

ELECTRIC HEATER

Installation , Wiring Instructions



803/805 HEAT PUMP

Left, Right and Rear Return

GENERAL

The electric heater, AH24, 30, 36, 42 and 60 is designed to be used with left and right hand return models 803-024-G through 803-060-G and models 805-024-G through 805-060-G Friedrich Heat Pumps.

The electric heater, AR24, 30, 36, and 42 is to be used with rear return models 803/805-024 through 042 Friedrich Heat Pumps.

The AH60 electric heater is designed to be used with rear return models 803/805-060 Friedrich Heat Pumps. Each heat pump model is approved for use with specific electric heaters.

Friedrich Heat Pumps are equipped with multi-speed motors to provide 3 speed operation. The motor speed that provides rated airflow should be used for electric heat.

To insure proper operation of the heater, installation instructions must be carefully followed. Failure to do so will result in an unsafe condition and nuisance tripping of automatic resets.

INSTALLATION LEFT AND RIGHT RETURN

Installation is the same for model 803-024/805-024 through 803-042/805-042 left and right hand return (see figure #1). For 803-060/805-060 left hand return (see figure #1). For 803-060/805-060 right hand return (see figure #2).

1. Place heater over unit air discharge. The heater control box should be on same side as control access panel of heat pump (see figure #1) (figure #2) heater control box left of panel.
2. Fasten heater to heat pump through mounting holes in heater flange.
3. Feed supply wire from fused disconnect into heater, see table #3 and heater labeling for proper size of wiring.
4. Feed supply wire from fused disconnect into heat pump. Wiring must be to NEC and local codes (see diagram).
5. From thermostat feed thermostat wires into heater terminal block and into heat pump terminal block. For desired stages (see figures #4, 5 and 6) for proper sequence of stages.
6. Connect ground lead to ground lug.
7. All wiring must be done to NEC code and meet all local codes.

INSTALLATION REAR RETURN

Installation is the same for models 803/805-024 through 060 rear return (see figure #1).

1. Place heater over unit air discharge. The heater control box should be on the same side as control access panel of heat pump (see figure #1).
2. Fasten heater to heat pump through mounting holes in heater flange.
3. Feed supply wire from fused disconnect into heater, see table #3 and heater labeling for proper size wiring.
4. Feed supply wire from fused disconnect into heat pump. Wiring must be to NEC and local codes (see diagram).
5. From thermostat feed thermostat wires into heater terminal block into heat pump terminal block. For desired stages, (see figures #4, 5 and 6) for proper sequence of stages.
6. Connect ground lead to ground lug.
7. All wiring must be done to NEC code and meet all local codes.

LEFT AND RIGHT HAND RETURN

	<u>AH24</u>	<u>AH30</u>	<u>AH36</u>	<u>AH42</u>	<u>AH60</u>
A.	11-7/8	10-5/8	12-7/8	13-11/16	14-7/8
B.	12-7/8	13-5/8	11-3/4	12-7/8	15-3/4
C.	16-7/8	17-5/8	15-3/4	16-3/4	19-3/4
D.	13-7/8	12-5/8	15	16	18-1/4
E.	12	12	10	11	12
F.	13	13	11	12	13

