MANUAL 2100-068


COOLING MAINTENANCE PROCEDURES

# REFRIGERATION, HEATING AND AIR CONDITIONING

**BARD MANUFACTURING CO. • BRYAN, OHIO 43506**

*Dependable quality equipment. . .since 1914*

# Maintenance Checksheet

Dealer _____ Address _____

Customer _____ Address _____

Date _____ Person _____ Time In _____ Time Out _____

Equipment Make & Model _____

Notes _____

## Pre-Service Check

☐ Customer satisfied with system performance _____

_____

☐ Customer dissatisfied with system performance _____

_____

## Thermostat Checks

☐ Record thermostat settings: Temp.: _____ F
Mode: HEAT OFF COOL FAN ON AUTO

☐ Check terminal connections for tightness

☐ Clean bimetal. Inspect mercury switch

☐ Check thermostat for level

☐ Check control circuit amperage: _____ A

☐ If customer dissatisfied with temperature control in heating season, adjust anticipator to match control circuit amp draw

☐ Initiate appropriate seasonal demand from thermostat

## Blower Compartment Checks

☐ Check supply voltage at junction box: _____ vac _____ time

☐ Check blower motor amperage: _____ A _____ nameplate rating

☐ Turn power at unit main disconnect to OFF

☐ Check all wiring for loose connections and bad insulation

☐ Clean or change filter

## Direct Drive Blower

☐ Check blower bearings

☐ Lubricate blower bearings

☐ Clean blower and compartment

☐ Check blower wheel for free and balanced rotation

☐ Check all blower housing mounts and setscrews for tightness

☐ Unused motor leads taped and out of way

## Belt Drive Blower

☐ Remove blower belt and check for wear

☐ Check motor bearings for wear

☐ Lubricate motor bearings

☐ Check blower wheel bearings for wear

☐ Lubricate blower wheel bearings

☐ Clean blower and compartment

☐ Check blower wheel for free and balanced rotation

☐ Check pulley alignment

☐ Check motor and blower pulley setscrews for tightness

☐ Put belt back on blower and motor pulley and check belt tension

☐ Check all blower housing and motor mounts for tightness

## Heating Section Checks Electric

☐ Check electrical wiring — connections and insulation

☐ Check amperage draw of each element

☐ Check total amperage draw of elements _____ amps

☐ Check temperature rise _____ F

☐ Return outdoor thermostats to original settings if present

## Gas

☐ Check all electrical wiring for loose connections and damaged insulation

☐ Check burners for lint, dust and scale

☐ Check for cracks in heat exchanger

☐ Check furnace vent for size and deterioration

☐ Check for quiet, even burner ignition

☐ Check supply line gas pressure NAT _____ in. w.c. LP _____ in. w.c.

☐ Check manifold gas pressure NAT _____ in. w.c. LP _____ in. w.c.

### Electronic Ignition Control

☐ Check electronic ignition control sequence of operation

☐ Check safety lockout _____ min.

☐ Check pressure switch _____

### Standing Pilot

☐ Check pilot flame

☐ Check thermocouple open circuit _____ dcmv closed circuit _____ dcmv

☐ Check pilot valve safety drop-out time _____ min.

☐ Check automatic vent damper system

☐ Check limit safety

☐ Check temperature rise _____ °F

☐ Gas manifold hand valve is open before leaving

## Oil

☐ Check electrical wiring — connections and insulation

☐ Inspect combustion chamber

☐ Inspect for soot in heat exchanger

☐ Change fuel oil tank for sludge/water

☐ Change oil line filter

☐ Check oil lines

☐ Service oil burner

☐ Conduct combustion efficiency test:
_____ in. w.c. smoke _____ % CO2 _____ °F net

☐ Check limit safety

☐ Check temperature rise

☐ Check primary control

☐ Check furnace vent for rust

## Cooling

☐ Check electrical wiring — connections and insulation (indoor)

☐ Check/clean evaporator coil

☐ Check/clean condensation drain

☐ Check static pressure drop _____ in. w.c. _____ cfm (dry coil)

