



INSTALLATION INSTRUCTIONS **AIR COOLED CONVERTIBLE 2 - 15 TONS**



INTRODUCTION

Units are designed to meet many different air conditioning installation requirements. Their design permits floor or slab mounting, stacking of the evaporator section on top of the condensing unit, or suspension from ceilings. The unit may be turned on its side to permit passage through narrow entrances. In addition, the unit is convertible so that the condensing section may be installed remotely from the evaporator section. If the evaporator-blower section and the condensing section are separated, use of available Stub Kits (STB45) with properly sized lengths of evacuated liquid and suction lines allows for their reconnection without loss of the refrigerant charge. Refrigerant (R-22) is then added to compensate for the additional tubing volume.

INSPECTION OF EQUIPMENT

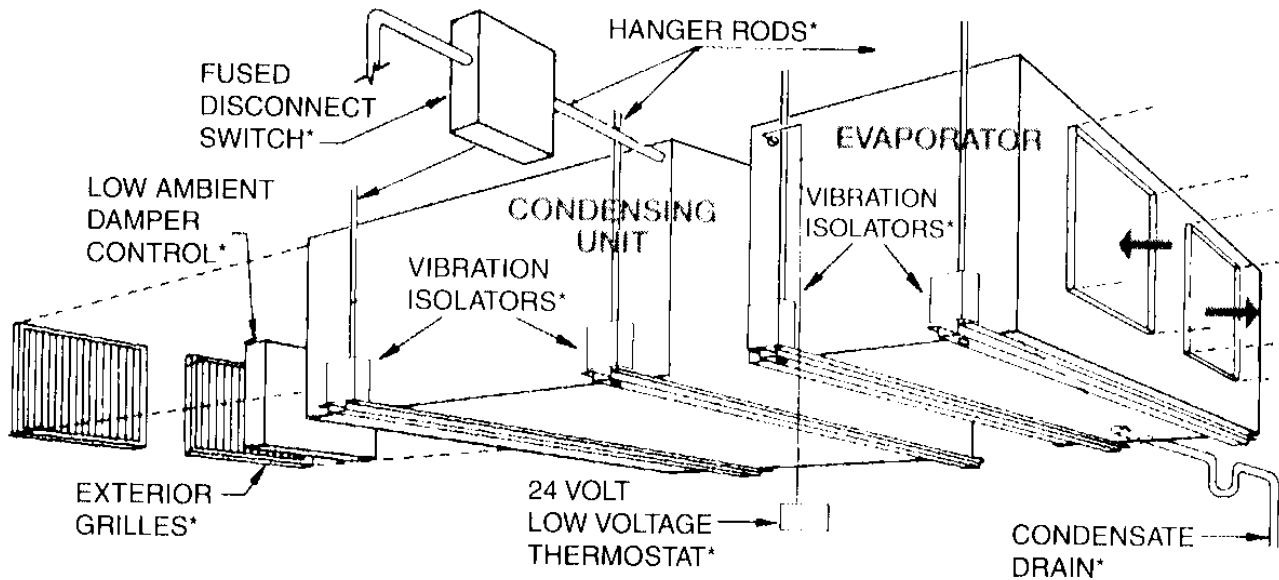
Upon receipt of the unit, inspect for visible or concealed damage. Report any damage to the freight carrier, and file a damage claim. Call 800-625-SKIL to request a fax of our written freight damage procedure. In the event even slight (cosmetic) damage is noted, IMMEDIATELY perform an inspection of the interior of the units paying particular attention to the major braze points on the coils, the set screws on the pulleys, and the connection to any interior valves. These are the areas most affected by G force impact and are the most common concealed damage sustained. REPORT ANY CONCEALED DAMAGE TO THE FREIGHT CARRIER AS SOON AS IT IS FOUND. If you do not know the carrier, please call customer support at 800-625-SKIL with unit serial number, they will provide the carrier's name and phone number to you.

All pulleys and belts must be checked to assure they have not loosened during transit. Set screws must be confirmed for tightness. Remove all foreign objects from the equipment. This includes accessories as they are often packed in the cabinets for shipment. Warranty documentation and Operation and Maintenance manuals are also shipped within the equipment (in their own zip-lock bag) and must be removed.

