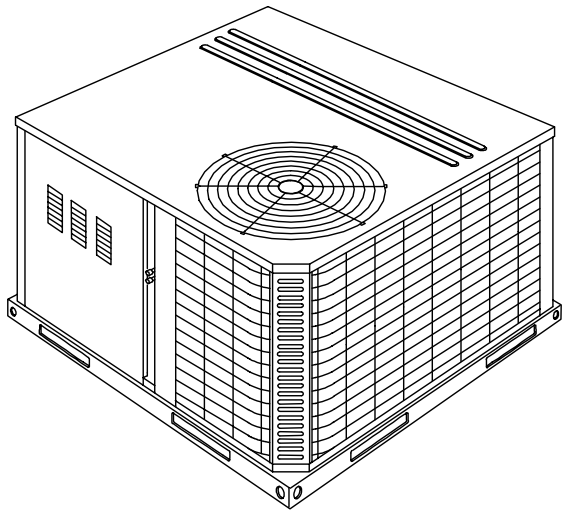
CHAMPION® SERIES
SINGLE PACKAGE AIR CONDITIONERS
ELECTRIC/ELECTRIC, AIR-COOLED

INSTALLATION INSTRUCTION

Supersedes: 035-16703-000-A-0701

035-16703-001-A-0202

MODELS D1EB018 THRU 060
1-1/2 THRU 5 TON
(10 SEER)



GENERAL

Model D1EB units are factory assembled cooling only air conditioners designed for outdoor installation on a rooftop or a slab. Field-installed electric heater accessories are available to provide electric heat combined with electric cooling. All units and heaters are certified by AGA and CGA.

The units are completely assembled on rigid, but easily removable base rails. All piping, refrigerant charge, and electrical wiring is factory installed and tested. The units require only electric power and duct connections at the point of installation.

The electric heaters have nickel-chrome resistance wire elements and utilize single point power connection.

INSPECTION

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. Refer to Form 50.15-NM for additional information.

REFERENCE

Additional information on the design, installation, operation and service of this equipment is available in the following reference forms:

- 55.70-N1 -General Installation
- 55.70-N2 -Pre-start & Post-start Check List
- 511.26-N1.1V -Electric Heater Accessory

REPLACEMENT PARTS

- Refer to Replacement Parts Manual for complete listing of replacement parts on this equipment.

All forms referenced in this instruction may be ordered from:

Standard Register
Norman, OK 73069
Toll Free: Tel. 877-318-9675/Fax. 877-379-7920

Installer should pay particular attention to the words: *NOTE, CAUTION* and *WARNING*. Notes are intended to clarify or make the installation easier. Cautions are given to prevent equipment damage. Warnings are given to alert installer that personal injury and/or equipment damage may result if installation procedure is not handled properly.

CAUTION

THIS PRODUCT MUST BE INSTALLED IN STRICT COMPLIANCE WITH THE ENCLOSED INSTALLATION INSTRUCTIONS AND ANY APPLICABLE LOCAL, STATE, AND NATIONAL CODES INCLUDING, BUT NOT LIMITED TO, BUILDING, ELECTRICAL, AND MECHANICAL CODES.

WARNING

INCORRECT INSTALLATION MAY CREATE A CONDITION WHERE THE OPERATION OF THE PRODUCT COULD CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.

PRODUCT NOMENCLATURE

D	1	E	B	0	2	4	A	0	6

PRODUCT CATEGORY
D = Single Package Air Conditioner (Air Cooled)

PRODUCT GENERATION
1 = NEW or Current Design

PRODUCT IDENTIFIER
EB = 10 SEER Cooling Models

NOMINAL COOLING CAPACITY (MBH)
018 = 18,000 BTUH
024 = 24,000 BTUH
030 = 30,000 BTUH
036 = 36,000 BTUH
042 = 42,000 BTUH
048 = 48,000 BTUH
060 = 60,000 BTUH

VOLTAGE CODE
06 = 208/230-1-60
25 = 208/230-3-60
46 = 460-3-60
58 = 575-3-60

FACTORY INSTALLED ELECTRIC HEAT
A = No Electric Heat Installed

INSTALLATION

LIMITATIONS

These units must be installed in accordance with the following national and local safety codes.

1. National Electrical Code ANSI/NFPS No. 70 or Canadian Electrical Code Part 1, C22.1 (latest editions).
2. Local plumbing and waste water codes and other applicable local codes.

Refer to Table 1 for unit application data and to Table 5 for electric heat application data.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or the customer's expense.

Size of unit for proposed installation should be based on heat loss/heat gain calculations made in accordance with industry recognized procedures identified by the Air Conditioning Contractors of America.

TABLE 1 - UNIT APPLICATION DATA

Voltage Variation Min. / Max.[1]	208/230V[3]	187 / 253[3]
	460V	414 / 504
	575V	518 / 630
Wet Bulb Temperature (°F) of Air on Evaporator Coil, Min. / Max.		57 / 72
Dry Bulb Temperature (°F) of Air on Condenser Coil, Min.[2] / Max.		45 / 120

[1] Rated in accordance with ARI Standard 110, utilization range "A".
[2] A low ambient accessory is available for operation down to 0°F
[3] "T1" transformer primary tap must be moved from the 230 volt connection to the 208 volt connection for low voltage applications of 208 volt and below.

LOCATION

Use the following guidelines to select a suitable location for these units.

1. Unit is designed for outdoor installation only.
2. Condenser must have an unlimited supply of air. Where a choice of location is possible, position unit on either north or east side of building.
3. For ground level installation, a level pad or slab should be used. The thickness and size of the pad or slab used should meet local codes and unit weight. Do not tie the slab to the building foundation.
4. For roof top installation, be sure the structure will support the weight of the unit plus any field installed components. Unit must be installed on a level roof curb or appropriate angle iron frame providing adequate support under the compressor/condenser section.
5. Maintain level tolerance of unit to 1/8" maximum.

RIGGING OR HANDLING

Care must be exercised when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig unit with slings placed under the unit. Spreader bars of sufficient length should be used across the top of the unit.

BEFORE LIFTING A UNIT, MAKE SURE THAT ITS WEIGHT IS DISTRIBUTED EQUALLY ON THE CABLES SO THAT IT WILL LIFT EVENLY.

Units may also be moved or lifted with a fork-lift. Slotted openings in the skid are provided for this purpose. Forks must pass completely through the base.

Refer to Table 2 for unit weights and to Figure 1 for approximate center of gravity.

TABLE 2 - UNITS WEIGHTS

UNIT SIZE	SHIPPING WEIGHT (lbs.)	OPERATING WEIGHT (lbs.)	CORNER WEIGHTS (location, lbs.)			
			"A"	"B"	"C"	"D"
018	318	313	86	76	73	83
024	324	319	88	77	75	85
030	333	328	85	81	82	86
036	338	333	91	80	78	88
042	347	342	94	83	80	91
048	368	363	92	88	92	97
060	376	371	105	100	84	87

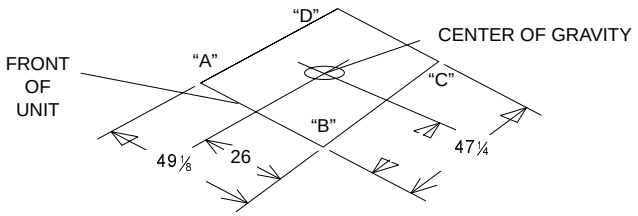


FIG. 1 - CENTER OF GRAVITY

CLEARANCES

All units require certain clearances for proper operation and service. Refer to Figure 3 for the clearances required for combustion, construction, servicing and proper unit operation.

WARNING: Do not permit overhanging structures or shrubs to obstruct the condenser air discharge outlet.

DUCT WORK

These units are adaptable to downflow use as well as rear supply and return air duct openings. To convert to downflow, use the following steps:

1. Remove the duct covers found in the bottom return and supply air duct openings. There are four (4) screws securing each duct cover (save these screws to use later).
2. Install the duct covers, removed in step one, to the rear supply and return air duct openings. Secure with the four (4) screws used in step one.
3. Seal the duct covers with silicone caulking.

Downflow units must have an L-shaped supply duct without any outlets or registers located directly below the supply outlet of the unit.

Duct work should be designed and sized according to the methods of the Air Conditioning Contractors of America (ACCA), as set forth in their Manual D.

