



Wiring Diagrams

INDEX

UNIT 50HJQ	LABEL DIAGRAM TYPE	VOLTAGE-Hz (3 Ph)	LABEL DIAGRAM NO. 50HJ502---	FIGURE NO.
014	Component Arrangement	208/230-60	337	1
		460-60	338	2
		575-60	339	3
	Schematic	208/230-60	337	4
		460-60	338	5
		575-60	339	6
016	Component Arrangement	208/230-60	330	7
		400-50	333	8
		460-60	331	9
		575-60	332	10
	Schematic	208/230-60	330	11
		400-50	333	12
		460-60	331	13
		575-60	332	14

ACCESSORIES

Item	Figure No.
Power Exhaust	15,16
Time Guard® II Device (016 Only)	17
Economizer and Smoke Control/Fire Shutdown*	18
Zero °F Low-Ambient Kit	19
Motormaster® Head Pressure Control Device	20-22
Remote Control Panel	23
Emergency Heat	24
Indoor-Air Quality Sensor Wiring	25

*Requires economizer and power exhaust

SEQUENCE OF OPERATION

Cooling, Units Without Economizer — With unit main power on, set thermostat to COOL position and desired room temperature. Set fan switch at AUTO. (on demand) or ON (continuous) position.

On a rise in room temperature, cooling contact no. 1 in the thermostat closes. The indoor and outdoor fan motors start. If the 5-minute compressor time-delay (CTD) on the defrost board (DB) is satisfied, then compressor no. 1 contactor is energized and compressor no. 1 will start. Compressor no. 1 cycles on demand of the thermostat to satisfy room conditions. Each time the cooling contactor no. 1 opens, the CTD starts the 5-minute delay.

On 50HJQ016 units, with an additional rise in room temperature, cooling contactor no. 2 in the thermostat closes, energizing compressor contactor no. 2. Compressor no. 2 starts and cycles on demand of the thermostat to satisfy the occupied space demands.

Cooling, Units With Economizer — Upon a call for cooling, when outdoor ambient temperature is above the temperature control setting, the indoor and outdoor fans and

compressor(s) energize. The economizer damper moves to vent position.

Upon a first-stage call for cooling, when outdoor ambient temperature is below the temperature control setting, the indoor fan starts and economizer damper modulates to maintain mixed-air temperature. The compressor(s) remains off.

Upon a second-stage call for cooling, compressor no. 1 (50HJQ016) or unloaded compressor (50HJQ014) is energized and mechanical cooling is integrated with economizer cooling. Compressor no. 2 (50HJQ016) is locked out. If the air temperature is below 50 F (10 C), a cooling lockout switch prevents the compressor(s) from running.

When supply-air temperature drops below a fixed set point, the economizer damper modulates to maintain the temperature at the fixed set point.

A freeze protection thermostat (FPT) is located on the indoor coil. It detects frost build-up and turns off the compressor(s), allowing the coil to clear. Once frost has melted, the compressor can be reenergized.

Heating, Units Without Economizer — With unit main power on, set thermostat at HEAT position and desired room temperature. Set fan switch at AUTO. (on demand) or ON (continuous) position.

On a drop in room temperature, heating contact no. 1 in the thermostat closes, energizing heat relay (HR), reversing valve relay (RVR), reversing valve solenoids (RVS1 and RVS2) and compressor no. 2 contactor. Compressor (014) or compressor no. 2 (016) and indoor and outdoor fan motors start. If the 5-minute CTD on the DB is satisfied, then compressor no. 1 contactor is energized and compressor no. 1 will start.

On units equipped with electric heat, when additional heat is needed, heating contactor no. 2 in the thermostat closes, energizing W2.

Heating, Units with Economizer — With unit main power on, set thermostat at HEAT position and desired room temperature. Set fan switch at AUTO. (on demand) or ON (continuous) position.

On a drop in room temperature, heating contact no. 1 in the thermostat closes, energizing heat relay (HR), reversing valve relay (RVR), reversing valve solenoids (RVS1 and RVS2) and compressor no. 2 contactor. Compressor no. 2 (016) and indoor and outdoor fan motors (014,016) start. If the 5-minute CTD on the DB is satisfied, then compressor (014) or compressor no. 1 (016) contactor is energized and compressor (014) or compressor no. 1 (016) will start. The outdoor-air damper stays at vent position while the indoor fan is operating.

On units equipped with electric heat, when additional heat is needed, heating contactor no. 2 in the thermostat closes, energizing W2.

Defrost Cycle — When the temperature of the outdoor coil drops below 28 F (–2.2 C) as sensed by the defrost thermostat (DFT1 or DFT2), the defrost timer starts. At the end of a timed period (field set at 30, 50, or 90 minutes), the defrost cycle will begin. The defrost board energizes terminals O and W2, energizes the defrost relay (DR), deenergizes the reversing valve solenoids (RVS1 and RVS2), and energizes the electric heat. The outdoor-fan motor will stop.

The unit continues to defrost either until the coil temperature as measured by DFT1 or DFT2 reaches 65 F (18.3 C), or until unit completes a 10-minute defrost cycle.

During the defrost mode, when a circuit defrosts, RVS will oscillate between heating and cooling modes until defrost mode is complete. This will prevent the head pressure from getting too high.

At the end of the defrost cycle, the electric heaters (if applicable) will be deenergized, the reversing valve solenoids will be energized, and the outdoor fans will start.

Automatic Changeover — When the system selection switch is set at AUTO. position, unit automatically changes from heating operation to cooling operation when the temperature of the conditioned space rises to the cooling lever setting. When the temperature of the conditioned space falls to the heating lever setting, unit automatically changes from cooling to heating operation (with a 3 F [1.7 C] deadband in between).

Continuous Air Circulation — Turn unit power on. Set system control at OFF position. Set fan switch at ON position. The indoor-fan contactor is energized through the thermostat switch and the indoor fan runs continuously.

Cycle-LOC™ Protection — If unit operation is interrupted by an open high-pressure switch, low-pressure switch, indoor coil freezestat, or by compressor internal line-break device (overcurrent or overtemperature), and compressor is calling for either cooling or heating, Cycle-LOC protection device simultaneously locks out unit and lights a warning light on the thermostat. Restart the unit by manually turning thermostat to OFF and then to ON position. If any of the protective devices opens again, the unit continues to lock out until corrective action is taken.

NOTE: If the unit fails to operate due to compressor overcurrent condition, restart by manually resetting circuit breakers at the unit. Restart cannot be accomplished at the room thermostat.

Emergency Heat — If compressor is inoperative due to a tripped safety device (high or low pressure, indoor coil freezestat, overcurrent, or overtemperature), the Cycle-LOC device locks out the compressor and lights a warning light on the room thermostat. When the switch is field installed into the unit, compressor circuit and outdoor thermostats are bypassed, and the second stage of thermostat energizes the indoor blower and the electric resistance heaters.

LEGEND (Fig. 1-14 and 18)

AHA	— Adjustable Heat Anticipator	LOR	— Lockout Relay
BRK W/AT	— Breaks With Amp Turns	LPS	— Low-Pressure Switch
C	— Contactor, Compressor	LS	— Limit Switch
CAP	— Capacitor	MAT	— Mixed-Air Thermostat
CB	— Circuit Breaker	OAT	— Outdoor-Air Thermostat
CC	— Cooling Compensator	OF	— Outdoor Fan
CH	— Crankcase Heater	OFC	— Outdoor (Condenser) Fan Contactor
CLO	— Compressor Lockout	OFM	— Outdoor (Condenser) Fan Motor
CLS	— Cooling Lockout Switch	OP	— Overcurrent Protector
COM	— Common	PL	— Plug Assembly
COMP	— Compressor Motor	QT	— Quadruple Terminal
CT	— Current Transformer	RVR	— Reversing Valve Relay
CTD	— Compressor Time Delay	RVS	— Reversing Valve Solenoid
DB	— Defrost Board	SR	— Solenoid Relay
DFT	— Defrost Thermostat	SW	— Switch
DM	— Damper Motor	TB	— Terminal Block
DR	— Defrost Relay	TC	— Thermostat Cooling
DU	— Dummy Terminal	TH	— Thermostat Heating
EAS	— Economizer Actuator Auxiliary Switch	TRAN	— Transformer
EM	— Exhaust Motor	U	— Unloaded
EQUIP	— Equipment	UR	— Unloader Relay
FL	— Fuse Link		
FLA	— Full Load Amps		Terminal (Marked)
FPT	— Freeze Protection Thermostat		Terminal (Unmarked)
FU	— Fuse		Terminal Block
GND	— Ground		Splice
HC	— Heater Contactor		Factory Wiring
HPS	— High-Pressure Switch		Field Wiring
HR	— Heat Relay		To indicate common potential only, not to represent wiring
HTR	— Heater		Option/Accessory Wiring
IFC	— Indoor (Evaporator) Fan Contactor		
IFCB	— Indoor (Evaporator) Fan Circuit Breaker		
IFM	— Indoor (Evaporator) Fan Motor		
IFR	— Indoor (Evaporator) Fan Relay		
IP	— Internal Protector		
L	— Light		
LLS	— Liquid Line Solenoid		

NOTES (Fig. 1-14)

1. Compressor and/or fan motor(s) is thermally protected. Three-phase motors are protected against primary single-phasing conditions.
2. If any of the original wire furnished must be replaced, it must be replaced with type 90° C or its equivalent.
3. Jumpers are omitted when unit is equipped with economizer.
4. Set thermostat heat anticipator(s) according to electric heat chart.
5. The CB1 and CB2 must trip amps are equal to or less than 156% FLA, and IFCB must trip amps are equal to or less than 140% FLA.
6. Number(s) indicates 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.
7. TRAN1 and 2 are wired for 230-v units. If 208/230-v unit is to be run with 208-v power supply. TRAN1 and 2 must be rewired as follows:
 - a. On both TRAN1 and TRAN2, disconnect the black wire from the orange wire.
 - b. On both TRAN1 and TRAN2, connect the black wire to the red wire.
 - c. Apply wirenuts to the orange TRAN1 and TRAN2 wires.
8. The CLO locks out the compressor to prevent short cycling on compressor overload and safety devices. Before replacing CLO, check these devices.
9. Remove jumper between terminals RC and RH.

ELECTRIC HEAT		AHA SETTING	
	208/240 V Amps	208/240 V kW	
			1st 2nd
A	39/ 45	14.0/18.8	1.00 0.26
B	72/ 82	25.7/34.2	1.00 0.52
C	117/135	42.3/56.1	1.00 0.78

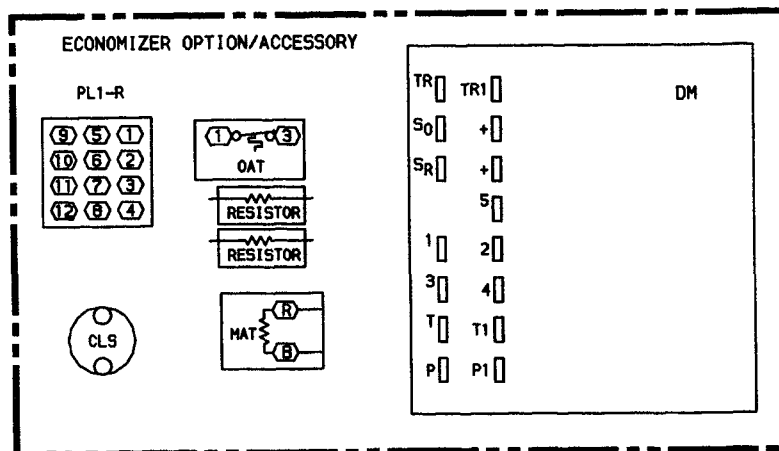
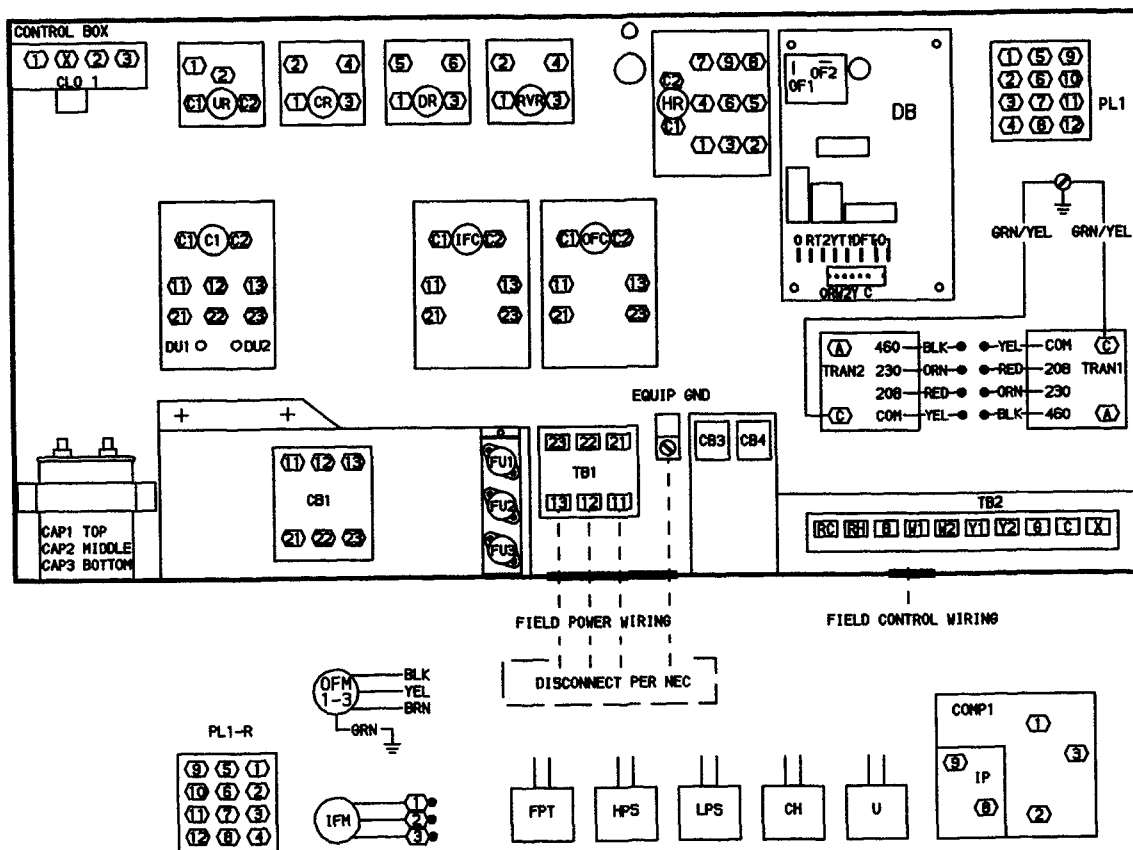
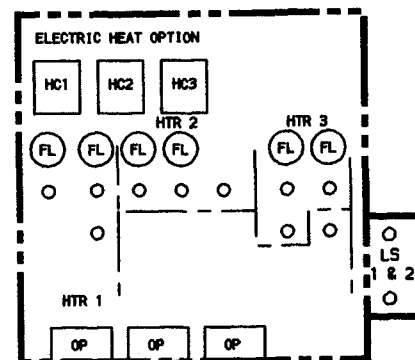


