



**HEAT PUMP
CONDENSING UNIT
OPERATION,
INSTALLATION,
AND
MAINTENANCE
MANUAL**

INSTALLATION INSTRUCTIONS **HEATPUMP CONDENSING UNIT 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 an 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. The important safeguards and instructions appearing in this manual are not meant to cover all possible conditions and situations that may occur. It must be understood that common sense, caution and care are factors which cannot be built into any product. These factors must be supplied by the person(s) installing this unit

INSPECTION OF EQUIPMENT

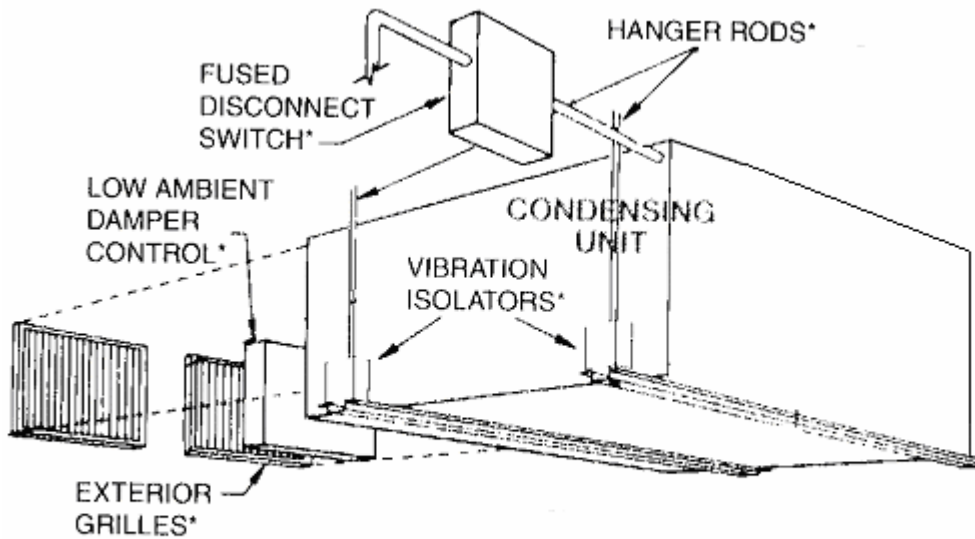
Upon receipt of the unit, inspect for visible or concealed damage. Report any damage to the freight carrier, and file a damage claim. Call 800-625-SKIL to request a fax of our written freight damage procedure. In the event even slight (cosmetic) damage is noted, IMMEDIATELY perform an inspection of the 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



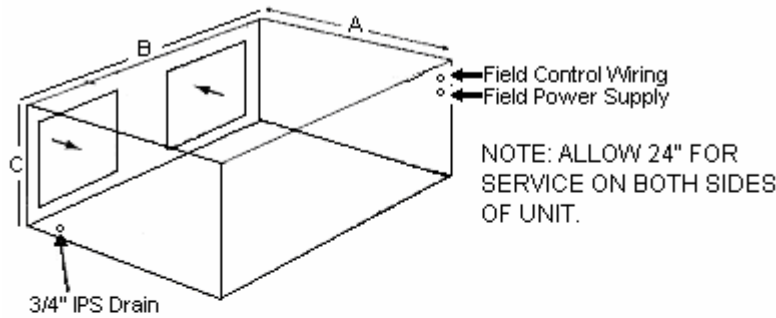
**Field installed and supplied by others*

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.

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

DIMENSIONS

Convertible Condensing Unit



Dimensions		
A	B	C
34 1/2"	43 1/8"	22"

CAA024,036

Dimensions		
A	B	C
40 1/2"	51 1/4"	29"

CAA048,060,072,096

Dimensions		
A	B	C
55"	70"	29"

CAA108,120,144,180

INTERCONNECTING TUBING

After the condensing section has been installed, the interconnection tubing can be run, using the quick-connects (optional) 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. 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.

2. Insulate the interconnection lines completely with ½ “ thick neoprene tubing insulation.
3. 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

4. **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
9 ton	(3) 3T Comp.	(3) 3/4	(3) 7/8	(3) 7/8	(3) 1 1/8	(3) 3/8	(3) 3/8
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.

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. 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.

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	CONDENSER	PAA MODELS	CONDENSER
2 Ton Unit	1600	8 Ton Unit	4000
3 Ton Unit	2100	9 Ton Unit	5000
4 Ton Unit	2600	10 Ton Unit	6000
5 Ton Unit	3200	12 Ton Unit	6000
6 Ton Unit	3800	15 Ton Unit	6300

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.

OPTIONS

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 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 adjust the motor location and change belt position.

REFRIGERATION SYSTEMS

All Skil-air 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 System 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.

DEFROST CONTROL

The *Skil-Aire* heat pump 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 F or less. This means that the unit (when in the heating cycle) will go into a defrost cycle only if the outdoor coil is cold enough to accumulate frost. The defrost cycle ends when the outdoor coil temperature rises to 80 F.

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 indoor air discharge duct. A separate power supply is required for the reheat. Consult wiring diagrams in this instruction and on the electric heater and heater pump thermostat. Also refer to the specification plate on the heater for proper voltage, kilowatts, and wiring requirements.