MANUAL 2100-001C

INSTALLATION INSTRUCTIONS

Bard®
SINCE 1914

MODELS

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

SPLIT AIR CONDITIONER

OUTDOOR SECTIONS

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

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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 a 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.

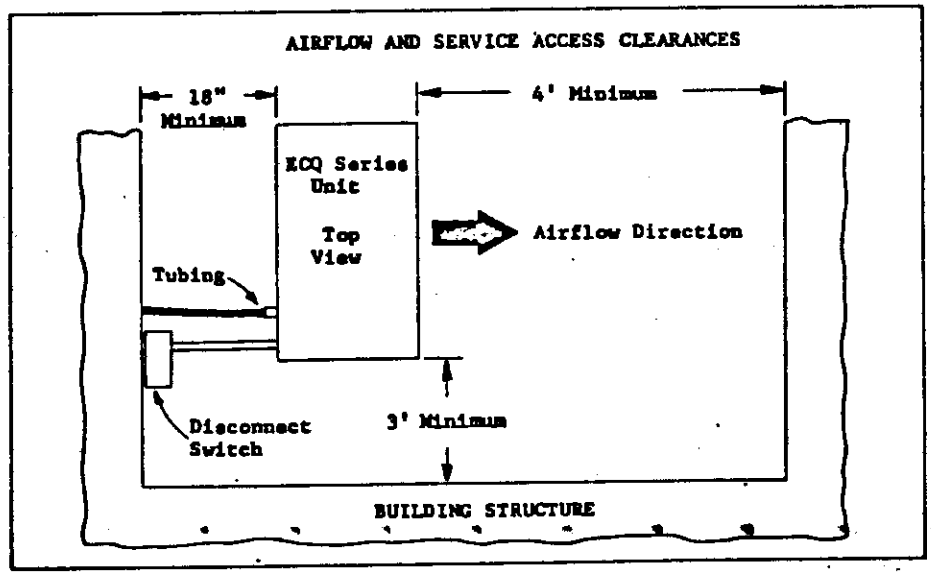


Figure 1

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.

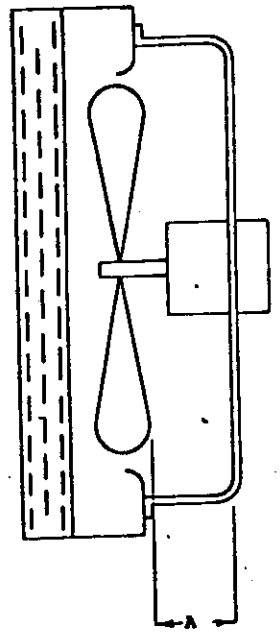
Refer to unit wiring diagram to find exact type of crankcase heater used.

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

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:

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

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.

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ELECTRICAL DATA

MODEL	ELECTRICAL RATING	OPERATING VOLTAGE RANGE	TOTAL UNIT AMPS 1	MINIMUM CIRCUIT AMPACITY	MAXIMUM 2 OVERCURRENT PROTECTION	60°C COPPER WIRE SIZE	COPPER GROUND WIRE SIZE
18ECQ1	230/208-60-1	197-253	13.6	17	25	#12	#12
24ECQ1	230/208-60-1	197-253	15.6	19	30	#12	#12
30ECQ2	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