SELECTION OF INSTALLATION SITE

Before unit is installed, a thorough study should be made of the structure. Careful consideration must be given to the location of wiring, condensate disposal, ductwork, and proper accessibility to the unit for maintenance and servicing. It is recommended that a minimum of 24" clearance space be allowed on each side of the unit to accommodate maintenance and servicing. Attention must also be given to the floor, ceiling, or wall load limitations.

UNIT MOUNTING



**Field installed and supplied by others*

As shown in Fig. 1, units are shipped as an integral package with a cross-member angle attached to both Sides of the unit at each of the four mounting channels.

Fig. 1 can be used for dimensioning of mounting system if the evaporator section is separated from the condensing section.

If unit is to be hung, use field-supplied 3/8" diameter minimum hanging rods, with proper washers and locknuts.

DIMENSIONS

Model No.	A	B	C	D	E
024 & 036	59	43 1/8	22	34 1/2	24 1/2
048 & 060	68 1/2	51 1/4	29	40 1/4	28 1/4
072 & 096	68 1/2	51 1/4	29	40 1/4	28 1/4
120, 144 & 180	89 1/2	70	29	55	34 1/2

SEPARATION OF SECTIONS

If the unit is to be connected as a split system, the following steps must be carefully followed in performing the separation.

1. Remove evaporator access panel (see Fig. 2)
2. Using open-end wrench, disconnect the suction and liquid line female portions of the valves. **Note: 8-ton and 10-Ton Units have 2 sets of valves and the 12-ton and 15-ton have 3 sets of valves.**
3. Remove the unit top piece, removing only those screws, which attach the top piece to the two covers. (See item 3 Fig. 2)
4. Remove and discard the wires, which run between the two internal control boxes. (See Fig. 3)
5. Remove the two side cross-member angles. (See item 5, Fig 2)
6. Carefully pull the evaporator section away from the condensing section. Double check that the quick-connect valves are completely disengaged.
7. Apply the protective caps supplied in STB45 kit to male halves projecting from the condensing section. **Note: 8-ton and 10-Ton Units require 2 STB45 kits and the 12-ton and 15-Ton Units require 3 STB45 kits.**
8. The sections may now be moved to their individual installation sites.

INTERCONNECTING TUBING

After the separated sections have been installed, the interconnection tubing can be run, using the quick-connects supplied in the STB45 kit. It is recommended that some refrigerant oil be placed on the valve threads to facilitate threading. Hot gas Bypass lines and connection sets are installed similarly.

The following instructions apply:

1. Remove the protective caps from the condensing section quick-connects. Hand thread the female halves of the quick-connects in the STB45 kit onto the male quick-connects on the condensing units approximately 1 to 1 ½ turns. This is to make sure that the interconnection tubing will be routed and brazed with the quick-connect couplings in their final proper location, so that there will be no difficulty when the final coupling assembly is made.
2. Attach the male quick-connects in the STB45 kit to the back panel of the evaporator section at the location vacated by the original condensing unit's quick-connect, using the flanges and screws provided in the kits. **Note: the panel has holes to accept the screws to be utilized.**
3. Run the interconnection tubing required. Follow appropriate refrigeration line pitch and trapping methods.

IMPORTANT: On the multiple compressor units, be careful not to inter-mix lines of circuit 1, circuit 2, and circuit 3. The equipment will not operate properly if the circuits are crossed.

CAUTION: When brazing tubing to the quick-connects stubs, be sure to use a wet rag on the quick-connect to prevent overheating of the valve.

NOTE: The interconnection tubing STB45 kits contain sufficient material to insert an access valve in each end of both the liquid and suction lines. This will facilitate evacuation and charging of the lines.

