Number One Air Conditioning Maker

Carrier

Division of Carrier Corporation

Carrier Parkway • Syracuse N Y 13221

Installation, Start-Up and Service Instructions

50DL
044,054,064

Single-Package Cooling Units

(Including Variable Volume Option)
50 Hz

These instructions contain information for 50-Hz units and are to be used in addition to the accompanying 60-Hz Installation, Start-Up and Service Instructions shipped with the unit.

Unit Operation — Start-up and operating sequence is similar to 60-Hz units except that timer circuit delays start of compressor for 7-1/2 minutes after cooling thermostat closes. See timer sequence charts.

Table 1 — Indoor Air Fan Pulley Data; English

UNIT 50DL	FAN RPM*	MOTOR PULLEY	FAN PULLEY	SINGLE-SPEED BELT	TWO-SPEED BELT
		No. Grooves — Type-In		NO.-SIZE	NO.-SIZE
044	768	4 - 3V - 5.6	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	823	3 - 3V - 6.0	3 - 3V - 10.6	3 - 3V - 750	3 - 3V - 770
	862	4 - 3V - 5.3	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	907	4 - 3V - 5.0	4 - 3V - 8.0	4 - 3V - 710	4 - 3V - 710
	962	5 - 3V - 6.3	5 - 3V - 10.6	5 - 3V - 750	5 - 3V - 770
	1017	4 - 3V - 5.0	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 710
	1079	4 - 3V - 6.0	4 - 3V - 8.0	4 - 3V - 710	4 - 3V - 710
054	768	4 - 3V - 5.6	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 750
	823	4 - 3V - 6.0	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	862	5 - 3V - 4.75	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 710
	891	4 - 3V - 6.5	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	907	5 - 3V - 5.0	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	962	5 - 3V - 5.3	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1017	5 - 3V - 5.6	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1079	5 - 3V - 6.0	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1204	5 - 3V - 6.7	5 - 3V - 8.0	5 - 3V - 710	—
064	768	4 - 3V - 5.6	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 750
	823	4 - 3V - 6.0	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	862	5 - 3V - 4.75	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 710
	891	4 - 3V - 6.5	4 - 3V - 10.6	4 - 3V - 750	4 - 3V - 770
	907	5 - 3V - 5.0	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	962	5 - 3V - 5.3	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1017	5 - 3V - 5.6	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1079	5 - 3V - 6.0	5 - 3V - 8.0	5 - 3V - 710	5 - 3V - 720
	1204	5 - 3V - 6.7	5 - 3V - 8.0	5 - 3V - 710	—

Shaded values indicate standard or optional pulley combinations available as shown in Physical Data table all other combinations are field supplied

*See Physical Data table for 2-speed rpms
†Three belts are required; 4 may be used if desired

Table 2 — Indoor Air Fan Pulley Data; SI Metric

UNIT 50DL	FAN RPS	MOTOR PULLEY	FAN PULLEY	SINGLE-SPEED BELT	TWO-SPEED BELT
		No. Grooves —Type-mm		NO -SIZE	NO.-SIZE
044	12.80	4 - 3V - 142	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	13.71	3 - 3V - 152	3 - 3V - 269	3 - 3V - 750	3 - 3V - 770
	14.36	4 - 3V - 132	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	15.12	4 - 3V - 127	4 - 3V - 203	4 - 3V - 710	4 - 3V - 710
	16.03	5 - 3V - 160	5 - 3V - 269	5 - 3V - 750	5 - 3V - 770
	16.95	4 - 3V - 106	5 - 3V - 203	5 - 3V - 710	5 - 3V - 710
	17.98	4 - 3V - 152	4 - 3V - 203	4 - 3V - 710	4 - 3V - 710
054	12.80	4 - 3V - 142	4 - 3V - 269	4 - 3V - 750	4 - 3V - 750
	13.71	4 - 3V - 152	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	14.36	5 - 3V - 121	5 - 3V - 203	5 - 3V - 710	5 - 3V - 710
	14.85	4 - 3V - 165	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	15.12	5 - 3V - 127	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	16.03	5 - 3V - 135	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	16.95	5 - 3V - 142	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	17.98	5 - 3V - 152	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	20.07	5 - 3V - 171	5 - 3V - 203	5 - 3V - 710	—
064	12.80	4 - 3V - 142	4 - 3V - 269	4 - 3V - 750	4 - 3V - 750
	13.71	4 - 3V - 152	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	14.36	5 - 3V - 121	5 - 3V - 203	5 - 3V - 710	5 - 3V - 710
	14.85	4 - 3V - 165	4 - 3V - 269	4 - 3V - 750	4 - 3V - 770
	15.12	5 - 3V - 127	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	16.03	5 - 3V - 135	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	16.95	5 - 3V - 142	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	17.98	5 - 3V - 152	5 - 3V - 203	5 - 3V - 710	5 - 3V - 720
	20.07	5 - 3V - 171	5 - 3V - 203	5 - 3V - 710	—

Shaded values indicate standard or optional pulley combinations available as shown in Physical Data table All other combinations are field supplied

*See Physical Data table for 2-speed RPS
†Three belts are required, 4 may be used if desired

Table 3 — Physical Data (English)

UNIT 50DL		044	054	064
OPERATING WEIGHT	lb			
Base Unit		5406	6100	6485
Economizer		225	250	250
Roof Curb		200	225	225
REFRIGERANT R22		Controlled by Thermostatic Expansion Valve		
Operating Charge	lb			
System 1		37 0	53 0	81 0
System 2		37 0	42 0	81.0
COMPRESSORS		Serviceable, Hermetic		
Number .Type		2 06E	2 . 06E	2 06E
Number Cylinders (each)		4	4/6	6
Motor Speed	rpm	1450	1450	1450
Capacity Steps (standard constant volume)	%	50/100	60/100	50/100
with Accessory Unloaders	%	25/50/100	20/40/60/100	16/33/50/67/83/100
Capacity Steps (variable volume) with Electric Unloaders	%	25/50/75/100	20/40/60/80/100	16/33/50/67/83/100
CONDENSER FANS		Propeller, Direct Drive		
Number...Diameter	in	3. .30	4. 30	4. .30
Total Air Quantity	cfm	17 500	23 400	25 800
Motor Power (ea)	hp	1	1	1
Motor Speed	rpm	875	875	959
CONDENSER COIL				
Number of Rows	3	3	3	4
Fin Spacing	fins/in.	15 8	15 8	15.8
Total Face Area	ft²	61 0	81.5	81.25
EVAPORATOR FANS		Belt Drive, Centrifugal Type		
Qty . Size (diam x width)	in.	4 .15 x 9	4 15 x 11	4 15 x 11
Maximum Speed	rpm	1300	1450	1450
Fan Shaft Diameter		1 11/16	1 11/16	1 11/16
STANDARD MOTOR AND DRIVE*				
Motor Power	hp	15	20	25
Motor Speed	rpm			
Single-Speed		1450	1450	1450
Two-Speed		1450/970	1450/970	1450/970
Motor Shaft Diameter	in			
Single-Speed		1 5/8	1 5/8	1 7/8
Two-Speed		1 7/8	1 7/8	1 7/8
Motor Frame Size				
Single-Speed		254T	256T	284T
Two-Speed		284T	286T	286T
Pulley Pitch Diameter	in			
Fan Pulley		10 6	10 6	8 0
Motor Pulley A		6 5	6 5	5 6
Motor Pulley B		5 6	6 0	6 0
Fan Speed	rpm			
Single-Speed Motor				
with Motor Pulley A		891	891	1017
with Motor Pulley B		768	823	1089
Two-Speed Motor				
with Motor Pulley A		891/594	891/594	1017/678
with Motor Pulley B		768/512	823/549	1089/725
ALTERNATE MOTOR AND DRIVE*				
Motor Power	hp	20	25†	30†
Motor Speed	rpm			
Single-Speed		1450	1450	1450
Two-Speed		1450/970	1450/970	1450/970
Motor Shaft Diameter	in			
Single-Speed		1 5/8	1 7/8	1 7/8
Two-Speed		1 7/8	1 7/8	—
Motor Frame Size				
Single-Speed		256T	284T	286T
Two-Speed		286T	286T	—
Pulley Pitch Diameter	in.			
Fan Pulley		8 0	8 0	6 0
Motor Pulley A		5 3	5 3	5.0
Motor Pulley B		5 6	5 6	‡
Fan Speed	rpm			
Single-Speed				
with Motor Pulley A		962	962	1204
with Motor Pulley B		1017	1017	‡
Two-Speed Motor				
with Motor Pulley A		962/641	962/641	1204/803
with Motor Pulley B		1017/678	1017/678	‡
EXHAUST FAN MOTOR				
Number...Motor Power	hp	2...3	2...3	2...3
EVAPORATOR COIL				
Number of Rows		4	4	4
Fin Spacing	fins/in.	15	15	13 9
Total Face Area	ft²	30 2	35 4	35.4
ELECTRIC RESISTANCE HEATERS		Open Nichrome Wire Elements with Multiple-Stage Control		
Heat/Cool Ratios (approx)		0.5:1, 0.75:1		
INDOOR AIR FILTERS				
Number . Size	in			
Standard 2" (throwaway)		27 16x25	9 20x25 21 16x25	9 20x25 21 16x25
Bag Type 12" (optional)		6 12x24 6 24x24	7 12x24 7 24x24	7 12x24 7 24x24

*Standard fan motor supplied with standard fan drive pulleys and belts; alternate fan motor supplied with alternate fan drive pulleys and belts Pulley A is installed in unit; pulley B is shipped with unit.

†Due to large frame size, the 25 hp, 208-230 volt and 30 hp motors are available in single-speed only

‡The 50DL064 alternate drive is supplied with pulley A installed in unit Pulley B is not supplied

Table 4 — Physical Data (SI Metric)

UNIT 50DL		044	054	064
OPERATING WEIGHT	kg			
Base Unit		2452	2767	2942
Economizer		102	113	113
Roof Curb		91	102	102
REFRIGERANT R22				
Operating Charge	kg			
System 1		16 8	24 0	36 7
System 2		16 8	19 0	36 7
COMPRESSORS				
Number...Type		2 06E	2 . 06E	2 06E
Number Cylinders (each)		4	4/6	6
Motor Speed	r/s	24.2	24.2	24.2
Capacity Steps (standard constant volume)	%	50/100	60/100	50/100
with Accessory Unloaders	%	25/50/100	20/40/60/100	16/33/50/67/83/100
Capacity Steps (variable volume) with Electric Unloaders		25/50/75/100	20/40/60/80/100	16/33/50/67/83/100
CONDENSER FANS				
Number...Diameter	mm	3. .762	4 . 762	4.. 762
Total Air Quantity	L/s	8258	11 042	12 174
Motor Power (ea)	kW	0 75	0 75	0.75
Motor Speed	r/s	14 6	14 6	15 7
CONDENSER COIL				
Number of Rows		3	3	4
Fin Spacing	fins/m	622	622	622
Total Face Area	m^2	5 66	7 57	7 53
EVAPORATOR FANS		Belt Drive, Centrifugal Type		
Qty . Size (diam x width)	mm	4 381 x 229	4 381 x 279	4 381 x 279
Maximum Speed	r/s	21 6	21 6	24 2
Fan Shaft Diameter	mm	42 8	42 8	42 8
STANDARD MOTOR AND DRIVE				
Motor Power	kW	11 20	15 0	18 6
Motor Speed	r/s			
Single-Speed		24 2	24 2	24.2
Two-Speed		24 2/16 2	24 2/16 2	24 2/16 2
Motor Shaft Diameter	mm			
Single-Speed		41 3	41 3	47 6
Two-Speed		47 6	47 6	47 6
Motor Frame Size				
Single-Speed		254T	256T	284T
Two-Speed		284T	286T	286T
Pulley Pitch Diameter	mm			
Fan Pulley		269	269	203
Motor Pulley A		165	165	142
Motor Pulley B		142	152	152
Fan Speed	r/s			
Single-Speed Motor		14 9	14 9	17 0
with Motor Pulley A		12 8	13 7	18 2
with Motor Pulley B				
Two-Speed Motor				
with Motor Pulley A		14 9/10 0	14 9/10 0	16 9/11 3
with Motor Pulley B		12 8/ 8 5	13 7/ 9 2	18 2/12 1
ALTERNATE MOTOR AND DRIVE				
Motor Power	kW	15 0	18 6	22 3
Motor Speed	r/s	24 2	24 2	24 2
Single-Speed				
Two-Speed		24 2/16 7	24 2/16 7	24 2/16 7
Motor Shaft Diameter	mm			
Single-Speed		41 3	47 6	47 6
Two-Speed		47 6	47 6	—
Motor Frame Size				
Single-Speed		256T	284T	286T
Two-Speed		286T	286T	—
Pulley Pitch Diameter	mm			
Fan Pulley		203	203	152
Motor Pulley A		135	135	127
Motor Pulley B		142	142	‡
Fan Speed				
Single-Speed	r/s			
with Motor Pulley A		16 0	16 0	20 1
with Motor Pulley B		17 0	17 0	‡
Two-Speed Motor	r/s			
with Motor Pulley A		16 0/10 7	16 0/10 7	20 1/13 4
with Motor Pulley B		17 0/11 3	17 0/11 3	‡
EXHAUST FAN MOTOR				
Number. .Motor Power	kW	2 2 2	2 2 2	2 2 2
EVAPORATOR COIL				
Number of Rows		4	4	4
Fin Spacing	fins/m	590	590	547
Total Face Area	m^2	2 80	3 29	3 29
ELECTRIC RESISTANCE HEATERS		Open Nichrome Wire Elements with Multiple-Stage Control		
Heat/Cool Ratios (approx)		0 5:1, 0 75:1		
DISCHARGE AIR FILTERS				
Number. .Size	in.			
Standard 2" (throwaway)		27 16x25	9 20x25	9 20x25
			21 16x25	21 16x25
Bag Type 12" (optional)		6 12x24	7 12x24	7 12x24
		6 24x24	7 24x24	7 24x24

*Standard fan motor supplied with standard fan drive pulleys and belts; alternate fan motor supplied with alternate fan drive pulleys and belts Pulley A is installed in unit; Pulley B is shipped with unit.

