

INSTALLATION INSTRUCTIONS

MODELS

**18ECQ2, 24ECQ4, 30ECQ2, 31ECQ, 36ECQ4,
37ECQ, 42ECQ1, 48ECQ2, 60ECQ1**

SPLIT AIR CONDITIONER OUTDOOR SECTIONS

**FOR USE WITH:
MATCHING INDOOR BLOWER
COIL UNITS AND MATCHING
ADD ON COIL ONLY UNITS**

APPLICATION AND INSTALLATION INSTRUCTIONS

GENERAL

These instructions explain the recommended method to install the pre-charged air cooled remote type condensing unit, the inter-connecting pre-charged refrigerant tubing and the electrical wiring connections to the unit.

The condensing units are to be used in conjunction with the matching pre-charged evaporator coils or pre-charged evaporator blower units for comfort cooling applications as shown in the specification sheet.

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 "Connecting Quick-Connect Couplings, 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.

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.

INSTALLATION

Size of unit for a proposed installation should be based on heat loss calculation made according to methods of National Warm Air Heating and Air Conditioning Association. 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 Systems, NFPA No. 90B. Where local regulations are at variance with instructions, installer should adhere to local codes.

LOCATION

The condensing unit (outdoor unit) must be located in an area having good air circulation and set where the hot discharge air from the unit will not be recirculated into the condensing coil. Figure 1 illustrates the recommended clearances for unrestricted airflow and service access.

MOUNTING UNIT OUTSIDE ON SLAB

A solid level base or platform, capable to support the unit's weight, must be set at the outdoor unit predetermined location. The base should be at least two inches larger than the base dimensions of the unit and at least two inches higher than the surrounding grade level. The required unit minimum installed clearances must be maintained as called out in Figure 1 when locating and setting the base.

Remove the unit from its shipping carton and position the unit on the prepared base or platform.

Do not attach the unit or its base to the building structure to avoid the transmission of noise into the occupied area.

NOTE: These units employ internally sprung compressors; therefore, it is not necessary to remove or loosen the base mounting bolts on the compressor prior to operation.

Consideration should be given to the electrical and tubing connections when placing the unit to avoid unnecessary bends or length of material.

WIRING

All wiring must be installed in accordance with the National Electrical Code and local codes. Power supply voltage must conform to the voltage shown on the unit serial plate. A wiring diagram of the unit is attached to the inside of the electrical cover. The power supply shall be sized and fused according to the specifications supplied. A ground lug is supplied in the control compartment for equipment ground.

The control circuit is a 24 volt circuit. "Typical" wiring diagrams illustrating some of the various circuits which could be encountered can be found later in the manual.

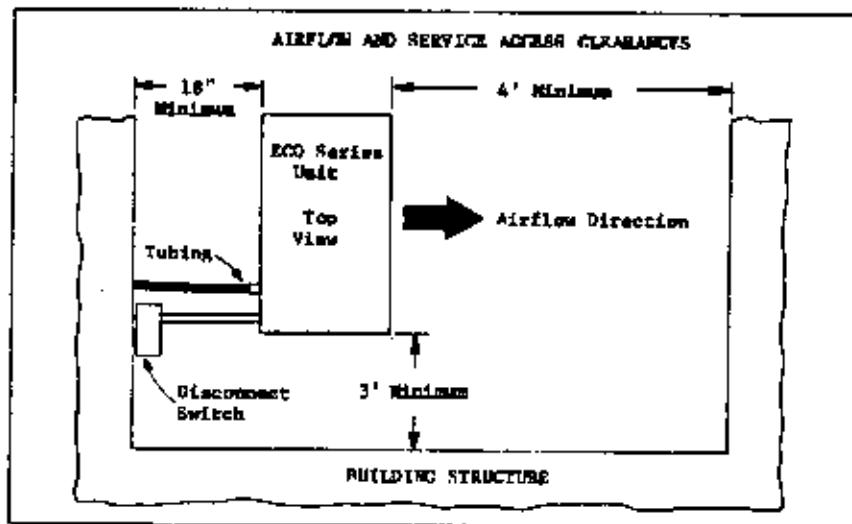


Figure 1

The unit rating plate lists a "Maximum Time Delay Fuse" or "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.

When matching with a B-model blower coil unit, refer to the installation instructions with that indoor unit for 24V wiring information.

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. It is imperative to match the correct pressure curve to the unit by model number.

The pressure service ports on the split system air conditioners are located on the inter-connecting tubing quick connect fittings.

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 following decal is affixed to all outdoor units detailing start-up procedure. This is very important. Please read carefully.

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 SURE THE ROOM THERMO STAT IS IN THE OFF POSITION (THE COMPRESSOR IS NOT OPERATING).

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.

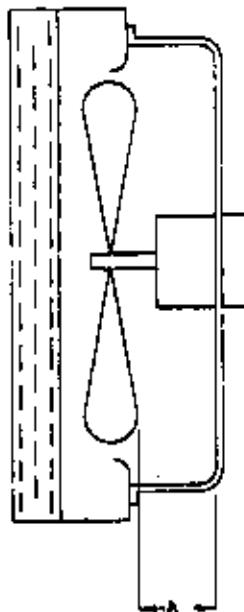
5 EXCEPT AS REQUIRED FOR SAFETY WHILE REFRIGERATING - DO NOT OPEN SYSTEM DISCONNECT SWITCH.

7001-061

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.



MODEL	DIM. A
All	1/2"

IMPORTANT INSTALLER NOTE:

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

ELECTRICAL DATA							
MODEL	ELECTRICAL RATING	OPERATING VOLTAGE RANGE	TOTAL UNIT ANPS	MINIMUM CIRCUIT AMPACITY	MAXIMUM OVERCURRENT PROTECTION	60°C COPPER WIRE SIZE	COPPER GROUND WIRE SIZE
18ECQ2	230/208-60-1	197-253	11.6	15	20	#14	#14
24ECQ4	230/208-60-1	197-253	12.1	15	25	#14	#14
30ECQ3	230-60-1	207-253	17.6	22	35	#10	#10
31ECQ	230/208-60-1	197-253	14.6	18	30	#12	#12
36ECQ4	230-60-1 230-60-3 460-60-3	197-253 187-253 414-506	25.6 13.8 7.0	32 17 15	50 25 15	#8 #12 #14	#10 #12 #14
37ECQ	230-208-60-1	197-253	19.6	24	40	#10	#10
42ECQ1	230/208-60-1 230/208-60-3 460-60-3	197-253 187-253 414-506	24.3 16.8 9.4	30 21 15	50 30 20	#10 #10 #14	#10 #10 #14
48ECQ2	230/208-60-1 230/208-60-3 460-60-3	197-253 187-253 414-506	25.8 19.3 11.4	32 24 16	50 35 25	#8 #10 #12	#10 #10 #12
60ECQ1	230/208-60-1 230/208-60-3 460-60-3	197-253 187-253 414-506	31.8 22.8 9.2	39 28 15	60 45 15	#8 #10 #14	#10 #10 #14

Compressor and outdoor motor.

Time Delay Fuse or HACR Type Circuit Breaker.

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:

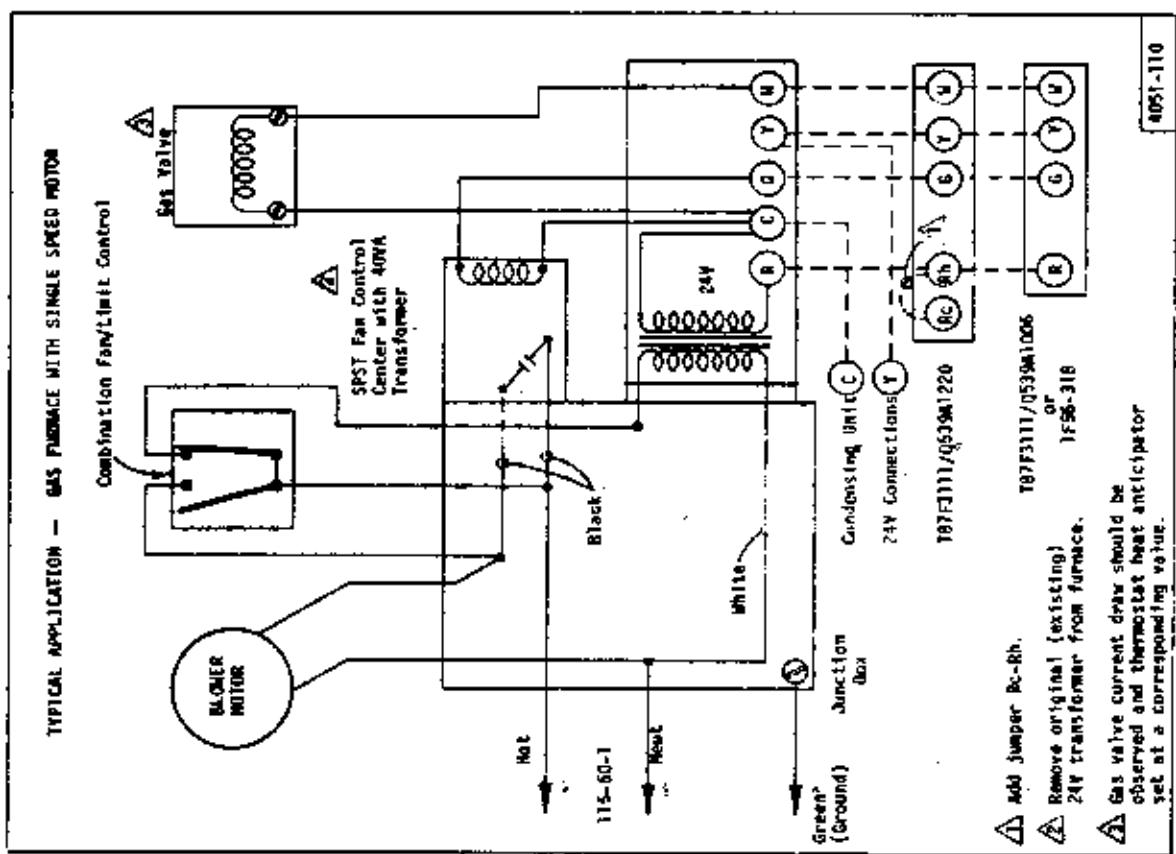
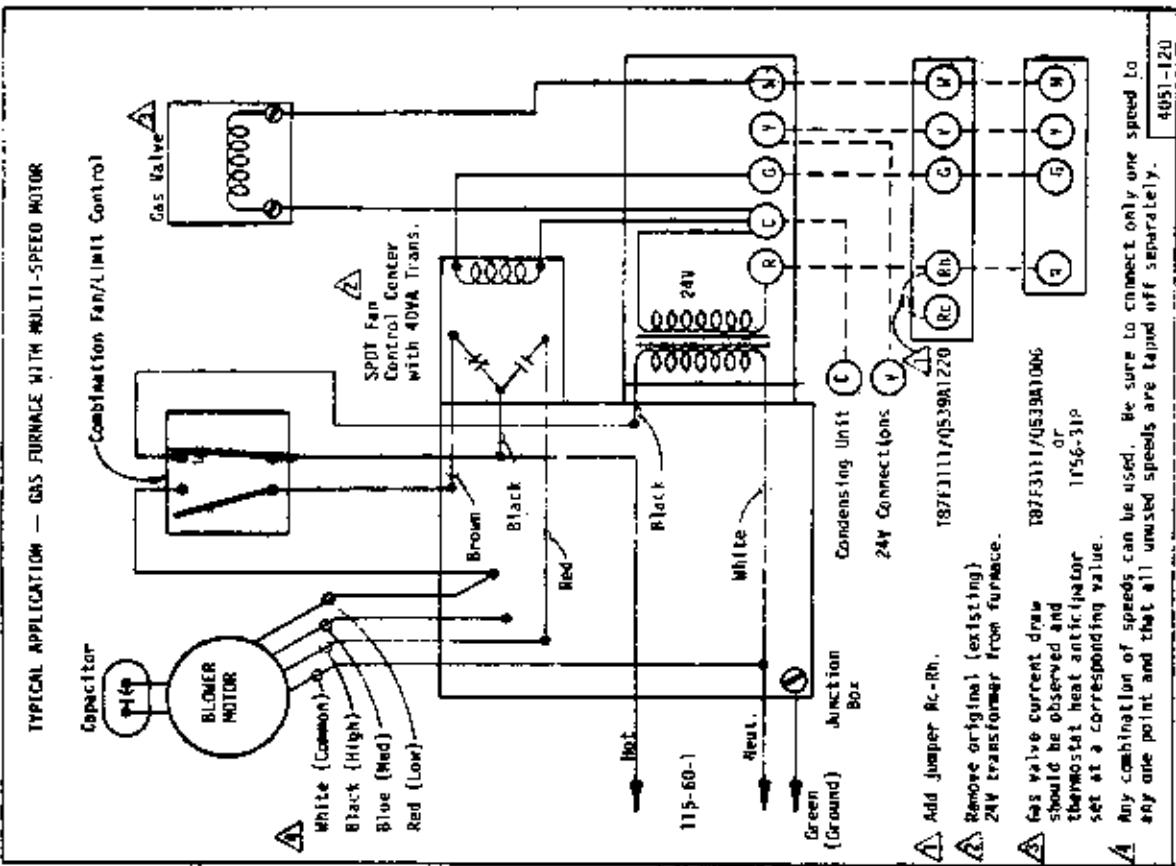
RATED CFM AND AIRFLOW DATA (WET COIL — COOLING)						
OUTDOOR UNIT MODEL	INDOOR COIL MODEL	RATED CFM	PRESSURE DROP IN. H ₂ O	RATED E.S.P.	RECOMMENDED AIR FLOW RANGE ^A	
10ECQ2	1ACQ3 2ACQ1 B1BEHQ1 B24EHQ1	600 640 650 650	.30 .20 .30 .30	.540 575 - 705 585 - 715 585 - 715	540 - 660 575 - 705 585 - 715 585 - 715	
24ECQ4	24QS1 2ACQ1 B24BHQ1 B16EHQ1	870 870 800 800	.30 .30 .10 .10	.780 - 960 780 - 960 720 - 880 720 - 880	780 - 960 810 - 1020 970 - 1190 720 - 880	
30ECQ2	3ACQ3 3HCQ B36EHQ1	1100 925 1080	.26 .30 .36	.990 - 1210 990 - 1210 970 - 1190	990 - 1210 810 - 1020 970 - 1190	
31ECQ	3ACQ3 3ACQ5 3HCQ B36EHQ1	1050 1100 925 1000	.29 .27 .30 .30	.940 - 1160 990 - 1210 990 - 1020 900 - 1100	940 - 1160 990 - 1210 990 - 1020 900 - 1100	
31ECQ	B30EHQ B30QS	860 760	.30 .30	.720 - 880 680 - 840	720 - 880 680 - 840	
36ECQ4	3ACQ3 3HCQ B36EHQ1	1150 925 1275	.30 .30 .26	.1055 - 1265 1035 - 1265 1035 - 1265	1055 - 1265 1035 - 1265 1035 - 1265	
37ECQ	3ACQ3 3ACQ5 3HCQ B36EHQ1	1150 1150 925 1295	.30 .30 .30 .20	.630 - 1020 1150 - 1400 630 - 1020 1165 - 1425	630 - 1020 1150 - 1400 630 - 1020 1165 - 1425	
42ECQ1	4ACQ2 5ACQ1 4HCQ BC48A	1450 1600 1600 1600	.25 .14 .30 .30	.1300 - 1600 1440 - 1760 1550 - 1650 1440 - 1730	1300 - 1600 1440 - 1760 1550 - 1650 1440 - 1730	
40ECQ2	4ACQ2 5ACQ1 4HCQ BC48A	1690 1600 1600 1600	.30 .18 .30 .30	.1520 - 1860 1620 - 1980 1485 - 1815 1460 - 1790	1550 - 1900 1620 - 1980 1485 - 1815 1460 - 1790	
60ECQ1	5ACQ1 SMCQ BC48A RG60A	1390 1650 1625 1600	.28 .30 .30 .30	.1790 - 2190 1485 - 1815 1460 - 1790 1590 - 1850	1790 - 2190 1485 - 1815 1460 - 1790 1590 - 1850	