RATED CFM AND AIRFLOW DATA (WET COIL — COOLING)					
OUTDOOR UNIT MODEL	INDOOR COIL MODEL	RATED CFM	PRESSURE DROP IN. H_2O (1)	RATED E.S.P. (2)	RECOMMENDED AIRFLOW RANGE
18ECQ1	18QS3	575	.30		520 - 630
	2ACQ	680	.22		615 - 750
	B18EQ1	635		.10	570 - 700
24ECQ1	24QS	780	.30		700 - 850
	2ACQ	815	.30		730 - 900
	B24EQ1	780		.10	700 - 860
30ECQ2	3ACQ3	1100	.28		990 - 1210
	3HCQ	925	.30		830 - 1020
	B36EHQ1	1080		.30	970 - 1190
31ECQ	3ACQ3	1050	.28		945 - 1160
	3ACQ5	1100	.27		990 - 1210
	3HCQ	925	.30		930 - 1020
	B36EHQ1	1000		.30	900 - 1100
36ECQ4	3ACQ3	1150	.30		1035 - 1265
	3HCQ	925	.30		830 - 1020
	B36EHQ1	1275		.25	1150 - 1400
37ECQ	3ACQ3	1150	.30		1035 - 1265
	3ACQ5	1150	.30		1035 - 1265
	3HCQ	925	.30		830 - 1020
	B36EHQ1	1295		.20	1165 - 1425
42ECQ1	4ACQ2	1450	.25		1300 - 1600
	5ACQ1	1600	.14		1440 - 1760
	4HCQ	1500	.30		1350 - 1650
	B48EHQ	1575		.40	1420 - 1730
48ECQ2	4ACQ2	1690	.30		1520 - 1860
	5ACQ1	1800	.18		1620 - 1980
	4HCQ	1600	.30		1440 - 1760
	B48EHQ	1725		.30	1550 - 1900
60ECQ1	5ACQ1	1990	.28		1790 - 2190
	5HCQ	1650	.30		1485 - 1815
	B48EHQ	1625		.30	1460 - 1790

(1) Measured across the evaporator coil assembly, including drain pan.

(2) 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.

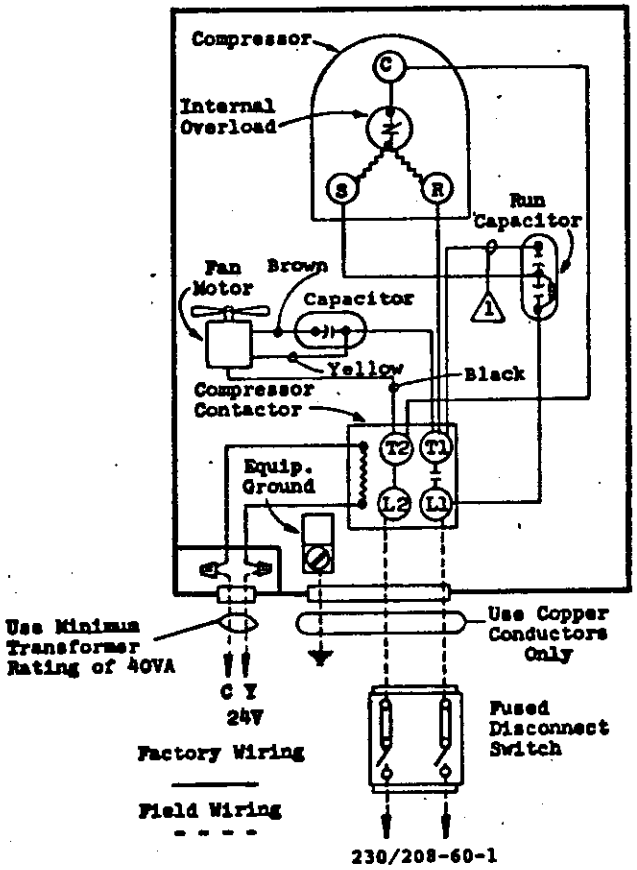
REFRIGERANT CHARGE

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:

