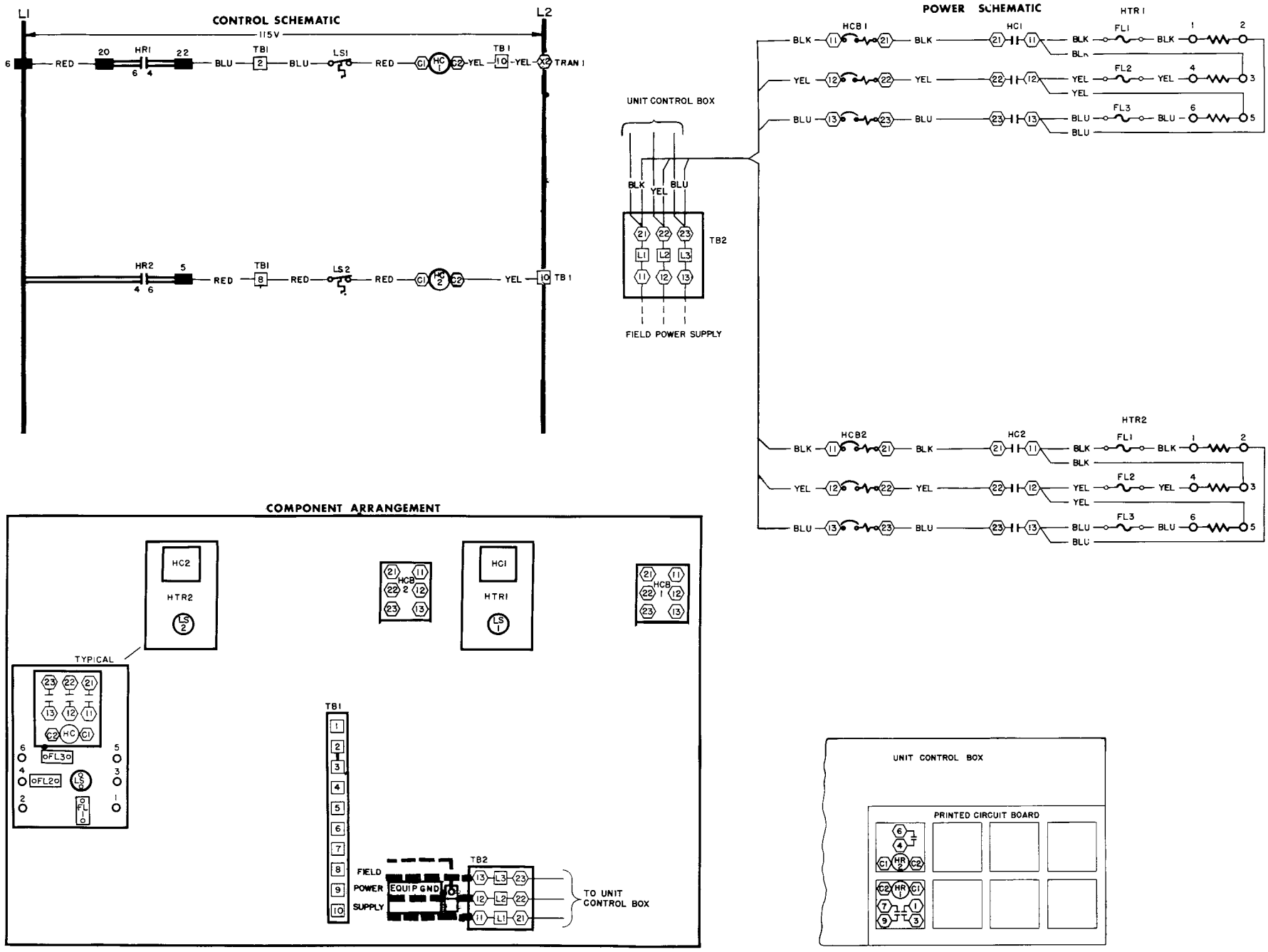


Fig. 3 — Label Diagram (Low Electric Heat), 50DF024; 208/230-3-60

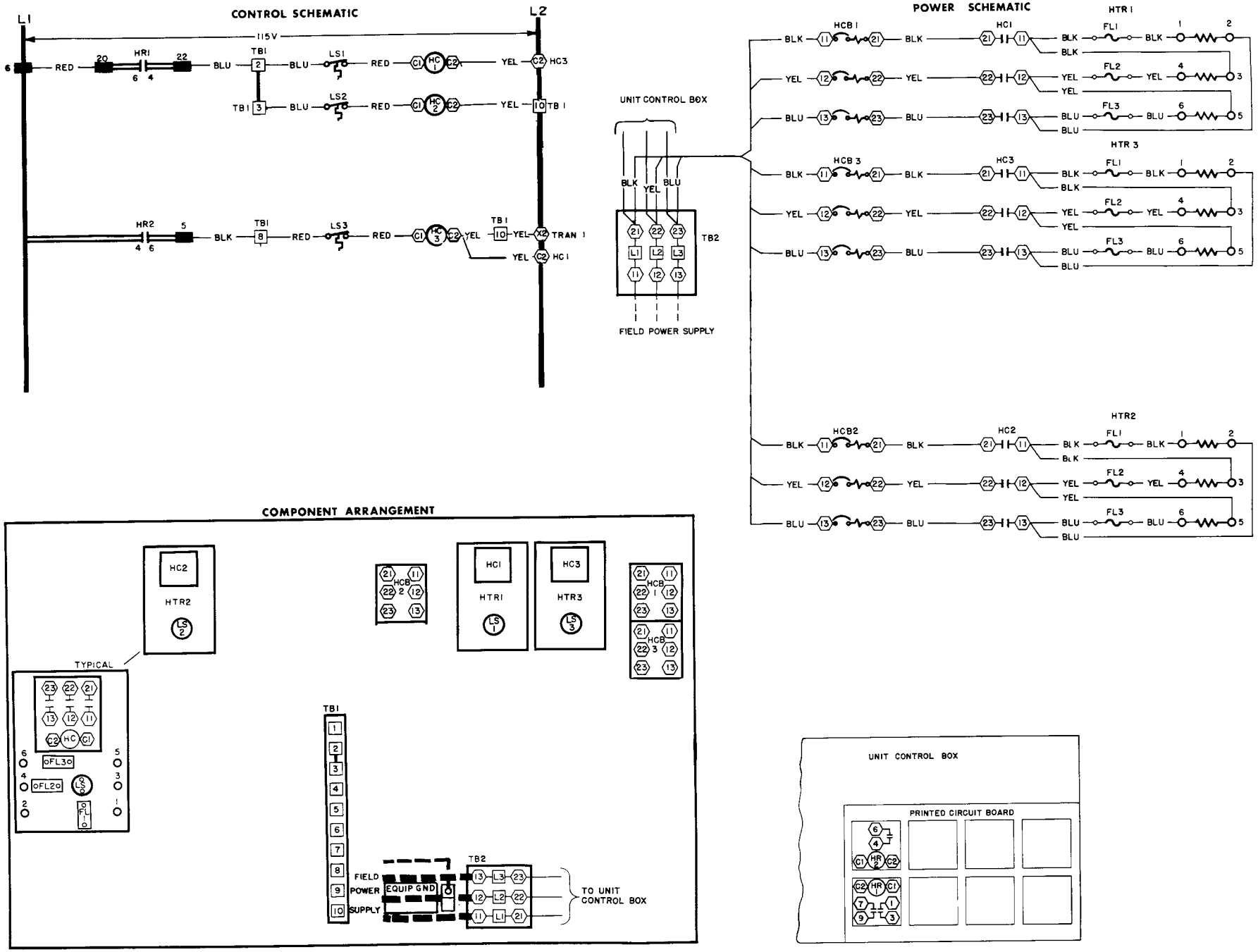


Fig. 4 — Label Diagram (Medium Electric Heat), 50DF024; 208/230-3-60

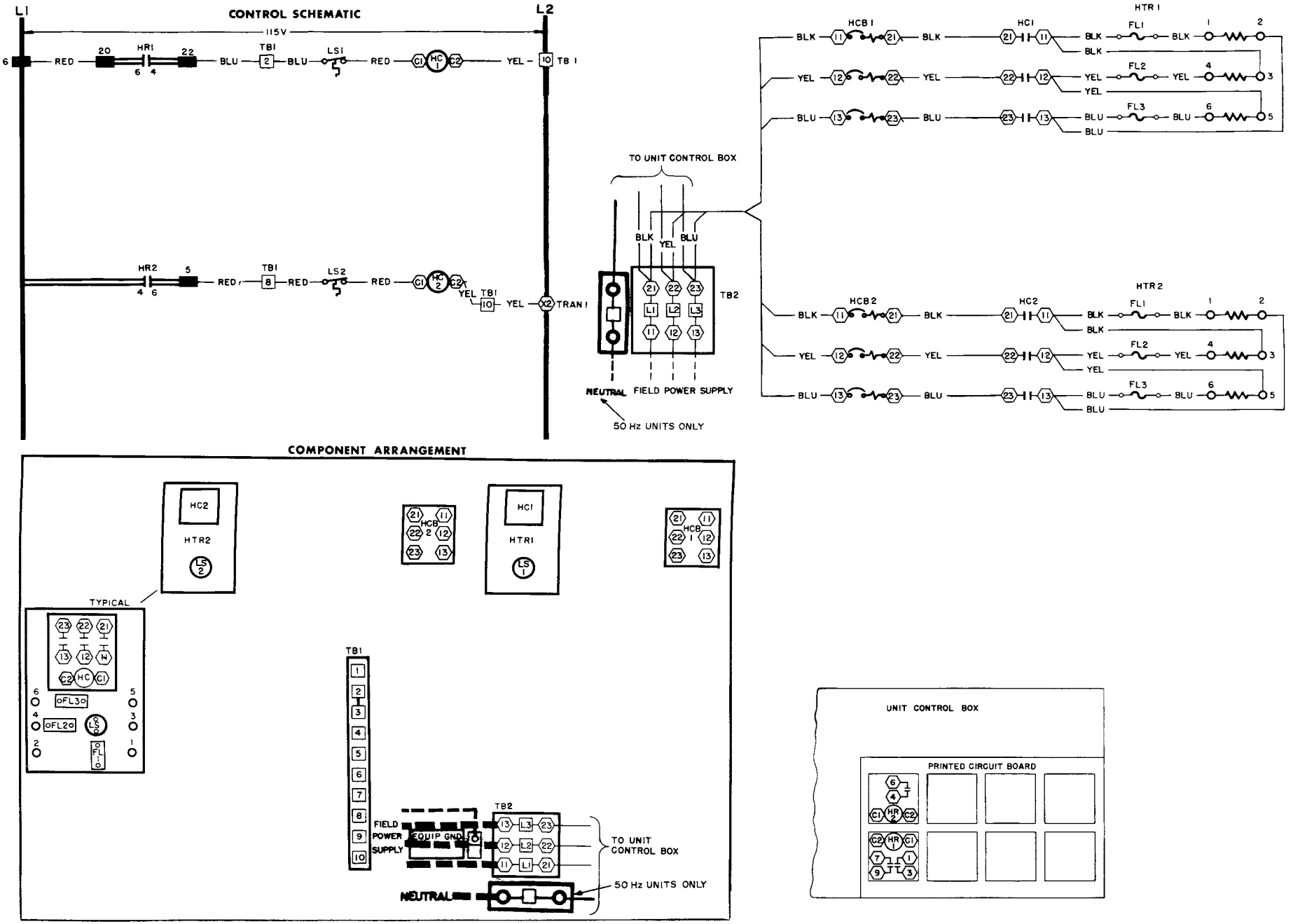


Fig. 5 — Label Diagram (Low Electric Heat), 50DF024; 460-3-60

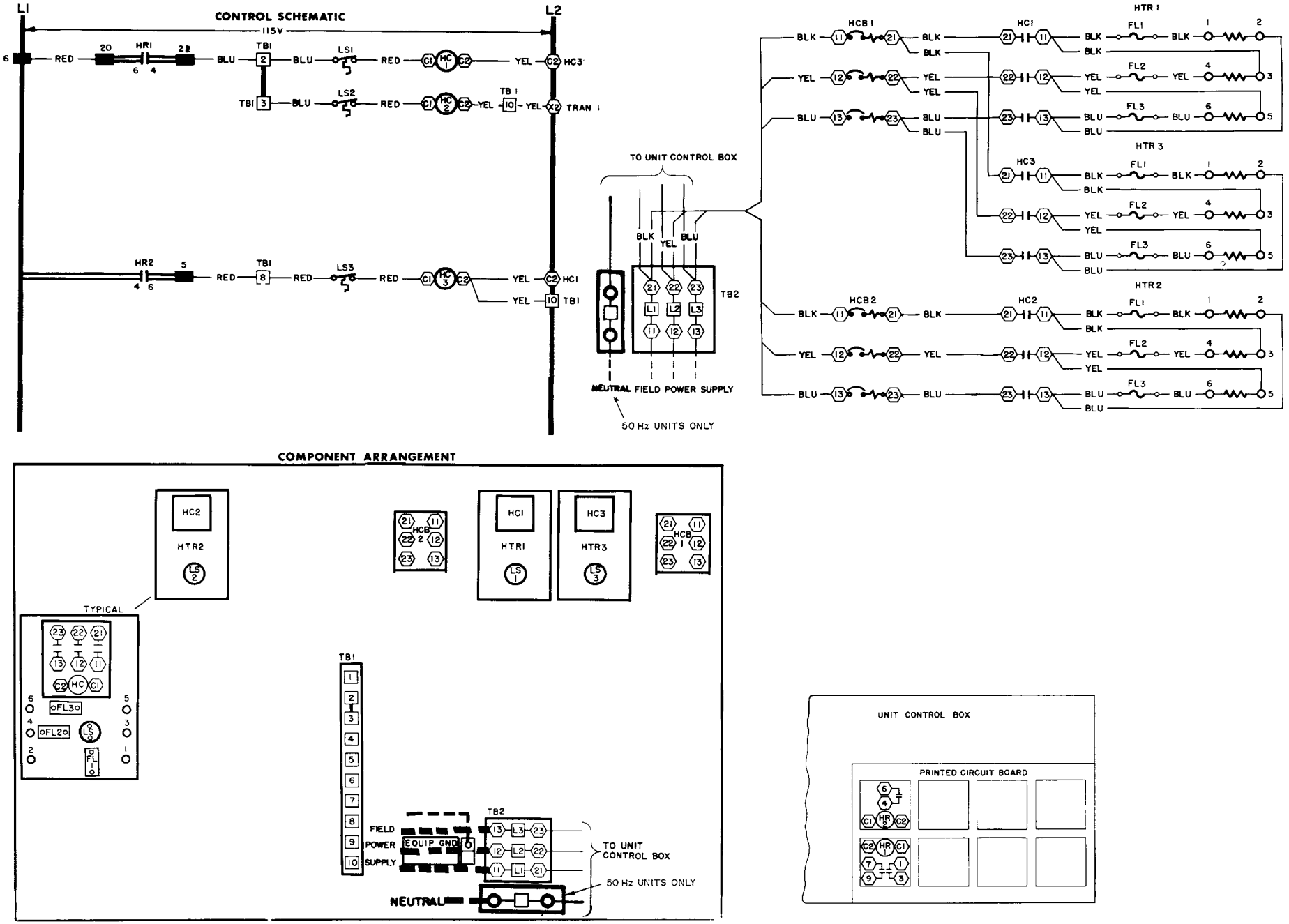


Fig. 6 — Label Diagram (Medium Electric Heat), 50DF024; 460-3-60

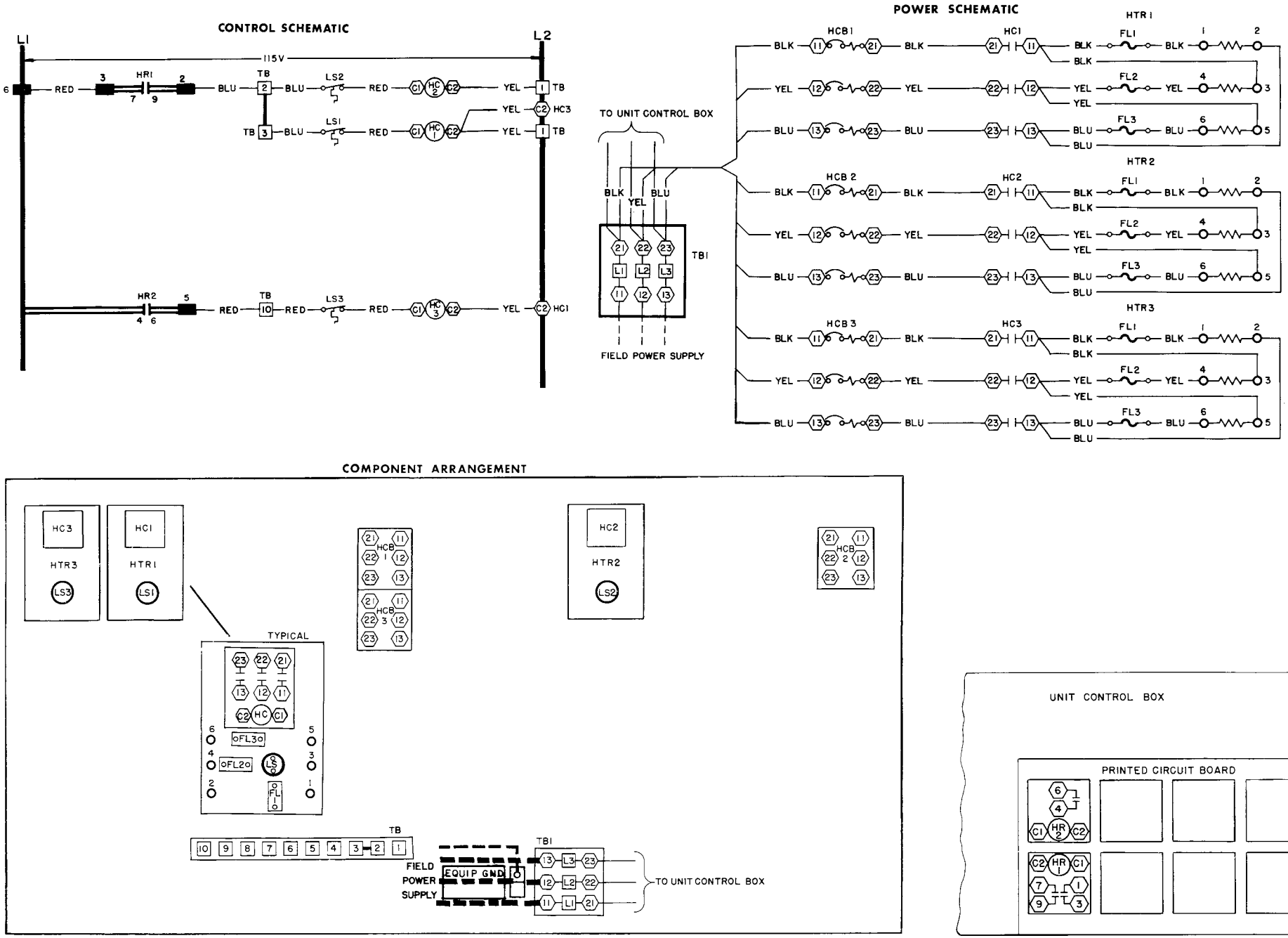


Fig. 7 — Label Diagram (Low Electric Heat), 50DF028; 208/230-3-60

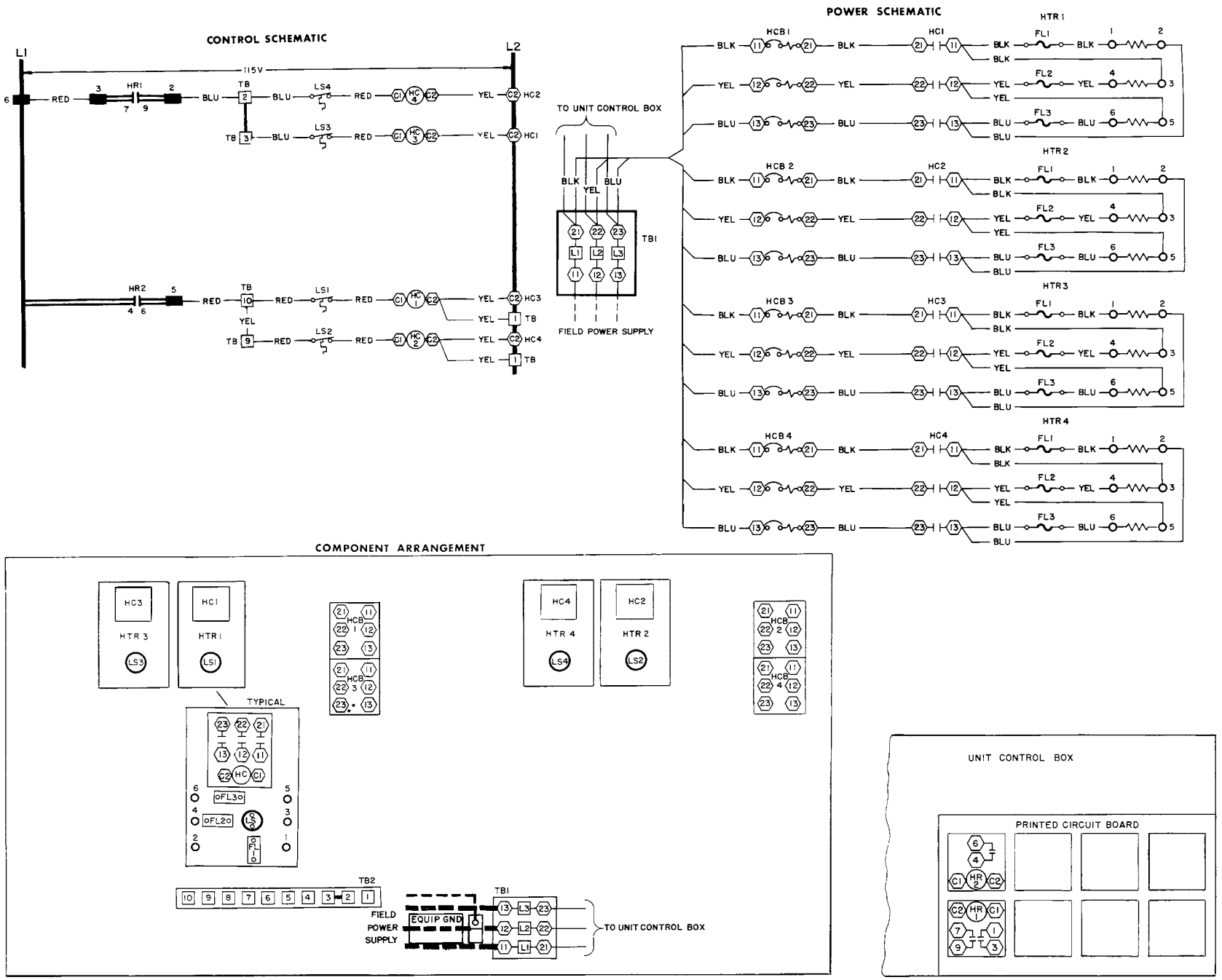


Fig. 8 — Label Diagram (Medium Electric Heat), 50DF028; 208/230-3-60

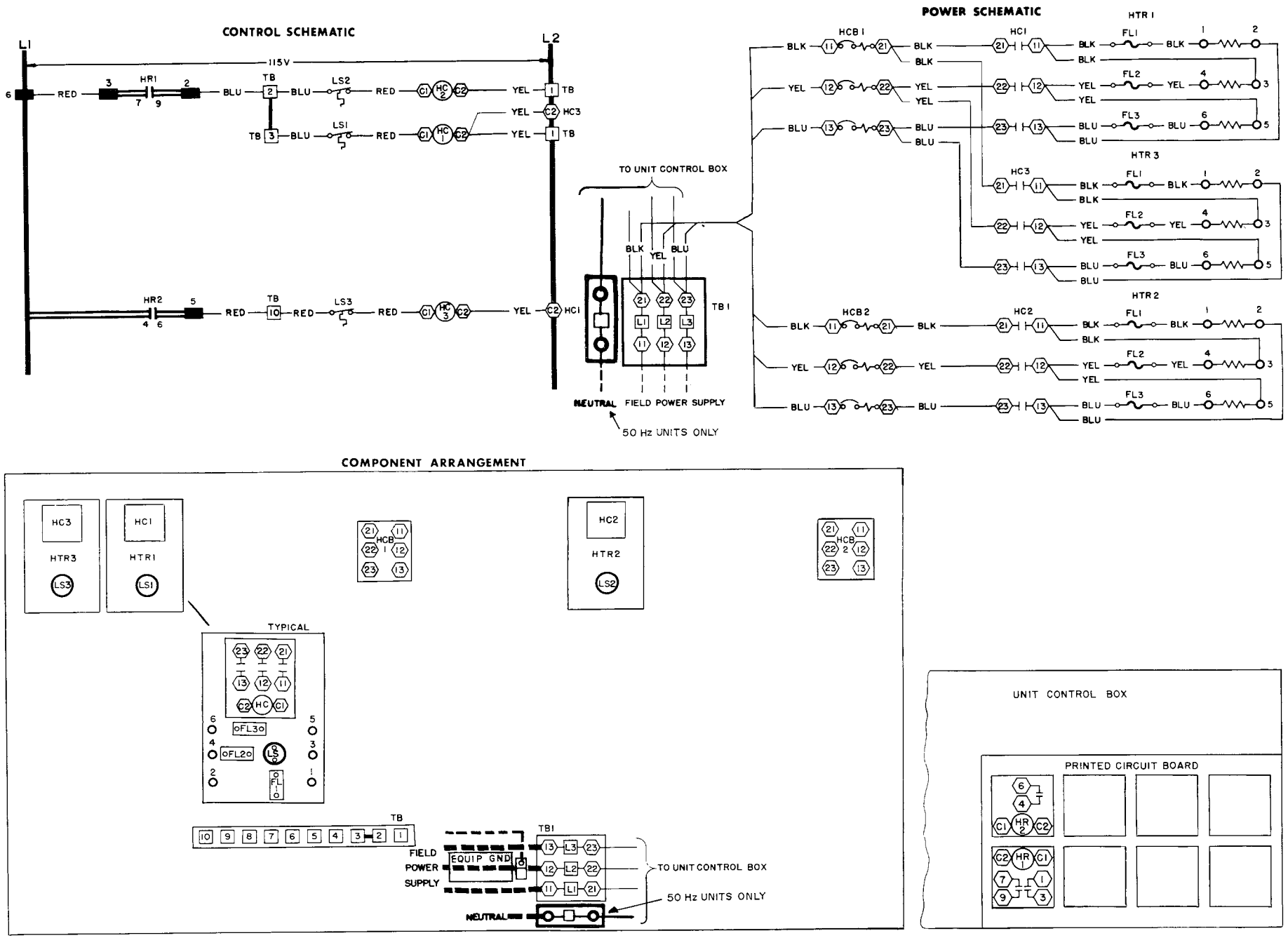


Fig. 9 — Label Diagram (Low Electric Heat), 50DF028; 460-3-60

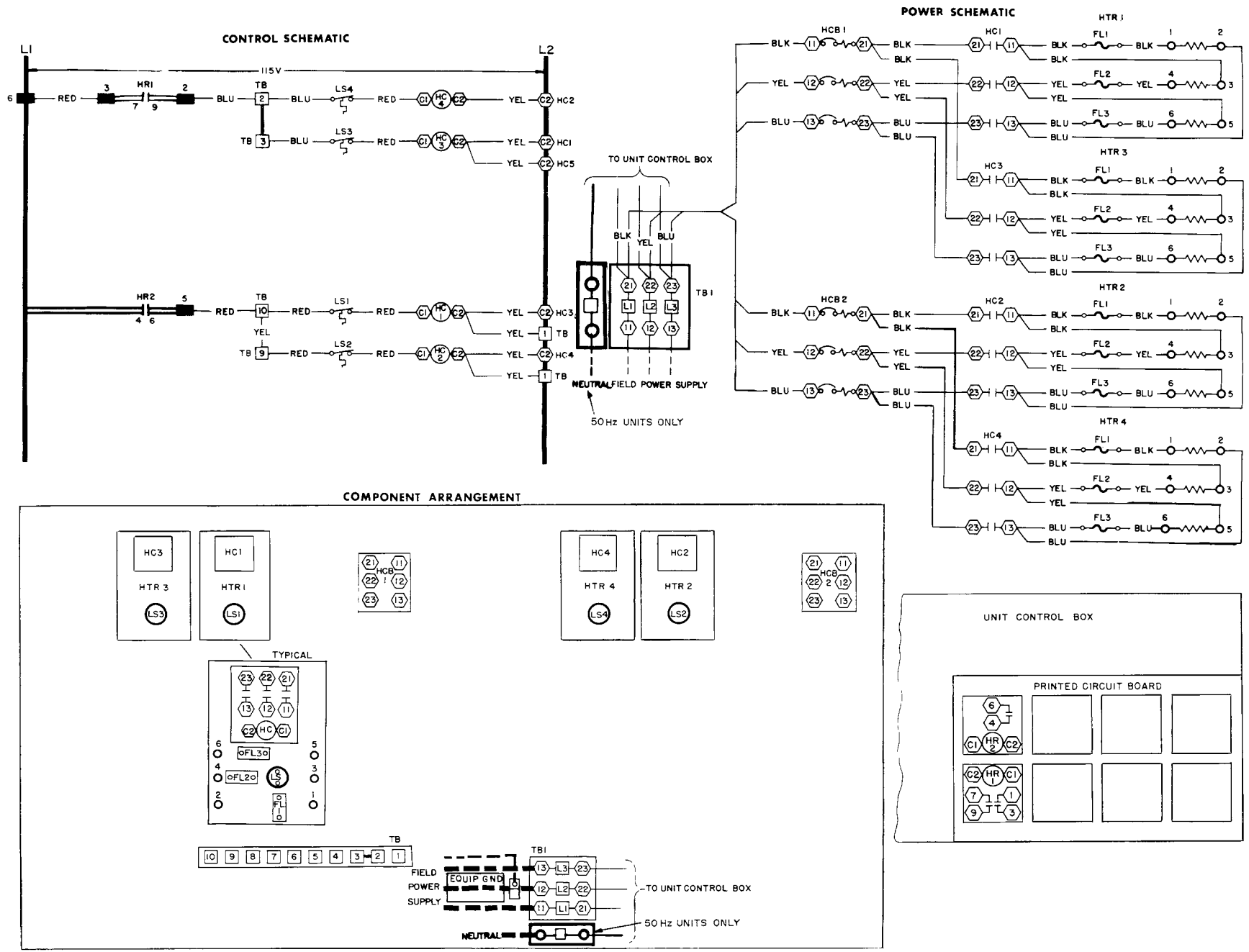


Fig. 10 — Label Diagram (Medium Electric Heat), 50DF028; 460-3-60

