

INSTALLATION INSTRUCTIONS

WALL MOUNTED PACKAGE AIR CONDITIONERS

MODELS

42WA

49WA

60WA

MANUAL 2100-038 REV. K
SUPERSEDES REV. J
FILE VOL. III, TAB 16

COPYRIGHT APRIL, 1989
BARD MANUFACTURING COMPANY
BRYAN, OHIO 43506

INDEX

Important	2
Shipping Damage	2
General	2
Installation	2
Duct Work	2
Filter	2
Fresh Air Intake	3
Wall Mounting	3
Wiring--Main Power	3
Pressure Service Ports	4
Crankcase Heaters	4
Important Installer Note	4
Fan Blade Setting Dimensions	4
Refrigerant Charge	5

INDEX OF FIGURES AND TABLES

Figure 1	1
Figure 2	4
Figure 3	5
Figure 4	7
Figure 5	8

Table 1	1
Table 2	5
Table 3	6
Table 4	6
Table 5	9

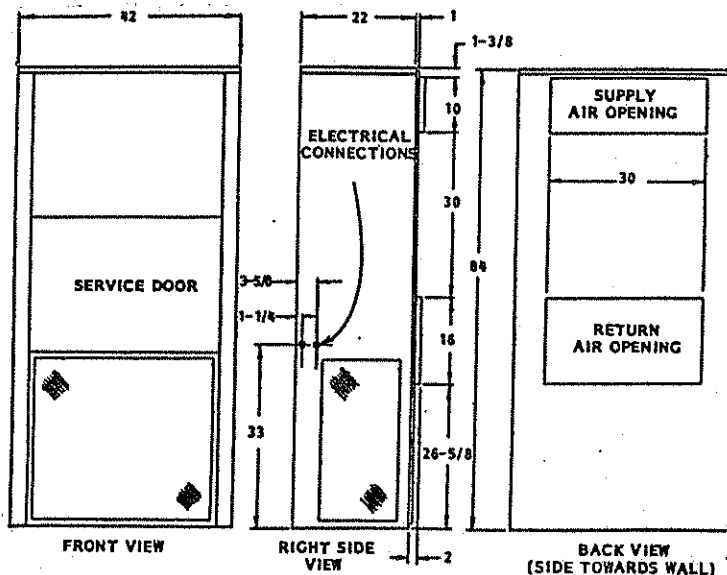
Model	Rated Volts & Phase	Max. Unit Amps @ 240/208V	"N" VERSION (STD MODELS LESS CIRCUIT BREAKERS)						"C" VERSIONS (WITH CIRCUIT BREAKERS)								
			No. Field Power Circuit	Internal Fuses (CKTA)	② Max. Ext. Fuse or Circuit Breaker	③ Minimum Circuit Ampacity	④ Field Power Wire Size	④ Ground Wire Size	No. Field Power Ckts.	② Max Ext. Fuse or Circuit Breaker		③ Minimum Circuit Ampacity		④ Field Power Wire Size		④ Ground Wire Size	
										CktA	CktB	CktA	CktB	CktA	CktB	CktA	CktB
42WA-A00*	230/208	27.3/25.3	1	--	50	33	8	10	1	50	--	33	--	6	--	10	--
10*	1	45.6/40.2	1	--	60	57	4	10	1	60	--	57	--	3	--	10	--
15*		66.5/58.1	1	60/30	90	84	2	8	2	60	30	57	26	4	8	10	10
20*		87.2/76.1	1	60/30	110	109	1	6	2	60	60	57	52	3	4	10	10
42WA-B00*	230/208	19.8/19.8	1	--	35	24	10	10	1	35	--	24	--	10	--	10	--
09*	3	25.7/22.7	1	--	35	33	8	10	1	35	--	33	--	8	--	10	--
15*		40.2/35.2	1	--	60	51	6	10	1	60	--	51	--	6	--	10	--
18*		47.3/41.5	1	--	60	60	4	10	1	60	--	60	--	10	--	10	--
49WA-A00*	230/208	27.3/28.8	1	--	50	35	8	10	1	50	--	35	--	8	--	10	--
10*	1	45.6/40.2	1	--	60	57	4	10	1	60	--	57	--	4	--	10	--
15*		66.5/58.1	1	60/30	90	84	2	8	2	60	30	57	26	3	8	10	10
20*		87.2/76.1	1	60/60	110	109	1	6	2	60	60	57	52	3	4	10	10
49WA-B00*	230/208	20.8/20.8	1	--	35	25	10	10	1	35	--	25	--	10	--	10	--
09*	3	25.7/22.7	1	--	35	33	8	10	1	35	--	33	--	8	--	10	--
15*		40.2/35.2	1	--	60	51	6	10	1	60	--	51	--	6	--	10	--
18*		47.3/41.5	1	--	60	60	4	10	1	60	--	60	--	4	--	10	--
49WA-C00*	460	10.8	1	--	20	15	14	12	1	20	--	15	--	14	--	12	--
09*	3	12.3	1	--	20	16	12	12	1	20	--	16	--	12	--	12	--
15*		19.5	1	--	25	25	10	10	1	25	--	25	--	10	--	10	--
60WA-A00*	230/208	30.3/32.8	1	--	60	44	6	10	1	60	--	44	--	6	--	10	--
10*	1	45.6/40.2	1	--	60	57	4	10	1	60	--	57	--	4	--	10	--
15*		66.5/58.1	1	60/30	90	84	2	8	2	60	30	57	26	3	8	10	10
20*		87.2/76.1	1	60/60	110	109	1	6	2	60	60	57	52	3	4	10	10
60WA-B00*	230/208	22.3/24.3	1	--	45	29	8	10	1	45	--	29	--	8	--	10	--
09*	3	25.7/24.3	1	--	45	33	8	10	1	45	--	33	--	8	--	10	--
15*		40.2/35.2	1	--	60	51	6	10	1	60	--	51	--	6	--	10	--
18*		47.3/45.1	1	--	60	60	4	10	1	60	--	60	--	4	--	10	--
60WA-C00*	460	11.8	1	--	20	15	14	12	1	20	--	15	--	14	--	12	--
09*	3	12.3	1	--	20	16	12	12	1	20	--	16	--	12	--	12	--
15*		19.5	1	--	25	25	10	10	1	25	--	25	--	10	--	10	--

* - N for standard models (less circuit breakers).

- C for models with circuit breakers.

- ① All wiring must conform to the National Electrical Code and all local codes.
- ② Maximum size of the time delay fuse or HACR type circuit breaker for protection of field wiring conductors. (Sizes 70 amp or greater are not HACR type).
- ③ These "Minimum Circuit Ampacity" values are to be used for sizing the field power conductors. Refer to the National Electric Code (latest revision) article 310 for power conductor sizing. Caution: When more than one field power conductor circuit is run thru one conduit, the conductors must be derated. Pay special attention to note 8 of tables 310 regarding Ampacity Adjustment Factors when more than 3 conductors are in a raceway.
- ④ Based on 60 degree C copper wire.

FIGURE 1



IMPORTANT

The equipment covered in this manual is to be installed by trained, experienced service and installation technicians. Any heat pump is more critical of proper operating, charge and an adequate duct system than a straight air conditioning unit. All duct work supply and return, must be properly sized for the design air flow requirement of the equipment. ACCA is an excellent guide to proper sizing. All duct work or portions thereof not in the conditioned space should be properly insulated in order to both conserve energy and prevent condensation or moisture damage.

SHIPPING DAMAGE

Upon receipt of equipment, the carton should be checked for external signs of shipping damage. If damage is found, the receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier's agent.

GENERAL

The refrigerant system is completely assembled and charged. All internal wiring is complete.

The unit is designed for use with or without duct work. Flanges are provided for attaching the supply and return ducts.

These instructions explain the recommended method to install the air cooled self-contained unit and the electrical wiring connections to the unit.

These instructions and any instructions packaged with any separate equipment required to make up the entire air conditioning system should be carefully read before beginning the installation. Note particularly "Starting Procedure" and any tags and/or labels attached to the equipment.

While these instructions are intended as a general recommended guide, they do not supersede any national and/or local codes in any way. Authorities having jurisdiction should be consulted before the installation is made.

INSTALLATION

Size of unit for a proposed installation should be based on heat loss calculation made according to methods of Air Conditioning Contractors of America (ACCA). The air duct should be installed in accordance with the Standards of the National Fire Protection Association for the Installation of Air Conditioning and Ventilating systems of Other Than Residence Type, NFPA No. 90A, and Residence Type Warm Air Heating and Air Conditioning System, NFPA No. 90B. Where local regulations are at a variance with instructions, installer should adhere to local codes.

DUCT WORK

Design the duct work according to methods given by the Air Conditioning Contractors of America. When duct runs through unheated spaces, it should be insulated with a minimum of one inch of insulation. Use insulation with a vapor barrier on the outside of the insulation. Flexible joints should be used to connect the duct work to the equipment in order to keep the noise transmission to a minimum.

A one-inch clearance to combustible material for the first three feet of duct attached to the outlet air frame is required. See page 8 for further details.

FILTER

A one-inch throwaway filter is supplied with each unit. The filter slides into position making it easy to service. This filter can be serviced from the outside by removing the service door.

FRESH AIR INTAKE

All units are built with a fresh air inlet hole punched in the service panel. The fresh air damper assembly is shipped with each unit, and must be attached at the installation site. See Figure 4 for typical installation procedure.

The fresh air damper assembly is standard equipment with the unit because of the variety of state or local codes requiring fresh air capability.

All capacity, efficiency and cost of operation information as required for Department of Energy "Energyguide" Fact Sheets is based upon the fresh air blank-off plate in place and is recommended for maximum energy efficiency.

The blank-off plate is available upon request from the factory and is installed in place of the fresh air damper shipped with each unit.