^A Measured across the evaporator coil assembly, including drain pan.

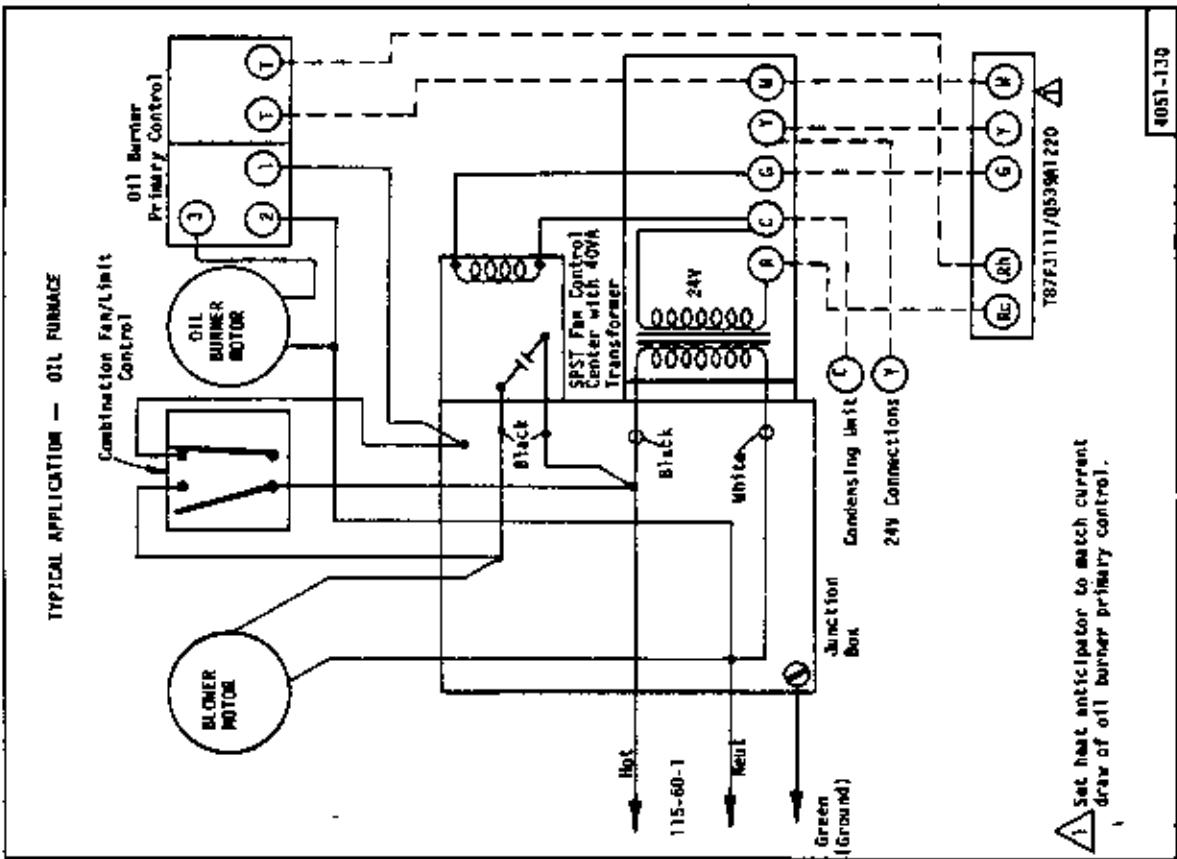
^A External static pressure available for the duct system — supply and return. All blower coil models have multi-speed motors; and value shown is at recommended speed. Consult specification airflow charts for complete information as to other speeds available.

OUTDOOR UNIT	INDOOR UNIT	95°F O.D. TEMP.	82°F O.D. TEMP.
18ECQ2	1ACQ3 2ACQ1 B1BEHQ1 B24EHQ1	.62 - 64 48 - 50 58 - 60 58 - 60	.66 - 68 57 - 59 63 - 65 62 - 64
24ECQ4	2ACQ1 B1BEHQ1 B24EHQ1	.44 - 46 59 - 61 50 - 52	.50 - 52 56 - 58 56 - 58
24ECQ4	2ACQ1 B24EHQ1	.50 - 52 60 - 62 61 - 63	.56 - 58 66 - 68 66 - 68
30ECQ2	3ACQ3 3HCQ B36EHQ1	.51 - 53 60 - 62 61 - 63	.59 - 61 66 - 68 66 - 68
30ECQ2	B30EHQ H30QS	.47 - 49 46 - 48	.52 - 54 49 - 51
31ECQ	3ACQ3 3ACQ4 3HCQ B36EHQ1	.53 - 55 49 - 51 50 - 60 65 - 65	.61 - 63 54 - 56 74 - 76 72 - 74
31ECQ	B30EHQ H30QS	.59 - 61 56 - 59	.62 - 64 56 - 58
36ECQ4	3ACQ3 3ACQ5 3HCQ B36EHQ1	.49 - 51 52 - 54 54 - 56	.40 - 42 53 - 55 58 - 60
37ECQ	B30EHQ H30QS	.54 - 56 51 - 53	.62 - 64 56 - 58
42ECQ1	4ACQ2 5ACQ1 4HCQ BC48A	.47 - 49 50 - 52 55 - 57	.59 - 61 53 - 55 63 - 65 55 - 57
48ECQ2	4ACQ2 5ACQ1 4HCQ BC48A	.59 - 61 50 - 52 69 - 71 53 - 55	.64 - 66 52 - 54 72 - 74 60 - 62
60ECQ1	5ACQ1 SMCQ BC48A RG60A	.61 - 63 49 - 51 55 - 57 48 - 50	.67 - 69 50 - 60 63 - 65 56 - 60

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



SPLIT SYSTEM CONDENSING UNITS



INSTALLING REFRIGERANT TUBING

PRE-CHARGED TUBING - Examine carefully the two lengths of pre-charged tubing furnished with the Unit. The larger is the suction line. The smaller is the liquid line. The end of the tubing with the hex nut and gauge port is to be attached to the Condensing Unit.

Unroll the tubing, being careful not to kink, and install it between the Condensing Unit and the Evaporator Coil.

CAUTION: Be careful not to tear the insulation when pushing it through holes in masonry or frame walls.

When sealing tube opening in house wall use a soft material to prevent tube damage and vibration transmission.

Before fastening either end, use a tubing bender to make any necessary bends in the tubing. (AVOID EXCESSIVE BENDING IN ANY ONE PLACE TO AVOID KINKING).

Start connecting the tubing at the Evaporator coil end, first remove the protective caps and plugs from the quick-connect fittings on the Evaporator Coil and the pre-charged tubing. Inspect fittings and clean if necessary, making sure they are clear of foreign materials. If you clean the fittings, lubricate them with refrigeration oil. Connect both tubes to the fittings on the coil and draw up by hand.

When necessary to bend the insulated tube, suction line, cut the insulation around its circumference at a distance far enough beyond the point of the bend so as to clear the tubing bender.

Slip the insulation back together and vapor-seal the joint with caps.

NOTE: The maximum distance for pre-charge tubing between the Condenser and the Evaporator is 45 feet.