†Due to large frame size, the 25 hp, 208-230 volt and 30 hp motors are available in single-speed only

‡The 50DL064 alternate drive is supplied with pulley A installed in unit Pulley B is not supplied

Table 5 — Electrical Data

UNIT MODEL NOMINAL V-PH-HZ	VOLTAGE RANGE		COMPR NO. 1		COMPR NO. 2		OUTDOOR FAN MOTORS	INDOOR FAN MOTOR			EXHAUST FAN MOTOR	HEATERS (1)		POWER SUPPLY	
	Min	Max	RLA	LRA	RLA	LRA		kW	hp	FLA	FLA	kW	FLA	MCA	MOCP†
50DL044 400-3-50	342	440	37 0	173	37 0	173	Total of three: OFM1* 230-1-50 5 5 FLA OFM2&3 400-3-50 2.1 FLA	11 2	15	21	—	—	—	114	150
								11 2	15	21	4 8	—	—	124	150
								14 9	20	27	—	—	—	120	150
								11 2	15	21	—	42	63	114	150
								11 2	15	21	—	56	84	132	150
								14 9	20	27	4 8	—	—	130	150
								11 2	15	21	4 8	42	63	124	150
								11 2	15	21	4 8	56	84	132	150
								14 9	20	27	—	42	63	120	150
								14 9	20	27	—	56	84	139	175
								14 9	20	27	4 8	42	63	130	150
								14 9	20	27	4 8	56	84	139	175
50DL054 400-3-50	342	440	53 0	253	36 0	173	Total of four: OFM1* 230-1-50 5 5 FLA OFM2,3,4 400-3-50 2 1 FLA	14.9	20	27	—	—	—	142	175
								14 9	20	27	4 8	—	—	151	200
								18 6	25	34	—	—	—	149	200
								14 9	20	27	—	55	84	142	175
								14 9	20	27	—	70	105	165	200
								18 6	25	34	4 8	—	—	158	200
								14 9	20	27	4 8	55	84	151	200
								14 9	20	27	4 8	70	105	165	200
								18 6	25	34	—	55	84	149	200
								18 6	25	34	—	70	105	174	225
								18 6	25	34	4 8	55	84	158	200
								18 6	25	34	4 8	70	105	174	225
50DL064 400-3-50	342	440	53 0	253	53 0	253	Total of four: OFM1,2,3,4 400-3-50 3 0 FLA	18 6	25	34	—	—	—	166	200
								18 6	25	34	4 8	—	—	175	200
								22 3	30	40	—	—	—	172	200
								18 6	25	34	—	55	84	166	200
								18 6	25	34	—	70	105	174	225
								22 3	30	40	4 8	—	—	181	200
								18 6	25	34	4 8	55	84	175	200
								18 6	25	34	4 8	70	105	175	225
								22 3	30	40	—	55	84	172	225
								22 3	30	40	—	70	105	182	250
								22 3	30	40	4 8	55	84	181	225
								22 3	30	40	4 8	70	105	182	250

FLA — Full load amps
hp — Nominal horsepower
kW — Kilowatts
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
OFM — Outdoor Fan Motor
RLA — Rated Load Amps

NOTES:
(1) All heaters are 3-phase assemblies

*Suitable for field-installed Motormaster accessory
†Fuse only

Table 6 — Circuit Breaker Must Trip Amps

UNIT MODEL	COMPR		INDOOR FAN MOTOR				CONTROL CIRCUIT BREAKER
	No. 1	No. 2	Hp	Single Speed	2-Speed		
					IFCB1	IFCB2	
50DL044	50	50	15.0 20.0	27 36	27 36	16.1 21.0	27
50DL054	71	50	20.0 25 0	36 45	36 45	21 0 23.8	31
50DL064	71	71	25 0 30 0	45 56	45 —	23 8 —	31

IFCB — Indoor Fan Circuit Breaker

*Indoor fan motor is protected by control circuit breaker See label diagram

INDEX

Base Unit Wiring Diagrams

MODEL 50DL	VOLTS-PH-HZ	LABEL DIAGRAMS							
		Control Wiring				Power Wiring	Fig.	Component Arrangement	Fig.
		Single Speed Fan	Fig.	2-Speed Fan	Fig.				
044	400-3-50	50DD507684	4	50DD507694	5	50DD507784	1	50DD507784	8
054	400-3-50	50DD507684	4	50DD507694	5	50DD507804	2	50DD507804	9
064	400-3-50	50DD507864	6	50DD507874	7	50DD507854	3	50DD507854	10

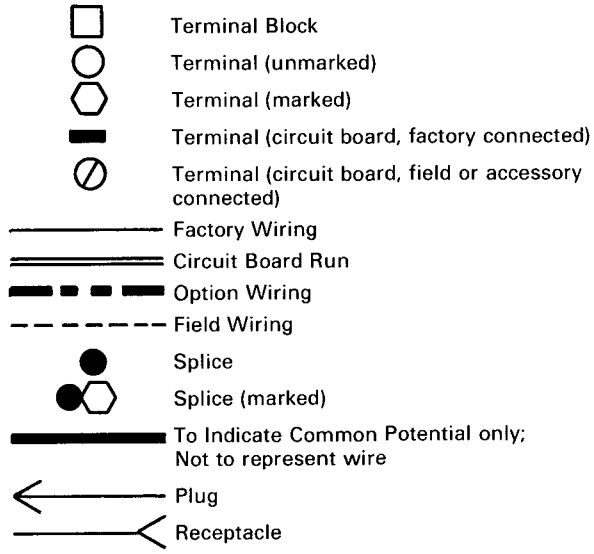
Optional Electric Heater Wiring Diagrams

BASE UNIT	HEATER KW	V-PH-HZ	LABEL DIAGRAM NO.	FIG.
50DL044	42 (Low) 56 (Med)	400-3-50	50DD508234 50DD508224	11 and 12 13 and 14
50DL054/064	55 (Low) 70 (Med)	400-3-50	50DD508224 50DD508254	13 and 14 15 and 16

ITEM	LABEL	FIG.
VARIABLE AIR VOLUME		
Schematic	50DD506864	18
Component Arrangement	50DD506864	17
ENERGY MANAGEMENT (NIGHT SET-BACK) OPTION		
Schematic	50DD504003	19
Component Arrangement	50DD504003	20
MOTORMASTER®		
Power Wiring		22
Defrost Thermostat with Jumper on Low-Pressure Switch and New Liquid Line Low-Pressure Switch Installed		23
Motormaster Control Location		21
Motormaster Control Sensor Location		24
Wind Baffle		25

LEGEND (Fig. 1-20)

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
DM	— Damper Motor (Day Mode — Fig 17, 18, 19, 20)
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
PER	— Power Exhaust Relay
PI	— Plug
Pri	— Primary
QT	— Quad Terminal
Sec	— Secondary
SSM	— Set-up — 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



NOTES

1. Compressor and/or fan motor(s) thermally protected. Three-phase motors protected against primary single-phasing conditions.
2. Screw terminals of printed-circuit board are suitable for connection of NEC Class 2 control circuit, 24 volts.
3. If any of the original wire furnished must be replaced, it should be replaced with type 90 C wire or its equivalent.
4. Field power supply fuses must be supplied.
5. All circuit breaker must trip amps are equal to or less than 140% FLA.
6. Number 1 compressor location is right side facing control box and bottom portion of indoor coil.
7. Transformers 1 and 2 are wired for 230v for 400-v unit. Transformer 1 is wired to ⟨H3⟩ (230v) for 400-v unit.
8. No connections between CCB and IFC when unit is equipped with nominal 7-1/2 hp indoor fan motor and drive.
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.

OPERATING SEQUENCE

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

COOLING — System switch set at AUTO. or COOL, indoor air fans 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 (16.7 C), economizer starts to modulate toward the minimum position. At 50 F (10 C), 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.

Operating Sequence 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 (16.7 C), economizer starts to modulate toward minimum position. At 50 F (10 C), 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 F (2.8 C), 10 F (5.6 C) or 15 F (8.3 C) below set point on the room thermostat.

The COOLING SETUP is field selectable at unit for 5 F (2.8 C), 8 F (4.4 C) or 12 F (6.7 C) 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

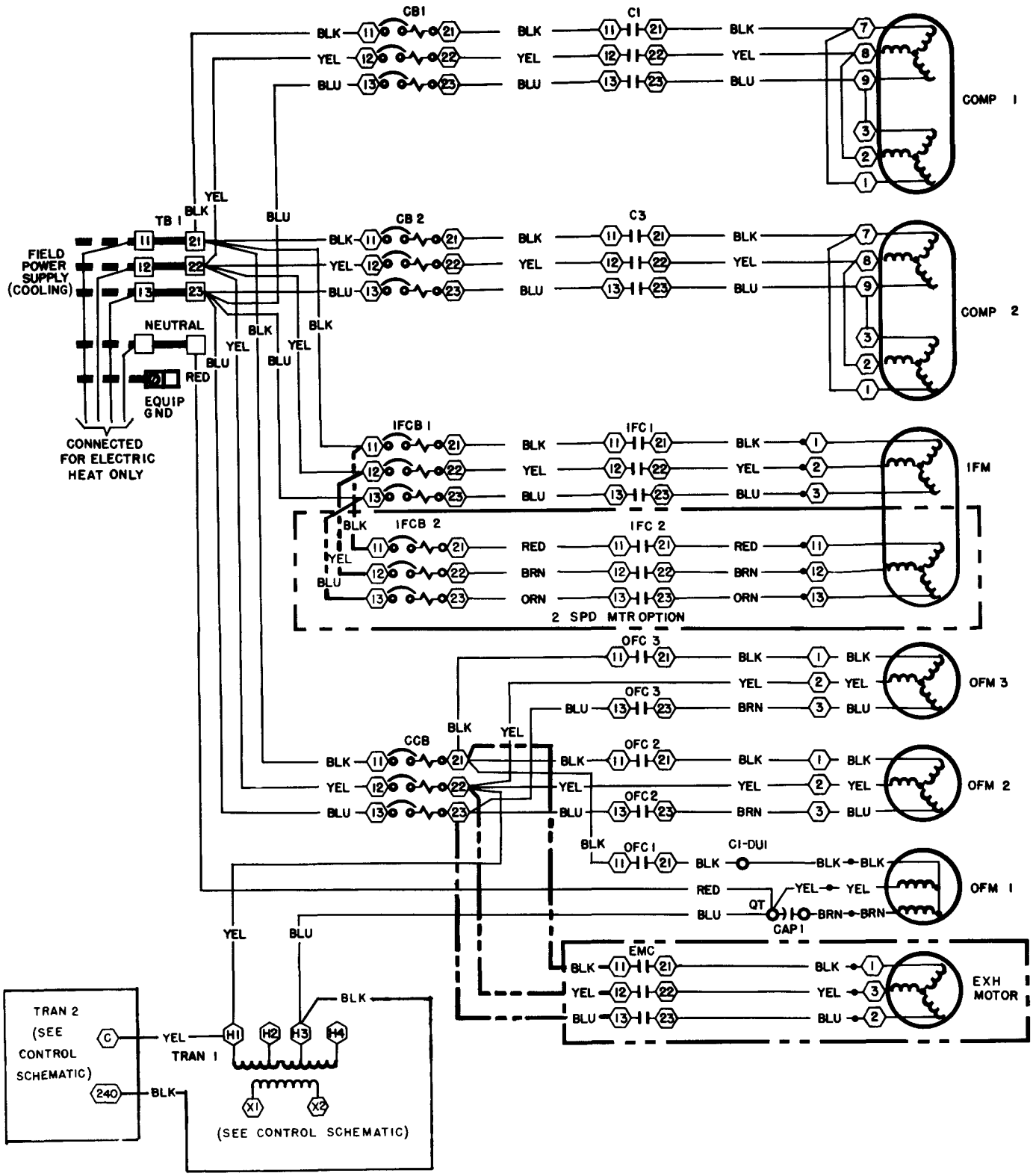


Fig. 1 — Label Diagram, Power Wiring Schematic; 50DL044; 400-3-50; 2-Speed and Single-Speed Fan

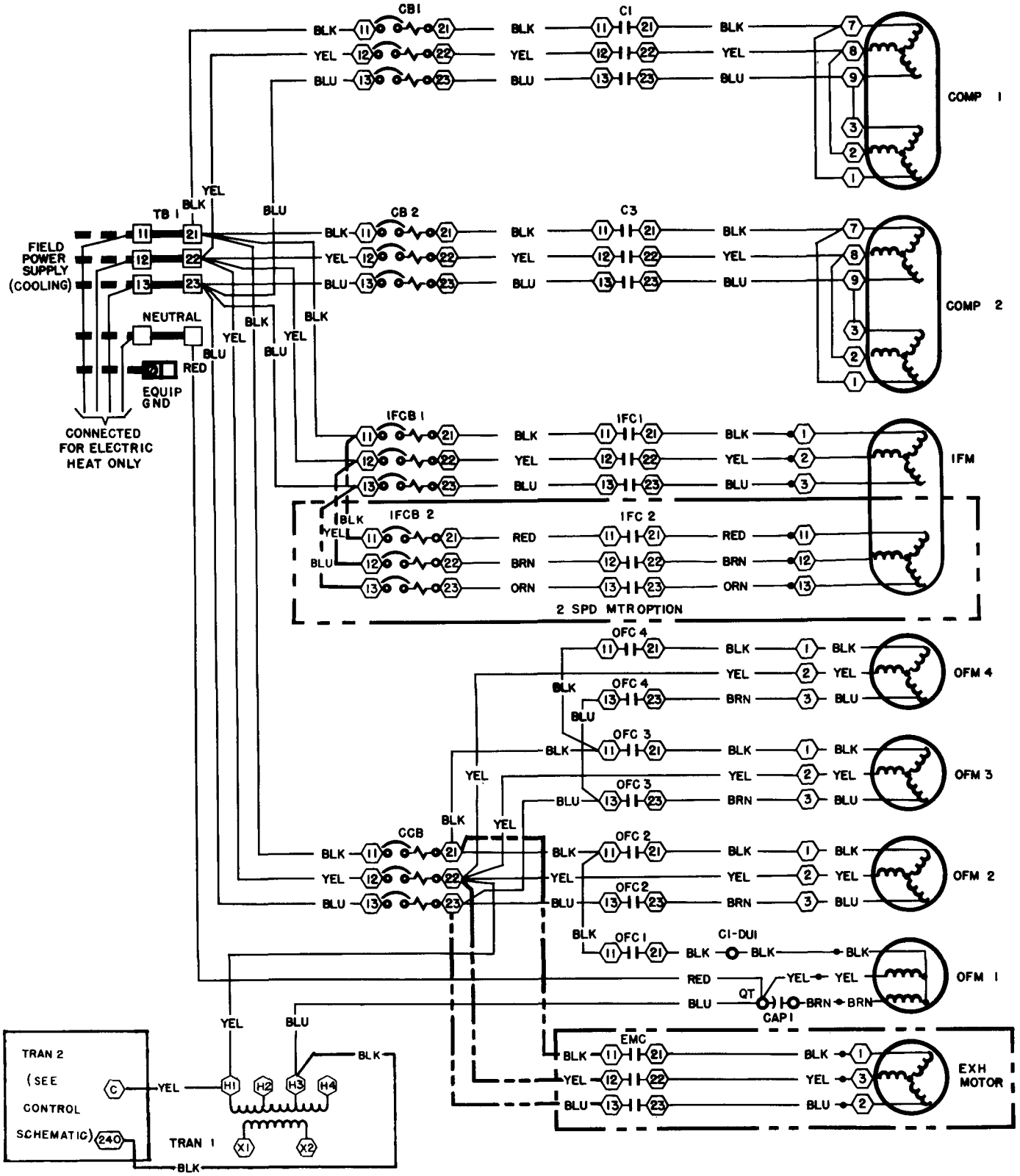


Fig. 2 — Label Diagram, Power Wiring Schematic; 50DL054; 400-3-50; 2-Speed and Single-Speed Fan