A closed return duct system shall be used. This shall not preclude use of economizers or ventilation air intake. Flexible joints may be used in the supply and return duct work to minimize the transmission of noise.

CAUTION: When fastening duct work to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing. Outdoor duct work must be insulated and waterproofed.

NOTE: Be sure to note supply and return openings.

Refer to Figure 3 for information concerning rear and bottom supply and return air duct openings.

FILTERS

Single phase units are shipped without a filter and is the responsibility of the installer to secure a filter **in the return air ductwork or install a Filter/Frame Kit** (1FF0114).

A filter rack and a filters are standard on three phase units.

Filters must always be used and must be kept clean. When filters become dirt laden, insufficient air will be delivered by the blower, decreasing your units efficiency and increasing operating costs and wear-and-tear on the unit and controls.

Filters should be checked monthly especially since this unit may be used for both heating and cooling.

CONDENSATE DRAIN

A condensate trap is required to be installed in the condensate drain. The plumbing must conform to local codes. Use a sealing compound on male pipe threads. Install the condensate drain line (¾" NPTF) to spill into an open drain.

SERVICE ACCESS

Access to all serviceable components is provided by the following removable panels:

- Blower service access
- Electrical/filter access
- Compressor service access

Refer to Figure 3 for location of these access panels and minimum clearance.

THERMOSTAT

The room thermostat should be located on an inside wall approximately 56" above the floor where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with the thermostat for general installation procedure. Four or five color coded insulated wires (minimum #18 AWG) should be used to connect thermostat to unit. See Figure 2.

TABLE 3 - PHYSICAL DATA

MODELS		DEB						
		018	024	030	036	042	048	060
EVAPORATOR BLOWER	CENTRIFUGAL BLOWER (Dia. x Wd. in.)	9 X 6	10 X 8	10 X 8	10 x 8	11 X 10	11 x 10	11 x 10
	FAN MOTOR HP (Three Speed)	½	½	½	¾	¾	¾	1
EVAPORATOR COIL	ROWS DEEP	2	2	2	2	2	2	3
	FINS PER INCH	13	15	15	15	15	13	16
	FACE AREA (Sq. Ft.)	2.19	2.81	4.38	4.38	4.38	5.62	5.26
CONDENSER FAN	PROPELLER DIA. (in.)	22	22	22	22	22	22	22
	FAN MOTOR HP	¼	¼	¼	¼	¼	¼	¼
	NOM. CFM TOTAL	1,800	2,200	2,400	2,400	2,400	2,800	2,800
CONDENSER COIL	ROWS DEEP	1	1	1	1	1	1	1
	FINS PER INCH	18	16	20	18	16	13	20
	FACE AREA (Sq. Ft.)	8.3	8.3	8.3	8.3	11.7	16.4	16.4
CHARGE	REFRIGERANT 22 (lbs./oz.)	3 / 4	3 / 5	3 / 13	3 / 10	4 / 7	5 / 15	5 / 15
FILTER	FACE AREA (Sq. Ft. / Qty. / Size)	2.14 / 2 / 14" x 22"						
COMPRESSOR	HERMETIC Type, (Qty. = 1)	Recip	Recip	Recip	Recip	Recip	Scroll	Scroll

POWER AND CONTROL WIRING

Field wiring to the unit must conform to provisions of the current N.E.C. ANSI/NFPA No. 70 or C.E.C. and/or local ordinances. The unit must be electrically grounded in accordance with local codes or, in their absence, with the N.E.C./C.E.C. Voltage tolerances which must be maintained at the compressor terminals during starting and running conditions are indicated on the unit Rating Plate and Table 3.

The wiring entering the cabinet must be provided with mechanical strain relief.

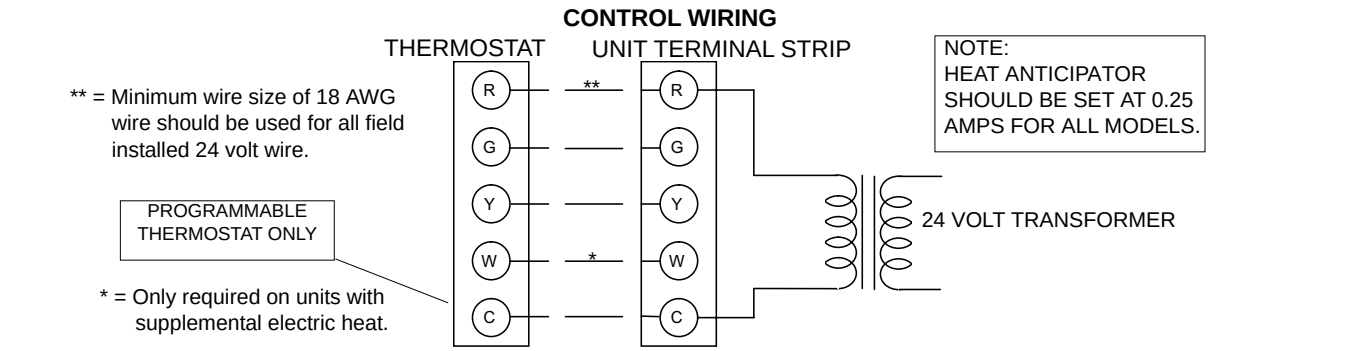
A fused or HACR breaker disconnect switch should be field provided for the unit. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical line must be sized properly to carry the load. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly fused.

Refer to Figure 2 for typical field wiring and to the appropriate unit wiring diagram for control circuit and power wiring information.

COMPRESSORS

Units are shipped with compressor mountings factory-adjusted for shipping. **CAUTION:** Loosen compressor mounting bolts half turn before operating unit.



CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

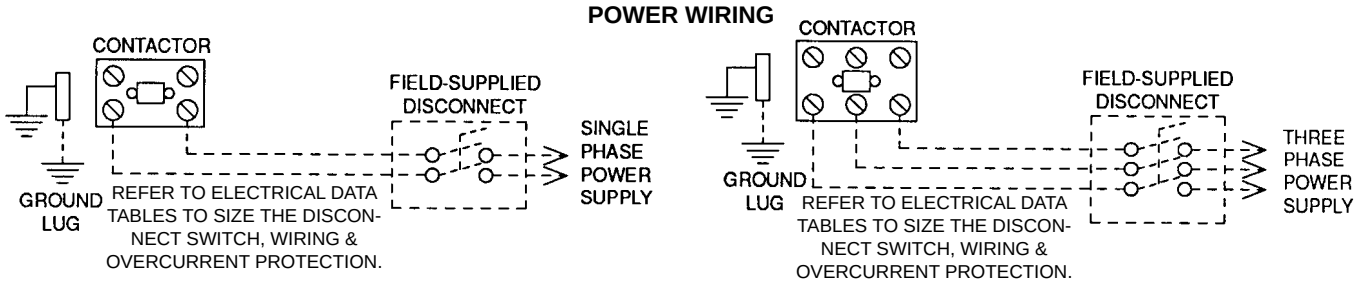


FIG. 2 - TYPICAL FIELD WIRING DIAGRAM

TABLE 4 - ELECTRICAL DATA (BASIC UNIT)

MODEL DEB	POWER SUPPLY	VOLTAGE LIMITATIONS [1]		COMPRESSOR		COND. FAN MOTOR, FLA	SUPPLY AIR BLOWER MOTOR, FLA	MINIMUM CIRCUIT AMPACITY	MAX. FUSE SIZE, AMPS [2]	MAX. HACR BREAKER SIZE, AMPS	UNIT POWER FACTOR	TRANSFORMER SIZE (VA)
		MIN.	MAX.	RLA	LRA							
018	208/230-1-60	187	253	9.0	48.0	1.1	2.6	14.9	20	20	.96	40
024	208/230-1-60	187	253	11.5	60.0	1.1	2.6	18.1	25	25	.96	40
030	208/230-1-60	187	253	14.7	73.0	1.1	2.6	22.1	30	30	.96	40
036	208/230-1-60	187	253	17.3	94.0	1.1	3.5	26.2	35	35	.96	40
042	208/230-1-60	187	253	20.5	120.0	1.1	3.5	30.2	40	40	.96	40
048	208/230-1-60	187	253	24.4	140.0	1.3	4.0	35.8	45	45	.96	40
060	208/230-1-60	187	253	28.9	165.0	1.3	4.0	44.4	60	60	.96	40
036	208/230-3-60	187	253	10.9	78.0	1.1	3.5	18.2	25	25	.96	75
042	208/230-3-60	187	253	14.1	110.0	1.1	3.5	22.2	30	30	.96	75
048	208/230-3-60	187	253	14.1	105.0	0.7	4.0	22.3	30	30	.96	75
060	208/230-3-60	187	253	16.0	125.0	1.3	7.0	28.3	40	40	.96	75
036	460-3-60	414	504	5.8	40.0	0.6	1.8	9.6	15	15	.96	75
042	460-3-60	414	504	7.1	54.0	0.6	1.8	11.2	15	15	.96	75
048	460-3-60	414	504	7.1	55.0	0.6	2.0	11.5	15	15	.96	75
060	460-3-60	414	504	8.0	67.0	0.7	3.5	14.2	20	20	.96	75
036	575-3-60	518	630	4.5	32.0	0.4	1.5	7.6	15	15	.96	75
042	575-3-60	518	630	5.8	44.0	0.4	1.5	9.1	15	15	.96	75
048	575-3-60	518	630	5.6	44.0	0.6	1.6	9.3	15	15	.96	75
060	575-3-60	518	630	6.4	50.0	0.6	2.8	11.4	15	15	.96	75