OUTDOOR UNIT	INDOOR UNIT	RATED AIRFLOW	95°F O.D. TEMP.	82°F O.D. TEMP.
18ECQ1	18QS3	575	47 - 49	60 - 62
	2ACQ	680	62 - 64	64 - 66
	B18EQ1	635	62 - 64	67 - 69
24ECQ1	24QS	780	43 - 45	50 - 52
	2ACQ	815	45 - 47	57 - 59
	B24EQ1	780	43 - 45	54 - 56
30ECQ2	3ACQ3	1100	52 - 54	59 - 61
	3HCQ	925	60 - 62	63 - 65
	B36EHQ1	1080	61 - 63	65 - 67
31ECQ	3ACQ3	1050	52 - 54	61 - 63
	3ACQ4	1100	50 - 52	54 - 56
	3HCQ	925	69 - 71	74 - 76
	B36EHQ1	1000	67 - 69	72 - 74
36ECQ4	3ACQ3	1150	41 - 43	40 - 42
	3HCQ	925	45 - 47	53 - 55
	B36EHQ1	1275	48 - 50	58 - 60
37ECQ	3ACQ3	1150	55 - 57	62 - 64
	3ACQ5	1150	48 - 50	62 - 64
	3HCQ	925	52 - 54	66 - 68
	B36EHQ1	1295	61 - 63	70 - 72
42ECQ1	4ACQ2	1450	47 - 49	59 - 61
	5ACQ1	1600	49 - 51	53 - 55
	4HCQ	1500	54 - 56	63 - 65
	B48EHQ	1575	51 - 53	92 - 94
48ECQ2	4ACQ2	1690	49 - 51	64 - 66
	5ACQ1	1800	43 - 45	52 - 54
	4HCQ	1600	68 - 70	72 - 74
	B48EHQ	1725	53 - 55	60 - 62
60ECQ1	5ACQ1	1990	61 - 63	67 - 69
	5HCQ	1650	49 - 51	58 - 60
	B48EHQ	1625	55 - 57	63 - 65