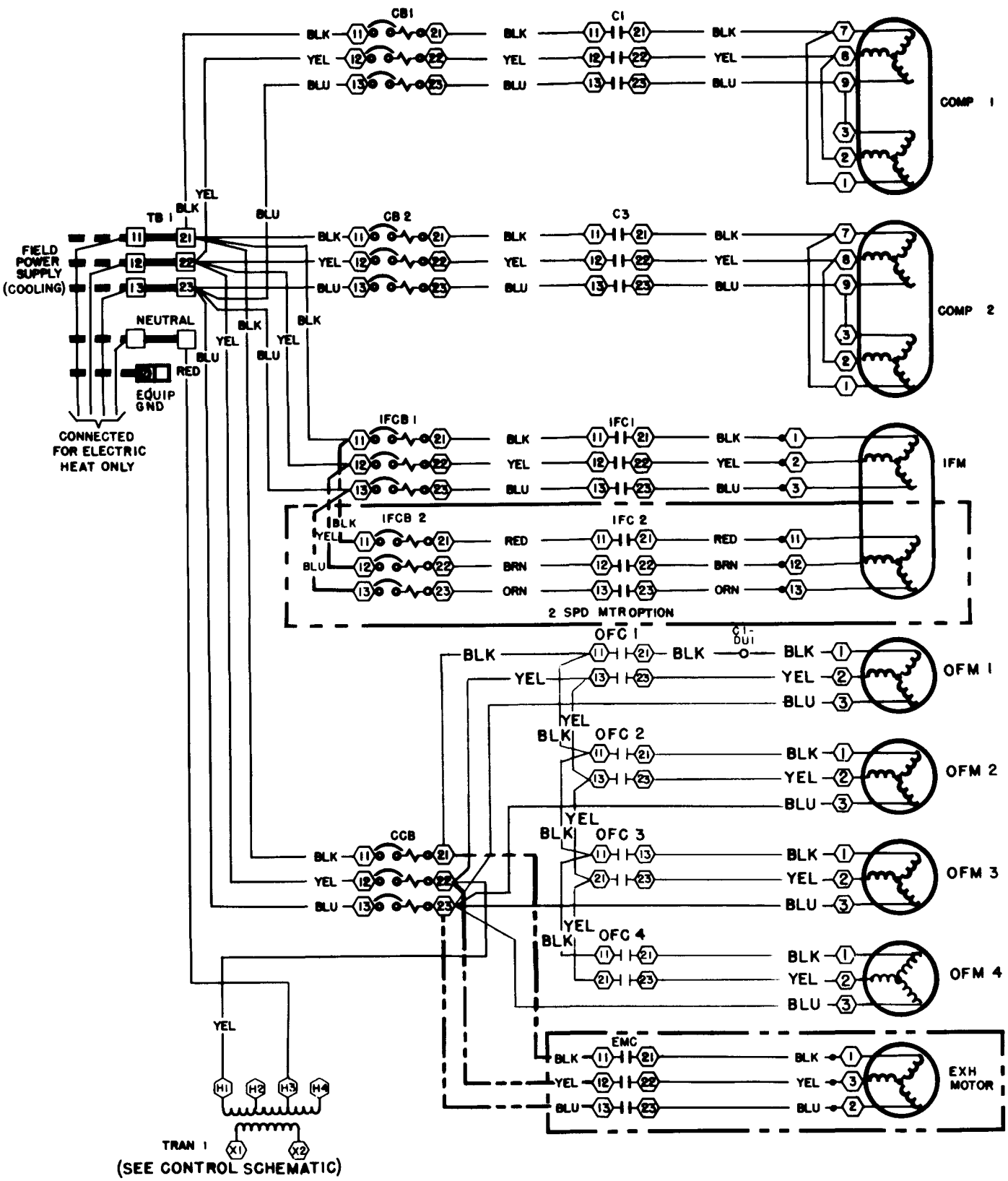
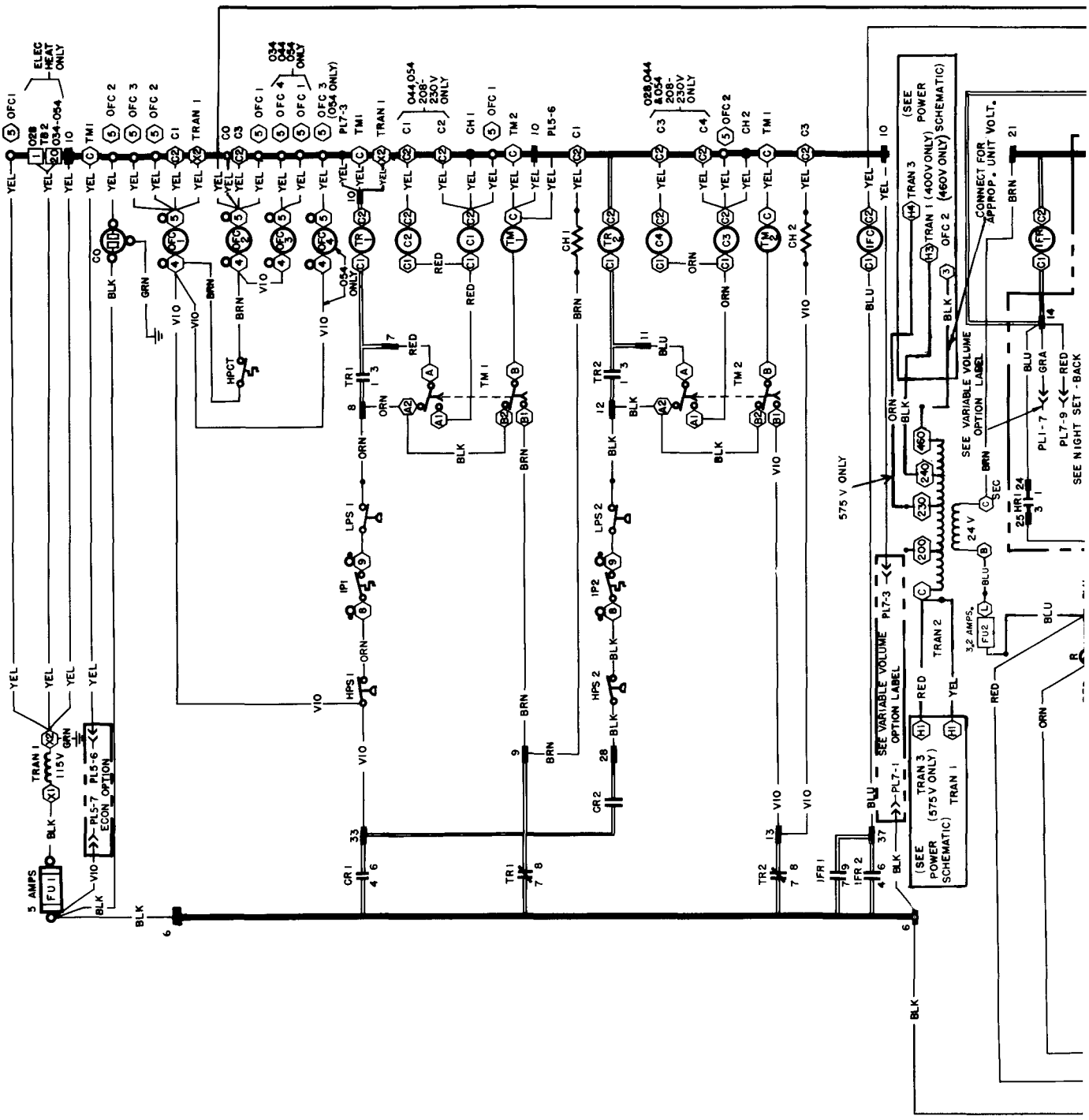


Fig. 3 — Label Diagram, Power Wiring Schematic; 50DL064; 400-3-50; 2-Speed and Single-Speed Fan



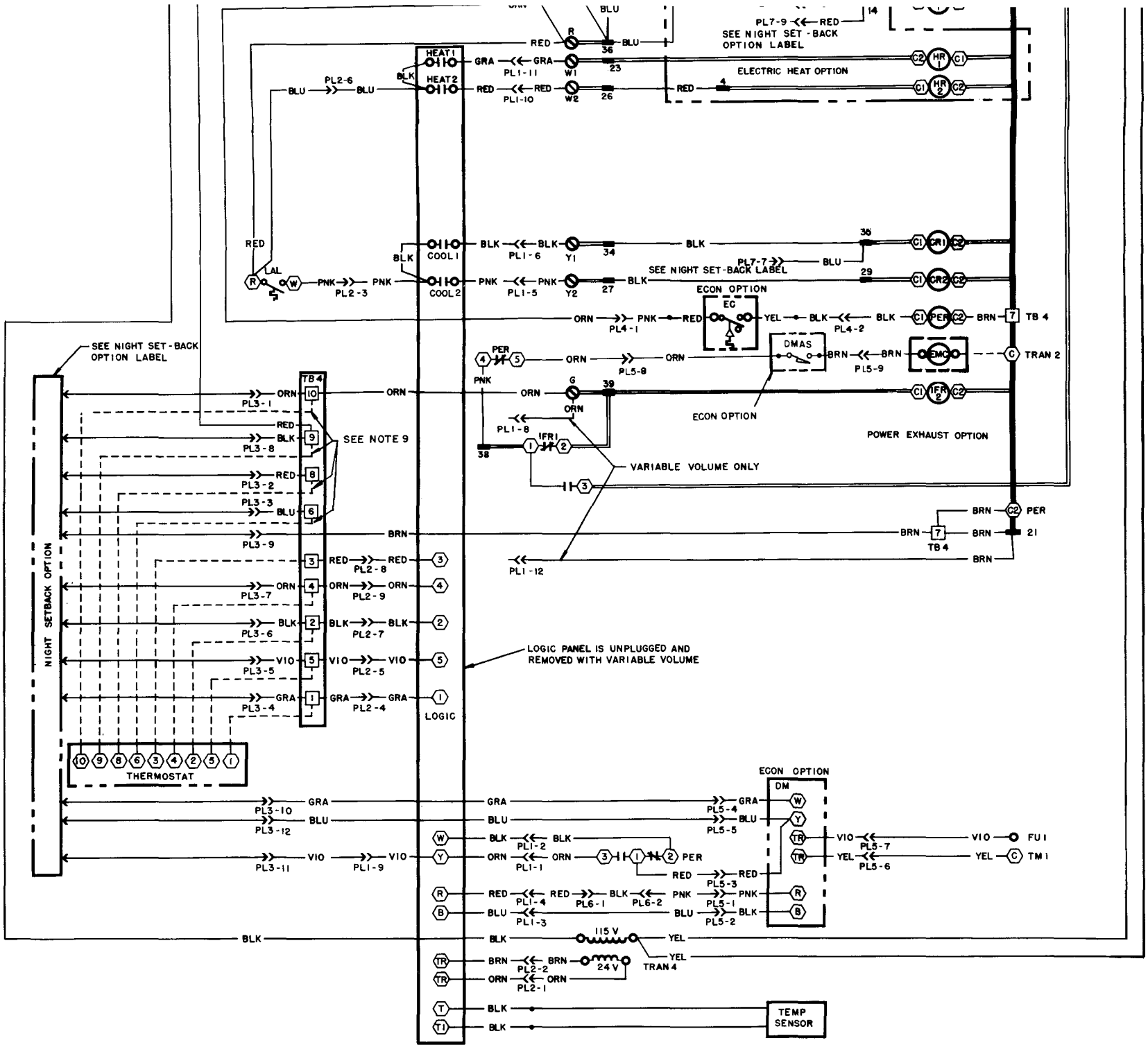
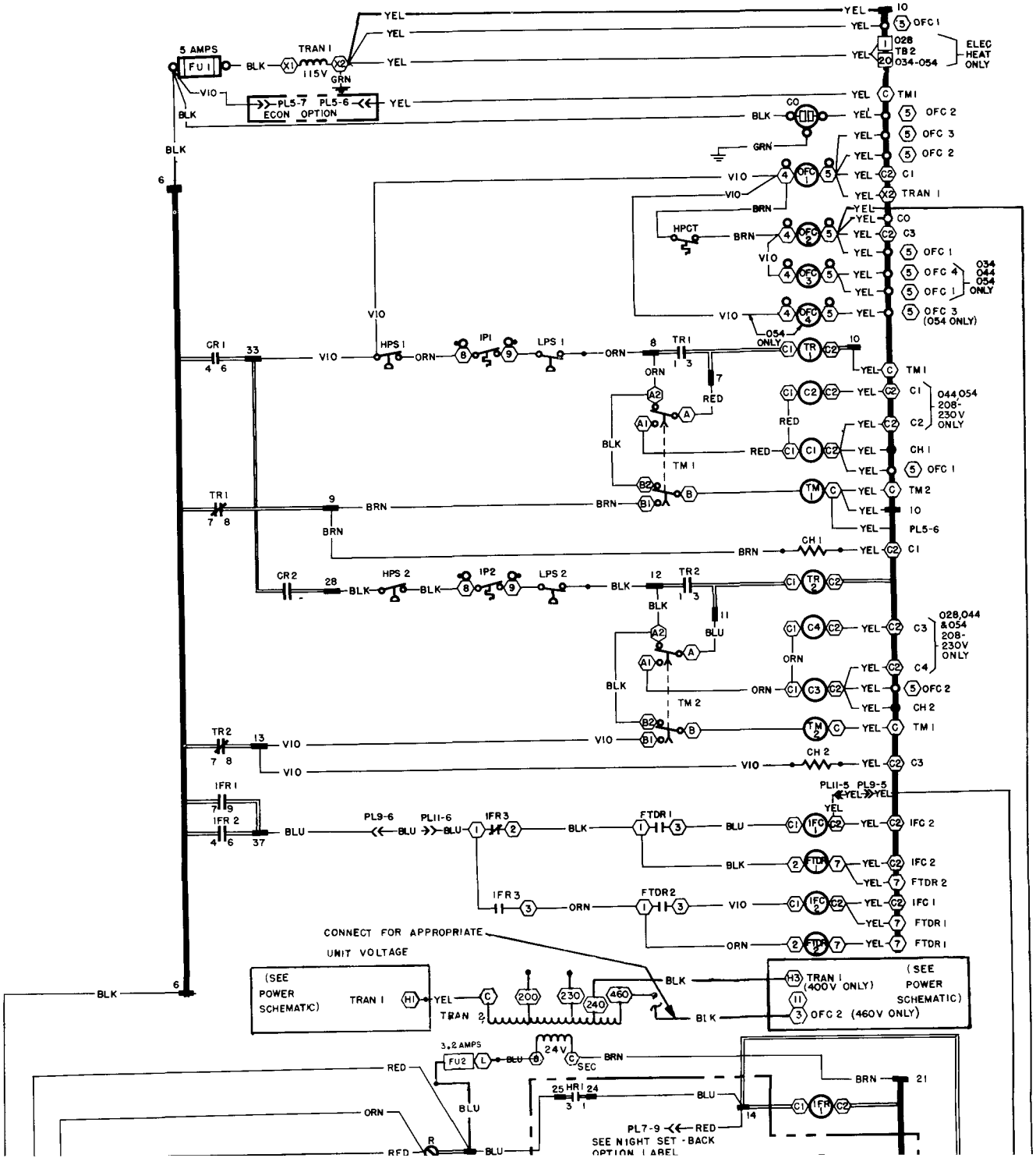


Fig. 4 — Control Wiring Schematic w/Single-Speed Fan; 50DL044,054; 400-3-50


5 AMPS
FU1
TRAN 1
115V
BLK
YEL
GRN
VIO
PL5-7 PL5-6
ECON OPTION
ELEC HEAT ONLY
TB2
028
034-054
TM1
OFC 1
OFC 2
OFC 3
C1
TRAN 1
HPCT
C3
034 044 054 ONLY
OFC 4
OFC 3 (054 ONLY)
GR1
HPS 1
IPI
LPS 1
TR1
CR2
HPS 2
IP2
LPS 2
TR2
CH 1
CH 2
044,054 208-230V ONLY
028,044 &054 208-230V ONLY
TM2
CH2
IFR1
IFR 2
IFR3
PL9-6
PL11-6
FTDR1
FTDR2
IFC 2
IFC 1
FTDR 2
PL11-5 PL9-5
CONNECT FOR APPROPRIATE UNIT VOLTAGE
(SEE POWER SCHEMATIC)
TRAN 2
200
230
240
460
TRAN 1 (400V ONLY)
OFC 2 (460V ONLY)
3.2 AMPS
FU2
24V
SEC
HR1
IFR
PL7-9
SEE NIGHT SET-BACK OPTION LABEL