CAUTION: Prior to connecting the pre-charged tubing to the Evaporator Coil or Condensing Unit, be sure all bends have been made, then coil any excess tubing in a horizontal plane, with the slope of the tubing toward the Condensing Unit.

CAUTION: Be sure to hold the coupling firmly to prevent movement of the coupling and tubing. Failure to do so could tear out the diaphragm causing a blockage of the system.

CAUTION: After starting to tighten up the fitting never try to back it off or take it apart.

For connecting the tubing at the condensing unit and, first remove the protective caps and plugs from the quick-connect fittings on the condensing unit and the pre-charged tubing. Inspect fittings and clean if necessary, making sure they are clear of foreign materials. If you clean the fittings, lubricate them with refrigeration oil. Connect both tubes to the fittings on the coil and draw up by hand.

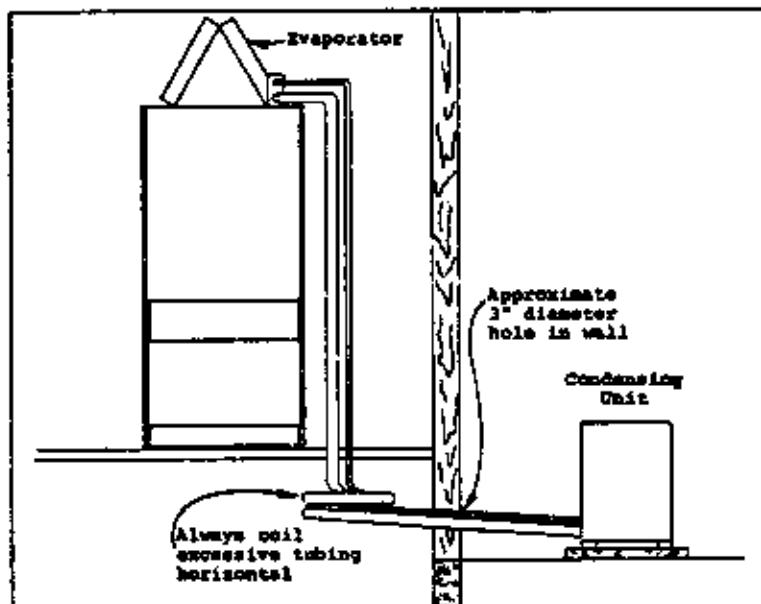
Locate the Gauge Port in a 45° angle from a vertical up position so as to be accessible for gauge connections.

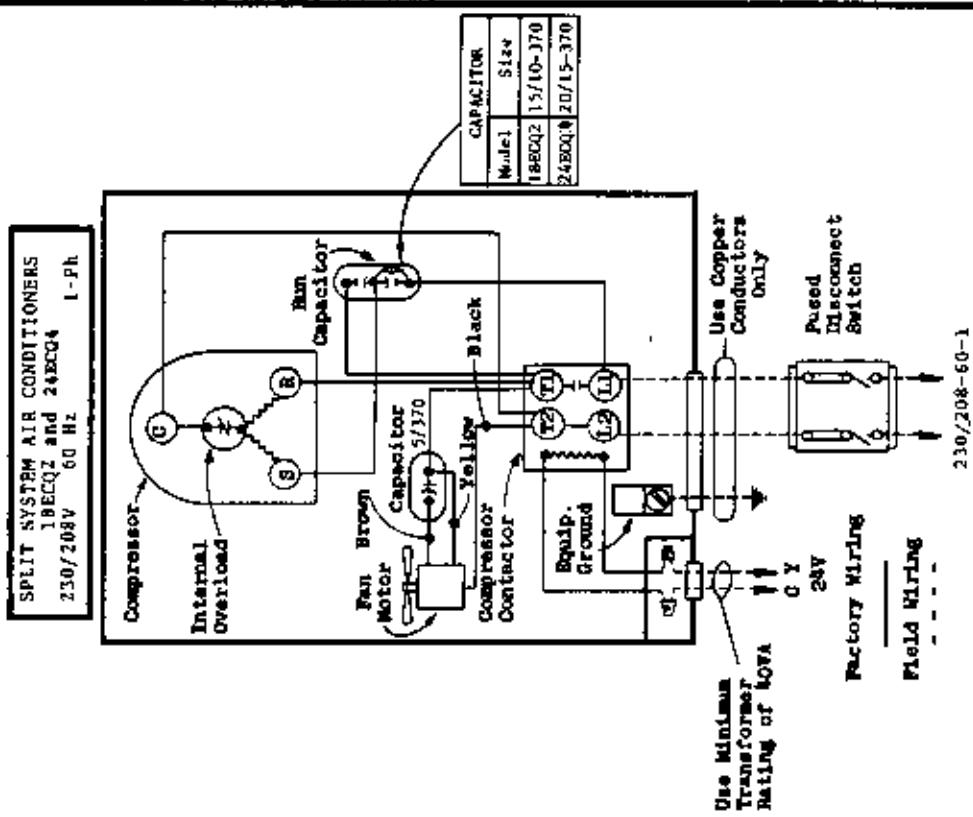
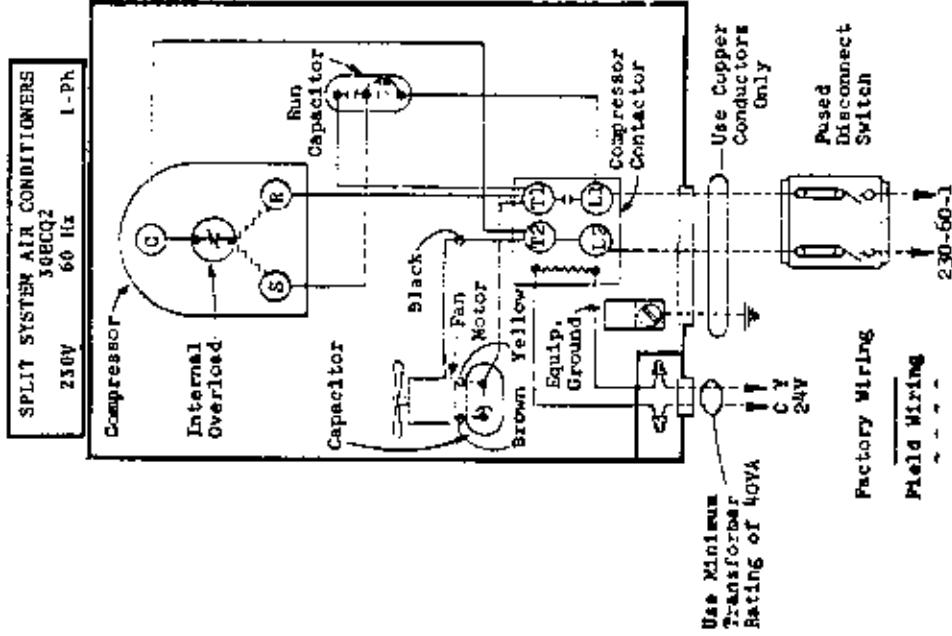
Use a wrench on the hex nut of the female fitting backing up the fitting with another wrench to keep tube from turning. Tighten the fittings together until they bottom out then tighten for an additional 1/4 turn so that coupling will seat properly.

Check the gauge port cap to make sure it is tight. If loose, tighten, being careful not to tighten too much as it will damage the valve in the gauge port.

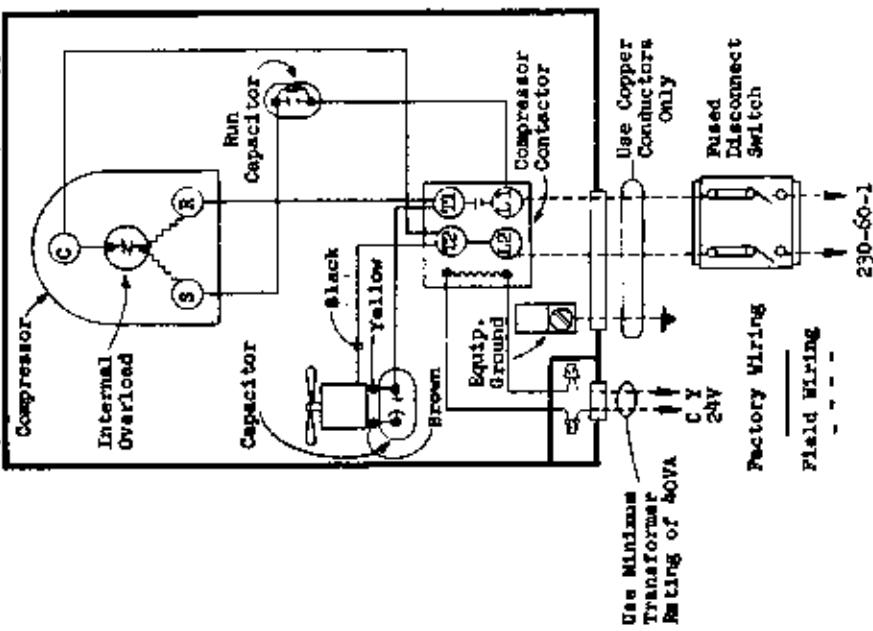
Leak test all connections using an Electronic Leak Detector or a Halide Torch.

When tubing is installed in attics or drop ceiling, insulate the quick connect fitting on the larger tube thoroughly with 3/8" wall thickness, closed cell sponge tube insulation or equivalent. Failure to insulate will result in water damage to ceiling as the fitting will "sweat" and drop water on the ceiling.