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

SPLIT SYSTEM AIR CONDITIONERS
1.5 Ton & 2 Ton
230/208V 60 Hz 1-Ph



1 This wire not used on 1.5 Ton model. two terminal capacitor only.

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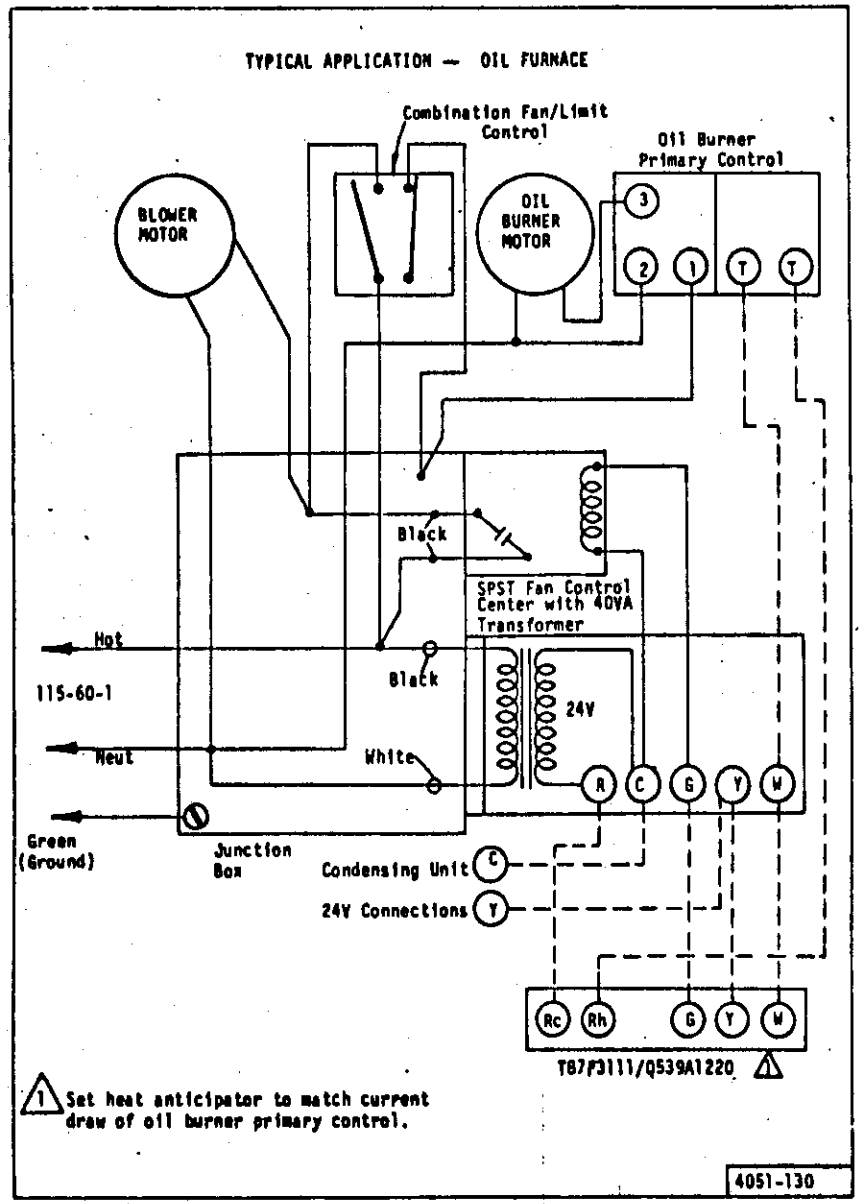
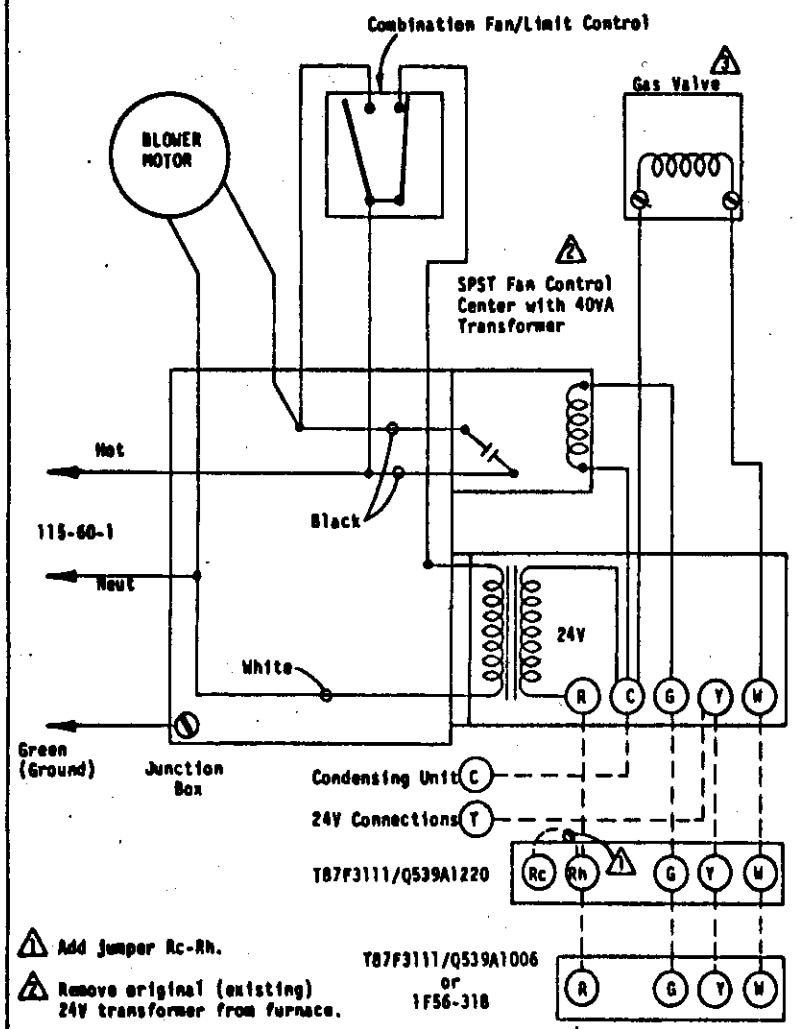