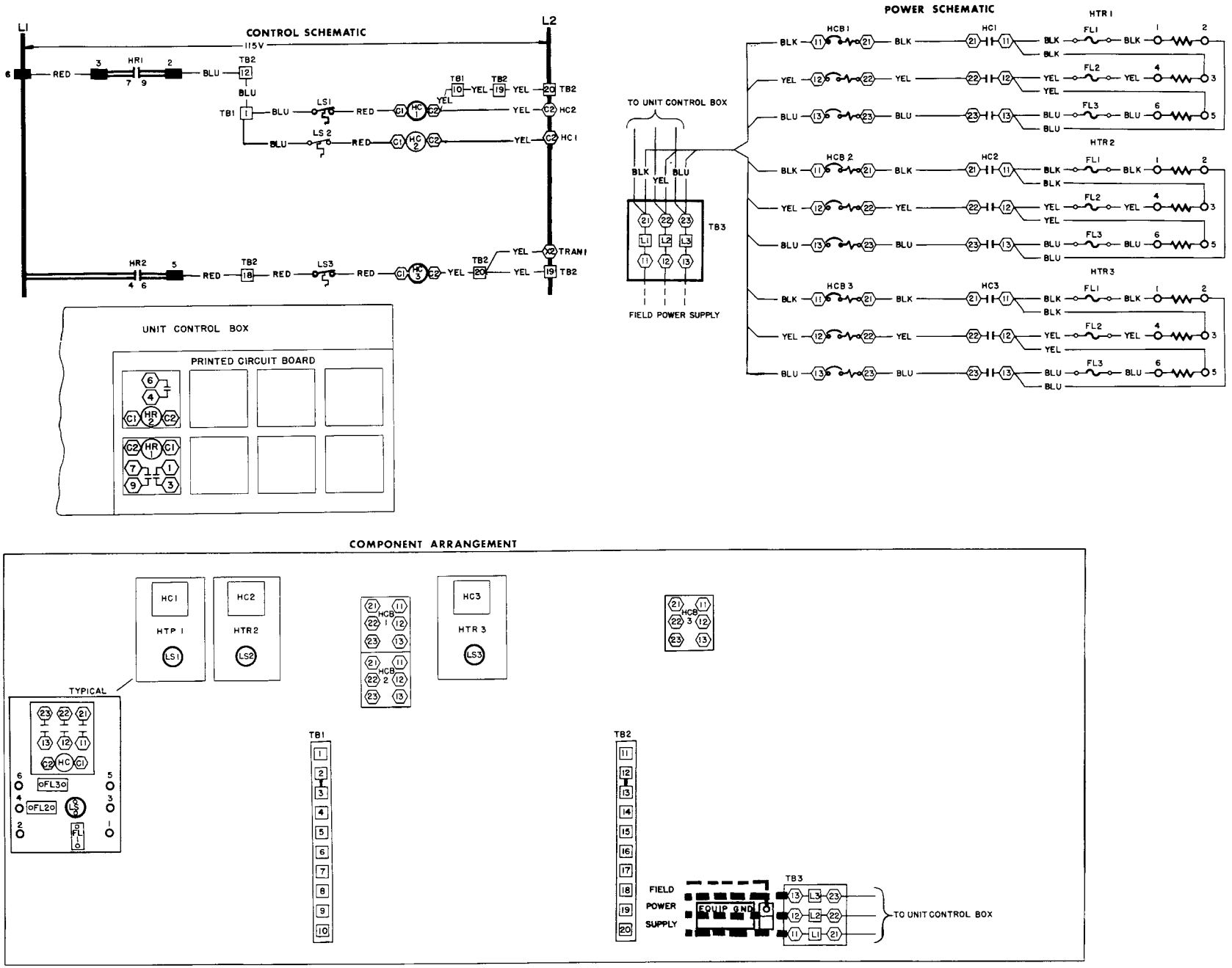


Fig. 11 — Label Diagram (Low Electric Heat), 50DF034; 208/230-3-60

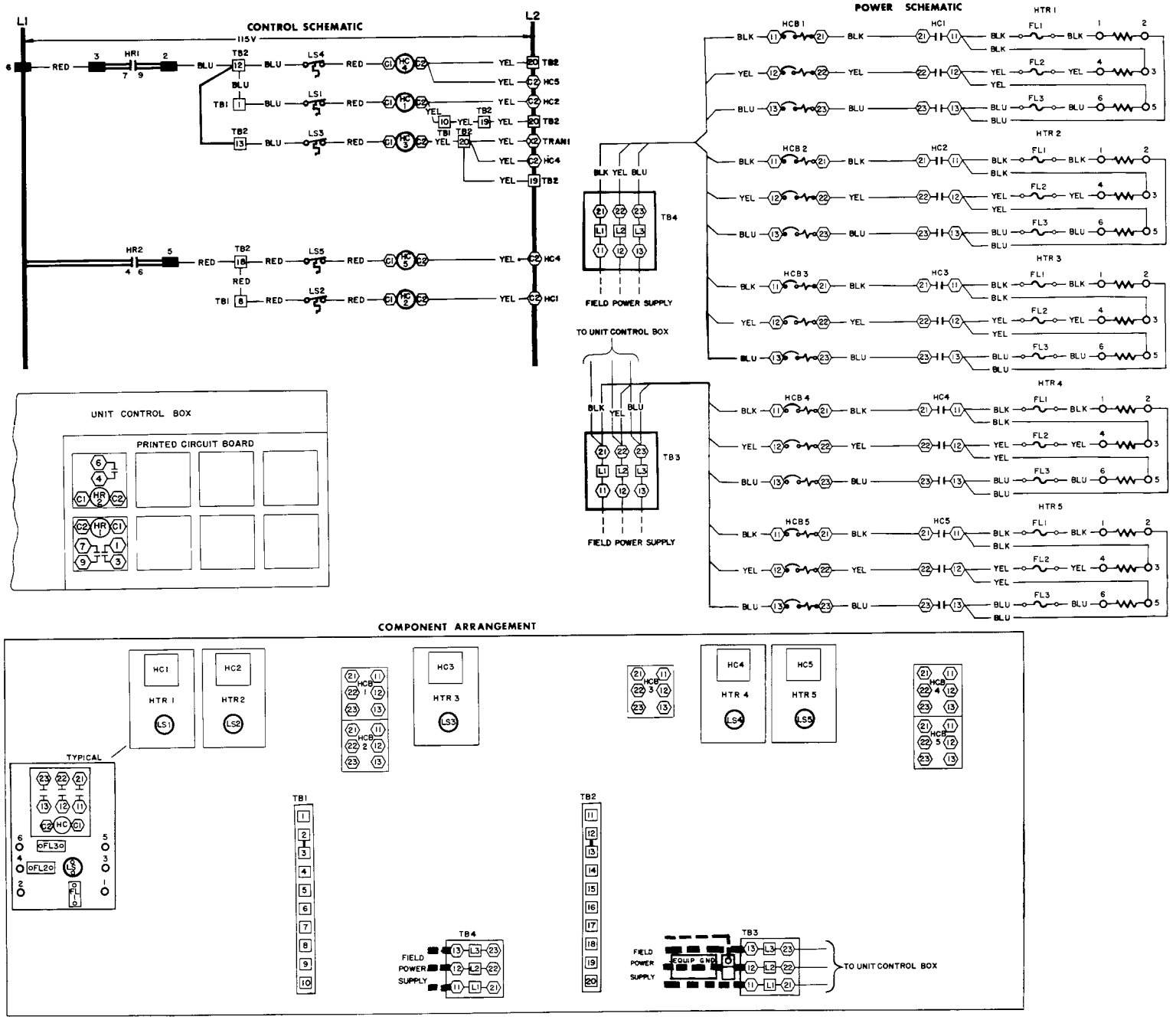


Fig. 12 — Label Diagram (Medium Electric Heat), 50DF034; 208/230-3-60

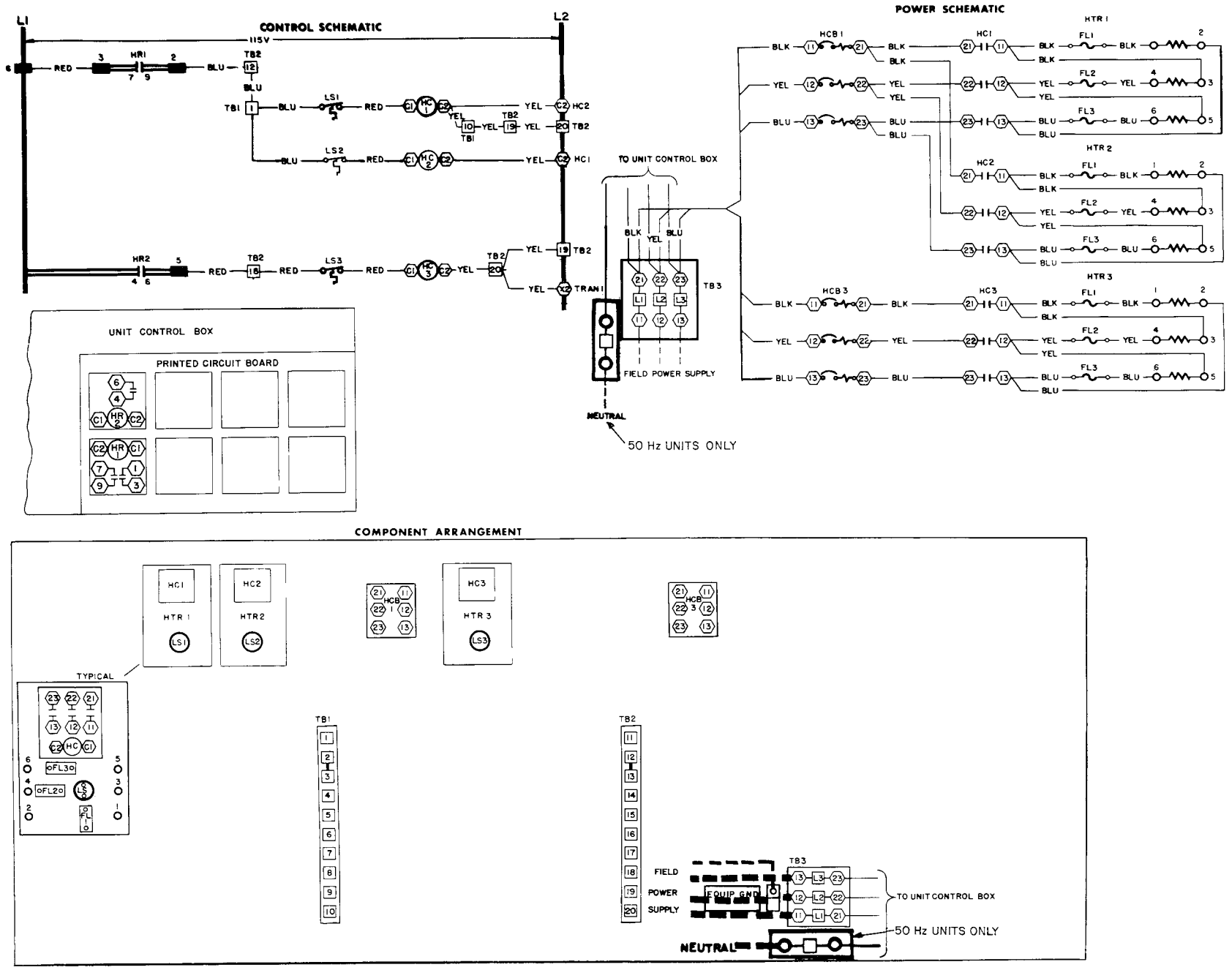


Fig. 13 — Label Diagram (Low Electric Heat), 50DF034; 460-3-60

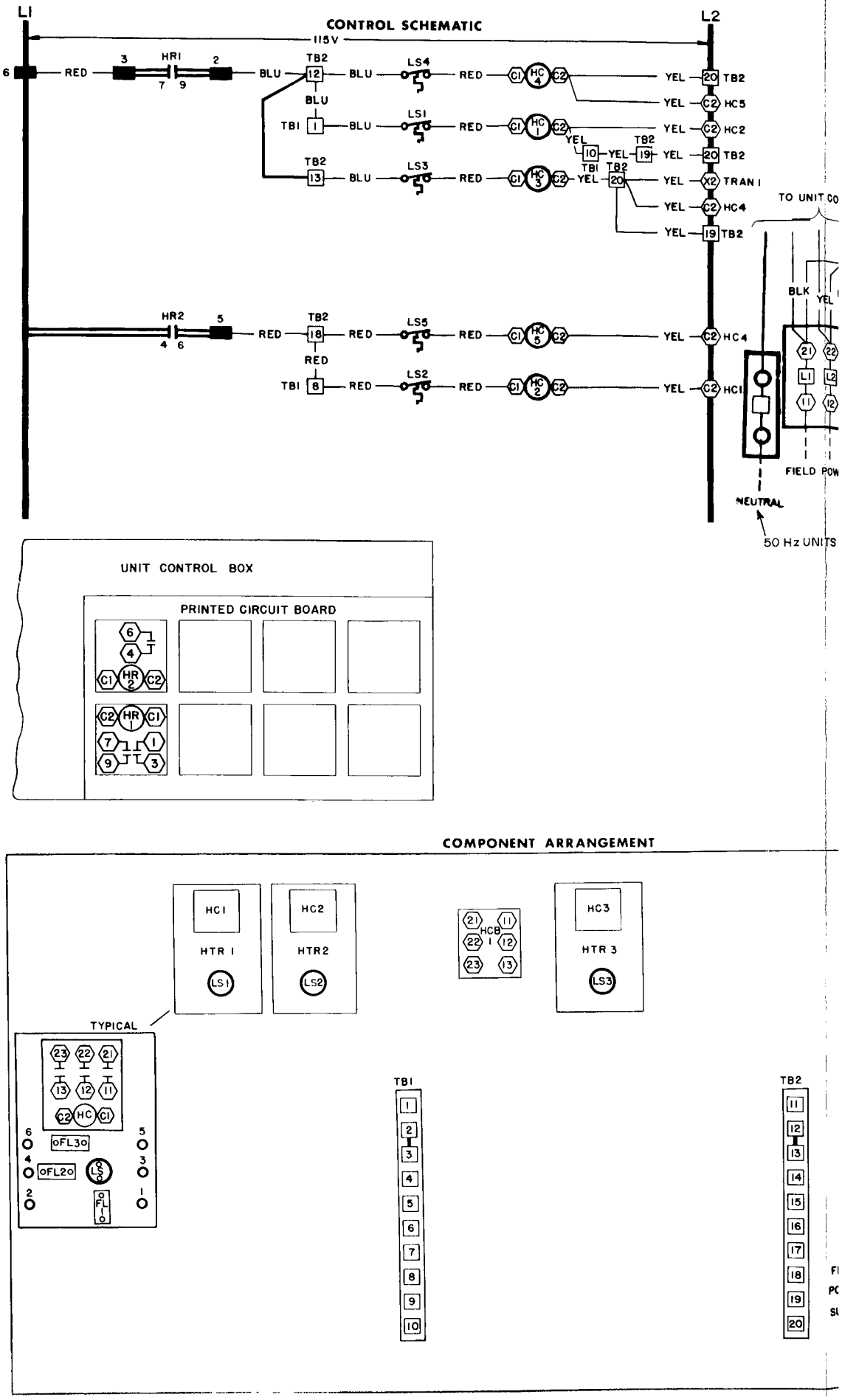
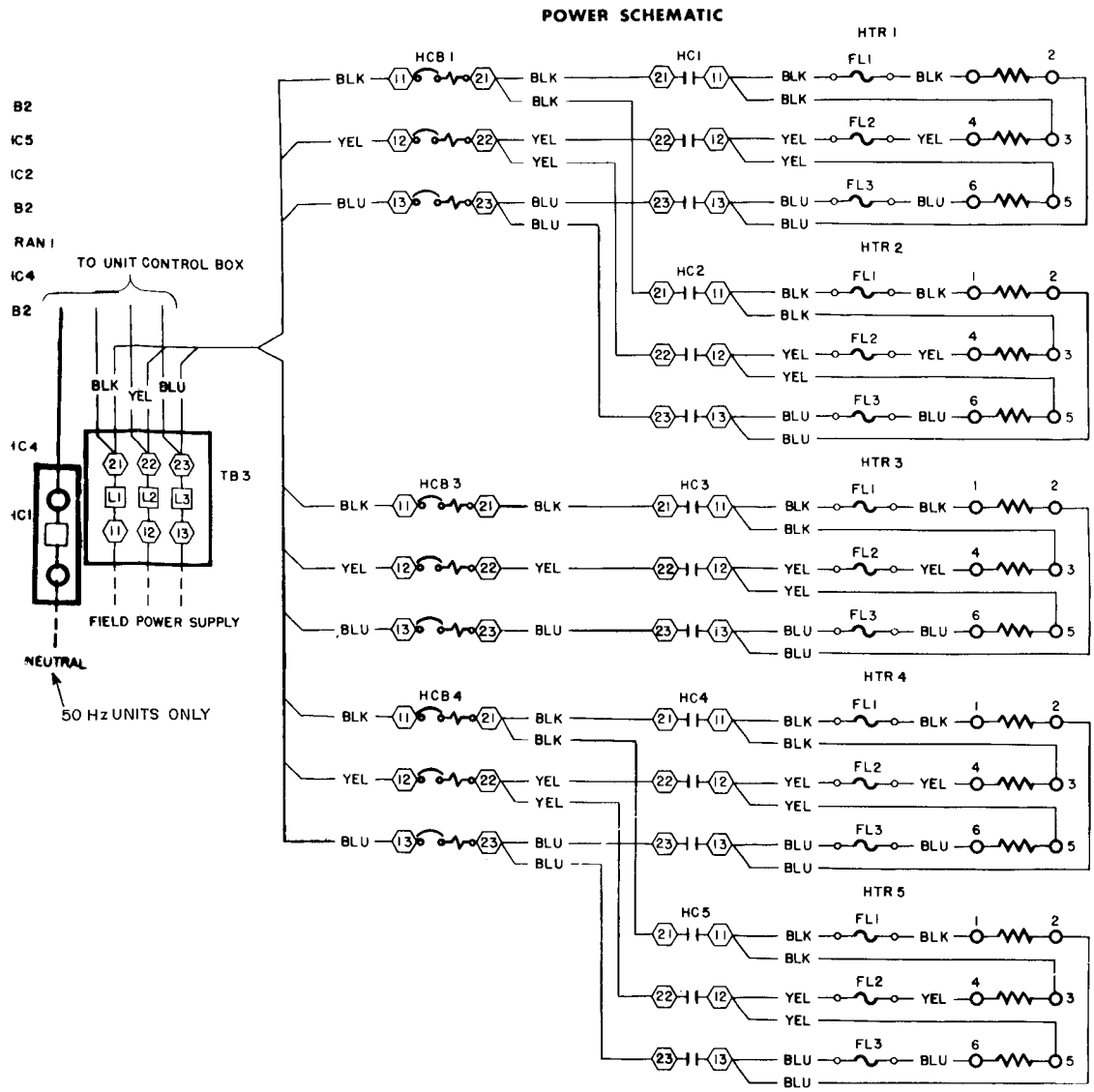
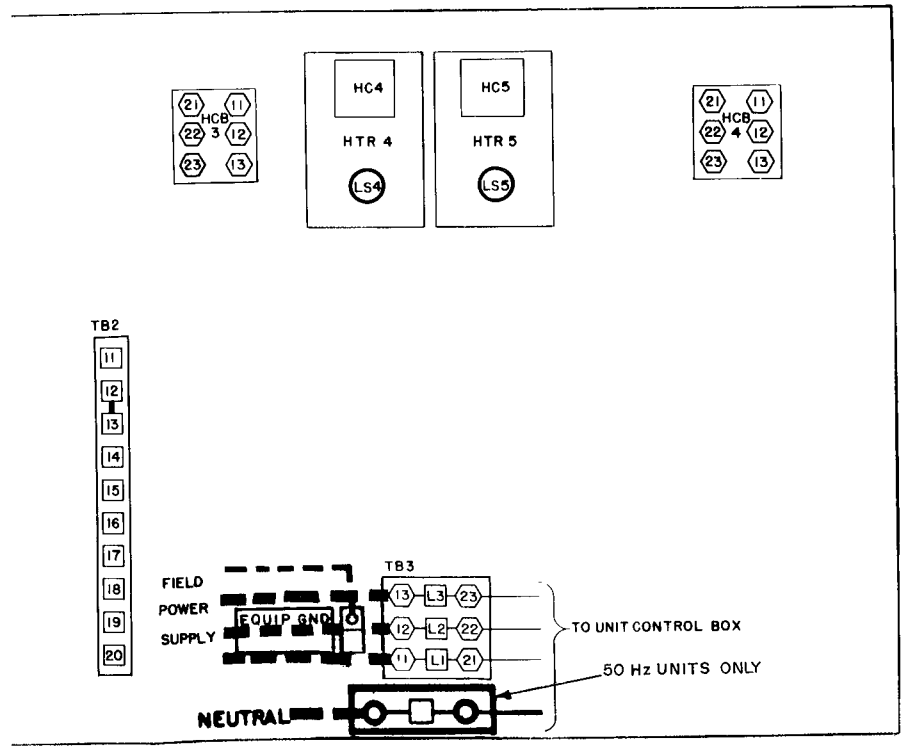
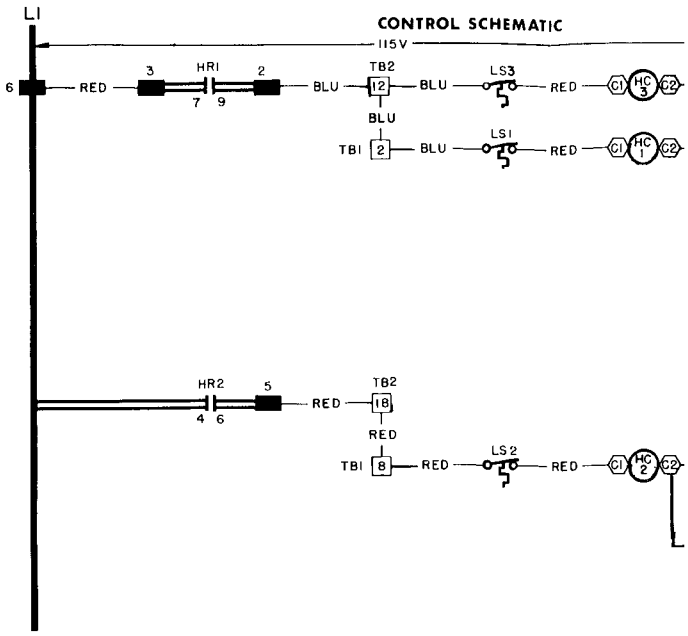


Fig. 14 — Label Diagram (Medium Electri





dium Electric Heat), 50DF034; 460-3-60



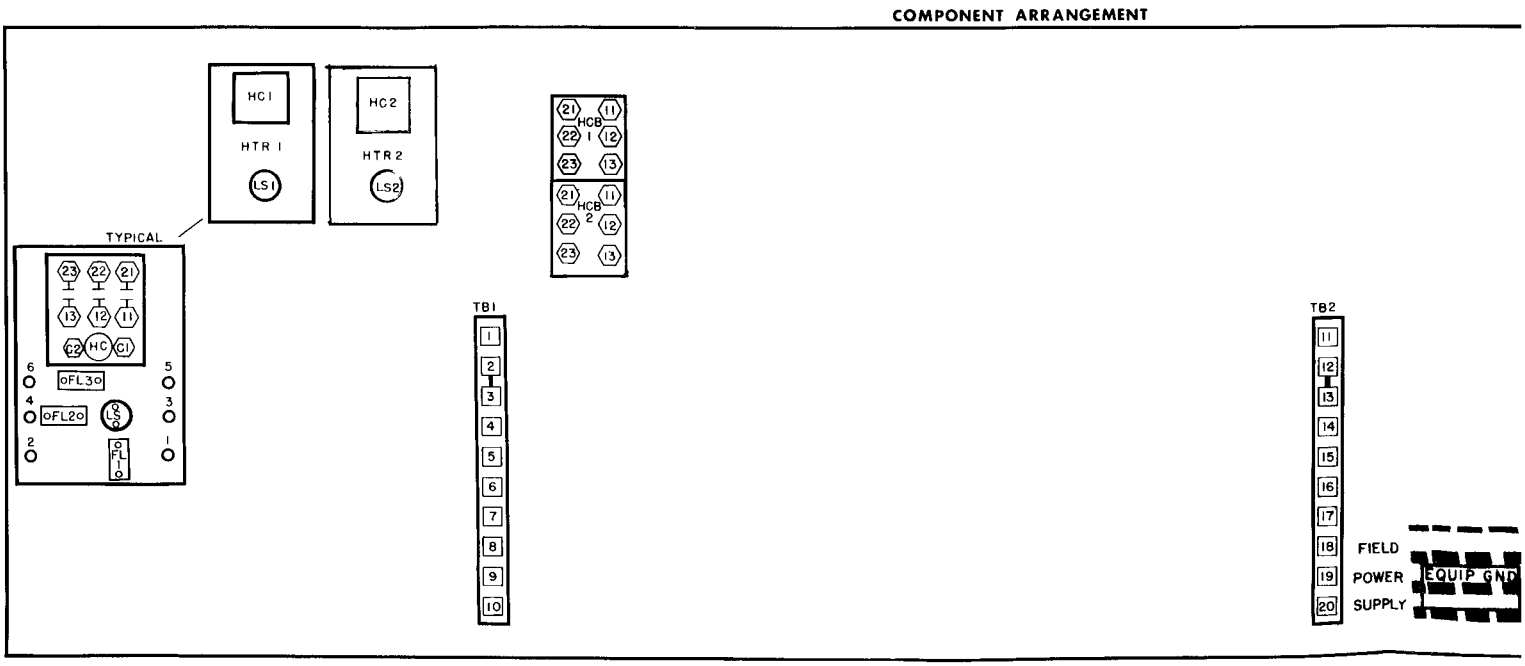
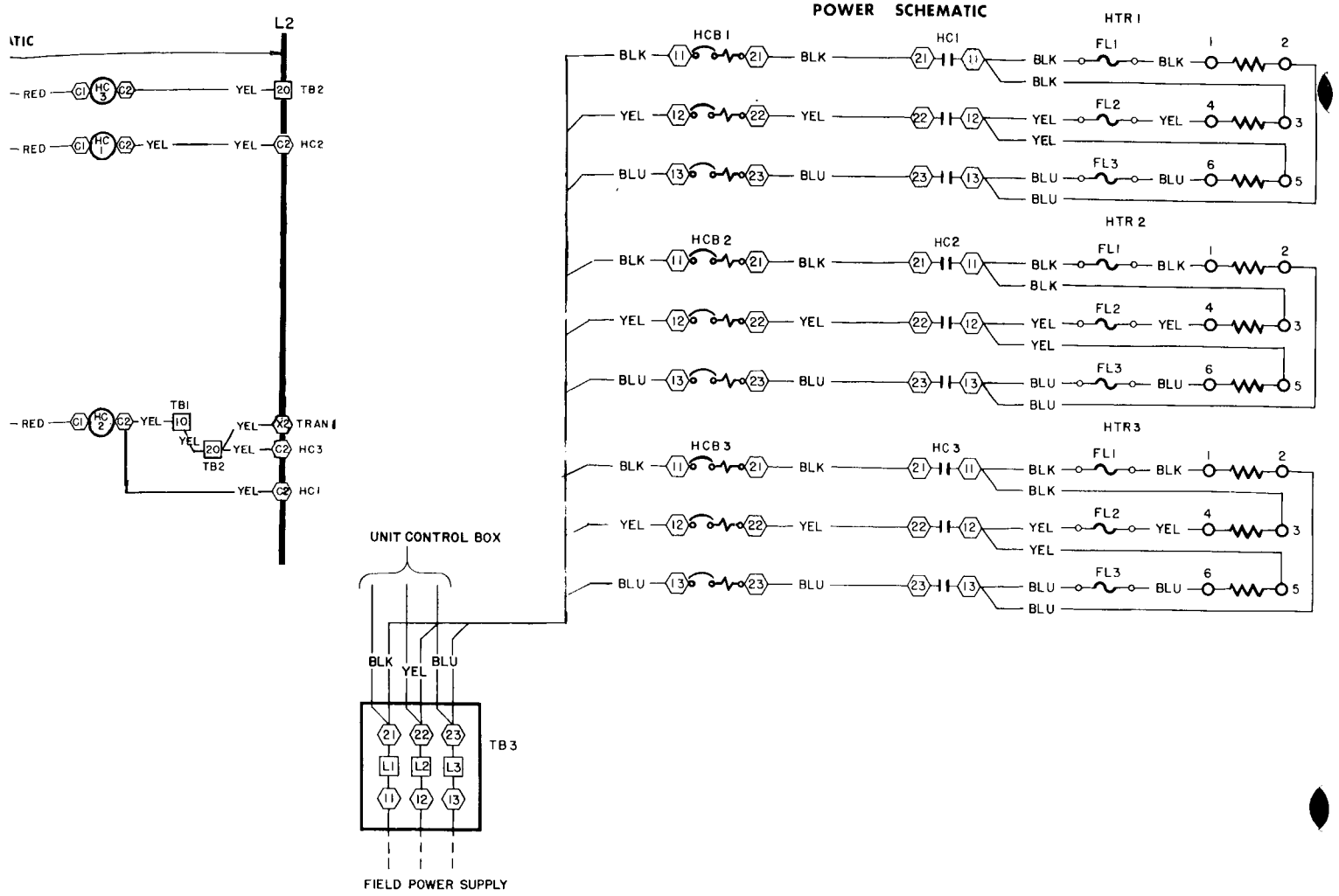
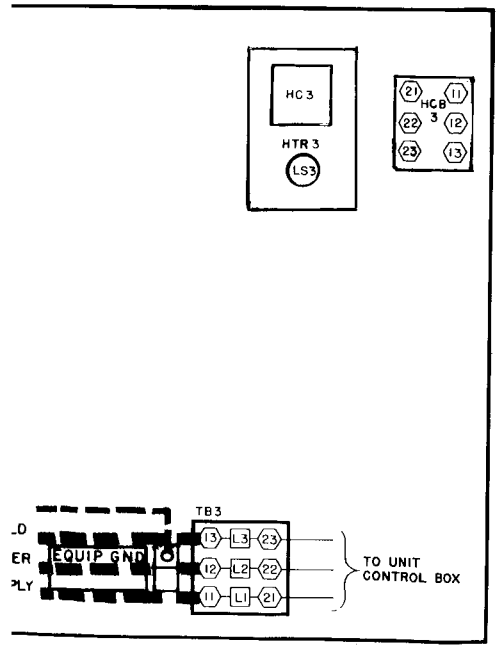
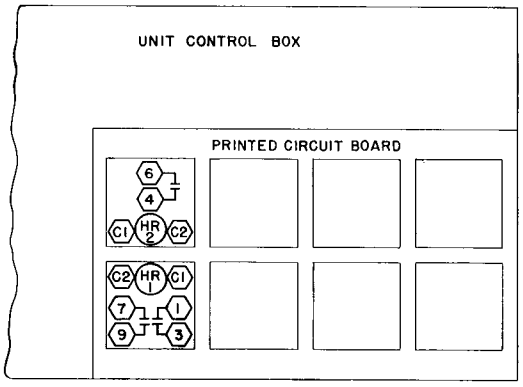


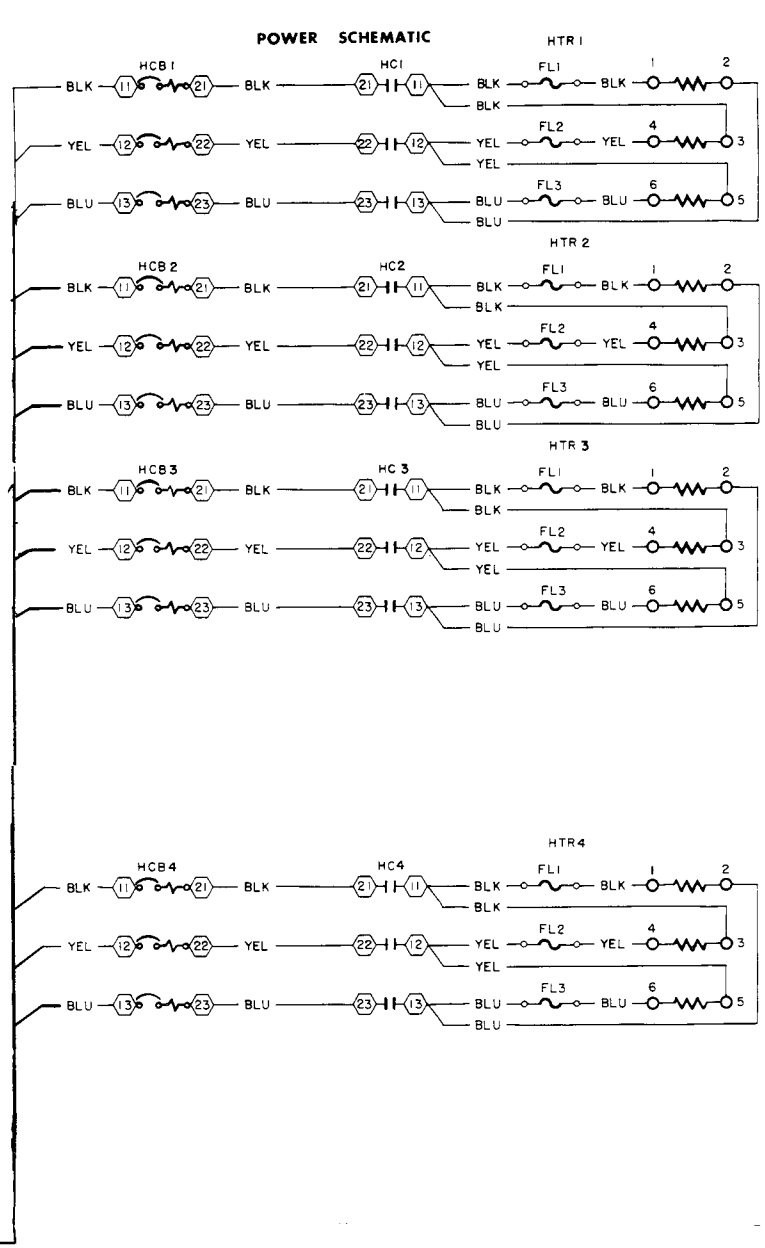
Fig. 15 — Label Diagram (Low Electric He