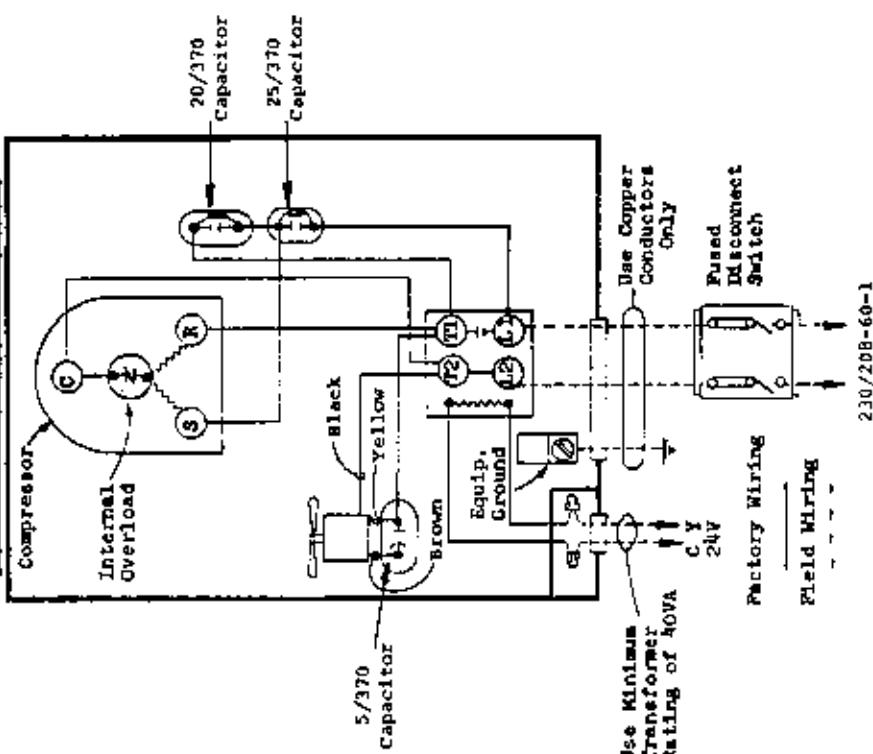


SPLIT SYSTEM AIR CONDITIONERS
16ECQ4
230V 60 Hz 1-Ph

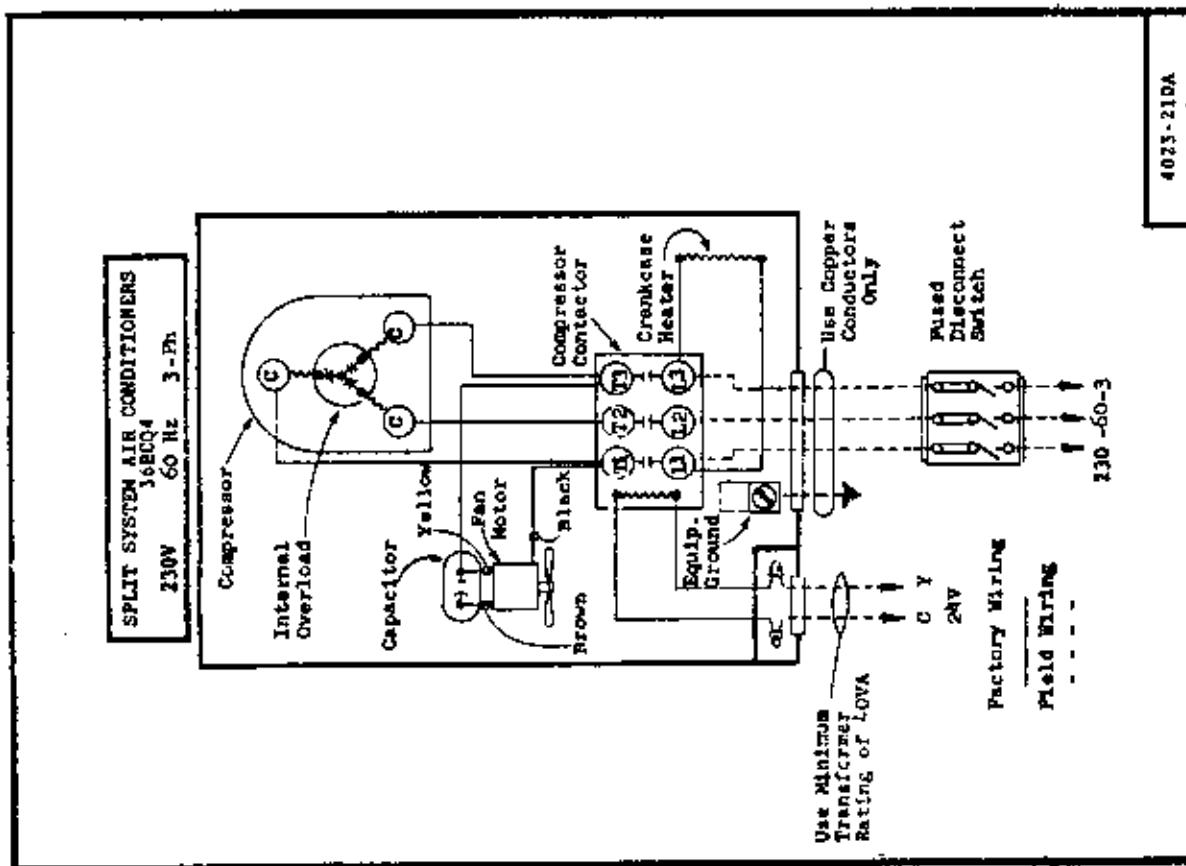
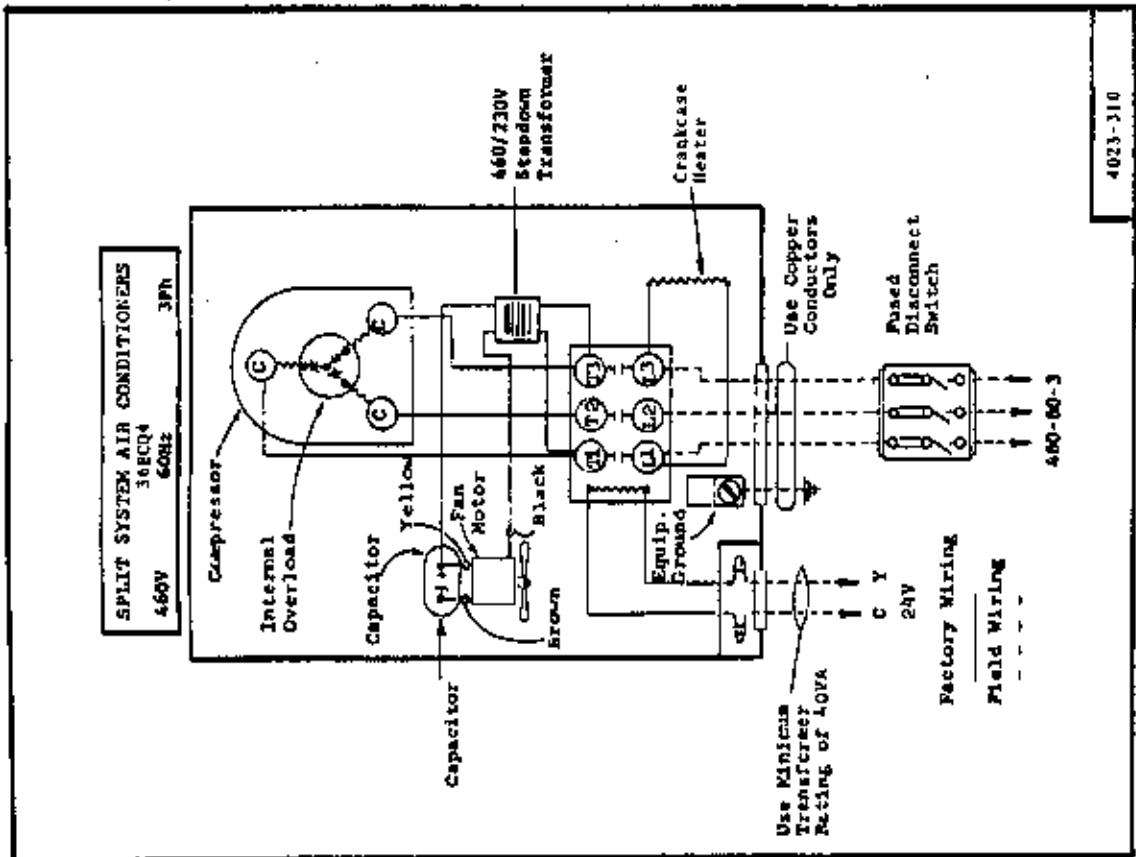


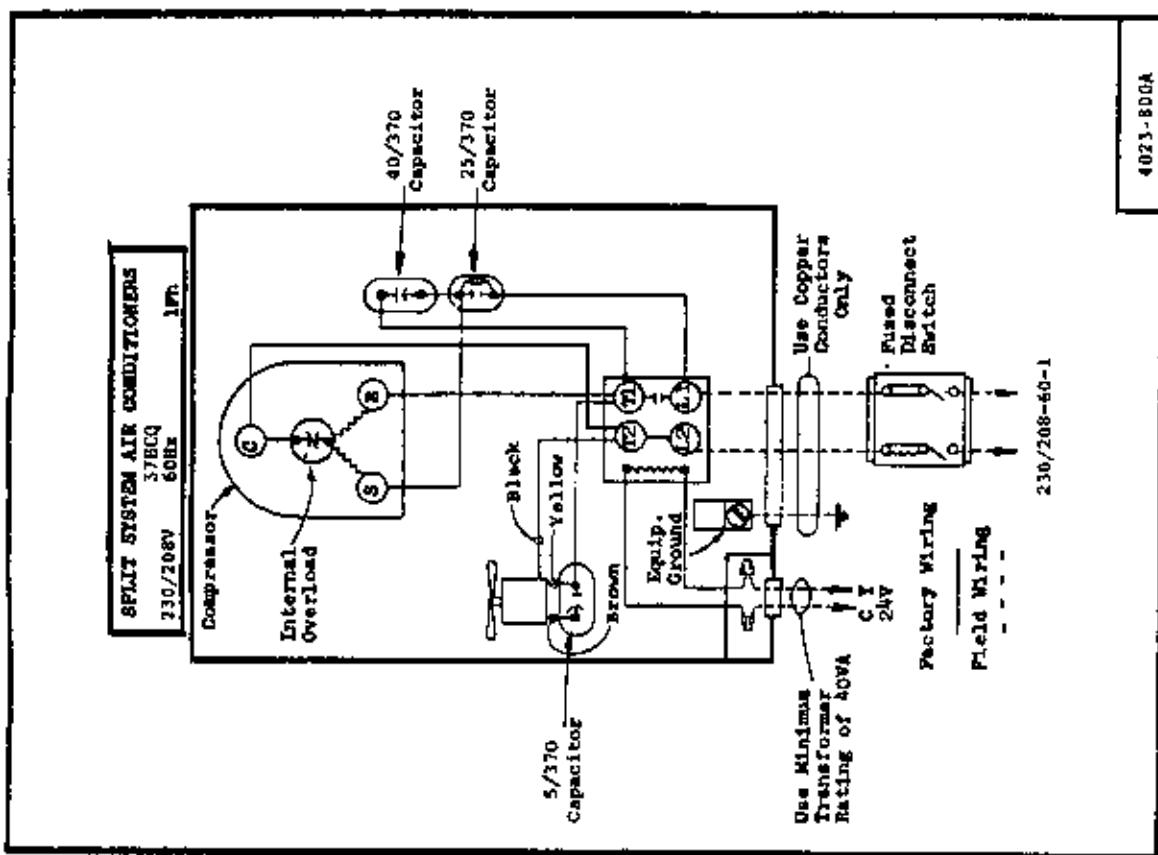
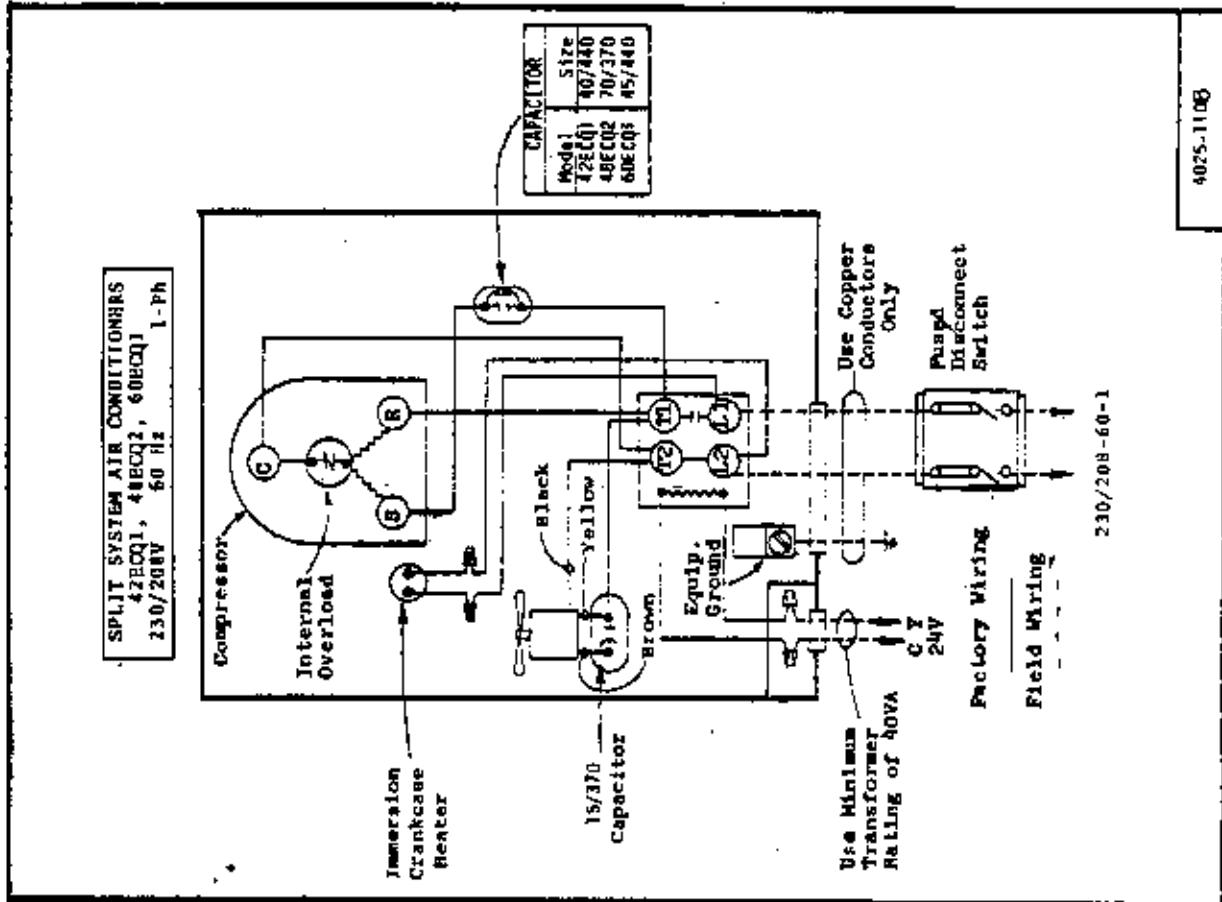
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SPLIT SYSTEM AIR CONDITIONERS
11ECQ
230/208V 60Hz 1Ph