Fig. 1 — Label Diagram, Component Arrangement; 50HJQ014, 208/230 V, 60 Hz Unit

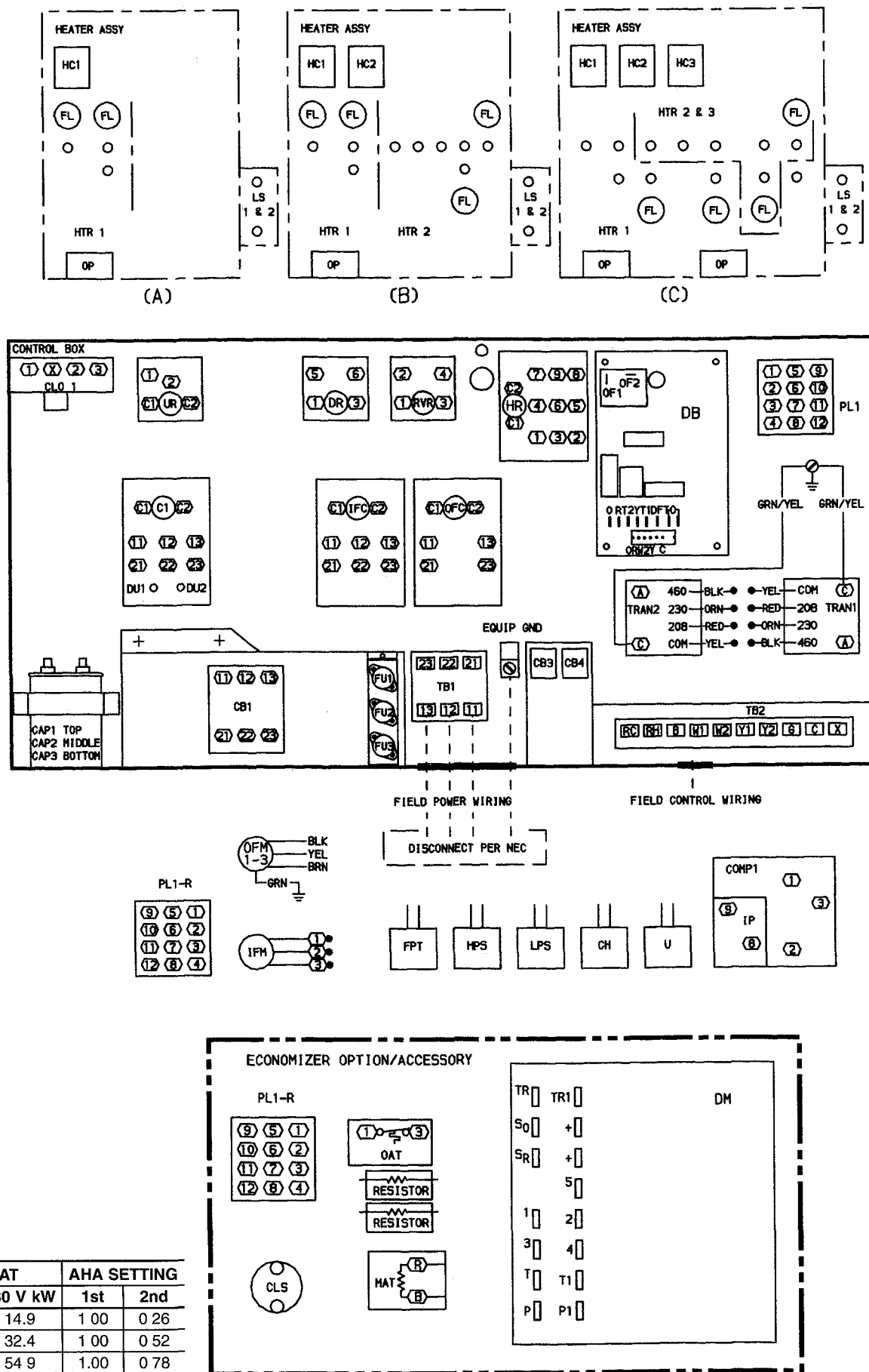
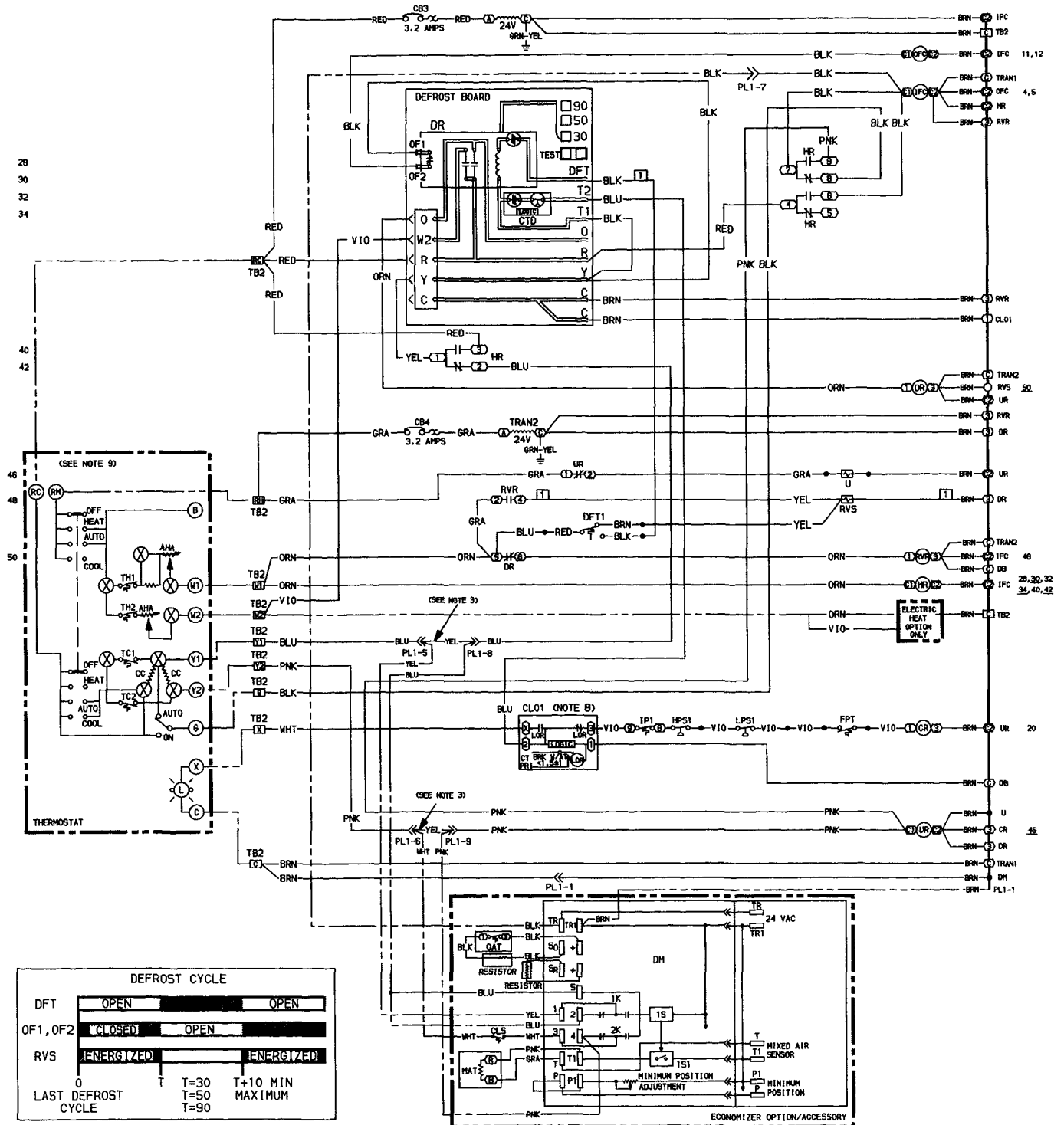


Fig. 2 — Label Diagram, Component Arrangement; 50HJQ014, 460 V, 60 Hz Unit

Diagram of the HEATER ASSY. The assembly includes three main components labeled HC1, HC2, and HC3. Below these are two horizontal sections labeled HTR 1 and HTR 2 & 3. HTR 1 contains two circular components labeled FL. HTR 2 & 3 contains three circular components labeled FL. The diagram also shows various other components labeled OP, LS, and 1 & 2.







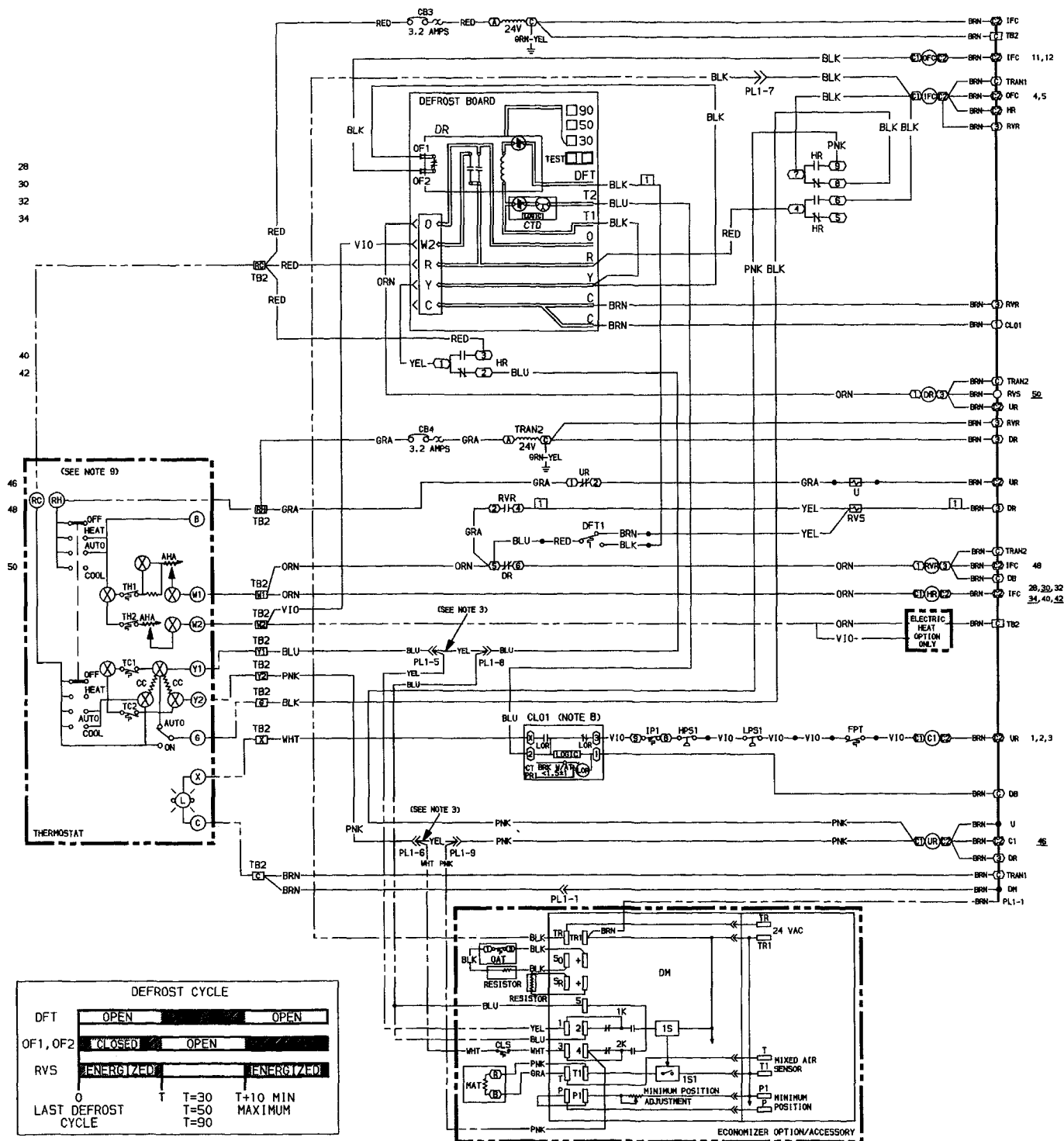


Fig. 5 — Label Diagram, Schematic; 50HJQ014, 460 V, 60 Hz Unit (cont)

