



## **INSTALLATION INSTRUCTIONS** **WATER COOLED CONVERTIBLE 2 - 15 TONS**



### **INTRODUCTION**

Units are designed to meet many different air conditioning installation requirements. Their design permits floor mounting 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, using available Stub Kits (STB45) and properly sized lengths of processed liquid and suction lines reconnects them. Refrigerant (R-22) is then added to compensate for the additional tubing volume.

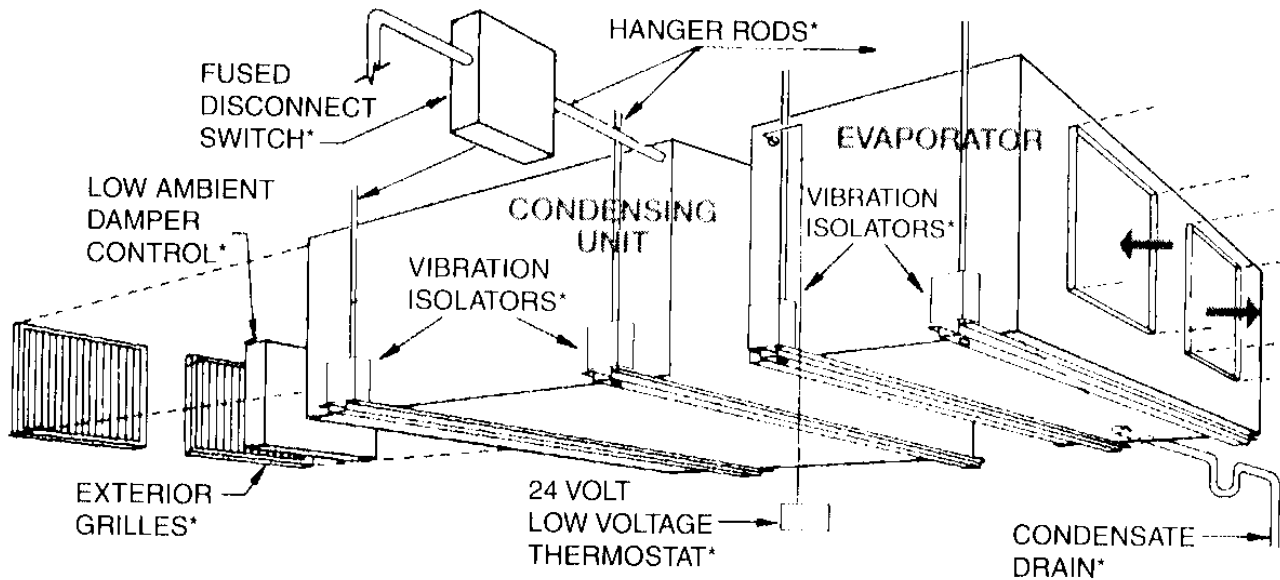
### **INSPECTION OF EQUIPMENT**

Upon receipt of the unit, inspect for visible or concealed damage. Report any damage to the freight carrier, and file a damage claim.

### **SELECTION OF INSTALLATION SITE**

Before unit is installed, a thorough study should be made of the structure. Careful consideration must be given to location of wiring, condensate disposal, ductwork, and 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 locations.

## **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. 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 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.  
**IMPORTANT:** On the multiple compressor units, be careful not to intermix lines of System 1, 2, & System 3. **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 and of both the liquid and suction 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, 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. 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 ½" 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:
  - a) Install a suction line accumulator close to the condensing units. (**Note: use 2 for 8-Ton Unit**)

For 2, 3, 6 and 12Ton Units use:	For 4, 5, 8, 10, and 15Ton Unit's use:
Refrigerant Research 3670	3738
AC&R S7046	S7057
Virginia Chemical VA54-7SRD	VA57-7SRD
  - b) 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	100 Up to feet	Over 100 feet	Up to 100 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.