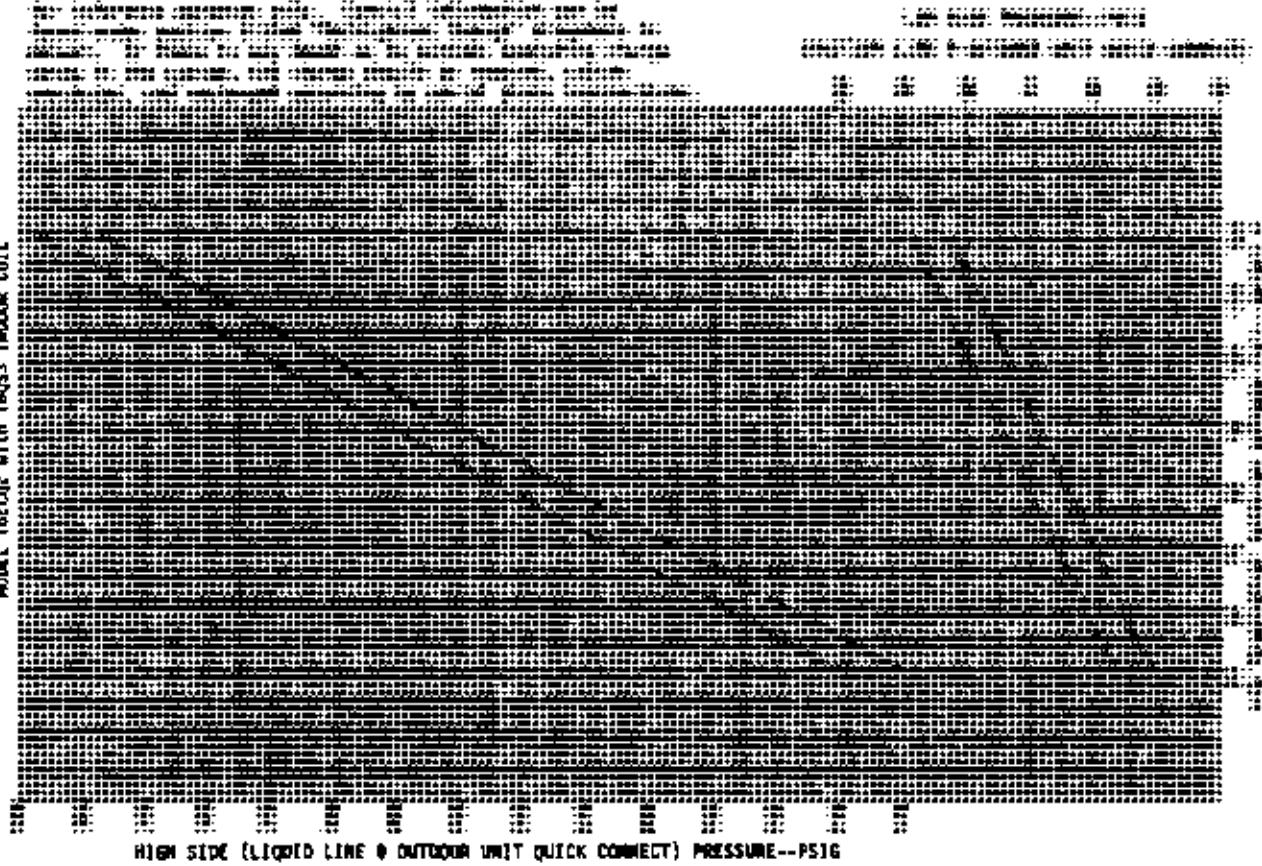


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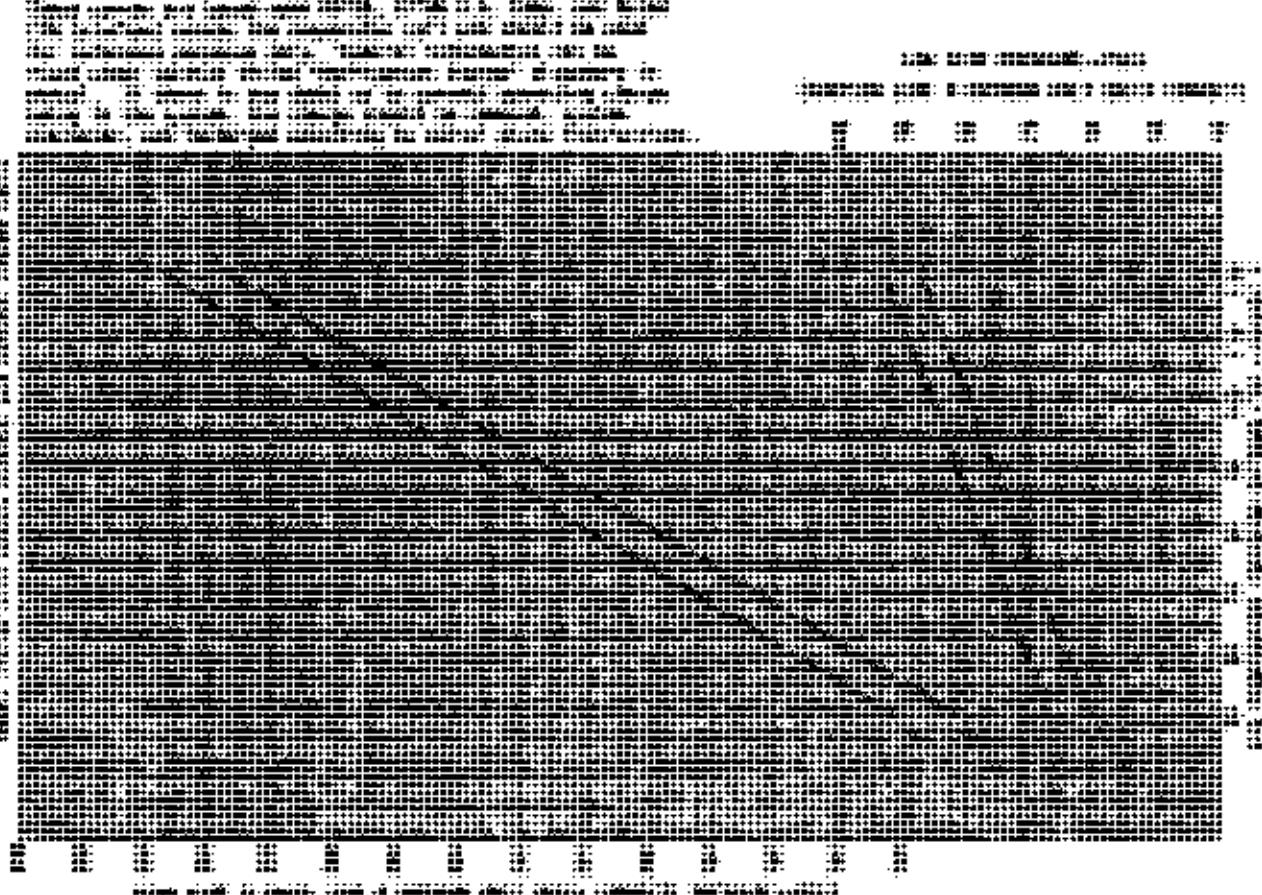