ALPHABETICAL PARTS LIST
SPLIT SYSTEM CONDENSING UNITS

PART NO.	DESCRIPTION	18ECQ1	24ECQ1	30ECQ2	31ECQ	36ECQ4	36ECQ4-3	37ECQ	42ECQ	42ECQ-3	48ECQ1	48ECQ1-3	60ECQ1	60ECQ1-3	36ECQ4-3 460V	48ECQ1-3 460V	60ECQ1-3 460V
8552-015	Capacitor 25/370V	x			x			x									
8552-007	Capacitor 20/15-370V		x	x													
8552-012	Capacitor 35/440V				x				x								
8552-009	Capacitor 25/15-440V										x						
8552-017	Capacitor 45/440V												x				
8552-005	Capacitor 10/370V								x	x	x	x	x	x		x	x
8552-022	Capacitor 20/370V				x												
8552-024	Capacitor 40/370V							x									
8552-002	Capacitor 5/370V	x	x	x	x	x	x	x									
8000-001	Compressor AB111FT	x															
8000-002	Compressor AB114FT		x														
8000-006	Compressor AH152GT			x													
8000-050	Compressor H2EA253AB				x												
8000-008	Compressor AH301FT					x											
8000-051	Compressor H2EA363AB							x									
8000-009	Compressor AH302RT						x			x							
8000-011	Compressor YRB4-0300								x								
8000-013	Compressor YRC4-0350										x						
8000-015	Compressor YRC4-0350											x					
8000-027	Compressor AG122ET												x				
8000-031	Compressor AG122RT													x			
8000-010	Compressor AH302TT														x		
8000-018	Compressor CL157TT															x	
8000-048	Compressor AG122UT																x
5051-011	Condenser Coil	x															
5051-013	Condenser Coil		x														
5051-001	Condenser Coil			x		x	x								x		
5051-023	Condenser Coil				x			x									
5051-009	Condenser Coil								x	x	x	x				x	
5051-024	Condenser Coil												x	x			x
8401-007	Contactor - Comp. 25A	x	x	x	x			x									
8401-003	Contactor - Comp. 30A					x			x		x						
8401-002	Contactor - Comp. 25A						x			x		x		x	x	x	x
8401-016	Contactor - Comp. 35A												x				
8605-001	Crankcase Heater						x			x		x					
8605-002	Crankcase Heater														x	x	
5151-001	Fan Blade TF1839	x	x														
5151-007	Fan Blade TP2029			x	x	x	x	x							x		
5151-017	Fan Blade FA2430-4B								x	x	x	x	x	x		x	x
8406-010	High Pressure Switch															x	
8103-008	Motor - Fan 1/5	x	x														
8103-009	Motor - Fan 1/5			x	x	x	x	x							x		
8105-005	Motor - Fan 1/3								x	x	x	x	x	x		x	x
8200-001	Motor Mount - Fan	x	x	x	x	x	x	x							x		
8200-004	Motor Mount - Fan								x	x	x	x	x	x		x	x
8607-002	Terminal Block 230V														x	x	x
8407-003	Transformer-Stepdown														x	x	x

TYPICAL APPLICATION — GAS FURNACE WITH SINGLE SPEED MOTOR



1. Add jumper Rc-Rh.
2. Remove original (existing) 24V transformer from furnace.
3. Gas valve current draw should be observed and thermostat heat anticipator set at a corresponding value.