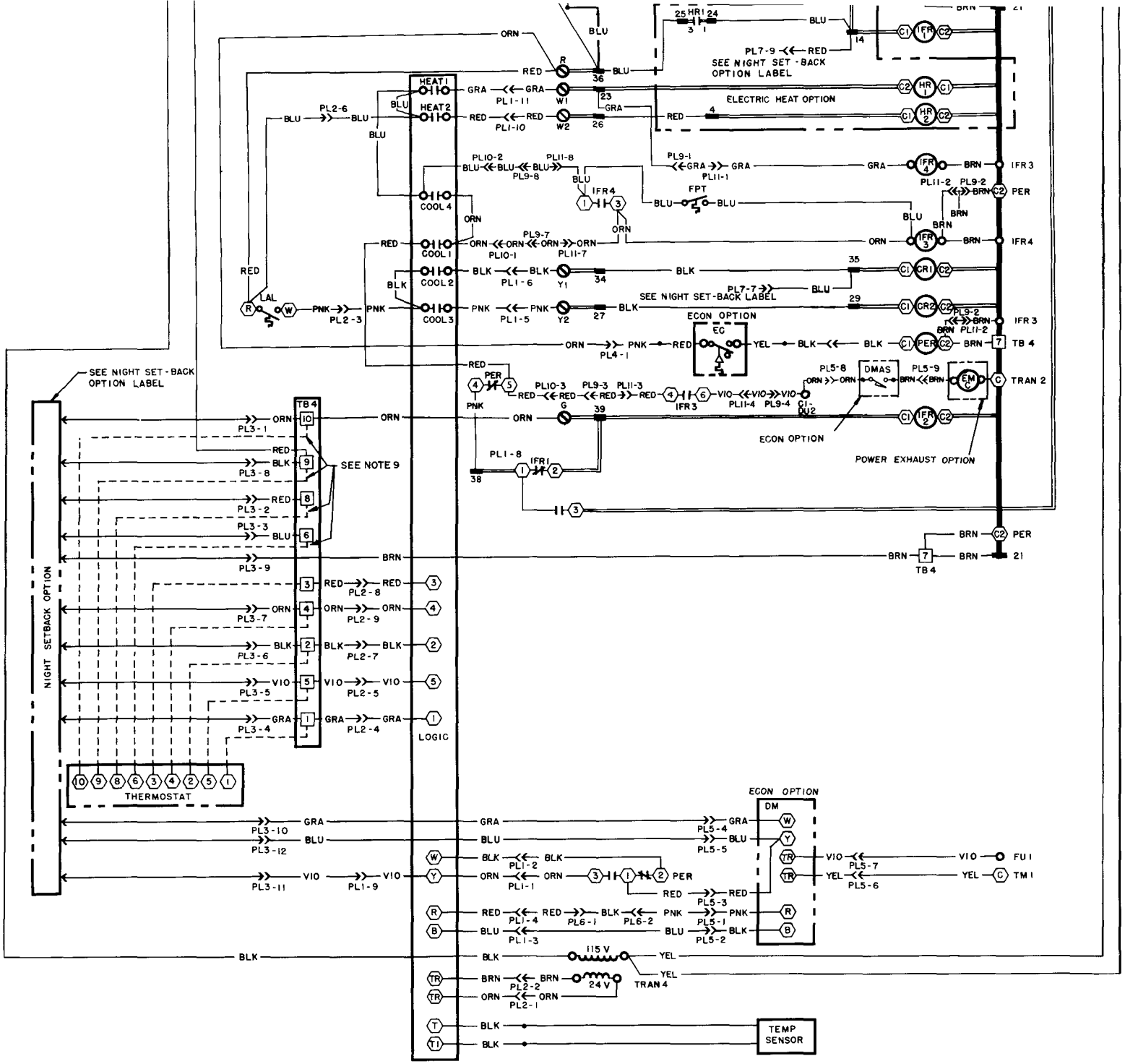
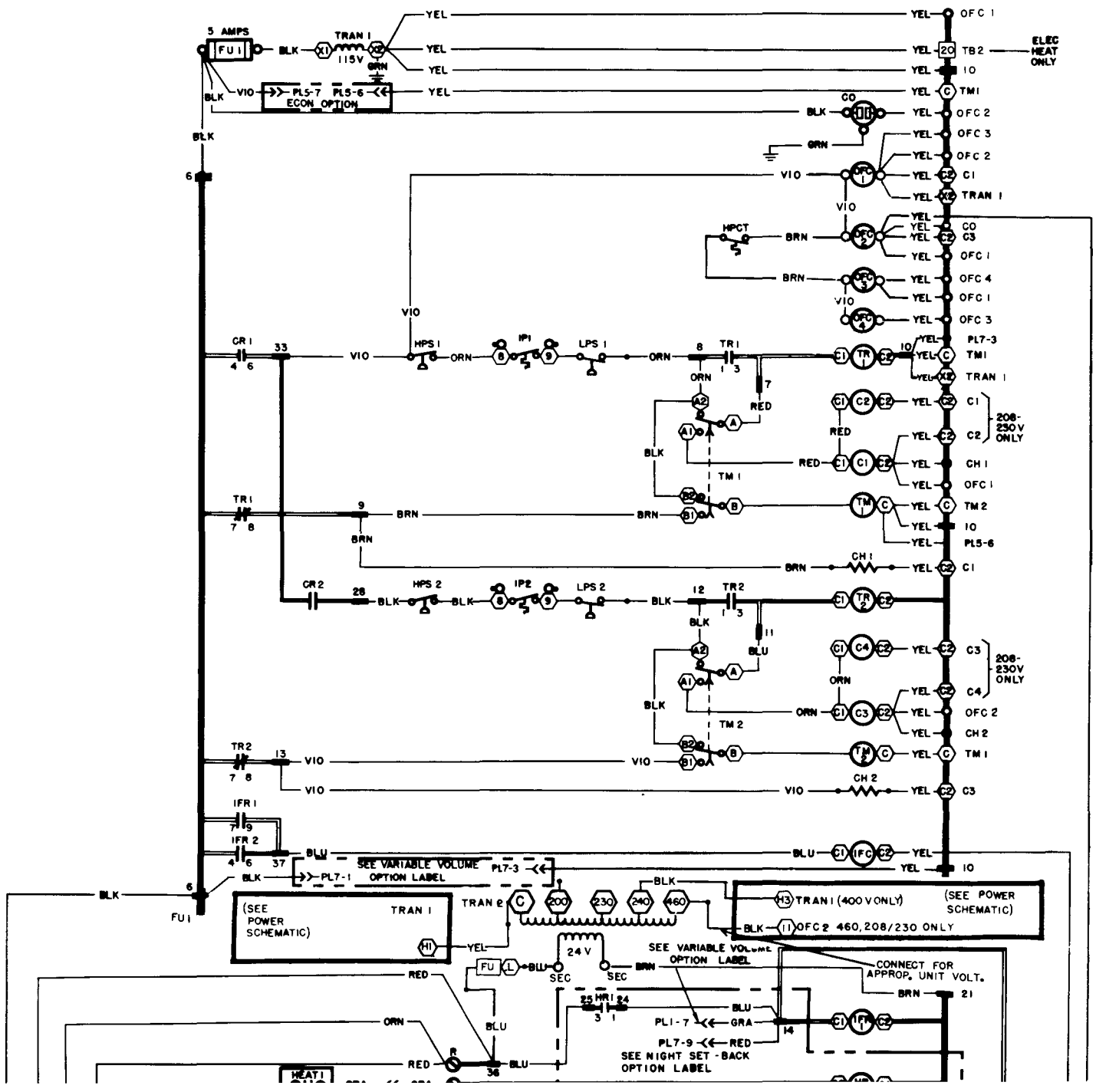


Fig. 5 — Label Diagram, Control Wiring Schematic w/2-Speed Fan; 50DL044,054; 400-3-50


5 AMPS
FU 1
TRAN 1
115V
PL5-7 PL5-6
ECON OPTION
OFC 1
TB2
ELEC HEAT ONLY
TM1
OFC 2
OFC 3
OFC 4
HPCT
CR 1
HPS 1
IP1
LPS 1
TR1
PL7-3
CH 1
208-230V ONLY
TM 1
TM2
PL5-6
CR2
HPS 2
IP2
LPS 2
TR2
CH 2
IFR 1
IFR 2
SEE VARIABLE VOLUME OPTION LABEL
PL7-1
(SEE POWER SCHEMATIC)
TRAN 2
200
230
240
460
TRAN 1 (400 V ONLY)
OFC 2 460, 208/230 ONLY
24 V
SEC
CONNECT FOR APPROP. UNIT VOLT.
HR1
PL1-7
PL7-9
SEE NIGHT SET-BACK OPTION LABEL
HEAT 1

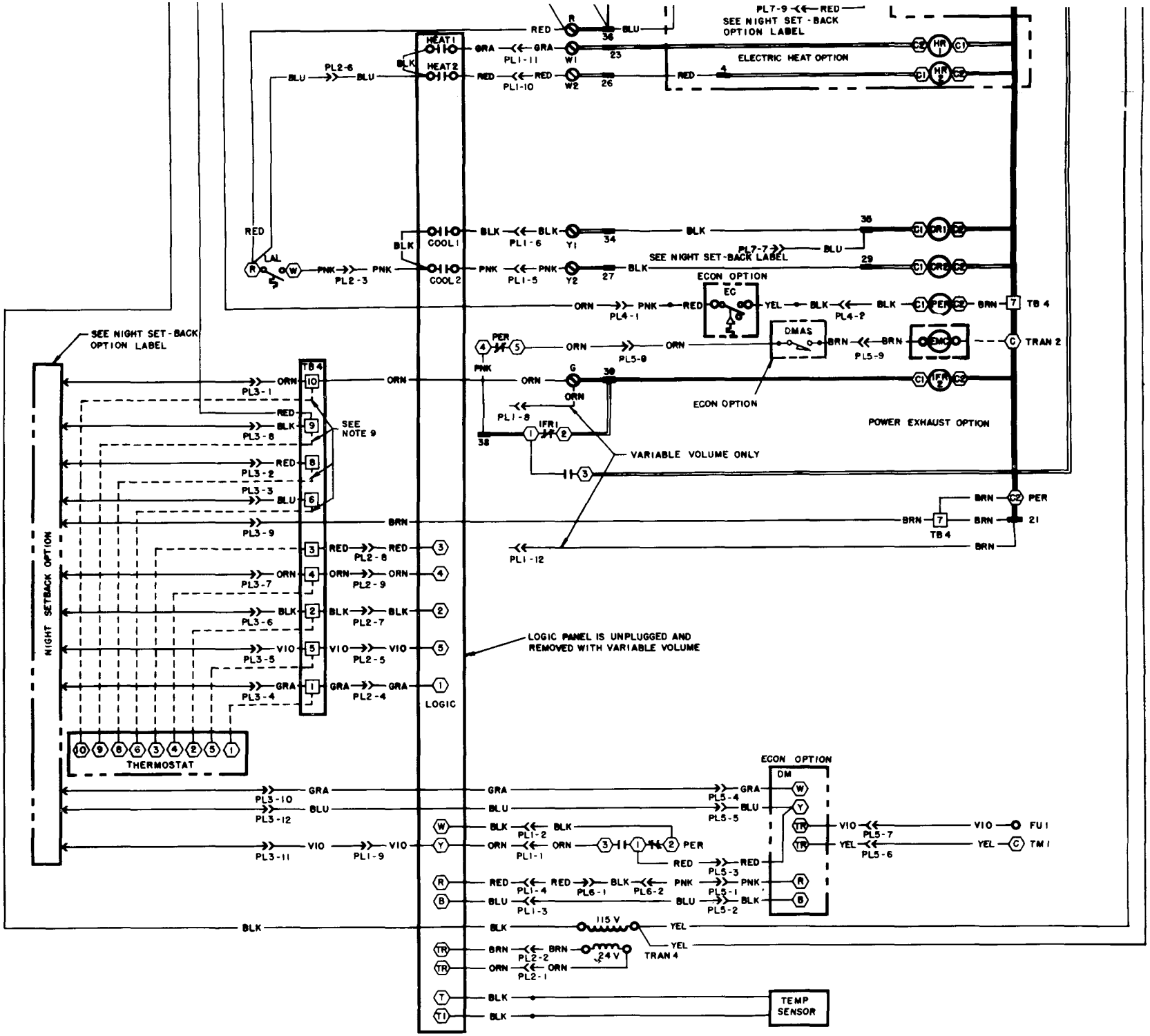
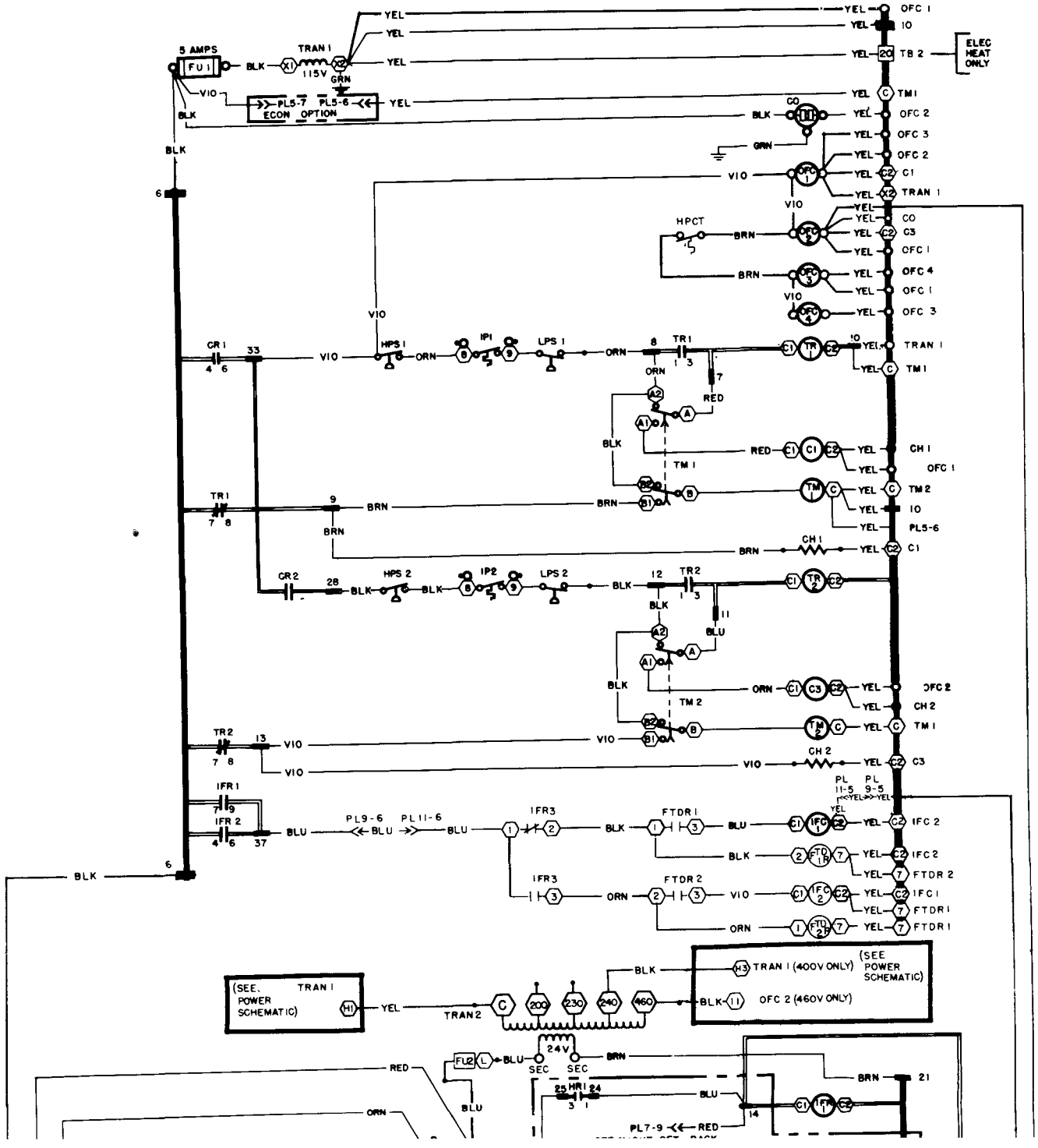


Fig. 6 — Label Diagram, Control Wiring Schematic; 50DL064; 400-3-50; Single-Speed Fan


5 AMPS
FU 1
TRAN 1
115V
ECON OPTION
PL5-7
PL5-6
ELEC HEAT ONLY
TB 2
TM 1
OFC 1
OFC 2
OFC 3
OFC 4
TRAN 1
HPCT
CR 1
HPS 1
IP1
LPS 1
TR 1
CH 1
TM 2
CR 2
HPS 2
IP2
LPS 2
TR 2
CH 2
IFR 1
IFR 2
IFR3
FTDR 1
FTDR 2
IFC 1
IFC 2
PL9-6
PL11-6
PL 11-5
PL 9-5
(SEE POWER SCHEMATIC)
TRAN 1 (400V ONLY)
OFC 2 (460V ONLY)
TRAN2
200
230
240
460
24V
SEC
FU2
HR1
PL7-9
BLK
BRN
RED
ORN
BLU
YEL
VIO
GRN