Fig #2 For
803/805-060
Right Hand
Only

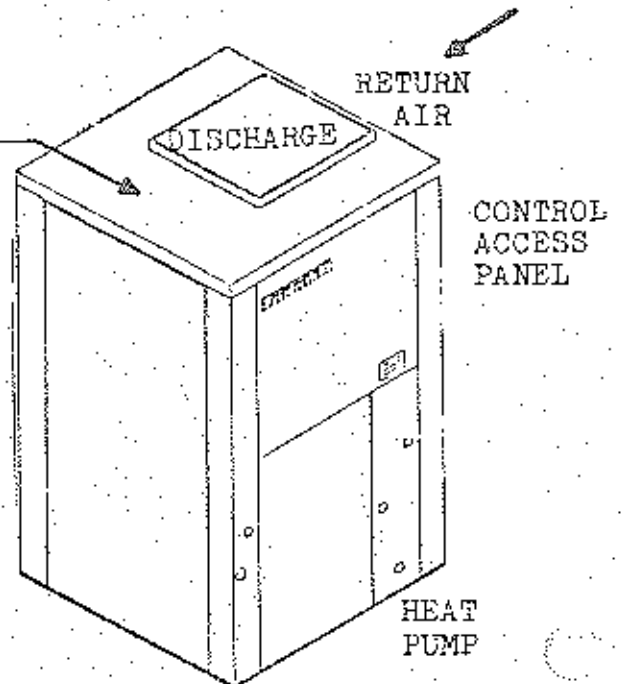
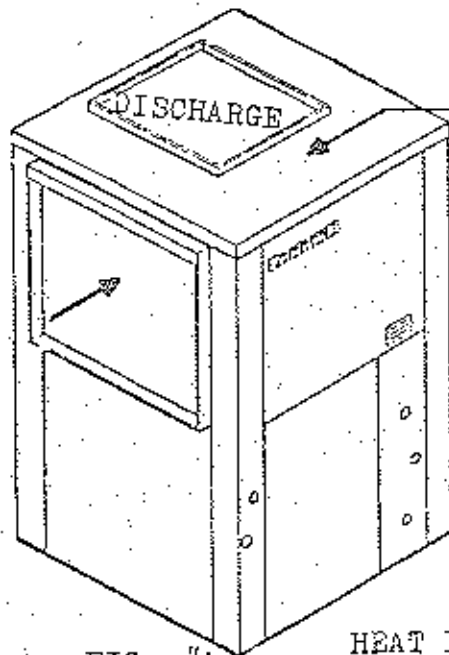
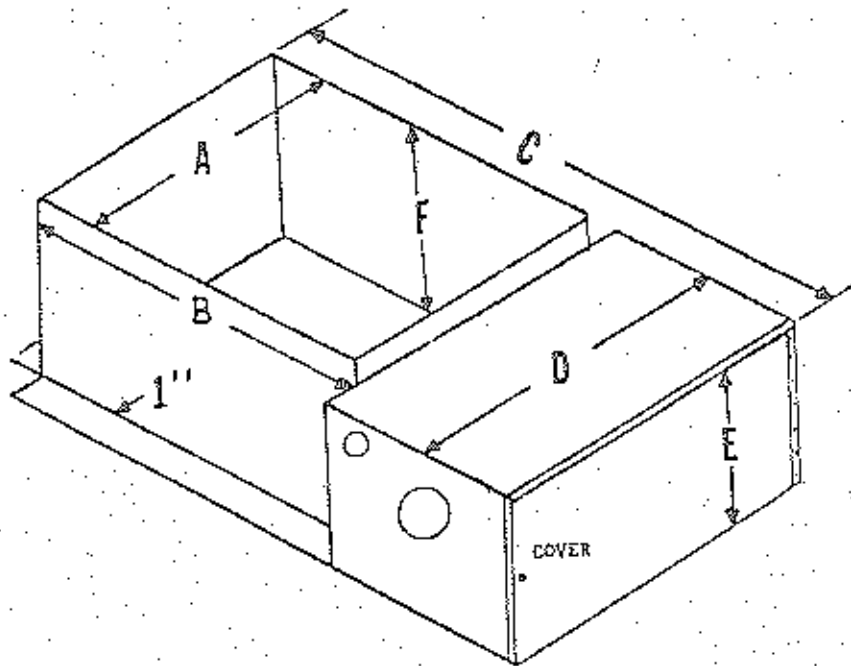


FIG. #1

FIG. #2

REAR RETURN

	<u>AR24</u>	<u>AR30</u>	<u>AR36</u>	<u>AR42</u>	<u>AH60</u>
A.	- 12-7/8	13-5/8	11-3/4	12-7/8	14-7/8
B.	- 11-7/8	10-5/8	12-7/8	13-11/16	15-3/4
C.	- 15-7/8	14-5/8	16-7/8	17-11/16	19-3/4
D.	- 15-7/8	16-5/8	15-3/4	16-3/4	18-3/4
E.	- 12	12	10	11	12
F.	- 13	13	11	12	13