WALL MOUNTING

1. Two holes, for the supply and return air openings must be cut through the wall as shown in Figure 5.
2. On wood-frame walls, the wall construction must be strong and rigid enough to carry the weight of the unit without transmitting any unit vibration. **WARNING:** Fire hazard can result if one inch clearance to combustible material for supply air duct is not maintained. See Figure 5.
3. Concrete block walls must be thoroughly inspected to insure that they are capable of carrying the weight of the installing unit.
4. Ducts through the walls must be insulated and all joints taped or sealed to prevent air or moisture entering the wall cavity.
5. Some installations may not require any return air duct. It is recommended that on this type of installation that a filter grille be located in the wall. Filters must be of sufficient size to allow a maximum velocity of 400 FPM.

NOTE: If no return air duct is used, applicable installation codes may limit this cabinet to installation only in a single story structure.

WIRING--MAIN POWER

Refer to the unit rating plate for wire sizing information and maximum fuse or "HACR Type" circuit breaker size. Each outdoor unit is marked with a "Minimum Circuit Ampacity." This means that the field wiring used must be sized to carry that amount of current. Depending on the installed KW of electric heat, there may be two field power circuits required. If this is the case, the unit serial plate will so indicate. Some models are suitable only for connection with copper wire, while others can be wired with either copper or aluminum wire. Each unit and/or wiring diagram will be marked "Use Copper Conductors Only" or "Use Copper or Aluminum Conductors." These instructions **MUST BE** adhered to. Refer to the National Electrical Code for complete current carrying capacity data on the various insulation grades of wiring material.

The electrical data lists fuse and wire sizes (60 degree F copper) for all models, including the most commonly used heater sizes. Also shown are the number of field power circuits required for the various models with heaters.

Field conduit connections must be to the control box and not terminate at the cabinet.

The unit rating plate lists a "Maximum Time Delay Relay Fuse" of "HACR Type" circuit breaker that is to be used with the equipment. The correct size must be used for proper circuit protection and also to assure that there will be no nuisance tripping due to the momentary high starting current of the compressor motor.

PRESSURE SERVICE PORTS

High and low pressure service ports are installed on all units so that the system operating pressures can be observed. Pressure curves can be found later in the manual covering all models on both cooling and heating cycles. It is imperative to match the correct pressure curve to the unit by model number.

CRANKCASE HEATERS

All units are provided with some form of compressor crankcase heat. Some single phase units utilize the compressor motor start winding in series with a portion of the run capacitor to generate heat within the compressor shell to prevent liquid refrigerant migration.

Some three phase units utilize a wraparound type of crankcase heater that warms the compressor oil from the outside.

Some single and three phase models have an insertion well-type heater located in the lower section of the compressor housing. This is a self-regulating type heater that draws only enough power to maintain the compressor at a safe temperature.

Some form of crankcase heat is essential to prevent liquid refrigerant from migrating to the compressor, causing oil pump out on compressor start-up and possible valve failure due to compressing a liquid.

Refer to unit wiring diagram to find exact type of crankcase heater used.

The decal in Figure 2 is affixed to all outdoor units detailing start-up procedure. This is very important. Please read carefully.

IMPORTANT INSTALLER NOTE

For improved start-up performance, wash the indoor coil with a dishwasher detergent.

NOTE: If this unit is operated in cooling below a 65 degree outdoor ambient temperature, the installation of low ambient controls (LAC-1 and 8201-008 relay) to unit is required.

FAN BLADE SETTING DIMENSIONS

Shown in the drawing below are the correct fan blade setting dimensions for proper air delivery across the outdoor coil.

Any service work requiring removal or adjustment in the fan and/or motor area will require that the dimensions below be checked and blade adjusted in or out on the motor shaft accordingly.

FIGURE 2

IMPORTANT

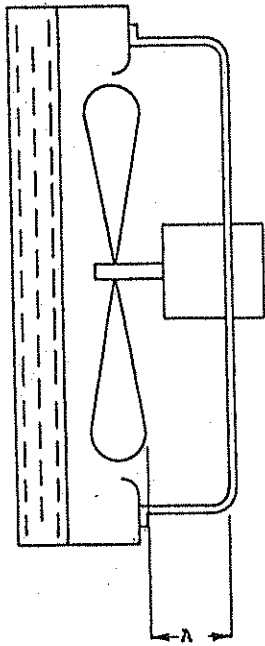
THESE PROCEDURES MUST BE FOLLOWED AT INITIAL START-UP AND AT ANY TIME POWER HAS BEEN REMOVED FOR 12 HOURS OR LONGER.

TO PREVENT COMPRESSOR DAMAGE WHICH MAY RESULT FROM THE PRESENCE OF LIQUID REFRIGERANT IN THE COMPRESSOR CRANKCASE

1. MAKE CERTAIN THE ROOM THERMOSTAT IS IN THE "OFF" POSITION. (THE COMPRESSOR IS NOT TO OPERATE).
2. APPLY POWER BY CLOSING THE SYSTEM DISCONNECT SWITCH. THIS ENERGIZES THE COMPRESSOR HEATER WHICH EVAPORATES THE LIQUID REFRIGERANT IN THE CRANKCASE.
3. ALLOW 4 HOURS OR 60 MINUTES PER POUND OF REFRIGERANT IN THE SYSTEM AS NOTED ON THE UNIT RATING PLATE, WHICHEVER IS GREATER.
4. AFTER PROPERLY ELAPSED TIME THE THERMOSTAT MAY BE SET TO OPERATE THE COMPRESSOR.
5. EXCEPT AS REQUIRED FOR SAFETY WHILE SERVICING — DO NOT OPEN SYSTEM DISCONNECT SWITCH.

7961-D61

FIGURE 3



Model	Dimension A
42WA	1
49WA	2
60WA	2

REFRIGERANT CHARGE

The correct system R-22 charge is shown on the unit rating plate. Optimum unit performance will occur with a refrigerant charge resulting in a suction line temperature (6" from compressor) as shown in the following table:

TABLE 2

Model	Rated Airflow	° 95 F OD Temperature	° 82 F OD Temperature
42WA	1575	57 - 59	67 - 69
49WA	1725	60 - 62	68 - 70
60WA	1700	54 - 56	63 - 65

The above suction line temperatures are based upon 80 degrees F dry bulb/67 degrees F wet bulb (50% R.H.) temperature and rated airflow across the evaporator during cooling cycle.

TABLE 3

RATED CFM AND E.S.P. (WET COIL--COOLING)			
Model	Rated *CFM	Rated *E.S.P.	Recommended Airflow Range
42WA	1575	.40	1425 - 1700 CFM
49WA	1725	.30	1425 - 1900 CFM
60WA	1700	.20	1425 - 1900 CFM

*Rated CFM and E.S.P. on high speed tap.

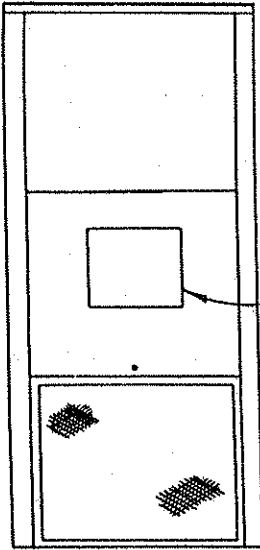
TABLE 4

INDOOR BLOWER PERFORMANCE CFM--DRY COIL WITH FILTER				
E.S.P. In H ₂ O	Models 42WA, 49WA		Model 60WA	
	Low	High	Low	High
.0	1475	2000	1495	2020
.1	1435	1875	1475	1915
.2	1380	1760	1430	1810
.3	--	1635	--	1700
.4	--	1460	--	1560
.5	--	1280	--	1415
.6	--	1100	--	1270

FIGURE 4

UNIT MODELS

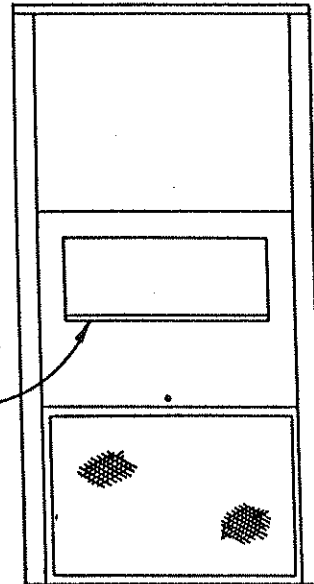
20WA
24WA
18WH
24WH



Model FAD10
Fresh Air Cover
With Adjustable
Damper

UNIT MODELS

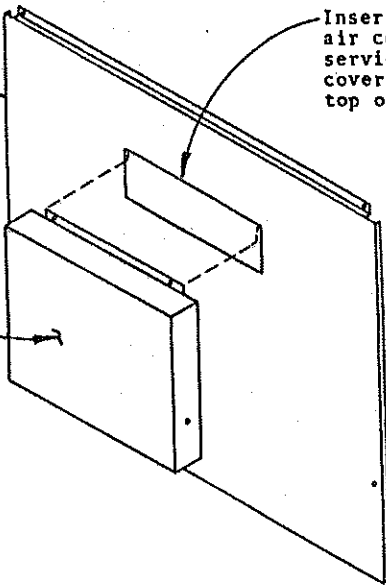
30WA
36WA
30WH
36WH
42WA
45WH
49WA
48WH
60WA
60WH