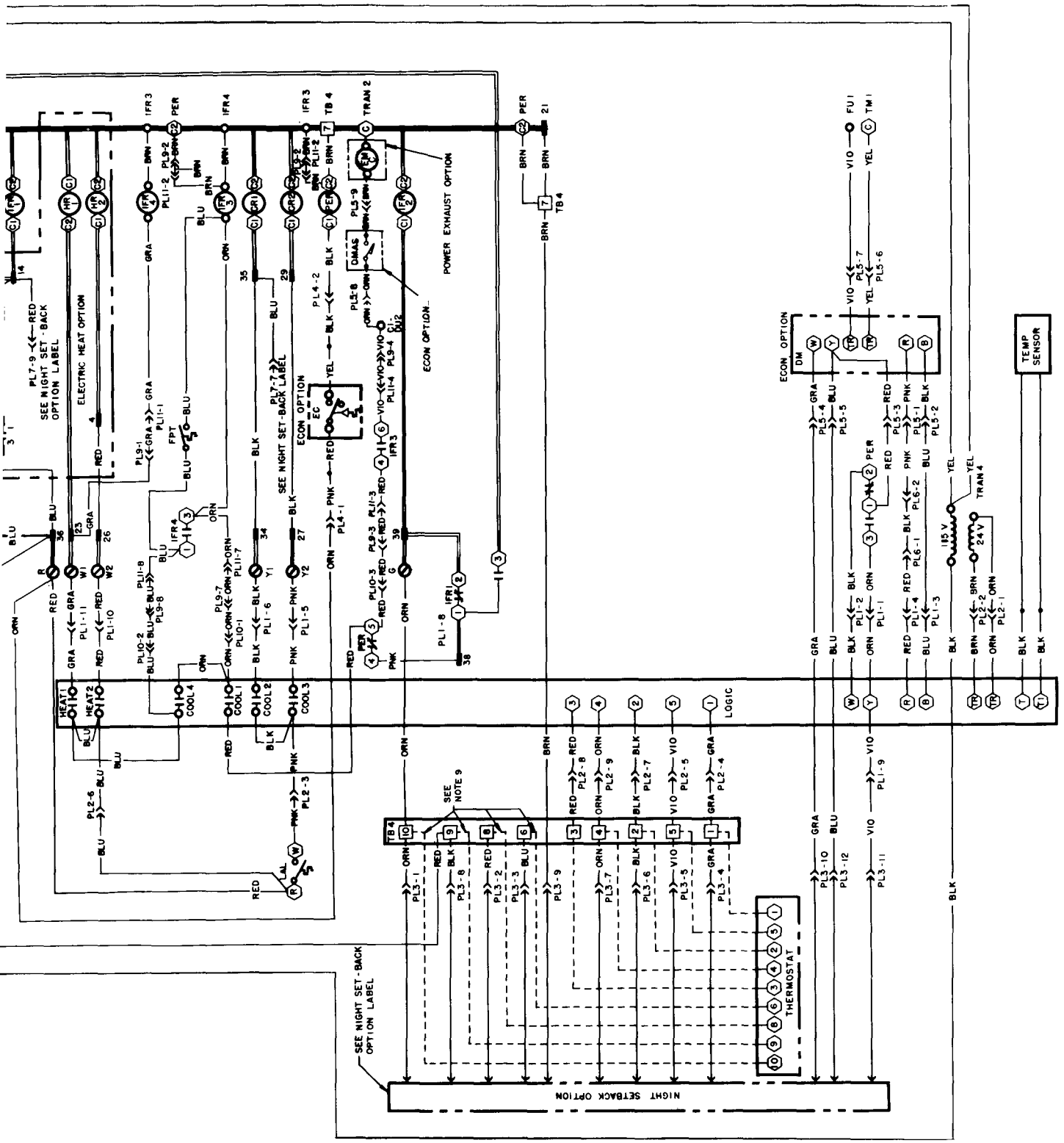


Fig. 7 — Label Diagram, Control Wiring Schematic; 50DL064; 400-3-50; 2-Speed Fan

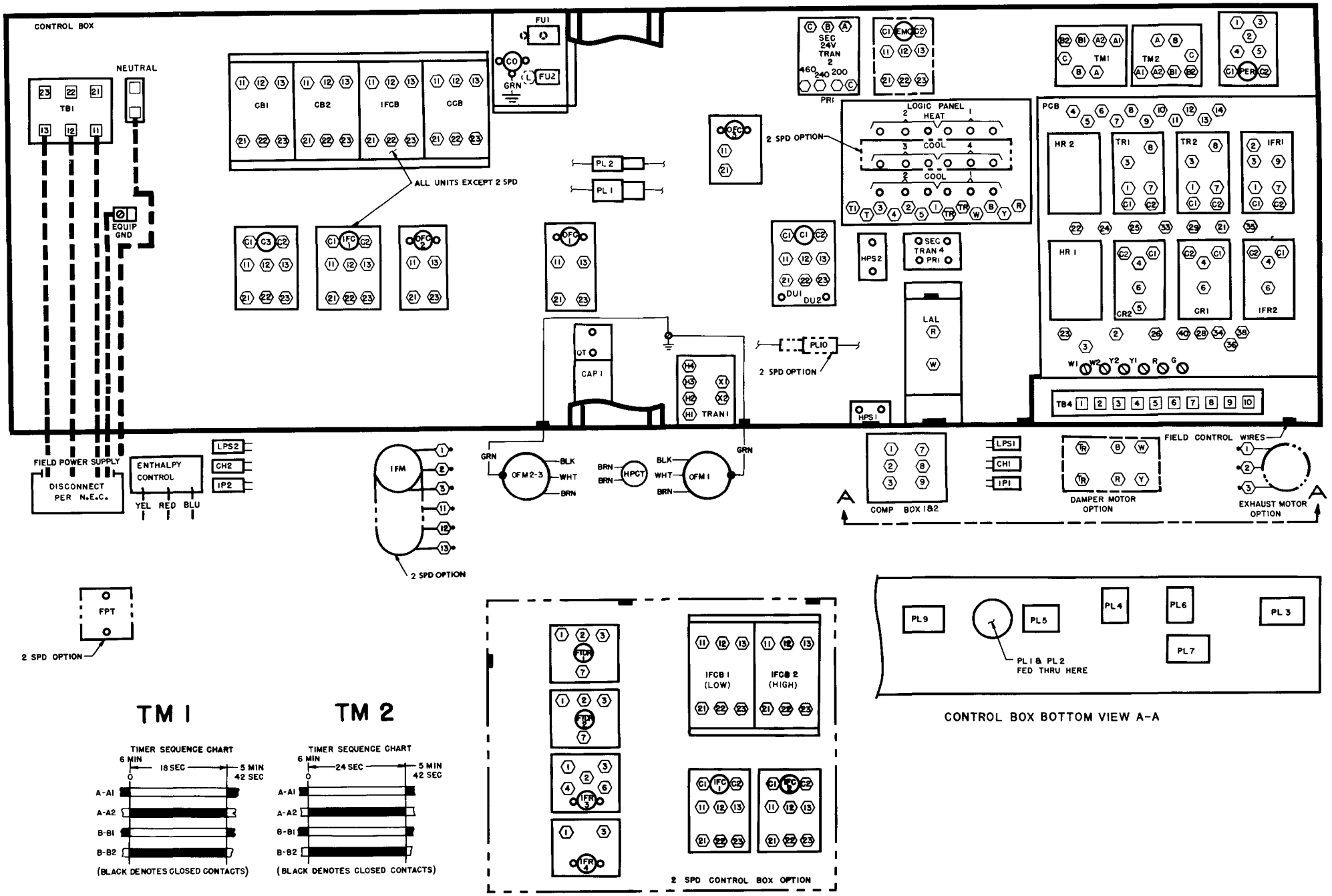


Fig. 8 — Label Diagram, Component Arrangement; 50DL044; 400-3-50; 2-Speed and Single-Speed Fan

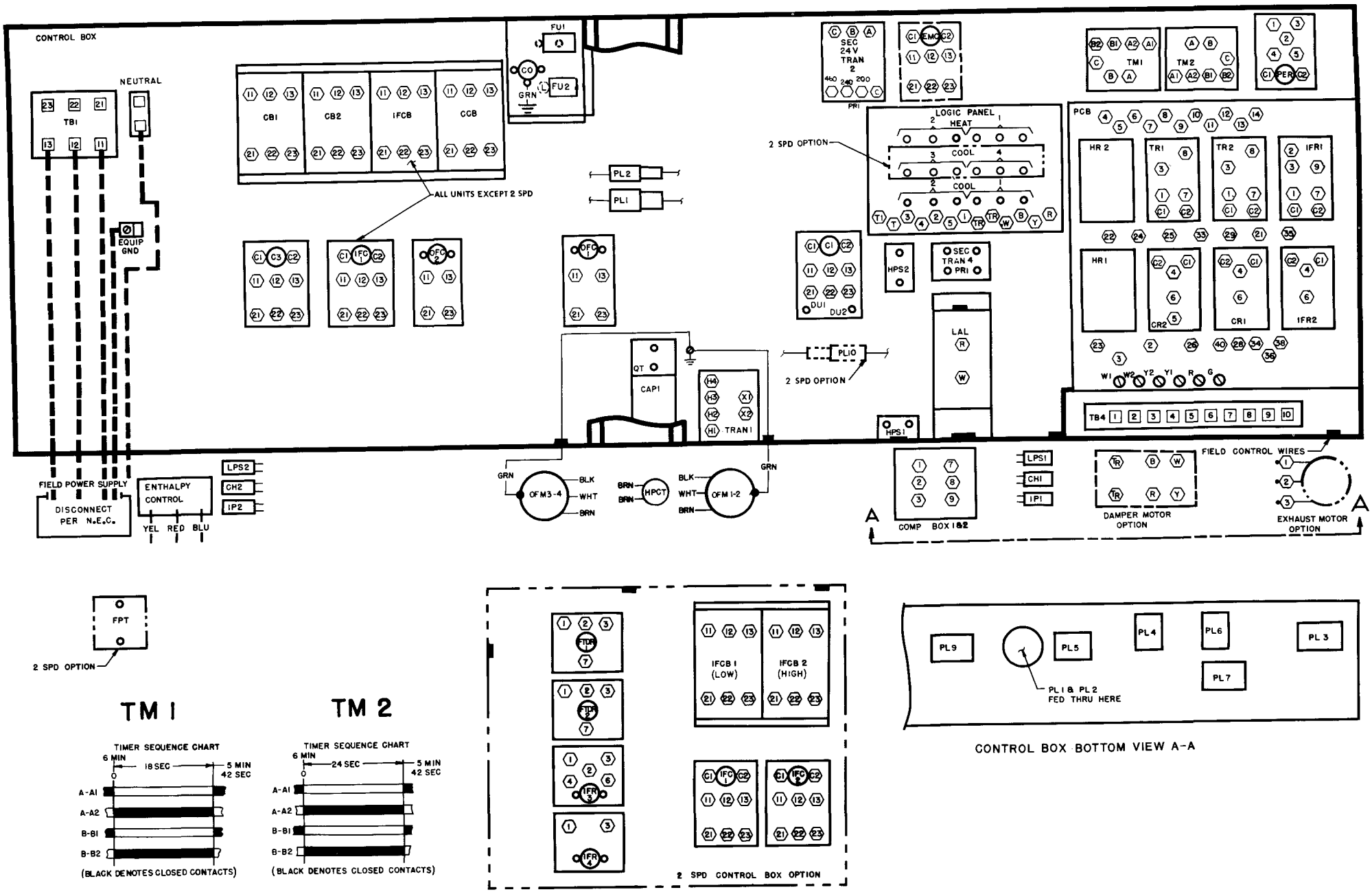


Fig. 9 — Label Diagram, Component Arrangement; 50DL054; 400-3-50; 2-Speed and Single-Speed Fan

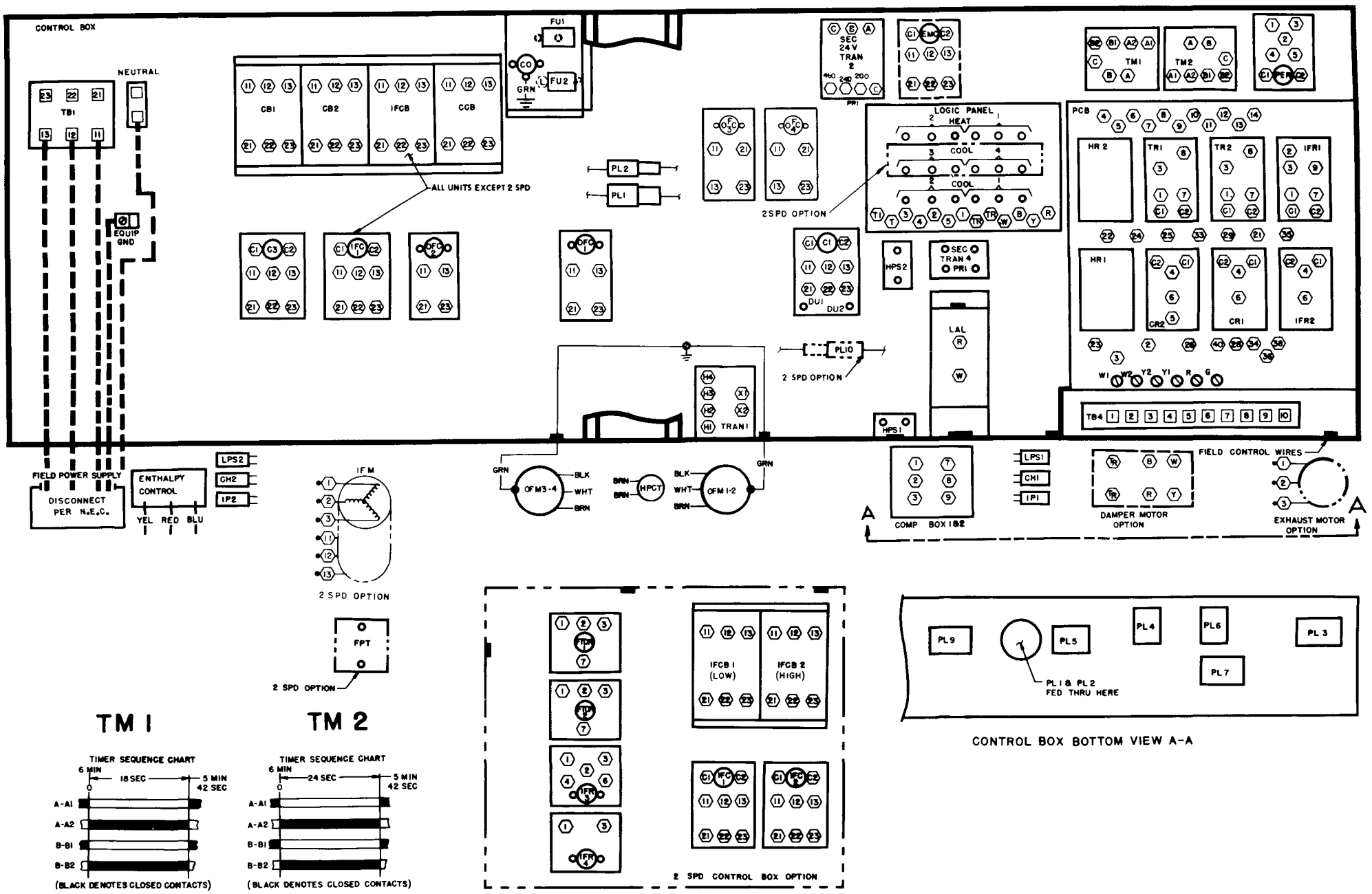


Fig. 10 — Label Diagram, Component Arrangement; 50DL064; 400-3-50; 2-Speed and Single-Speed Fan