SPLIT AIR CONDITIONER
MODEL 18EFC2 WITH 18QG3 INDOOR COIL

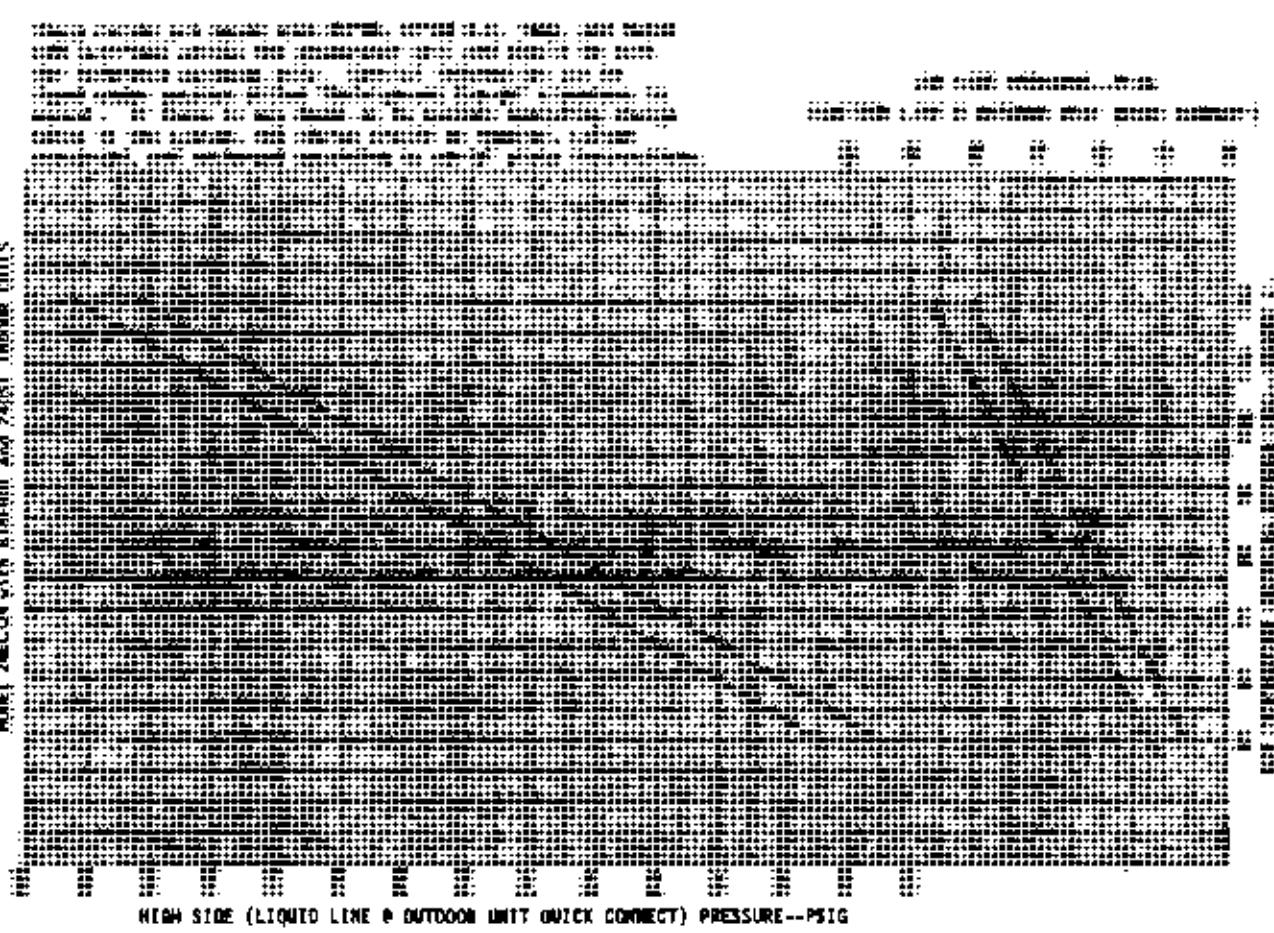


HIGH SIDE (LIQUID LINE & OUTDOOR UNIT QUICK CONNECT) PRESSURE--PSIG

SPLIT AIR CONDITIONER
MODEL 18EFC2 WITH 18QG3 INDOOR COIL



SPLIT AIR CONDITIONER
HOME 1 ZONE ON with Blower on and 24PSI indoor fans

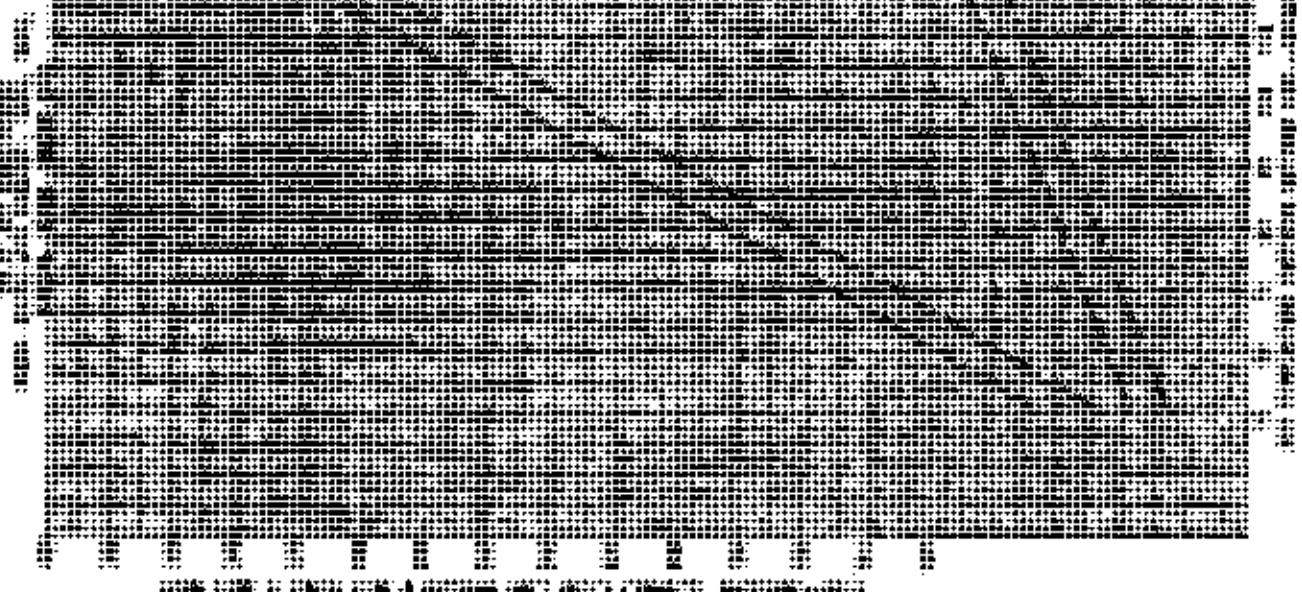
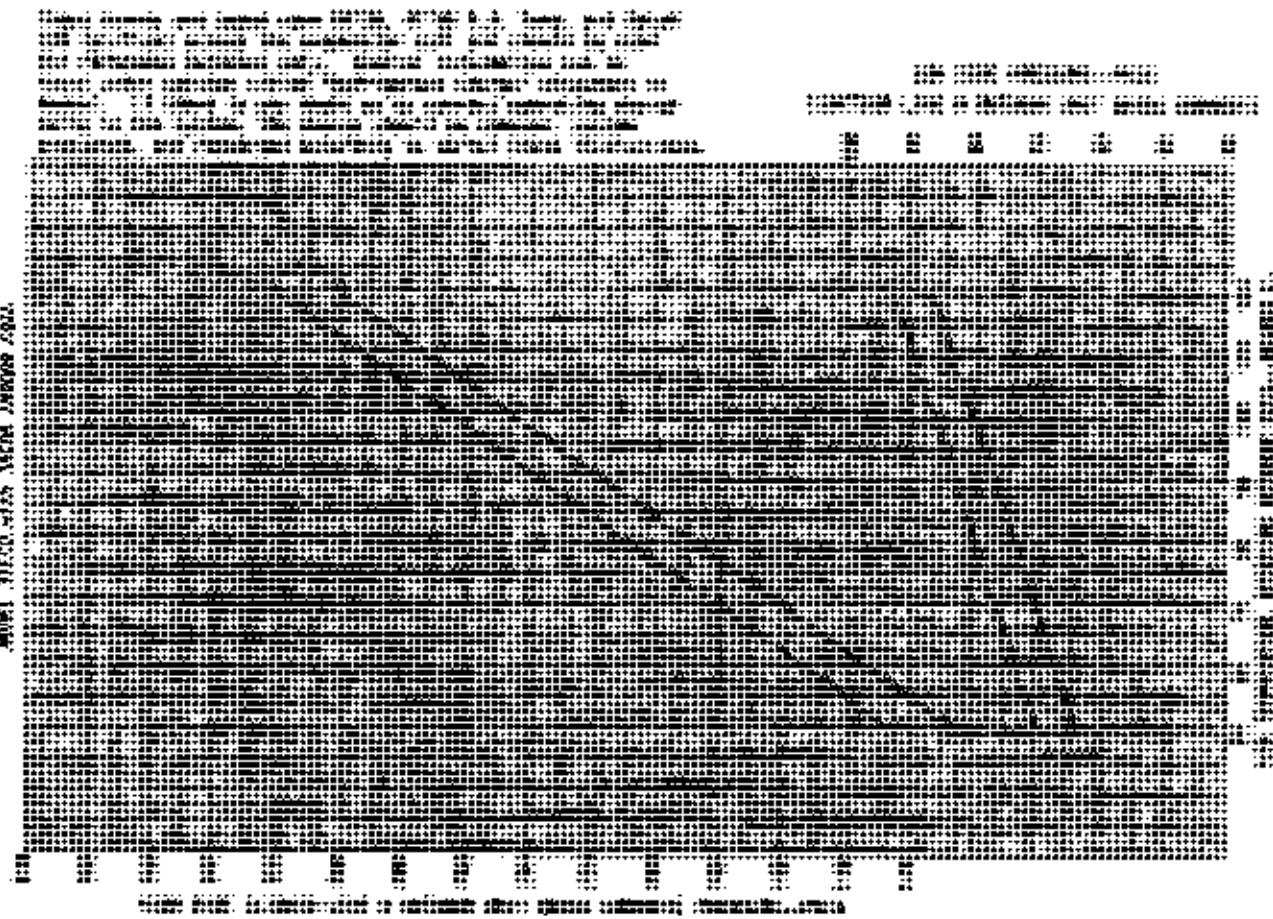


HIGH SIDE (LIQUID LINE & OUTDOOR UNIT QUICK CONNECT) PRESSURE--PSIG

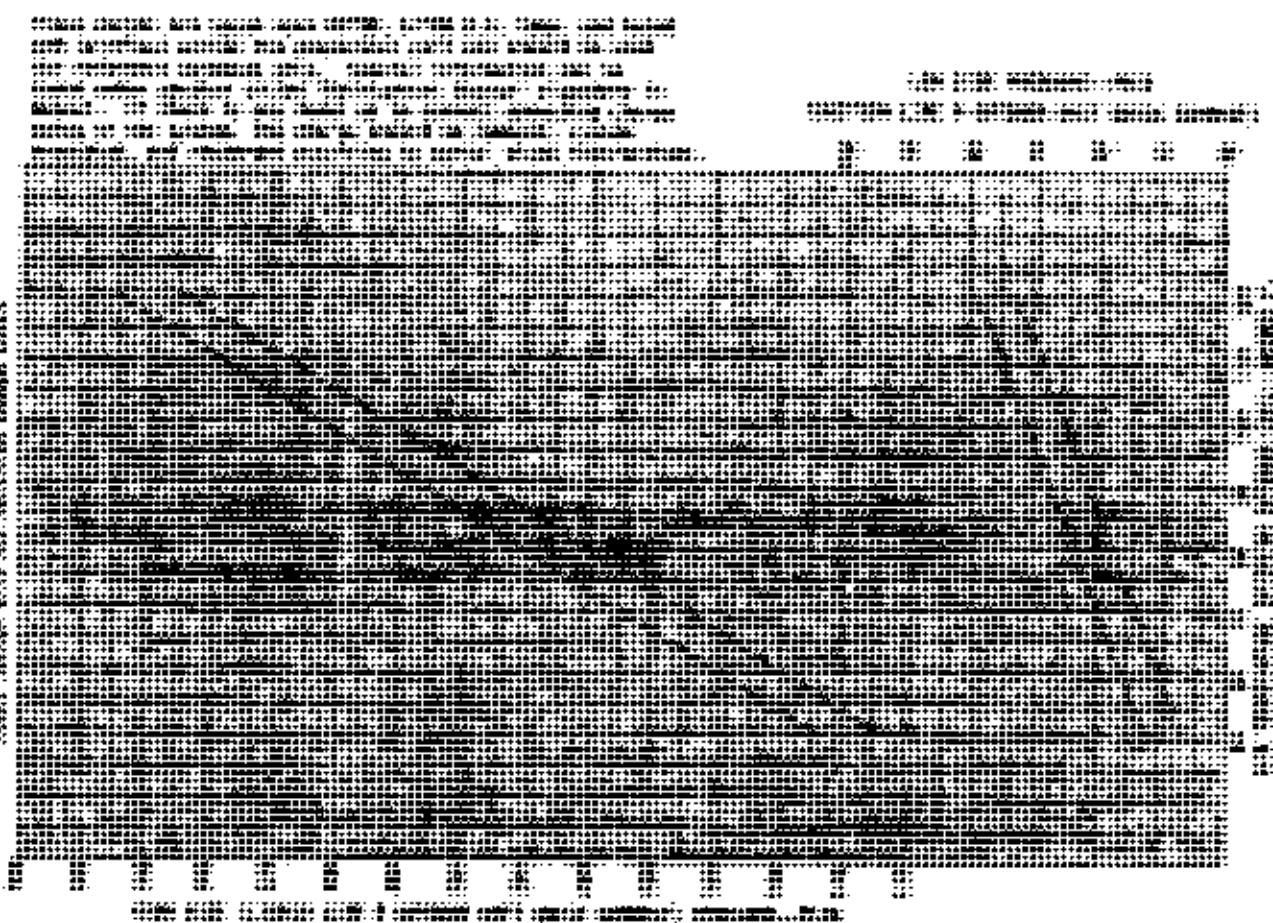
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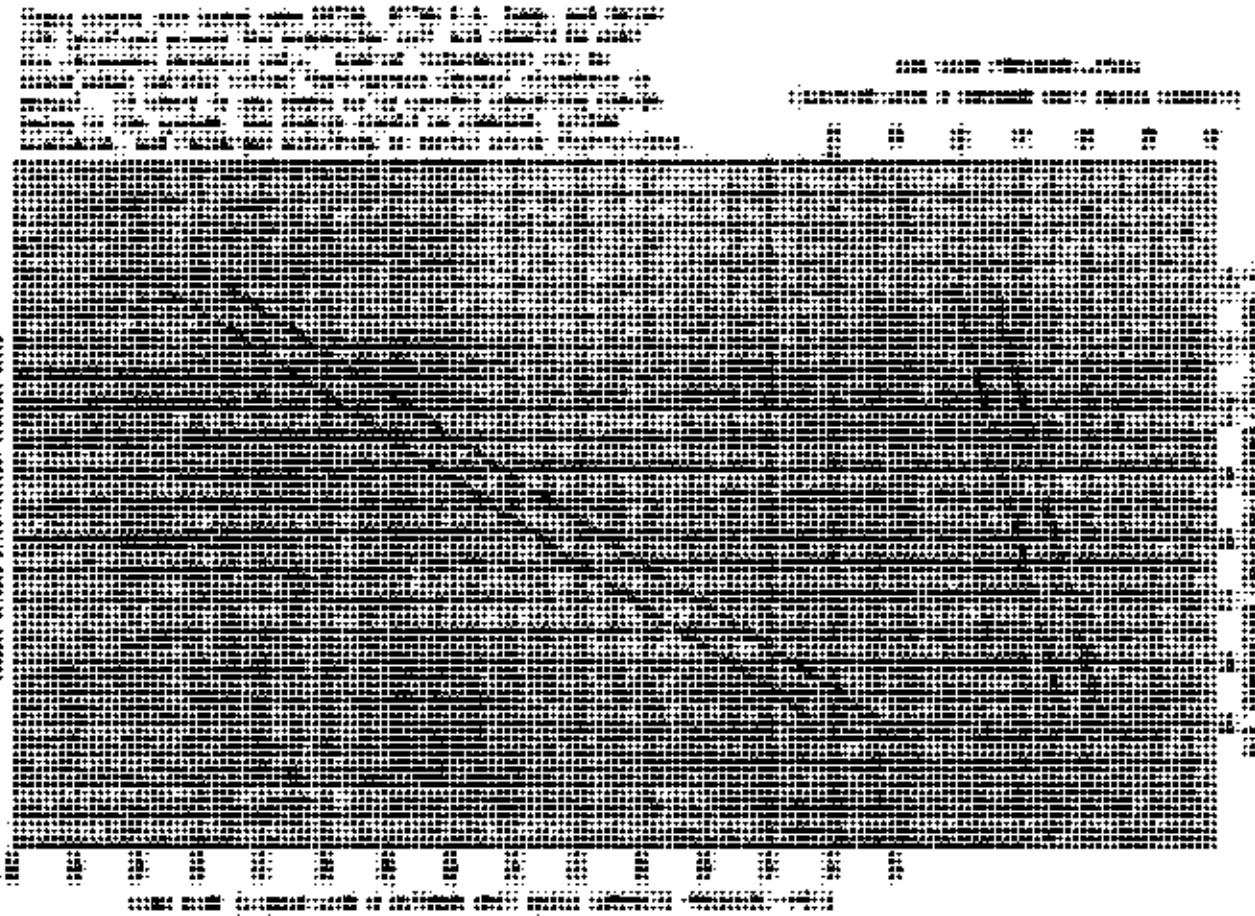
SPLIT AIR CONDITIONER
MODEL 31E50-A1XW VACUUM 2012