[1] = Rated in accordance with ARI Standard 110, utilization range "A". [2] = Dual element, time delay type.

* = KW listed is for 240 volts, use this table for 208 or 230 volts.

	NOMINAL VOLTAGE	VOLTAGE	KW CAP. MULTIPLIER
ELECTRIC HEAT CORRECTION FACTORS	240	208	.75
		230	.92
	480	460	.92
	600	575	.92

TABLE 5 - ELECTRICAL DATA (COOLING / ELECTRIC HEAT)

MODEL DEB	POWER SUPPLY	COMPRESSOR		COND. FAN MOTOR FLA	SUPPLY AIR BLOWER MOTOR, FLA	ELECTRIC HEAT ACCESSORY				MINIMUM CIRCUIT AMPACITY	MAX. FUSE SIZE,[1] AMPS	MAX. HACR[2] BREAKER SIZE
		RLA	LRA			MODEL NO.	STAGE	KW	TOTAL AMPS			
018	208/230-1-60	9.0	48.0	1.1	2.6	2NH04500506	1	3.8/5.0 *	18.1/20.8	25.8/29.3	30/30	30/30
						2NH04500706	2	5.6/7.5 *	27.1/31.3	37.1/42.3	40/45	40/45
024	208/230-1-60	11.2	60.0	1.1	2.6	2NH04500506	1	3.8/5.0 *	18.1/20.8	25.8/29.3	30/30	30/30
						2NH04500706	2	5.6/7.5 *	27.1/31.3	37.1/42.3	40/45	40/45
						2NH04501006	2	7.5/10.0 *	36.1/41.7	48.4/55.3	50/60	50/60
030	208/230-1-60	12.0	73.0	1.1	2.6	2NH04500506	1	3.8/5.0 *	18.1/20.8	25.8/29.3	30/30	30/30
						2NH04500706	2	5.6/7.5 *	27.3/31.3	37.1/42.3	40/45	40/45
						2NH04501006	2	7.5/10.0 *	36.1/41.7	48.4/55.3	50/60	50/60
						2NH04501506	2	11.3/15.0 *	54.2/62.5	71.0/81.4	80/90	80/90
036	208/230-1-60	17.3	94.0	1.1	3.5	2NH04501006	2	7.5/10.0 *	36.1/41.7	49.5/56.5	50/60	50/60
						2NH04501506	2	11.3/15.0 *	54.2/62.5	72.1/82.5	80/90	80/90
042	208/230-1-60	20.5	120.0	1.1	3.5	2NH04500506	1	3.8/5.0 *	18.1/20.8	30.2/30.4	40/40	40/40
						2NH04500706	2	5.6/7.5 *	27.1/31.3	38.2/43.4	50/50	50/50
						2NH04501006	2	7.5/10.0 *	36.1/41.7	49.5/56.5	50/60	50/60
						2NH04501506	2	11.3/15.0 *	54.2/62.5	72.1/82.5	80/90	80/90
048	208/230-1-60	24.4	140.0	1.3	4.0	2NH04501006	2	7.5/10.0 *	36.1/41.7	50.1/57.1	60/60	60/60
						2NH04501506	2	11.3/15.0 *	54.2/62.5	72.1/83.1	80/90	80/90
						2NH04502006	2	15.0/20.0 *	72.2/83.3	95.3/109.2	100/110	100/110
						2NH04502506	2	18.8/25.0 *	90.3/104.2	117.8/135.2	125/150	125/150
060	208/230-1-60	28.9	165.0	1.3	7.0	2NH04501006	2	7.5/10.0 *	36.1/41.7	53.9/60.8	70/70	70/70
						2NH04501506	2	11.3/15.0 *	54.2/62.5	76.5/86.9	80/90	80/90
						2NH04502006	2	15.0/20.0 *	72.2/83.3	99.0/112.9	100/125	100/125
						2NH04502506	2	18.8/25.0 *	90.3/104.2	121.6/139.0	125/150	125/150
036	208/230-3-60	10.9	78.0	1.1	3.5	2NH04501025	1	7.5/10.0 *	20.8/24.1	30.4/34.4	35/35	35/35
						2NH04501525	1	11.3/15.0 *	31.3/36.1	43.5/49.5	45/50	45/50
042	208/230-3-60	14.1	110.0	1.1	3.5	2NH04501025	1	7.5/10.0 *	20.8/24.1	30.4/34.4	35/35	35/35
						2NH04501525	1	11.3/15.0 *	31.3/36.1	43.5/49.5	45/50	45/50
048	208/230-3-60	14.1	105.0	0.7	4.0	2NH04501025	1	7.5/10.0 *	20.8/24.1	31.1/35.1	35/40	35/40
						2NH04501525	1	11.3/15.0 *	31.3/36.1	44.1/50.1	45/60	45/60
						2NH04502025	2	15.0/20.0 *	41.7/48.1	57.1/65.1	60/70	60/70
						2NH04502525	2	18.8/25.0 *	52.1/60.1	70.2/80.2	80/90	80/90
060	208/230-3-60	16.0	125.0	1.3	7.0	2NH04501025	1	7.5/10.0 *	20.8/24.1	34.8/38.8	40/40	40/40
						2NH04501525	1	11.3/15.0 *	31.3/36.1	47.8/53.9	50/60	50/60
						2NH04502025	2	15.0/20.0 *	41.7/48.1	60.9/68.9	70/70	70/70
						2NH04502525	2	18.8/25.0 *	52.1/60.1	73.9/83.9	80/90	80/90
036	460-3-60	5.8	40.0	0.6	1.8	2NH04501046	1	10.0 **	12.0	17.3	20	20
						2NH04501546	1	15.0 **	18.0	24.8	25	25
042	460-3-60	7.1	54.0	0.6	1.8	2NH04501046	1	10.0 **	12.0	17.3	20	20
						2NH04501546	1	15.0 **	18.0	24.8	25	25
048	460-3-60	7.1	55.0	0.6	2.0	2NH04501046	1	10.0 **	12.0	17.5	20	20
						2NH04501546	1	15.0 **	18.0	25.1	30	30
						2NH04502046	2	20.0 **	24.1	32.6	35	35
						2NH04502546	2	25.0 **	30.1	40.1	45	45
060	460-3-60	8.0	67.0	0.7	3.5	2NH04501046	1	10.0 **	12.0	19.4	20	20
						2NH04501546	1	15.0 **	18.0	26.9	30	30
						2NH04502046	2	20.0 **	24.1	34.4	35	35
						2NH04502546	2	25.0 **	30.1	42.0	45	45
036	575-3-60	4.5	32.0	0.4	1.5	2NH04501058	1	10.0 ***	9.6	13.9	15	15
						2NH04501558	1	15.0 ***	14.4	19.9	20	20
042	575-3-60	5.8	44.0	0.4	1.5	2NH04501058	1	10.0 ***	9.6	13.9	15	15
						2NH04501558	1	15.0 ***	14.4	19.9	20	20
048	575-3-60	5.6	44.0	0.6	1.6	2NH04501058	1	10.0 ***	9.6	14.0	15	15
						2NH04501558	1	15.0 ***	14.4	20.0	25	25
						2NH04502058	2	20.0 ***	19.2	26.1	30	30
						2NH04502558	2	25.0 ***	24.1	32.1	35	35
060	575-3-60	6.4	50.0	0.6	2.8	2NH04501058	1	10.0 ***	9.6	15.5	20	20
						2NH04501558	1	15.0 ***	14.4	21.5	25	25
						2NH04502058	2	20.0 ***	19.2	27.6	30	30
						2NH04502558	2	25.0 ***	24.1	33.6	35	35

[1] = Dual element, time delay type.
[2] = Standard circuit breakers may be used in Canada and on applications over 60 amps where the heaters are separately fused.