MODEL FAD25
Fresh Air Cover
With Adjustable
Damper

Service
Door

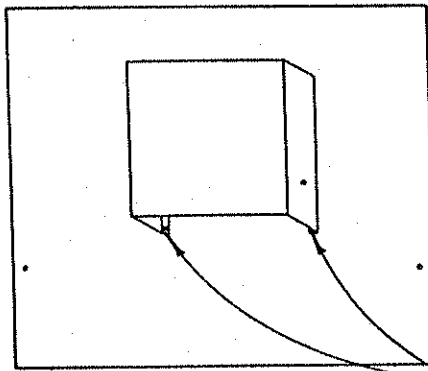
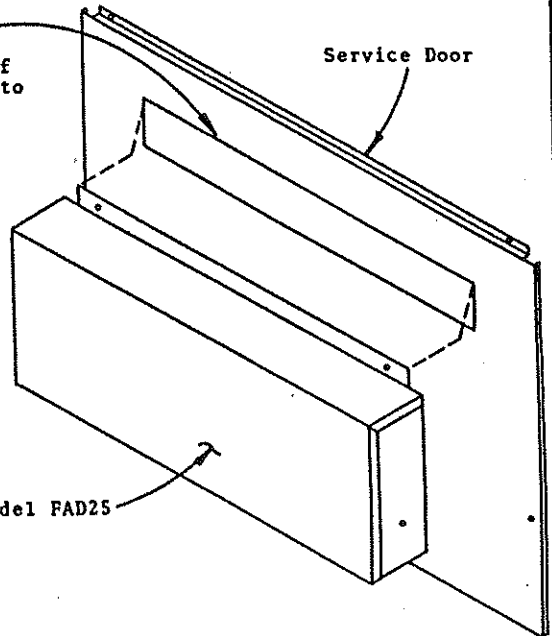
Model FAD10



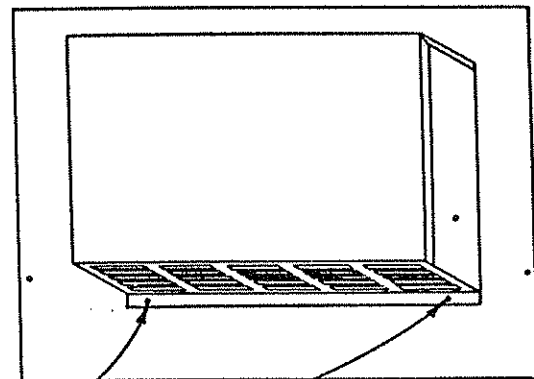
Insert top flange of fresh
air cover into opening in
service door and push top of
cover assembly all the way to
top of opening.

Service Door

Model FAD25



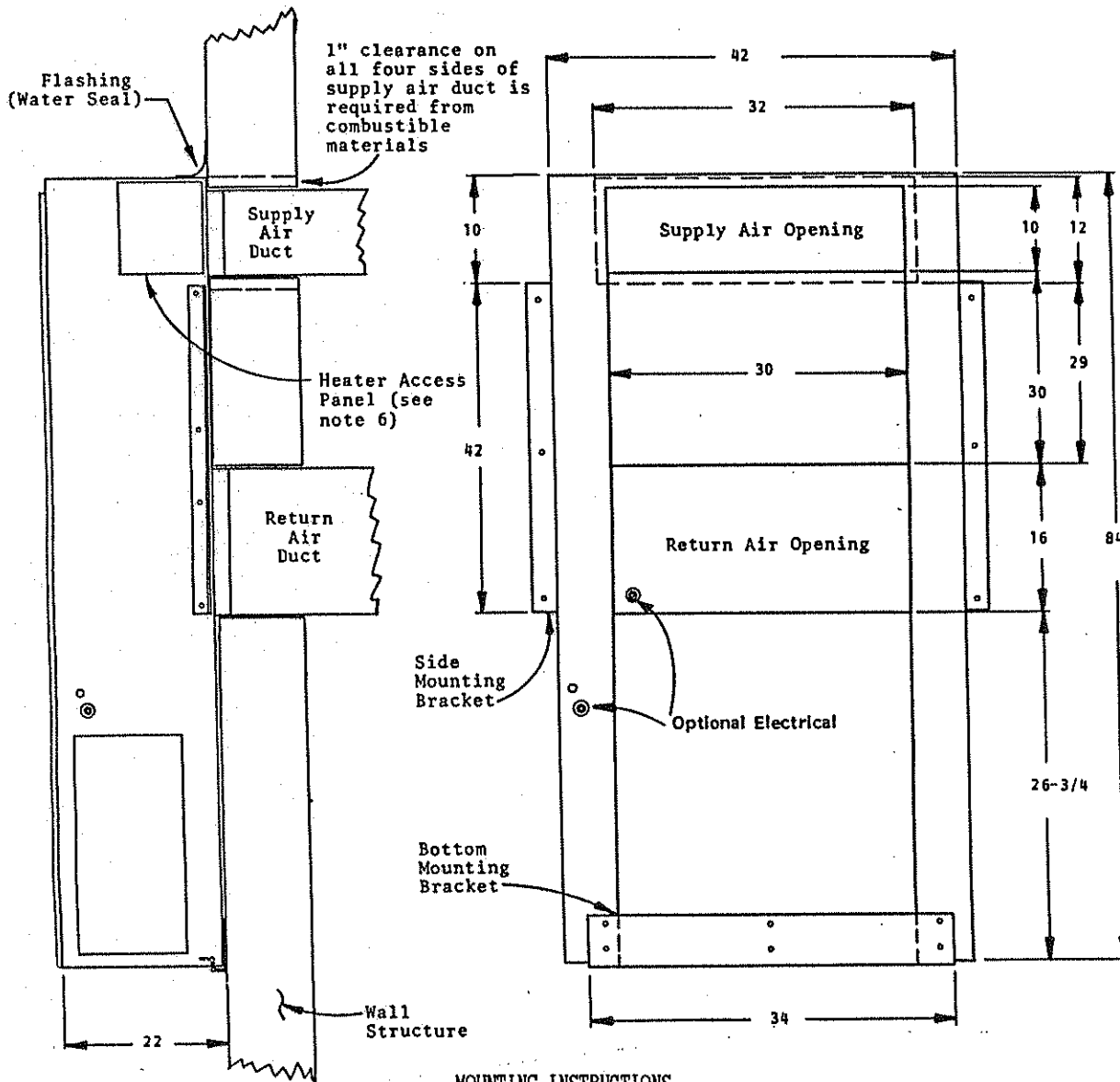
Secure bottom of
Fresh Air Cover Assembly
with two screws.



RIGHT SIDE VIEW

FIGURE 5

WALL VIEW



MOUNTING INSTRUCTIONS

1. These units are secured by wall mounting brackets which secure the unit to the outside wall surface at both sides and at the bottom.
2. The unit itself is suitable for "0" inch clearance, but the supply air duct flange and the first three feet of supply air duct require 1 inch clearance to combustible material. If combustible wall, use 32" x 12" dimensions for sizing, if non-combustible, use 30" x 10" dimensions.

WARNING: Failure to provide the one inch clearance for the first three feet between the supply duct and a combustible surface can result in fire.

3. After the wall opening positions have been selected, lay out the position for the bottom and side brackets. Fasten the brackets securely to the wall (type of fasteners will depend on wall construction).
4. Be sure to observe the 10" dimension when attaching the side brackets. This will assure that no screws are driven into the unit sides damaging any internal parts. One-half inch sheet metal screws are recommended.
5. For additional mounting rigidity, the return air and supply air (depending upon wall construction) frames or collars can be drilled and screwed or welded to the structural wall itself. Be sure to observe required clearance if combustible wall.
6. Maintain 30 inches minimum clearance on right side of unit to allow access to heat strip and control panel.

COOLING

TABLE 5

Air Temperature Entering Outdoor Coil Degree F

Model	Return Air Temperature	Pressure	°	°	°	°	°	°	°	°	°
			75	80	85	90	95	100	105	110	115
42WA	75 deg. DB	Low Side	72	74	76	78	80	82	89	87	89
	62 deg. WB	High Side	213	229	247	263	279	295	311	326	341
	80 deg. DB	Low Side	77	78	81	83	85	87	89	93	95
	67 deg. WB	High Side	218	235	253	270	285	300	315	334	350
	85 deg. DB	Low Side	83	85	87	89	94	94	96	99	102
	72 deg. WB	High Side	226	244	262	279	296	313	330	346	362
49WA	75 deg. DB	Low Side	71	73	76	78	80	82	84	86	88
	62 deg. WB	High Side	203	221	239	257	275	293	311	329	347
	80 deg. DB	Low Side	76	78	81	83	85	87	89	92	94
	67 deg. WB	High Side	208	226	245	264	282	300	320	337	356
	85 deg. DB	Low Side	82	84	87	89	91	94	96	99	101
	72 deg. WB	High Side	215	234	254	273	292	311	330	349	368
60WA	75 deg. DB	Low Side	69	71	72	74	76	77	78	80	81
	62 deg. WB	High Side	219	236	254	271	288	305	322	339	356
	80 deg. DB	Low Side	74	76	77	79	81	83	84	86	87
	67 deg. WB	High Side	225	244	262	278	295	313	332	348	365
	85 deg. DB	Low Side	80	82	83	85	87	89	90	92	94
	72 deg. WB	High Side	233	251	270	288	306	324	342	360	378

Low side pressure \pm 2 PSIG
 High side pressure \pm 5 PSIG

Tables are based upon rated CFM (airflow) across the evaporator coil and should be found under section titled "Refrigerant Charge" elsewhere in manual. If there is any doubt as to correct operating charge being in the system, the charge should be removed, system evacuated, and recharged to serial plate instructions.