ELECTRIC HEAT		AHA SETTING	
575 V Amps	575 V kW	1st	2nd
50	49.6	1.00	1.00

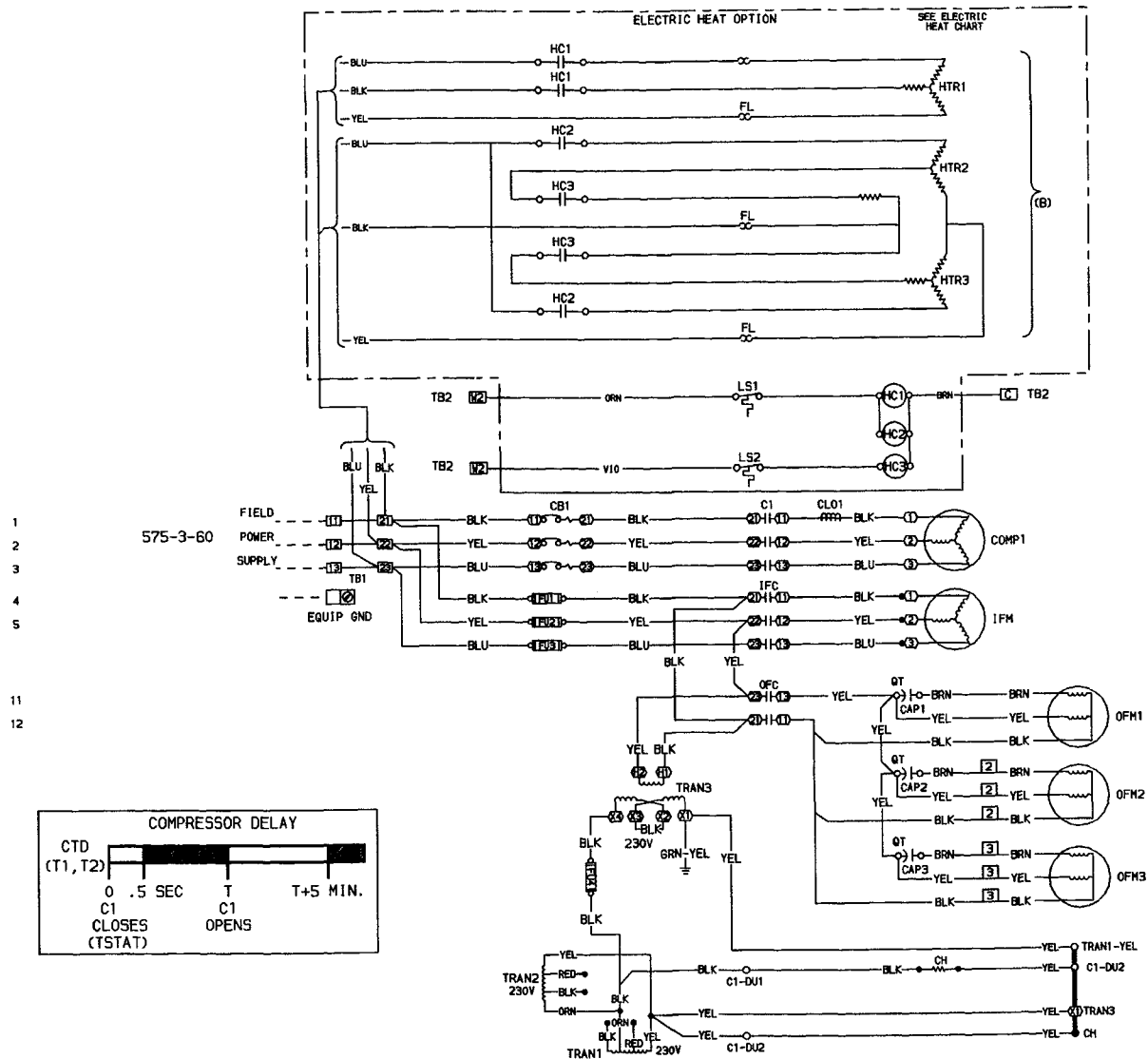


Fig. 6 — Label Diagram, Schematic; 50HJQ014, 575 V, 60 Hz Unit

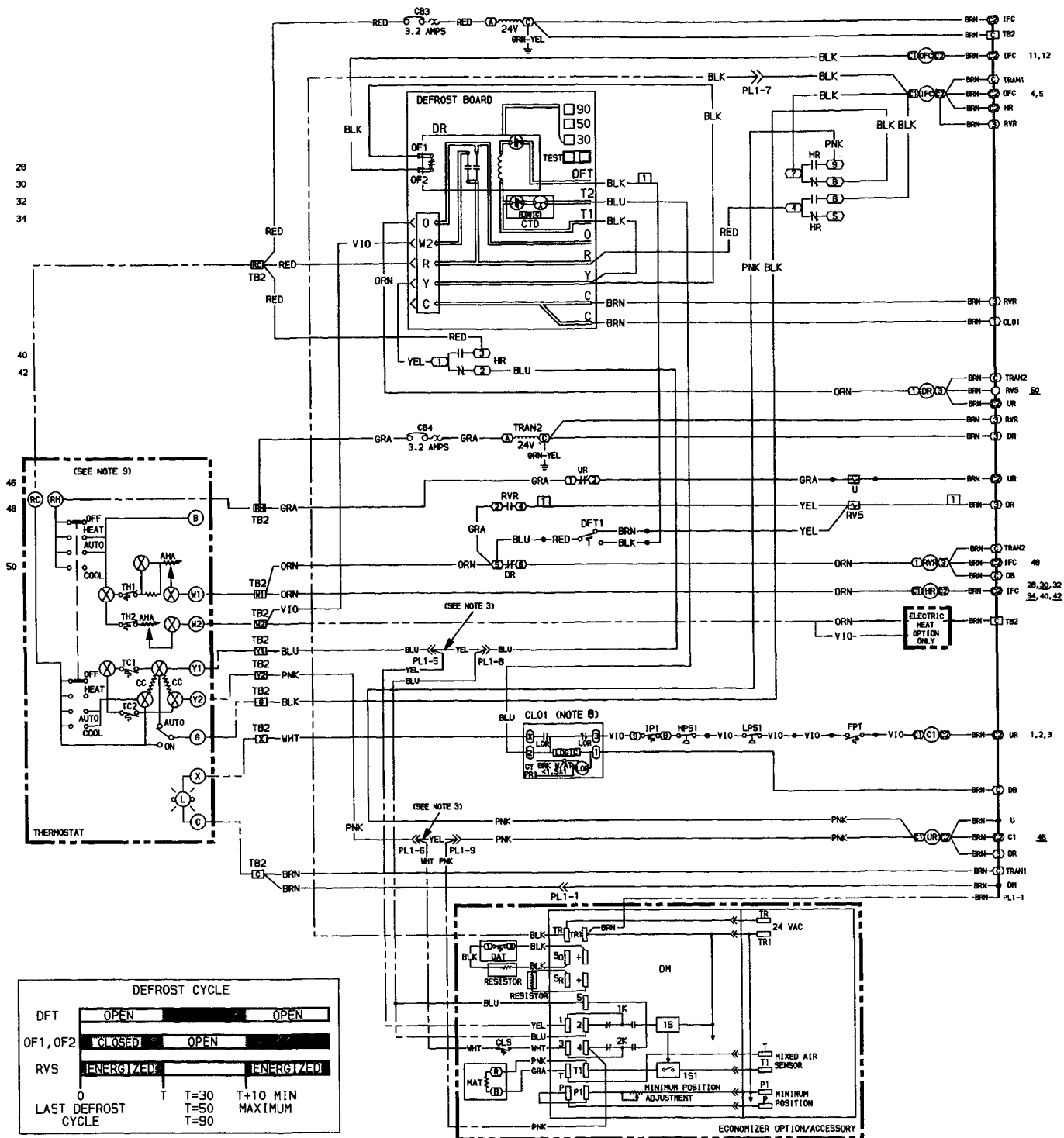


Fig. 6 — Label Diagram, Schematic; 50HJQ014, 575 V, 60 Hz Unit (cont)

ELECTRIC HEAT		AHA SETTING	
	208/240 V Amps	208/240 V kW	
	1st	2nd	
A	72/ 82	25 7/34.2	1.00 0.52
B	117/135	42 3/56 1	1.00 0.78

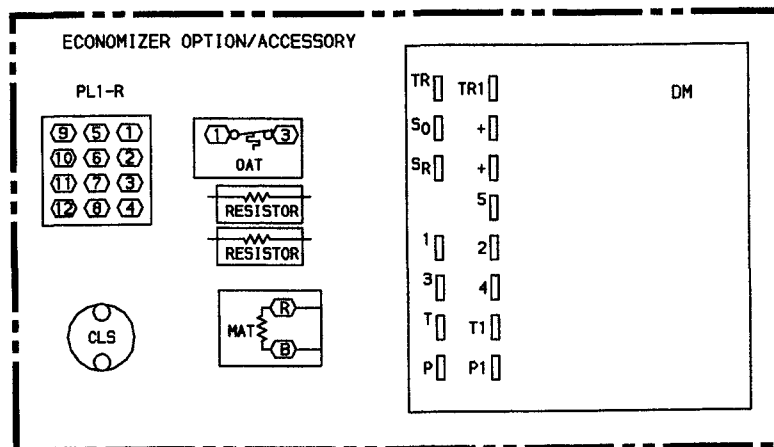
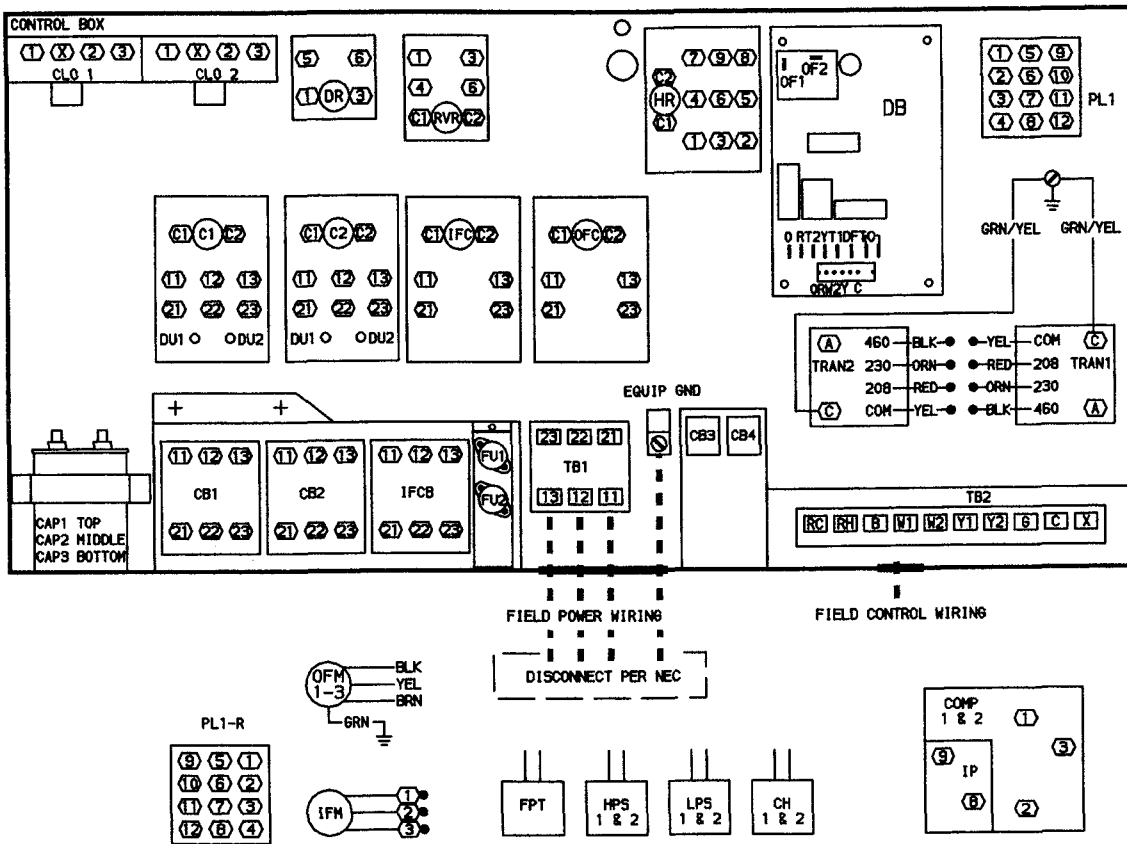
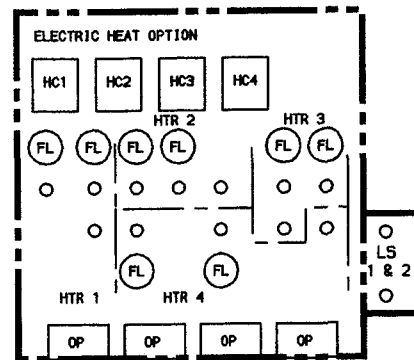
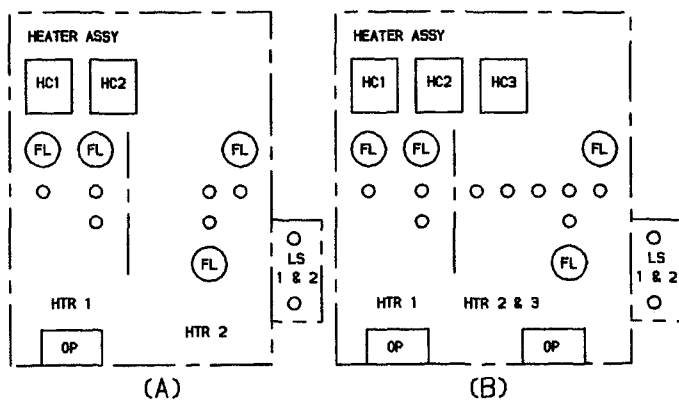