* = KW listed is for 240 volts, use table on previous page for 208 or 230 volts.
** = KW listed is for 480 volts, use table on previous page for 460 volts.
*** = KW listed is for 600 volts, use table on previous page for 575 volts.

Checking Supply Air CFM

To check the supply air CFM after the initial balancing has been completed:

1.Remove the two ¼ inch dot plugs in the duct panel.

2.Insert at least 8 inches of ¼ inch tubing into each of these holes for sufficient penetration into the airflow on both sides of the indoor coil.

3.Using an inclined manometer, determine the pressure drop across the dry evaporator coil. Since the moisture on an evaporator coil may vary greatly, measuring the pressure drop across a wet coil under field conditions would be inaccurate. To ensure a dry coil, the compressors should be deactivated while the test is being run.

4.Knowing the pressure drop across a dry coil, the actual CFM through the unit can be determined from the curve in Coil Delta P vs. Supply Air CFM figure.

WARNING! Failure to properly adjust the total system air quantity can result in extensive system damage.

After readings have been obtained, remove the tubes and reinstall the two ¼ inch plugs removed in Step 1.

NOTE: De-energize the compressors before taking any test measurements to ensure a dry indoor coil.

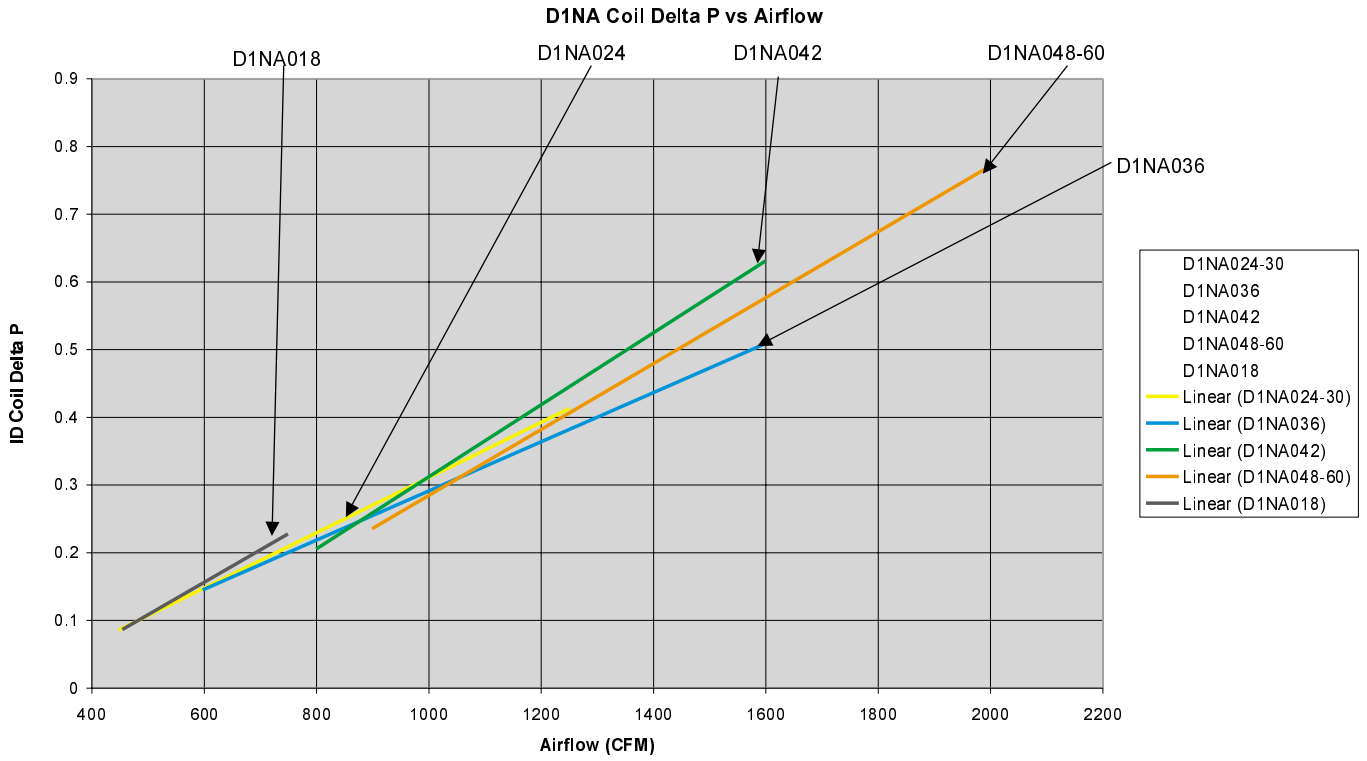


TABLE 6 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB018

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 600 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	17.8	19.8	21.8	23.9	25.9	27.9	29.9	31.1	32.3	33.6	34.8
70	12.2	14.9	17.5	20.2	22.8	25.4	28.1	29.3	30.6	31.9	33.1
75	6.6	9.9	13.2	16.4	19.7	23.0	26.3	27.6	28.9	30.2	31.5
85	-	-	-	9.0	13.6	18.1	22.6	24.0	25.4	26.8	28.3
90	-	-	-	8.0	12.0	16.0	19.9	21.7	23.4	25.1	26.8
95	-	-	-	6.9	10.4	13.8	17.3	19.3	21.3	23.3	25.3
100	-	-	-	5.3	8.0	10.6	13.3	16.0	18.7	21.4	24.1
105	-	-	-	-	5.5	7.4	9.2	12.7	16.1	19.5	22.9
110	-	-	-	-	-	-	5.2	9.3	13.4	17.6	21.7
115	-	-	-	-	-	-	-	6.0	10.8	15.7	20.5

TABLE 7 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB024

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 800 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	13.5	15.0	16.5	18.0	19.6	21.1	22.6	23.9	25.3	26.6	27.9
70	10.1	11.8	13.5	15.2	16.9	18.6	20.3	21.9	23.4	25.0	26.5
75	6.7	8.6	10.5	12.4	14.3	16.2	18.1	19.8	21.6	23.4	25.2
80	-	5.4	7.5	9.6	11.6	13.7	15.8	17.8	19.8	21.8	23.8
85	-	-	-	6.7	9.0	11.2	13.5	15.7	17.9	20.2	22.4
90	-	-	-	6.3	8.3	10.3	12.3	14.5	16.7	19.0	21.2
95	-	-	-	6.0	7.6	9.3	11.0	13.3	15.5	17.8	20.0
100	-	-	-	5.3	6.6	7.8	9.1	11.1	13.1	15.0	17.0
105	-	-	-	-	5.5	6.4	7.2	8.9	10.6	12.3	14.0
110	-	-	-	-	-	-	5.3	6.7	8.2	9.6	11.0
115	-	-	-	-	-	-	-	-	5.7	6.8	8.0

TABLE 8 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB030

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 1,000 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	21.6	22.5	23.4	24.3	25.3	26.2	27.1	27.5	28.0	28.4	28.8
70	18.0	19.3	20.5	21.7	23.0	24.2	25.4	26.0	26.6	27.1	27.7
75	14.5	16.0	17.6	19.1	20.7	22.2	23.8	24.5	25.2	25.9	26.6
80	11.0	12.8	14.7	16.5	18.4	20.3	22.1	23.0	23.8	24.7	25.5
85	7.4	9.6	11.8	14.0	16.1	18.3	20.5	21.5	22.4	23.4	24.4
90	-	5.6	7.9	10.3	12.6	15.0	17.3	18.8	20.3	21.9	23.4
95	-	-	-	6.6	9.1	11.6	14.1	16.2	18.3	20.3	22.4
100	-	-	-	5.4	7.2	9.1	10.9	13.5	16.1	18.7	21.3
105	-	-	-	-	5.3	6.6	7.8	10.9	14.0	17.1	20.3
110	-	-	-	-	-	-	-	8.3	11.9	15.5	19.2
115	-	-	-	-	-	-	-	5.7	9.8	14.0	18.1