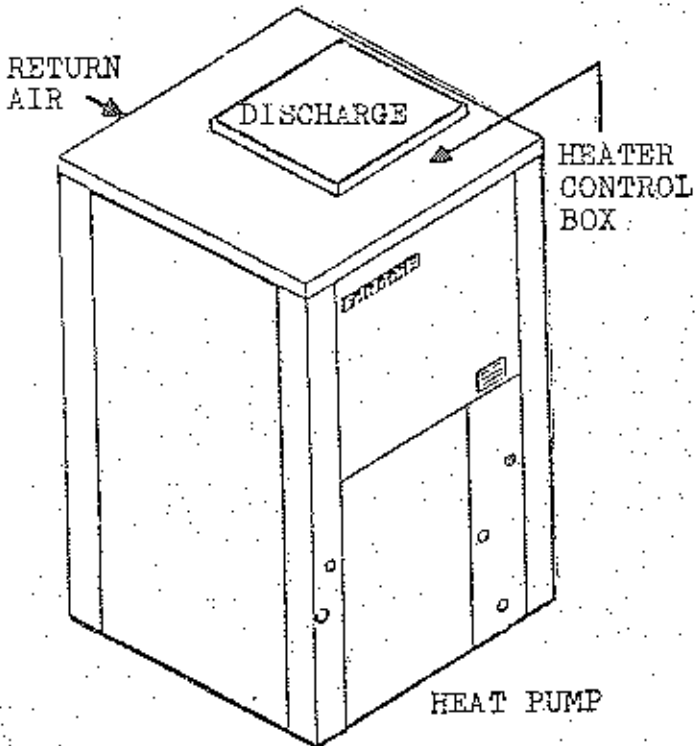
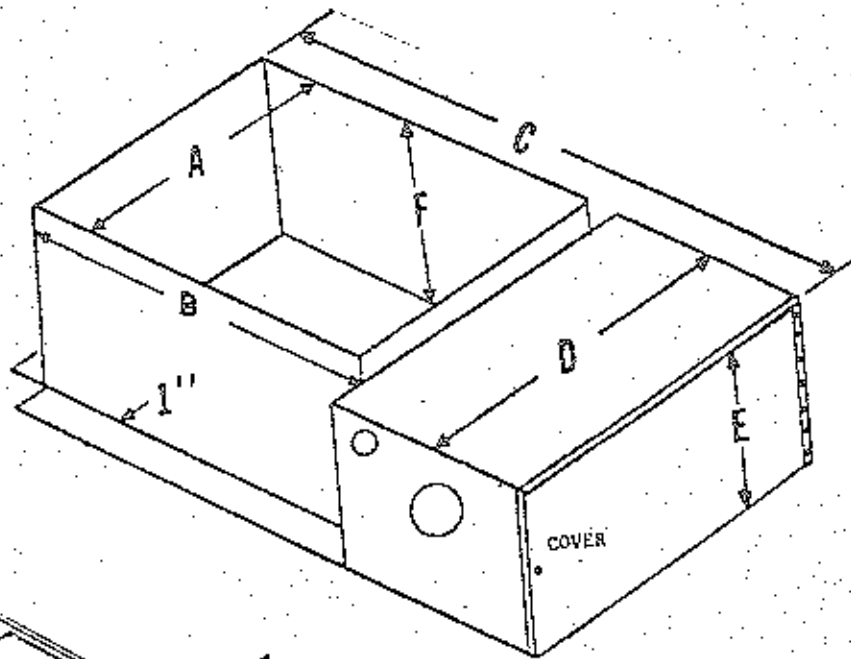


FIG. #1

TABLE 1: STAGE SELECTION CHART

HEATER MODEL	FIG. #4		FIG. #5		FIG. #6		
KW	Stage 1-Stage 2		Stage 1-Stage 2		Stage 1-	X	- Stage 2
10 KW	4.9	4.9	4.9	4.9	4.9		4.9
15 KW	4.9	9.8	9.8	4.9	4.9	4.9	4.9
17.25KW	5.75	11.5	11.5	5.75	5.75	5.75	5.75
20 KW	4.9	14.7	9.8	9.8	4.9	4.9	9.8
25 KW	4.9	19.6	9.8	14.7	4.9	4.9	14.7

FIG. 4 - 5KW 1st stage(W1)
Remaining KW
2nd stage(W2)

FIG. 5 - 10KW - 1st stage(W1)
remaining KW
2nd stage(W2)

FIG. 6 - Remove jumper -
5KW 1st stage(W1)
5KW outside thermo-
stat (X)
remaining KW 2nd
stage(W2)