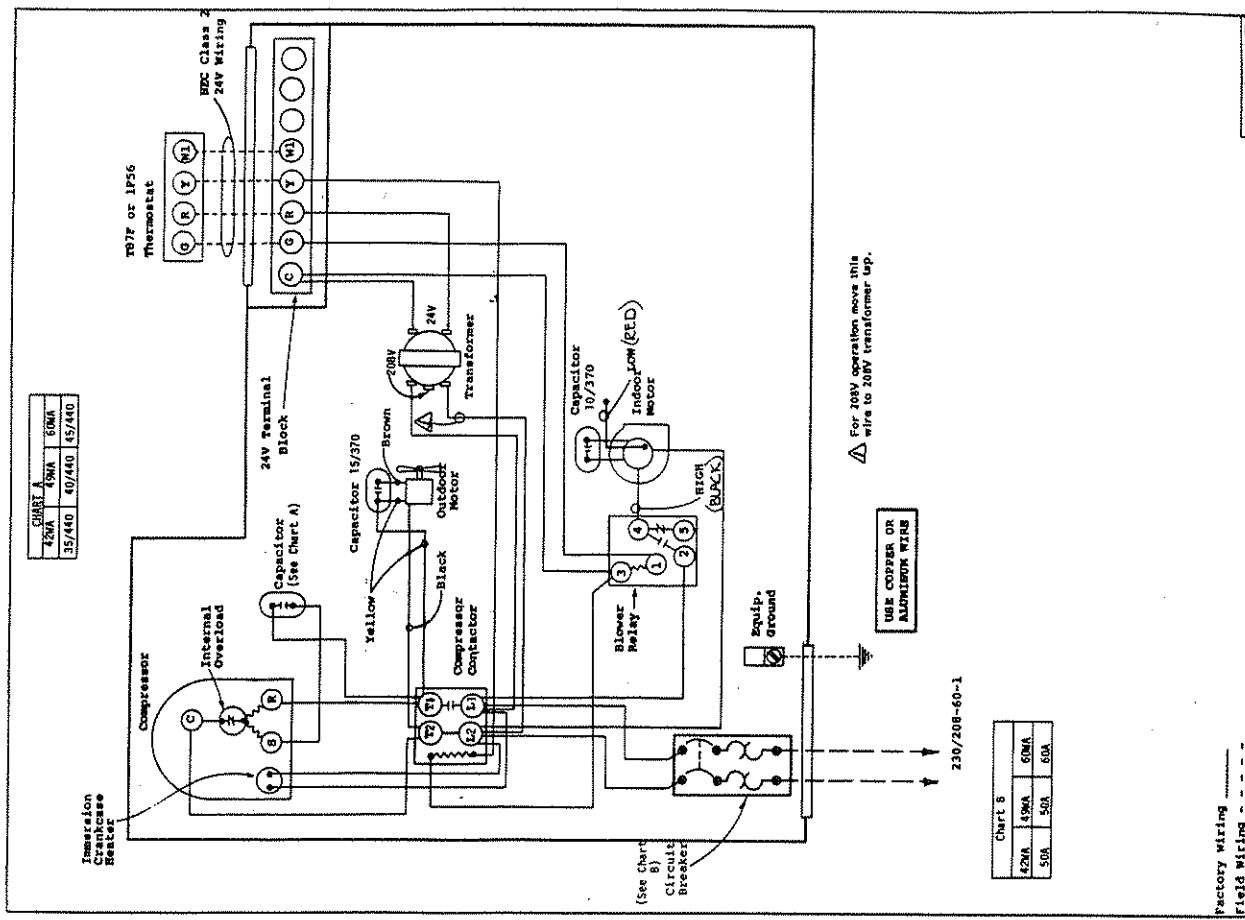
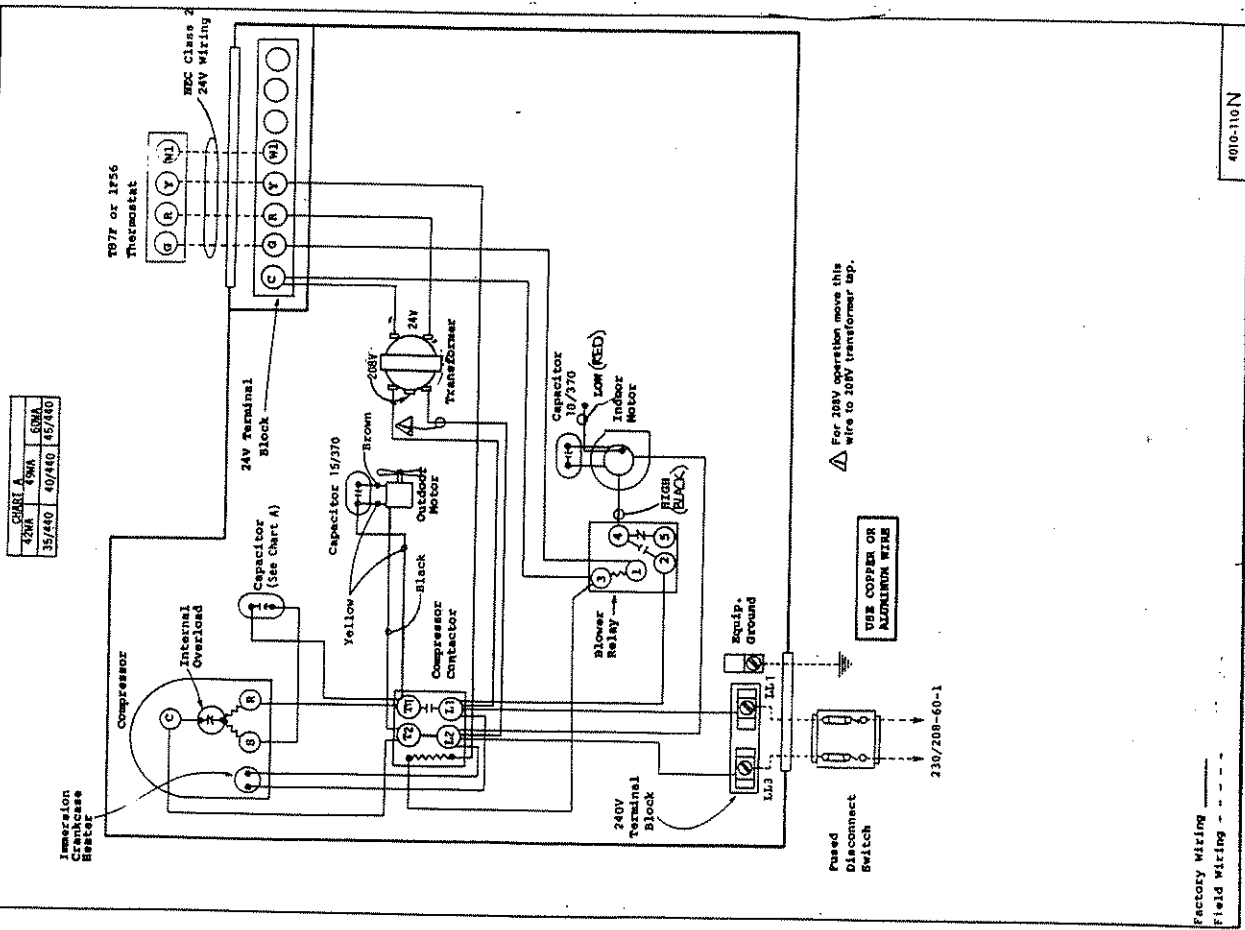
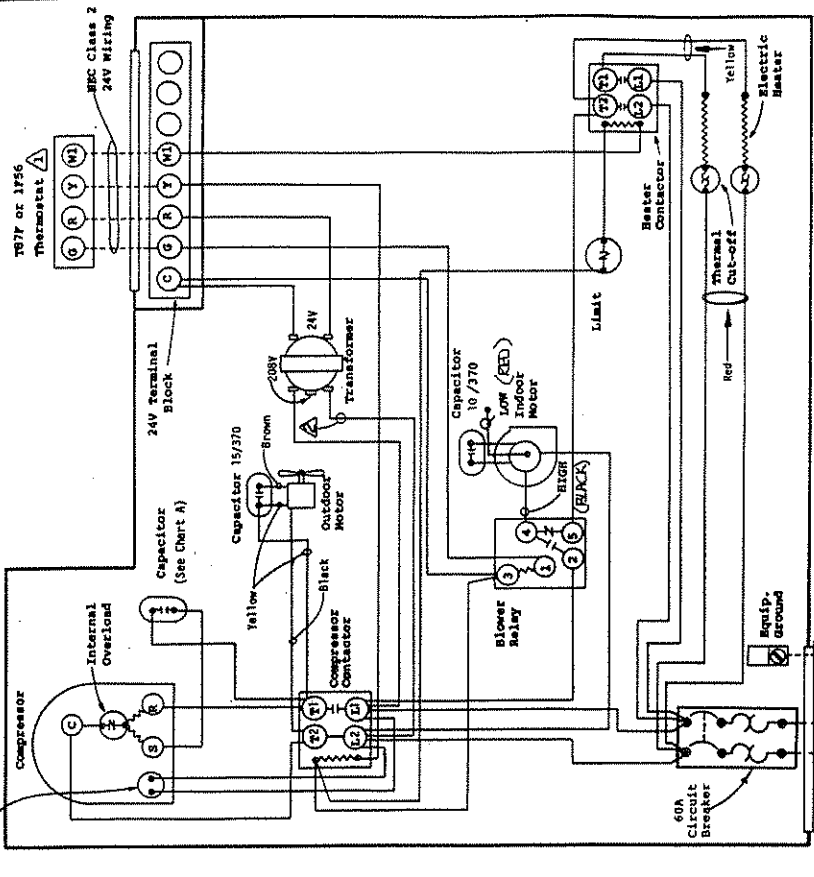


CHART A

42MA	49MA	60MA
35/440	40/440	5/440



⚠ Set heat anticipator at .40A.
 ⚠ For 208V operation move this wire to 208V transformer tap.