☐ Check wiring — connections and insulation (outdoor)

☐ Check/clean condenser coil

☐ Lubricate condenser fan motor

☐ Check line set and connections for evidence of leaks

☐ Check and record supply voltage

☐ Check refrigerant charge

☐ Check amperage draw on condenser fan motor

☐ Check amperage draw on compressor

## Humidifier

☐ Check electrical wiring — connections and insulation

☐ Check transformer voltage _____ vac

☐ Check damper position

### Spray Type

☐ Check solenoid valve

☐ Check nozzle spray pattern

### Drum Type

☐ Check for free rotation and scale

☐ Check water level adjustment

☐ Check overflow/drain line

## Electronic Air Cleaner

☐ Check electrical wiring — connections and insulation

☐ Check sail switch or electrical blower interlock

☐ Check test button operation

☐ Check supply voltage _____ vac (120 vac)

☐ Check voltage to collecting plates _____ vdc (3500 vdc)

☐ Check voltage to ionization wires _____ vdc (8000 vdc)

☐ TURN POWER OFF

☐ Wash cells

☐ Wash prefilter screens

## Post-Service Checks

☐ Return thermostat to original settings recorded at beginning of service call

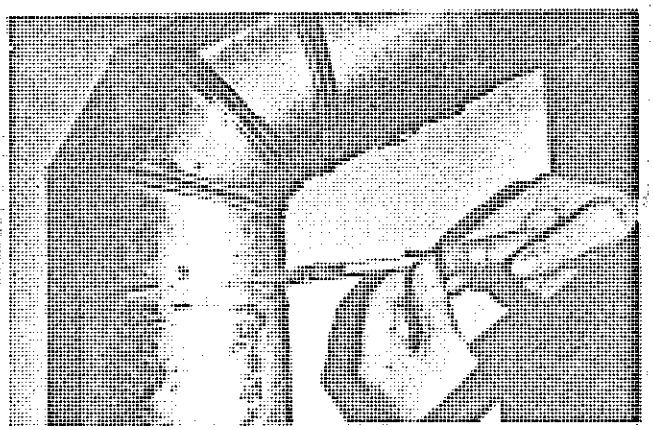
☐ Leave copy of completed checksheet with customer

☐ Power ON before leaving

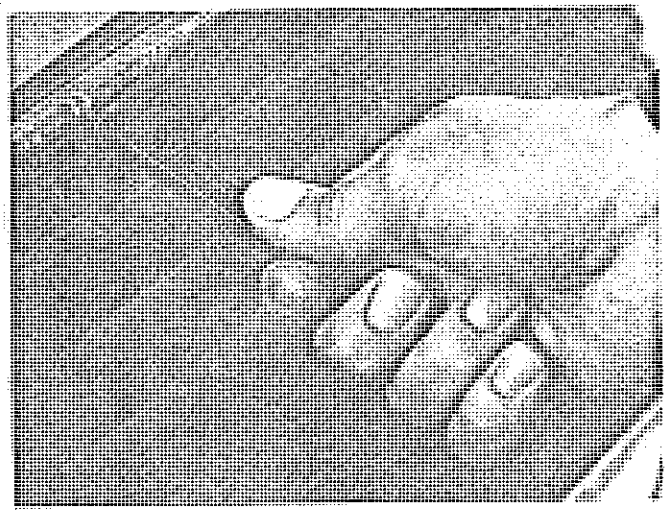
COOLING

☐ Check electrical wiring connections and insulation (indoors).

☐ Check/clean evaporator coil.



1. Remove screws from vent. Remove vent.
2. Remove evaporator access panel.
3. Check fins of evaporator for accumulated dirt or dust.