*On 17.25KW heater
stages are 5.75KW
instead of 5KW

HEATER TERMINAL BLOCK
CONNECTION FOR LOW
VOLTAGE

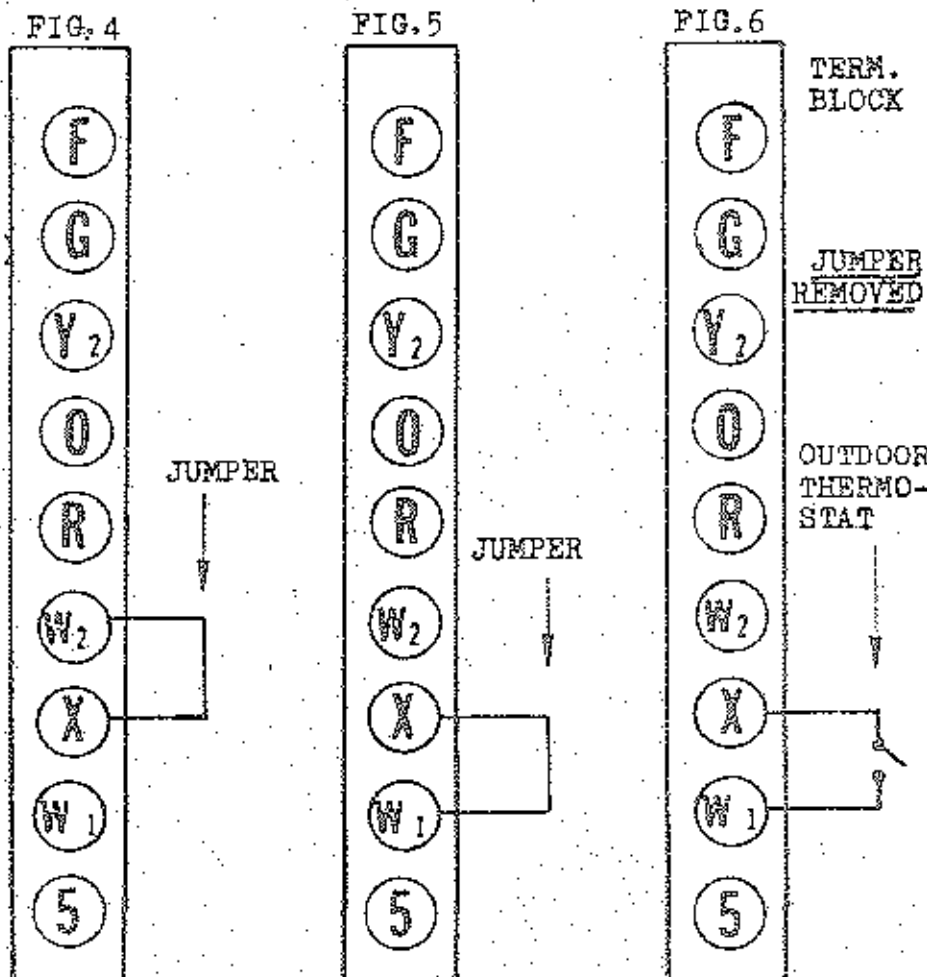


TABLE #2

SPECIFICATION ON HEATERS FOR FRIEDRICH UNITS - ELECTRICAL RATINGS

1. - KILOWATTS

MODEL	KW	MODEL	KW
AR/AH2410	9.8	AR/AH4217	17.25
AR/AH2415	14.7	AR/AH4220	19.6
AR/AH3010	9.8	AH6010	9.8
AR/AH3015	14.7	AH6015	14.7
AR/AH3610	9.8	AH6017	17.25
AR/AH3615	14.7	AH6020	19.6
AR/AH4210	9.8	AH6025	24.5
AR/AH4215	14.7		

TABLE #3 Heaters are suitable for 208V/240V operation. Values for heater output at 208 volts are 75% of their value at 240 volts.

2. - TOTAL AMPERAGE (240 volts - 1 phase)

KW	TOTAL AMPS	*WIRE SIZE
9.8	40.83	8
14.7	61.25	6
17.25	71.87	4
19.6	81.66	4
24.5	102.08	2

Handwritten notes: 1.25 = MIN, CE 7. BKR

TOTAL AMPERAGE (208 volts - 1 phase)

KW	TOTAL AMPS	*WIRE SIZE
7.35	35.33	8
11.02	52.98	6
12.93	62.12	4
14.70	70.67	4
18.37	88.31	3

AMPERAGE PER STEP (240 volts)

KW	Fig. #4		Fig. #5		Fig. #6		
	Stage 1-	Stage 2	Stage 1-	Stage 2	Stage 1-	X	Stage 2
9.8	20.41	20.41	20.41	20.41	20.41	-	20.41
14.7	20.41	40.83	40.83	20.41	20.41	20.41	20.41
17.25	23.95	47.9	47.9	23.95	23.95	23.95	23.95
19.6	20.41	61.25	40.83	40.83	20.41	20.41	40.83
24.5	20.41	81.66	40.83	61.25	20.41	20.41	61.25

*Based on 75°C wire - Table 310-16 - NEC 1981

TABLE #4

3. - OVER CURRENT PROTECTION (Internal)

<u>KW</u>	<u>CIRCUIT 1</u>	<u>CIRCUIT 2</u>	<u>CIRCUIT 3</u>
9.8	none	none	none
14.7	50 amps	25 amps	none
17.25	60 amps	30 amps	none
19.6	50 amps	50 amps	none
24.5	50 amps	50 amps	25 amps