Fig. 7 — Label Diagram Component Arrangement; 50HJQ016, 208/230 V, 60 Hz Unit



	ELECTRIC HEAT		AHA SETTING	
	480 V Amps	480 V kW	1st	2nd
A	34	23.3	1.00	0.52
B	57	39.6	1.00	0.78

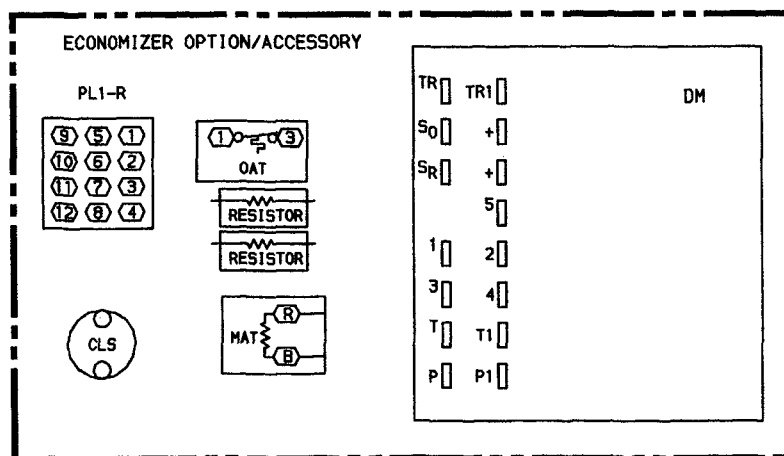
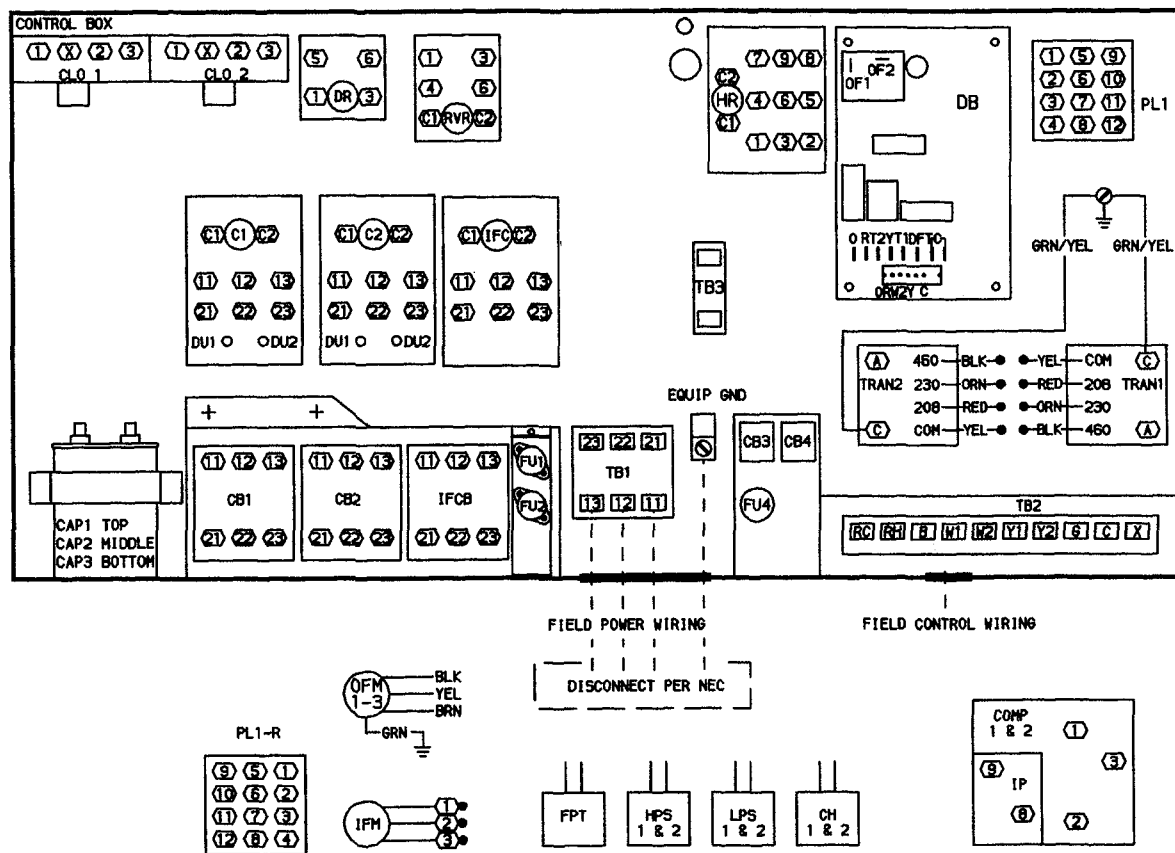
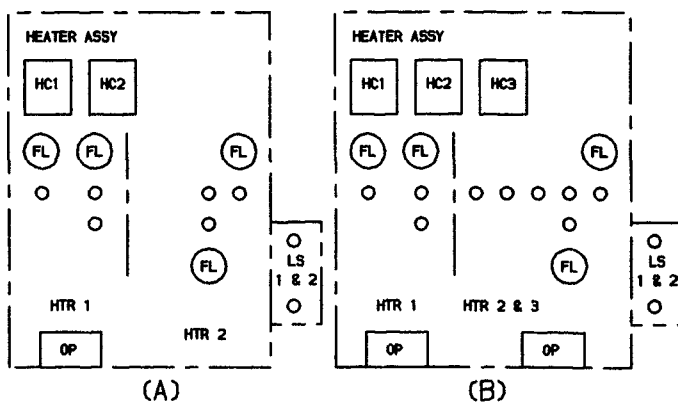


Fig. 8 — Label Diagram, Component Arrangement; 50HJQ016, 400 V, 50 Hz Unit



	ELECTRIC HEAT		AHA SETTING	
	480 V Amps	480 V kW	1st	2nd
A	39	32.4	1.00	0.52
B	66	54.9	1.00	0.78

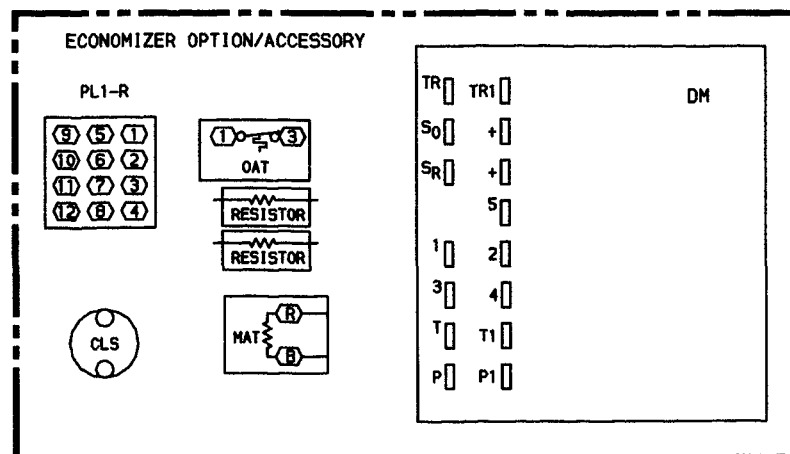
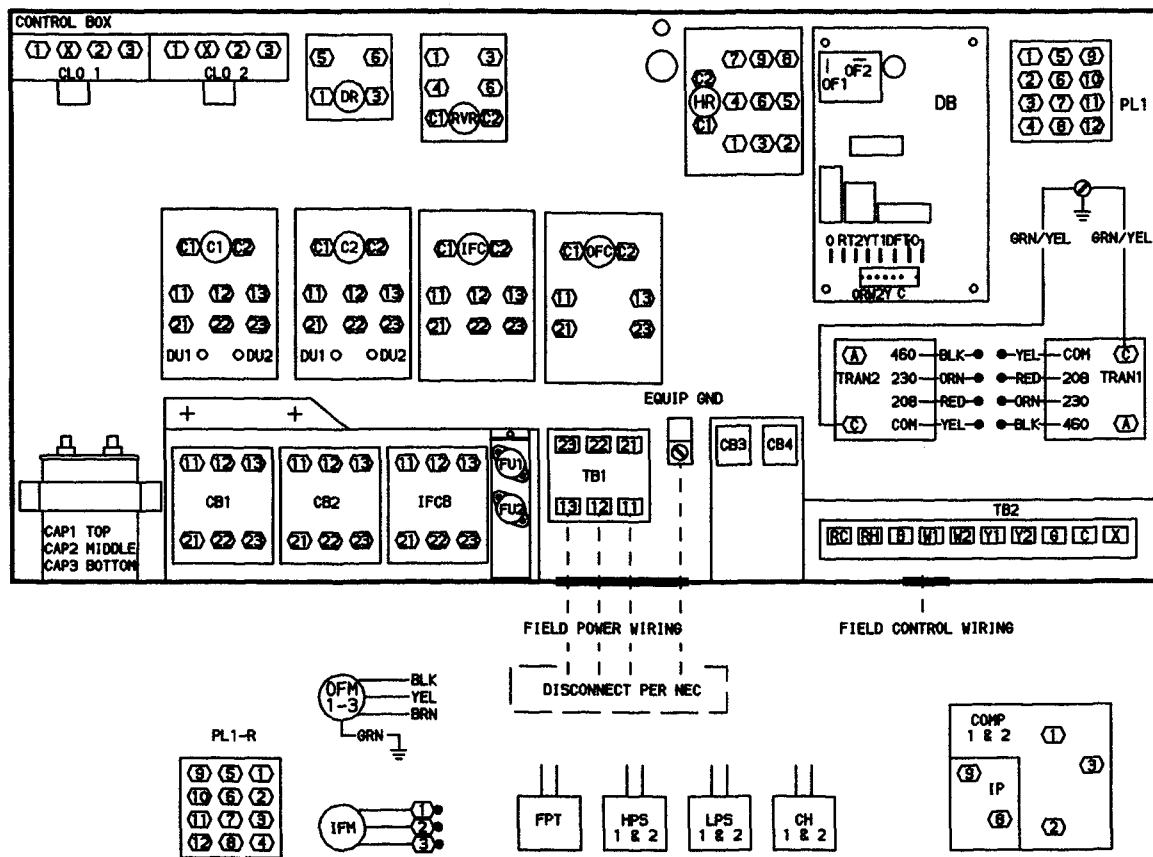