TABLE 9 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB036

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 1,200 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	11.5	13.4	15.4	17.4	19.4	21.4	23.4	24.6	25.9	27.1	28.4
70	9.3	11.4	13.4	15.5	17.6	19.6	21.7	23.3	24.9	26.4	28.0
75	7.1	9.3	11.4	13.6	15.8	17.9	20.1	22.0	23.9	25.7	27.6
80	-	7.2	9.4	11.7	13.9	16.2	18.4	20.6	22.8	25.1	27.3
85	-	5.1	7.5	9.8	12.1	14.5	16.8	19.3	21.8	24.4	26.9
90	-	5.5	7.4	9.2	11.0	12.8	14.6	17.6	20.6	23.6	26.5
95	-	5.9	7.3	8.6	9.9	11.2	12.5	15.9	19.3	22.8	26.2
100	-	5.5	6.6	7.8	9.0	10.2	11.4	15.0	18.5	22.1	25.6
105	-	-	6.0	7.1	8.2	9.3	10.3	14.0	17.7	21.4	25.1
110	-	-	5.4	6.4	7.3	8.3	9.2	13.1	16.9	20.7	24.5
115	-	-	-	5.7	6.5	7.3	8.1	12.1	16.1	20.0	24.0

TABLE 10 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB042

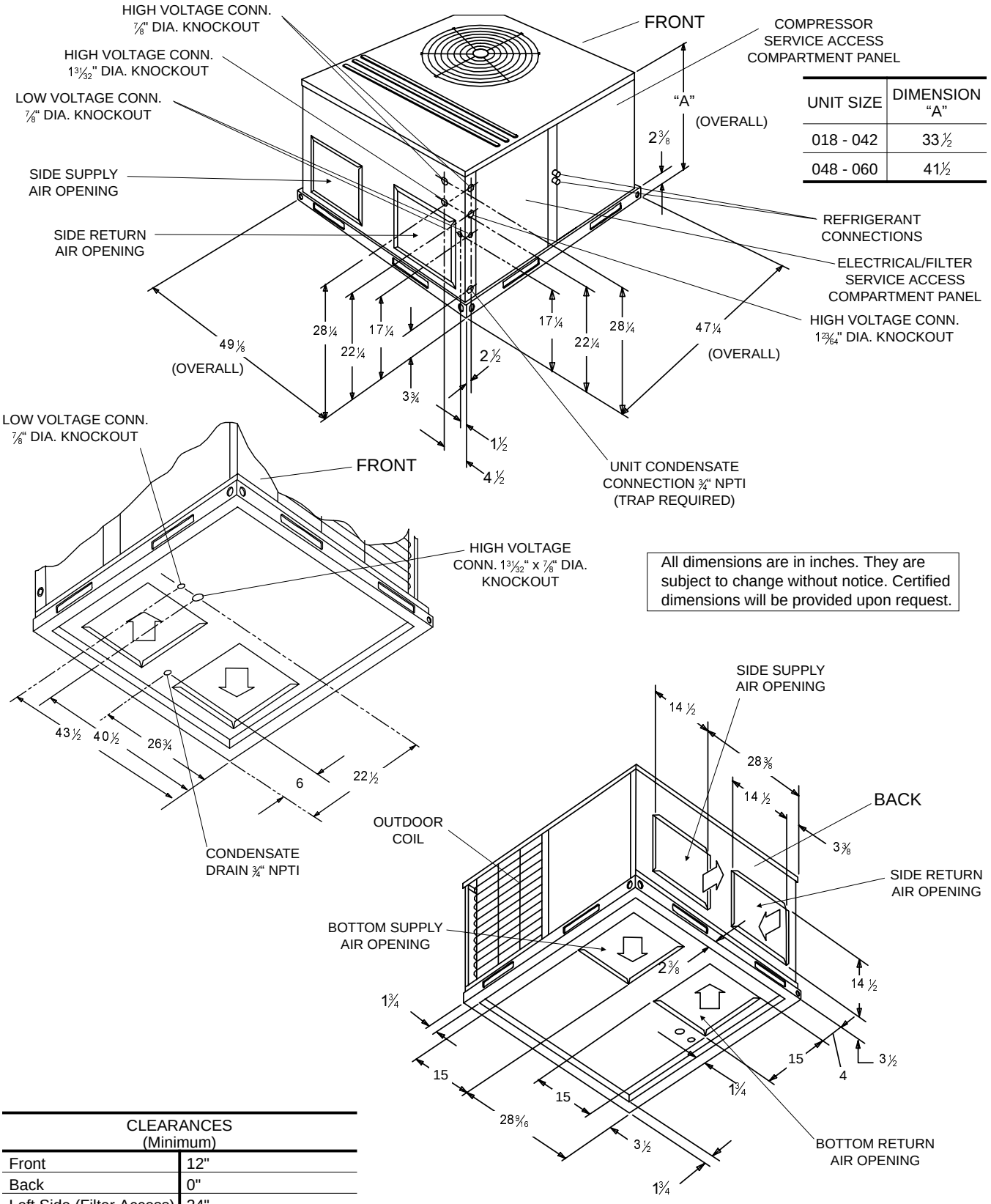
OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 1,400 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	20.3	21.9	23.5	25.0	26.6	28.1	29.7	30.6	31.6	32.6	33.6
70	16.7	18.5	20.3	22.1	23.9	25.7	27.5	28.6	29.7	30.8	32.0
75	13.0	15.1	17.1	19.2	21.2	23.2	25.3	26.6	27.8	29.1	30.4
80	9.4	11.7	13.9	16.2	18.5	20.8	23.1	24.5	25.9	27.3	28.7
85	5.7	8.2	10.8	13.3	15.8	18.4	20.9	22.5	24.0	25.6	27.1
90	-	6.5	9.1	11.7	14.2	16.8	19.4	21.0	22.6	24.1	25.7
95	-	-	7.4	10.0	12.7	15.3	17.9	19.5	21.1	22.7	24.3
100	-	-	5.8	7.9	10.0	12.0	14.1	16.3	18.4	20.6	22.8
105	-	-	-	5.8	7.3	8.7	10.2	13.0	15.8	18.6	21.4
110	-	-	-	-	-	5.5	6.4	9.8	13.2	16.5	19.9
115	-	-	-	-	-	-	-	6.5	10.5	14.5	18.5

TABLE 11 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB048

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 1,600 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	13.5	15.4	17.3	19.1	21.0	22.8	24.7	26.1	27.6	29.0	30.5
70	10.7	12.7	14.7	16.8	18.8	20.9	22.9	24.7	26.5	28.2	30.0
75	7.8	10.0	12.2	14.5	16.7	18.9	21.2	23.3	25.4	27.5	29.6
80	-	7.3	9.7	12.1	14.5	17.0	19.4	21.8	24.2	26.7	29.1
85	-	-	7.2	9.8	12.4	15.0	17.6	20.4	23.1	25.9	28.6
90	-	-	6.1	7.7	9.4	11.0	12.7	16.6	20.5	24.4	28.3
95	-	-	-	5.7	6.3	7.0	7.7	12.7	17.8	22.8	27.9
100	-	-	-	5.3	5.9	6.5	7.1	11.1	15.1	19.1	23.0
105	-	-	-	-	5.5	6.0	6.6	9.5	12.4	15.3	18.2
110	-	-	-	-	5.0	5.5	6.0	7.8	9.7	11.6	13.4
115	-	-	-	-	-	-	5.4	6.2	7.0	7.8	8.6

TABLE 12 - SUPERHEAT CHARGING TABLE FOR MODEL D1EB060

OUTDOOR TEMPERATURE (F)	SUPERHEAT AT COMPRESSOR SUCTION (F), AIRFLOW = 2,000 CFM/TON										
	INDOOR WB TEMPERATURE (F)										
	55	57	59	61	63	65	67	69	71	73	75
65	25.3	25.8	26.3	26.8	27.3	27.8	28.3	28.7	29.1	29.6	30.0
70	22.2	23.0	23.7	24.4	25.1	25.9	26.6	27.4	28.2	28.9	29.7
75	19.2	20.1	21.1	22.1	23.0	24.0	24.9	26.1	27.2	28.3	29.4
80	16.1	17.3	18.5	19.7	20.9	22.1	23.3	24.7	26.2	27.7	29.1
85	13.1	14.5	15.9	17.3	18.8	20.2	21.6	23.4	25.2	27.0	28.9
90	10.3	11.7	13.1	14.5	15.9	17.3	18.6	21.1	23.5	25.9	28.3
95	7.6	8.9	10.3	11.6	13.0	14.3	15.7	18.7	21.8	24.8	27.8
100	6.6	7.7	8.9	10.1	11.3	12.5	13.6	16.7	19.7	22.7	25.8
105	5.6	6.6	7.6	8.6	9.6	10.6	11.6	14.6	17.6	20.7	23.7
110	-	5.4	6.2	7.0	7.9	8.7	9.5	12.5	15.6	18.6	21.6
115	-	-	-	5.5	6.2	6.8	7.5	10.5	13.5	16.5	19.5



UNIT SIZE	DIMENSION "A"
018 - 042	33 1/2
048 - 060	41 1/2

All dimensions are in inches. They are subject to change without notice. Certified dimensions will be provided upon request.