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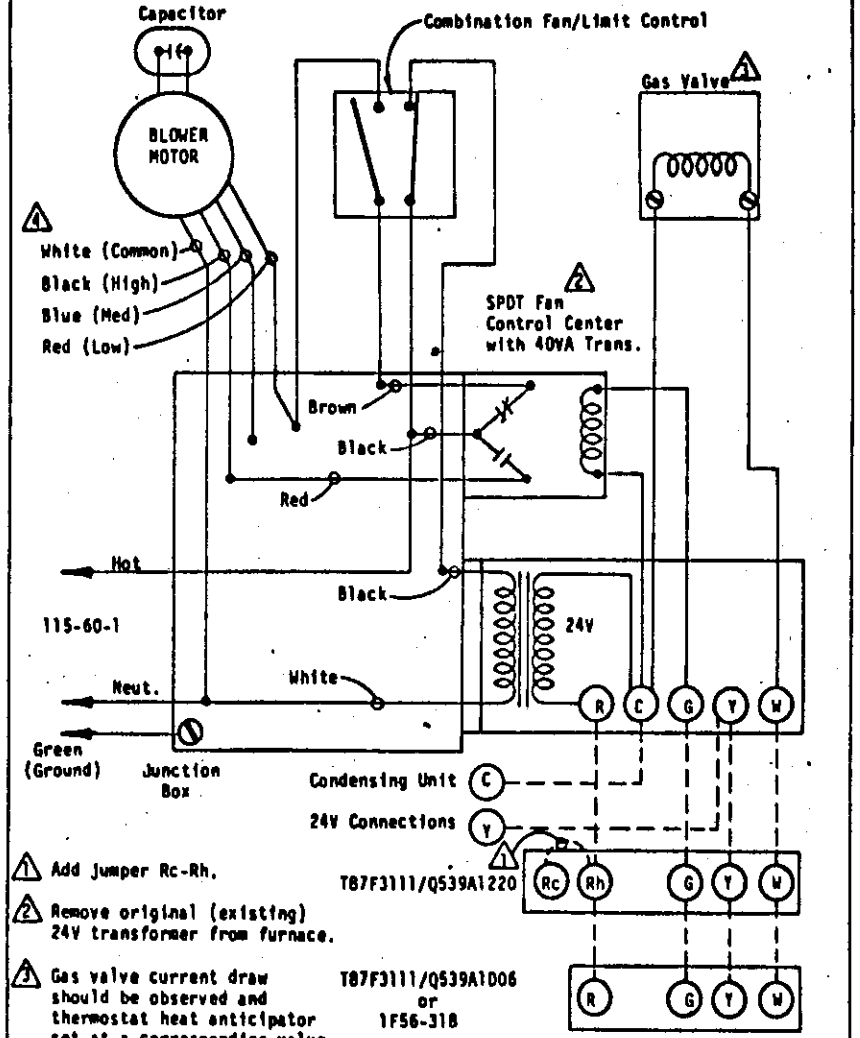
TYPICAL APPLICATION — GAS FURNACE WITH MULTI-SPEED MOTOR



1. Add jumper Rc-Rh.
2. Remove original (existing) 24V transformer from furnace.
3. Gas valve current draw should be observed and thermostat heat anticipator set at a corresponding value.
4. Any combination of speeds can be used. Be sure to connect only one speed to any one point and that all unused speeds are taped off separately.