USE COPPER OR ALUMINUM WIRE

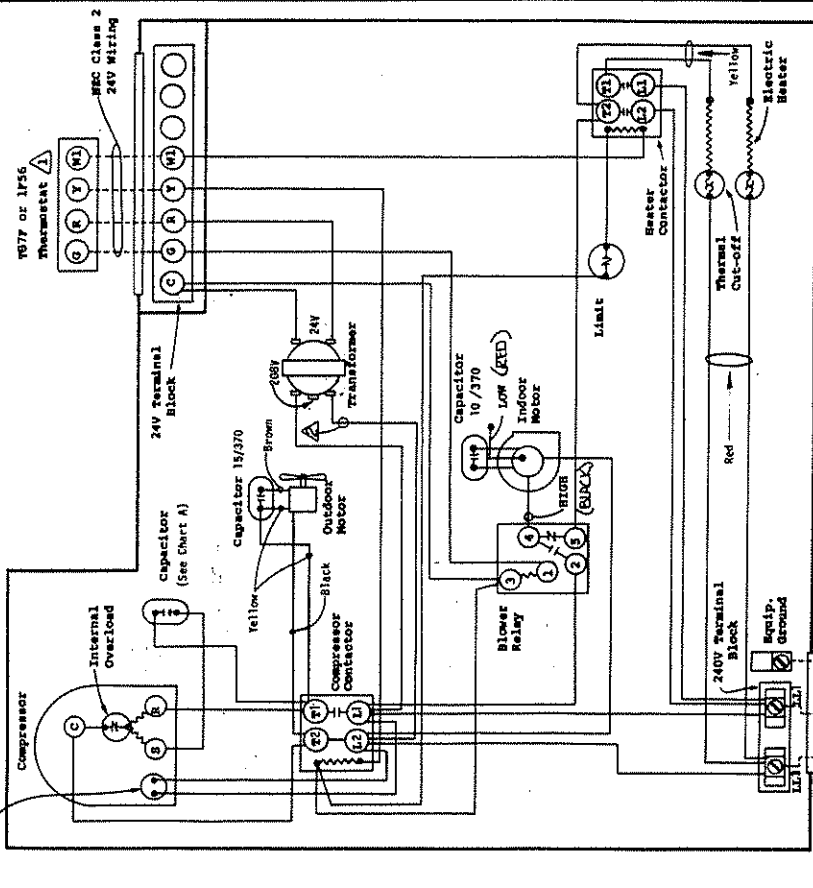
230/208-60-1

Factory Wiring - - - - -
 Field Wiring - - - - -

4010-31E

CHART A

42MA	49MA	60MA
35/440	40/440	45/440



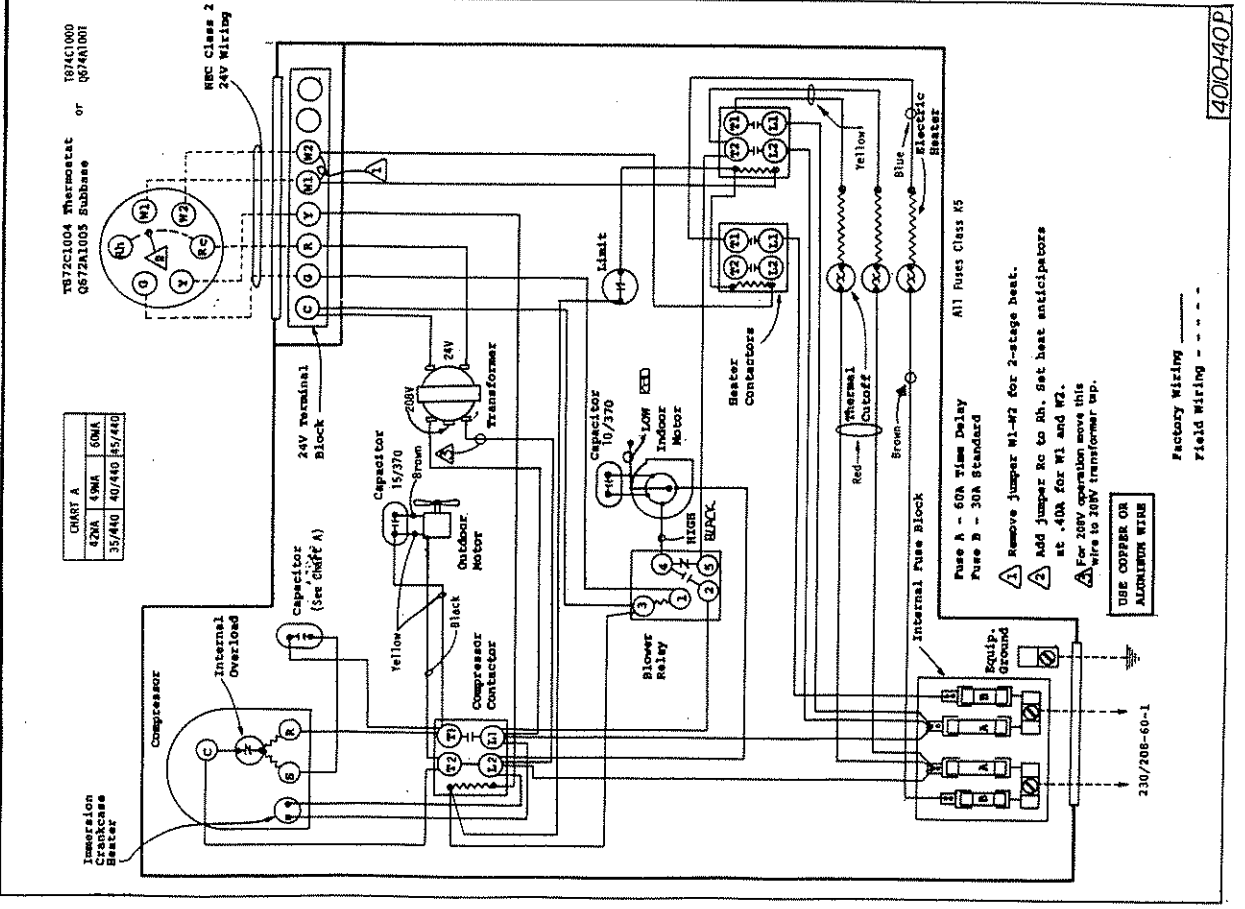
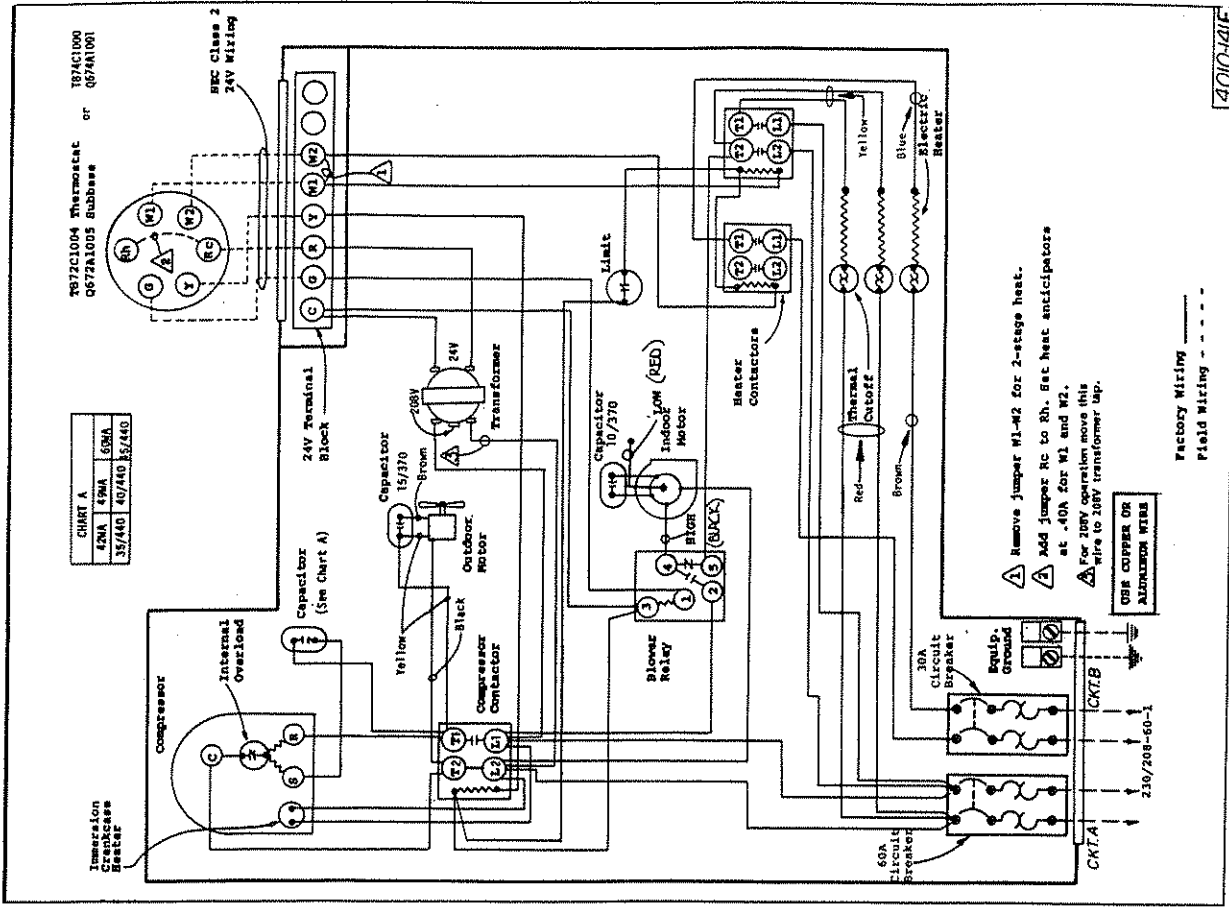
⚠ Set heat anticipator at .40A.
 ⚠ For 208V operation move this wire to 208V transformer tap.