CLEARANCES (Minimum)	
Front	12"
Back	0"
Left Side (Filter Access)	24"
Right Side	24"
Below Unit[1]	0"
Above Unit[2]	36" (For Condenser Air Discharge)

[1] Units may be installed on combustible floors made from wood or class A, B or C roof covering material.

[2] Units must be installed outdoors. Overhanging structures or shrubs should not obstruct outdoor air discharge outlet.

FIG. 3 - DIMENSIONS AND CLEARANCES

SEQUENCE OF OPERATION

Cooling

The following sequences of operation are based on using a standard single-stage cooling thermostat.

WITH POWER TO UNIT AND THERMOSTAT IN COOLING MODE.

1. If the fan switch on the thermostat is in the “ON” position, the 24 volts at “G” will energize the “K1" relay on the fan control board, close the ”K1" relay contacts, and energize the indoor blower motor. If the fan switch is in the “AUTO” position, the blower will operate only when there is a call for cooling by the thermostat.
2. On a call for cooling, the thermostat will send 24 volts to “Y” on the fan control board. The 24 volt signal will energize contactor “M1", and power will be supplied to the compressor and outdoor fan motor. If the fan switch on the thermostat is on the ”AUTO" position, the thermostat will also send a 24 volt signal to “G” on the fan control board and the indoor blower will operate as indicated in step 1.
3. When the demand for cooling has been satisfied, the “M1" contactor will be de-energized when the 24 volt ”Y" signal is removed. If the fan switch on the thermostat is energized when the 24 volt “Y” signal is removed. If the fan switch on the thermostat is in the “ON” position, the indoor blower will continue to run. If the fan switch is in the “AUTO” position, the 24 volt “G” signal will be removed, and after a 60 second delay, the “K1" relay will open and de-energize the indoor blower motor,

Heating

WITH POWER TO UNIT AND THERMOSTAT IN HEATING MODE.

1. If the fan switch on the thermostat is in the “ON” position, the 24 volts at “G” will energize the “K1" relay contacts, and energize the indoor blower motor. If the fan switch on the thermostat is in the ”AUTO" position, the blower will operate only when there is a call for heating by the thermostat.
2. On a call for heating, the thermostat will send 24 volts to “W1" on the fan control board. The 24 volts signal will energize relay ”K2" on the fan control board, and the first stage of electric heat will be energized.
3. When the heating demand is satisfied, the electric heat will be de-energized when the 24 volt “W1" and ”W2" signals are removed. If the fan switch on the thermostat is in the “ON” position, the indoor blower will continue to run. If the fan switch is in the “AUTO” position, the “K1" relay will open and de-energize the indoor blower motor after the appropriate time delay.

Please refer to Table 13 and 14 for more information.

TABLE 13 - THERMOSTAT SIGNALS (SINGLE PHASE UNITS)

SIGNAL	STATE	BOARD FUNCTION	SIGNAL	STATE	BOARD FUNCTION
“G”	ON	FAN INSTANT ON			
	OFF	FAN INSTANT OFF			
“G” “Y”	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON	“W1"	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT INSTANT ON
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SECOND DELAY OFF		OFF	HEATER BANK 1 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF
“G” “W1"	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT INSTANT ON	”W2"	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT ½ SEC. DELAY OFF HEATER BANK 2 ELEC. HEAT INSTANT ON
	OFF	HEATER BANK 1 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF		OFF	HEATER BANK 1 ELEC. HEAT ½ SEC. DELAY OFF HEATER BANK 2 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF
“G” “W1" ”W2"	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT INSTANT ON HEATER BANK 2 ELEC. HEAT 10 SECOND DELAY ON HEATER BANK 3 ELEC. HEAT 20 SECOND DELAY ON	“W1" ”W2"	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT INSTANT ON HEATER BANK 2 ELEC. HEAT 10 SECOND DELAY ON HEATER BANK 3 ELEC. HEAT 20 SECOND DELAY ON
	OFF	HEATER BANK 1 ELEC. HEAT INSTANT OFF HEATER BANK 2 ELEC. HEAT ½ SECOND DELAY ON HEATER BANK 3 ELEC. HEAT 1 SECOND DELAY ON FAN 6½ SECOND DELAY OFF		OFF	STAGE 1 ELEC. HEAT INSTANT OFF HEATER BANK 2 ELEC. HEAT ½ SECOND DELAY ON HEATER BANK 3 ELEC. HEAT 1 SECOND DELAY ON FAN 6½ SECOND DELAY OFF

TABLE 14 - THERMOSTAT SIGNALS (THREE PHASE UNITS)

SIGNAL	STATE	BOARD FUNCTION	SIGNAL	STATE	BOARD FUNCTION
"G"	ON	FAN INSTANT ON			
	OFF	FAN INSTANT OFF			
"G" "Y"	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON	"W1"	ON	FAN INSTANT ON HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT ON
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SECOND DELAY OFF		OFF	HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF
"G" "W1"	ON	FAN INSTANT ON HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT ON	"W2"	ON	FAN INSTANT ON HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT ON
	OFF	HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF		OFF	HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT OFF FAN 5 SECOND DELAY OFF
"G" "W1" "W2"	ON	FAN INSTANT ON HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT ON	"W1" "W2"	ON	FAN INSTANT ON HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT ON
	OFF	HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT OFF FAN 6½ SECOND DELAY OFF		OFF	HEATER BANK 1, 2 AND 3 ELEC. HEAT INSTANT OFF FAN 6½ SECOND DELAY OFF

SECURE OWNER'S APPROVAL: *When the system is functioning properly, secure the owner's approval. Show him the location of all disconnect switches and the thermostat. Teach him how to start and stop the unit and how to adjust temperature settings within the limitations of the system.*

MAINTENANCE

NORMAL MAINTENANCE

WARNING: Prior to any of the following maintenance procedures, shut off all power to the unit, to avoid personal injury.

Periodic maintenance consists of changing or cleaning filters and general cleaning of the outdoor coil.

FILTERS - Inspect once a month. Replace Disposable or clean Permanent Type as necessary. DO NOT replace Permanent Type with Disposable.

MOTORS - Indoor and outdoor fan motors are permanently lubricated and require no maintenance.

OUTDOOR COIL - Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep the coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure that the power to the unit is shut off prior to cleaning.

CAUTION: Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the hot condenser air discharge to be obstructed by overhanging structures or shrubs.