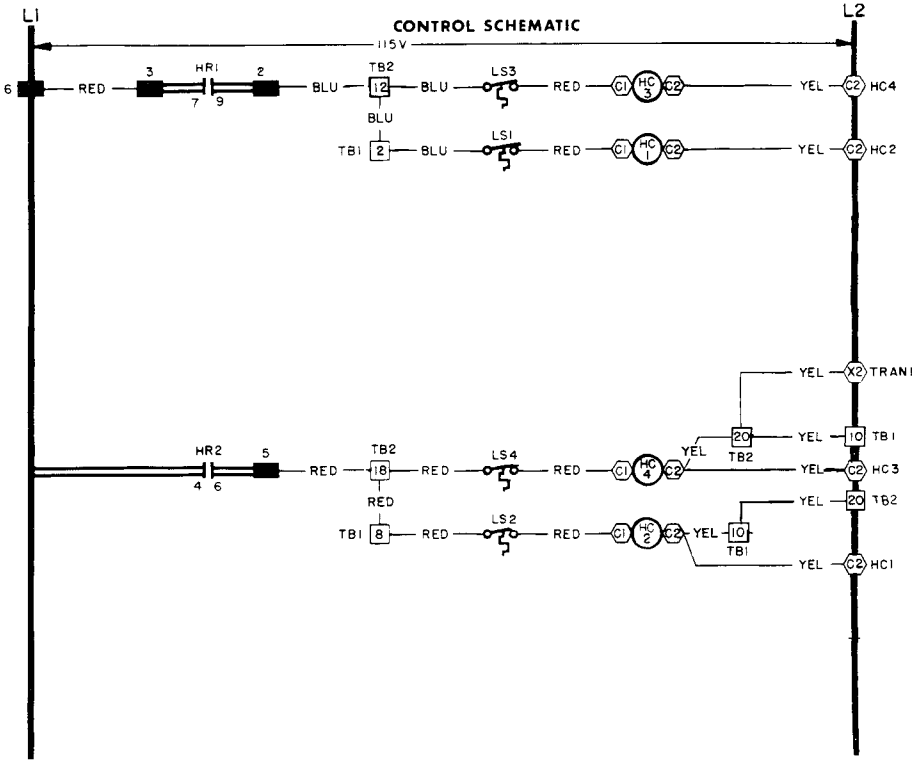


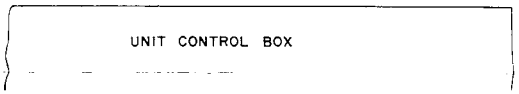




Electric Heat), 50DL044; 208/230-3-60


POWER SCHEMATIC
HTR 1
HCB 1
HC1
FL1
FL2
FL3
HTR 2
HCB 2
HC2
HTR 3
HCB 3
HC 3
HTR4
HCB4
HC4
BLK
YEL
BLU
UNIT CONTROL BOX


L1
L2
CONTROL SCHEMATIC
115V
HR1
HR2
TB2
TB1
LS1
LS2
LS3
LS4
HC1
HC2
HC3
HC4
TRAN1
RED
BLU
YEL


UNIT CONTROL BOX

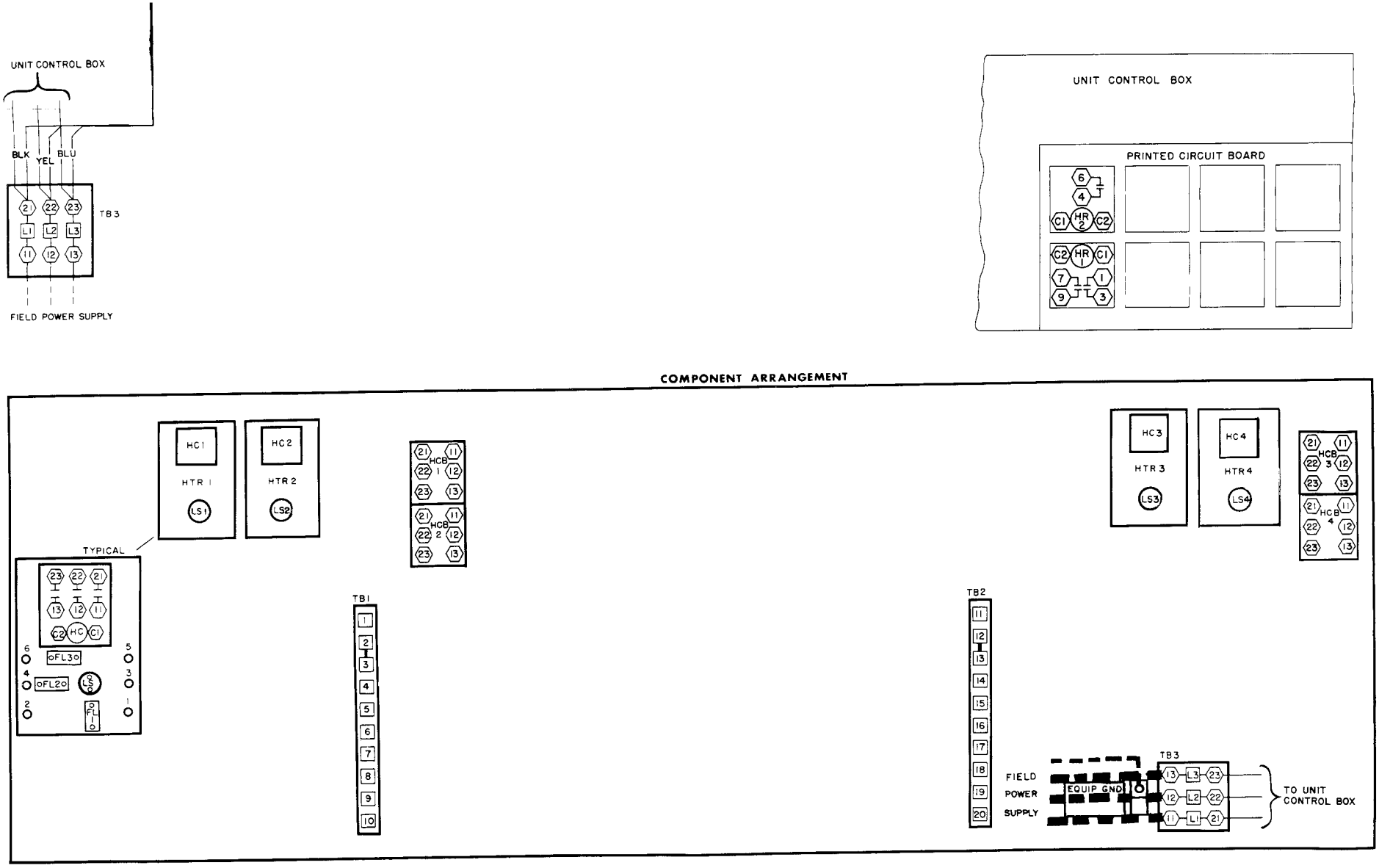
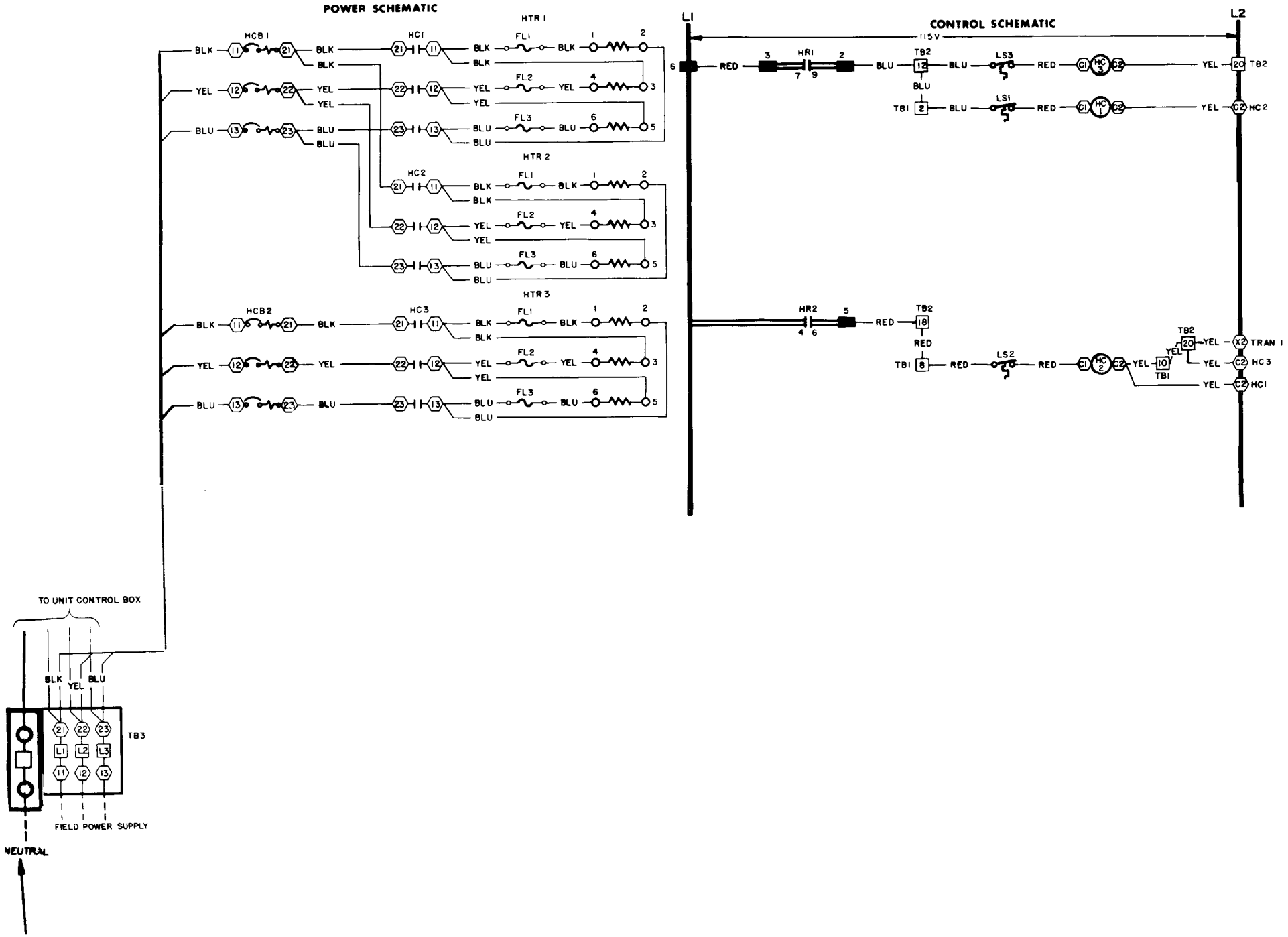
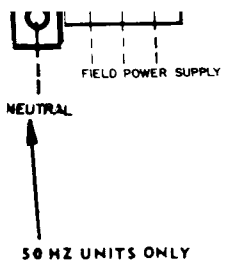
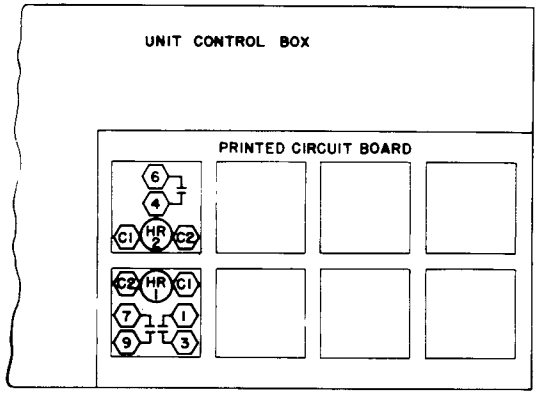


Fig. 16 — Label Diagram (Medium Electric Heat), 50DL044; (Low Electric Heat), 50DL054,064; 208/230-3-60


POWER SCHEMATIC
HTR 1
HTR 2
HTR 3
HCB 1
HCB 2
HC1
HC2
HC3
FL1
FL2
FL3
BLK
YEL
BLU
RED
TO UNIT CONTROL BOX
TB3
FIELD POWER SUPPLY
NEUTRAL
CONTROL SCHEMATIC
L1
L2
115V
HR1
HR2
TB1
TB2
LS1
LS2
LS3
HC 1
HC 2
HC 3
TRAN 1





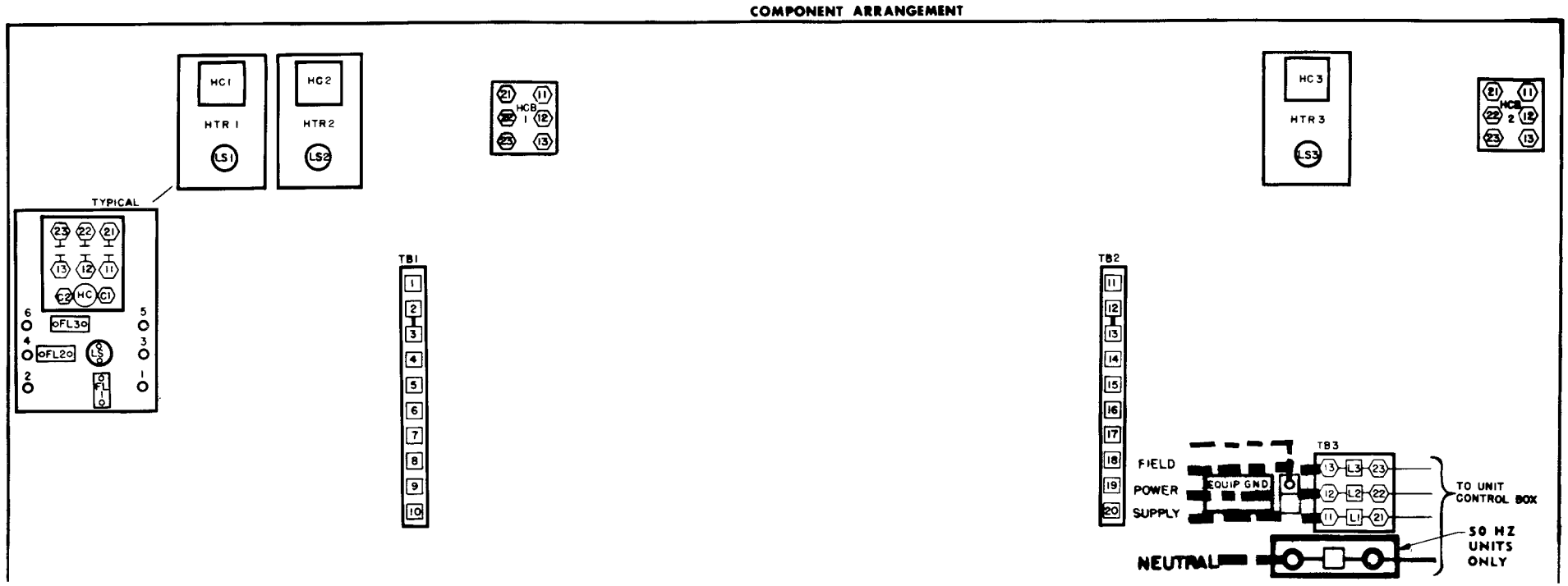
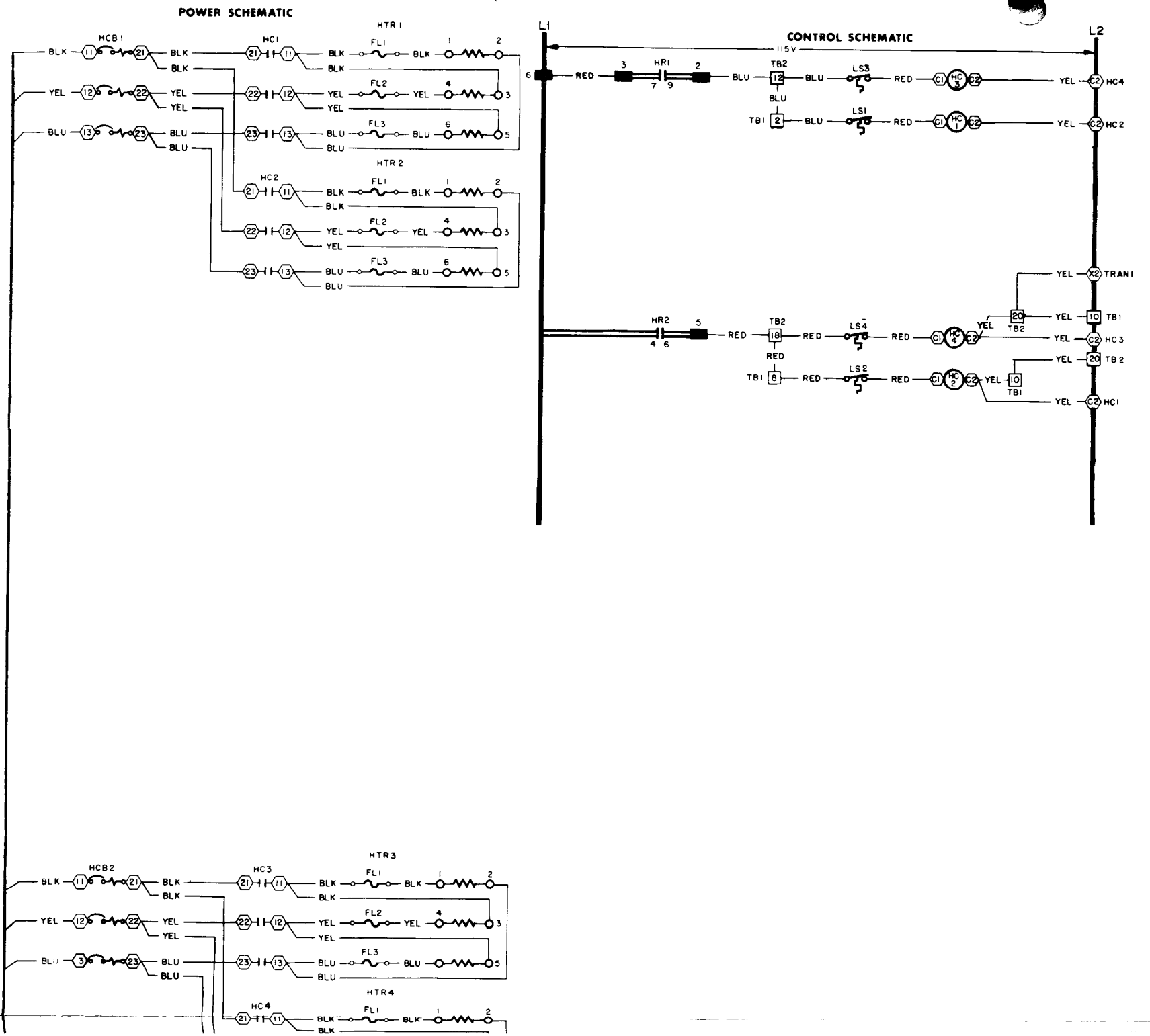


Fig. 17 — Label Diagram (Low Electric Heat), 50DL044; 460-3-60


POWER SCHEMATIC
HCB1
HC1
HTR1
FL1
FL2
FL3
HC2
HTR2
HCB2
HC3
HTR3
HC4
HTR4
BLK
YEL
BLU
RED
TO UNIT CONTROL BOX
CONTROL SCHEMATIC
L1
L2
115V
HR1
HR2
TB1
TB2
LS1
LS2
LS3
LS4
TRAN1
HC1
HC2
HC3
HC4
TB 1
TB 2

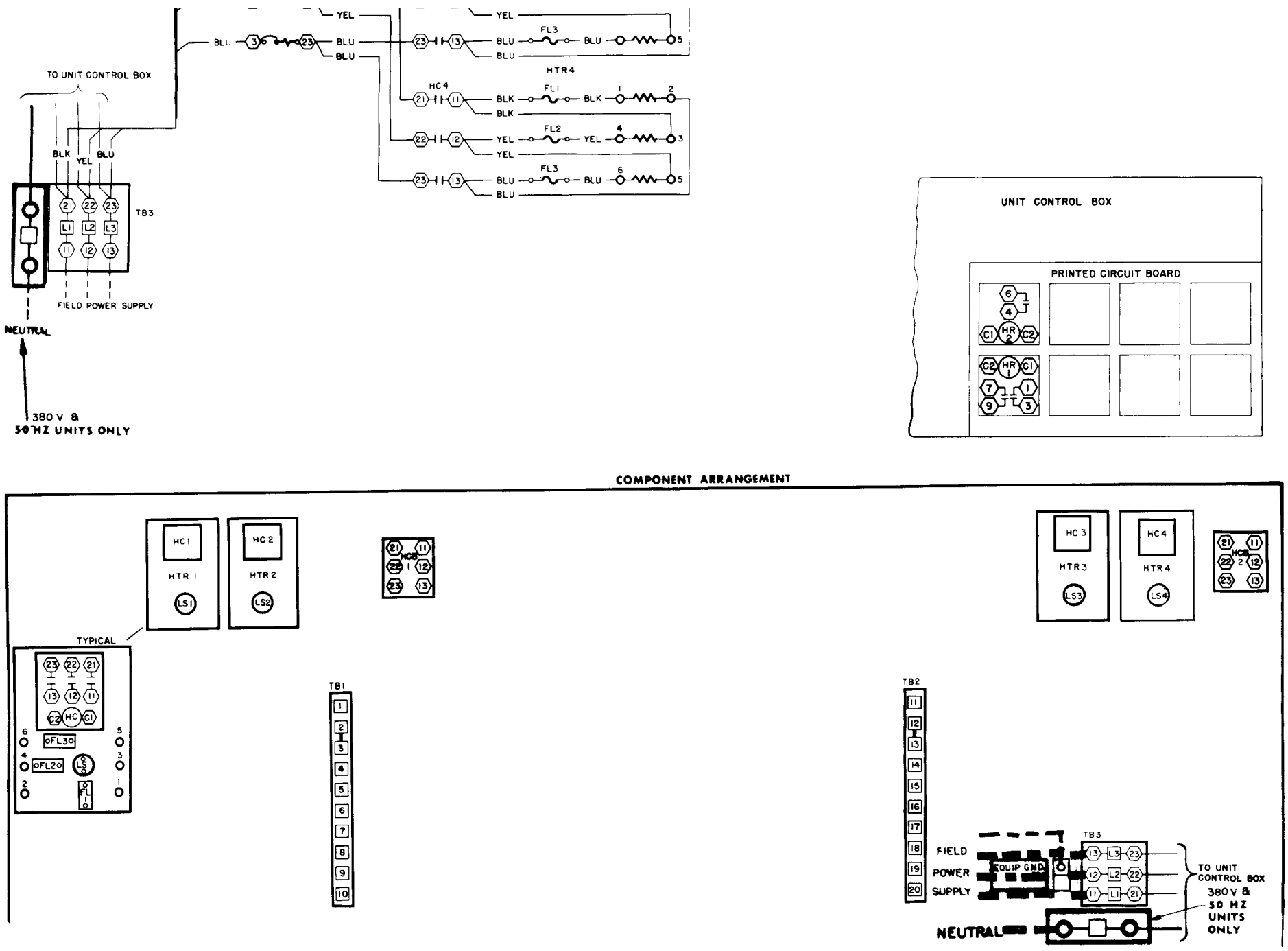
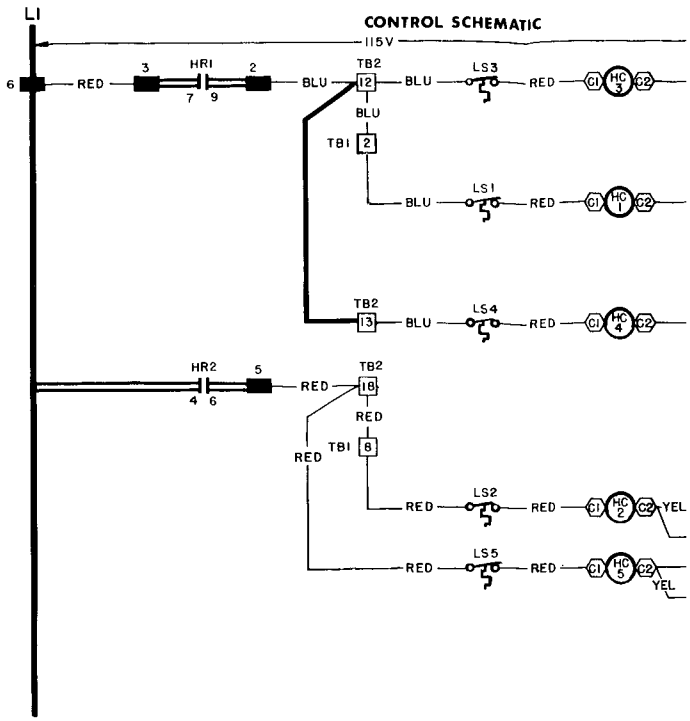
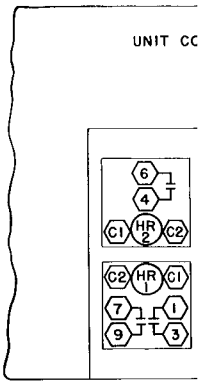


Fig. 18 — Label Diagram (Medium Electric Heat), 50DL044; (Low Electric Heat), 50DL054,064; 460-3-60





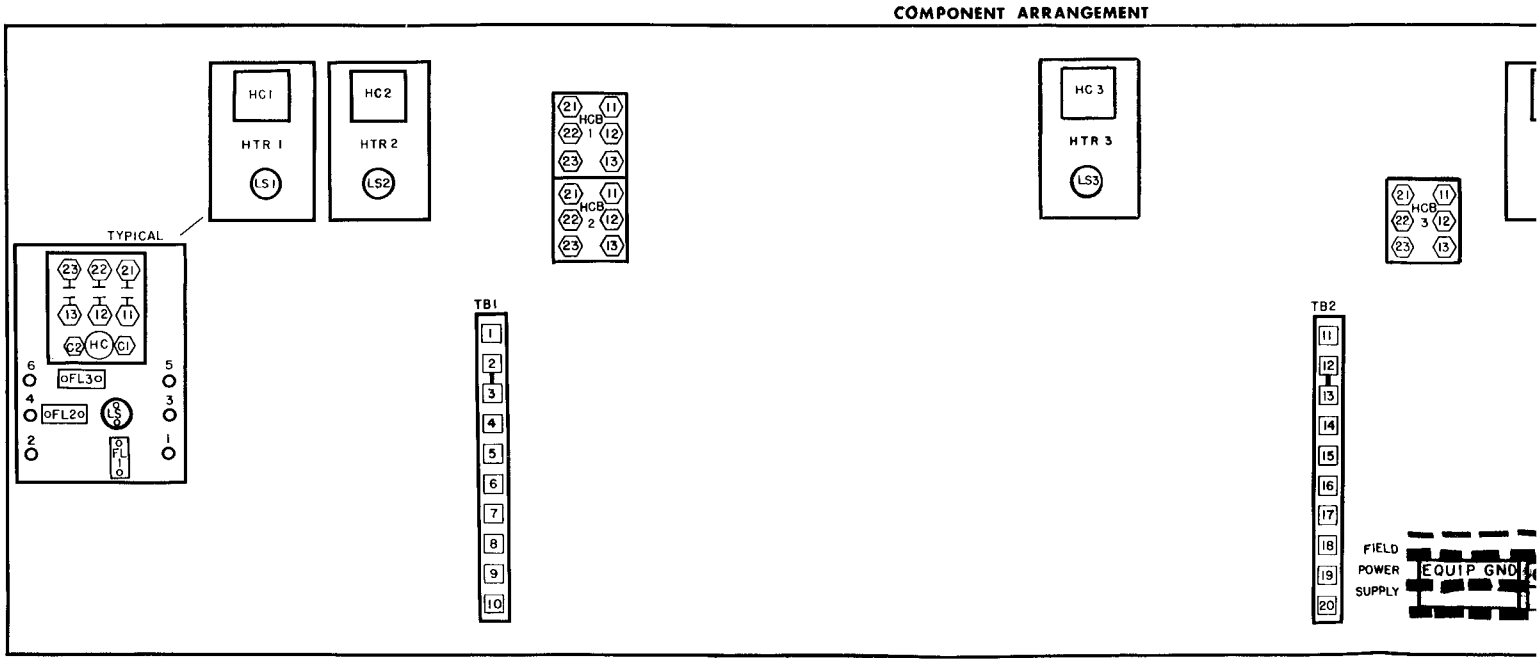
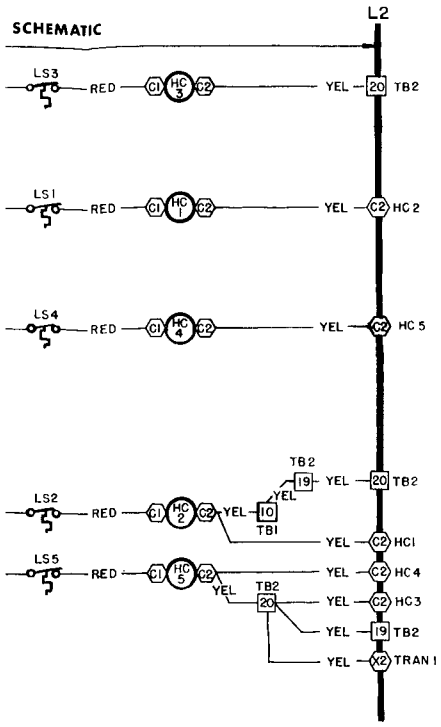
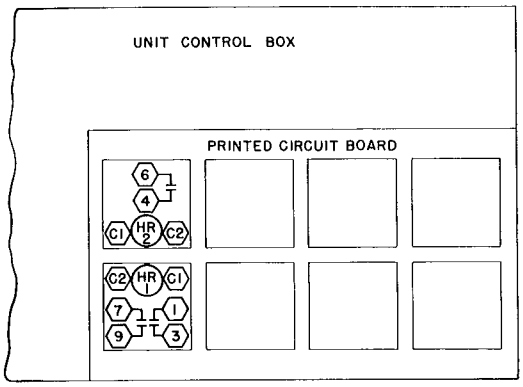
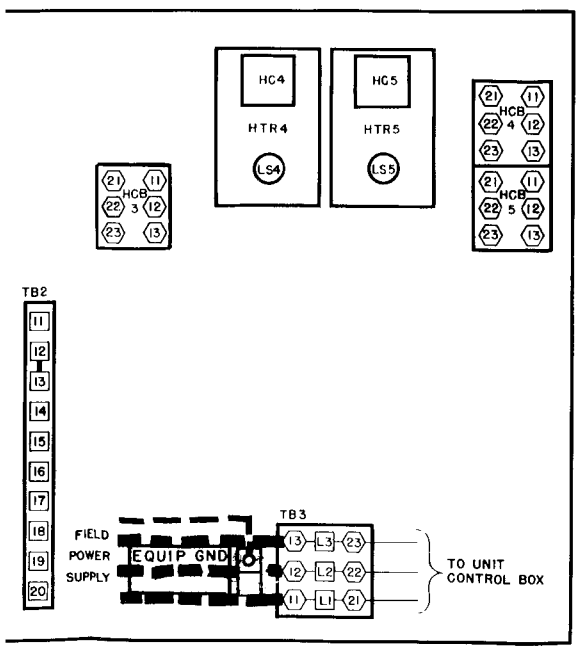
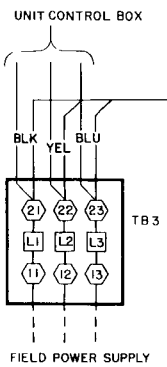


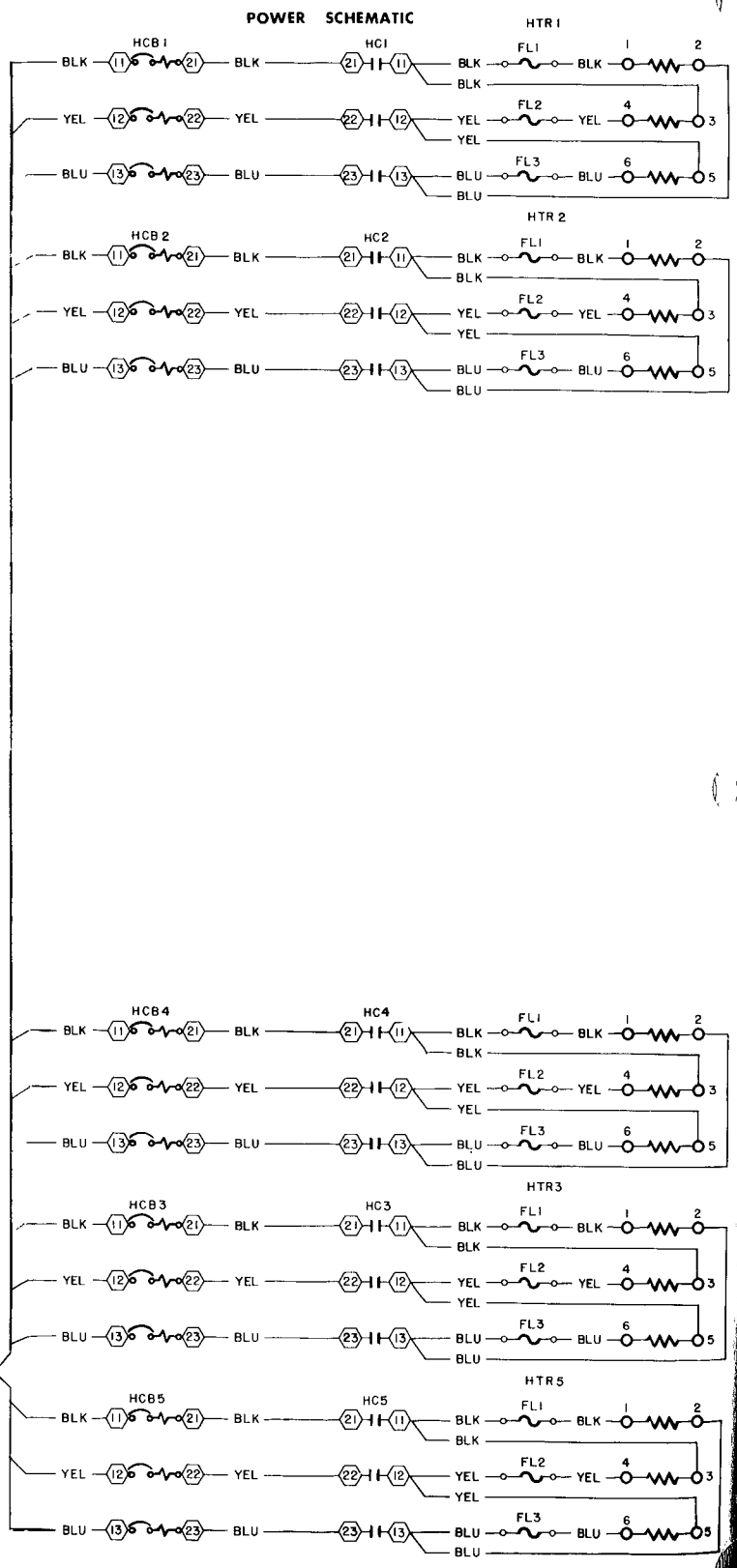
Fig. 19 — Label Diagram (Medium Electric Heat



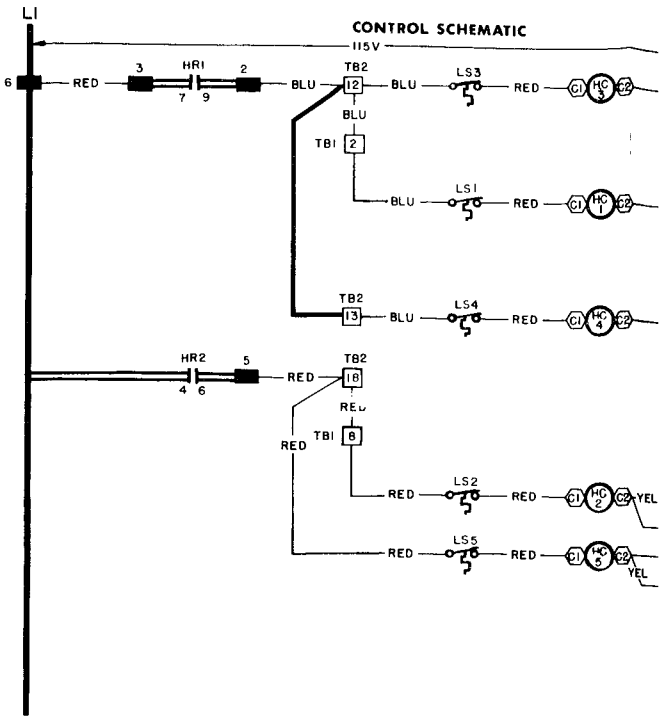


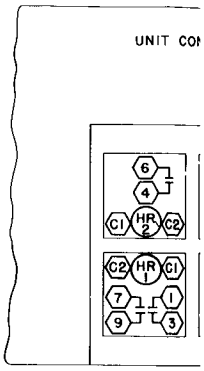






lium Electric Heat), 50DL054,064; 208/230-3-60





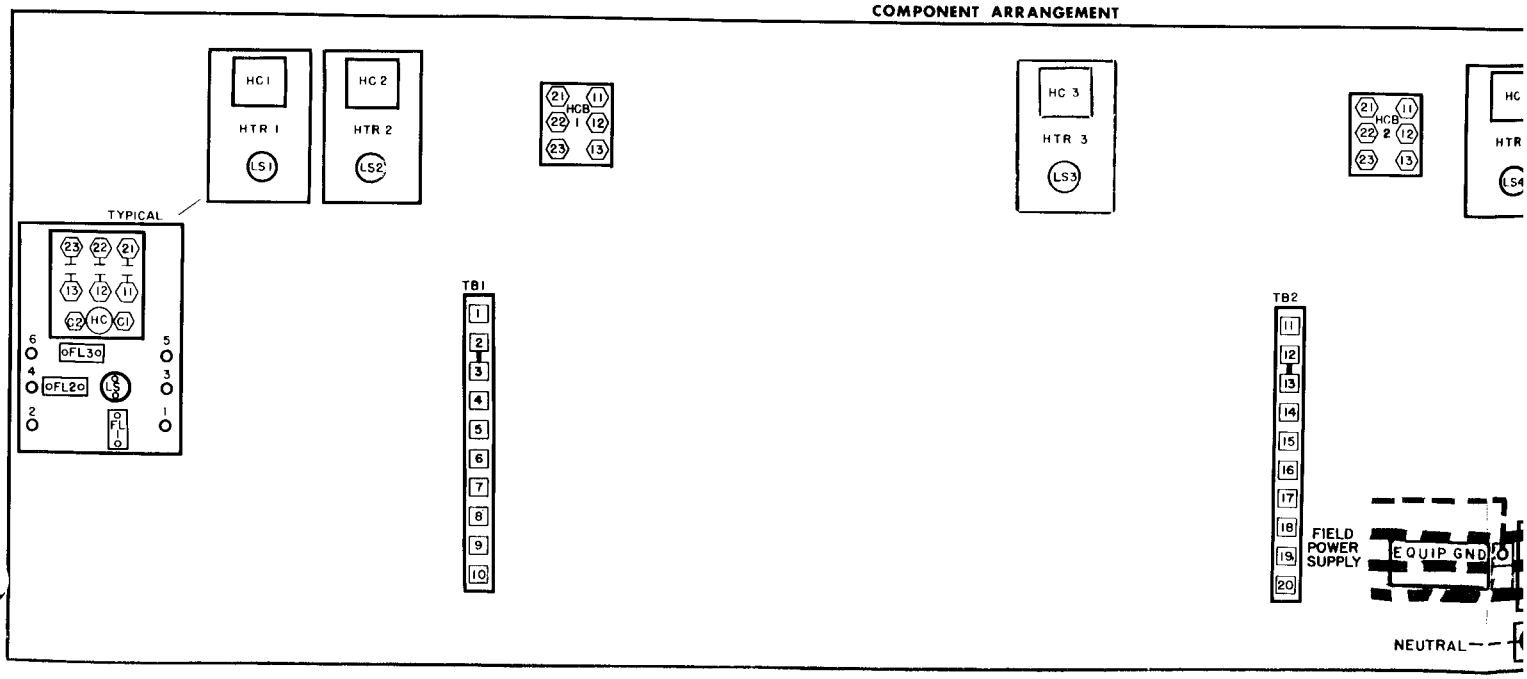
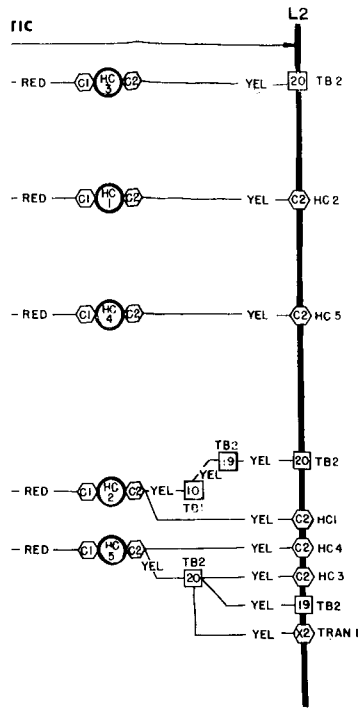
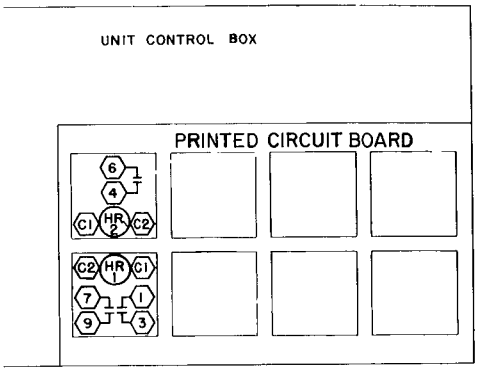
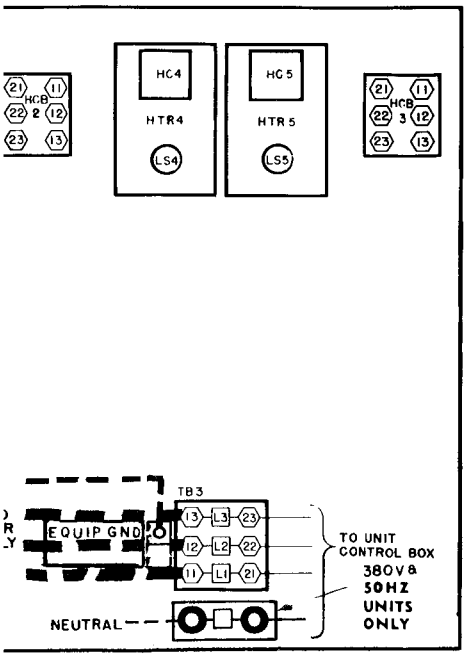
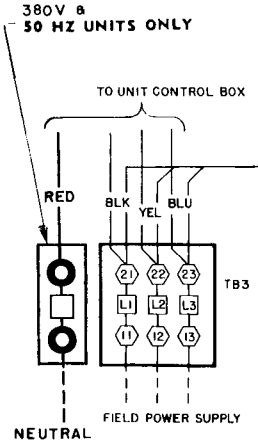