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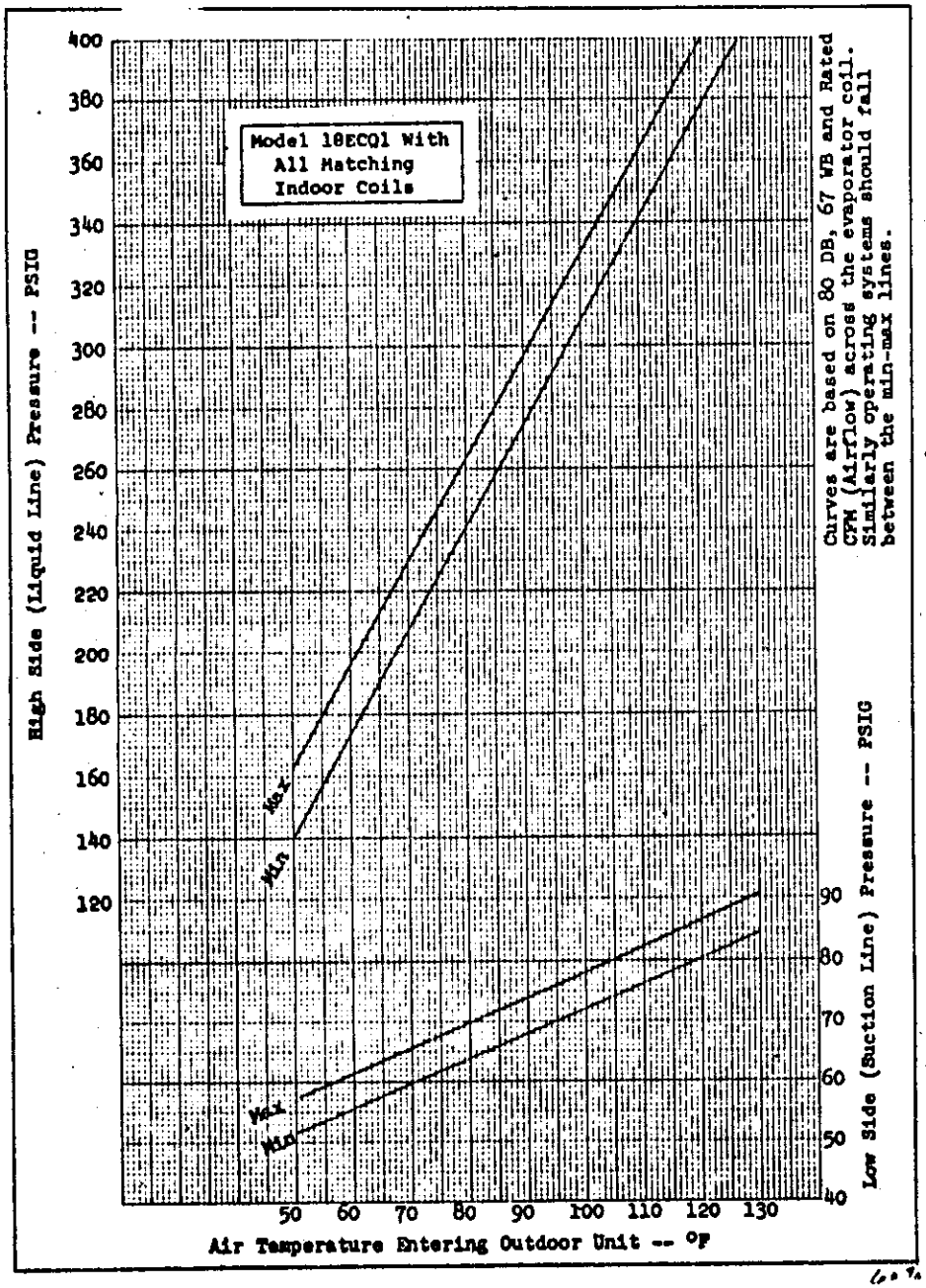
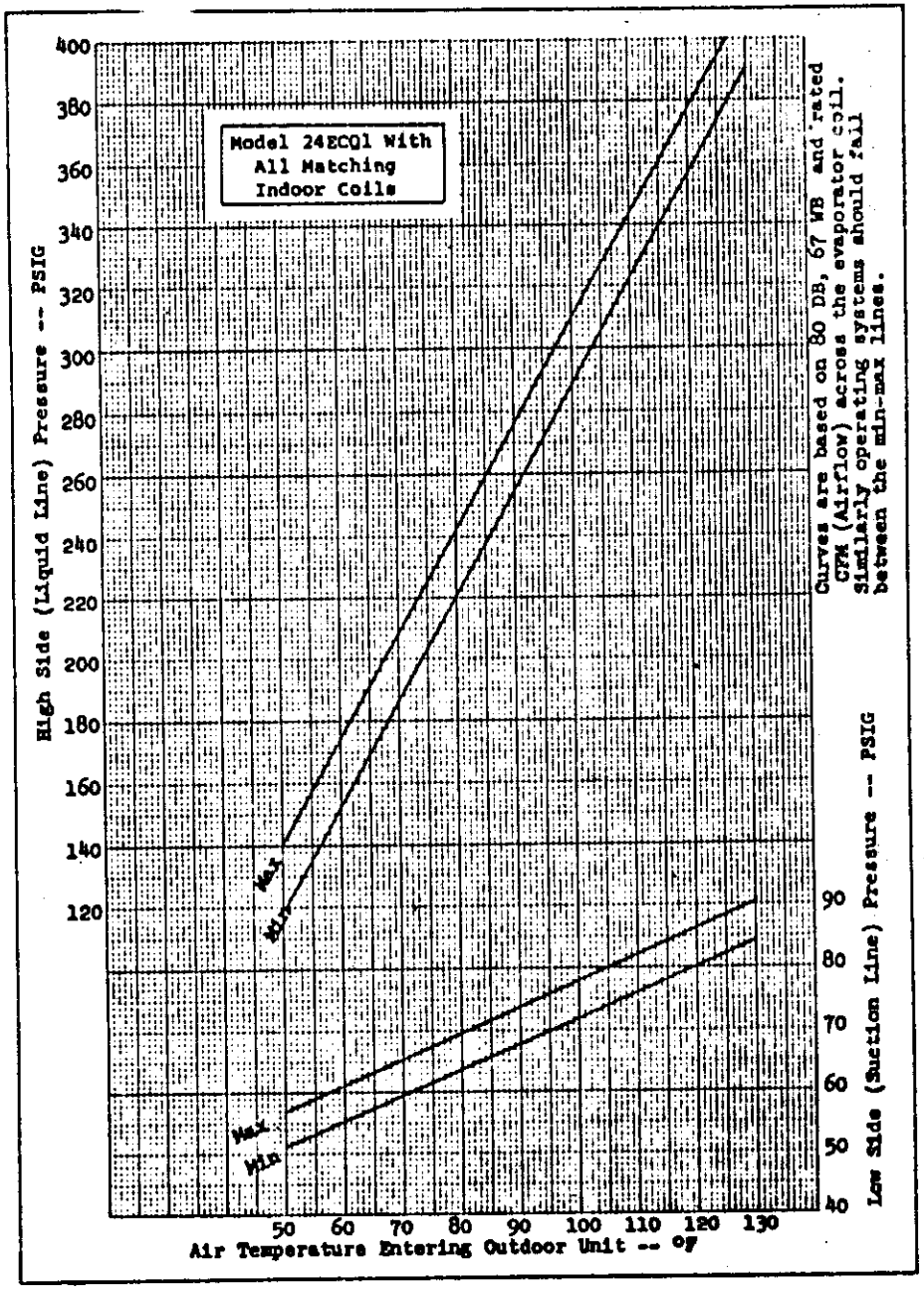

Model 18ECQ1 With
All Matching
Indoor Coils
High Side (Liquid Line) Pressure -- PSIG
Low Side (Suction Line) Pressure -- PSIG
Air Temperature Entering Outdoor Unit -- °F
Max
Min
Max
Min
Curves are based on 80 DB, 67 WB and Rated CFM (Airflow) across the evaporator coil. Similarly operating systems should fall between the min-max lines.


Model 24ECQ1 With
All Matching
Indoor Coils
High Side (Liquid Line) Pressure -- PSIG
Low Side (Suction Line) Pressure -- PSIG
Air Temperature Entering Outdoor Unit -- °F
Max
Min
Max
Min
Curves are based on 80 DB, 67 WB and rated CFM (Airflow) across the evaporator coil. Similarly operating systems should fall between the min-max lines.