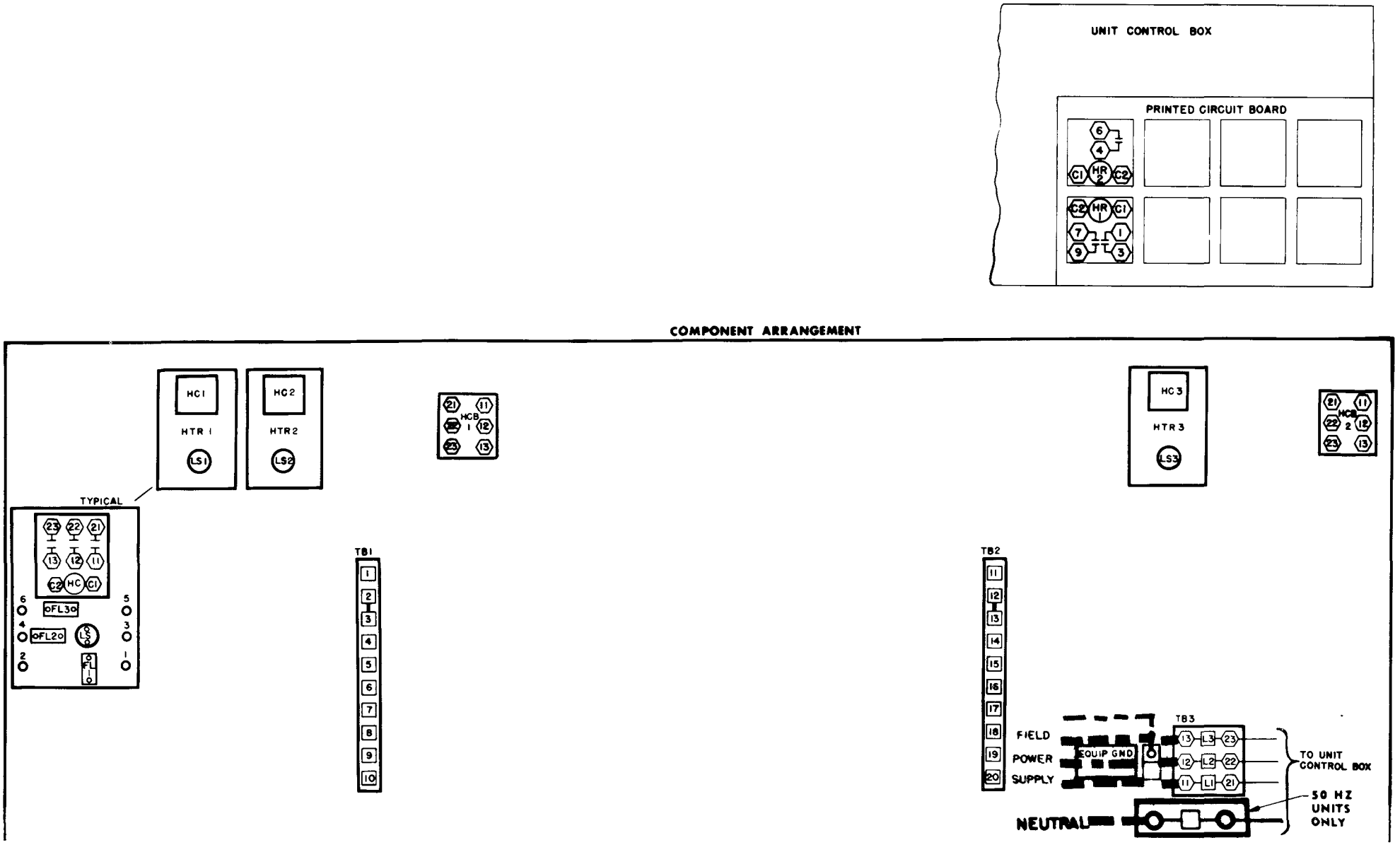


Fig. 11 — Label Diagram, Component Arrangement, (Low Electric Heat); 50DL044; 400-3-50

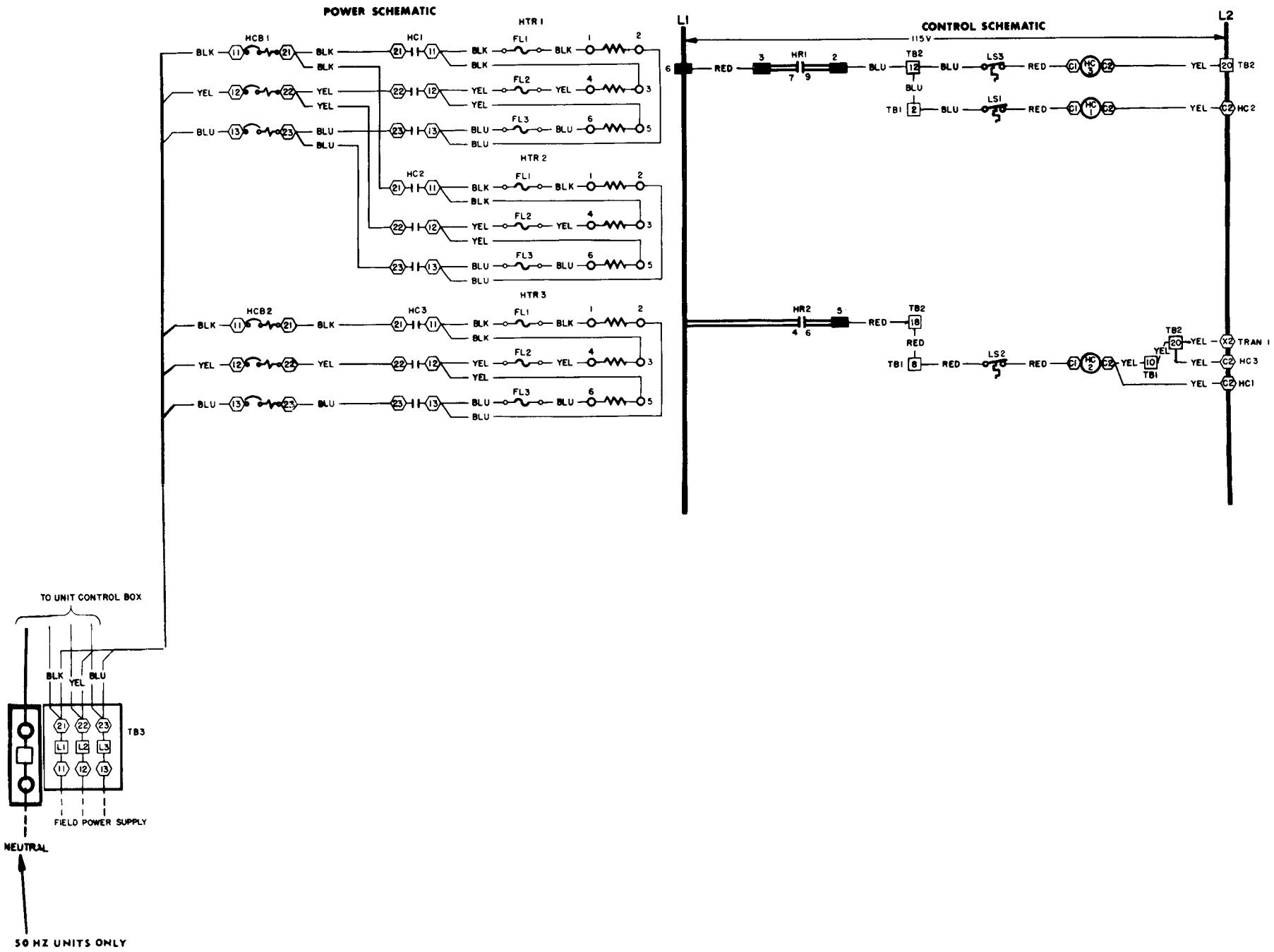


Fig. 12 — Label Diagram, Power and Control Schematics, Low Electric Heat; 50DL044

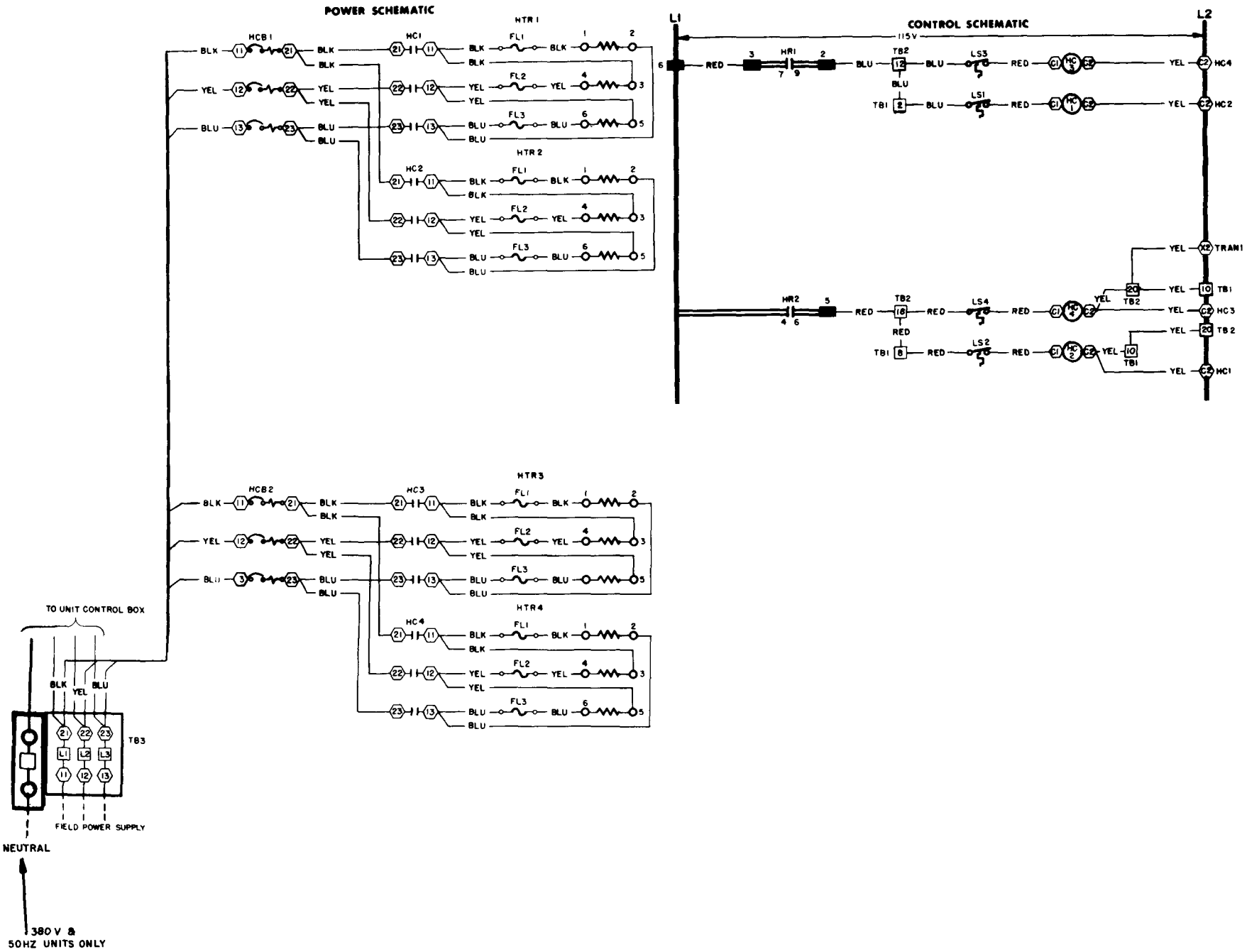


Fig. 13 — Label Diagram, Power and Control Schematics; Medium Electric Heat, 50DL044 and Low Electric Heat; 50DL054/064

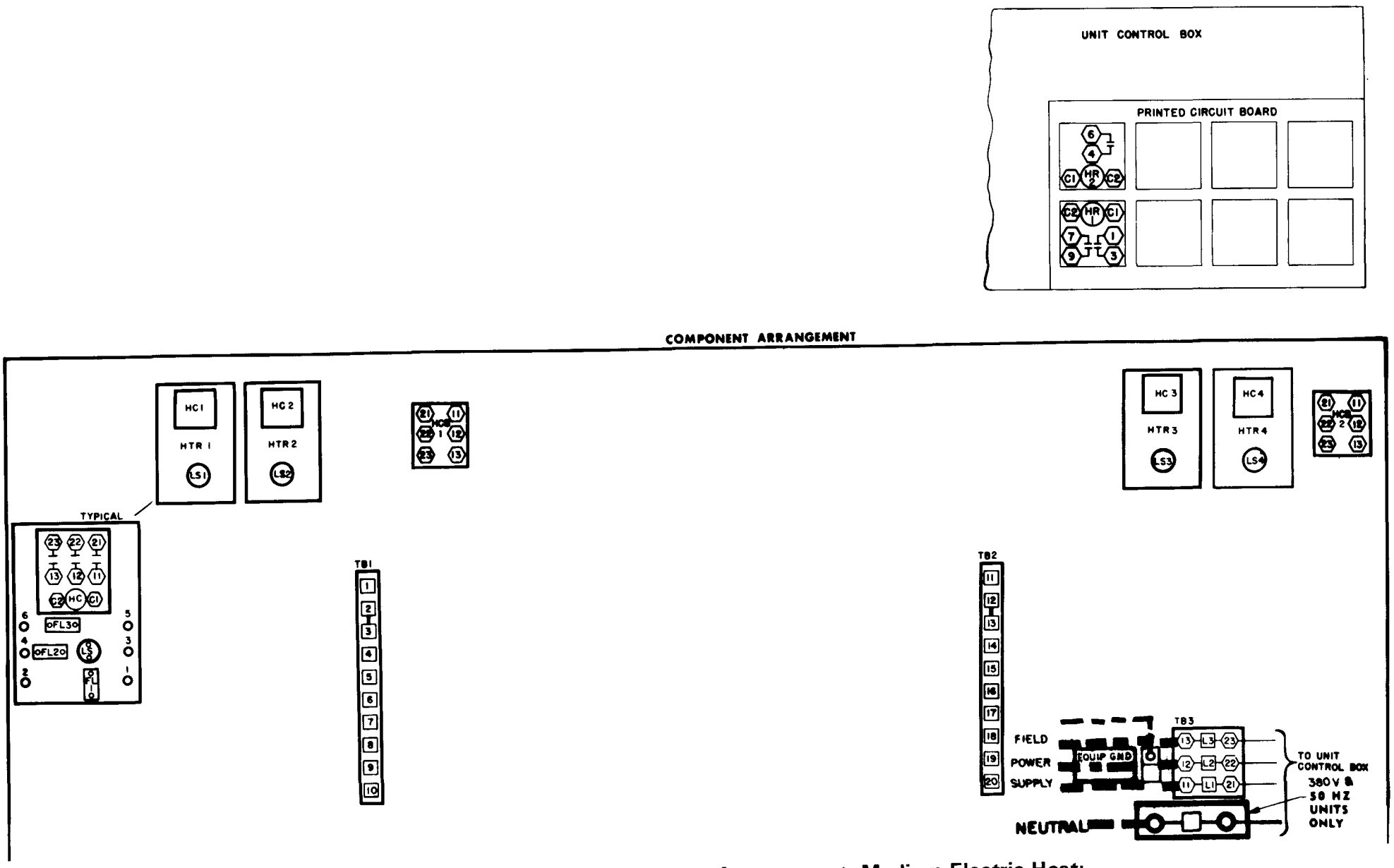


Fig. 14 — Label Diagram, Component Arrangement; Medium Electric Heat; 50DL044 and Low Electric Heat; 50DL054/064