Fig. 9 — Label Diagram, Component Arrangement; 50HJQ016, 460 V, 60 Hz Unit

ELECTRIC HEAT		AHA SETTING	
575 V Amps	575 V kW	1st	2nd
50	49.6	1 00	1 00

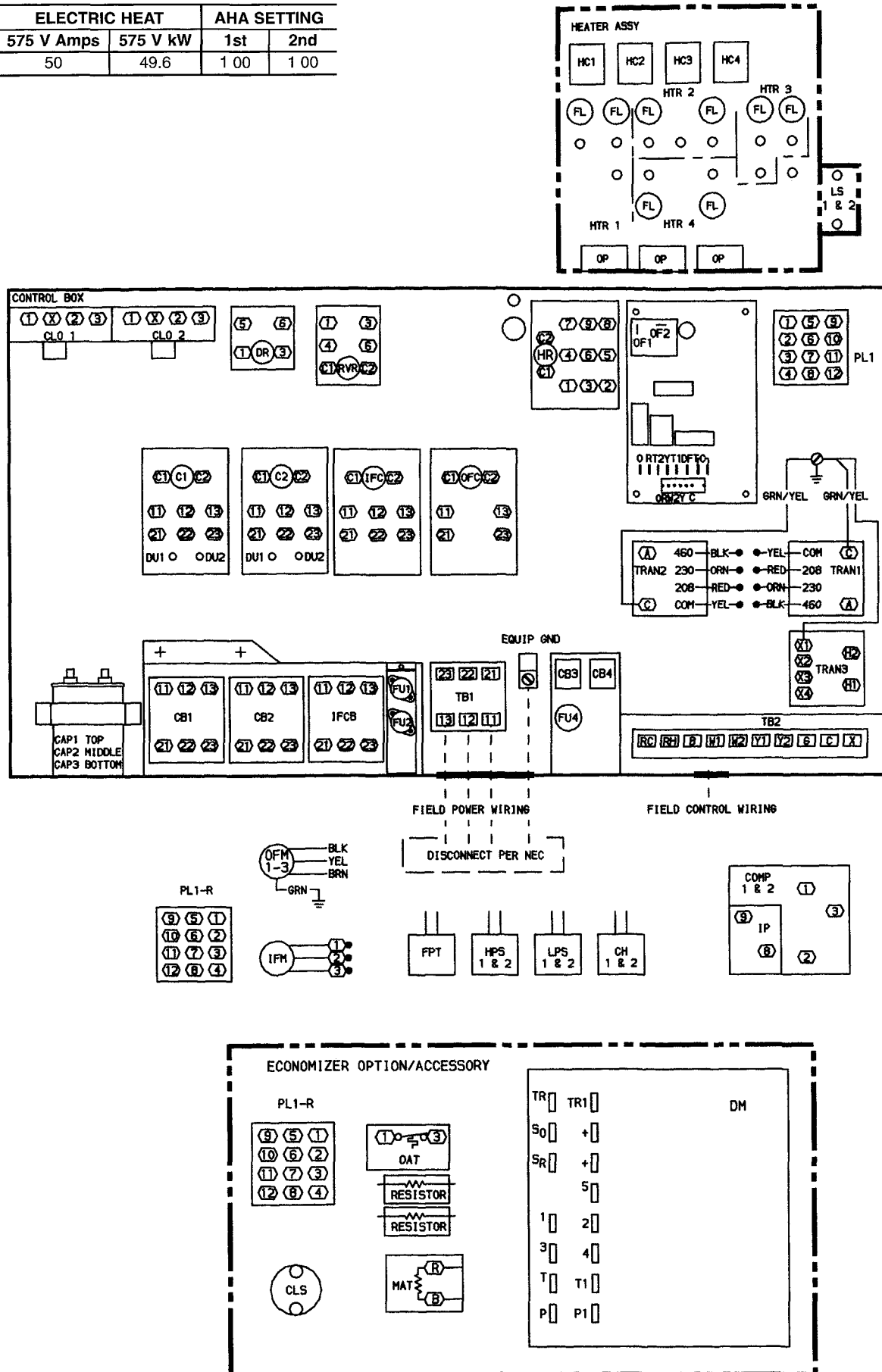


Fig. 10 — Label Diagram, Component Arrangement; 50HJQ016, 575 V, 60 Hz Unit

ELECTRIC HEAT			AHA SETTING	
	208/240 V Amps	208/240 V kW	1st	2nd
A	72/ 82	25.7/34.2	1.00	0.52
B	117/135	42.3/56.1	1.00	0.78

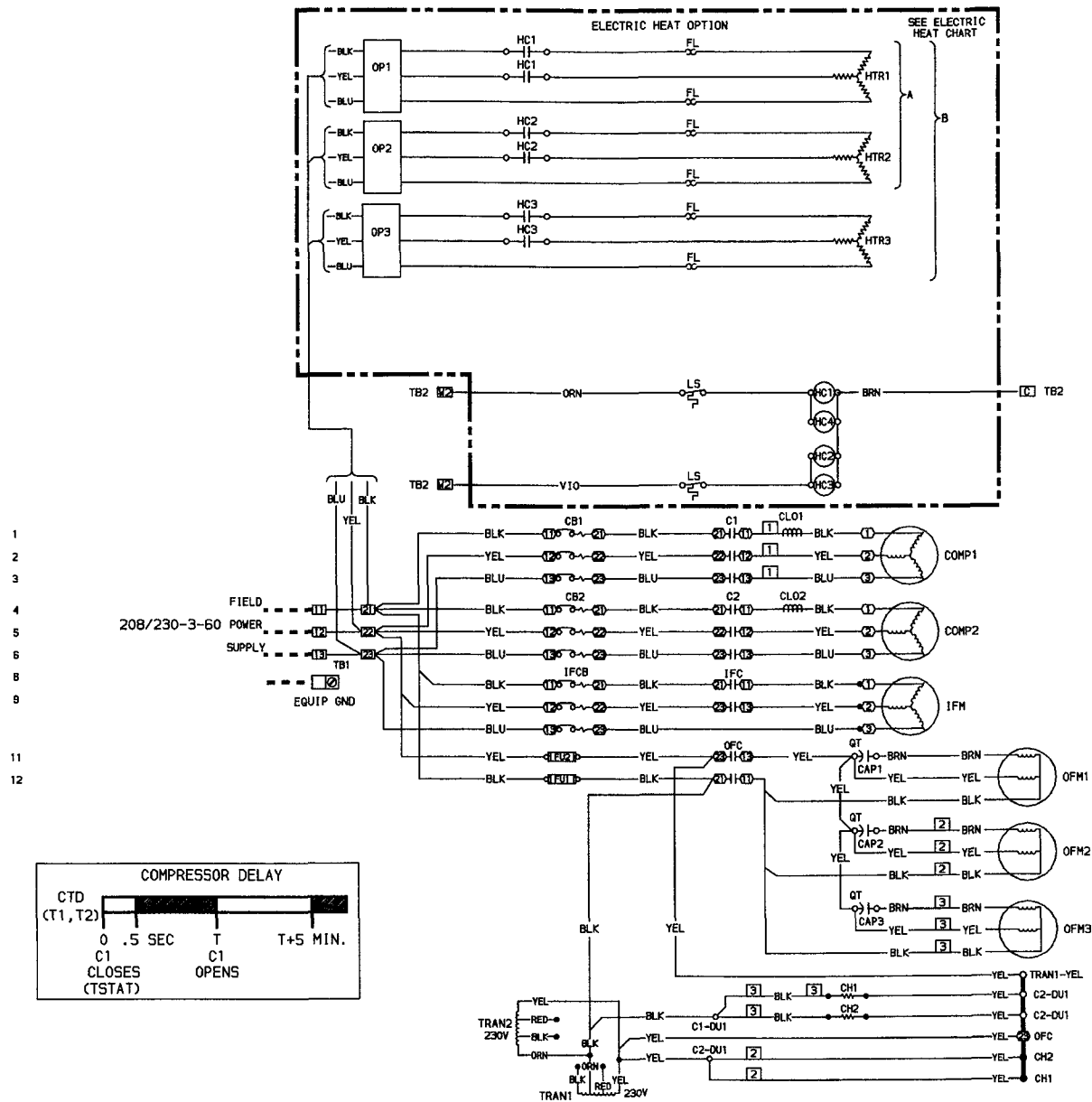
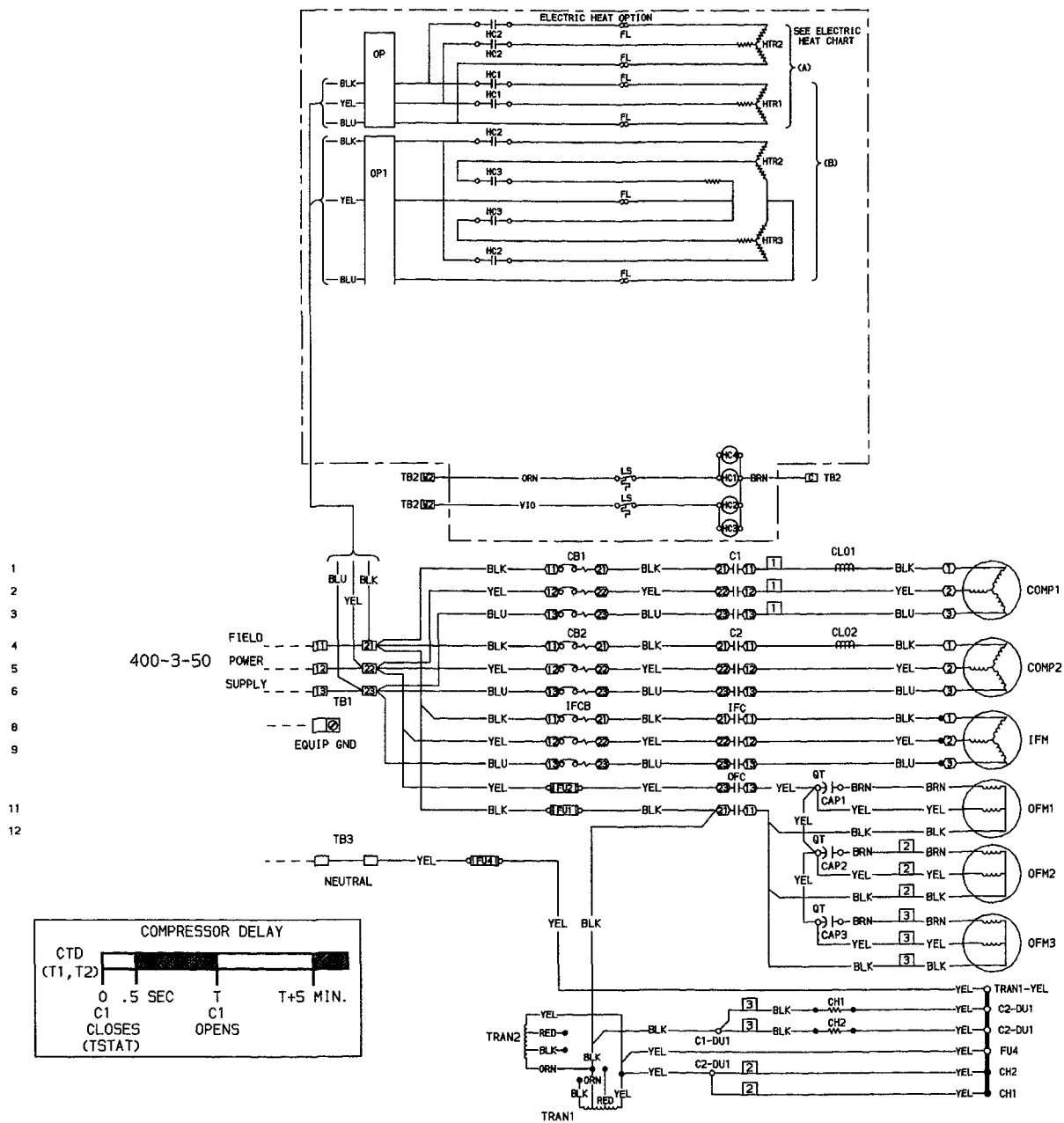
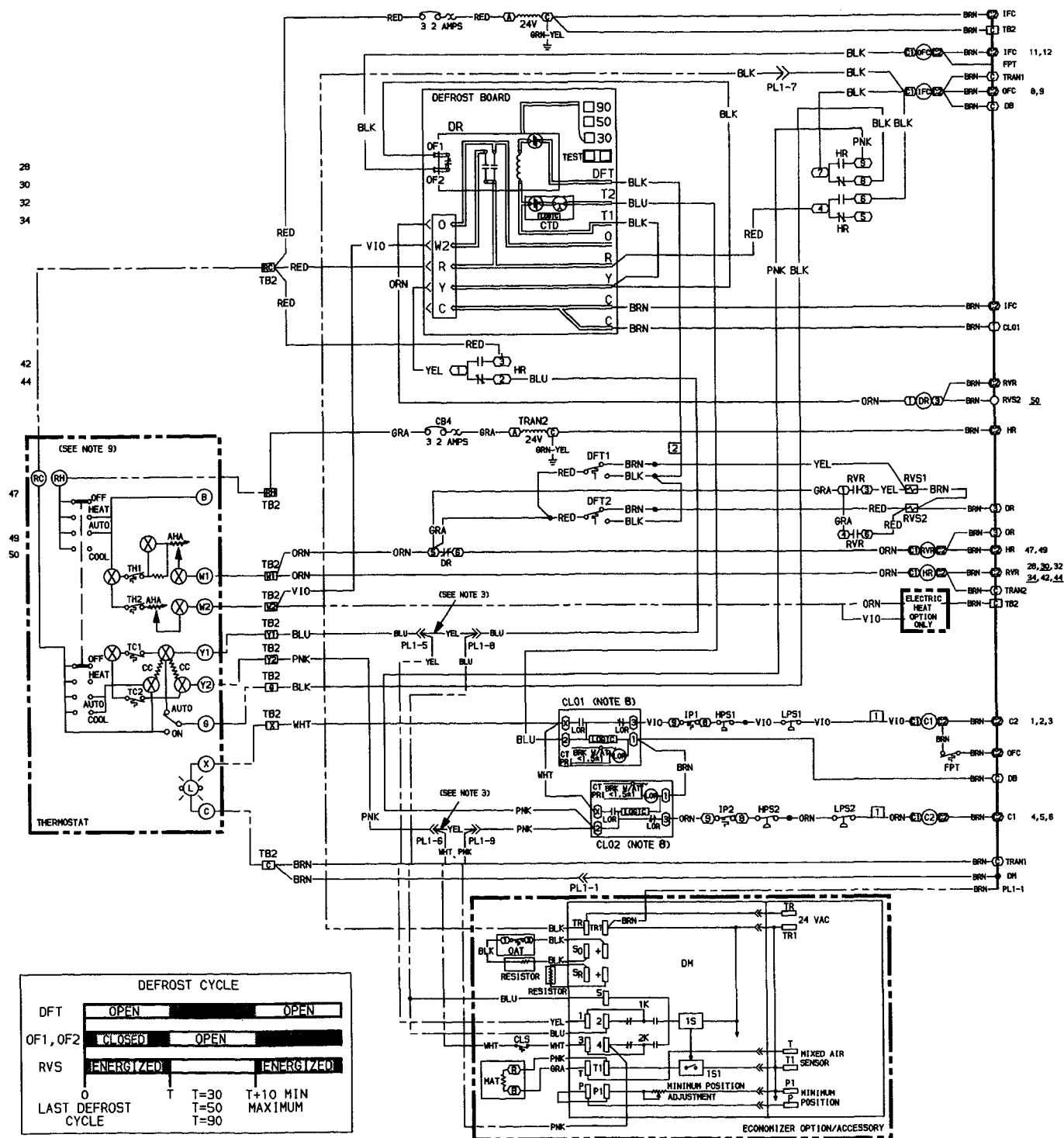