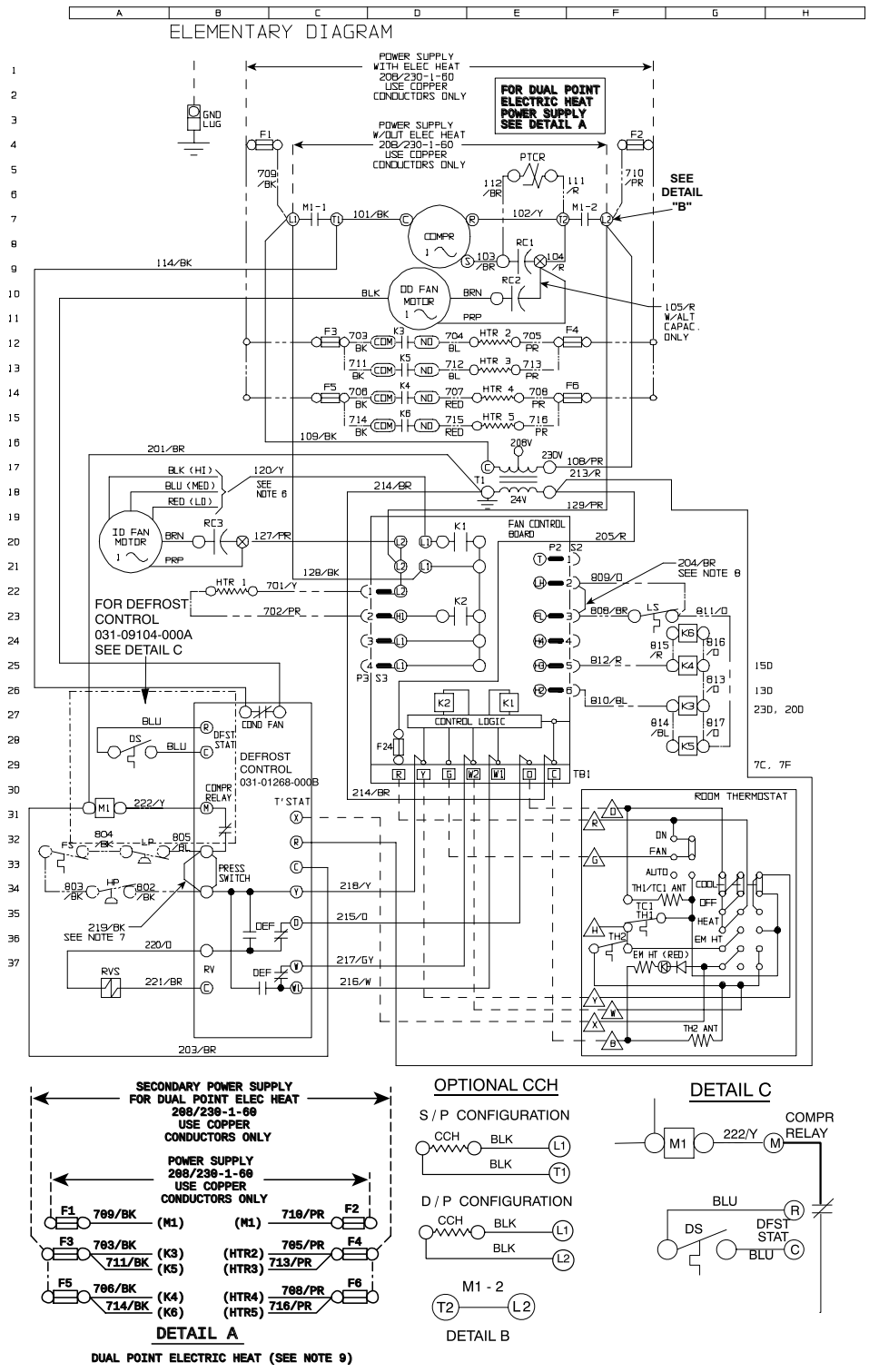


FIG. 4 - TYPICAL WIRING DIAGRAM (208/230-1-60 POWER SUPPLY)

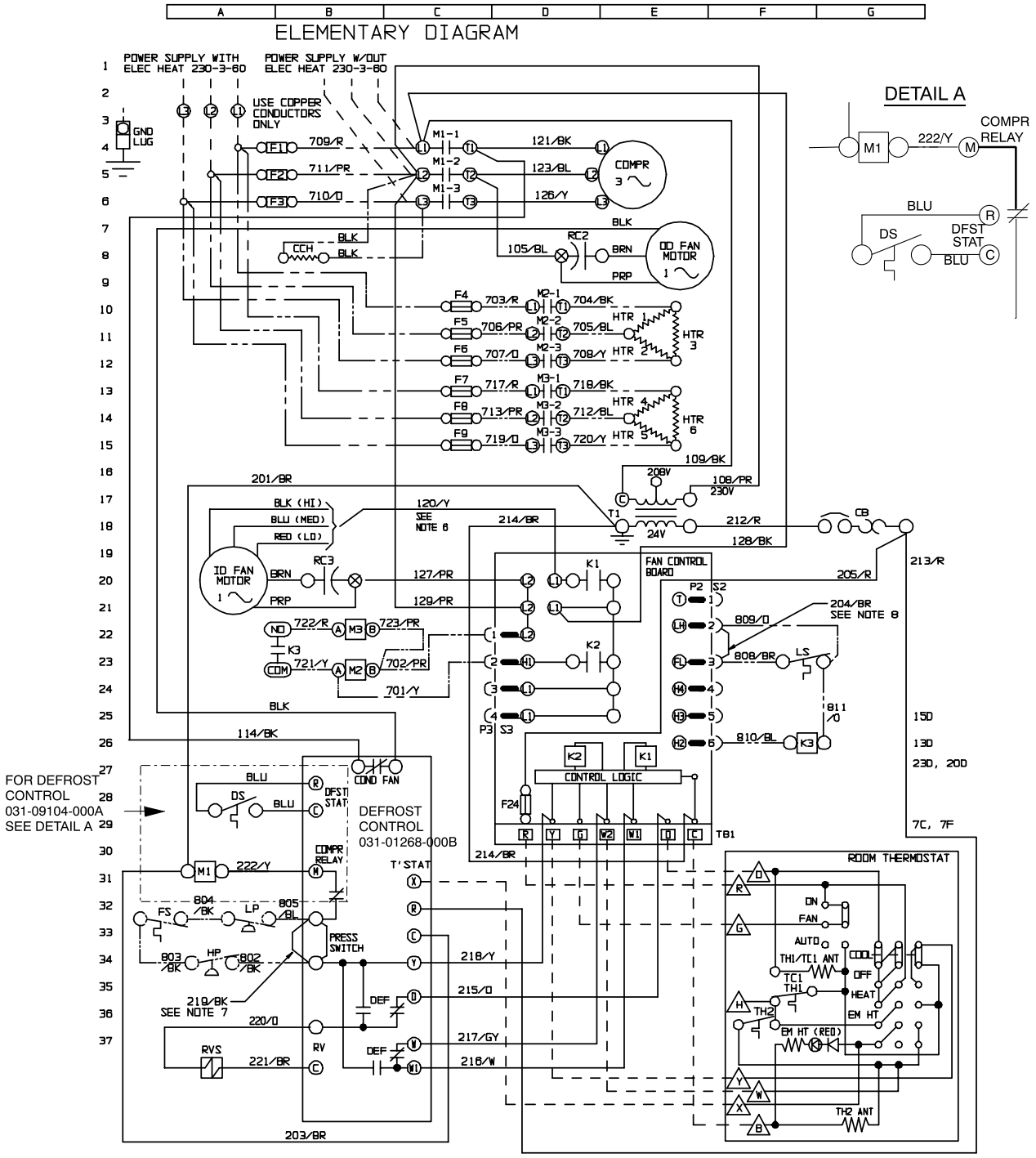


FIG. 5 - TYPICAL WIRING DIAGRAM (230-3-60 POWER SUPPLY)