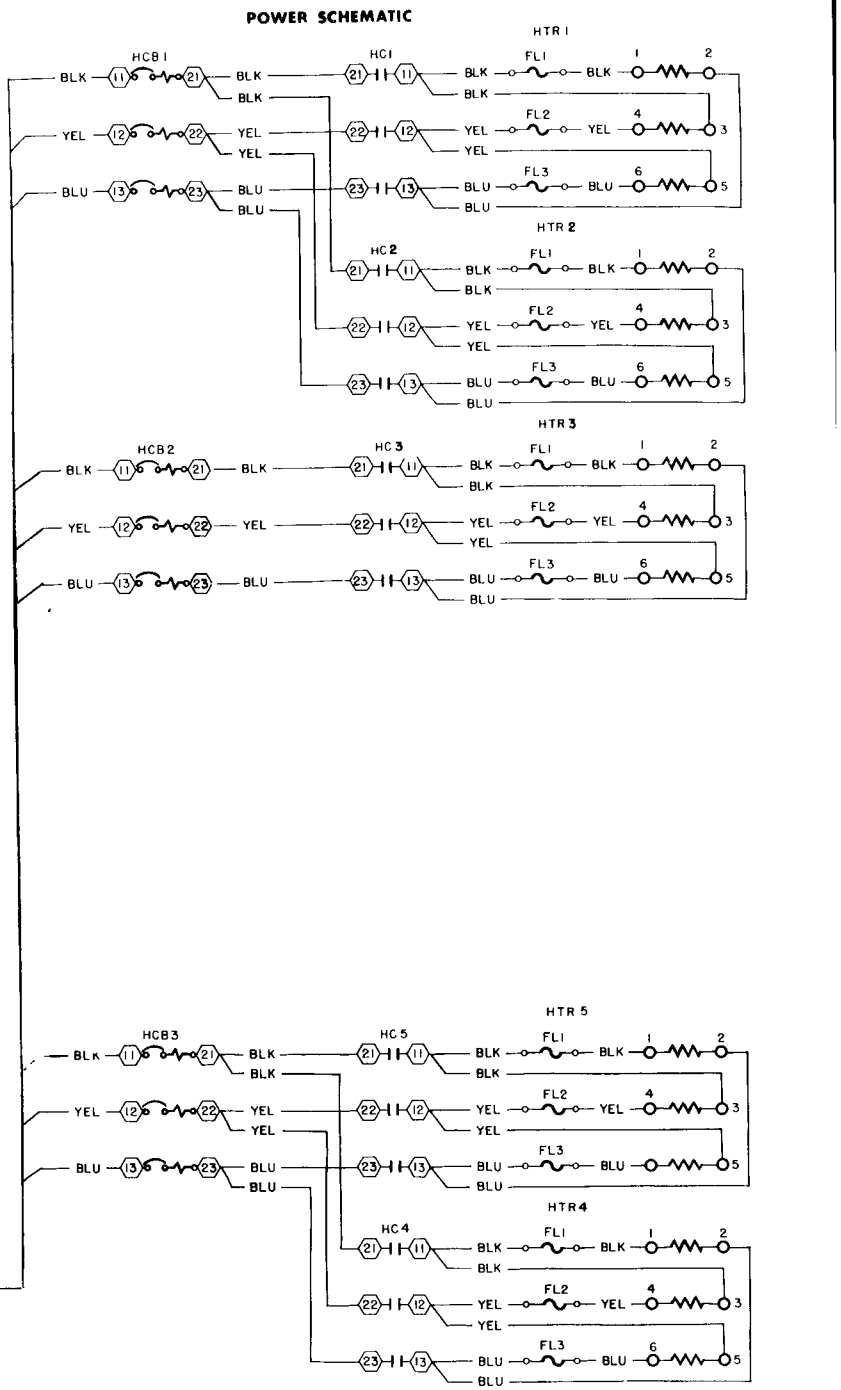
Fig. 20 — Label Diagram (Medium Electric