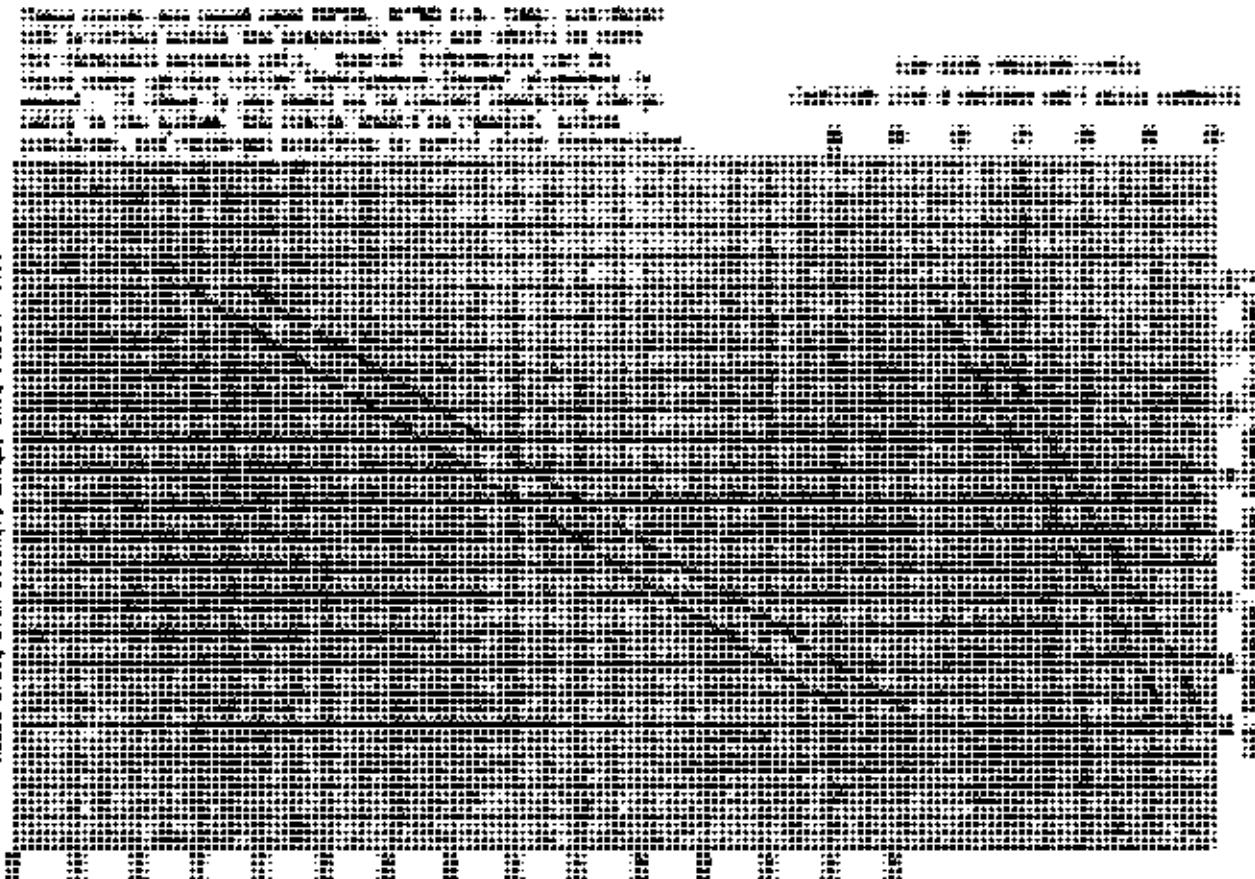
SPLIT AIR CONDITIONER
TYPE: 36FCAM WITH ALL MATCHING FANCOILS



SPLIT AIR CONDITIONER
MODEL: 37EQ with 3A05 Indoor coil

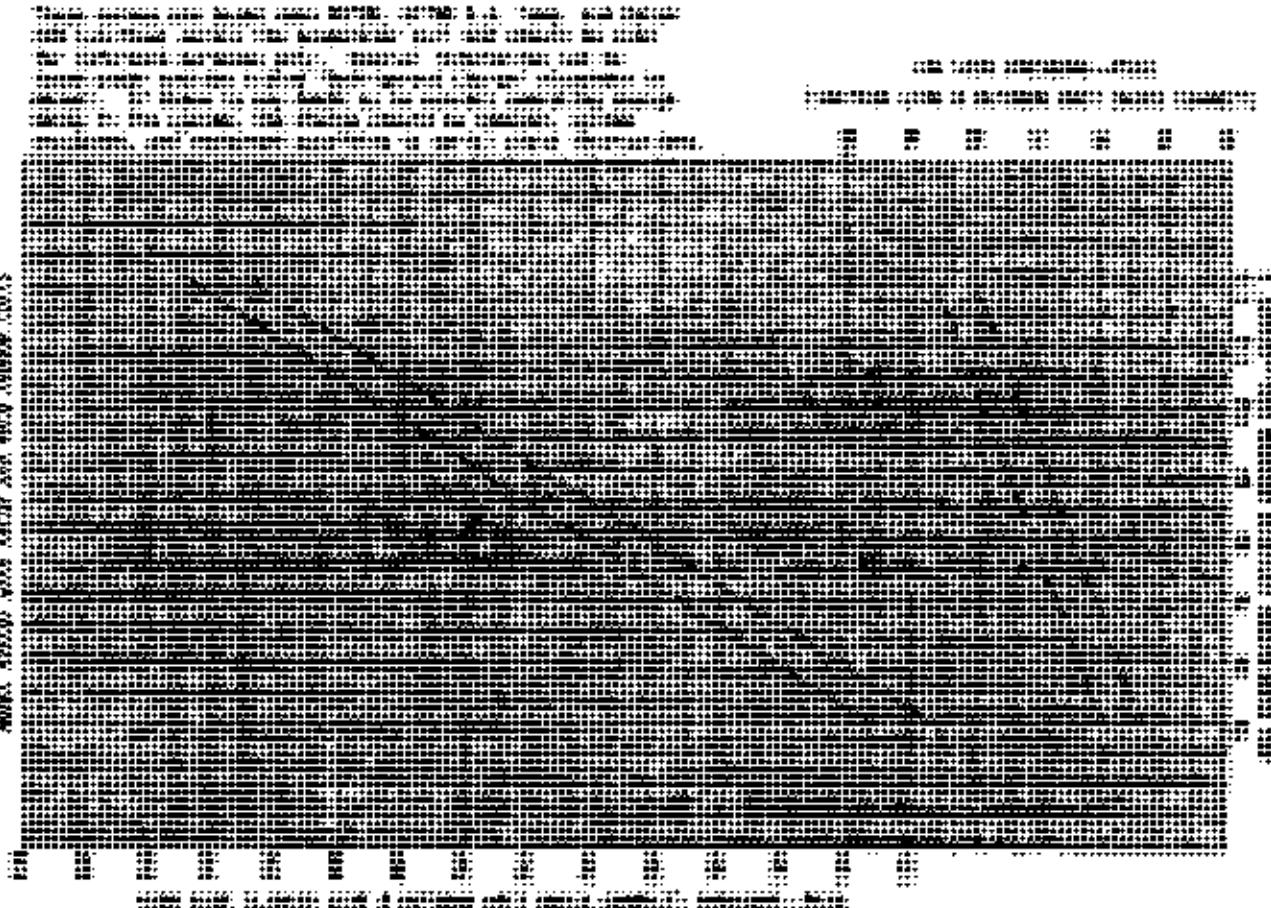


SPLIT AIR CONDITIONER
MODEL: 37EQ with 3A05. JACK, 3MCC Indoor coils

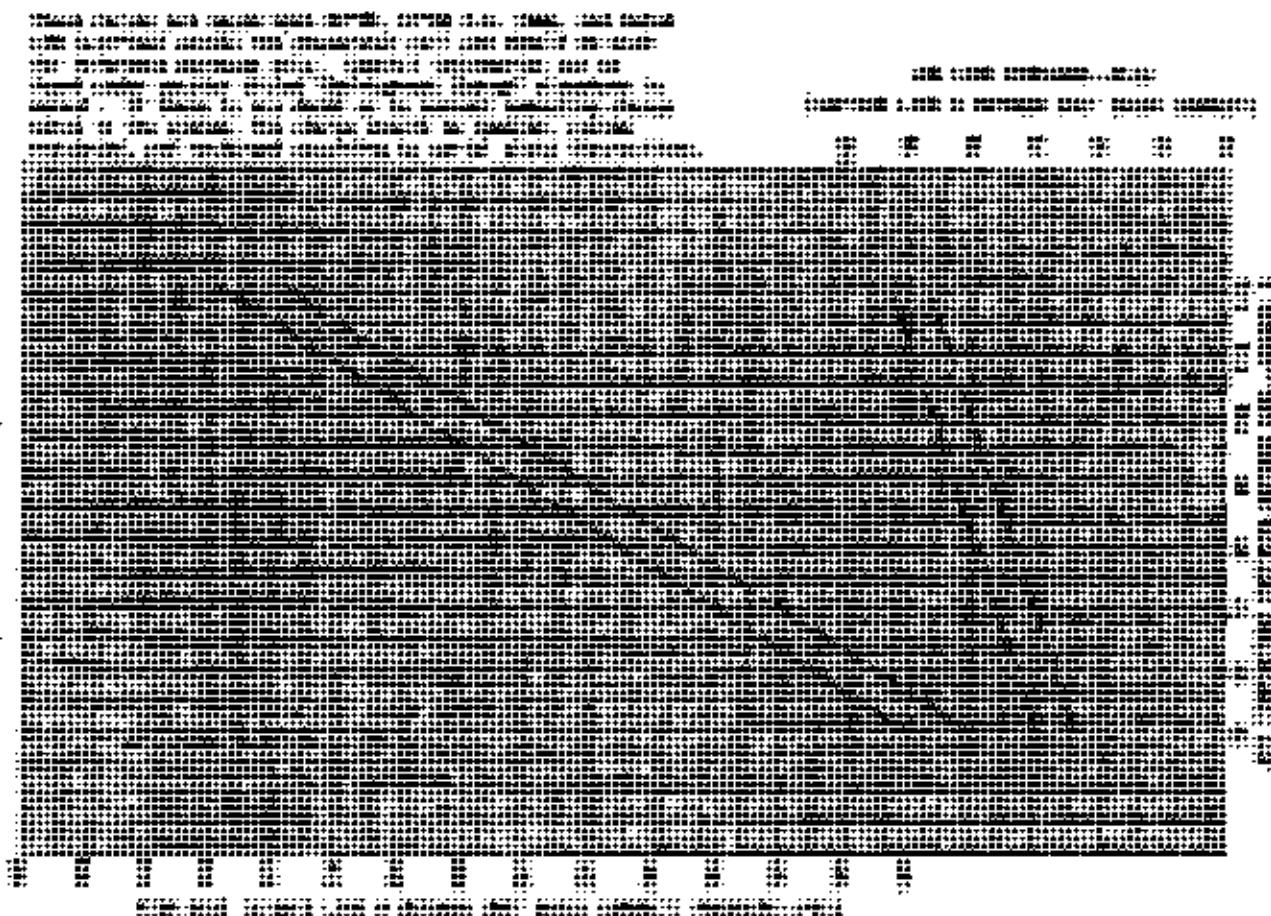


HIGH SIDE (LIQUID LINE & OUTDOOR UNIT QUICK CONNECT) PRESSURE--PSIG

SPLIT AIR CONDITIONER
MODEL 42EC01 WITH 8CBM AND 4ACQ INDOOR COILS



SPLIT AIR CONDITIONER
MODEL 42EC01 with 8CBM and 4ACQ INDOOR COILS

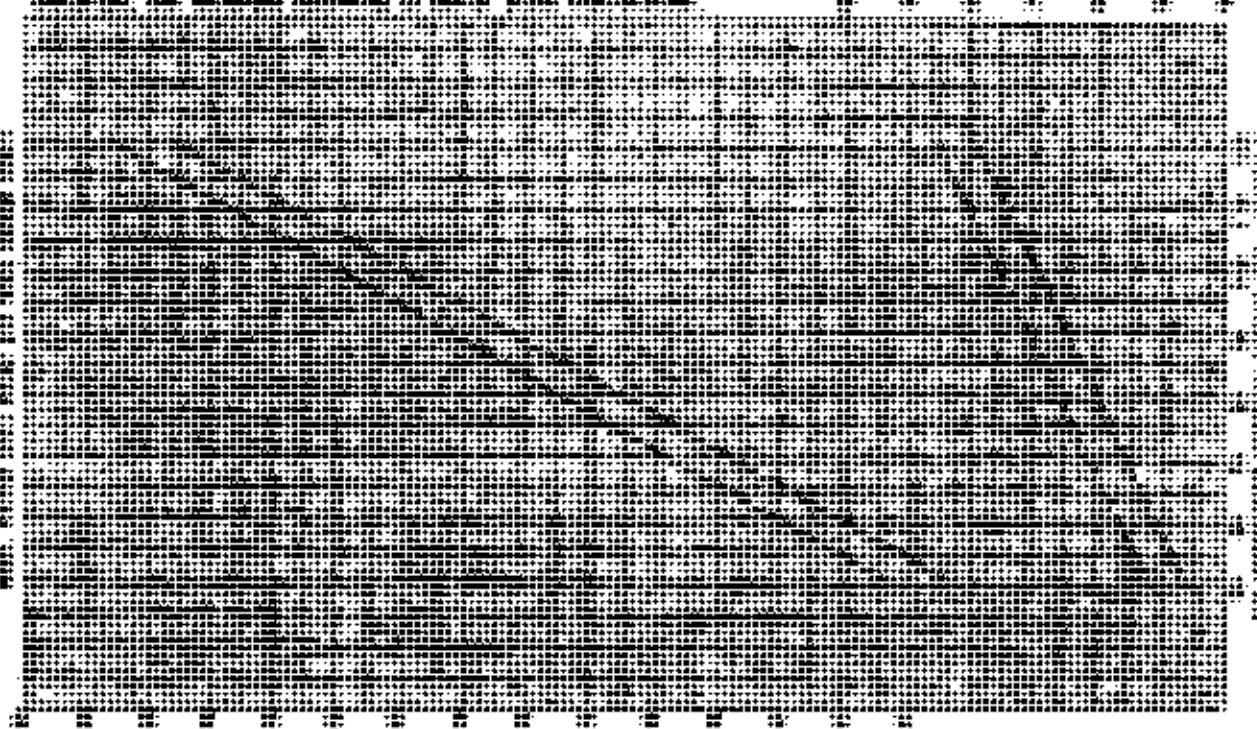


100% constant area contact plates required. Rating 21.44. Output, heat fluxes
and temperatures measured and subsequently used were plotted on graph
paper to determine the overall heat transfer coefficient and the
heat transfer area. The overall heat transfer coefficient was found to be
0.900 Btu/in² hr °F. The heat transfer area was found to be 1.10 ft².

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Rating 21.44. Output, heat fluxes

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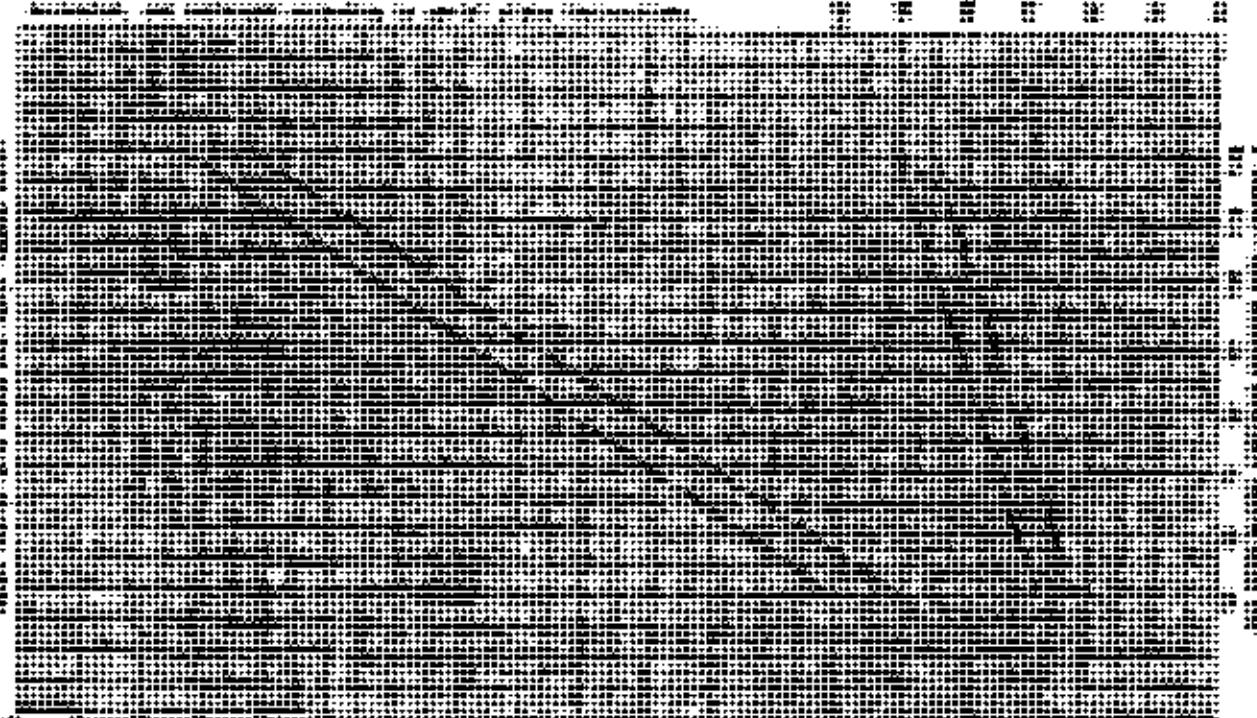