4. If clogged or dirty, clean with a wire brush or fin comb.

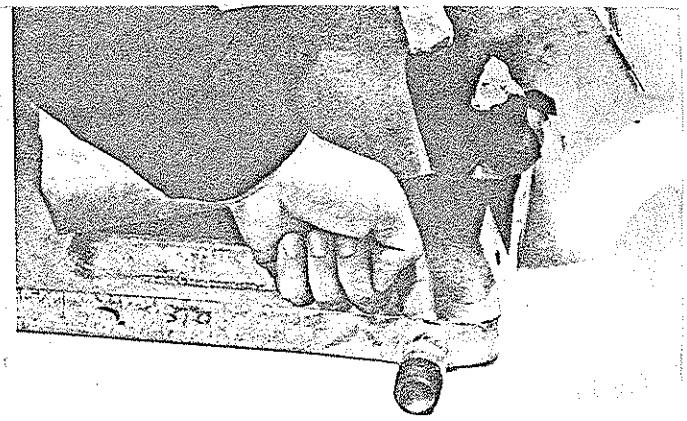
CAUTION: Use a wire brush or fin comb carefully so as not to damage coil.

5. Inspect tubing and connections for signs of oil leaks. Spots of oil indicate a leak which must be repaired and the unit recharged.

NOTE: Positive identification of a leak can be made with a leak detector or by the application of a soap bubble solution to the suspected area.

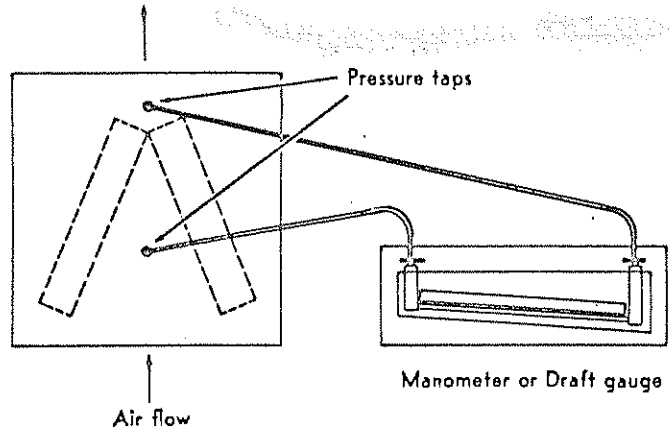
☐ Check and clean condensate drain.

1. Clean drip tray of any accumulated dust or dirt.
2. Probe drain hole with screwdriver to be sure it is not clogged.
3. Pour a small amount of water in the drip tray and observe if it drains easily.
4. Replace evaporator access panel.



☐ Check static pressure drop_____in. w.c._____cfm (dry coil).

NOTE: Quarter inch holes are not provided in the inlet and outlet of Bard evaporators for the purpose of measuring temperature difference and the static pressure drops across the evaporator coil. The serviceman should drill them. Be careful not to drill into the evaporator. The holes should be on the centerline of the coil.




Checking static pressure of low side.

The "coil drop" or static pressure can be measured with an incline manometer or draft gauge and must be measured across a dry coil.

1. Turn on evaporator blower only.
2. Insert an awl or screwdriver into the holes to open up the insulation behind them.
3. Level the manometer.
4. Check the rubber hoses from the manometer or draft gauge for leaks.
5. Insert the rubber hose into the holes in the evaporator cabinet so that about 1/4 in. extends inside the cabinet, and seal around the hole with Permagum or putty. The hose from the lower end of the inclined gauge should go into the downstream hole. The pressure differential between the pressure of the air entering and leaving the coil is the pressure drop through the coil.
6. Refer to unit installation instructions for correct pressure drop and air volume. Adjust blower speed to obtain correct pressure drop and air volume. Correct air volume should be 400 to 450 cfm per ton of rated capacity.

☐ Check wiring connections and insulation (outdoors).

☐ Check/clean condenser coil.

1. Turn unit off at manual disconnect switch.
2. Check and clean both sides of coil of dirt, leaves, grass, etc. (May be flushed with water hose). Remove the condenser coil grille when cleaning.

☐ Lubricate condenser fan motor.

1. Drop motor and fan out the bottom of the unit. Pull the motor out from under unit far enough to oil. Add a few drops of automotive SAE 10 non-detergent oil. Replace motor fan assembly.

☐ Check line set and connections for evidence of leaks.

NOTE: Look for oily/dirty surfaces.