lium Electric Heat), 50DL054,064; 460-3-60

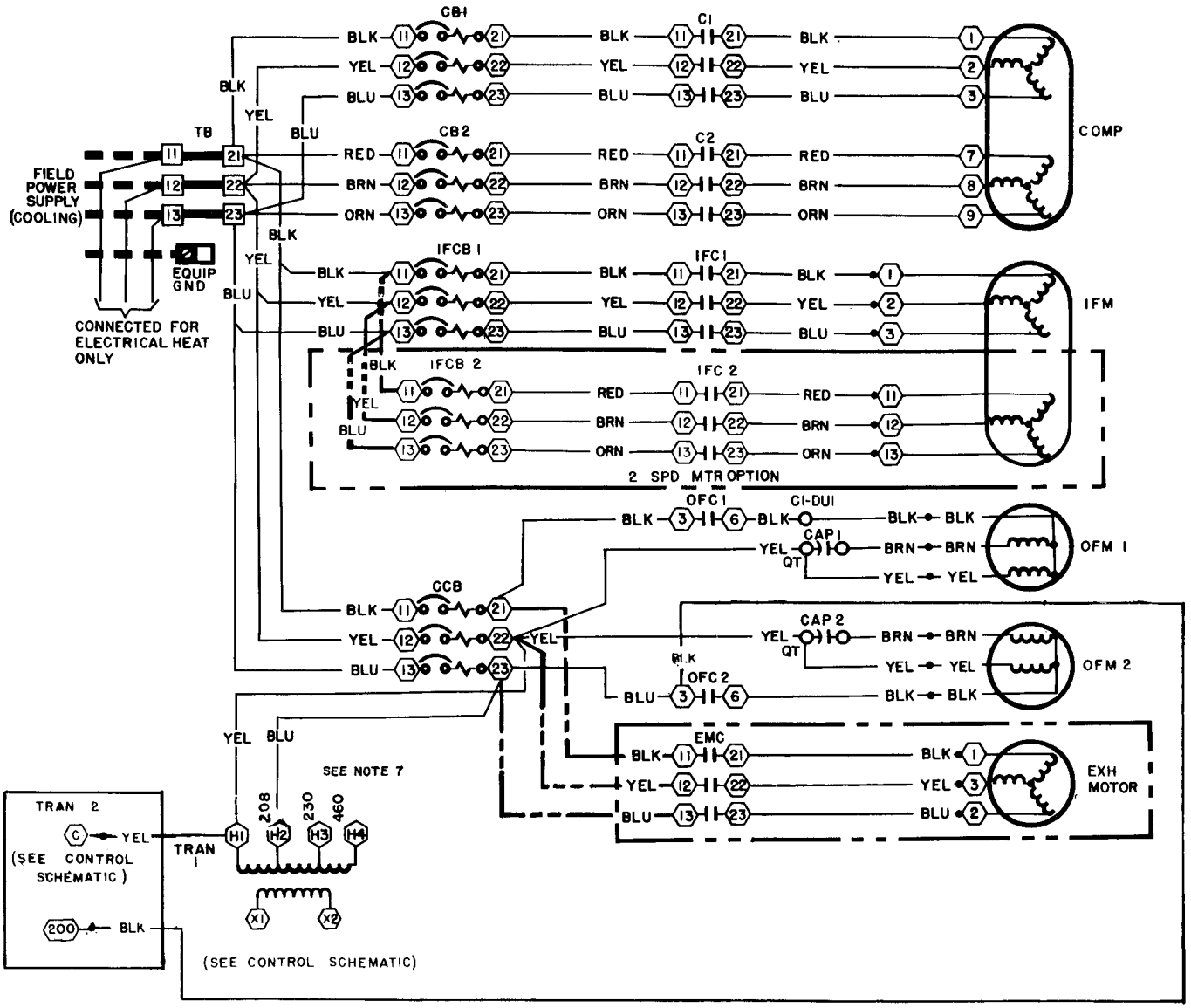


Fig. 21 — Power Wiring Schematic; 50DF024; 208/230-3-60

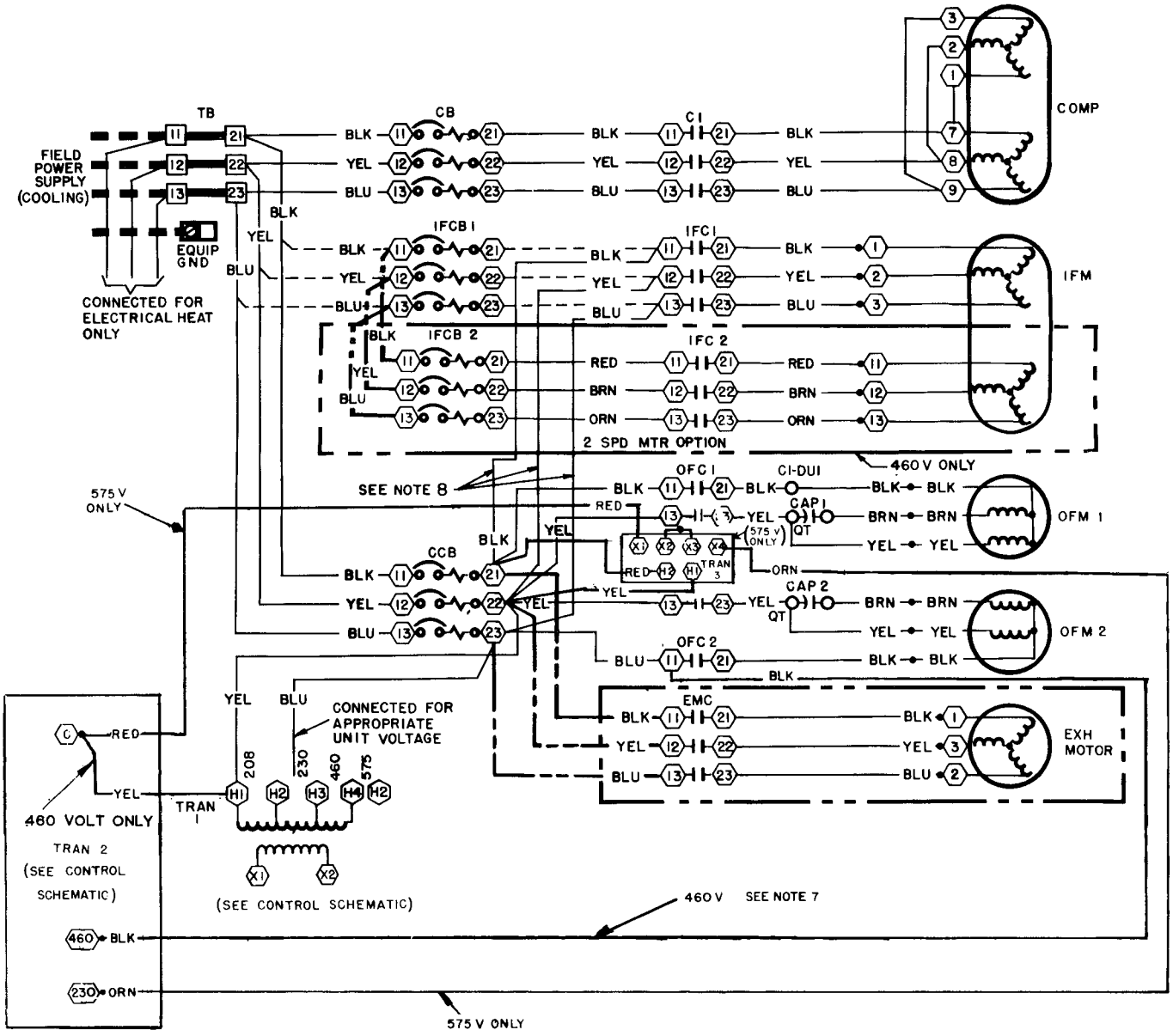


Fig. 22 — Power Wiring Schematic; 50DF024; 460, 575-3-60

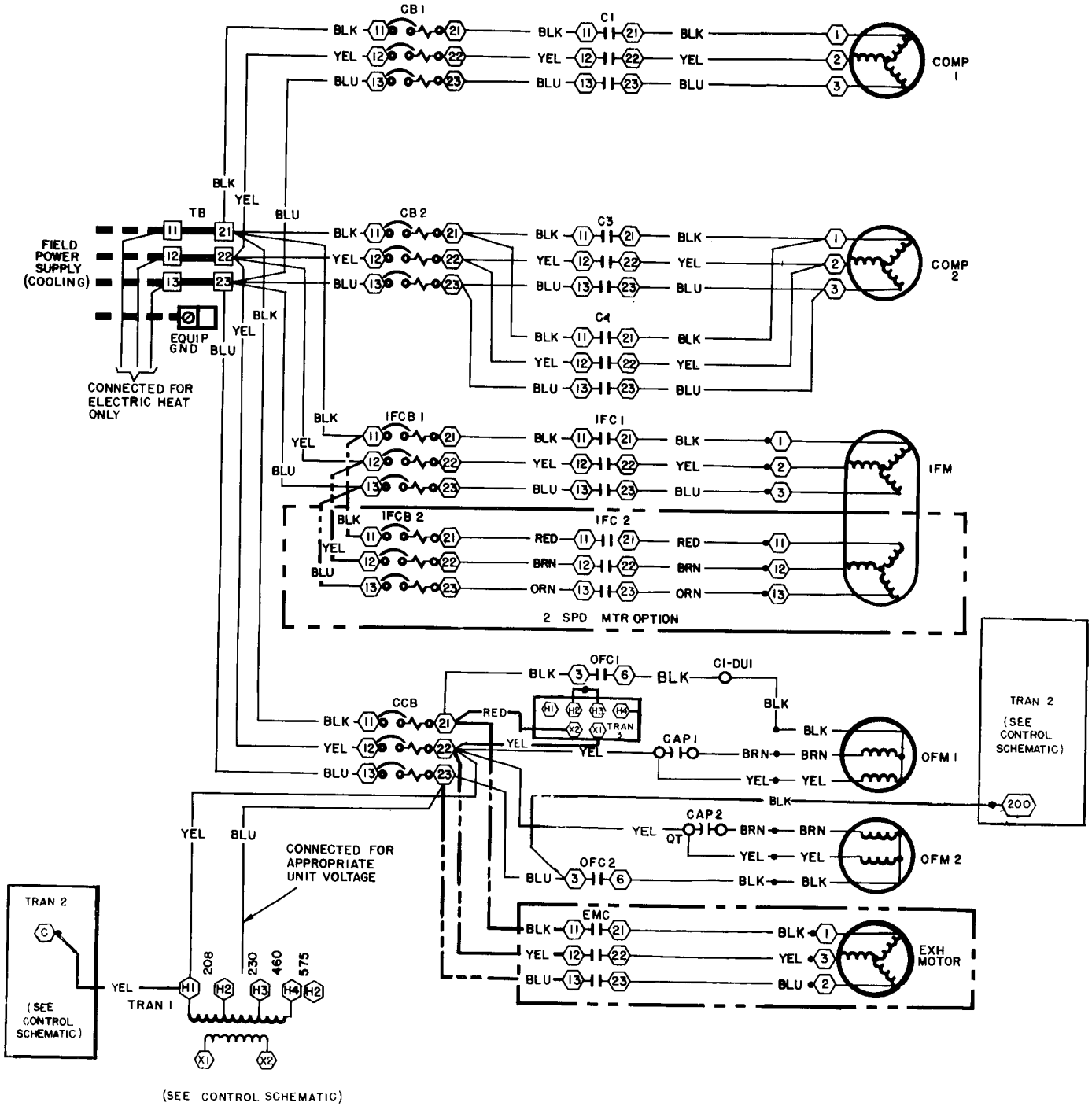


Fig. 23 — Power Wiring Schematic; 50DF028; 208/230-3-60

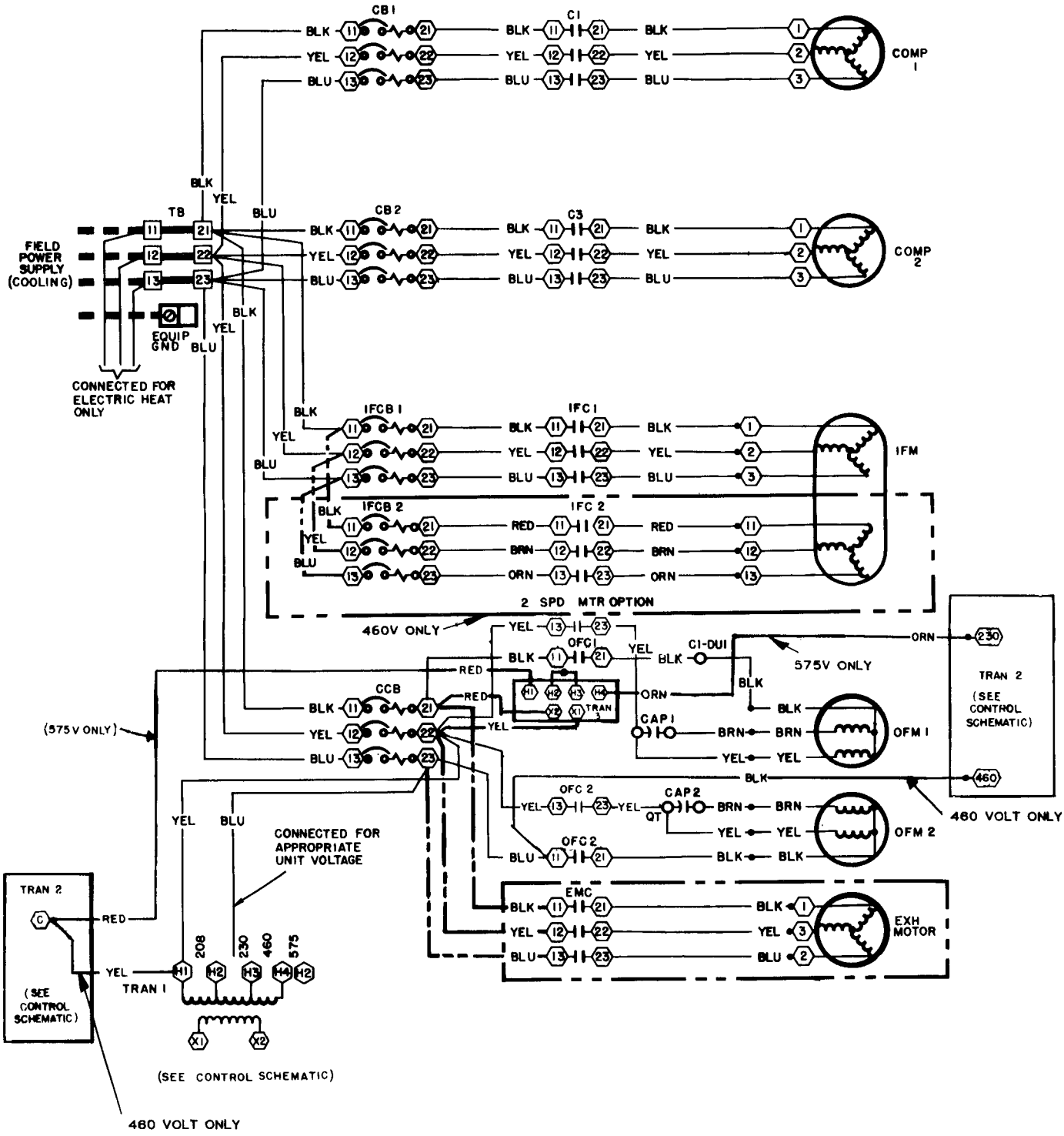


Fig. 24 — Power Wiring Schematic; 50DF028; 460, 575-3-60

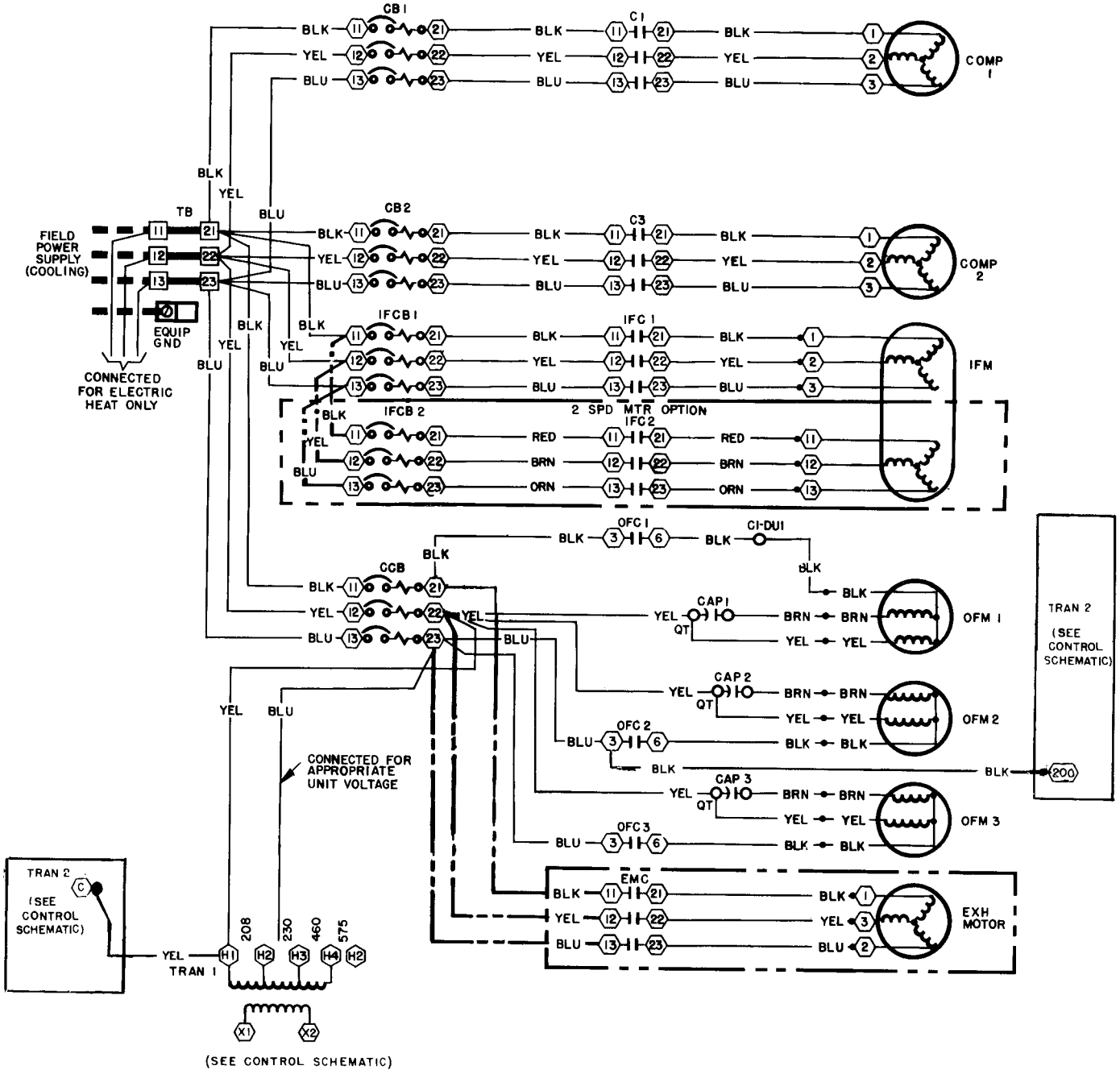


Fig. 25 — Power Wiring Schematic; 50DF034; 208/230-3-60

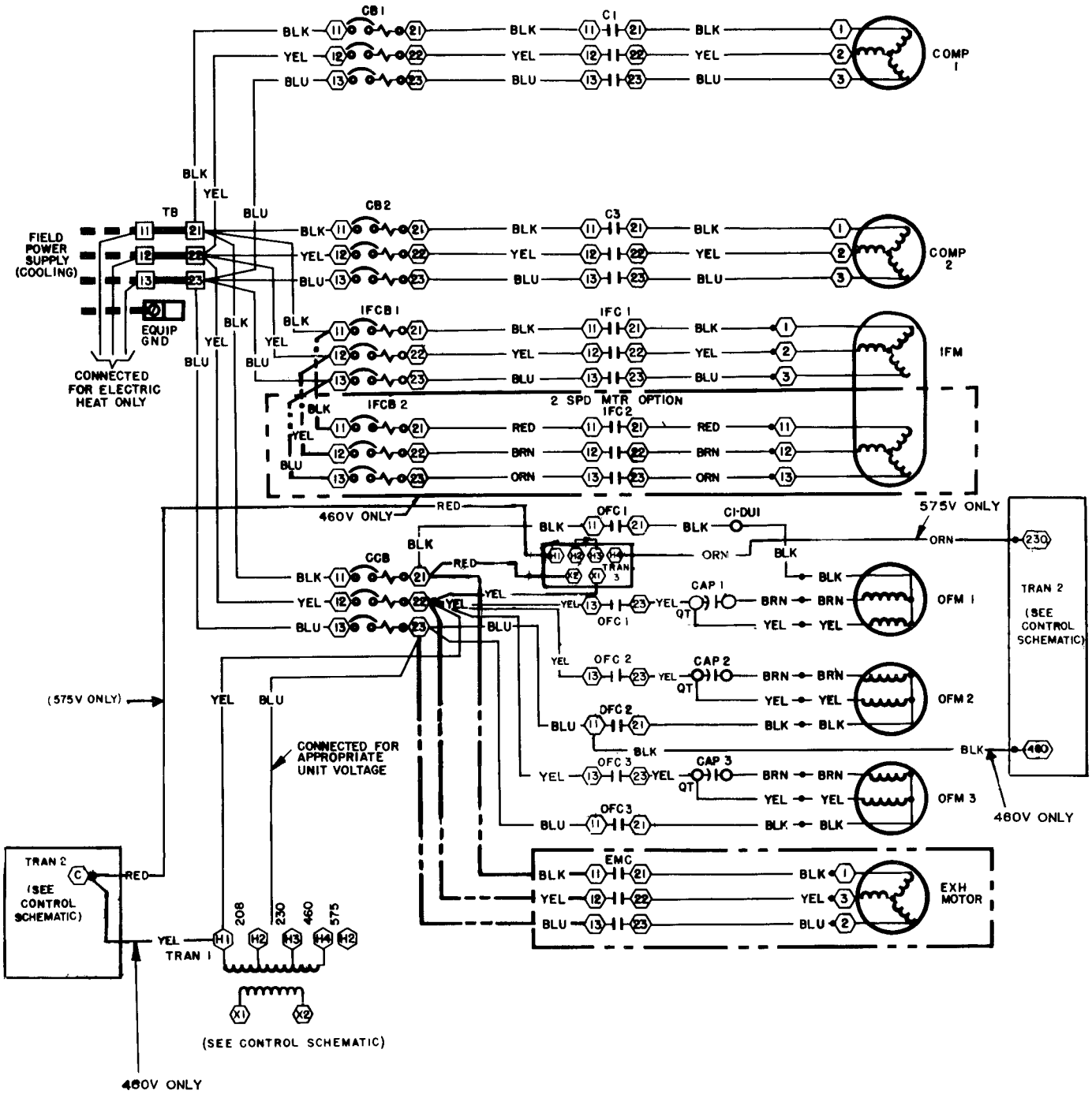


Fig. 26 — Power Wiring Schematic; 50DF034; 460, 575-3-60

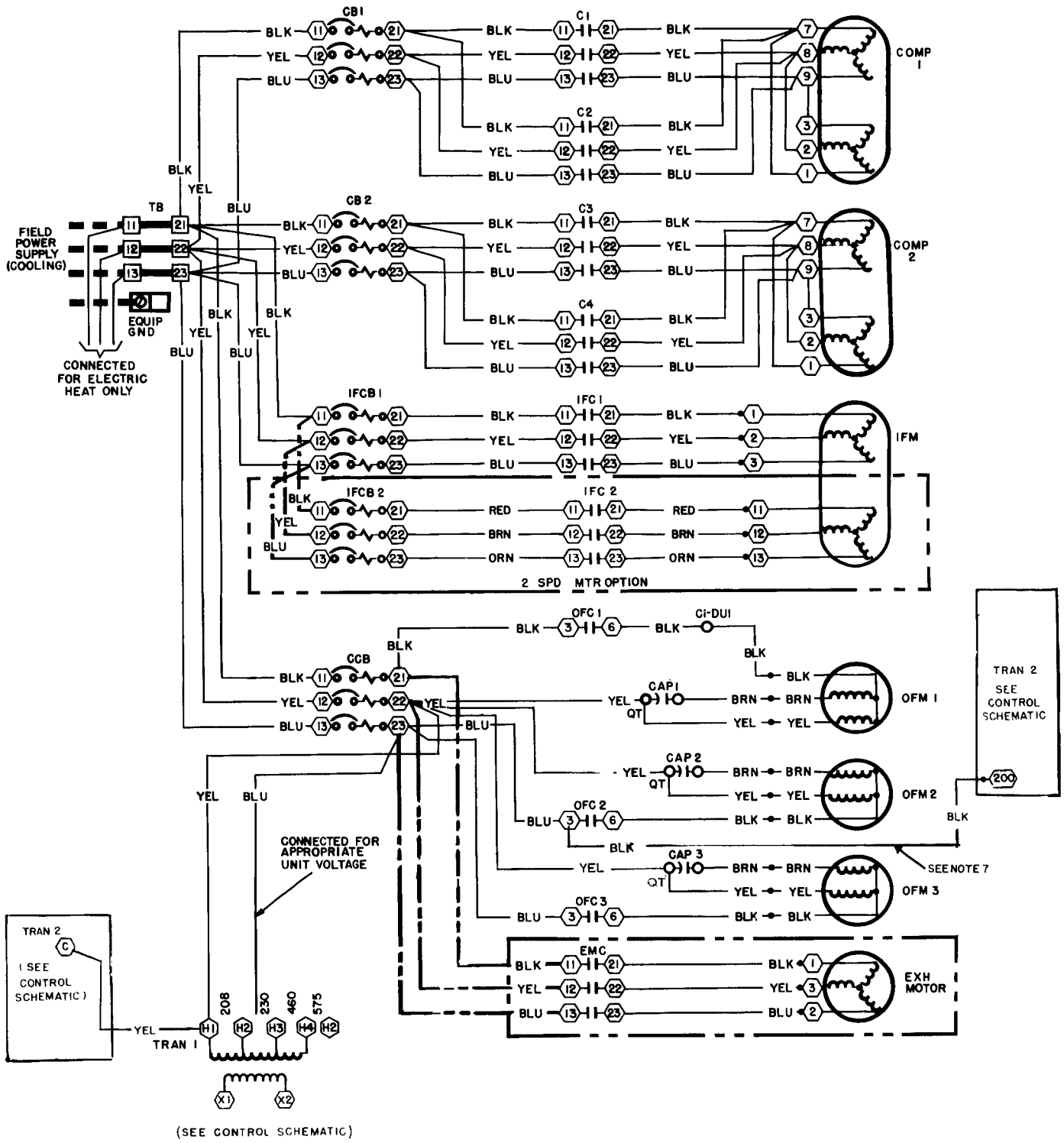


Fig. 27 — Power Wiring Schematic; 50DL044; 208/230-3-60

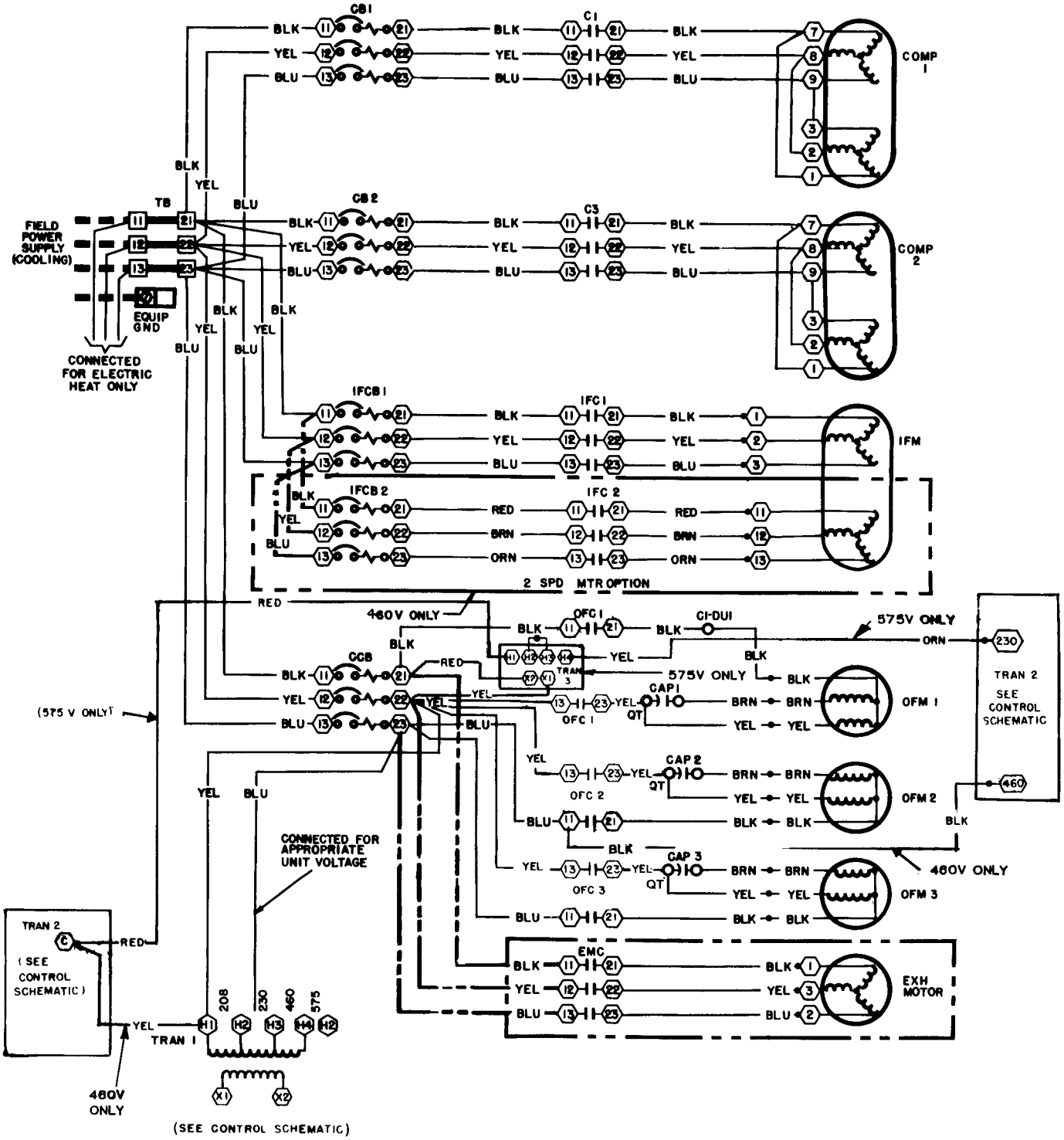


Fig. 28 — Power Wiring Schematic; 50DL044; 460, 575-3-60

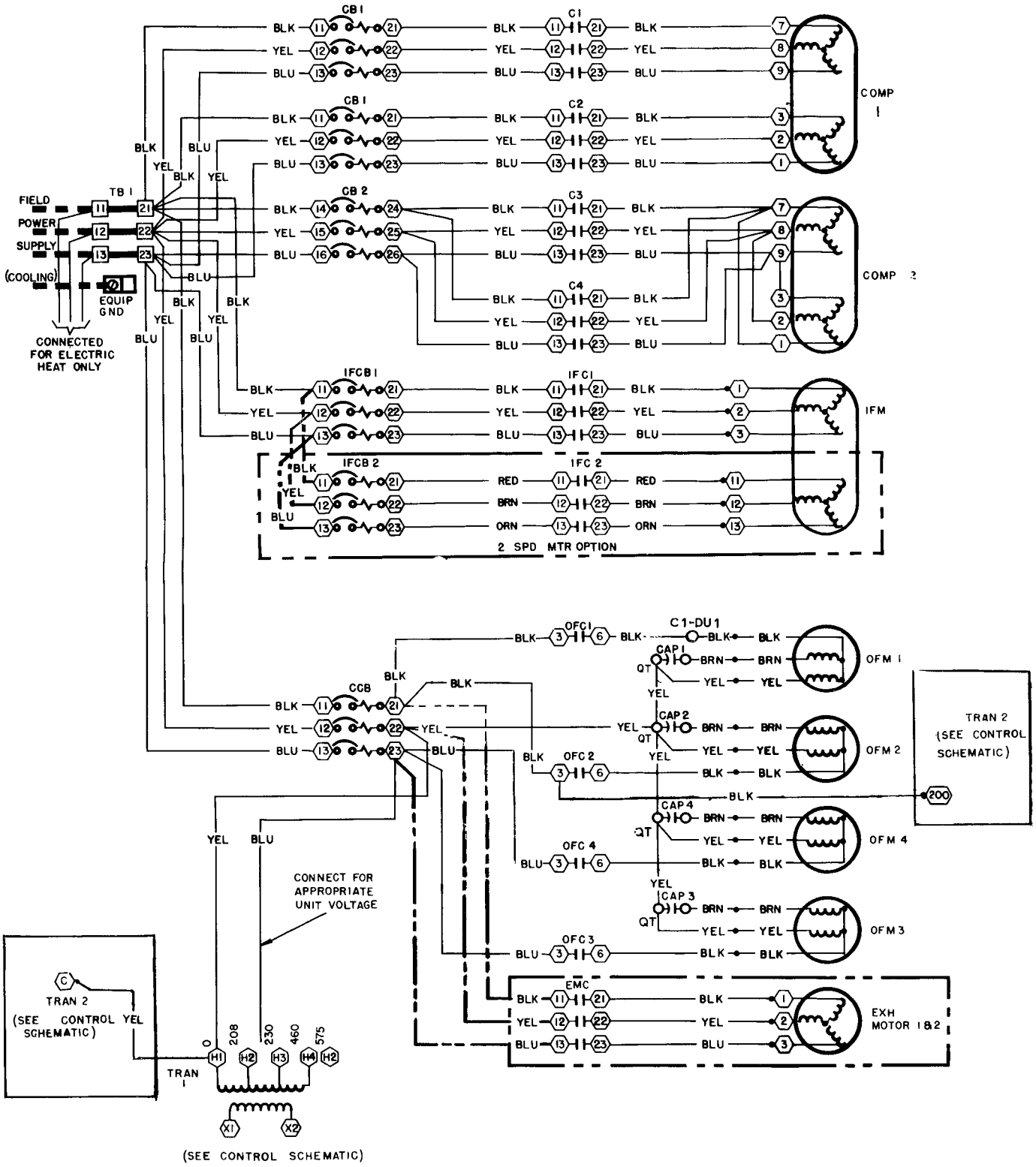


Fig. 29 — Power Wiring Schematic; 50DL054; 208/230-3-60

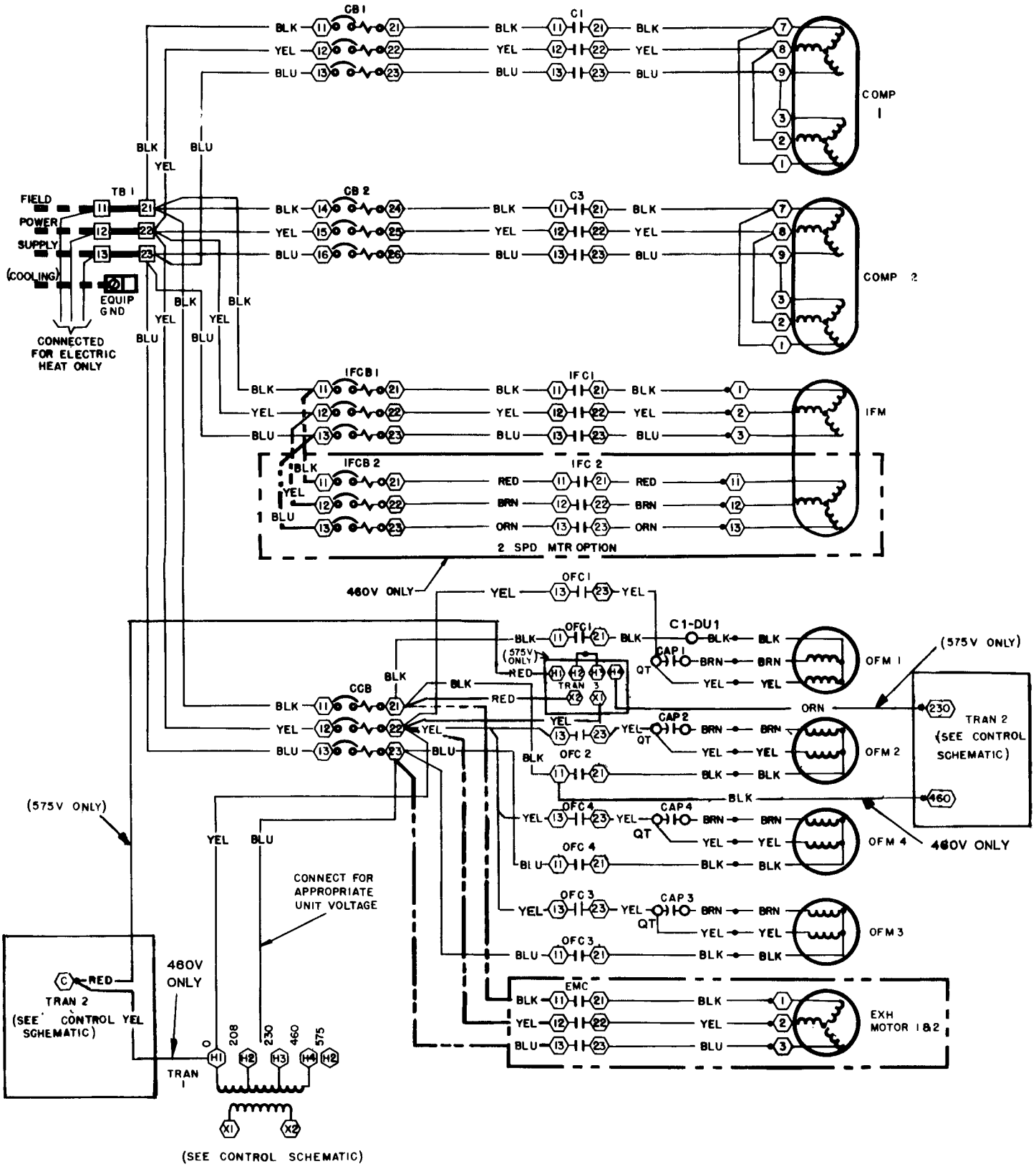


Fig. 30 — Power Wiring Schematic; 50DL054; 460, 575-3-60

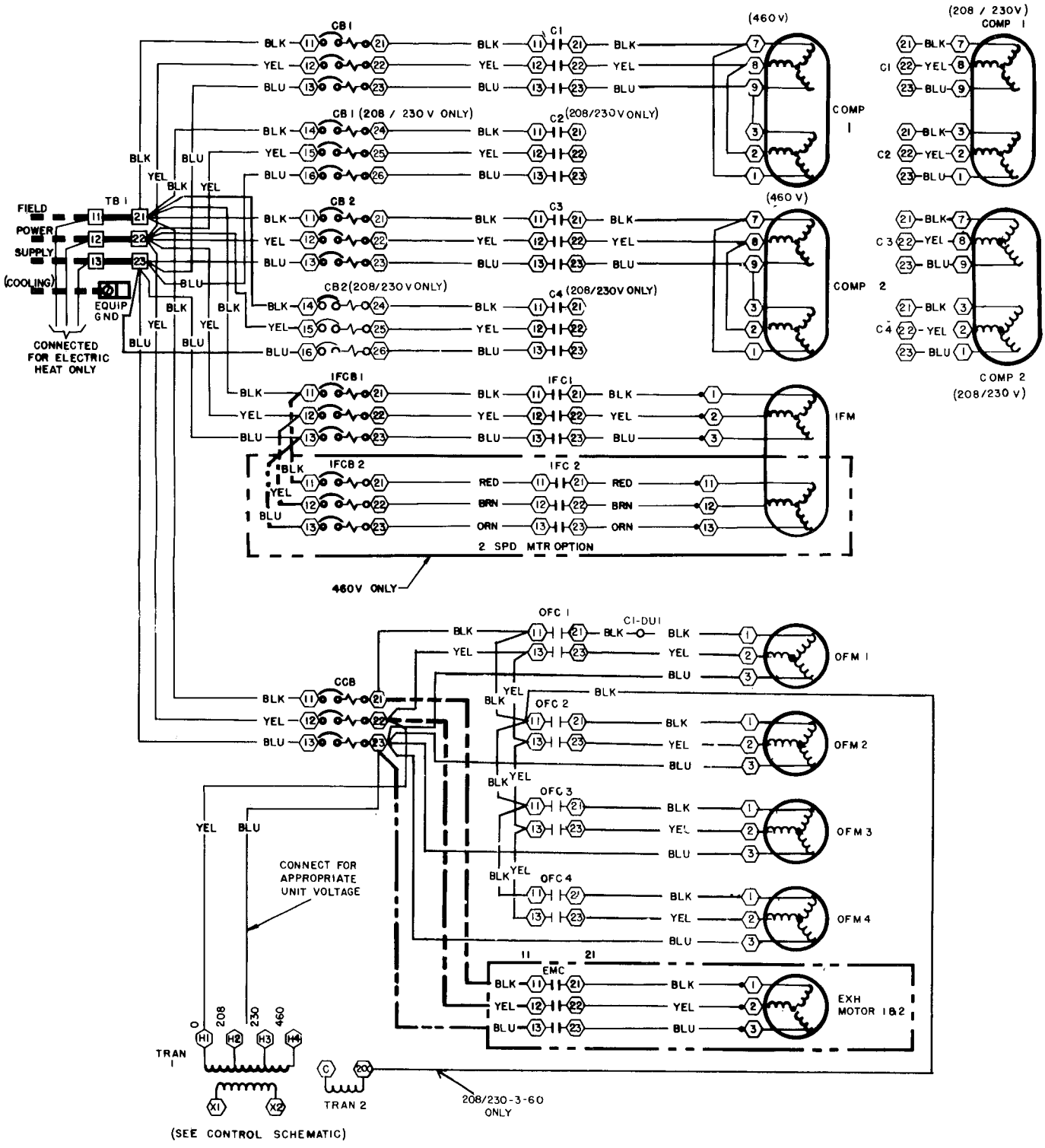


Fig. 31 — Power Wiring Schematic; 50DL064; 208/230, 460-3-60

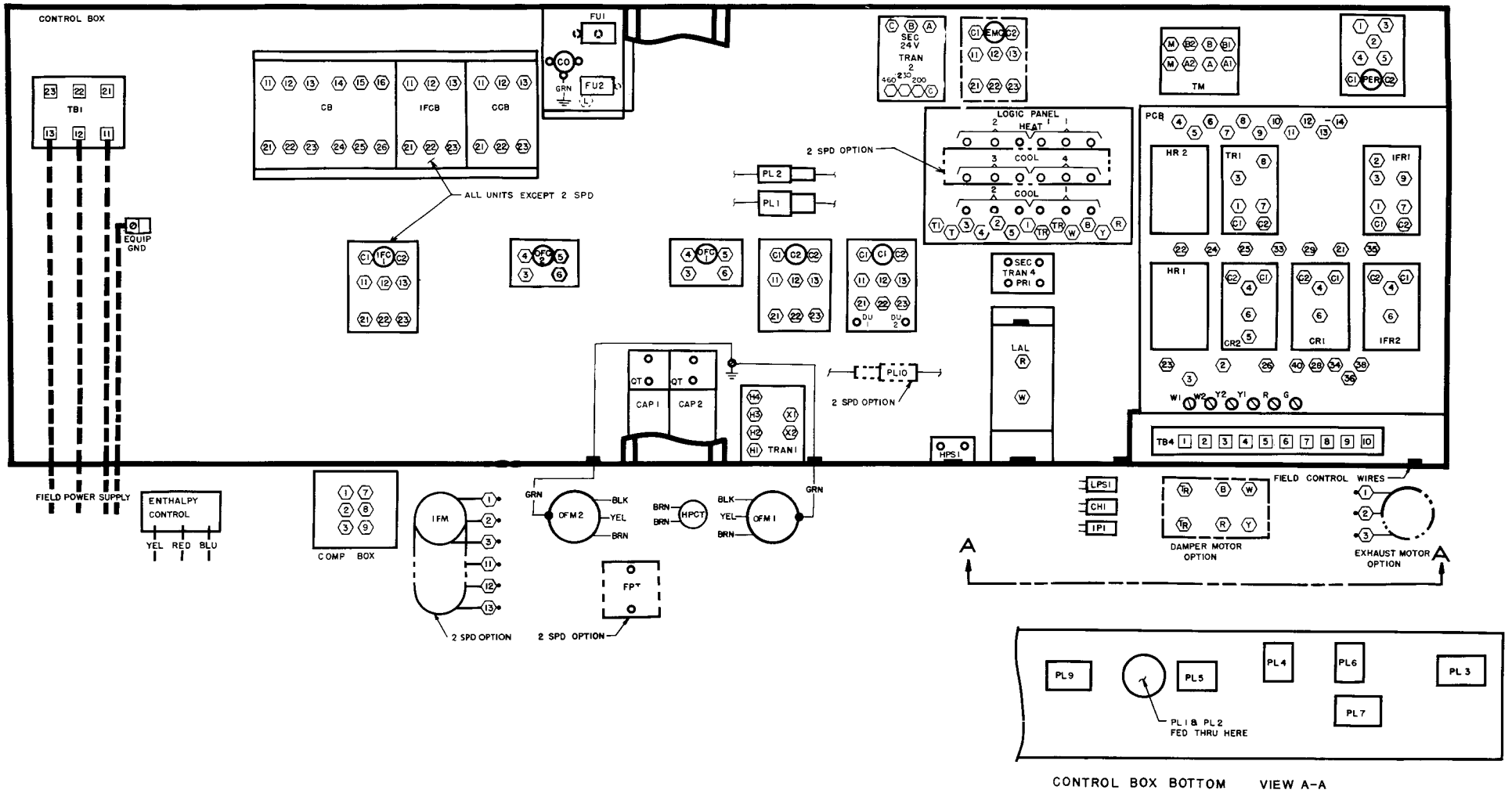


Fig. 32 — Component Arrangement; 50DF024; 208/230-3-60