HIGH SIDE (LIQUID LINE & OUTDOOR UNIT QUICK CONNECT) PRESSURE--PSIG

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100% constant area contact plates required.
Rating 21.44. Output, heat fluxes

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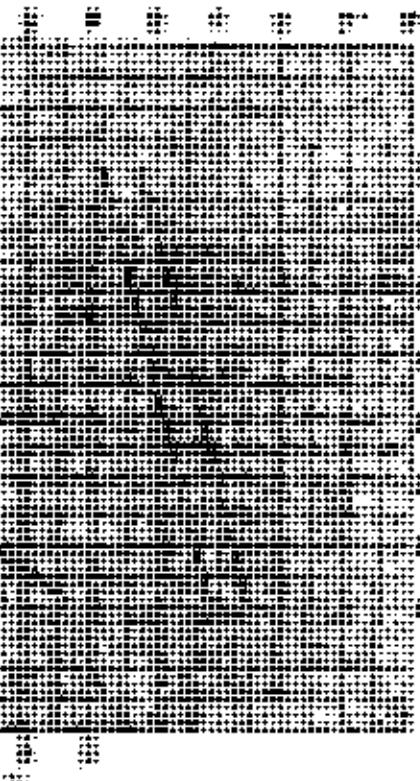


HIGH SIDE (LIQUID LINE & OUTDOOR UNIT QUICK CONNECT) PRESSURE--PSIG

SPLIT AIR CONDITIONER
WATER COOLED, 100% REHEAT, 2000 CFM

This section contains the following information:
1. General description of the system.
2. System operating characteristics.
3. System components and their descriptions.
4. System piping and layout.
5. System controls and sequence of operation.
6. System valves and their locations.
7. System pumps and their descriptions.
8. System piping and layout.
9. System controls and sequence of operation.
10. System valves and their locations.

System description
Components to support water control system



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System description
Components to support water control system