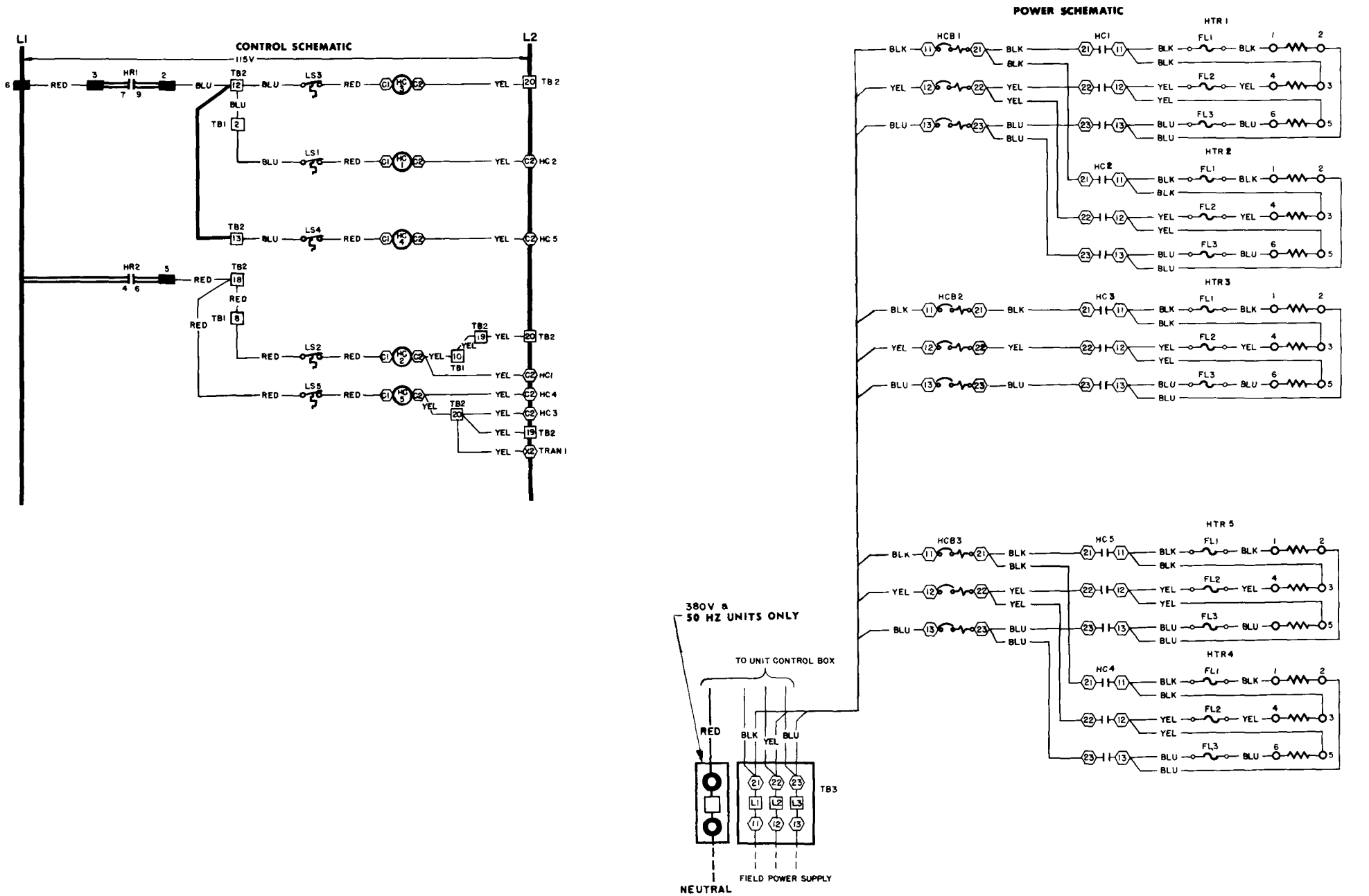


Fig. 15 — Label Diagram, Power and Control Schematics; Medium Electric Heat; 50DL054,064

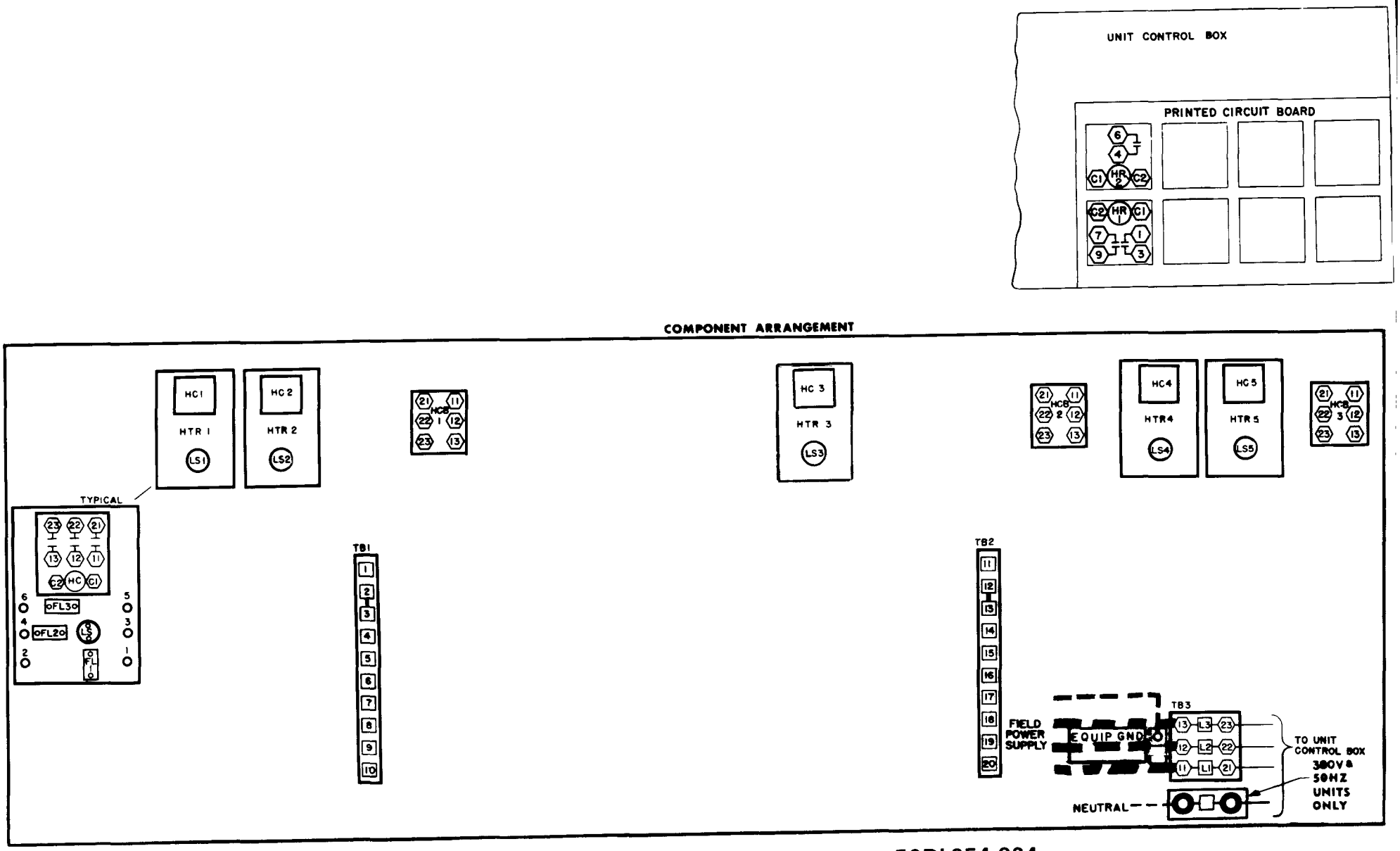


Fig. 16 — Label Diagram, Component Arrangement; 50DL054,064

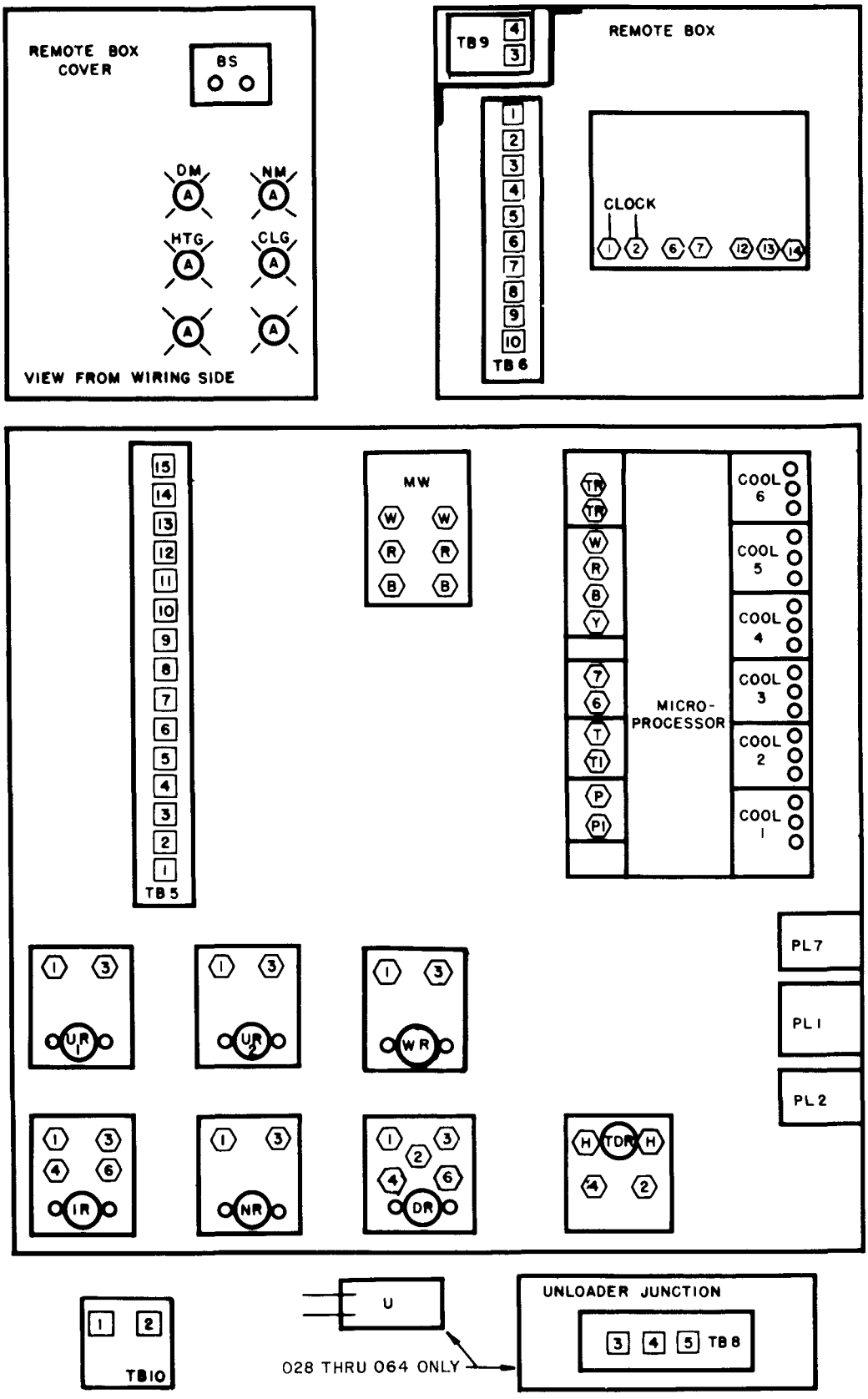
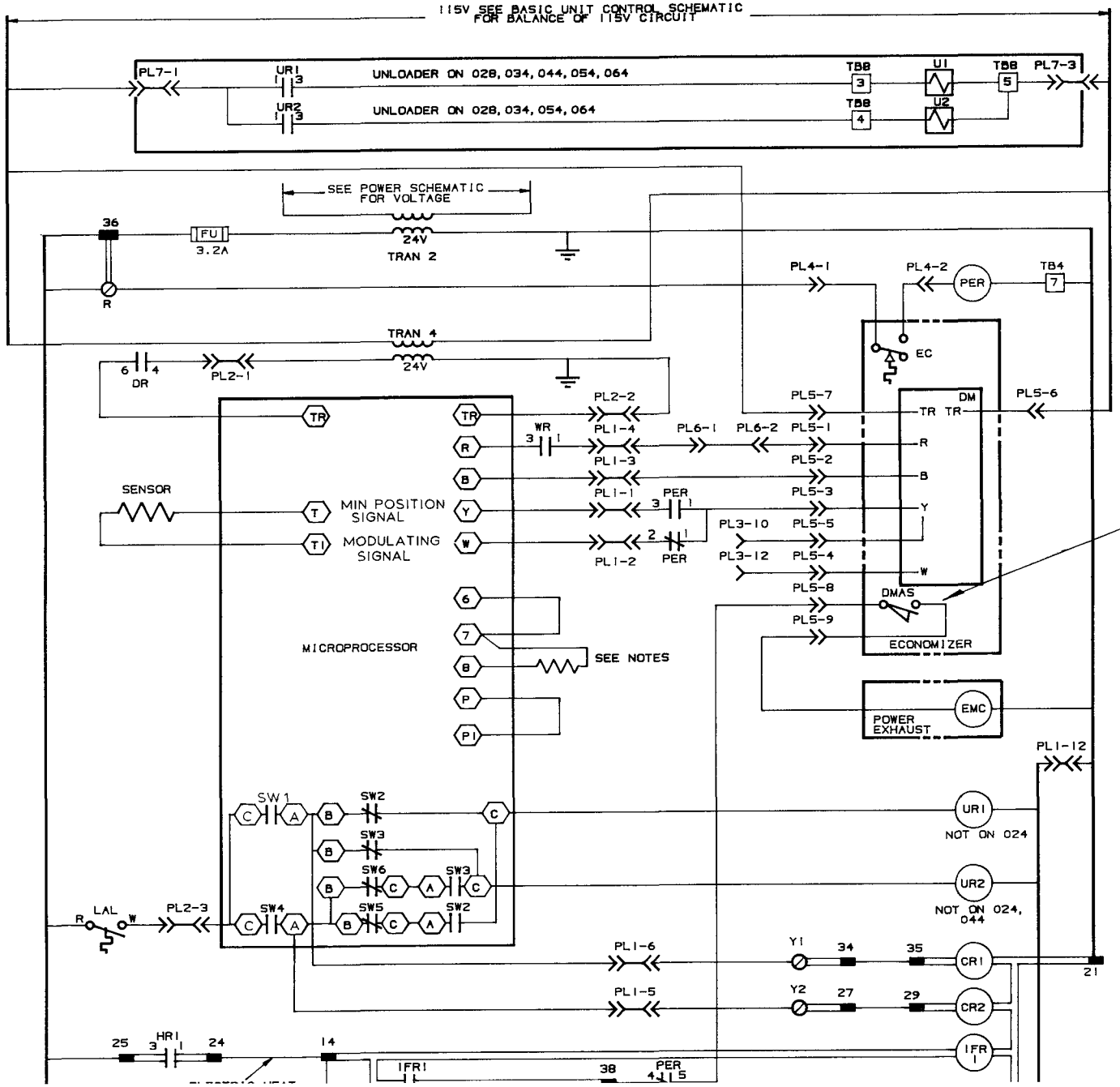
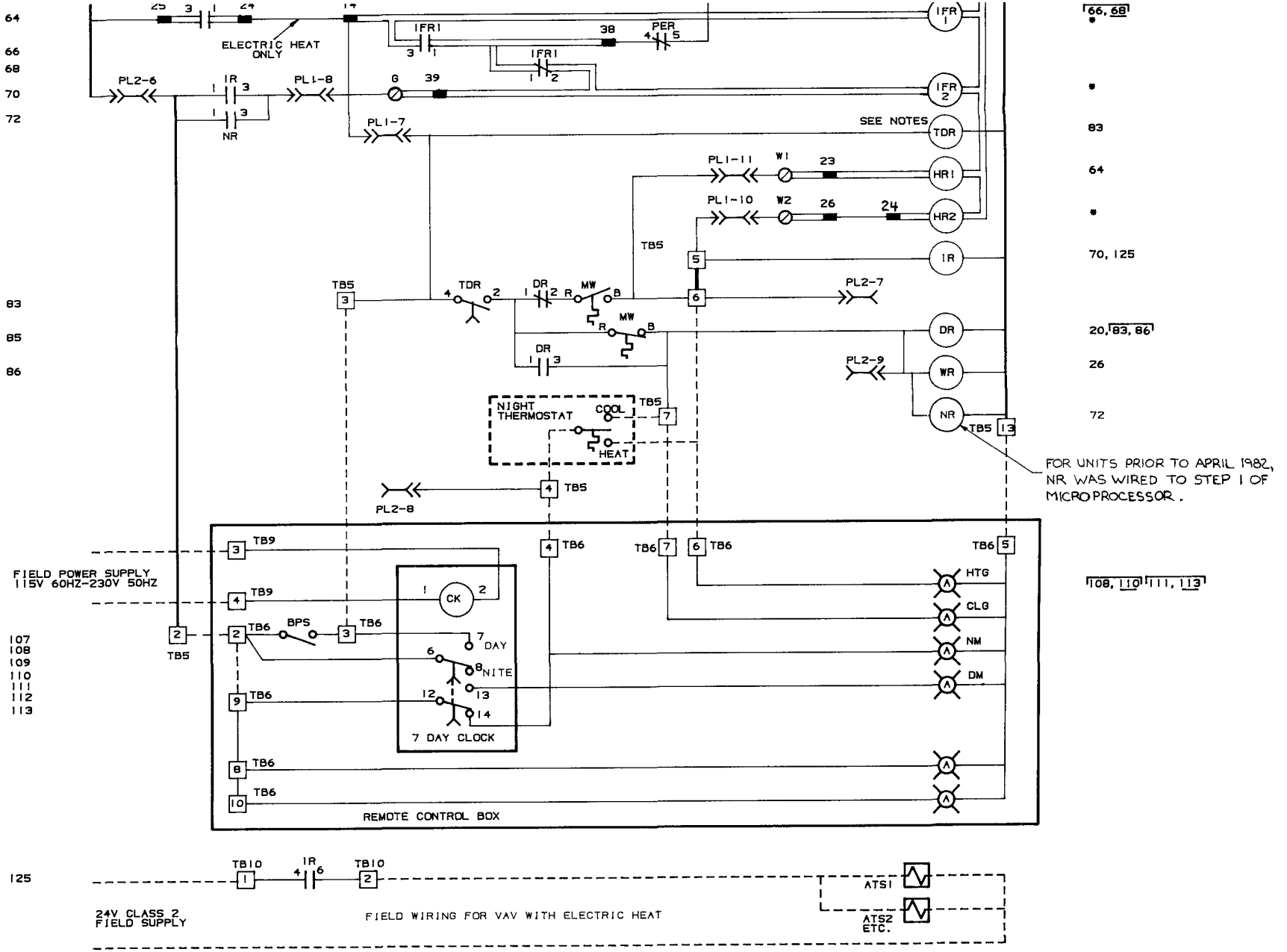


Fig. 17 — Label Diagram, Component Arrangement; Variable Air Volume

LINE NO.