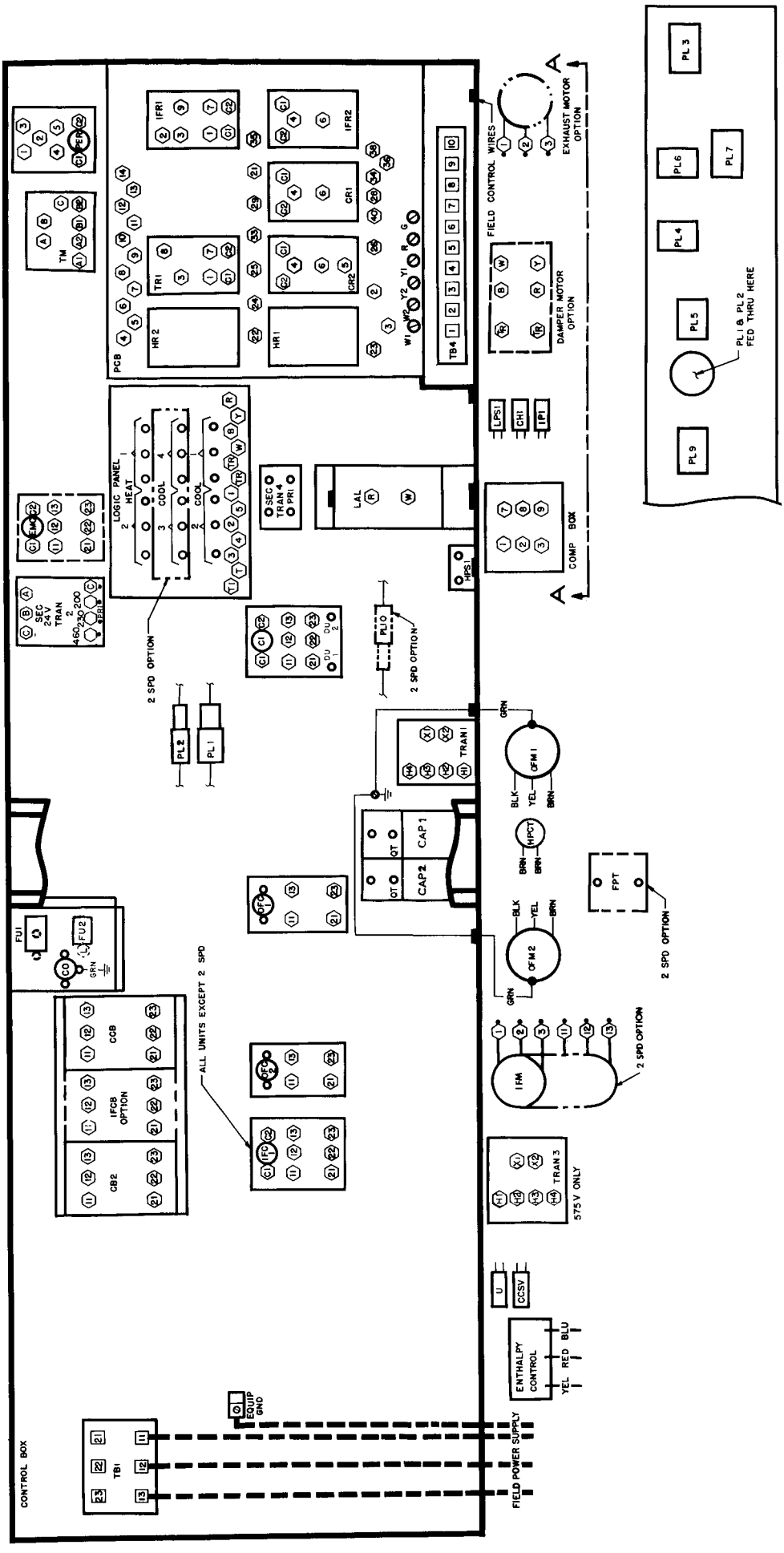


Fig. 33 — Component Arrangement; 50DF024; 460, 575-3-60

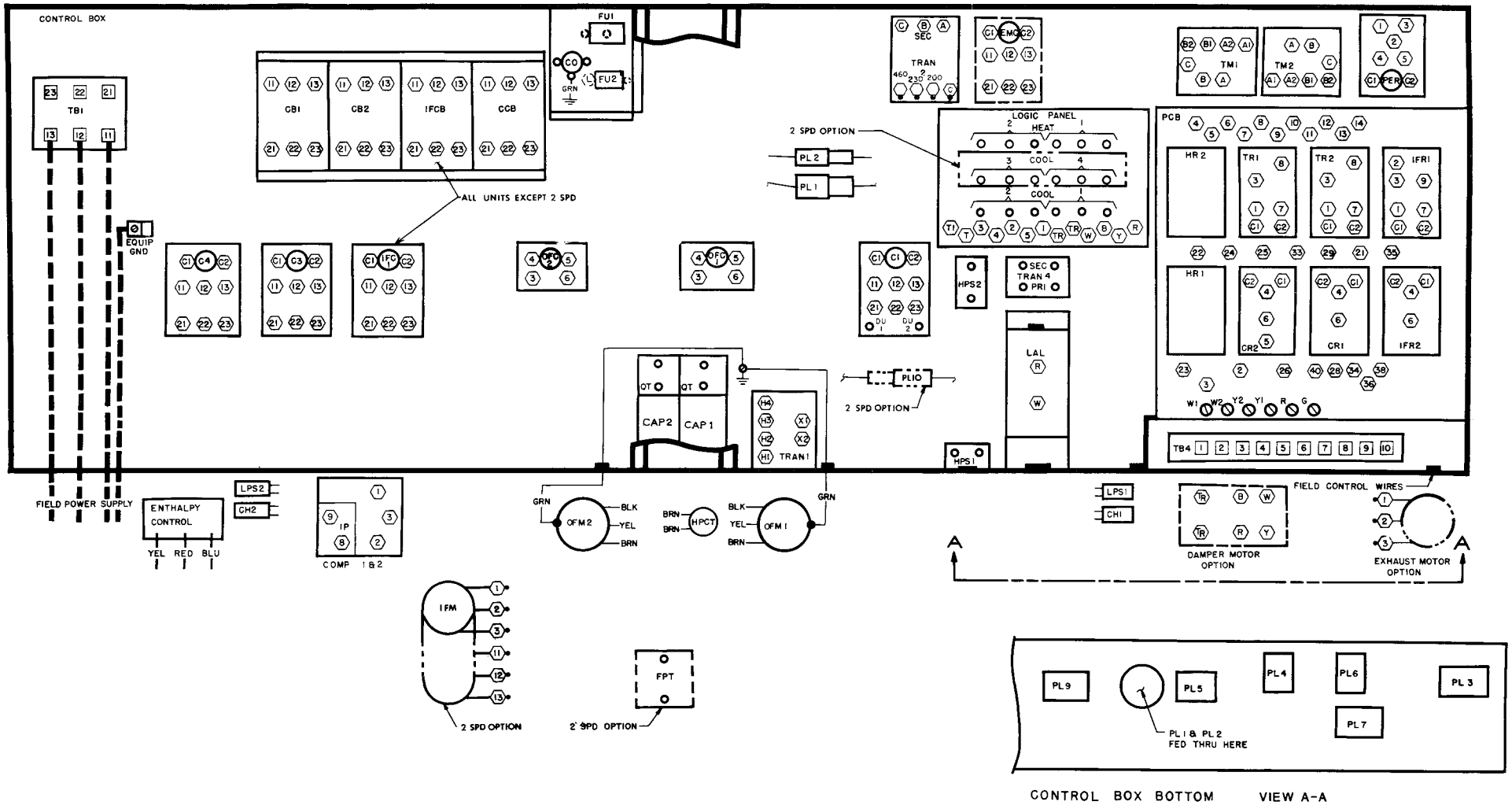


Fig. 34 — Component Arrangement; 50DF028; 208/230-3-60

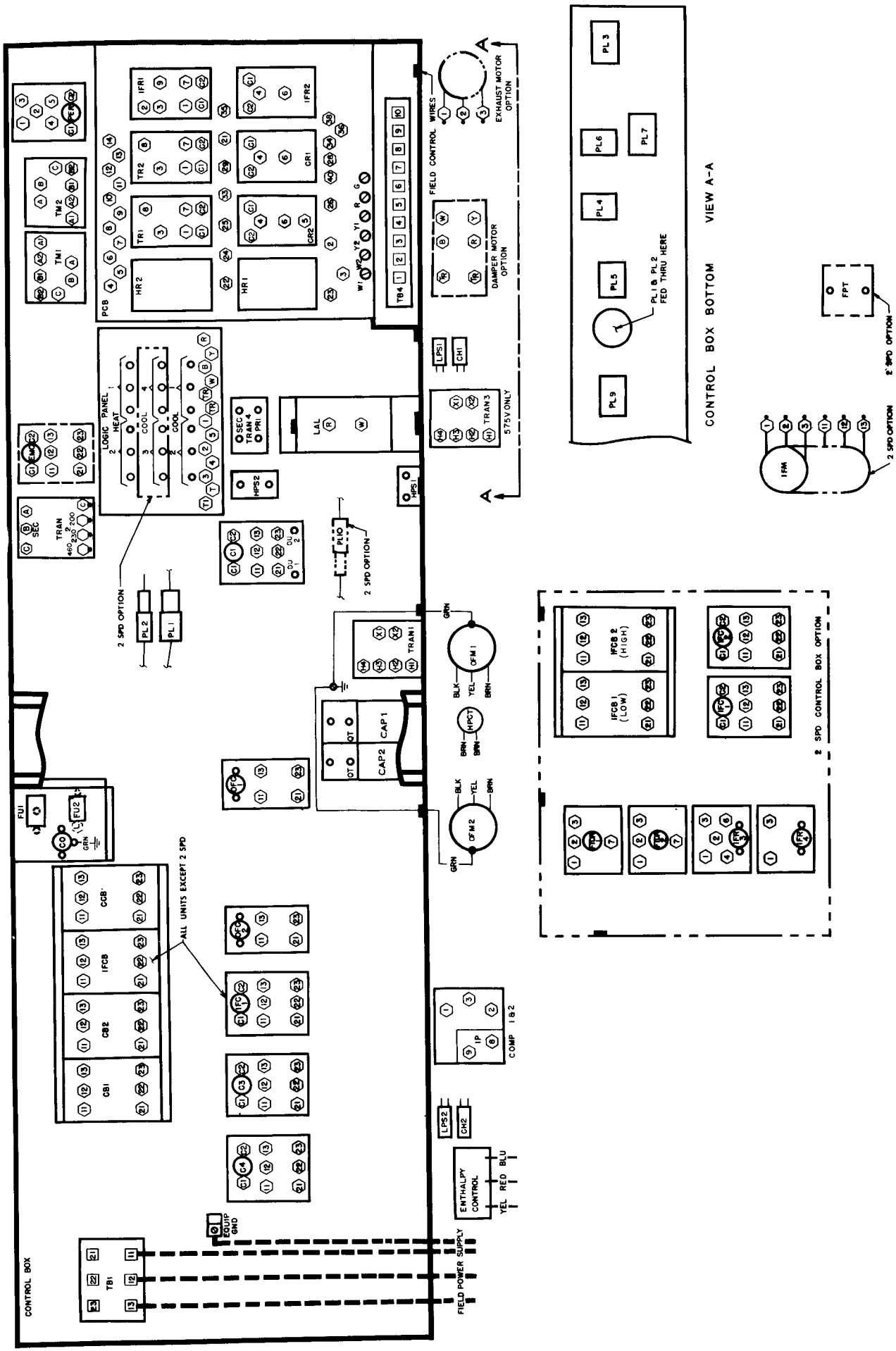


Fig. 35 — Component Arrangement; 50DF028; 460, 575-3-60

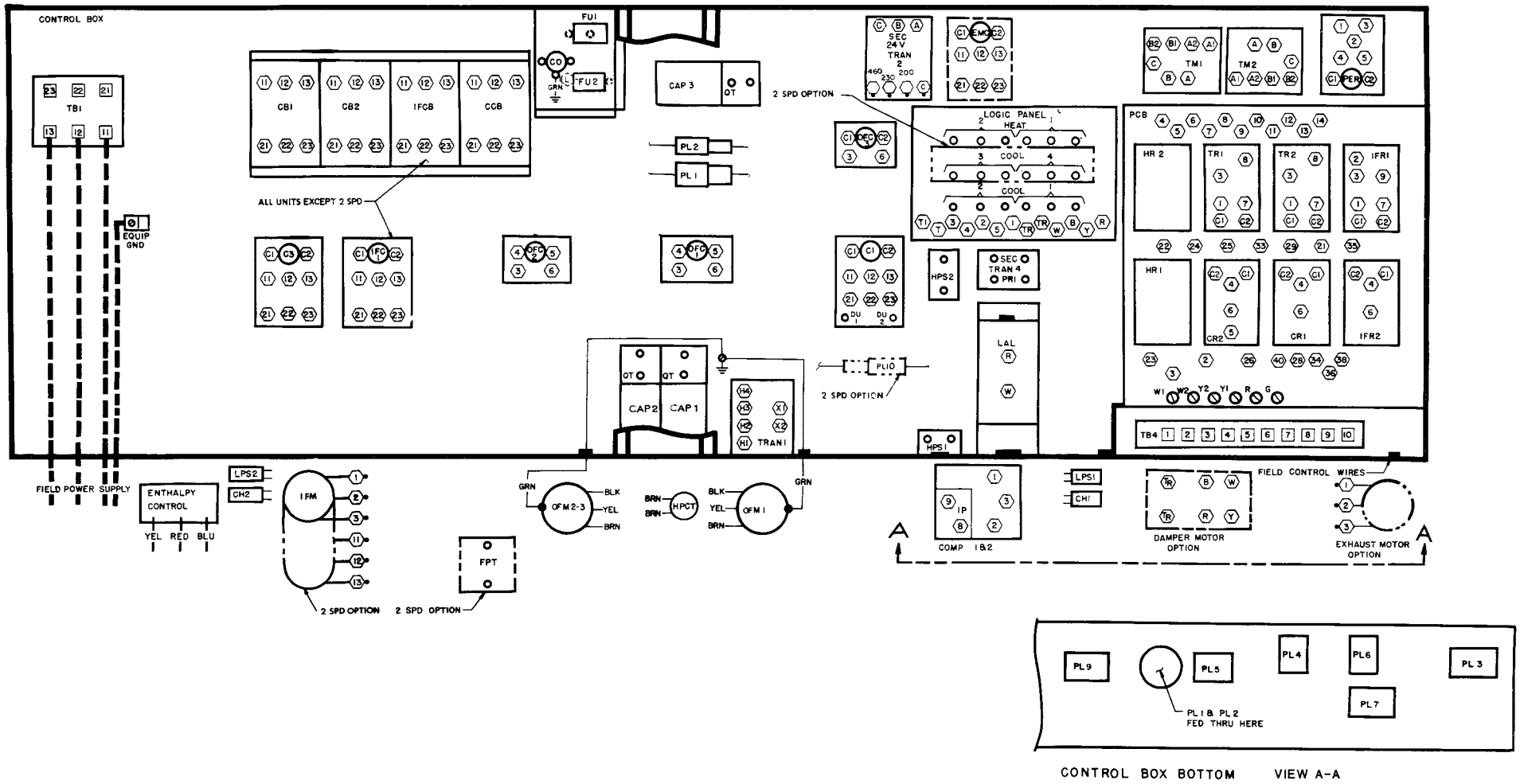


Fig. 36 — Component Arrangement; 50DF034; 208/230-3-60

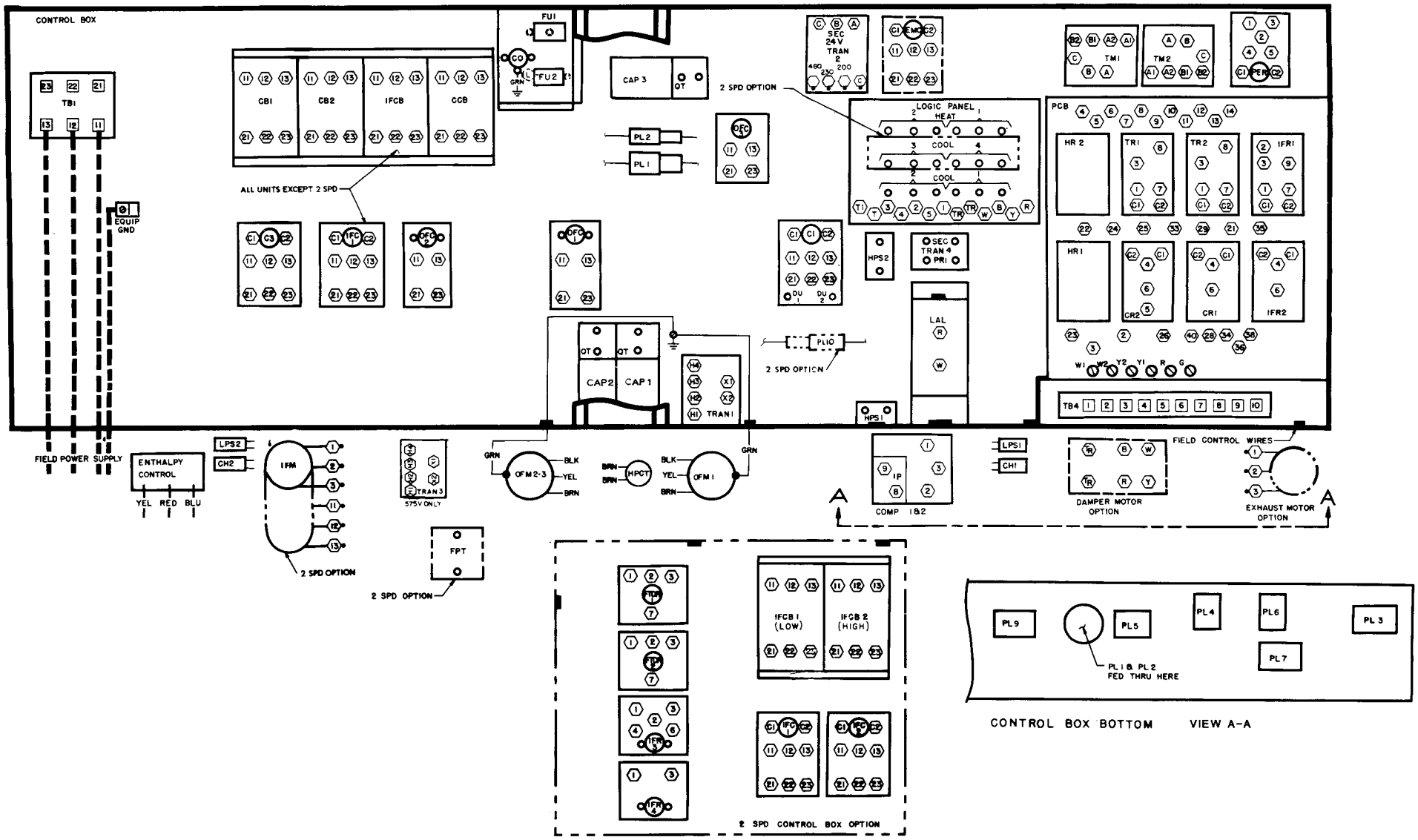


Fig. 37 — Component Arrangement; 50DF034; 460, 575-3-60

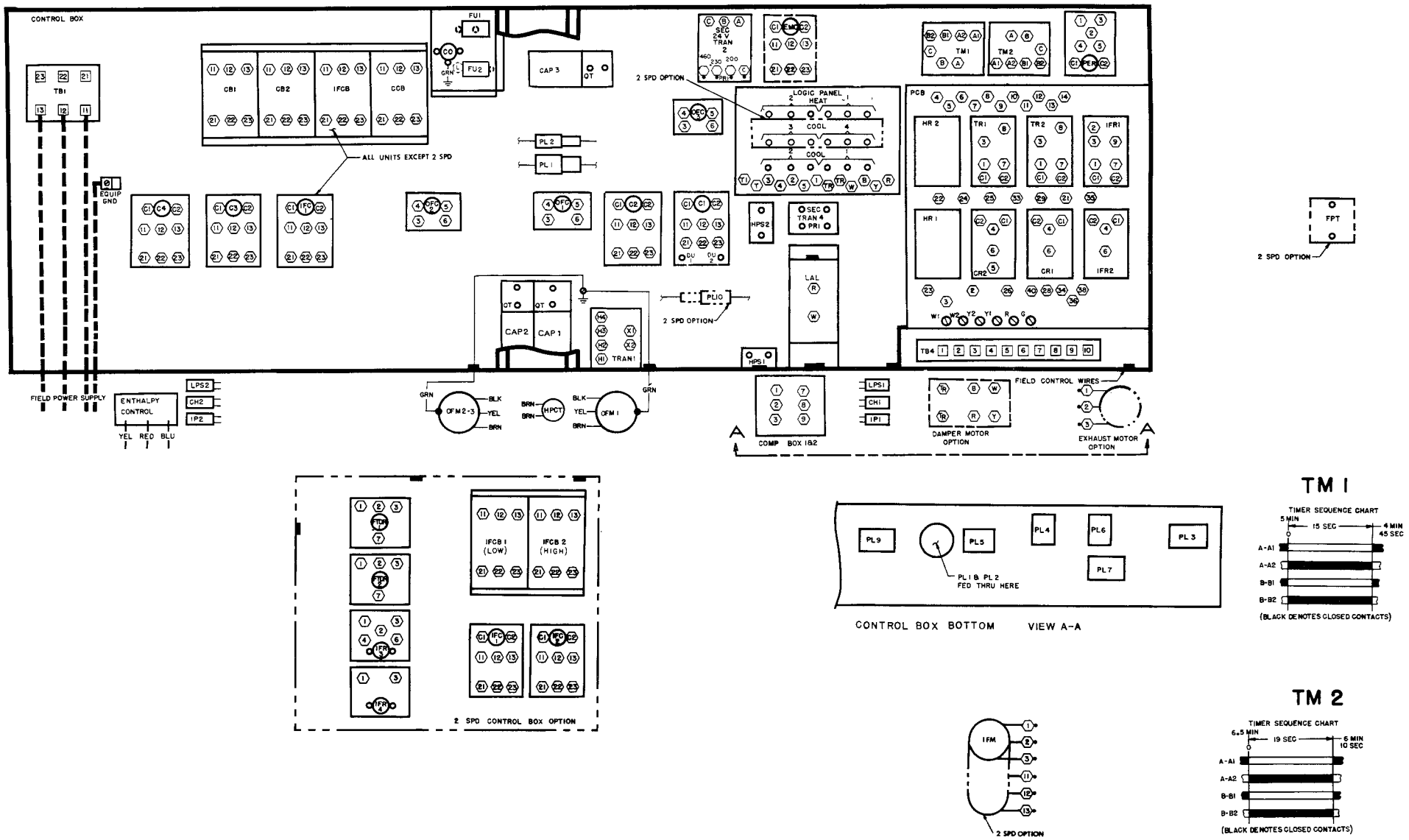


Fig. 38 — Component Arrangement; 50DL044; 208/230-3-60

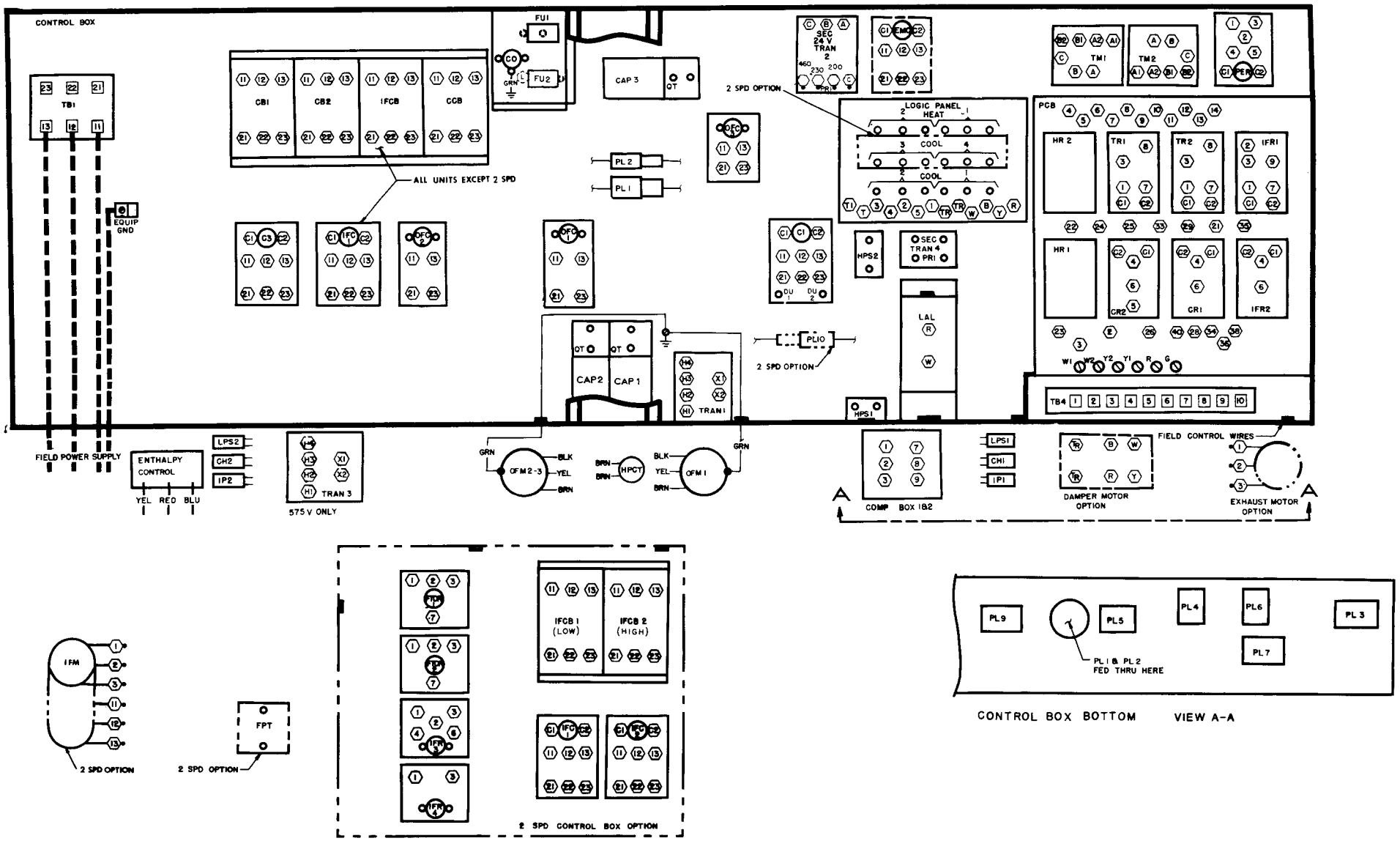


Fig. 39 — Component Arrangement; 50DL044; 460, 575-3-60

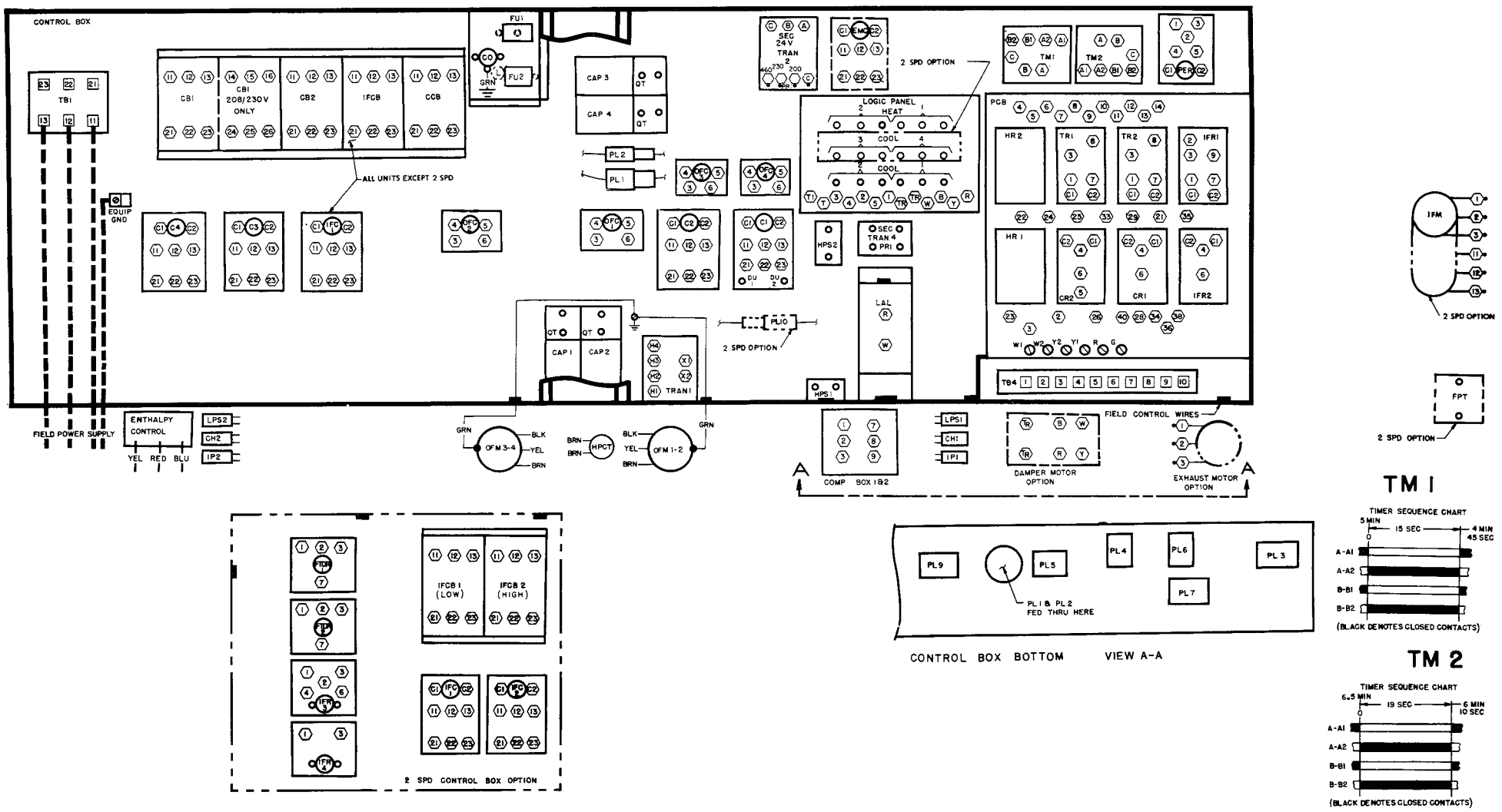


Fig. 40 — Component Arrangement; 50DL054; 208/230-3-60

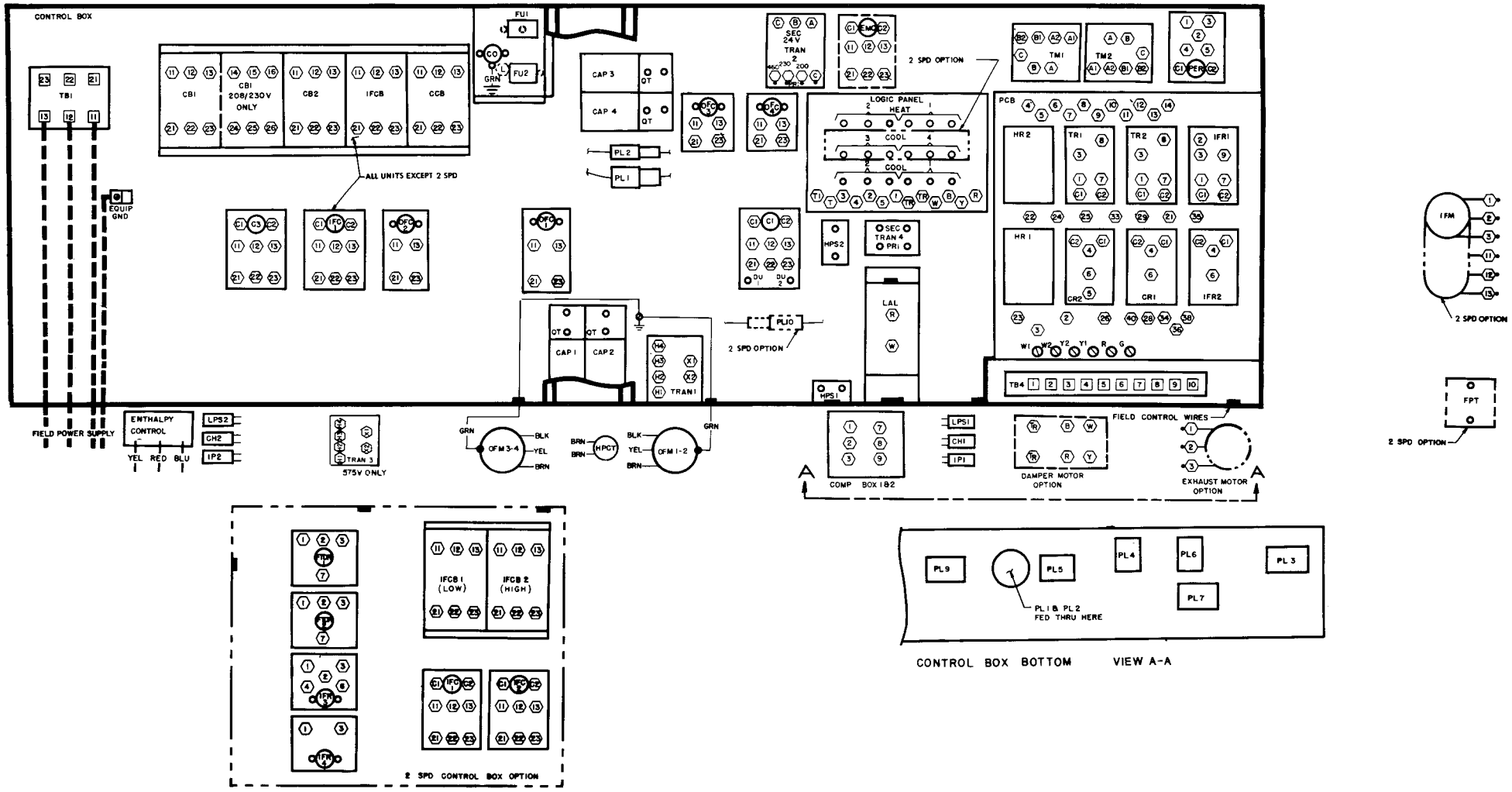


Fig. 41 — Component Arrangement; 50DL054; 460, 575-3-60

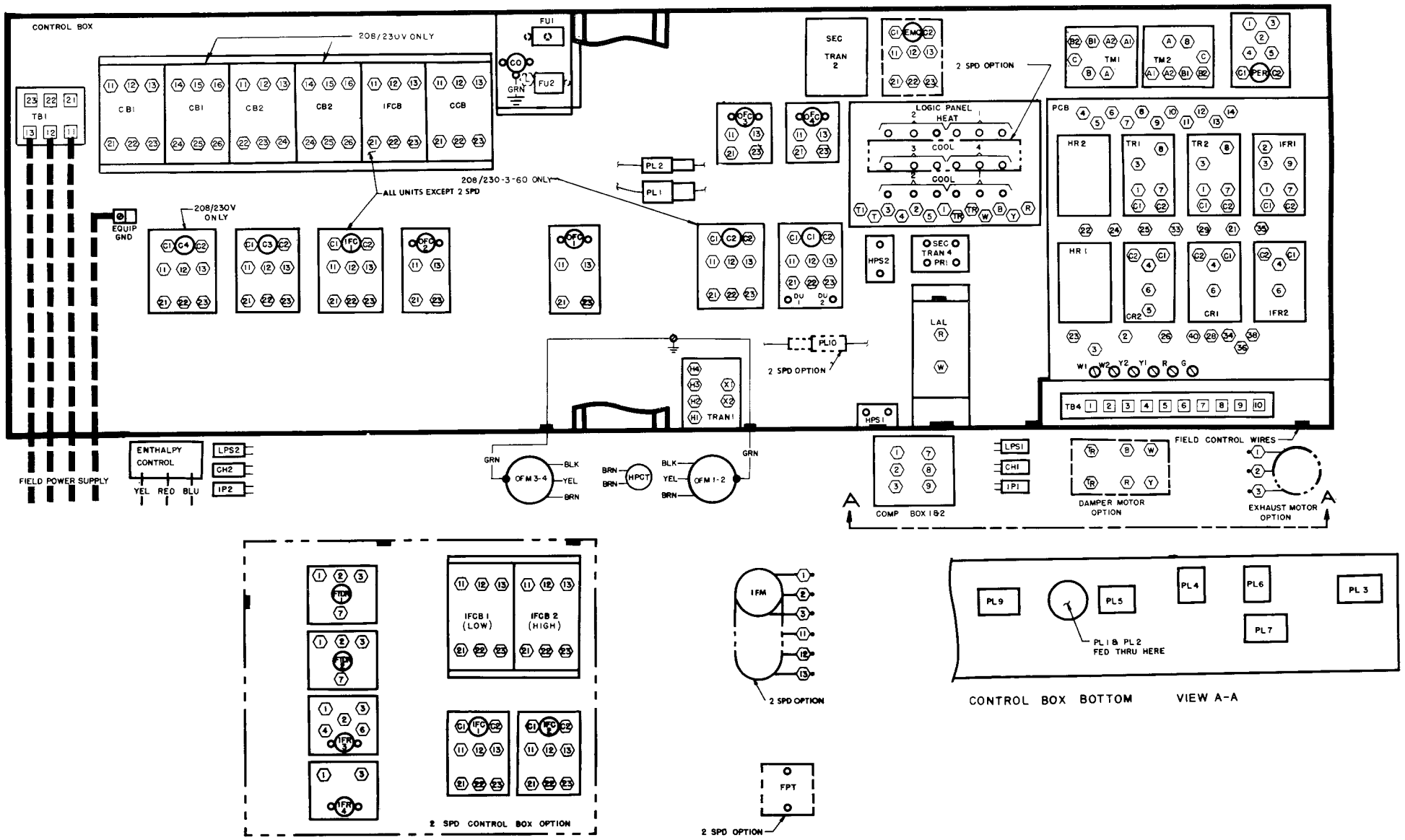


Fig. 42 — Component Arrangement; 50DL064; 208/230, 460, 575-3-60

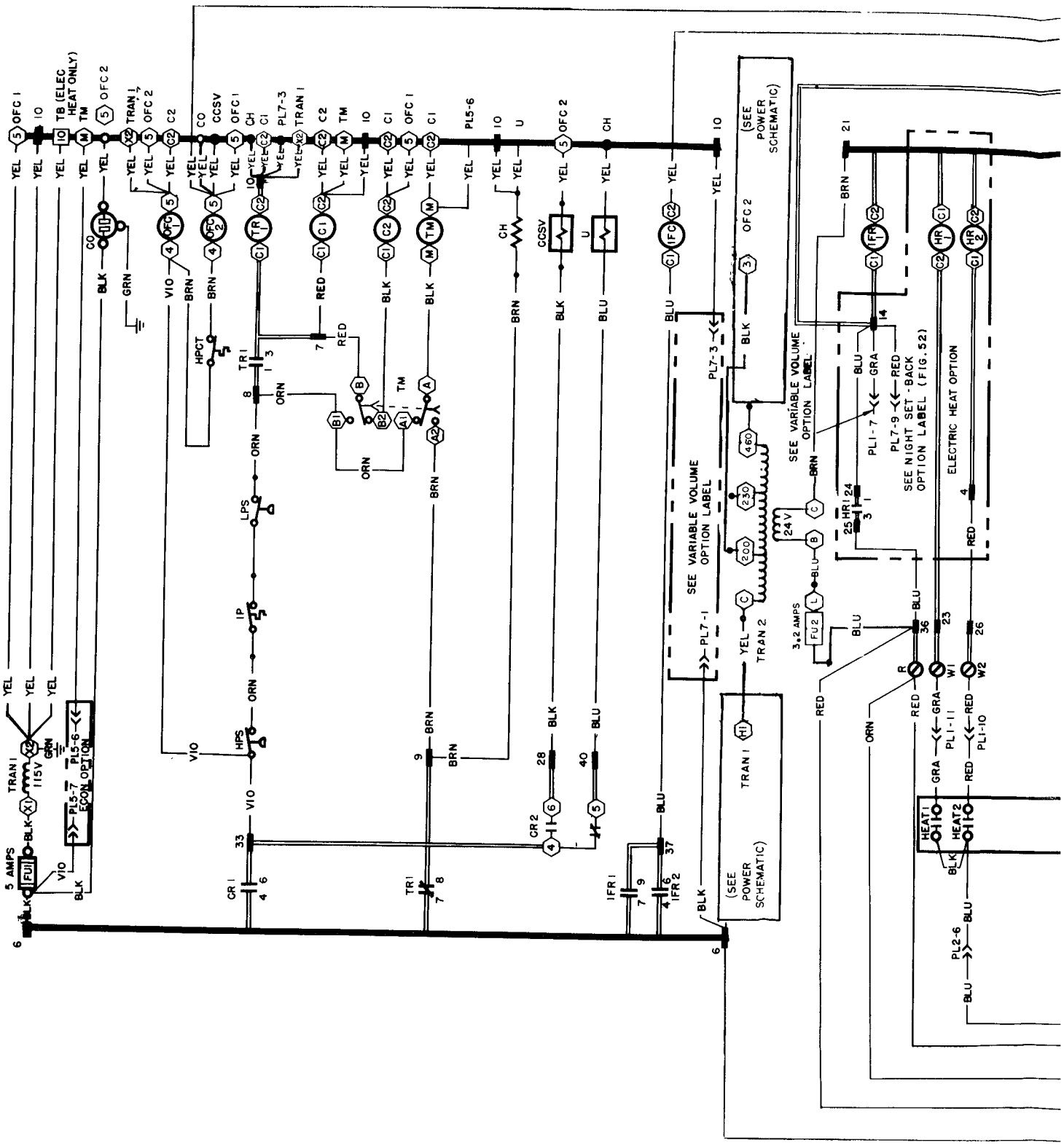
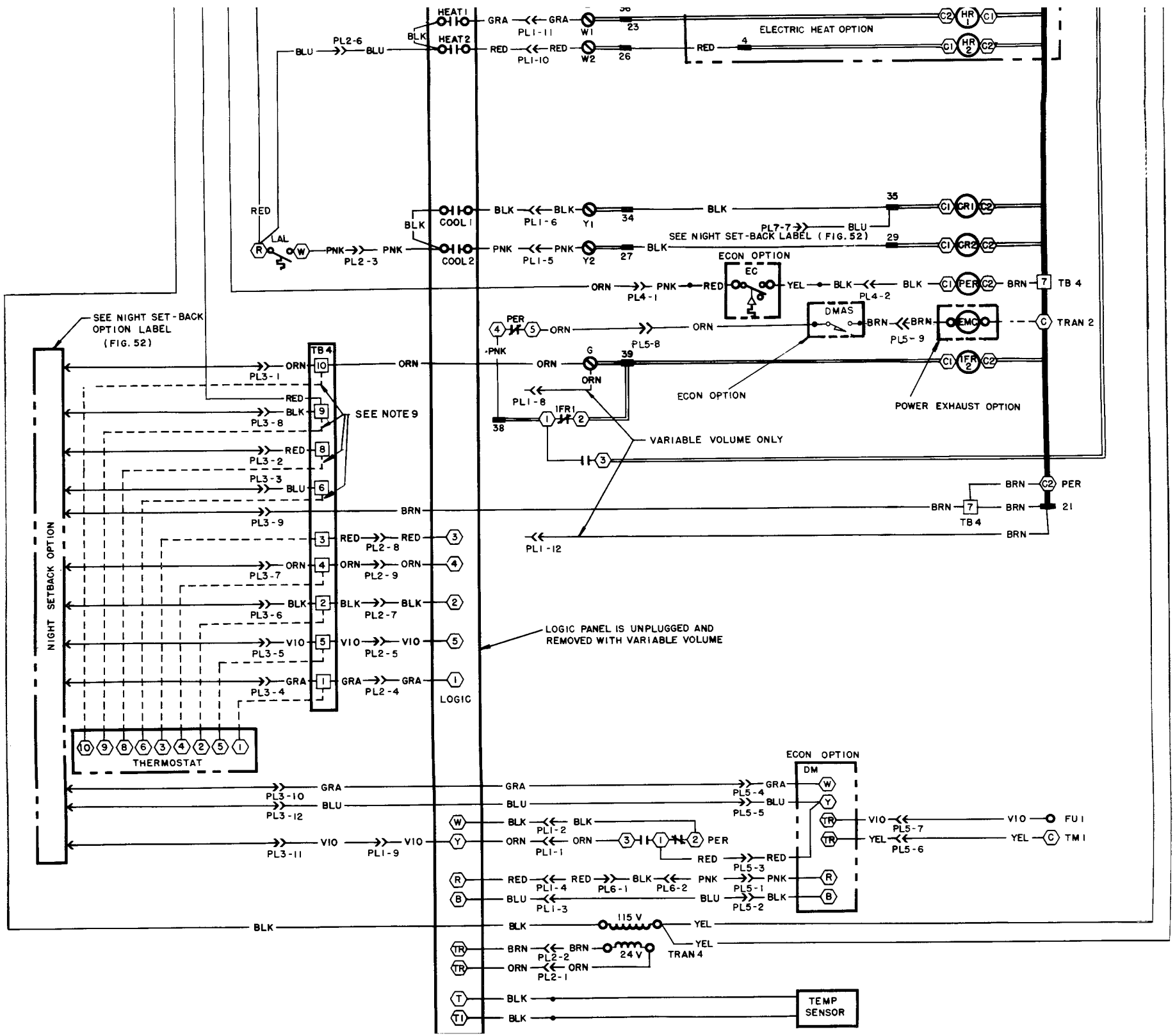


Fig. 43 — Control Wiring Schematic w/Sta

hematic w/Standard Fan; 50DF024; 208/230-3-60



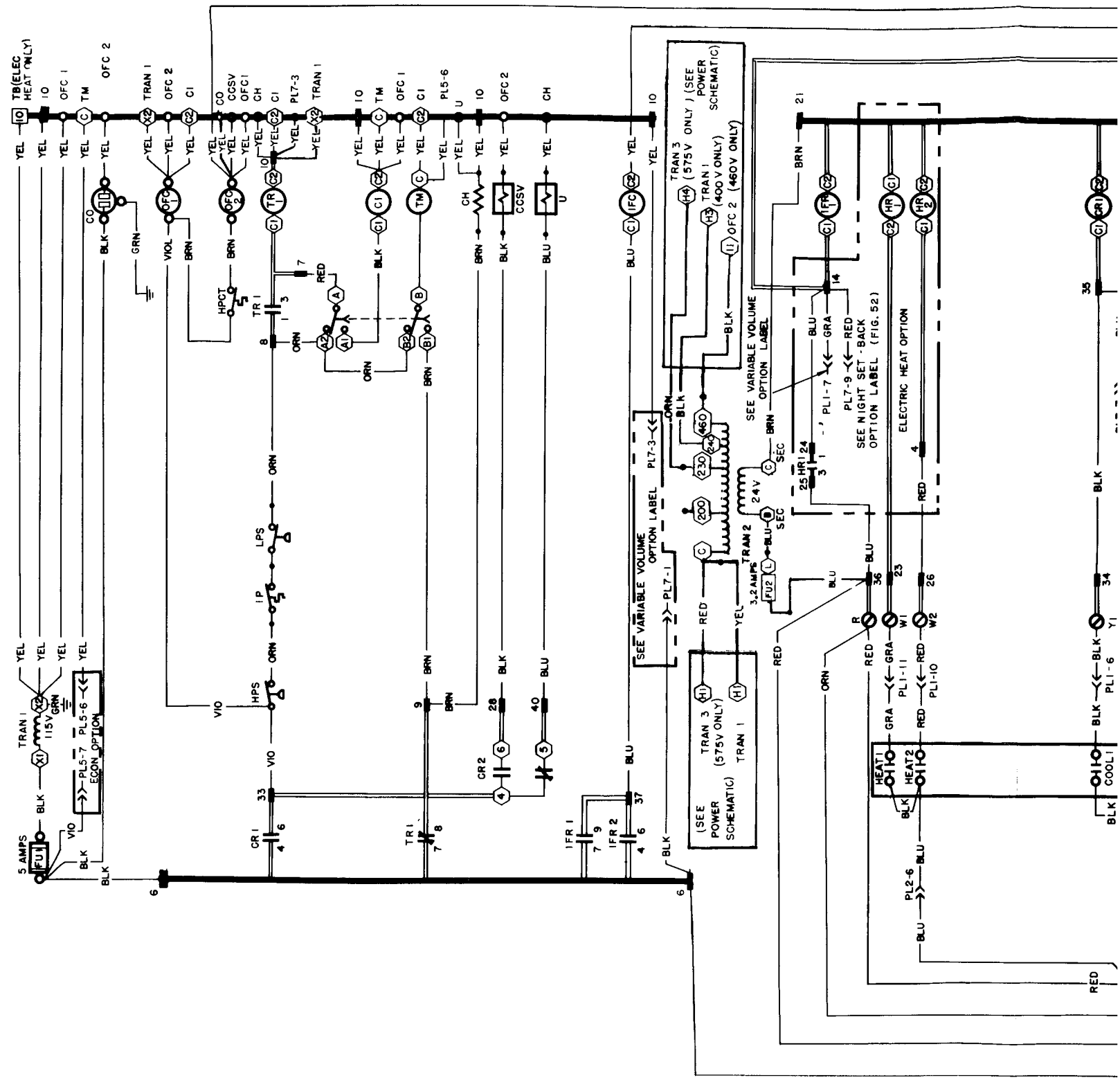
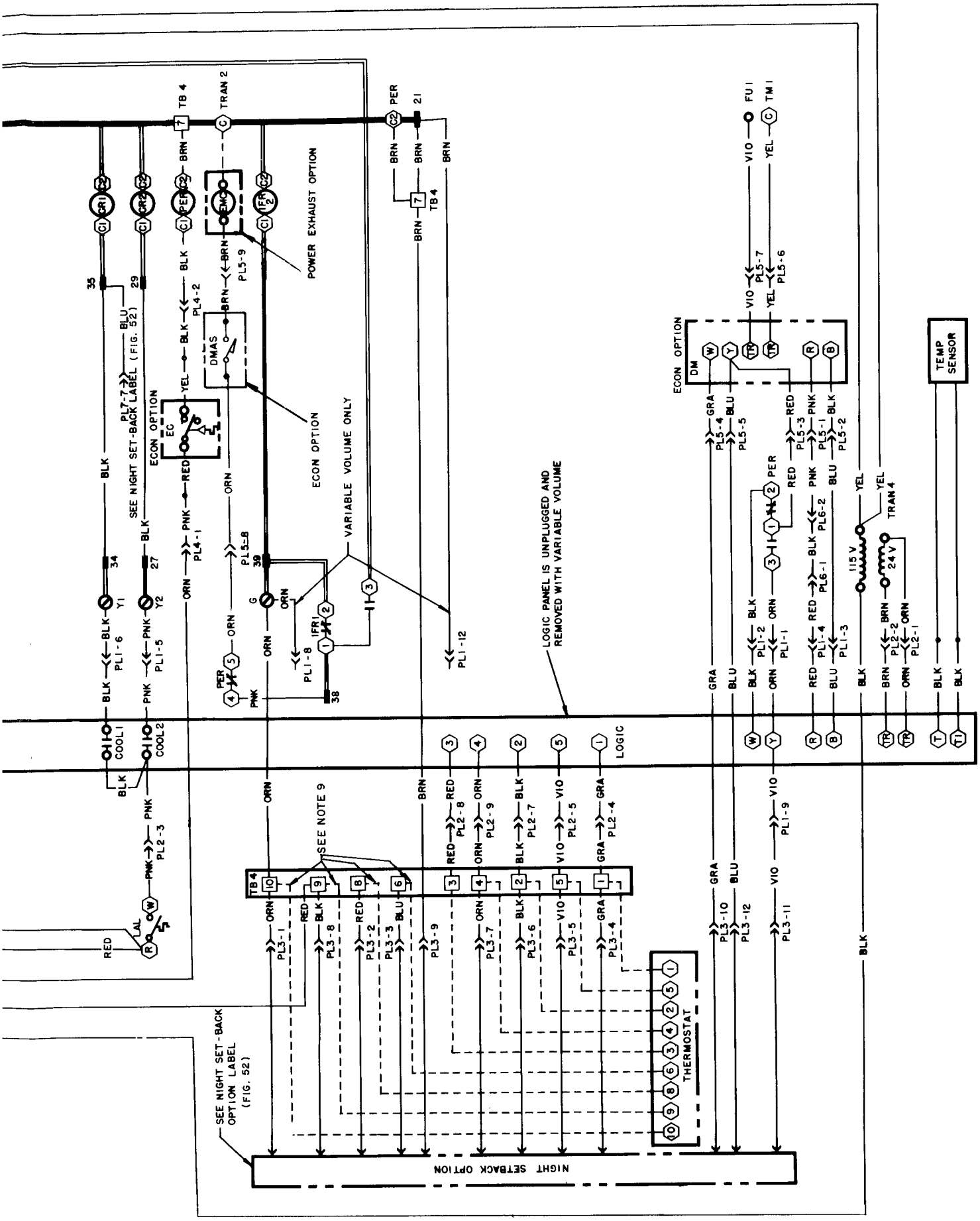