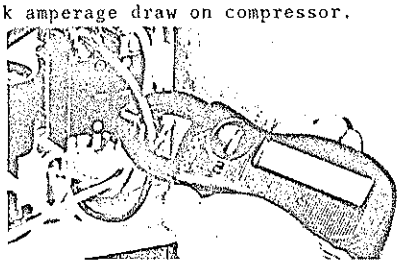
☐ Check and record supply voltage.

1. Check at disconnect or at compressor contactor. If voltage is taken at compressor contactor, service door must be taken off the condenser unit. Two screws hold service door in place.

☐ Check amperage draw on condenser fan motor.

1. Start condensing unit.
2. After it has come up to speed, check amperage draw with an amprobe.
3. Record nameplate amperage and actual amperage.

☐ Check amperage draw on compressor.



1. Record nameplate amperage and actual amperage.

☐ Turn power "on" before leaving.

## ☐ CHECKING REFRIGERANT CHARGE HEAT PUMPS AND AIR CONDITIONERS

### SAFETY

1. Always wear safety glasses when working with refrigerant.
2. Be careful of refrigerant burn when removing hoses.
3. Use caution when working with pressurized hoses.
4. Use only hoses with side wall designed for high pressure.

### GAUGE MANIFOLD

A very necessary instrument in checking and servicing air conditioning equipment is the gauge manifold. Its purpose is to determine the operating refrigerant pressures in order for the serviceman to analyze the condition of the system.

1. Install gauge manifold to unit.

   NOTE: As a safety measure, it is wise to attach refrigerant hoses at the lowest pressure readings on the system. To do this:

   a) Put high pressure hose (B) on first. (Unit should not be running).

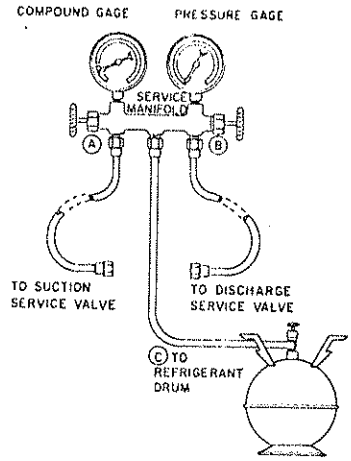
   b) Put low pressure hose (A) on second. (Unit should be running).

2. Check unit operating pressures recorded at gauge manifold with the normal operating pressure curve for this unit.
3. If the system is operating properly, make sure all service valves are open, disconnect gauge manifold, and replace all gauge port caps.

NOTE: As a safety measure, it is wise to detach refrigerant hoses at the lowest pressure readings on the system. To do this:

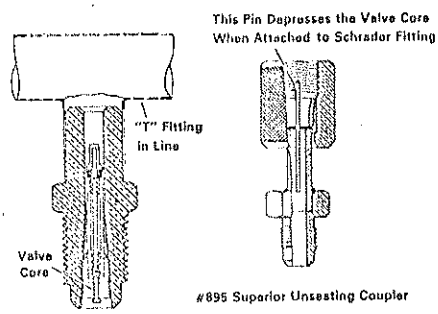
a) Remove the suction pressure hose (A) first. (Unit is running.)

b) Remove the high pressure hose (B) next. (Unit is not running.)




### ATTACHING MANIFOLD HOSE TO SCHRADER VALVE

1. Remove cap from valve.
2. Make sure gauge manifold valves are closed.
3. If hose does not have an unseating pin, a number 895 Superior Unseating Coupler (or equivalent) must be used.




4. Make sure coupler is lined up straight with Schrader valve. Screw coupler on to valve.
5. Open gauge manifold valve slightly and purge air from hose with refrigerant.
6. Read the suction pressure on compound gauge and head pressure on pressure gauge.
7. To remove, push end of coupler tight against end of Schrader valve and hold in place while quickly unscrewing coupler nut from Schrader valve.
8. Remove coupler from Schrader valve.