CLASS K5 Fuses

TABLE #5

4. - INTERNAL WIRING

- A. - Control Circuit
#18 ga. 105°C-AWM
- B. - Fan Interlock Circuit
#16 ga. 105°C-THHN
- C. - Power Circuit
#10 ga. 105°C-THHN

TABLE #6

PARTS BREAK DOWN ON AR/AH2410 THRU AR/AH60251. - TIME DELAYS - TEXAS INSTRUMENTS (all models)

<u>KW</u>			
9.8	Two	-	60000EO-
14.7	Three	-	60000EO-
17.25	Three	-	60000EO-
19.6	Three	-	60000EO- and One - 60000AO-
24.5	Three	-	60000EO- and Two - 60000AO-

2. - Relay - Essex
847184 - 20114-406

3. - AUTOMATIC RESET (limit control)
Therm-O-Disc L150 - 201648

4. - FUSE HOLDERS/LINE TERMINALS

<u>KW</u>	<u>UNDERWRITERS SAFETY DEVICE</u>
14.7	13195-404L
17.25	13195-404L
19.6	13195-402L
24.5	13195-602L

5. - ELEMENTS -240 Volt

<u>KW</u>	<u>MODEL NUMBER</u>
9.8	1-0039-29
14.7	1-0039-29
17.25	1-0039-46
19.6	1-0039-29
24.5	1-0039-29

TABLE #6

PARTS BREAK DOWN ON AR/AH2410 THRU AR/AH6025 (cont.)6. - ELEMENTS AND FRAME ASSEMBLY (AH series)