4. Unthread the female half of the couplings from the condensing section. Using the male plugs supplied with the STB45 kit, seal the ends of the female halves. On the evaporator end of the interconnecting tubing, apply the caps supplied in the kit to the male half-coupling.
5. Using the Schrader valve fittings on either the male or the female quick-connects of each line, check to ensure that each line holds a vacuum after removal of the vacuum pump (indicating no leaks). Then add a holding charge of Refrigerant-22. Remove the plugs from the female half-coupling at the condenser end of the interconnection tubing, and the caps from the male couplings at the evaporator end. Hand thread each half coupling to its mate until resistance is felt (approximately 1 ½ to 1 ¾ turns. Complete the connection of the mating half-couplings with a wrench. Be careful not to torque the fittings or the lines as this may unseat the braze and create leaks. The suction line valves will be totally engaged after an additional 5 ½ to 5 ¾ turns. The liquid line valves will be totally engaged after an additional 4 ½ to 4 ¾ turns.
6. Insulate the interconnection lines completely with ½ " thick neoprene tubing insulation.
7. Add R-22 charge to the system to compensate for the additional interconnecting tubing, as follows:
 - a) For 3/8" liquid line add .6 ounces per foot
 - b) For 1/2" liquid line add 1.2 ounces per foot
 - c) For 5/8" liquid line add 1.8 ounces per foot

8. **NOTE:** Installations may be made with up to 100 feet equivalent lengths by installing the recommended tube sizes and adding the necessary refrigerant, R-22. A maximum length of 150 feet of interconnection tubing is permitted if the following additional steps are taken:

Install a suction line accumulator close to the condensing units. **(Note: 6 ton system is multiple 3 ton circuits, 8 & 12 ton systems are multiple 4 ton circuits, 10 & 15 ton systems are multiple 5 ton circuits)**

	<u>2 & 3 Ton</u>	<u>4 & 5 Ton</u>
Refrig. Research	3670	3738
AC&R	S7046	S7057
Virginia Chemical	VA54-7SRD	VA57-7SRD

Add three ounces of refrigerant oil for each 10 feet of tubing over 100 feet.

Oil specifications are:
 Texaco Capella WF-32 Viscosity 150
 Suniso 3GS Viscosity 155

Recommended line sizes are as follows:

TONAGE/COMPRESSOR		SUCTION LINE				LIQUID LINE	
		Evaporator lower than Condenser Unit maximum lift 40 feet		Evaporator higher than or on same level as Condenser Unit		Up to 100 feet Over 100 feet	
		Up to 100 feet	Over 100 feet	100 Up to feet	Over 100 feet		
2 ton		3/4	3/4	3/4	7/8	3/8	3/8
3 ton		3/4	7/8	7/8	1 1/8	3/8	3/8
4 ton		7/8	7/8	1 1/8	1 1/8	3/8	1/2
5 ton		7/8	1 1/8	1 1/8	1 3/8	1/2	5/8
6 ton	(2) 3T Comp.	(2) 3/4	(2) 7/8	(2) 7/8	(2) 1 1/8	(2) 3/8	(2) 3/8
8 ton	(2) 4T Comp.	(2) 7/8	(2) 7/8	(2) 1 1/8	(2) 1 1/8	(2) 3/8	(2) 1/2
10 ton	(2) 5T Comp.	(2) 7/8	(2) 1 1/8	(2) 1 1/8	(2) 1 3/8	(2) 1/2	(2) 5/8
12 ton	(3) 4T Comp.	(3) 7/8	(3) 7/8	(3) 1 1/8	(3) 1 1/8	(3) 3/8	(3) 1/2
15 ton	(3) 5T Comp.	(3) 7/8	(3) 1 1/8	(3) 1 1/8	(3) 1 3/8	(3) 1/2	(3) 5/8

ELECTRICAL WIRING

Units are completely internally wired at the factory for normal supply voltages. Check unit specification plates for required voltages wire and fuse sizing. The factory wiring terminates in two boxes; one each in the evaporator and condensing sections. These control boxes are located behind the outer access panels and are each supplied with individual control box covers.

PACKAGE UNIT

If the unit is to be installed as an integral unit, low voltage (thermostat) wiring is to be brought through connection A, and power wiring will be brought through connection D. (See Fig. 3) See unit specification plate for power wiring minimum circuit ampacity and maximum fuse size.