Fig. 44 — Control Wiring Schematic w/Standard F



w/Standard Fan; 50DF024; 460, 575-3-60

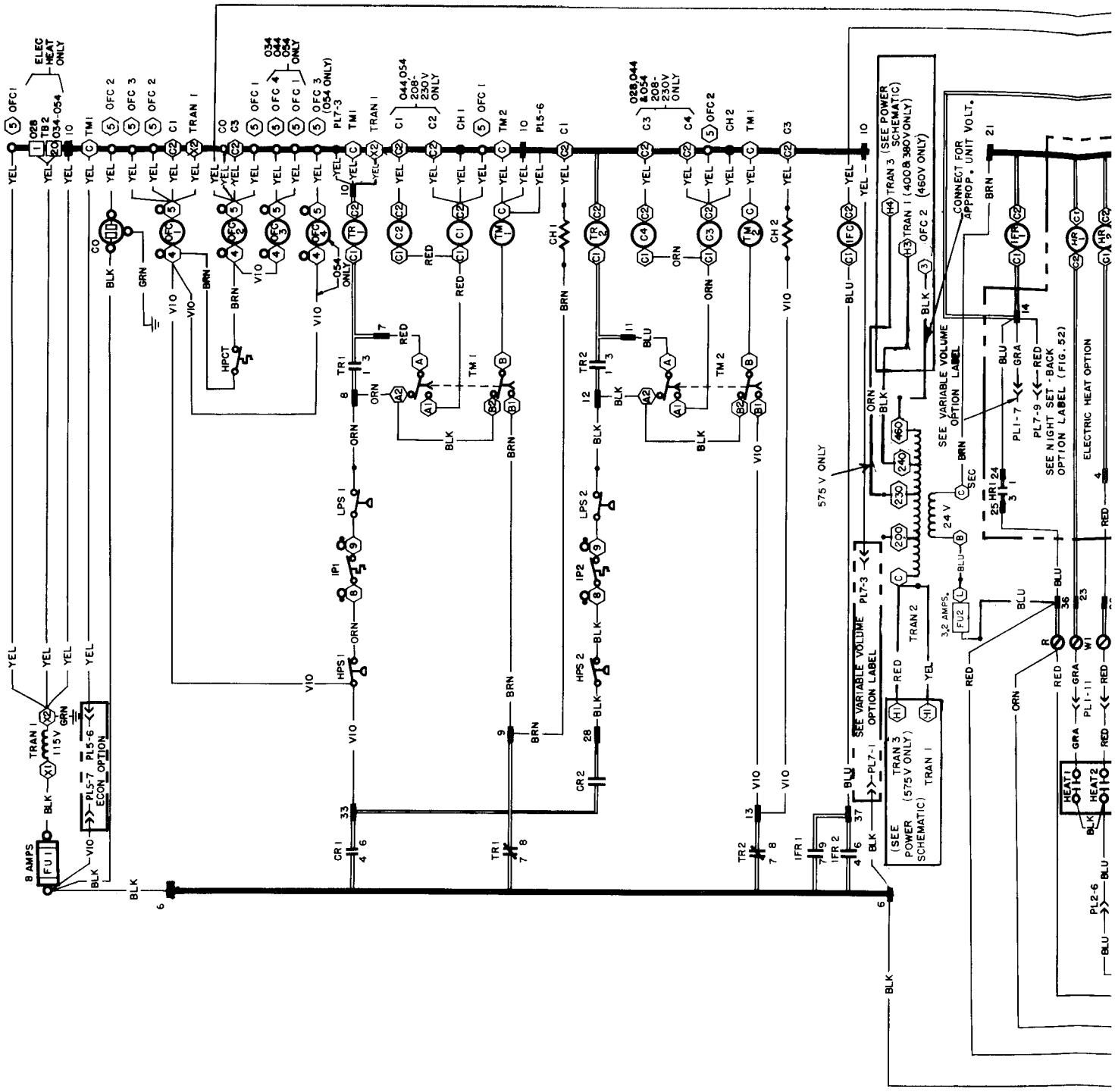
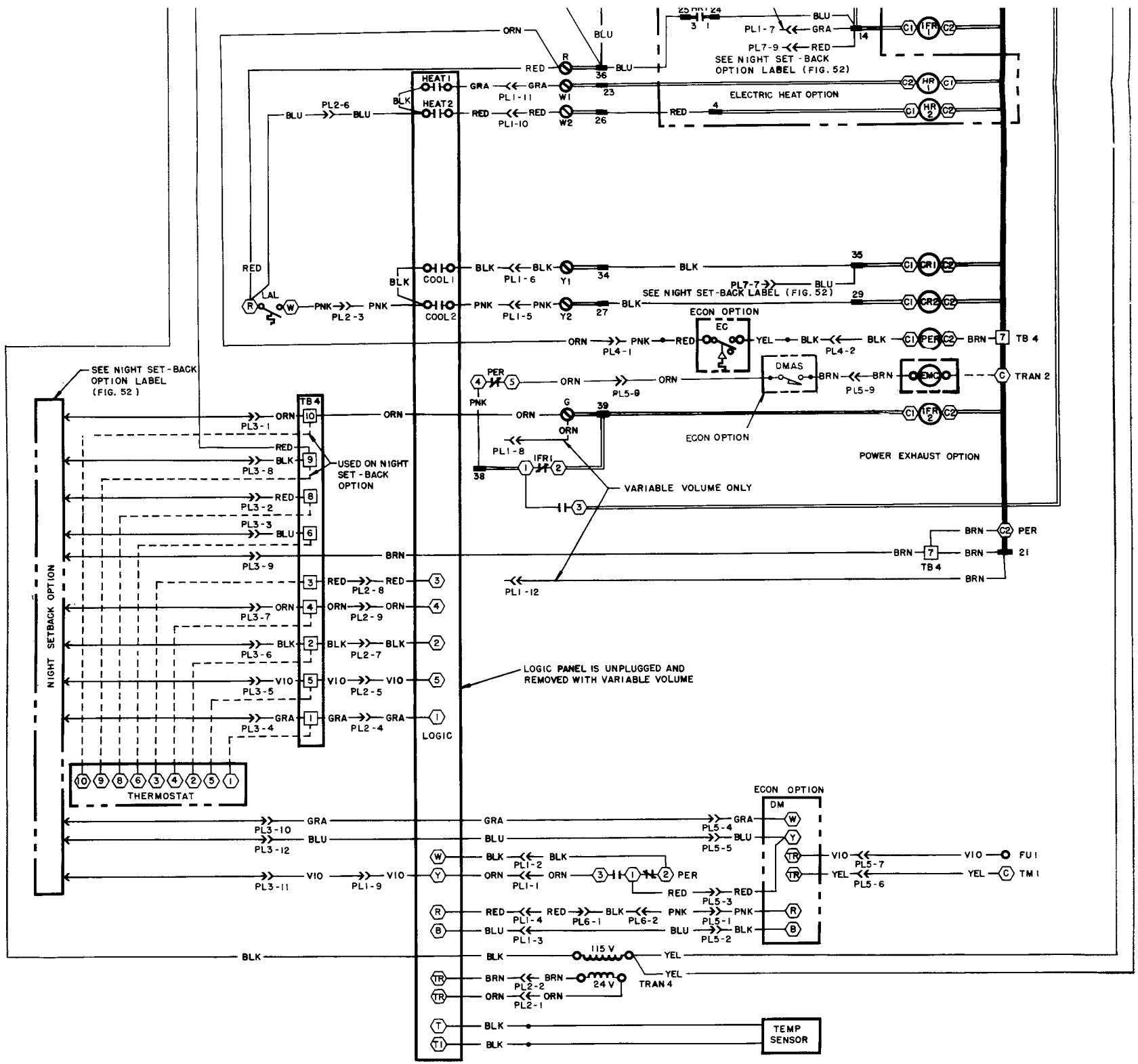


Fig. 45 — Control Wiring Schematic w/Standard 208/230, 4

w/Standard Fan; 50DF028,034 and 50DL044,054,064;
208/230, 460-3-60



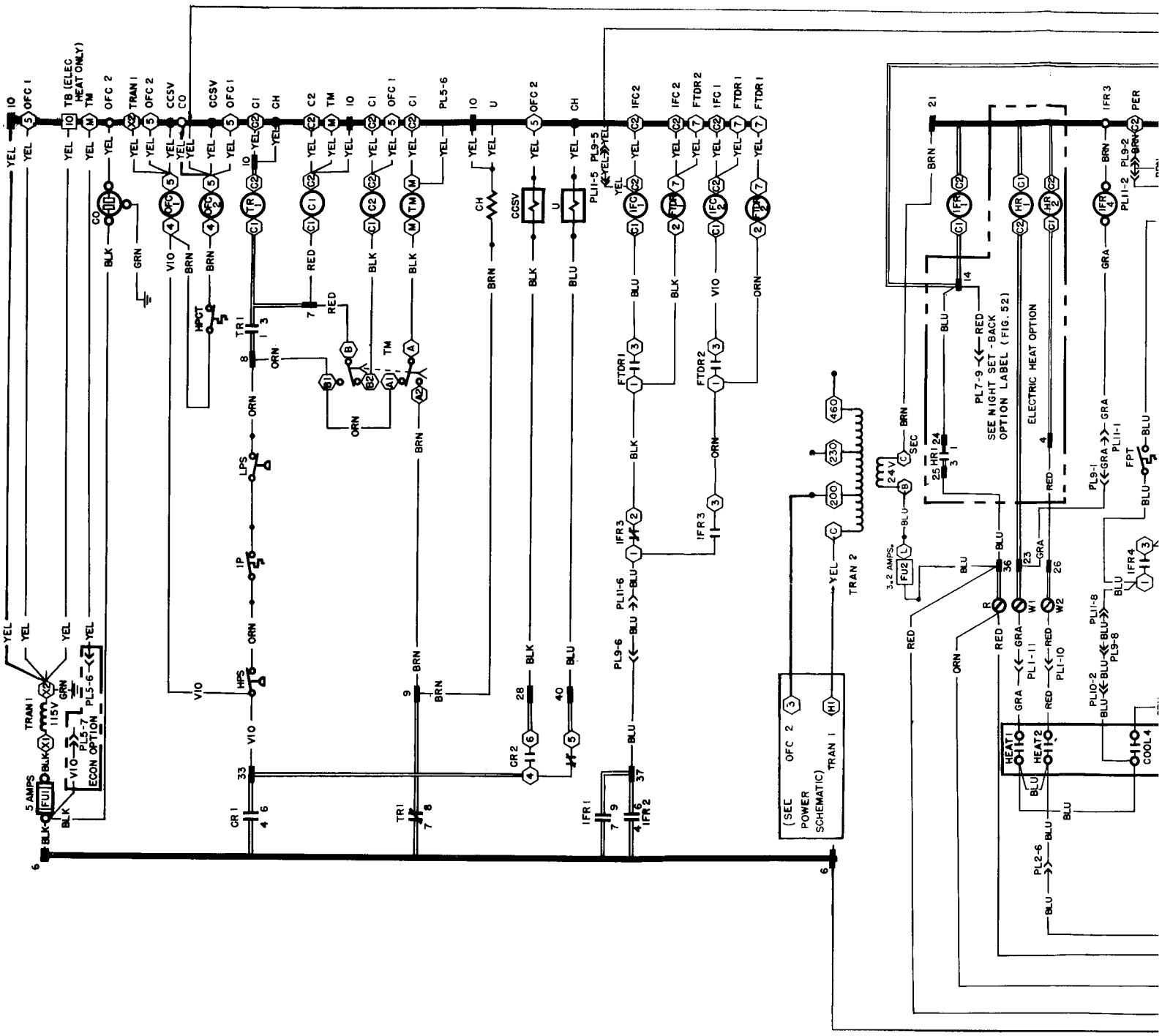
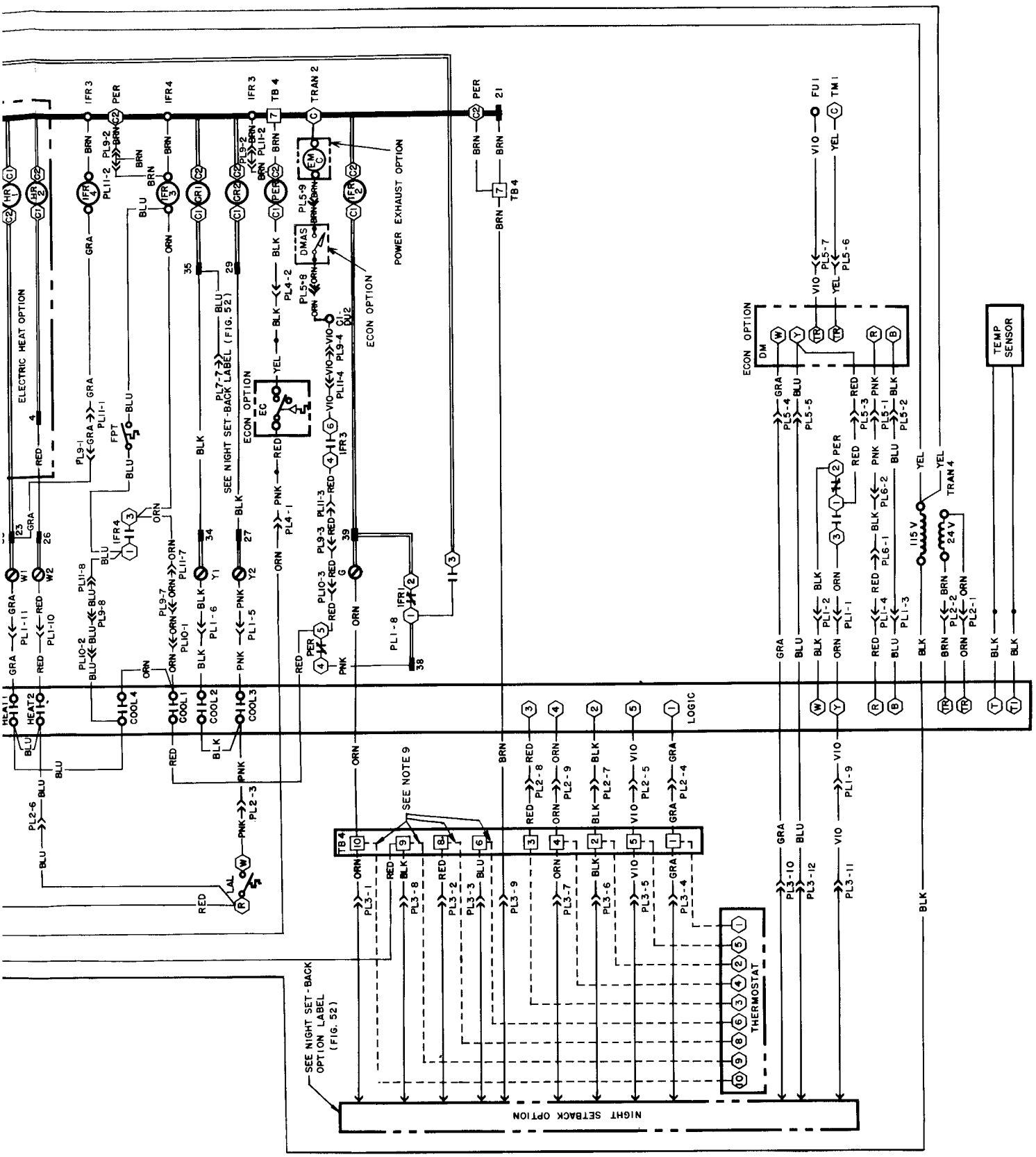


Fig. 46 — Control Wiring Schematic w/2-Speed Fan;



/2-Speed Fan; 50DF024; 208/230-3-60

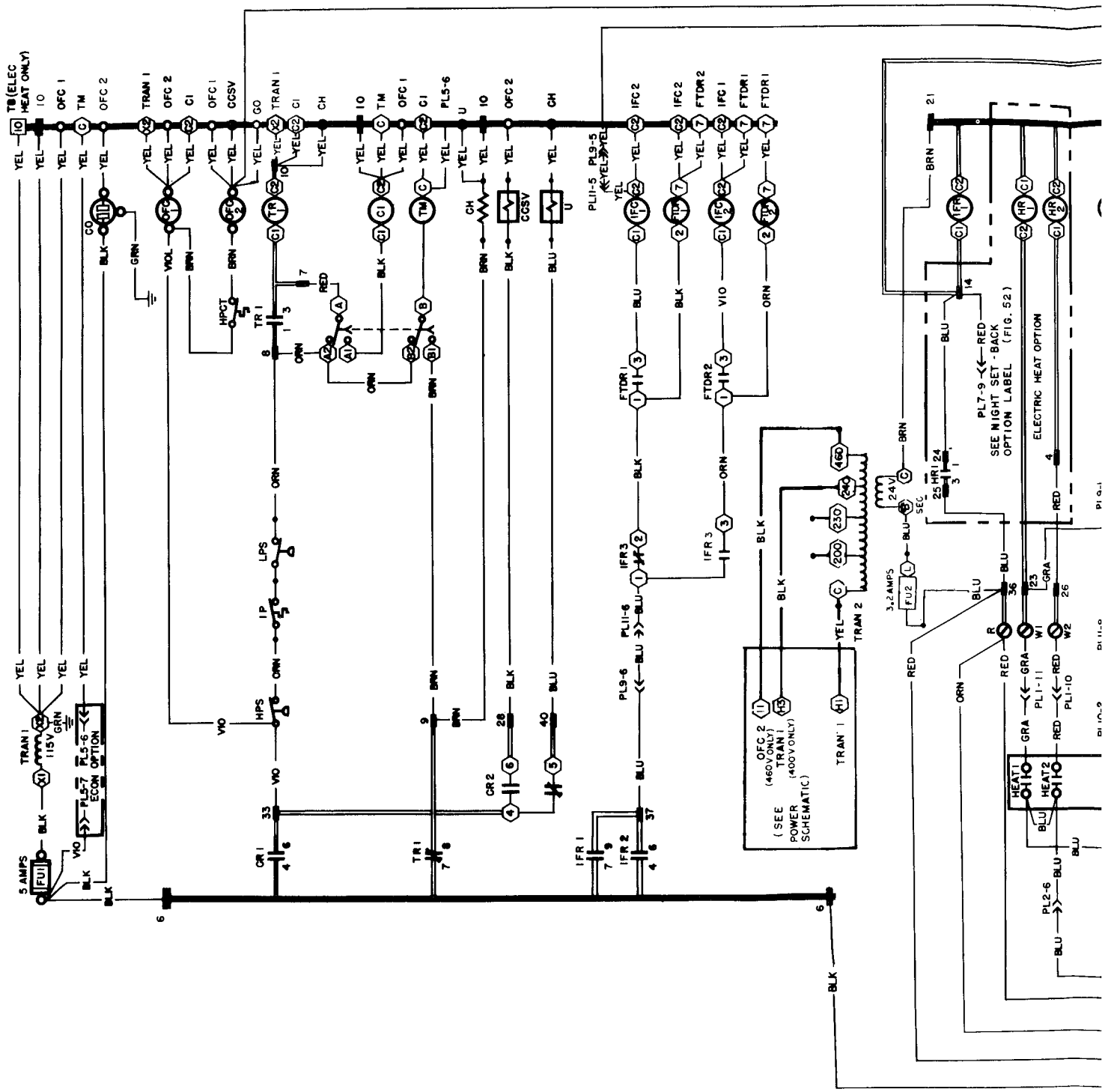
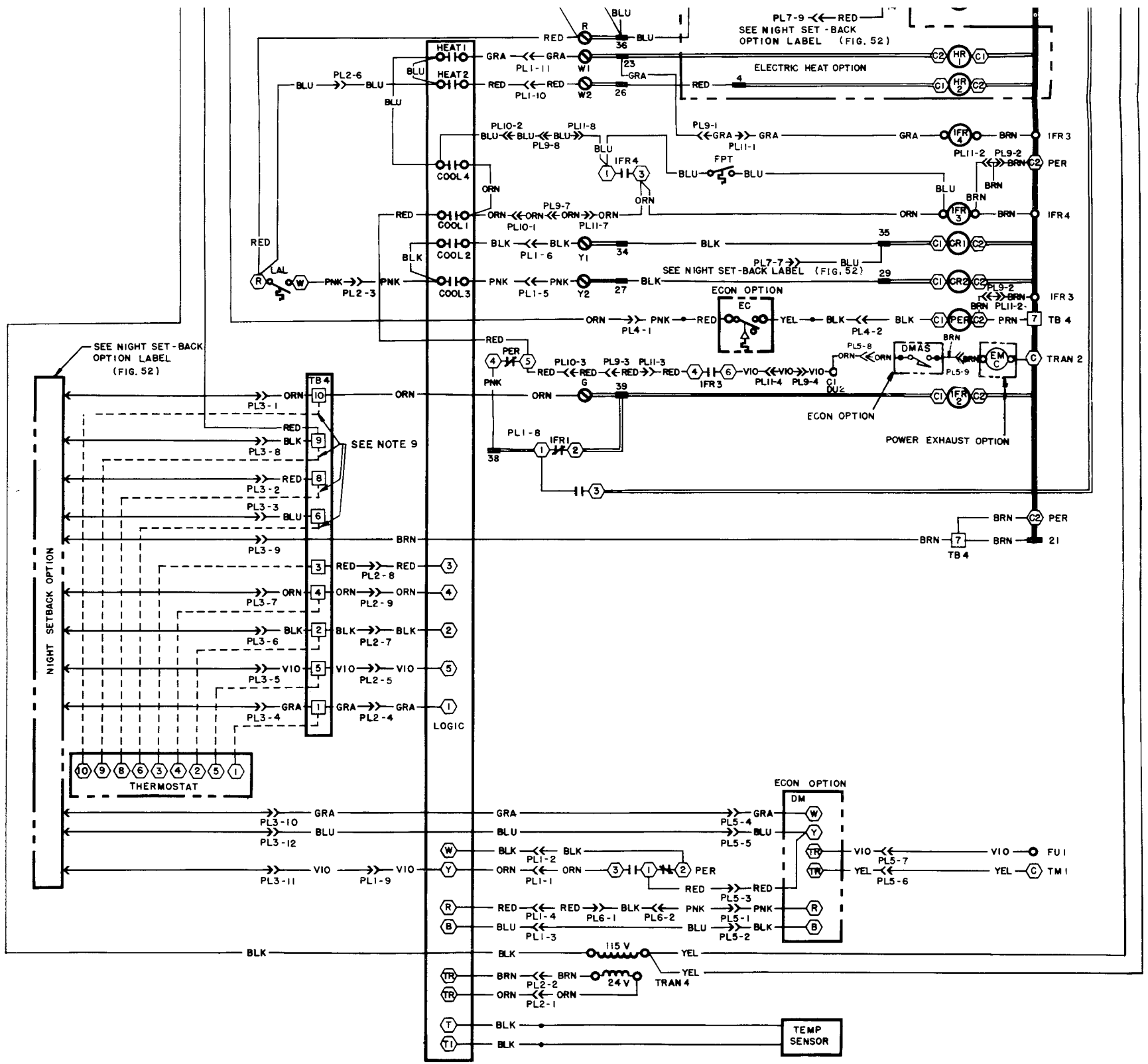


Fig. 47 — Control Wiring Schematic w/

Schematic w/2-Speed Fan; 50DF024; 460-3-60



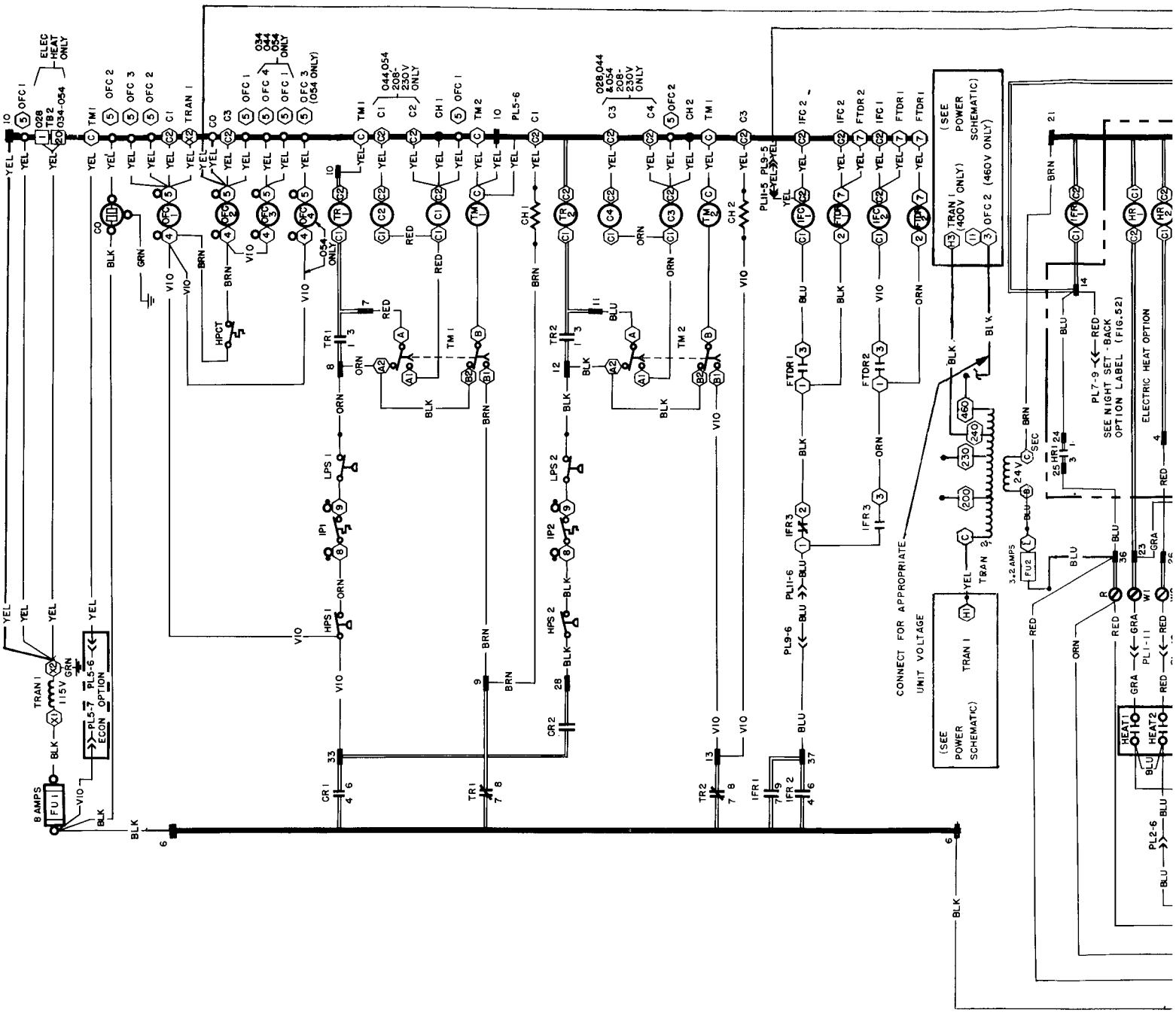
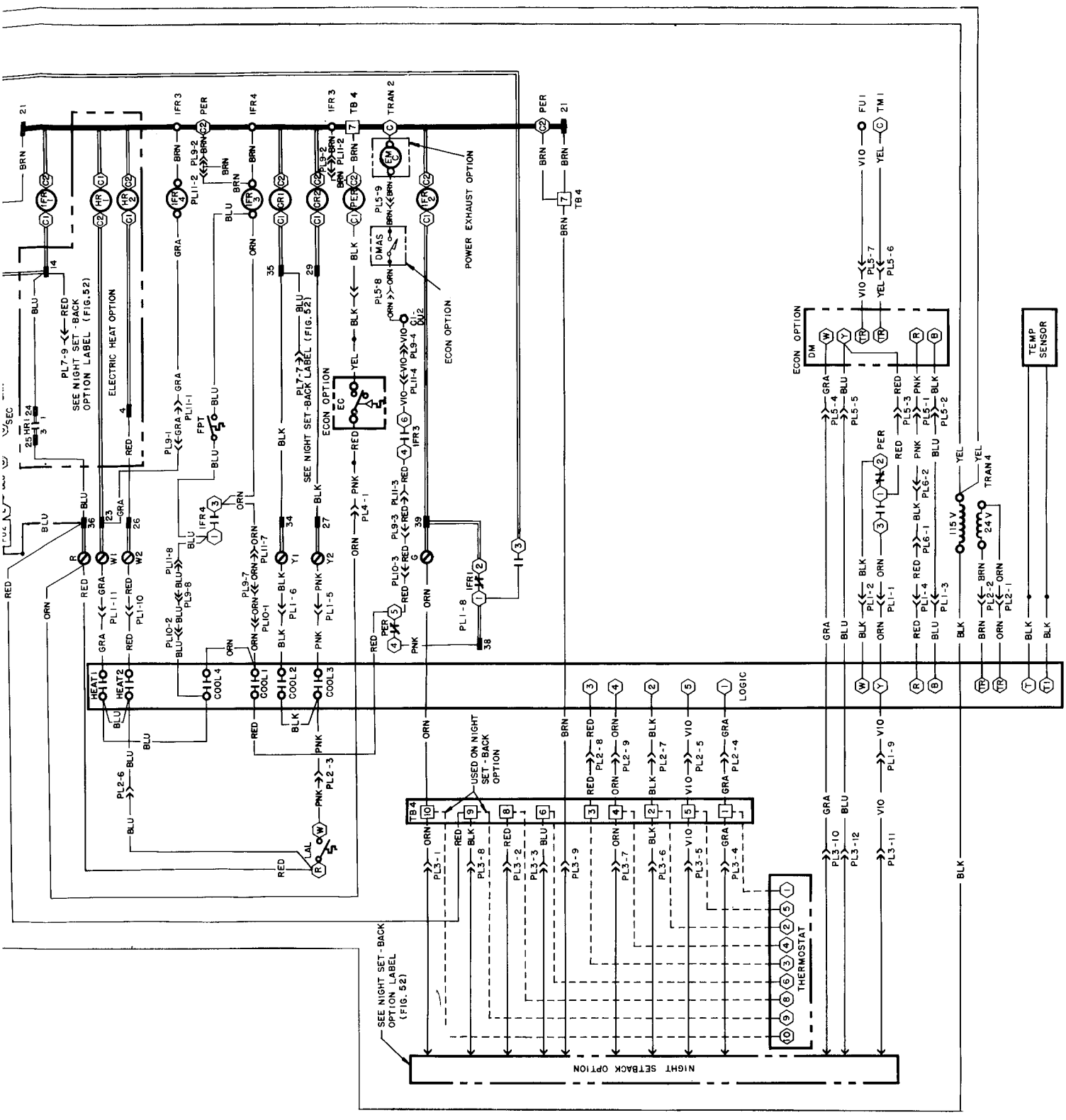
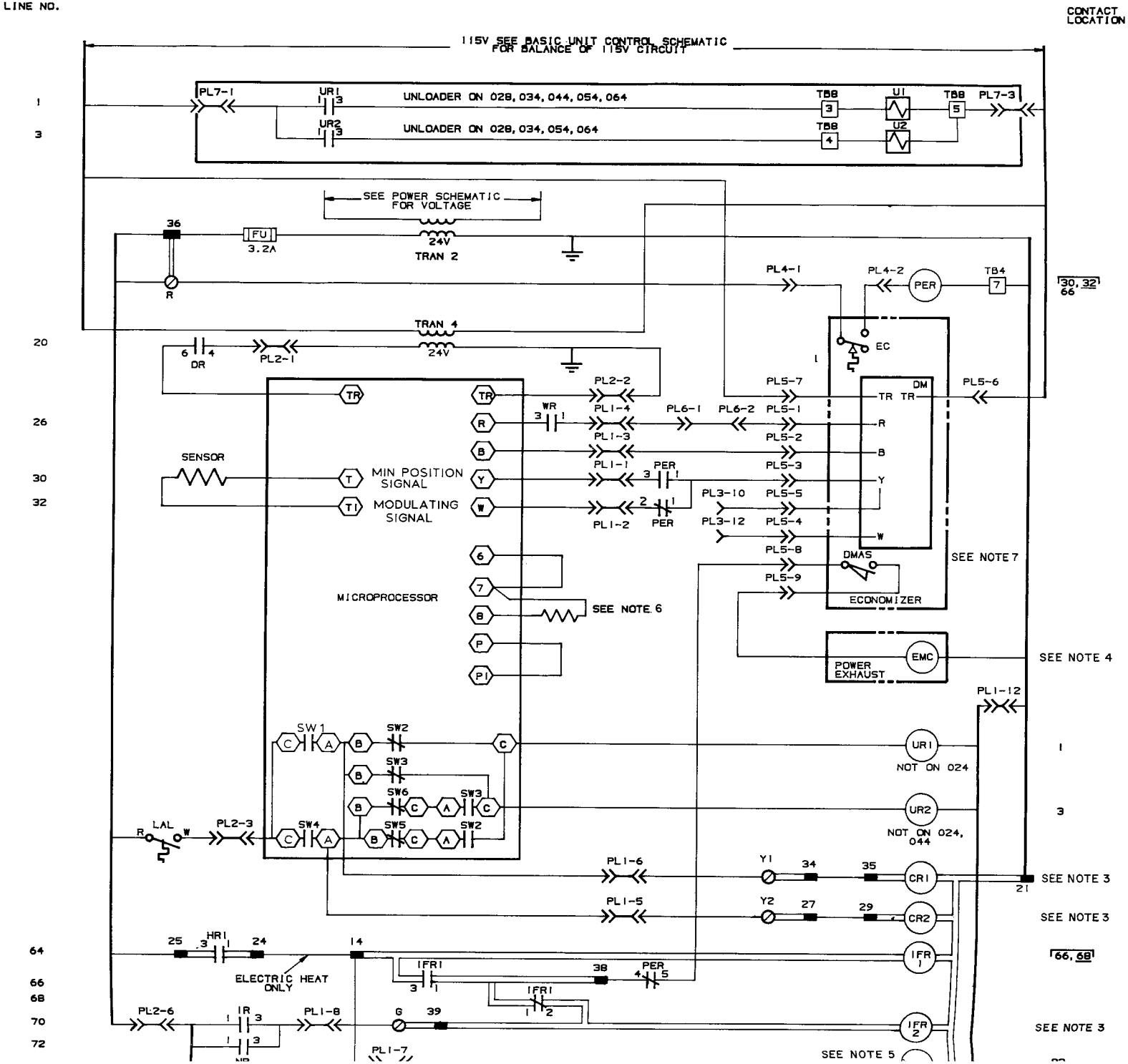
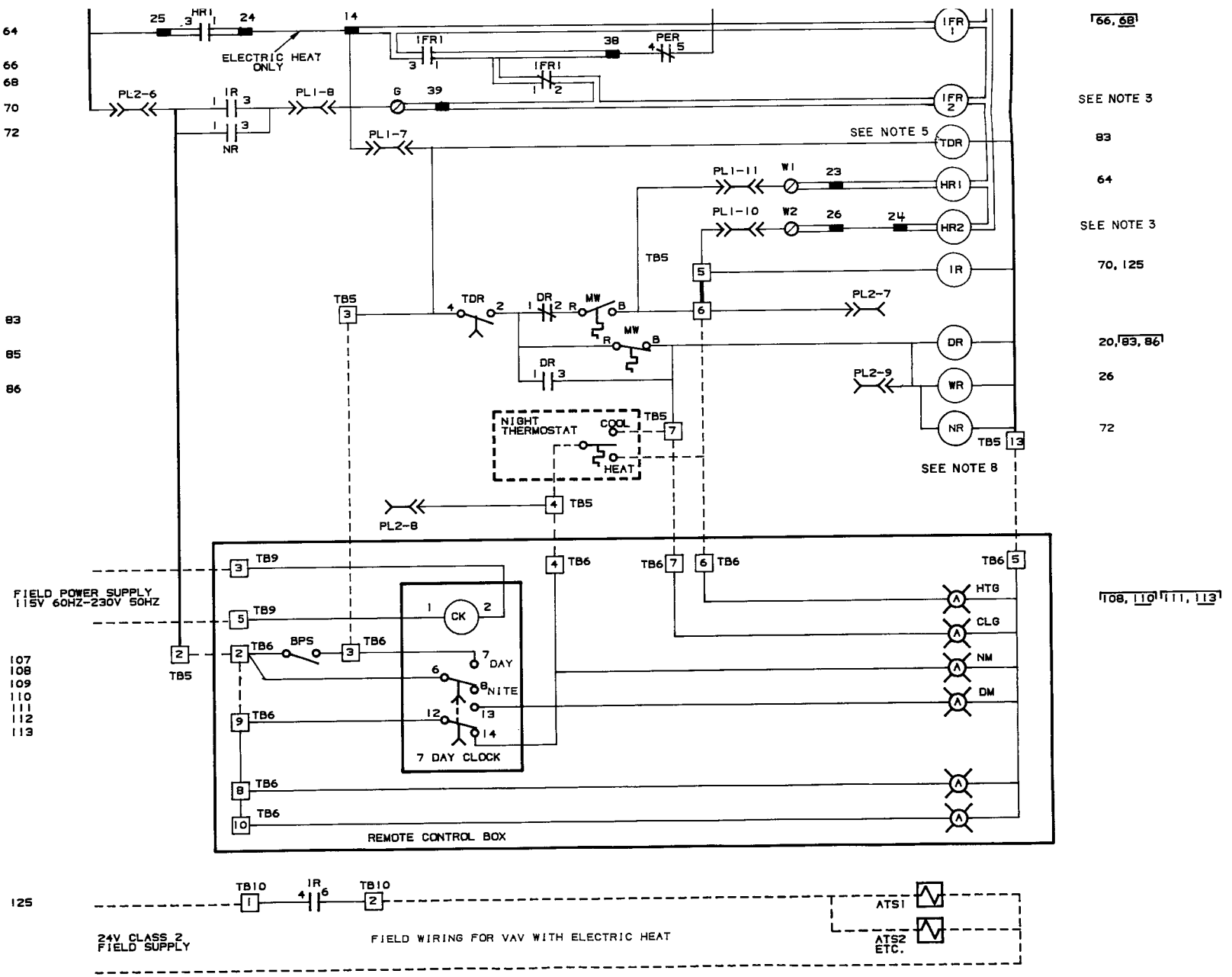