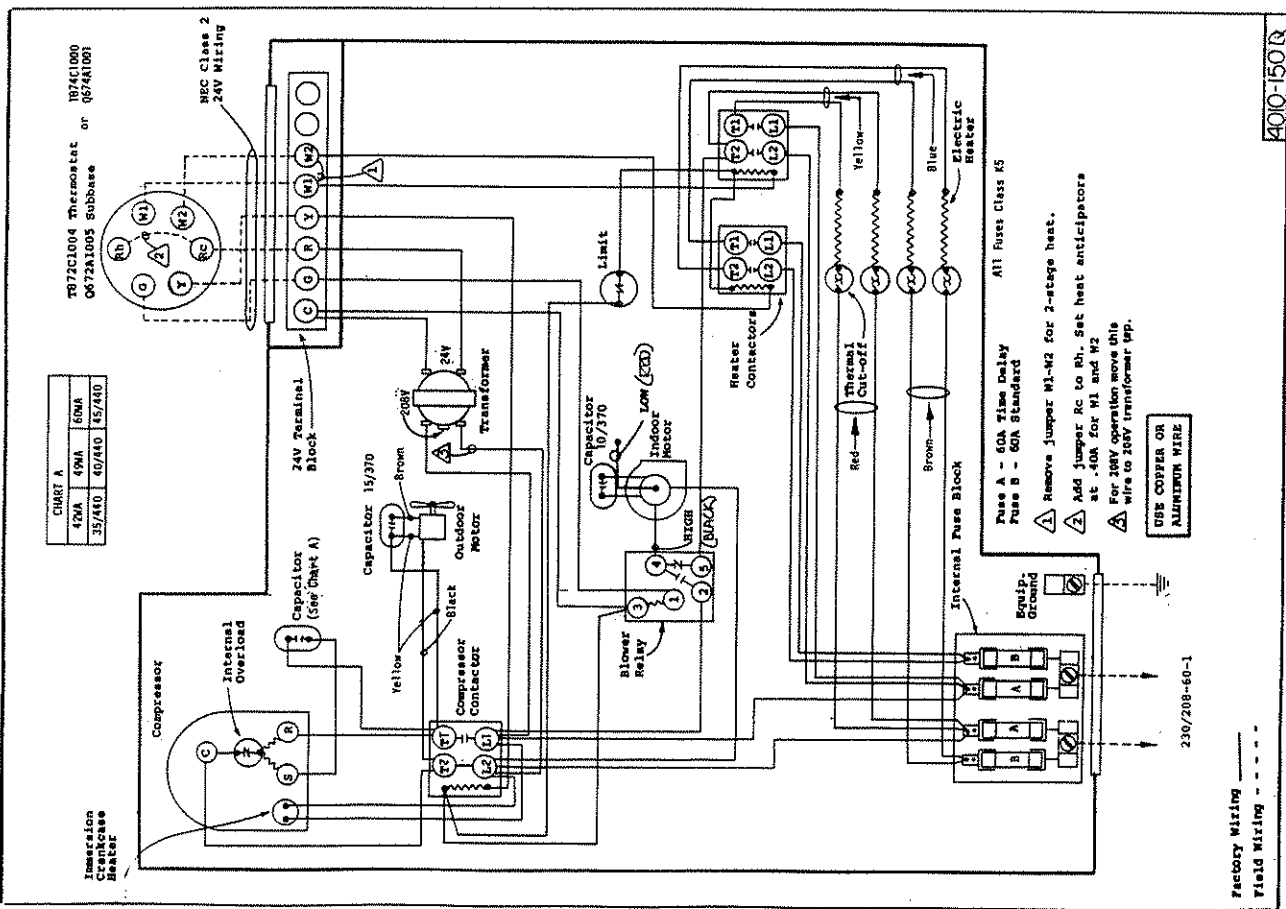
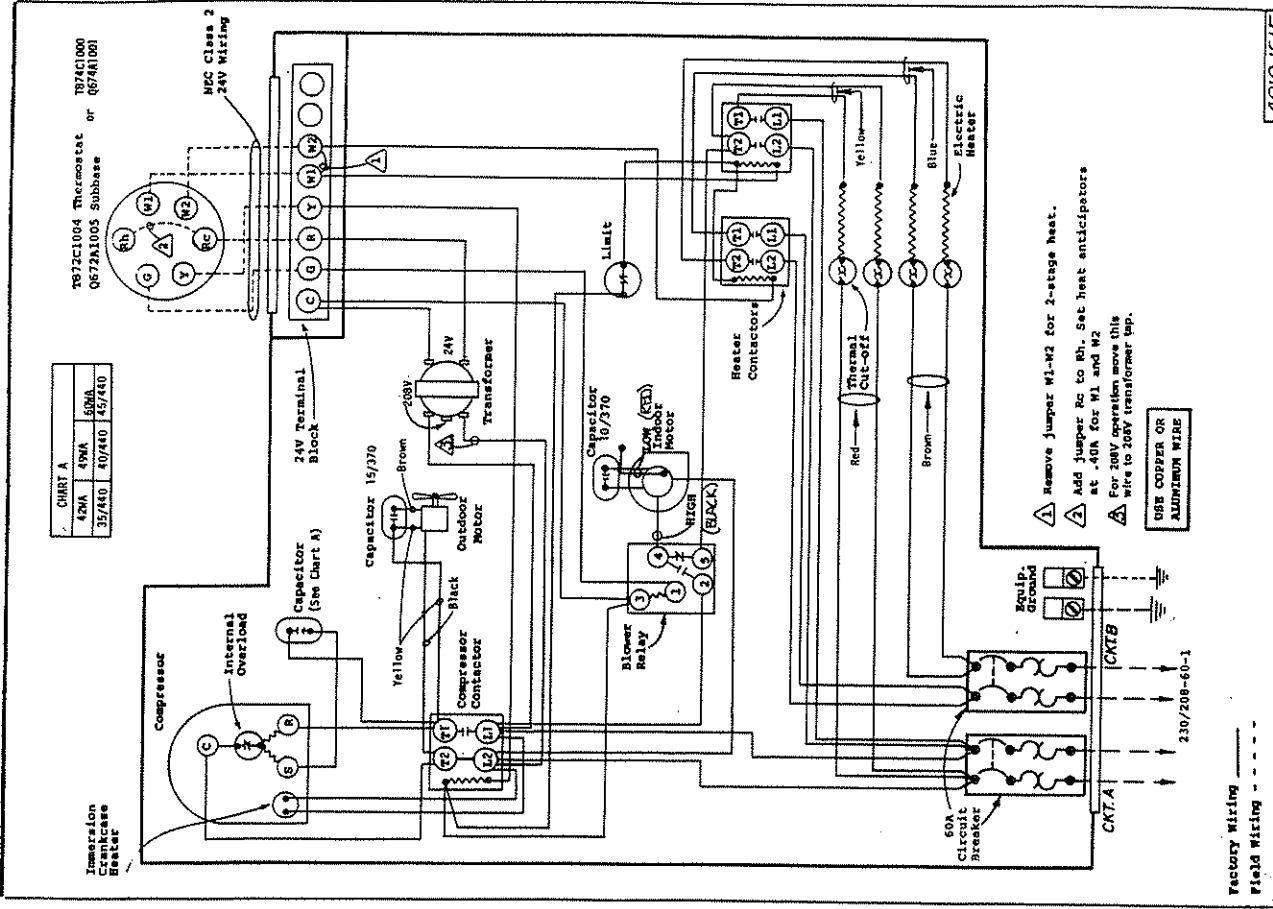
USE COPPER OR ALUMINUM WIRE