<u>MODEL</u>	<u>KW</u>	<u>PART NUMBER</u>
AH2410	9.8	1-0246-392
AH2415	14.7	1-0246-392 and 1-0024-393
AH3010	9.8	1-0246-394
AH3015	14.7	1-0246-394 and 1-0024-395
AH3610	9.8	1-0246-327
AH3615	14.7	1-0246-327 and 1-0246-328
AH4210	9.8	1-0246-325
AH4215	14.7	1-0246-325 and 1-0246-326
AH4217	17.25	1-0246-325 and 1-0246-326
AH4220	19.6	1-0246-325
AH6010	9.8	1-0246-325
AH6015	14.7	1-0246-335
AH6017	17.25	1-0246-335
AH6020	19.6	1-0246-335
AH6025	24.5	1-0246-335

7. - ELEMENTS AND FRAME ASSEMBLY (ARseries)

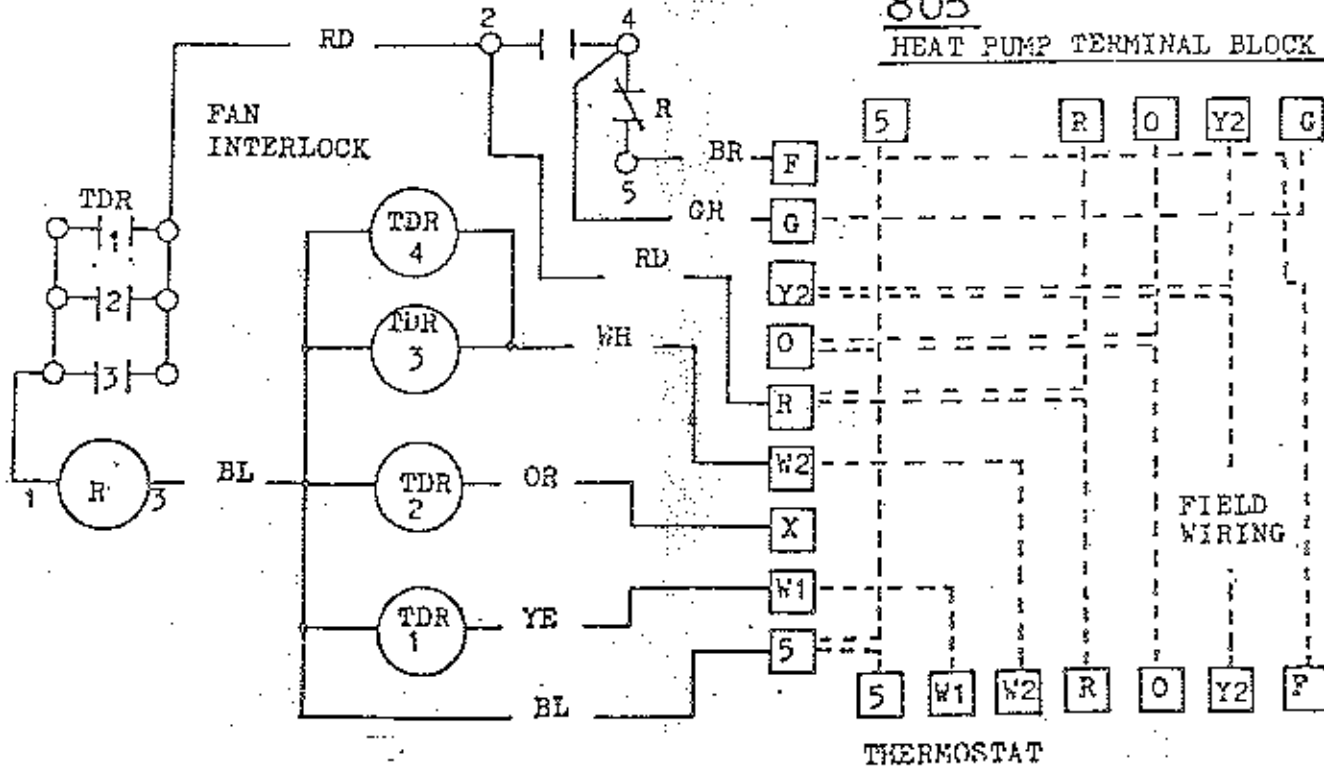
<u>MODEL</u>	<u>KW</u>	<u>PART NUMBER</u>
AR2410	9.8	1-0246-404
AR2415	14.7	1-0246-404 and 1-0246-405
AR3010	9.8	1-0246-406
AR3015	14.7	1-0246-406 and 1-0246-407
AR3610	9.8	1-0246-408
AR3615	14.7	1-0246-408 and 1-0246-409
AR4210	9.8	1-0246-410
AR4215	14.7	1-0246-410 and 1-0246-411
AR4217	17.25	1-0246-410 and 1-0246-411
AR4220	19.6	1-0246-410