Fig. 11 — Label Diagram, Schematic; 50HJQ016, 208/230 V, 60 Hz Unit

ELECTRIC HEAT			AHA SETTING	
	400 V Amps	400 V kW	1st	2nd
A	34	23.3	1 00	0 52
B	57	39.6	1 00	0 78





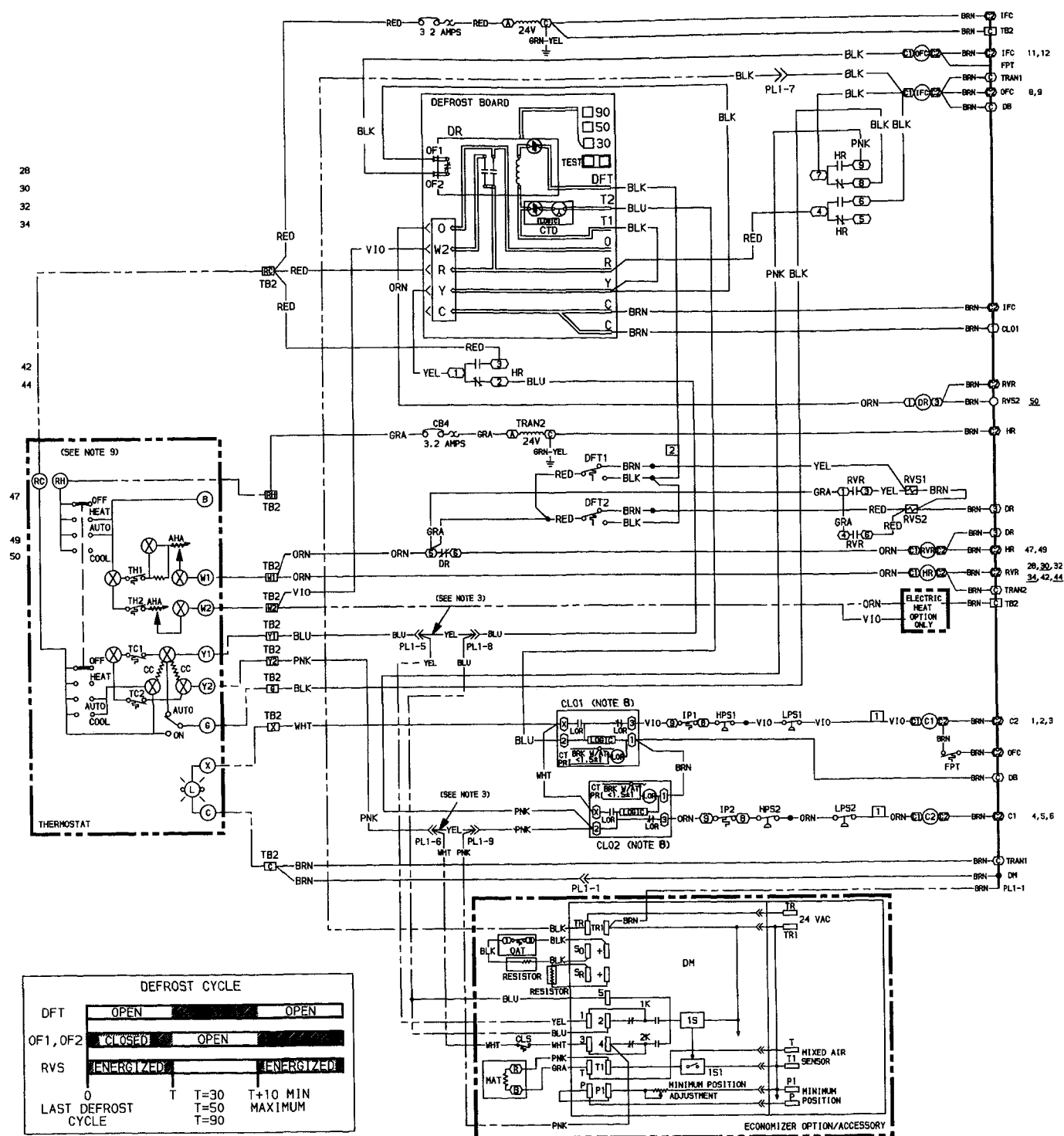


Fig. 13 — Label Diagram, Schematic; 50HJQ016, 460 V, 60 Hz Unit (cont)

ELECTRIC HEAT		AHA SETTING	
575 V Amps	575 V kW	1st	2nd
50	49.6	1.00	1.00

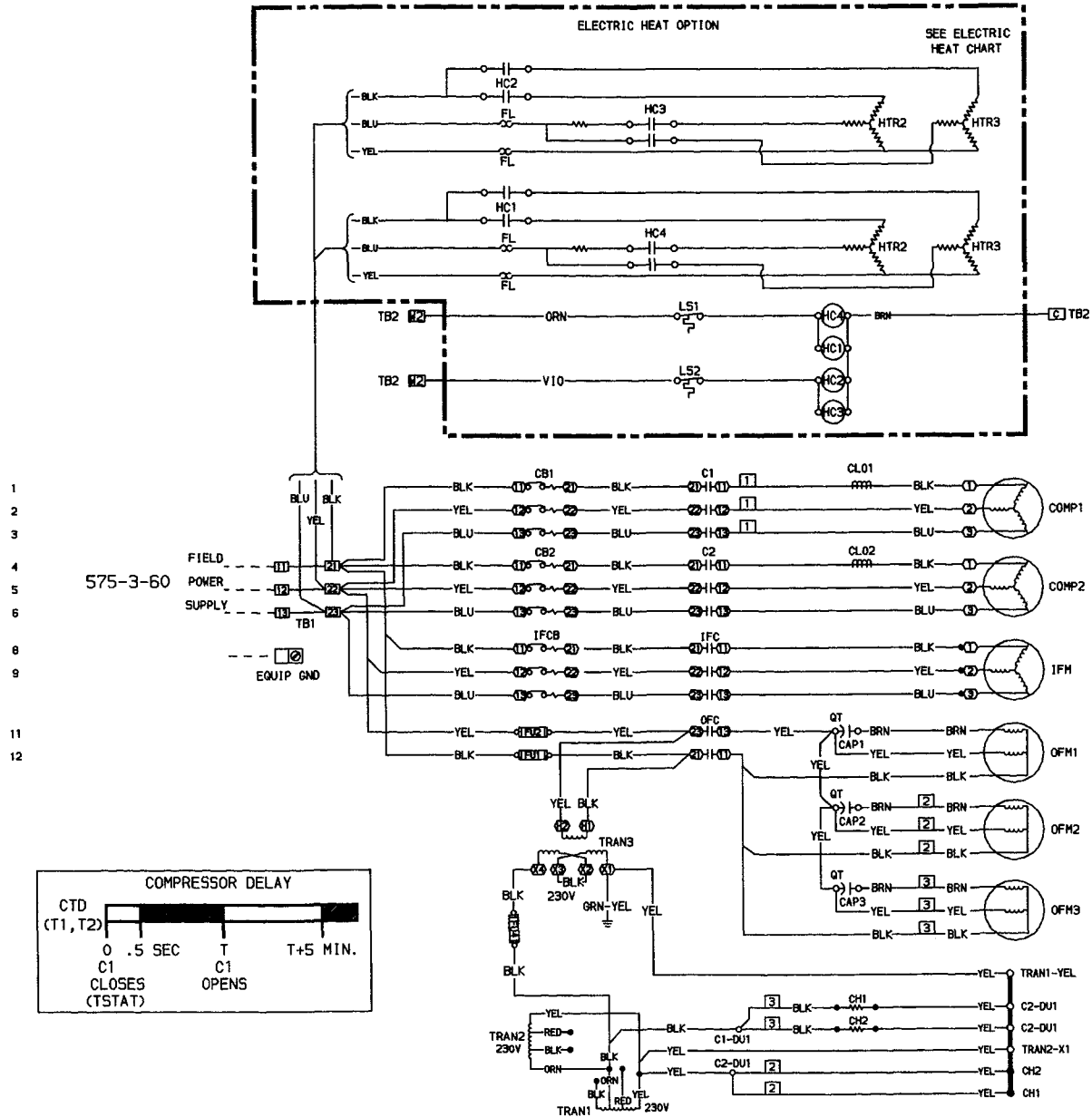
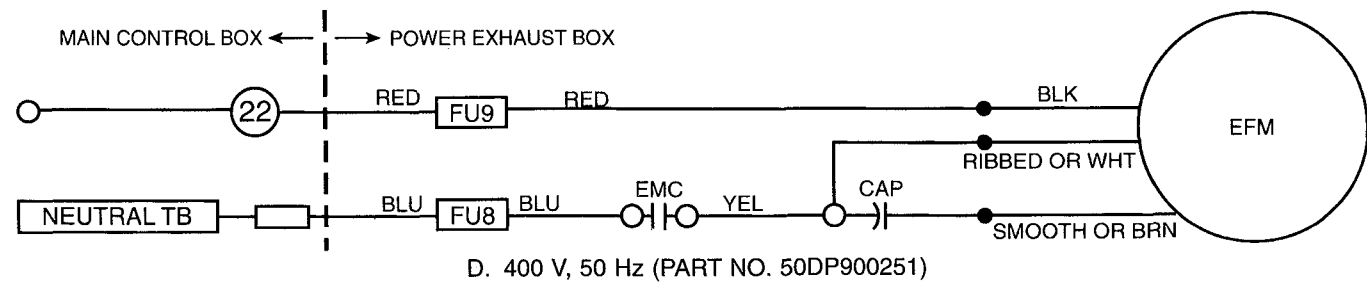
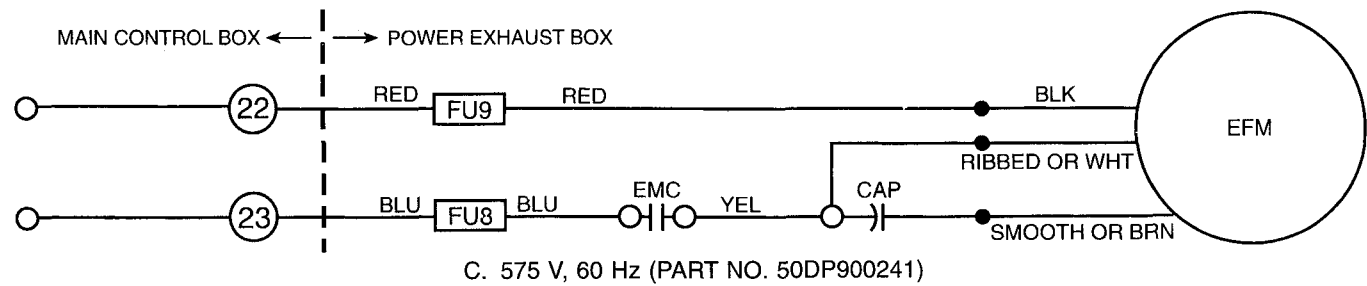
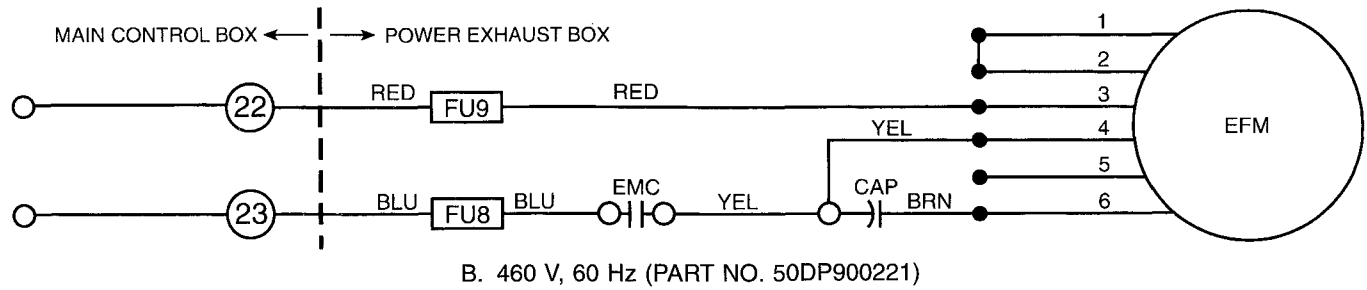
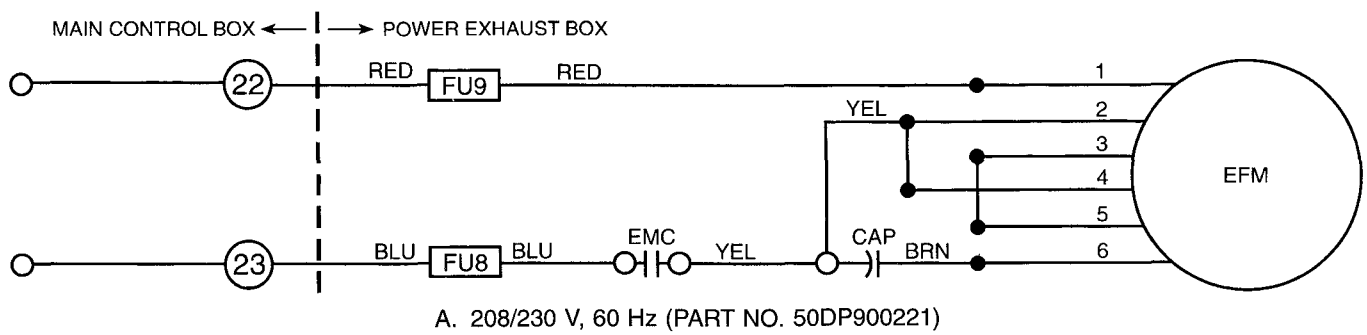