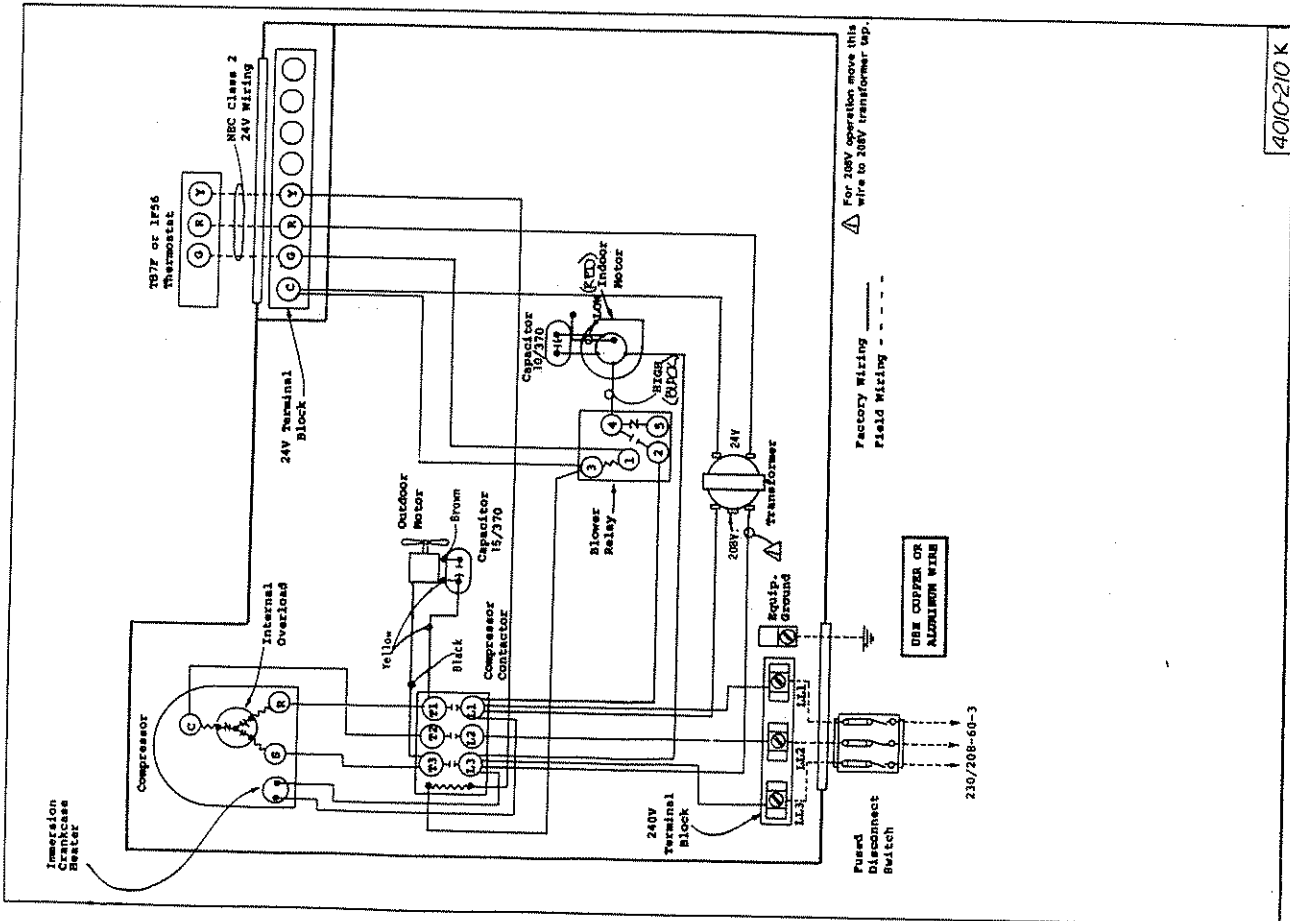
230/208-60-1

Factory Wiring - - - - -
 Field Wiring - - - - -

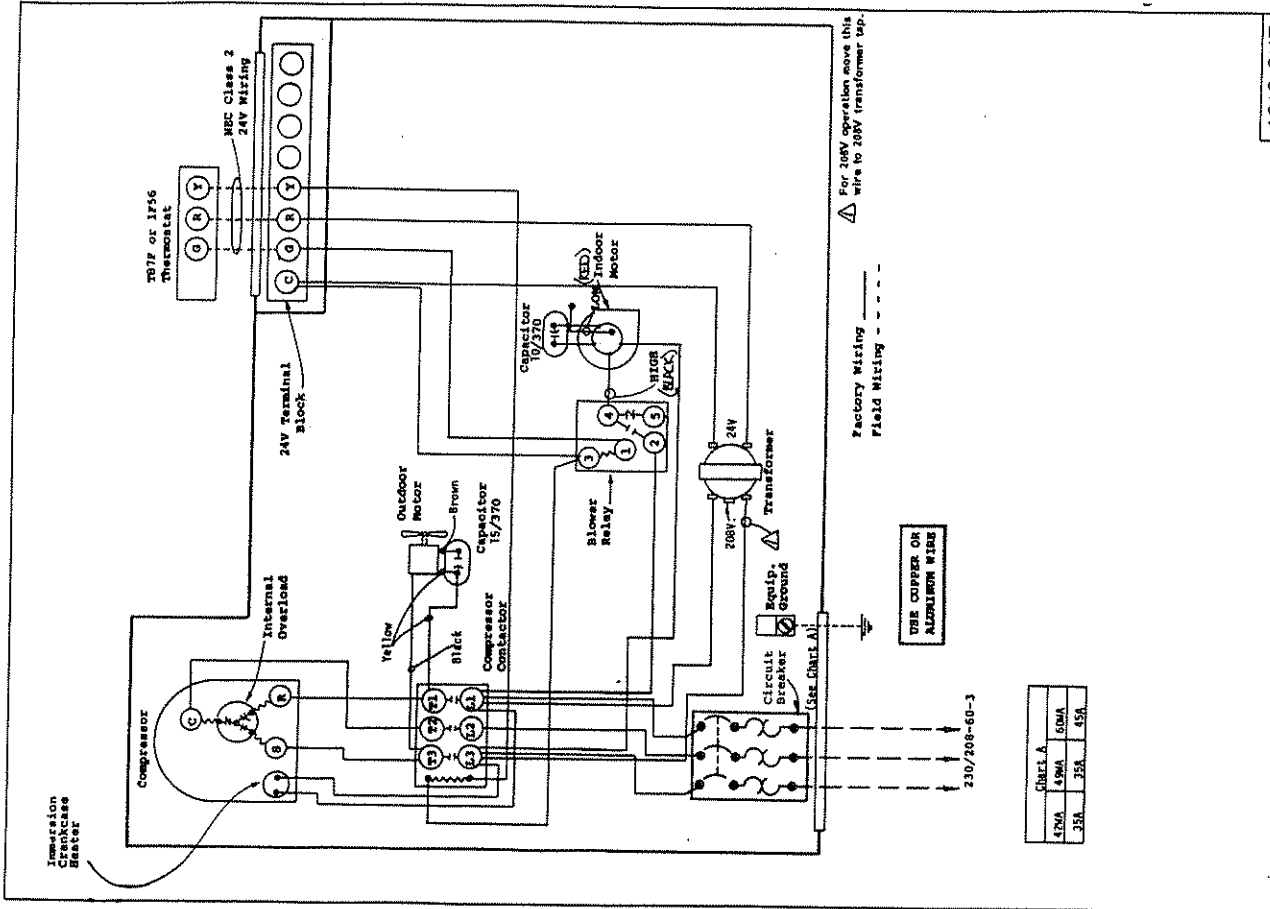
4010-30P





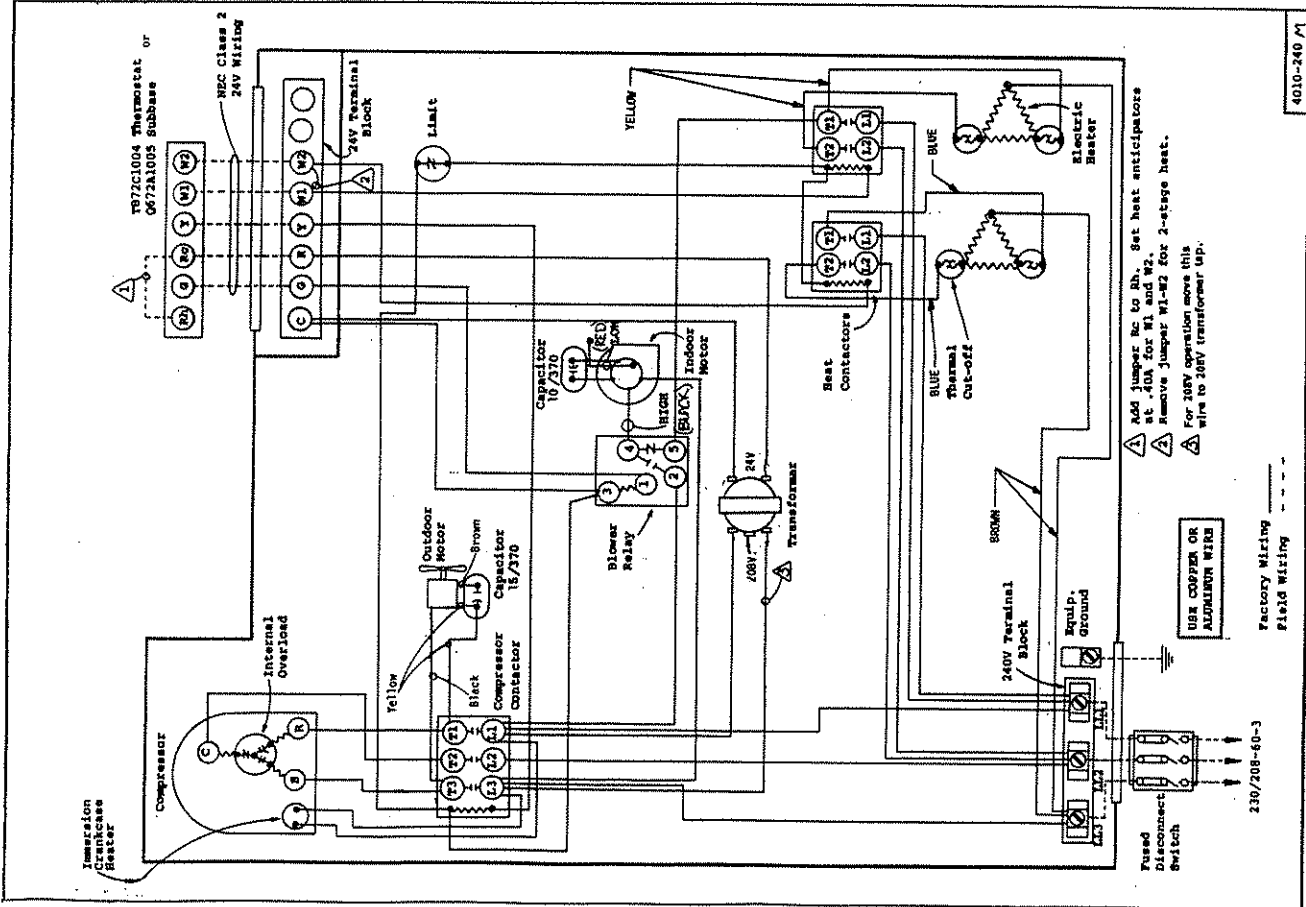


4010-210 K