CONTACT LOCATION





NOTES

SEE UNIT WIRING LABEL FOR LEGEND

* CONTACTS ARE IN THE 115V SCHEMATIC

** CONTACTS ARE IN THE POWER SCHEMATIC

TDR 65 SEC ON-25 SEC OFF

RESISTOR BETWEEN TERMINALS 7&8 APPLIES ONLY TO MICROPROCESSOR STYLE W7100A1046 (HH09AZ005) FOR PRODUCTION AFTER MAY 1982.

RESISTOR IS 1/4 WATT, 200 OHMS FOR 50DF024 & 1/4 WATT 600 OHMS FOR ALL OTHER MODELS

Fig. 18 — Label Diagram, Schematic; Variable Air Volume

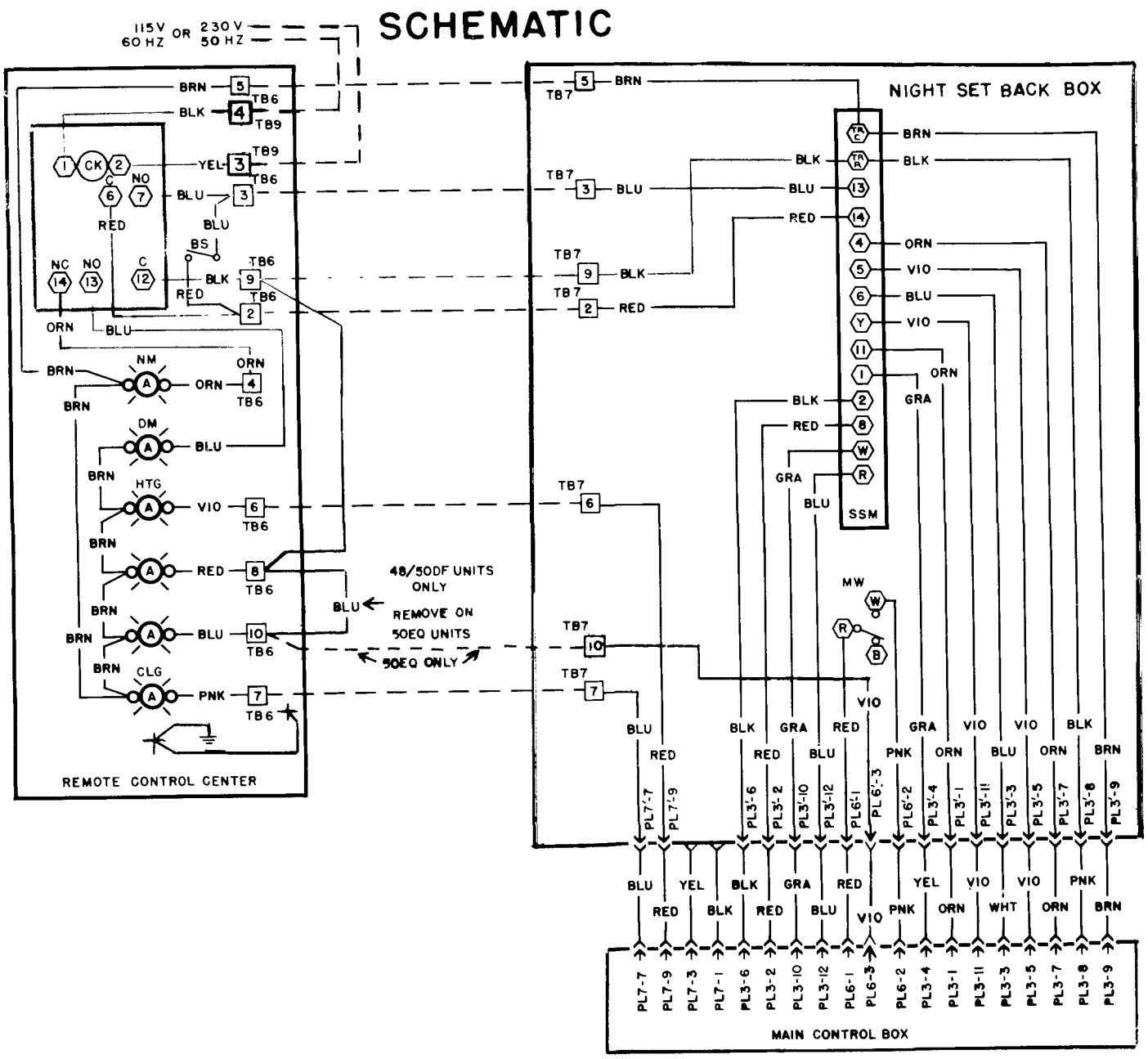


Fig. 19 — Label Diagram, Schematic; Energy Management Option/Accessory

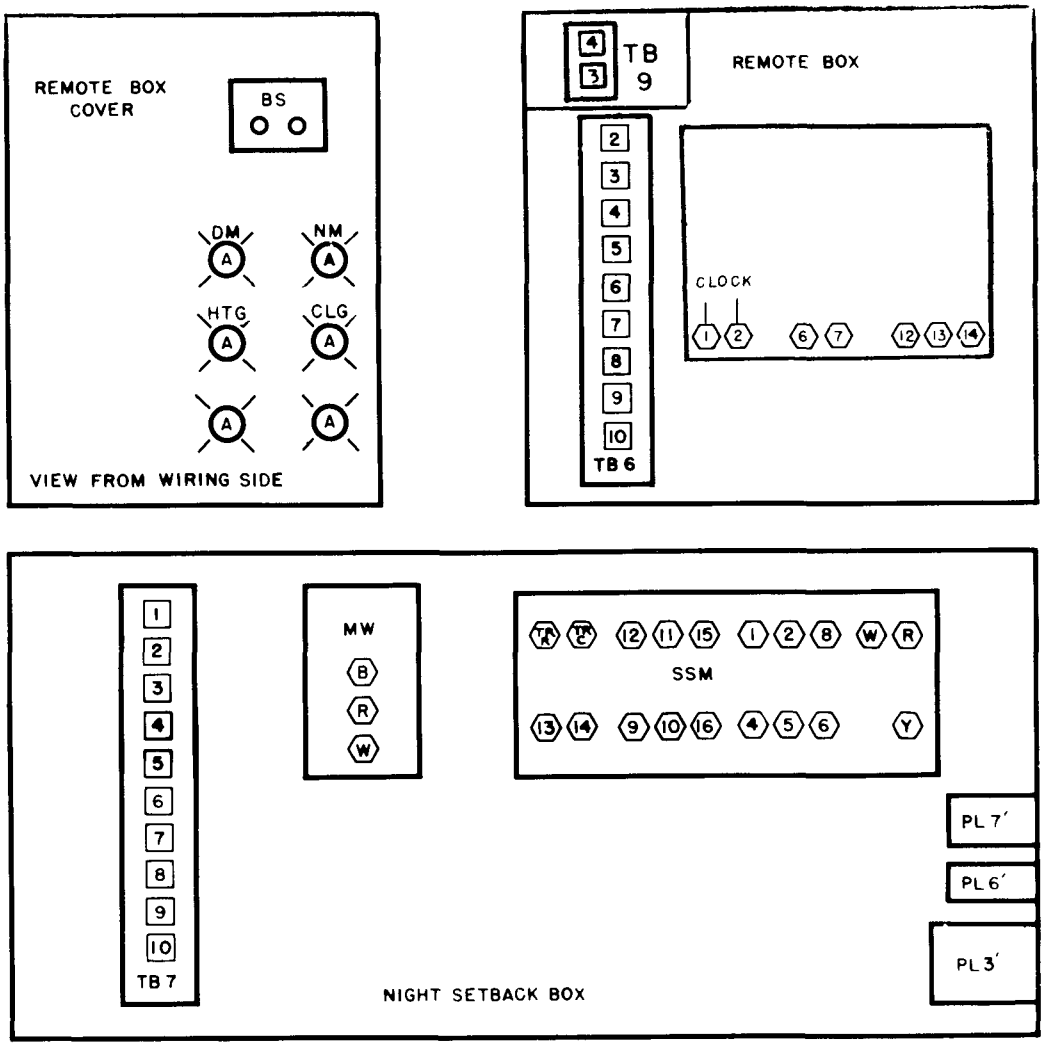


Fig. 20 — Label Diagram, Component Arrangement; Energy Management Option/Accessory

MOTORMASTER®

Use the following data, plus Installation Instructions packaged with Model 32LT Motormaster solid-state head pressure control, to apply Motormaster to 50DL cooling units.

1. **Locate Motormaster Control** as shown in Fig. 21, using the mounting template provided in the 32LT Installation Instructions.
2. **Power Wiring** must be checked to ensure that it is as specified and in compliance with local code requirements. Wire Motormaster control in series with fan motor (Fig. 22). Route the Motormaster power lead thru field-supplied connector in bottom of unit control box. If necessary, drill hole in bottom of control box. Use the 200/230-volt Motormaster unit.
3. **Winter Start Control** is required on all 50DL 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. 23)
4. **Locate Motormaster Control Sensor.** Route sensor wire from bottom of Motormaster control to the specified sensor location as shown in Fig. 24.

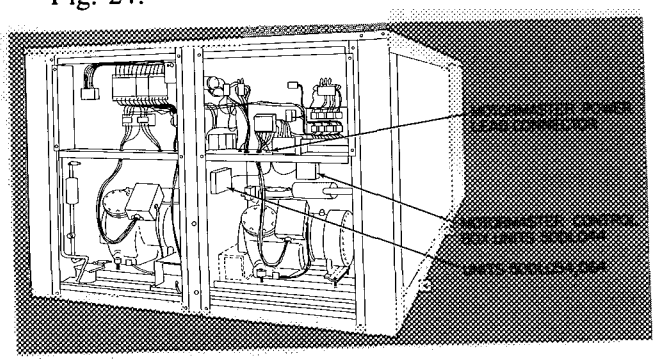


Fig. 21 — Motormaster® Control Location

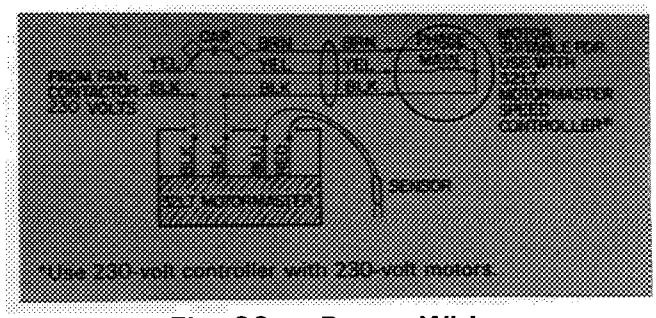


Fig. 22 — Power Wiring

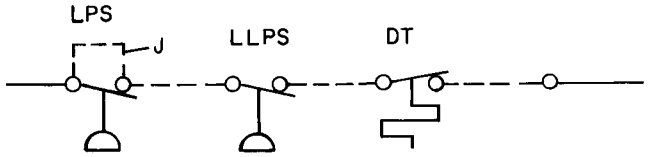


Fig. 23 — Defrost Thermostat with Jumper on Low-Pressure Switch and New Liquid Line Low-Pressure Switch Installed

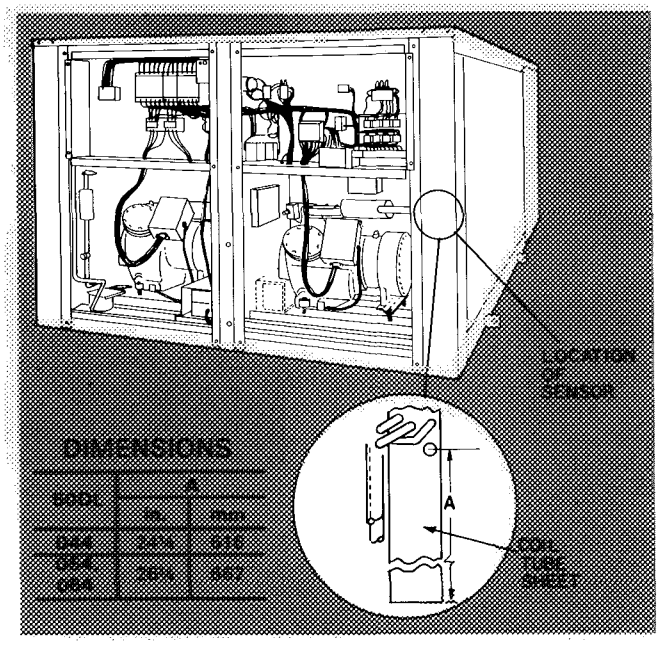


Fig. 24 — Motormaster Control Sensor Location

5. **Wind baffle** is required to prevent wind cross-currents from causing abnormal operation as fan speed control is modulated. Construct and apply baffle as shown in Fig. 25.

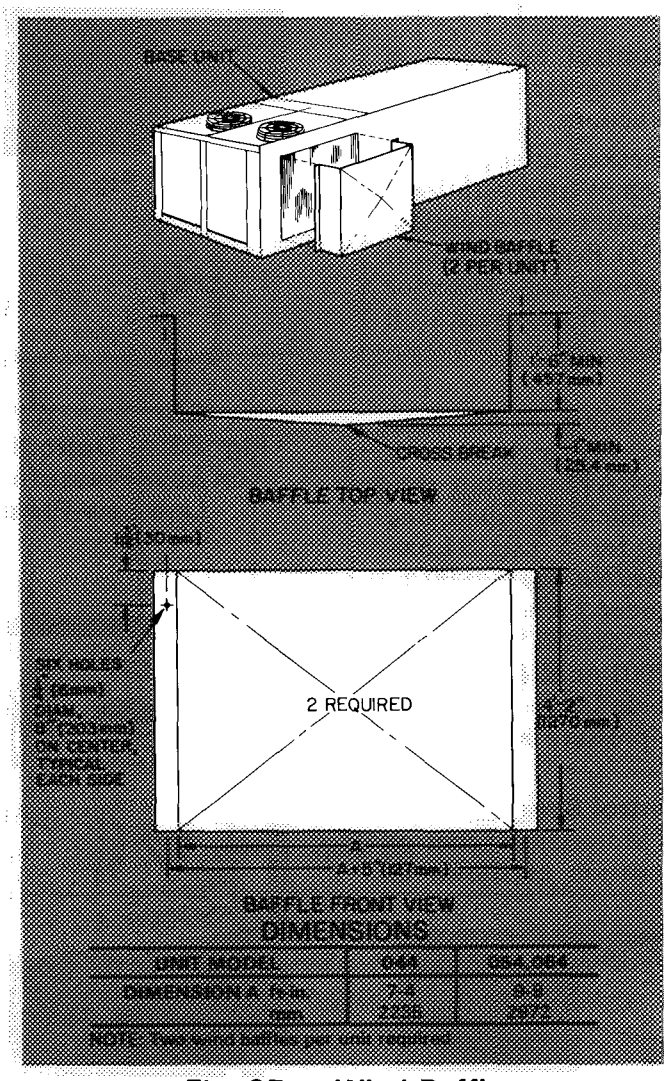


Fig. 25 — Wind Baffle