Fig. 14 — Label Diagram, Schematic; 50HJQ016, 575 V, 60 Hz Unit



LEGEND

CAP — Capacitor
EMC — Exhaust Motor Contactor
EFM — Exhaust Fan Motor
FU — Fuse
TB — Terminal Block

Fig. 15 — Power Exhaust Power Wiring

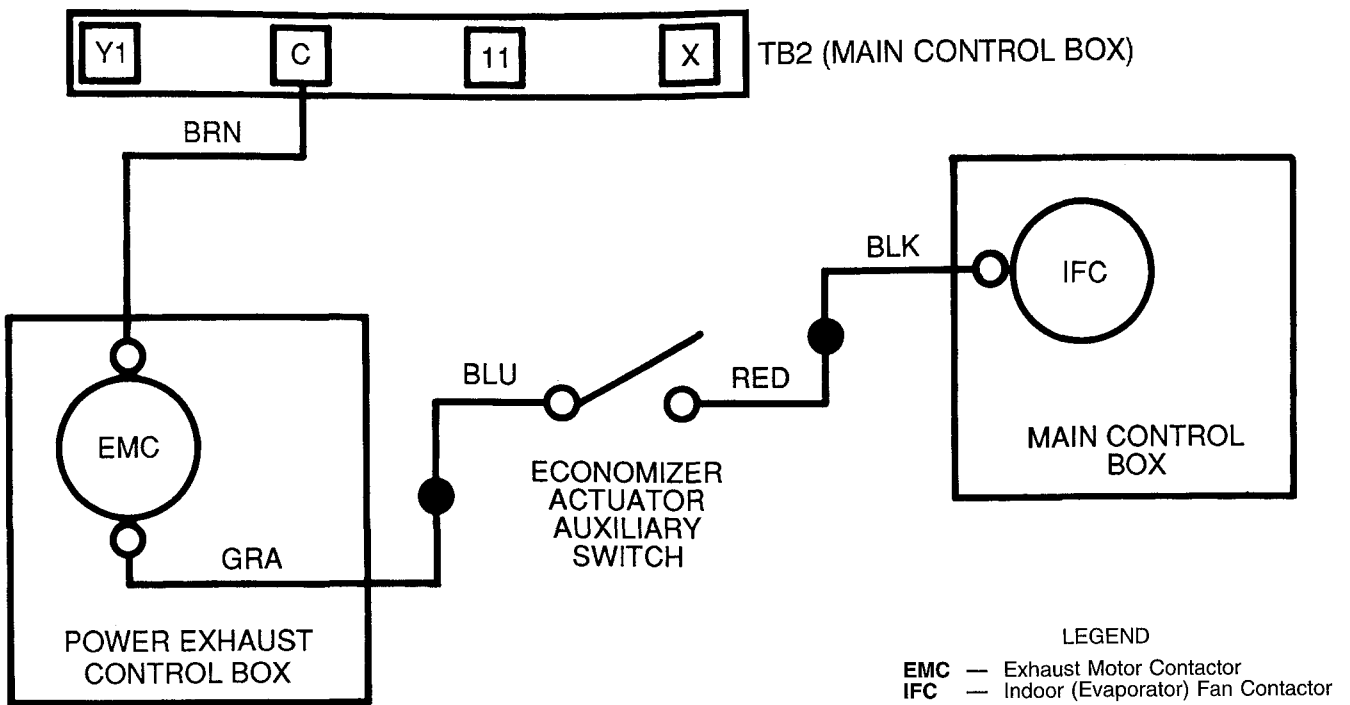


Fig. 16 — Power Exhaust Control Wiring

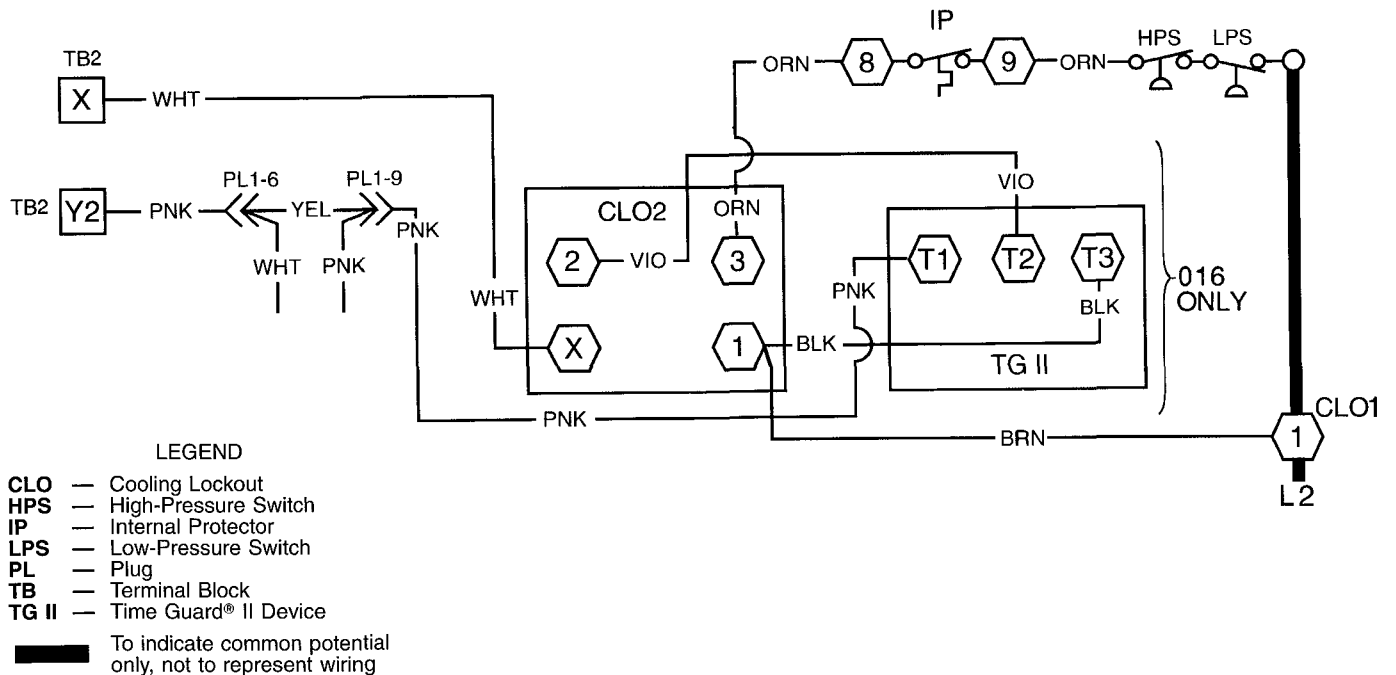


Fig. 17 — Time Guard II Device Wiring (016 Only)