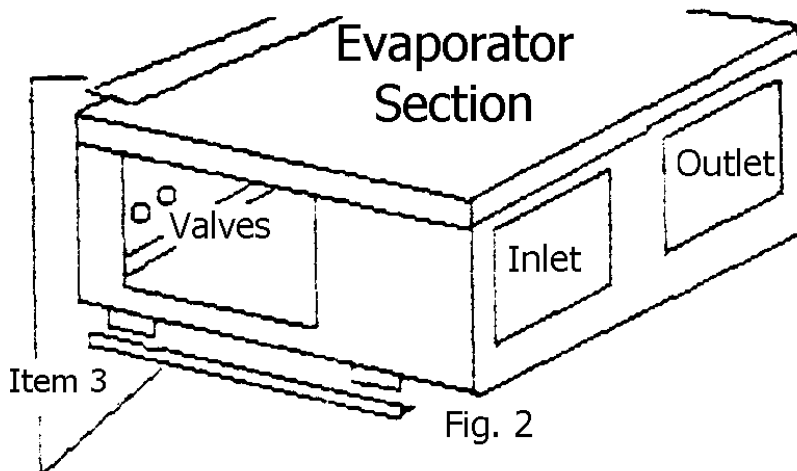


Fig. 2

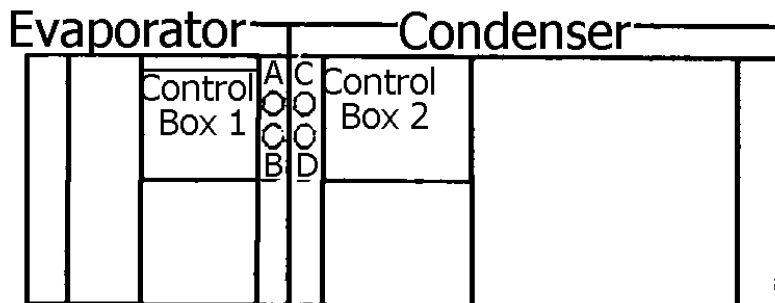


Fig. 3

## **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

## **WATER LINES**

Water/Glycol systems inlet and outlet piping connection are MPT and extend outside cabinet to facilitate fast connection to supply and return piping. Standard factory installed water regulation valve is 2-way and rated for 150 psig. Larger tubing may be required depending on length of run of the tubing and accessories used such as balancing valves, strainers, etc... Shut off valves should be provided for future disconnecting if necessary. A strainer is recommended and must be cleaned regularly. Humidifier option will require a water connection. A ¼ inch flare connection extends outside the cabinet.

## **CONDENSATE DRAINS**

Units are equipped with two ¾" 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. The trap must be primed with water prior to start-up of the unit. Improper trapping can cause water carryover and possible property damage!

## **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 filter must be the same as originally supplied. Removing the cover located on the right front corner of the unit (Fig. 1) attains Field access. **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 direction arrows on the filters point in the right direction. 2&3-Ton Units take (1) 20x20x2 filter, 4, 5, 6, & 8-Ton Units take (2) 14x25x2 filters, 10, 12, & 15-Ton Units take (3) 16x25x2 filters.

## **AIR FLOW**

Units are equipped with adjustable motor and blower combinations. The drive have been selected such that, at the mid-position of the adjustable sheaves, the units will supply air flow with .3 external static pressure as follows:

PAA MODELS	EVAPORATOR	CONDENSER	PAA MODELS	EVAPORATOR	CONDENSER
2 Ton Unit	800	1600	8 Ton Unit	3000	4400
3 Ton Unit	1200	2100	10 Ton Unit	4000	5000
4 Ton Unit	1600	2600	12 Ton Unit	4800	5600
5 Ton Unit	2000	3200	15 Ton Unit	5400	6200
6 Ton Unit	2400	3800			

The drive may be adjusted for different static pressures. If such an adjustment is made, check that the motor current 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 they run backwards, interchange two of the incoming power leads.

## OPTIONS

### GLYCOL FLUID COOLER & PUMP PACKAGE

The system may be purchased with a glycol cooler and pump package option. Refer to the attached Typical Piping Schematic for general guidelines. 24 volt control wiring must be run between the evaporator control panel and the pump package. Separate power connections must be run for the pump package and the air conditioner. The fluid cooler is typically run from the same power supply as the pump package.

Because of the various optional components available for these systems, please call the Customer Assistance line at the factory with questions specific to a system (800-625-7545). All air conditioners have a serial number on the electrical spec plate. Please refer to this number when calling the Customer Assistance Line.

## 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. Check for restrictions or foreign material in the air circuit.

## BELTS

Drive belts should be examined monthly for wear and for correct tension. A too tight belt can cause bearing wear; a too loose belt will cause slippage. If the two legs of the belt pressed in, midway between the pulley and the sheave, a properly tensioned belt will result in 1 inch 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 move the motor and change belt position.

## REFRIGERATION SYSTEMS

All Skil-aire systems contain a liquid line sight glass. 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.**

## 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.