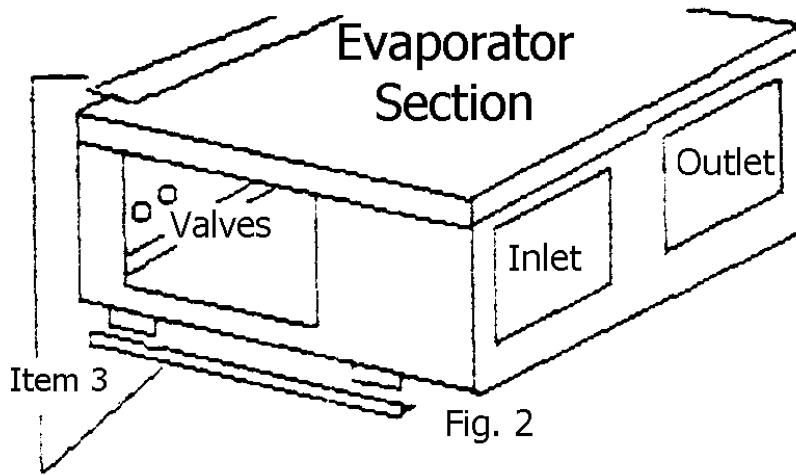


Fig. 2

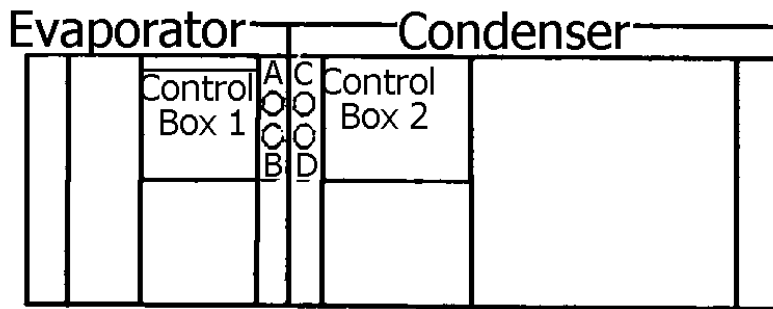


Fig. 3

SPLIT SYSTEM

If the unit is split (condensing unit remote from evaporator), the thermostat wiring is to be brought through connection A. Power wiring for the condensing unit is to be brought through connection D, and the power wiring for the evaporator through connection B. Interconnecting low voltage wiring (replacements for wires discarded in item 4, pg. 2), will be brought through A and C connections.

Power wiring to the condensing and the evaporator units must come through fused disconnects. Minimum circuit ampacity and maximum fuse sizes for the condensing unit are shown on the condensing unit specification plate. Power wiring to the evaporator section must be 14 gauge (copper) minimum. Refer to specification plate for evaporator motor current and fuse size per the National Electric Code.

For low voltage wiring: 18 gauge wire may be used for up to 50 feet lengths
 16 gauge wire for up to 100 feet lengths

CONDENSATE DRAINS

Units are equipped with two 3/4" IPS drains; one for the evaporator condensate and one for the condensing section when installed in those applications which may permit rain to enter the unit. It is EXTREMELY IMPORTANT that the lines attached to these connections contain a TRAP, to ensure positive draining. This

equipment is a draw-thru design, which creates a slight negative pressure within the cabinet; therefore, it is highly recommended that the trap be primed with water prior to start-up of the unit.

FILTERS

Throwaway filters are supplied with the unit and are an Underwriters Laboratories class 2 pleated extended surface type. Filters should be checked monthly for dirt accumulation and changed when necessary. Replacement filters must be the same as originally supplied. An auto-ship program is available which will provide replacement filters to the installation site on a regularly scheduled basis to provide both the filters and the reminder to change them. Call 800-625-SKIL to arrange for this handy service.

Remove the filter access panel located on the right front corner of the unit (Fig. 1).

Note: Unit must be shut off at the disconnect switch before the filter(s) are serviced and replaced. Be sure to check that the air flow arrows on the filters point in the proper direction. Airflow is INTO the equipment. 2&3-Ton Units require (1) 20x20x2 filter, 4, 5, 6, & 8-Ton Units require (2) 14x25x2 filters, and 10, 12, & 15-Ton Units require (3) 16x25x2 filters.