805

HEATER CONTROL CIRCUIT

805

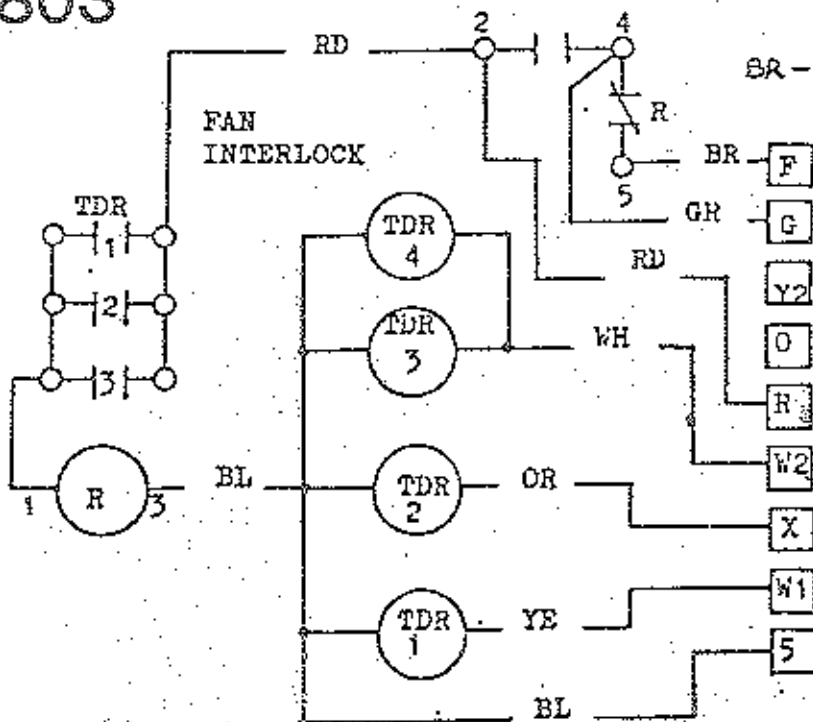
HEAT PUMP TERMINAL BLOCK



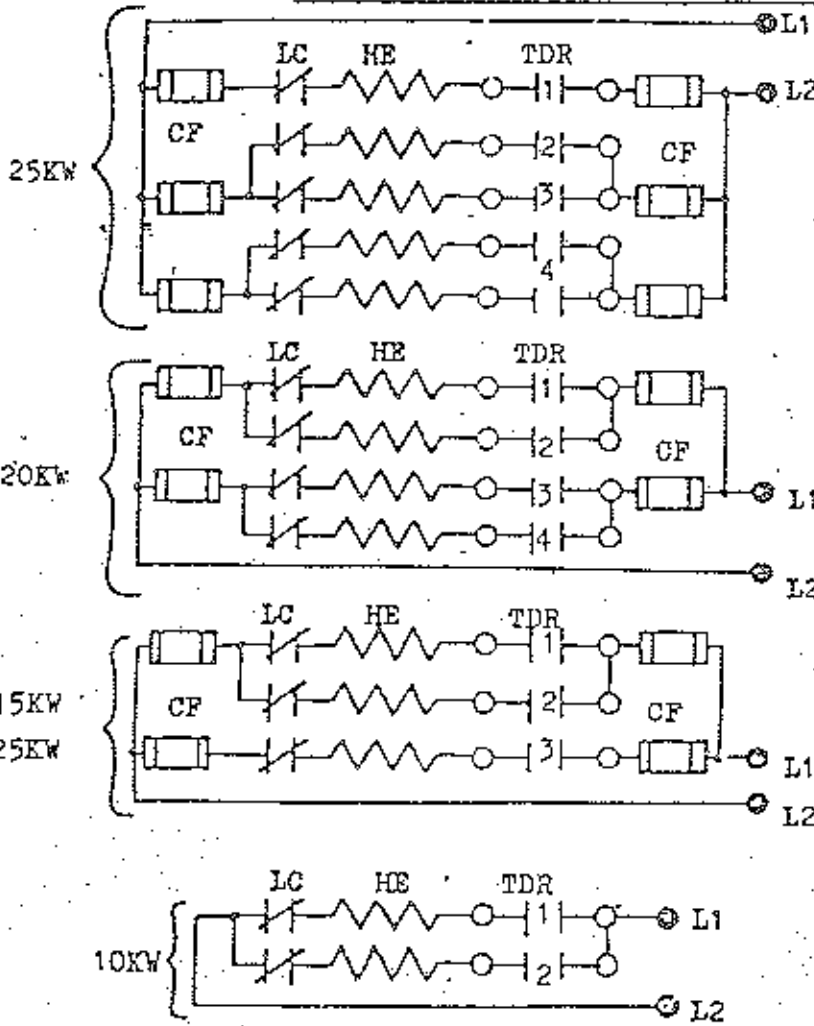
803

HEATER CONTROL CIRCUIT

GREY -



HEATER HIGH
VOLTAGE CIRCUIT SINGLE PHASE



NOTES:

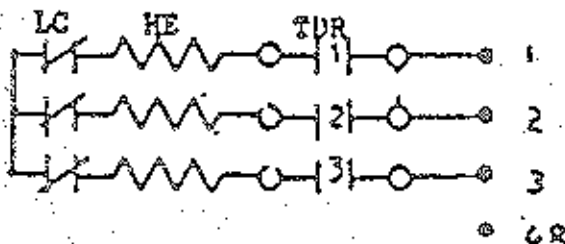
1. L1, L2-208/240-1 ϕ SUPPLY
2. FIELD WIRING MUST COMPLY WITH NEC & ALL APPLICABLE LOCAL CODES
3. EQUIPMENT GROUND CONNECTION IS PROVIDED IN CONTROL BOX
4. DISCONNECT FOR INCOMING FIELD POWER WIRE MUST BE WITHIN SIGHT OF UNIT
5. SPECIFIED THERMOSTAT MUST BE USED