Fig. 48 — Control Wiring Schematic w/2-Speed Fan; 5
208/230, 460-3-6



2-Speed Fan; 50DF028,034 and 50DL044,054,064;
/230, 460-3-60

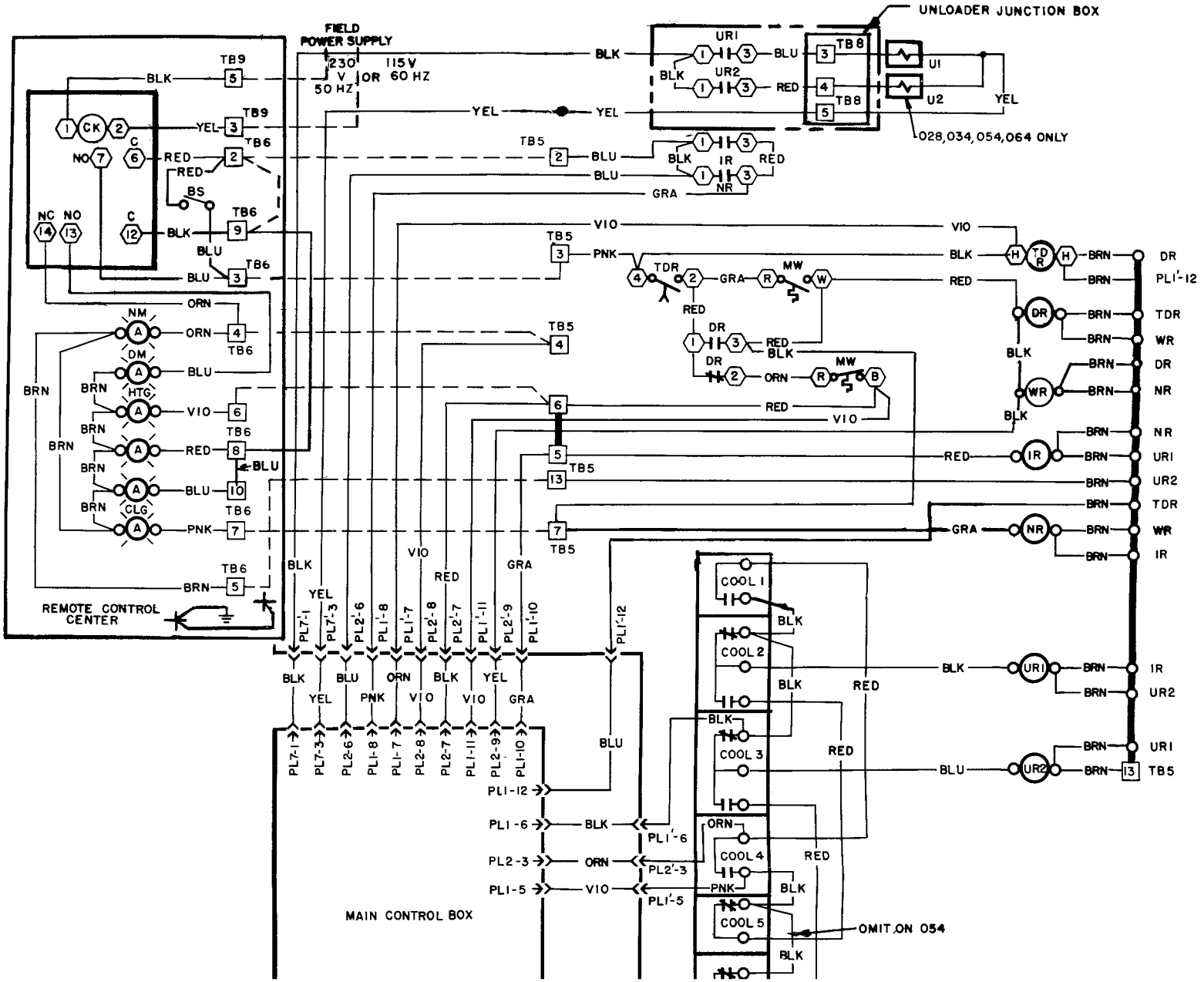

LINE NO.
CONTACT LOCATION
115V SEE BASIC UNIT CONTROL SCHEMATIC FOR BALANCE OF 115V CIRCUIT
PL7-1
UR1
UNLOADER ON 028, 034, 044, 054, 064
UR2
UNLOADER ON 028, 034, 054, 064
TB8
U1
U2
PL7-3
SEE POWER SCHEMATIC FOR VOLTAGE
36
FU
3.2A
24V
TRAN 2
R
PL4-1
PL4-2
PER
TB4
7
30, 32
66
TRAN 4
DR
PL2-1
EC
DM
PL5-7
PL5-6
TR
PL2-2
WR
PL1-4
PL6-1
PL6-2
PL5-1
PL1-3
PL5-2
B
SENSOR
T
MIN POSITION SIGNAL
Y
PL1-1
PL5-3
TI
MODULATING SIGNAL
W
PL3-10
PL5-5
PL1-2
PL3-12
PL5-4
PL5-8
DMAS
SEE NOTE 7
PL5-9
ECONOMIZER
6
7
8
SEE NOTE 6
MICROPROCESSOR
P
P1
POWER EXHAUST
EMC
SEE NOTE 4
PL1-12
SW1
SW2
SW3
SW6
SW4
SW5
LAL
PL2-3
URI
NOT ON 024
UR2
NOT ON 024, 044
PL1-6
Y1
34
35
CR1
SEE NOTE 3
21
PL1-5
Y2
27
29
CR2
SEE NOTE 3
25
HR1
24
14
IFR 1
66, 68
ELECTRIC HEAT ONLY
IFR1
38
PER
PL2-6
IR
PL1-8
G
39
IFR 2
SEE NOTE 3
PL1-7
SEE NOTE 5

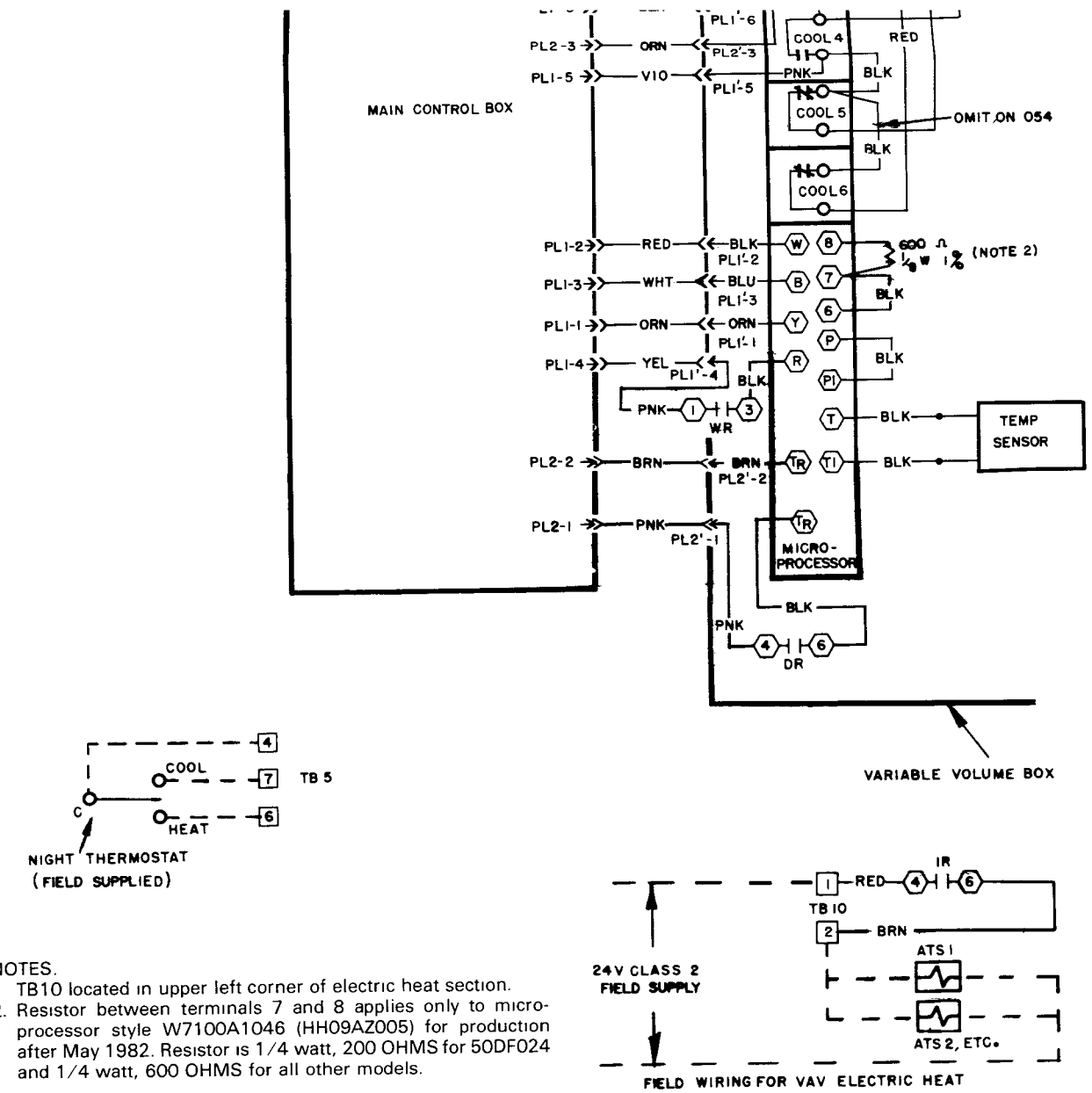


NOTES.

1. See page 3 for Legend.
2. Numbers indicate the line location of used contacts. A bracket over (2) numbers signifies a single pole double throw contact. An underlined number signifies a normally closed contact. Plain (no line) number signifies a normally open contact.
3. Contacts are in the 115-v schematic.
4. Contacts are in the power schematic.
5. TDR — 65 seconds on, 25 seconds off.
6. Resistor between terminals 7 and 8 applies only to microprocessor style W7100A1046 (HH09AZ005) for production after May 1982. Resistor is 1/4 watt, 200 OHMS for 50DF024 and 1/4 watt, 600 OHMS for all other models.
7. DMAS (Damper Motor Aux. Switch) was PETC for 50DF units built prior to December 1981
8. For units prior to April 1982, NR was wired to step 1 of microprocessor.

Fig. 49 — Label Diagram, Variable Air Volume, Integrated Wiring Schematic


UNLOADER JUNCTION BOX
FIELD POWER SUPPLY
230 V OR 115V 60 HZ
50 HZ
TB9
TB6
TB5
TB8
URI
UR2
IR
NR
U1
U2
028,034,054,064 ONLY
BS
NC NO C
NM
DM
HTG
CLG
REMOTE CONTROL CENTER
TDR
MW
DR
WR
COOL 1
COOL 2
COOL 3
COOL 4
COOL 5
OMIT ON 054
MAIN CONTROL BOX
BLK
YEL
RED
BLU
ORN
VIO
BRN
GRA
PNK



NOTES.
1. TB10 located in upper left corner of electric heat section.
2. Resistor between terminals 7 and 8 applies only to microprocessor style W7100A1046 (HH09AZ005) for production after May 1982. Resistor is 1/4 watt, 200 OHMS for 50DF024 and 1/4 watt, 600 OHMS for all other models.

Fig. 50 — Label Diagram, Variable Air Volume, Panel and Remote Box Schematic

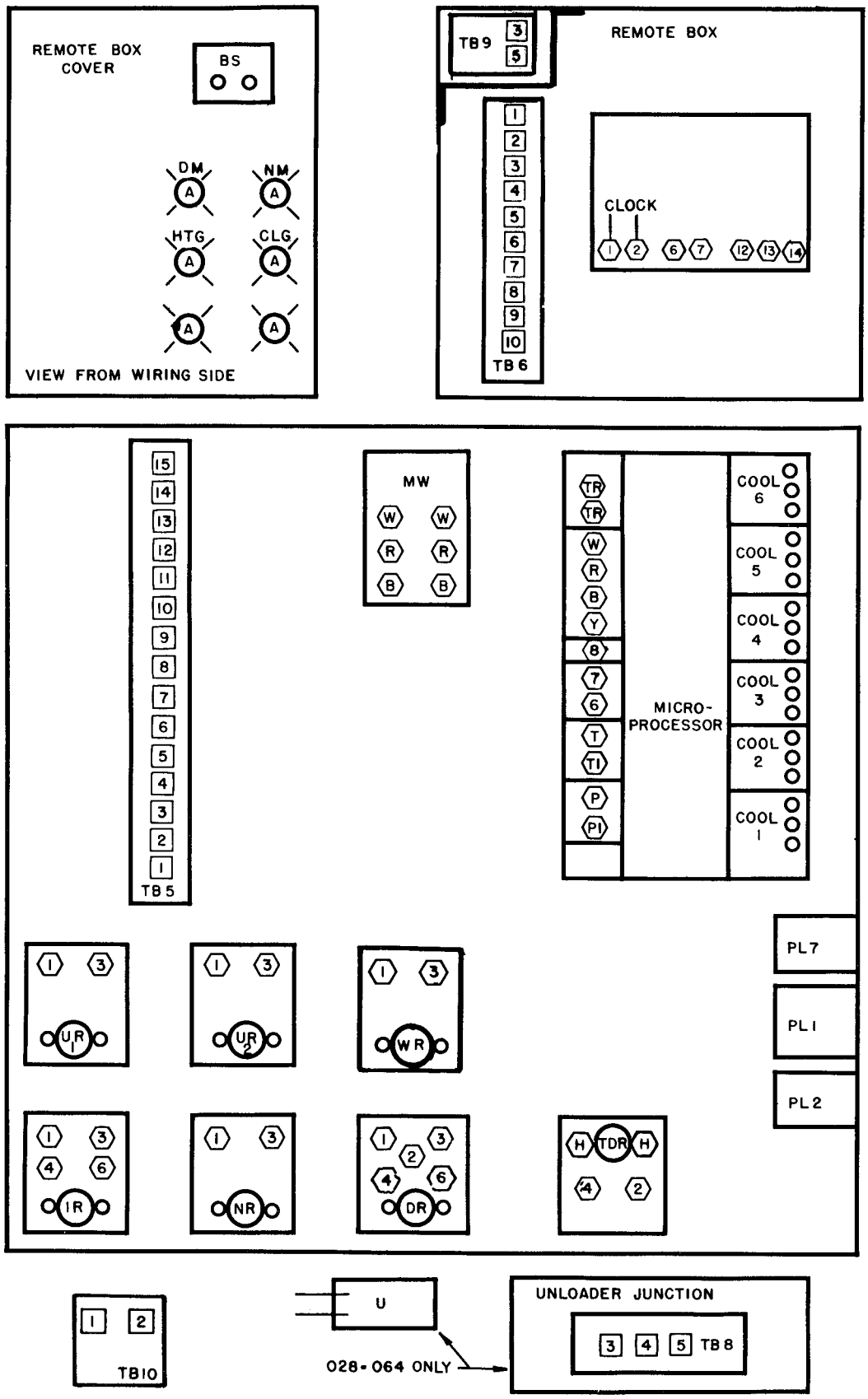


Fig. 51 — Label Diagram, Variable Air Volume, Component Arrangement

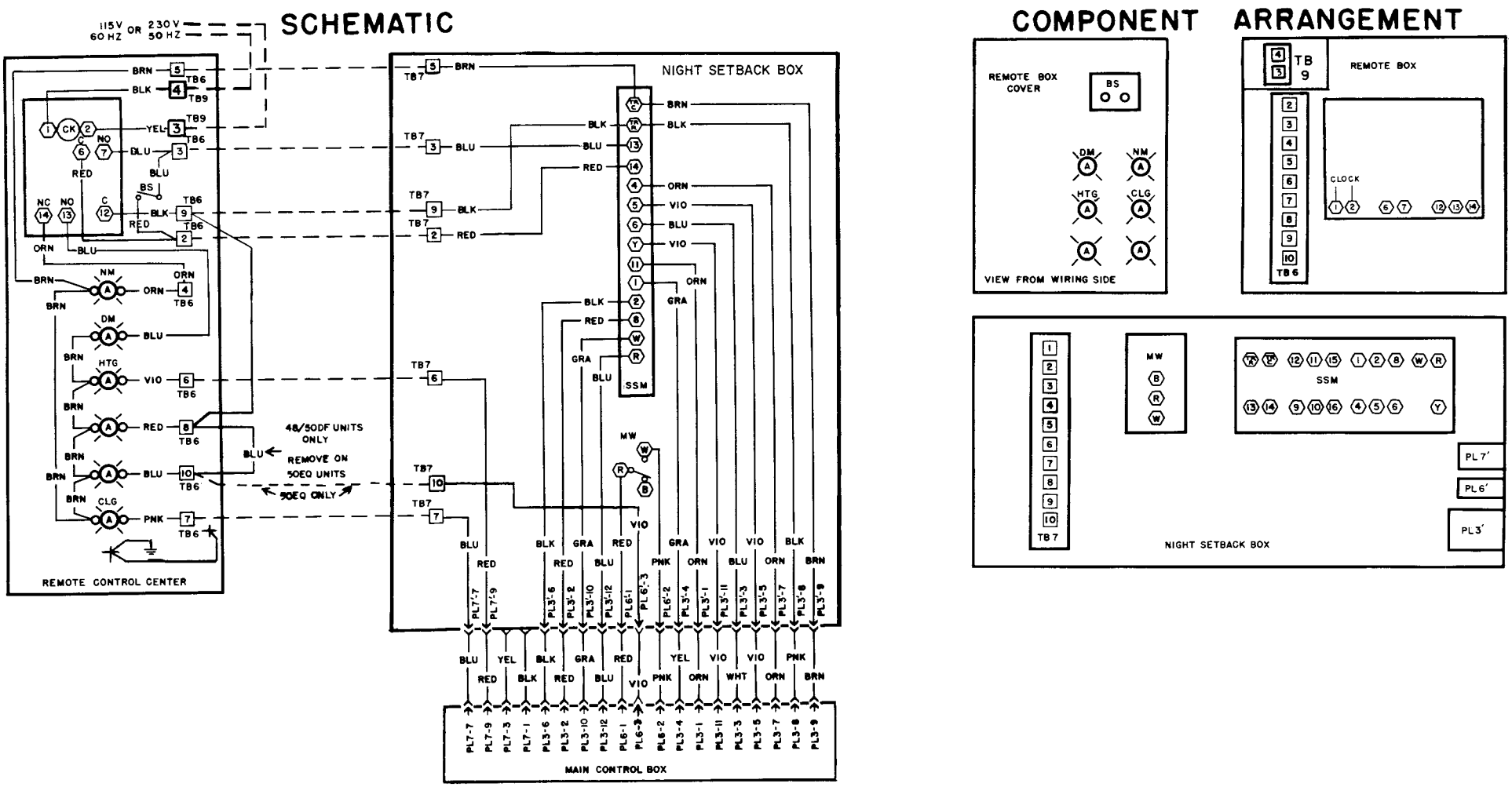


Fig. 52 — Label Diagram, Energy Management (Night Setback) Option

MOTORMASTER® CONTROL WIRING

Use the following data, plus Installation Instructions packaged with Model 32LT Motormaster solid-state head pressure control, to apply Motormaster to 50DF variable volume cooling units. Certain modifications must be made to the standard 50DF units:

1. **Outdoor Fan Motor**
   On 208/230- and 575-volt 50DF units, install special one-hp, 200-230-volt outdoor fan motor (Carrier Part No. HC52TE230) in place of factory-installed 50DF motor. On 460-volt 50DF units, install special one-hp, 460-volt outdoor fan motor (Carrier Part No. HC52VE460) in place of factory-installed 50DF motor. Wire fan motor for 230-volt (or 460-volt), one-phase, 60-Hz operation.
2. **Run Capacitors and Transformer**
   On 208/230- and 575-volt 50DF units, install a 30.0 MFD, 440-volt run capacitor (Carrier Part No. HC90BB030). The 575-volt 50DF units also require a 600-volt, 2.0 KVA transformer (Carrier Part No. HT01AH954). On 460-volt 50DF units, install a 12.5 MFD, 740-volt run capacitor (Carrier Part No. HC94HA012).
3. **Power Wiring** must be checked to ensure it is as specified and is in compliance with local and NEC code requirements. Wire Motormaster control in series with fan motor. Use the 200/230-volt Motormaster unit (Carrier Part No. 32LT900300) for the 208/230- and 575-voltage 50DF unit. Use the 460-volt Motormaster unit (Carrier Part No. 32LT900610) for the 460-volt 50DF unit.

   Figure 53 shows the Motormaster control wired into the condenser fan motor circuit for 208-230- and 460-volt, single- or 3-phase, 60-Hz power when no transformer is used. Figure 54 shows where the transformer is wired into the circuit of 575-volt, 3-phase, 60-Hz power when a 230-1-60 motor is used.

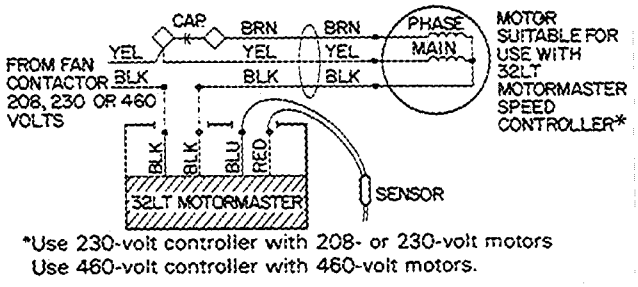


Fig. 53 — Power Wiring for 208-, 230- and 460-Volt Units

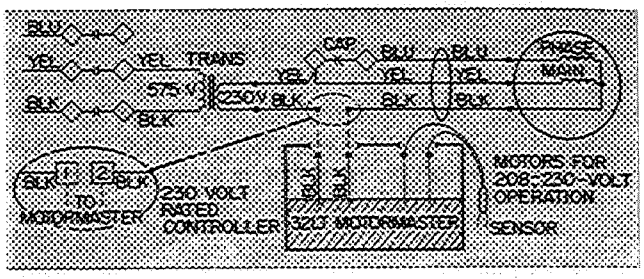


Fig. 54 — Power Wiring for 575-Volt Units Using 208-230-Volt Motors

4. **Winter Start Control** is required on all 50DF units. Jumper low-pressure switch to make it inactive. DO NOT RELOCATE. Install new liquid line low-pressure switch at liquid line service valve and reset it for 5 psig. (Low-pressure switch, Carrier Part No. HK02AB026, preset at 5 psig, is recommended.) When required by the application, install a defrost thermostat (Carrier Part No. 50BB900001 or HH22UA025) on evaporator coil to provide freeze-up protection lost by jumpering low-pressure switch. (See Fig. 55.)
5. **Locate Motormaster Control** as shown in Fig. 56, using the mounting template provided in the 32LT Installation Instructions.

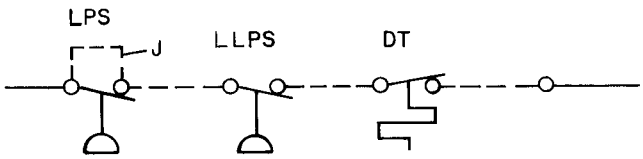


Fig. 55 — Defrost Thermostat with Jumper on Low-Pressure Switch and New Liquid Line Low-Pressure Switch Installed

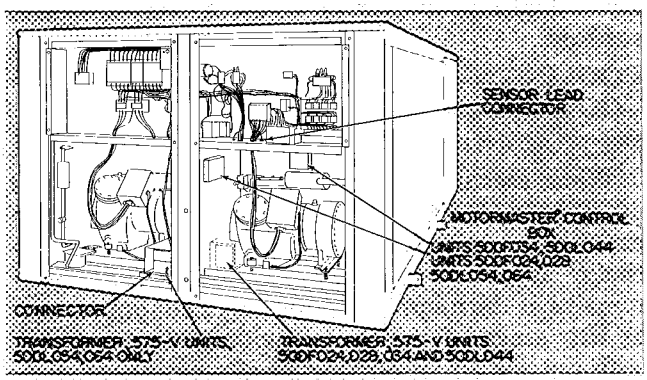


Fig. 56 — Motormaster Control Location

6. **Locate Motormaster® Control Sensor** as shown in Fig. 57. Route sensor wire from bottom of Motormaster control to bottom of control box, thru a connector in the bottom of the control box and across the partition to the specified sensor location. Connector is field supplied. If necessary, drill hole in control box for connector.

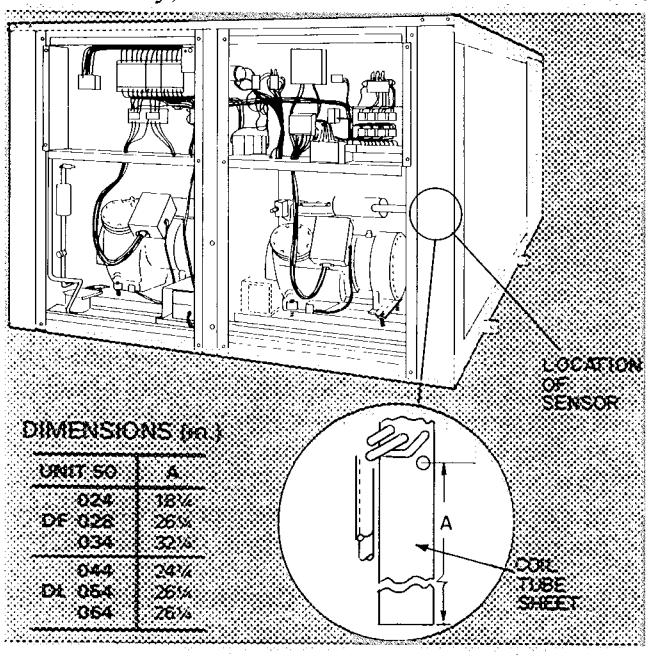
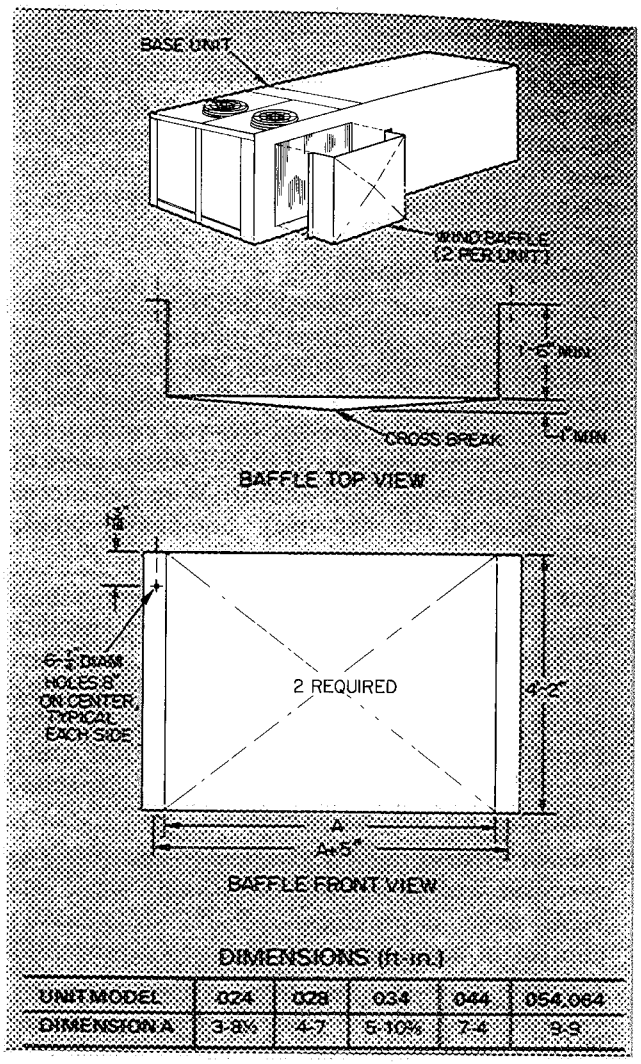


Fig. 57 — Motormaster Control Sensor Location

7. **Wind Baffle** is required for Motormaster control application to 50DF units to prevent wind cross-currents from causing abnormal operation as fan speed control is modulated. Construct baffle as shown in Fig. 58.



NOTE Two wind baffles are required on each unit

Fig. 58 — Wind Baffle

OPERATING SEQUENCE

With Economizer — (Without energy management Option/Accessory) using thermostat with subbase.

COOLING — System switch set at AUTO. or COOL, indoor air fan runs continually. Thermostat set at desired setting.

When thermostat calls for cooling and outdoor air enthalpy is below setting of enthalpy controller, economizer modulates open. (If outdoor air enthalpy is above enthalpy set point, economizer remains at the minimum position.) Economizer acts as first stage of cooling, providing "free cooling" with outside air. If outside air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling.

Compressor(s), working simultaneously with economizer, will be staged on to meet cooling load.

As conditioned space temperature approaches thermostat's cooling set point, stages cycle off, last stage first. After all stages of mechanical cooling are off, economizer modulates to minimum position.

During the cooling cycle, a discharge air sensor senses discharge air temperature. If discharge air temperature drops below 62 F, economizer starts to modulate toward the minimum position. At 50 F, economizer will be at the minimum position.

HEATING — System switch set at HEAT and AUTO., thermostat set at desired setting. When thermostat calls for heating, one or 2 stages of heat energize to satisfy the heating demand.

As space temperature approaches the heating temperature set point, heating stages cycle off.

During heating, economizer is limited to the minimum position to provide minimum outdoor air for ventilation requirements.

With Economizer and Energy Management Option/Accessory (Using electronic thermostat or transmitter) — Clock in remote control box switches controls to DAY (OCCUPIED) mode. Indoor air fan runs continually while in DAY (OCCUPIED) mode.

If return air temperature is below the adjustable setting of the morning warm-up thermostat, economizer remains closed.

When return air temperature goes above the setting of morning warm-up thermostat, economizer goes to adjustable minimum position.

When thermostat calls for cooling and outdoor air enthalpy is below setting of enthalpy controller, economizer modulates open. (If outdoor air enthalpy is above enthalpy set point, economizer remains at minimum position.) The economizer acts as first stage of cooling, providing "free cooling" with outside air. If outside air alone cannot satisfy cooling requirements of conditioned space, economizer cooling is integrated with mechanical cooling.

Compressor(s), working simultaneously with economizer, will be staged on to meet cooling load.

As conditioned space temperature approaches the thermostat's cooling set point, stages cycle off, last stage first. After all stages of mechanical cooling are off, economizer modulates to minimum position.

During cooling cycle, a discharge air sensor senses discharge air temperature. If discharge air temperature drops below 62 F, economizer starts to modulate toward minimum position. At 50 F, economizer will be at minimum position.

At end of the DAY (OCCUPIED) mode on the clock, unit controls enter NIGHT (UNOCCUPIED) mode. Economizer closes. Indoor air fan runs only on a call for heating or cooling. The temperature controls go into a HEATING SETBACK, COOLING SETUP or COOLING SHUTDOWN mode.

The HEATING SETBACK is field selectable at the unit for 5, 8, 12 or 15 degrees below set point on the room thermostat.

The COOLING SETUP is field selectable at unit for 5, 8, or 12 degrees above the set point on the room thermostat.

During the UNOCCUPIED mode, unit continues to use economizer cooling first and then, integrates economizer cooling with mechanical cooling to meet cooling requirements.

A 5-hour manual bypass timer is located in the remote control box to provide for times when air conditioning is needed during normally unoccupied hours.

Two-Speed Indoor Fan Option — The 2-speed indoor fan staging sequence is based upon room demand. As the conditioned space requires cooling, this cooling demand is transmitted from the room thermostat to the logic panel. Up to 4 stages of cooling can be sequenced on to meet the demand from the conditioned space.

As shown in the 2-speed indoor fan staging tables, the high fan speed is used only if and when needed.

When outdoor air enthalpy permits economizer operation, the indoor fan runs at high speed only when necessary to take maximum advantage of outside air to provide cooling. Low speed is used when modulating economizer can handle the cooling load.

When outdoor air enthalpy does not permit economizer operation, the economizer dampers remain at minimum position and the indoor fan motor runs at high speed only when cooling is at its highest demand.

During HEATING mode, the fans operate at low speed for ventilation only, and at high speed at all times during active heating.

Two-Speed Indoor Air Fan Staging Economizer Cooling (Enthalpy Permitting)

OPERATING CONDITION	FAN SPEED	ECONOMIZER DAMPER POSITION	COMPRESSOR OPERATION
No Call for Cooling (Ventilation Air)	Low	Min Position	Off
Step 1 (Call for Minimum Cooling)	Low	Modulating Between Min and Full Open	Off
Step 2 (Economizer Cooling)	High	Full Open	Off
Step 3 (Integrated Econ / Mech Cooling)	High	Full Open	Compr 1
Step 4 (Integrated Econ / Mech Cooling)	High	Full Open	Compr 1 and 2

Mechanical Cooling (Enthalpy Not Permitting Economizer Cooling)

OPERATING CONDITION	FAN SPEED	ECONOMIZER DAMPER POSITION	COMPRESSOR OPERATION
No Call for Cooling (Ventilation Air)	Low	Min Position	Off
Step 1	Low	Min Position	Off
Step 2	Low	Min Position	Compr 1
Step 3	Low	Min Position	Compr 1 and 2
Step 4	High	Min Position	Compr 1 and 2

Book	1
Tab	1b

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