AIR FLOW

Units are equipped with adjustable motor and blower combinations for varied static pressures and airflow requirements. The drives have been selected such that, at the mid-position of the adjustable sheaves, the units will supply airflow with .3 external static pressure as follows:

PAA MODELS	EVAPORATOR	CONDENSER	PAA MODELS	EVAPORATOR	CONDENSER
2 Ton Unit	800	1600	8 Ton Unit	2900	4000
3 Ton Unit	1200	2100	10 Ton Unit	3600	6000
4 Ton Unit	1600	2600	12 Ton Unit	3600	6000
5 Ton Unit	2000	3200	15 Ton Unit	3600	6300
6 Ton Unit	2400	3800			

The drives may be adjusted for different static pressures. If such an adjustment is made, check that the motor current amp draw does not exceed the motor nameplate current by more than ten percent. On units with three phase fan motors, check for proper blower rotation at start-up. If the blower runs backwards, interchange two of the incoming power leads; this will reverse the direction of the motor.

DEFROST CONTROL (HEAT PUMP MODELS ONLY)

The heat pump system utilizes a defrost system controlled by a temperature sensing device. The defrost cycle initiates when the bulb attached to the outdoor coil senses a temperature of 30 degrees F or less. While in the heating mode, the defrost system will signal the reversing valve if frost starts to accumulate on the coil. The defrost cycle ends when the bulb senses 80 degrees F.

OPTIONS

ELECTRIC HEAT

The electric heat option is in the form of a duct heater and must be installed a minimum of 4 feet downstream from the unit in the evaporator discharge duct. A separate power supply is required for the heater. Consult wiring diagrams in these instructions and note electric heater. The heater is actuated by the t-stat and is tied into the fan contactor.

LOW AMBIENT DAMPER CONTROL

For use where air conditioner is expected to operate with outdoors ambient below 60 F, the damper will maintain the condensing pressure at approximately 220 psig down to an ambient of 0F. The damper is installed directly onto the condenser inlet duct connection. A ¼ inch copper tube (field supplied) is connected to the pressure operator with a flare nut. The other end of the ¼ inch tube (with flare nut) is run through a grommet in the condenser corner panel to the liquid-line access fitting located in the condensing section. * Attach the flare nut to the field supplied Watsco fitting AVS-44 to port without Schrader valve. Connect the assembly to the access fitting on the liquid line, and tighten the flare nut securely.

To purge the ¼ inch line, loosen the flare nut connected to the damper pressure operator for about five seconds, then tighten.

***Note:** On the 8,10, 12, &15-Ton Units, with dual refrigerant systems, it is extremely important that the ¼ inch tube from the damper pressure operator be connected to the liquid line access fitting of System #1 (Circuit #1). Connection to System #2 or System #3 will cause a malfunction; the systems are clearly identified on the unit.

MAINTENANCE PROCEDURES

BLOWERS

Skil-aire air cooled units are provided with adjustable belt drive blower packages for both the evaporator and condenser sections. Check that the blower wheel is tight on the shaft and does not make contact with the housing. The squirrel cage should rotate freely. Check for restrictions or foreign material in the air circuit.

BELTS

Drive belts should be examined prior to start-up and then monthly for wear and for correct tension. A too tight belt can cause bearing wear; a too loose belt will cause slippage and or noise. If the two legs of the belt are pressed in, midway between the pulley and the sheave, a properly tensioned belt will result in 1inch to 1 ½ inches of movement. Belt tension can be adjusted by means of the adjusting bolt attached to the motor bracket. Larger units may have motors mounted to a support on the bottom pan, which requires loosening of four nuts to adjust the motor location and change belt position.

REFRIGERATION SYSTEMS

All Skil-aire systems contain a liquid line sight glass on each circuit. If bubbles appear in the sight glass, the system is either undercharged with refrigerant, or there may be a restriction in the liquid line up stream of the sight glass. The sight glass contains a moisture indicator, which changes color when moisture is present in the system. **If sight glass appearance is abnormal, servicing is required to determine the cause.**

EVAPORATOR AND CONDENSER COILS

Check semi-monthly the condition of the face of both the evaporator and condenser coils. A dirty condenser coil will cause high condensing pressures, resulting in higher power consumption and possibly system shut down by the high-pressure safety control. A dirty evaporator coil will reduce unit capacity and eventually will cause shut down by the low-pressure safety control.