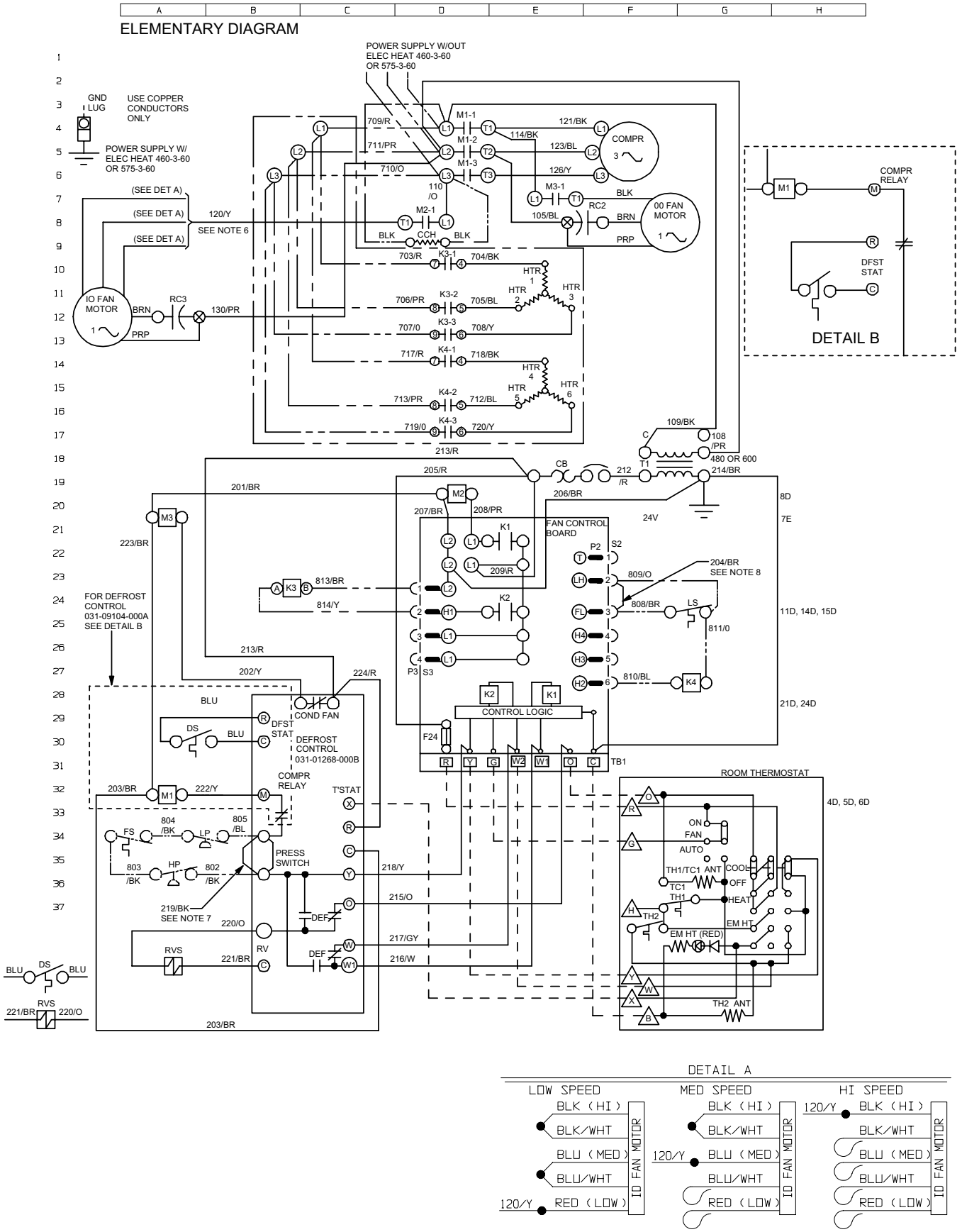


FIG. 6 - TYPICAL WIRING DIAGRAM (460-3-60 & 575-3-60 POWER SUPPLY)

TYPICAL WIRING DIAGRAM LEGEND

CB	CIRCUIT BREAKER 24V, 3 AMP
CCH	CRANKCASE HEATER (OPTIONAL)
COMPR	COMPRESSOR
DS	DEFROST SENSOR, CLOSES @ 31°F, OPENS @ 55°F.
F1 F2 F3	FUSES, LINE VOLTAGE - 60 AMP (10, 15, 20, & 25 KW ELEC HEAT)
F4 F5 F6	FUSES, LINE VOLTAGE - 30 AMP (10, 15, 20, & 25 KW ELEC HEAT)
F7 F8 F9	FUSES, LINE VOLTAGE - 30 AMP (20 & 25 KW ELEC HEAT)
F24	FUSE 24V SECONDARY, 5 AMP
FS	FREEZESTAT SWITCH (OPTIONAL ACCESSORY) OPEN @ 25°F
HP	HIGH PRESSURE SWITCH (OPTIONAL ACCESSORY) OPENS @ 380 PSIG
HTR 1	ELECTRIC HEATER (OPT. ACCSSRY: ALL KW ELEC HEAT)
HTR 2	ELECTRIC HEATER (OPT. ACCSSRY: 7.5, 10, 15, 20, & 25 KW ELEC HEAT)
HTR 3	ELECTRIC HEATER (OPT. ACCSSRY: 20 & 25 KW ELEC HEAT)
HTR 4	ELECTRIC HEATER (OPT. ACCSSRY: 15, 20, & 25 KW ELEC HEAT)
HTR 5	ELECTRIC HEATER (OPT. ACCSSRY: 20 & 25 KW ELEC HEAT)
HTR 6	ELECTRIC HEATER (OPT. ACCSSRY: 20 & 25 KW ELEC HEAT)
K1	RELAY INDOOR FAN MOTOR
K2	RELAY ELECTRIC HEATER
K3	RELAY ELECTRIC HEATER, 24 VDC COIL
K7	RELAY LIMIT TRIP, 24 VDC COIL
LP	LOW PRESSURE SWITCH (OPTIONAL ACCESSORY) OPEN @ 7 PSIG
LS	LIMIT SWITCH, ELECTRIC HEAT (PART OF ELEC HEAT ACCESSORY)
M1	CONTACTOR, COMPRESSOR & OUTDOOR FAN
M2	CONTACTOR, ELECTRIC HEAT, 230V COIL
M3	CONTACTOR, ELECTRIC HEAT, 230V COIL
PTCR	START ASSIST (OPTIONAL DEVICE)
RC1/RC2	COMPRESSOR START & OUTDOOR FAN RUN CAPACITOR
RC1	COMPRESSOR START CAPACITOR (ALTERNATE)
RC2	OUTDOOR FAN RUN CAPACITOR (ALTERNATE)
RC3	INDOOR FAN RUN CAPACITOR
RVS	REVERSING VALVE SOLENOID
S2/P2	SOCKET/PLUG CONNECTION ON FAN CONTROL BOARD, LOW VOLTAGE
S3/P3	SOCKET/PLUG CONNECTION ON FAN CONTROL BOARD, LINE VOLTAGE
S4/P4	SOCKET/PLUG CONNECTION ON ID FAN MOTOR,24V
S3/P3	SOCKET/PLUG CONNECTION ON ID FAN MOTOR, 230V
T1	TRANSFORMER, 24V, 40 VA
TB2	TERMINAL BLOCK ECM MOTOR "SPEED" CONNECTIONS
●	IDENTIFIED TERMINAL ON RUN CAPACITOR
Δ	ROOM THERMOSTAT 24V CONNECTIONS
□	TB1 ON FAN/ELEC HEAT CONTROL BOARD
———	FACTORY WIRING AND DEVICES
——··——	OPTIONAL WIRING AND DEVICES
- - - -	FIELD WIRING

TYPICAL WIRING DIAGRAM NOTES

1. ALL FIELD WIRING TO BE ACCOMPLISHED FOLLOWING CITY, LOCAL AND/OR NATIONAL CODES IN EFFECT AT TIME OF INSTALLATION OF THIS UNIT.
2. CAUTION: LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. IF ANY OF THE WIRE AS SUPPLIED WITH THIS UNIT MUST BE REMOVED, IT MUST BE REPLACED WITH TYPE 105° C, 600V WIRE OR EQUIVALENT CLEARLY RENUMBERED FOR IDENTIFICATION. VERIFY PROPER OPERATION AFTER SERVICING.
3. MOTORS ARE INHERENTLY PROTECTED.
4. UNIT FACTORY WIRED FOR 230 VOLT OPERATION. FOR 208 VOLT OPERATION MOVE '108/PR' WIRE FROM 240V TO 208V ON TRANSFORMER T1.
5. SEE UNIT NAMEPLATE FOR MAXIMUM FUSE SIZE AND MINIMUM CIRCUIT AMPACITY.
6. SELECT INDOOR BLOWER SPEED TO OBTAIN APPROX 400 CFM/TON IN COOLING.
7. IF OPTIONAL SAFETY SWITCH KIT IS INSTALLED, WIRE 219/BK IS REMOVED.
8. WIRE 204/BR IS REMOVED WHEN ELECTRIC HEAT IS INSTALLED.
9. ELECTRIC HEAT ACCESSORY WITH DUAL POINT SUPPLY POWER. SEE DETAIL A
10. SHUNT CONTACT ALSO USED WITH CRANKCASE HEATER. (OPTIONAL)

CAUTION - OPEN ALL DISCONNECTS
BEFORE SERVICING THIS UNIT

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Heating and Air Conditioning

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