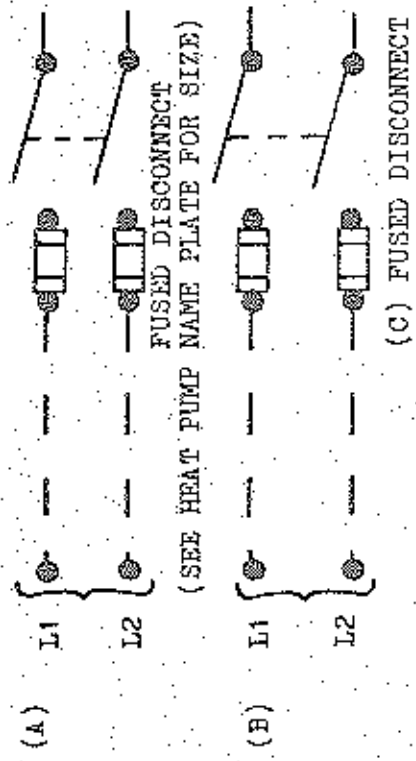
COLOR CODE

RD = RED
BR = BROWN
GR = GREEN
WH = WHITE
OR = ORANGE
BL = BLACK
YE = YELLOW

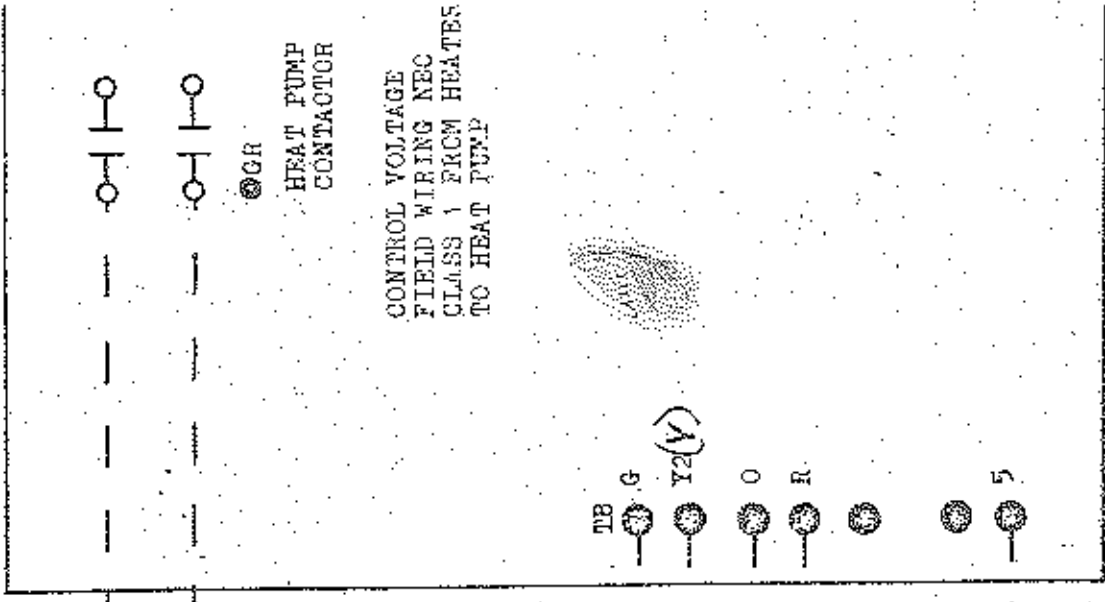
R - RELAY
TDR - TIME DELAY RELAY
TB - TERMINAL BLOCK
LC - LIMIT CONTROL
HE - HEATING ELEMENT
CF - CARTRIDGE FUSE

HEATER HIGH VOLTAGE CIRCUIT
THREE PHASE



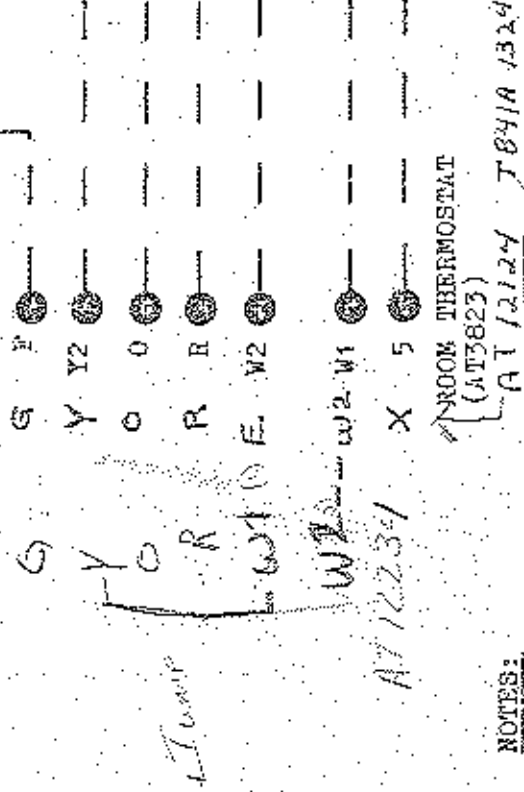


ALL WIRING TO UNIT
MUST COMPLY WITH
NEC & LOCAL CODES



CONTROL VOLTAGE
FIELD WIRING NEC
CLASS 1 FROM HEATES
TO HEAT PUMP

GR
HEAT PUMP
CONTACTOR



NOTES:

- (A) Supply voltage for heat pump 208/240 -- 1 ph.
- (B) Supply Voltage for heater 208/240 -- 1 ph. see total amp chart (Table 3) for proper wire size
- (C) Fuses must be no less than 125% & no more than 150% of total amp draw
- (D) See stage selection chart (Table 1) for selective KW draw on each stage.