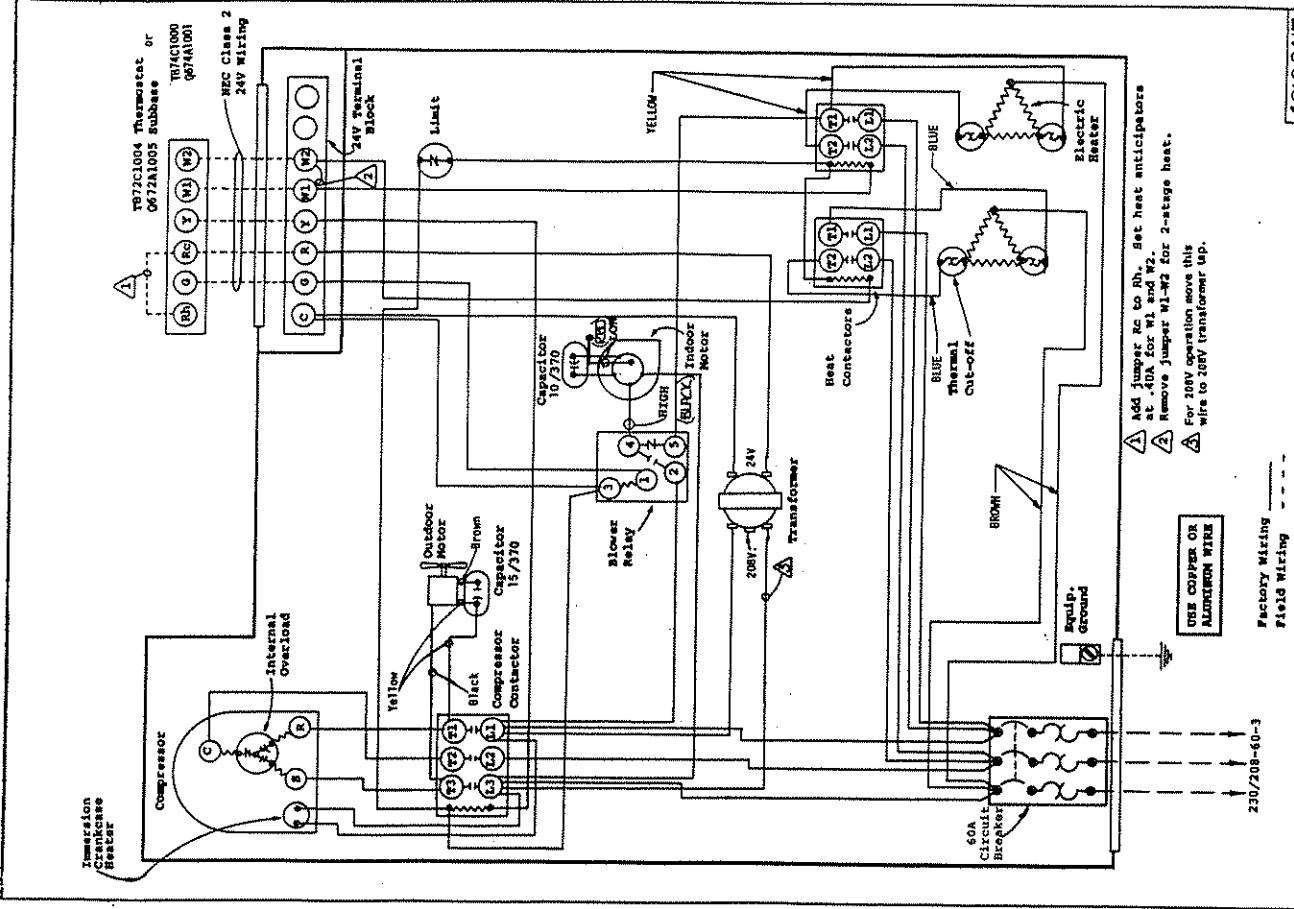


CIRCUIT A	
45VA	50VA
35A	45A

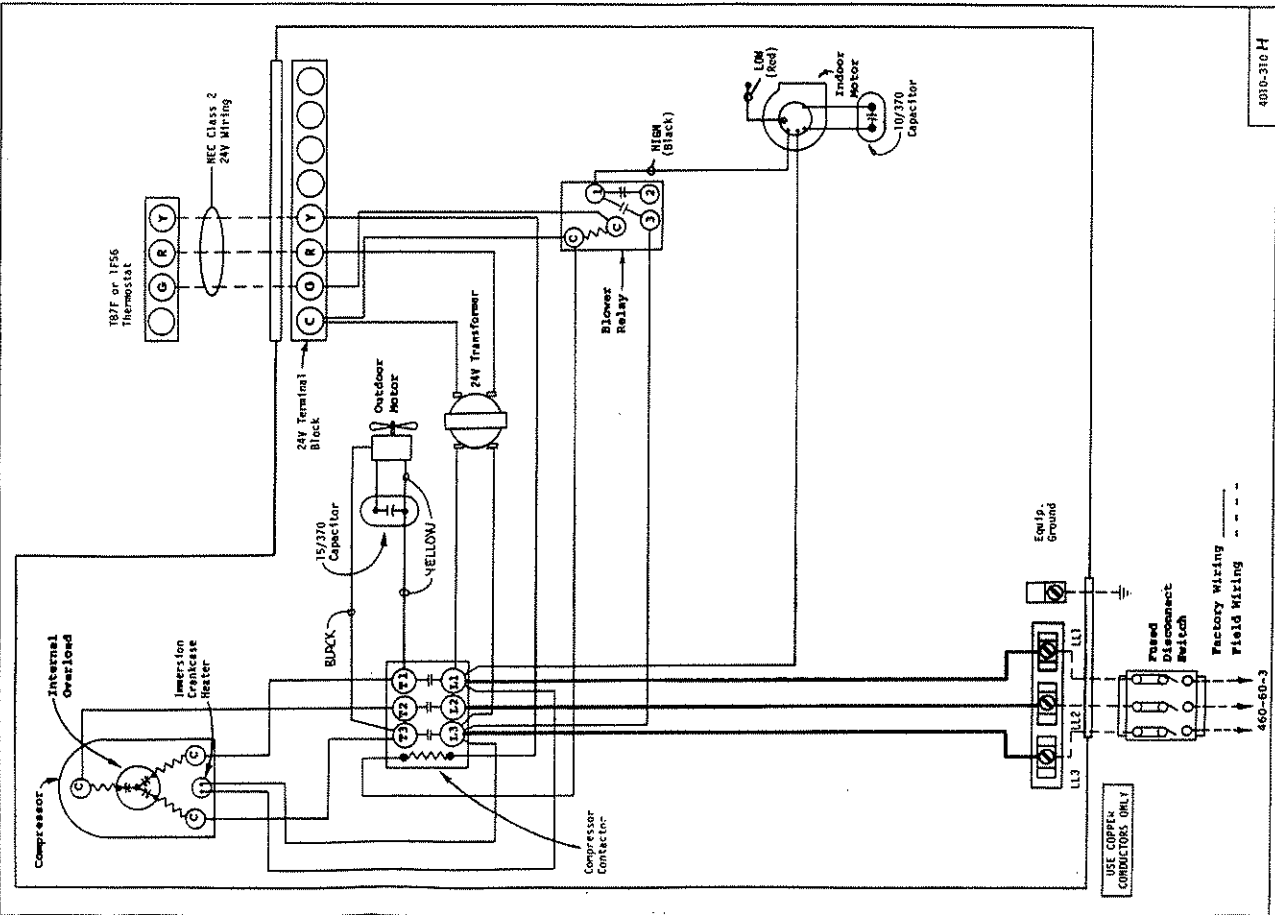
4010-210 E



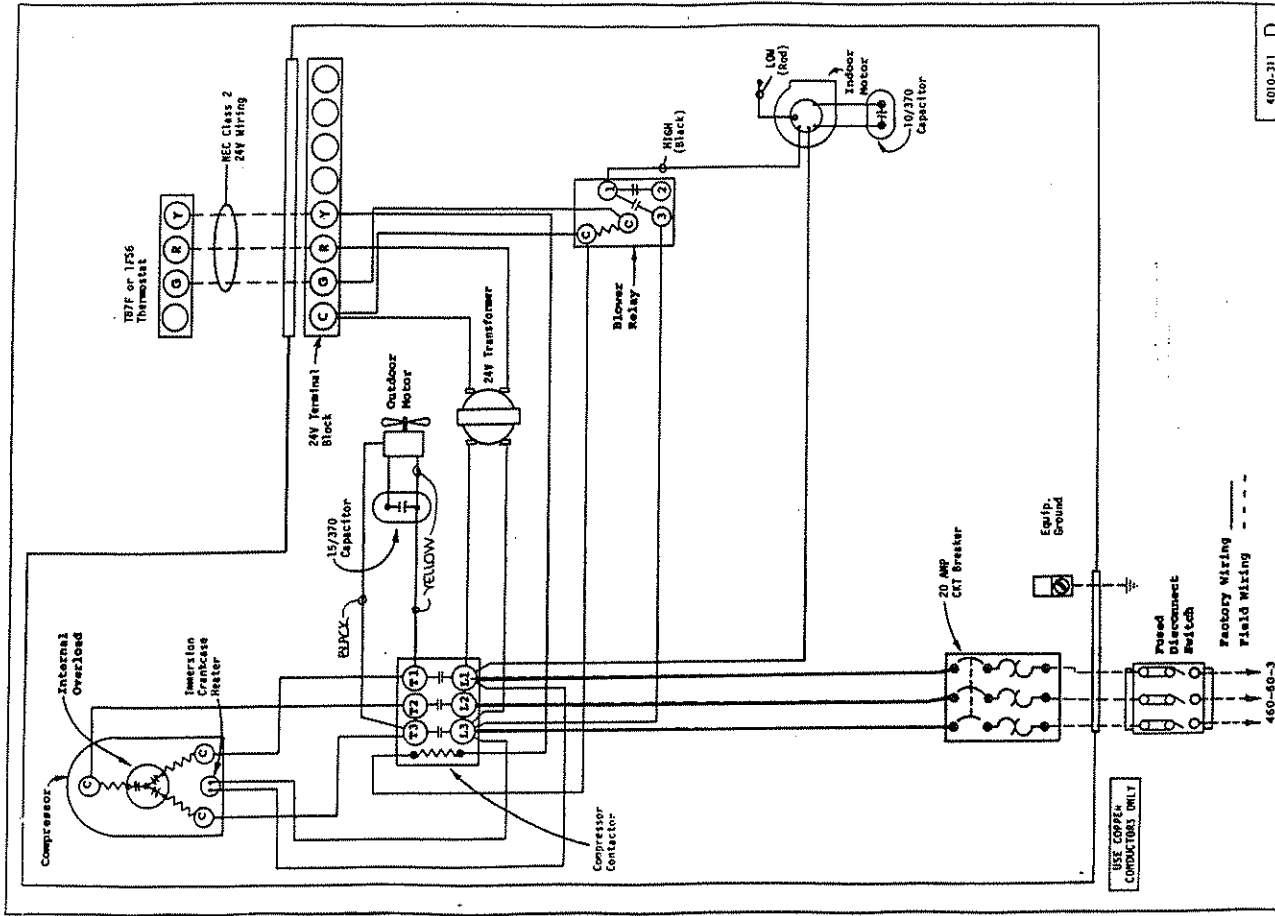
4010-240 M



4010-241 F



480-310 H



480-311 D