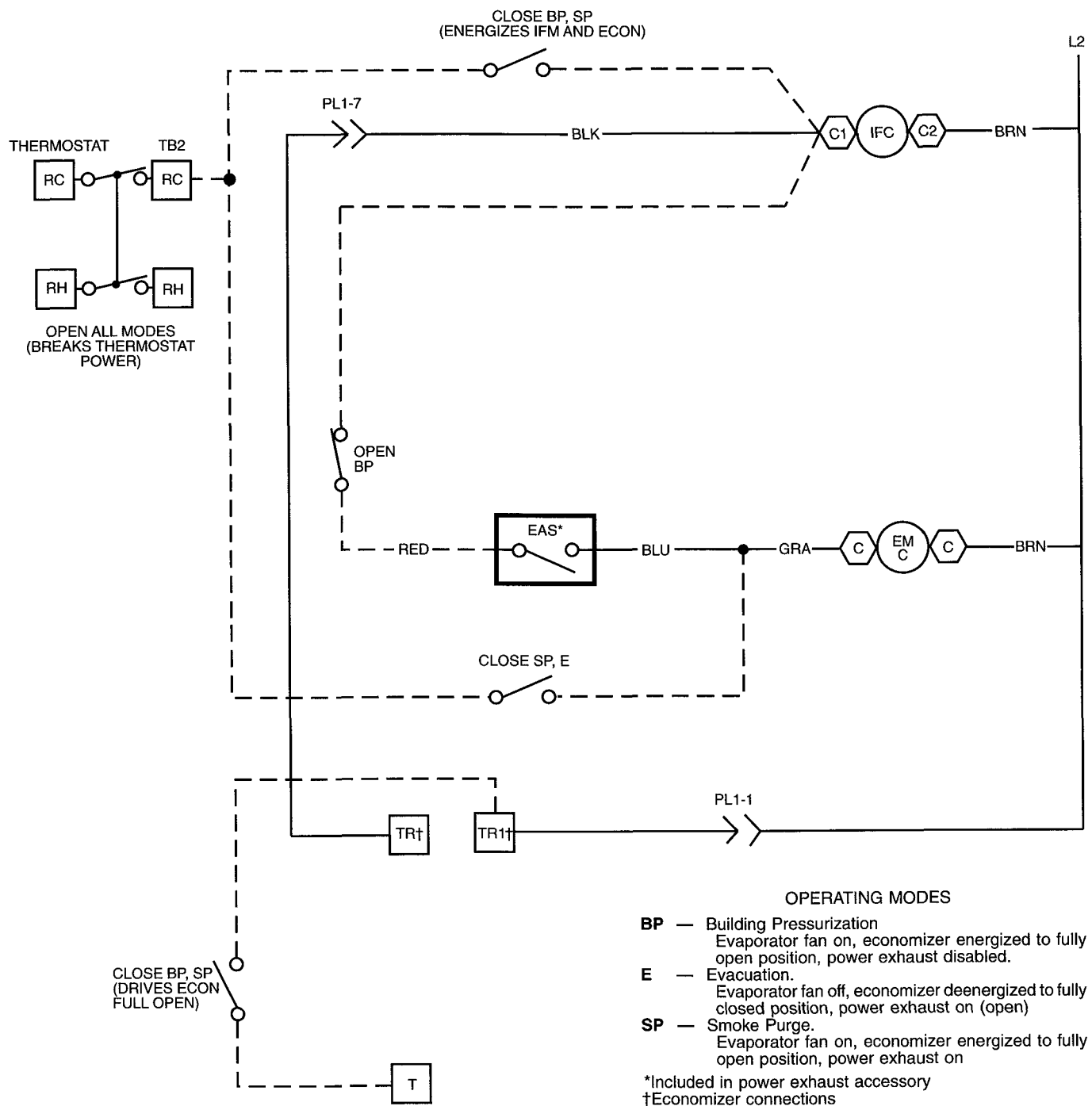


Fig. 18 —Economizer and Smoke Control/Fire Shutdown Wiring

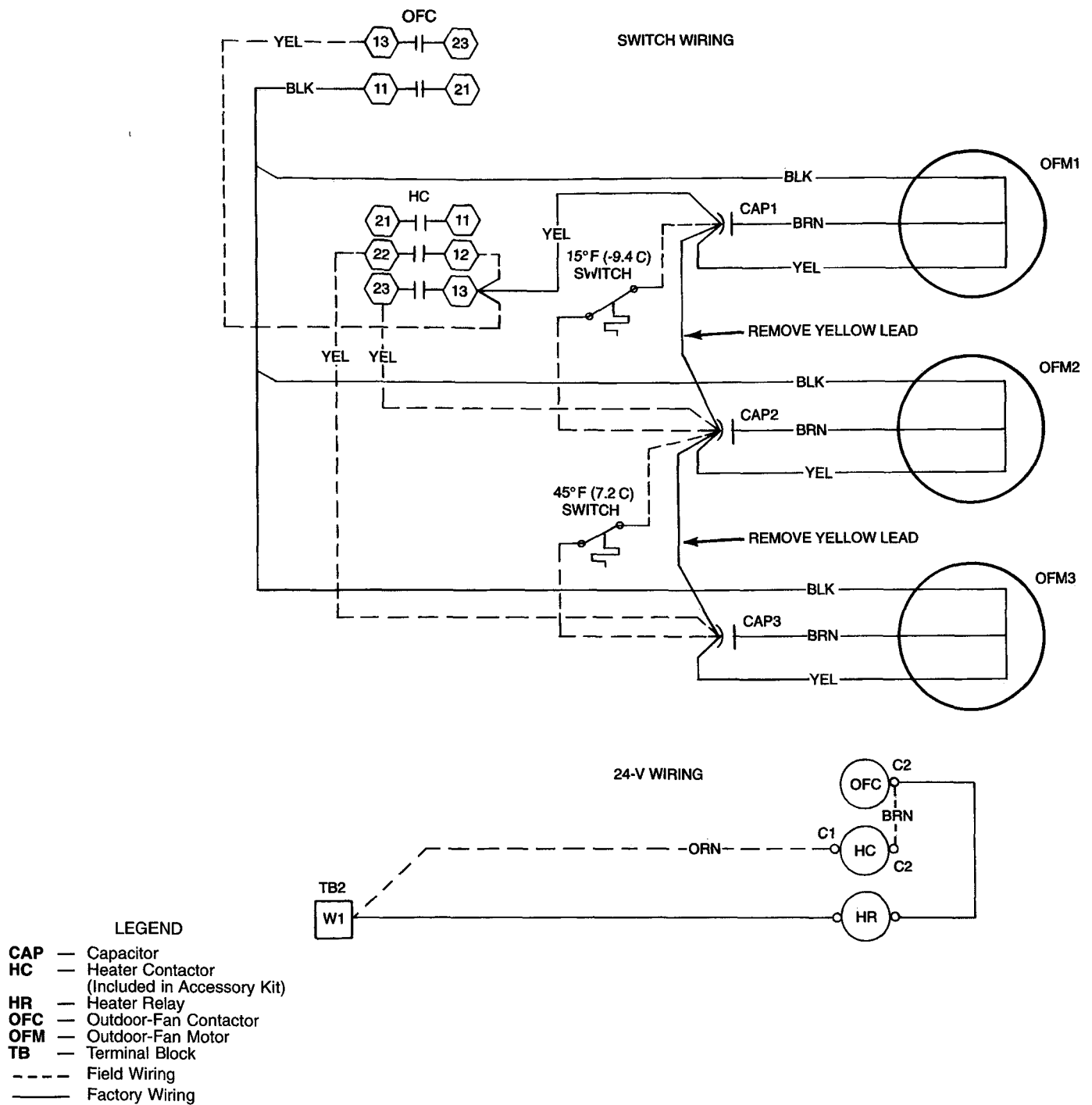
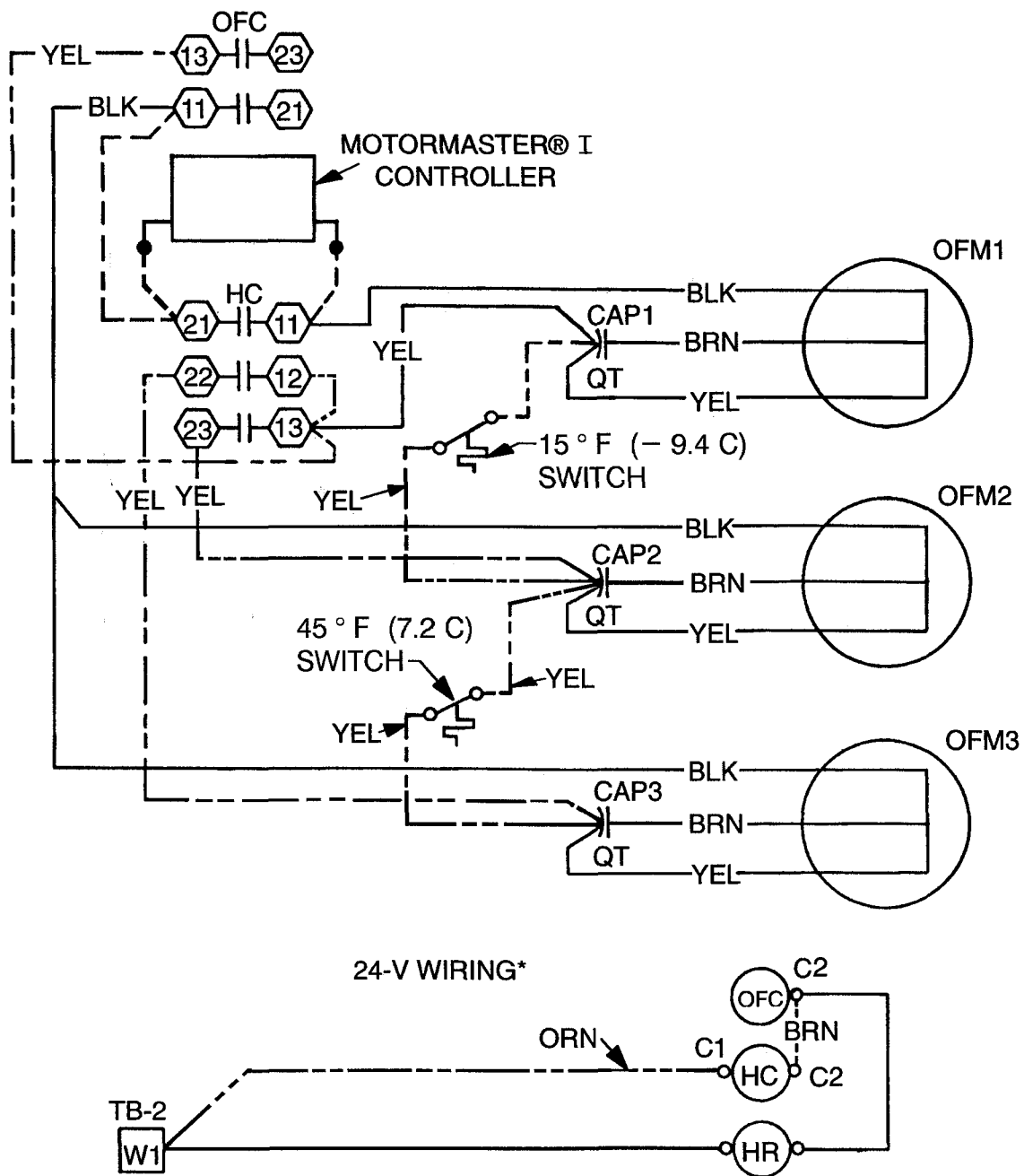


**Fig. 19 — Typical 0° F (-17.8 C) Low-Ambient Kit Wiring Diagram
(208/230, 400, 460 V Shown)**



LEGEND

- C** — Contactor
- CAP** — Capacitor
- HC** — Heater Contactor
- HR** — Heater Relay
- OFC** — Outdoor-Fan Contactor
- OFM** — Outdoor-Fan Motor
- TB** — Terminal Block
- QT** — Quadruple Terminal
- Field Wiring
- Factory Wiring
- - - Accessory Low-Ambient Wiring
- Splice

*Accessory low-ambient wiring

**Fig. 20 — Motormaster Device Wiring Diagram —
208/230, 400, 460 V Units**

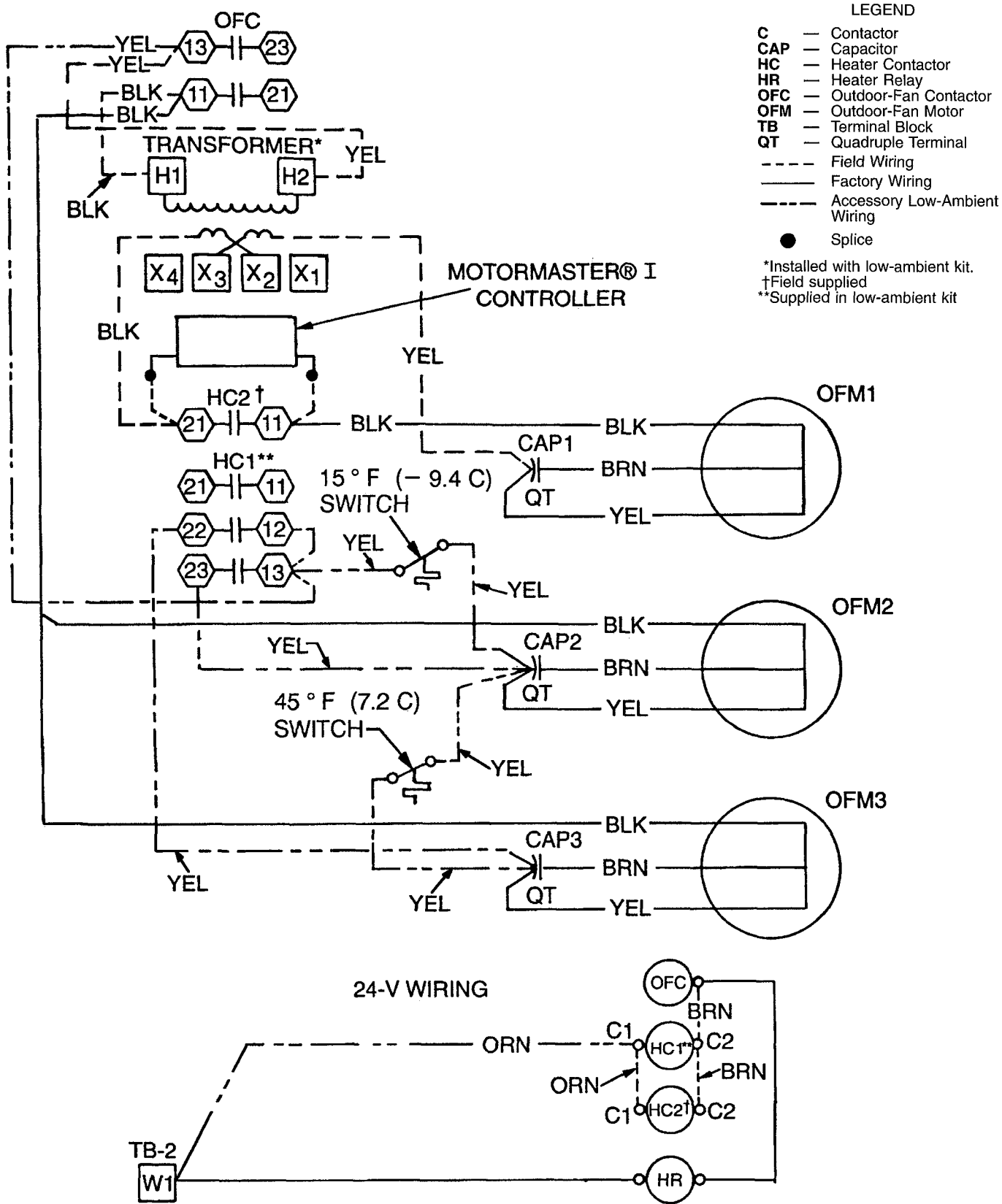


Fig. 21 — Motormaster Device Wiring Diagram —
575 V Units

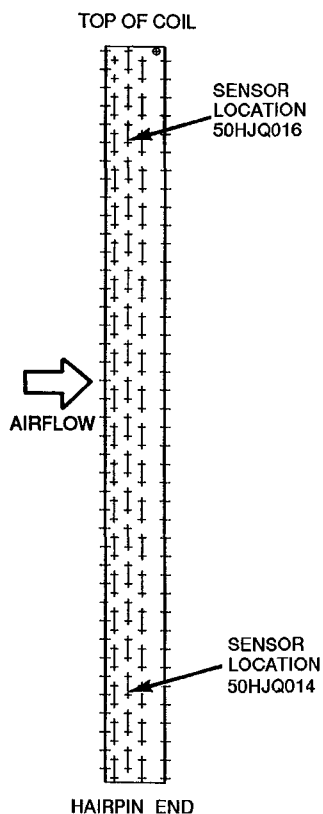


Fig. 22 — Motormaster® Device Sensor Location on Outdoor Coil

LEGEND AND NOTES FOR FIG. 23

LEGEND	
APS	— Air Pressure Switch
AUX	— Auxiliary Relay
C	— Contactor
CC	— Cooling Contactor
CCW	— Counterclockwise
CLS	— Cooling Lockout Switch
CW	— Clockwise
HA	— Heat Anticipator
OAT	— Outdoor-Air Thermostat
PL	— Plug
TB	— Terminal Block
TC	— Thermostat, Cooling
TH	— Thermostat, Heating

NOTES:

1. Economizer is a factory-installed option or field-installed accessory.
2. Air pressure switch (APS), if desired, must be field supplied.
3. The remote potentiometer and 2 in. x 4 in. electrical box must be field supplied.
4. All wiring shown as dashed (---) lines must be field provided and connected.
5. Auxiliary relay is field-supplied part number HN61KK224.