### CAPILLARY SYSTEMS

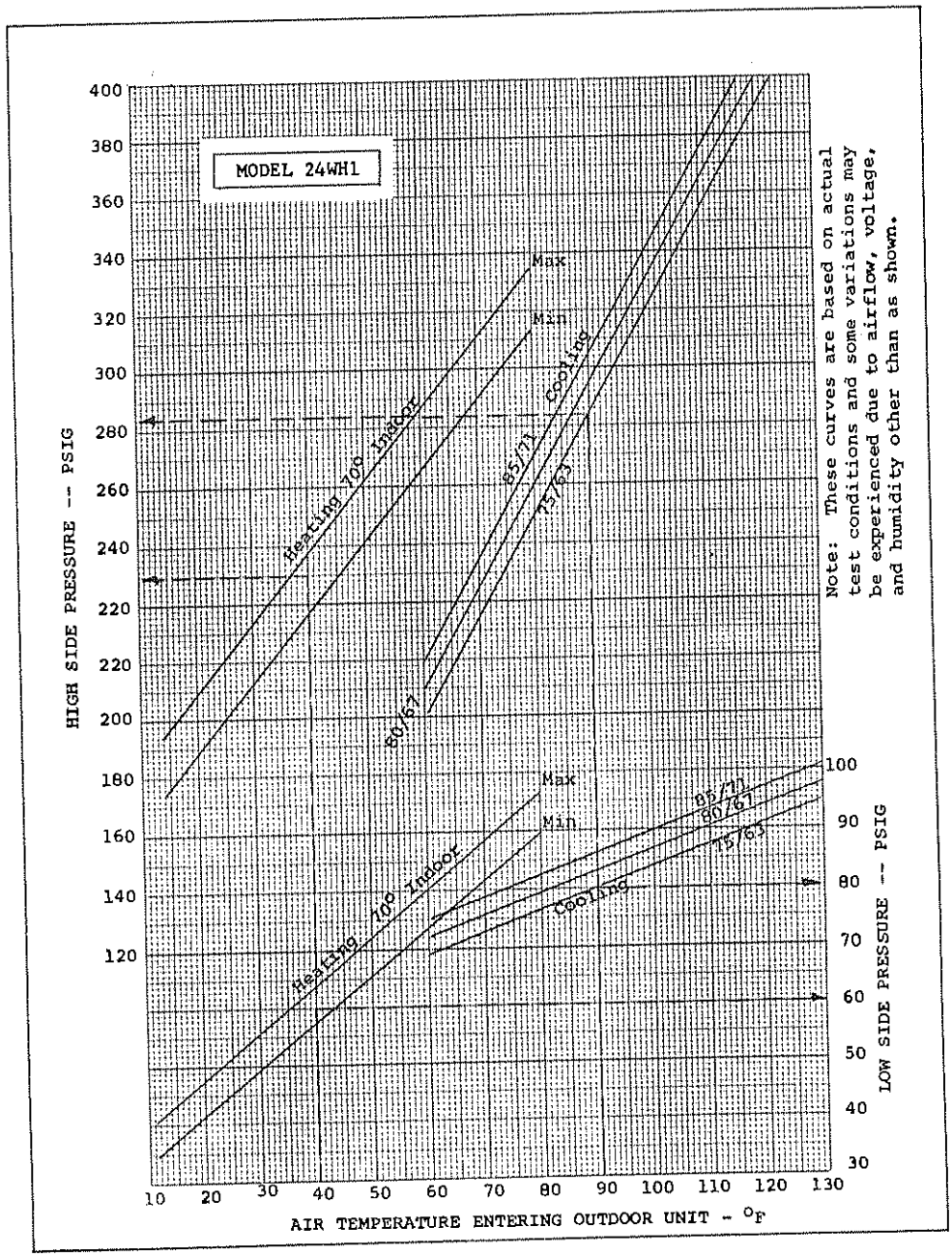
Weight Method:

Where no other method is available for checking a cap tube system for low charge and the operating pressure indicates a low charge, the remaining refrigerant in the unit must be discharged and the system evacuated before weighing in the new charge. Refer to the unit nameplate or "Unit Listing" for the correct charge.

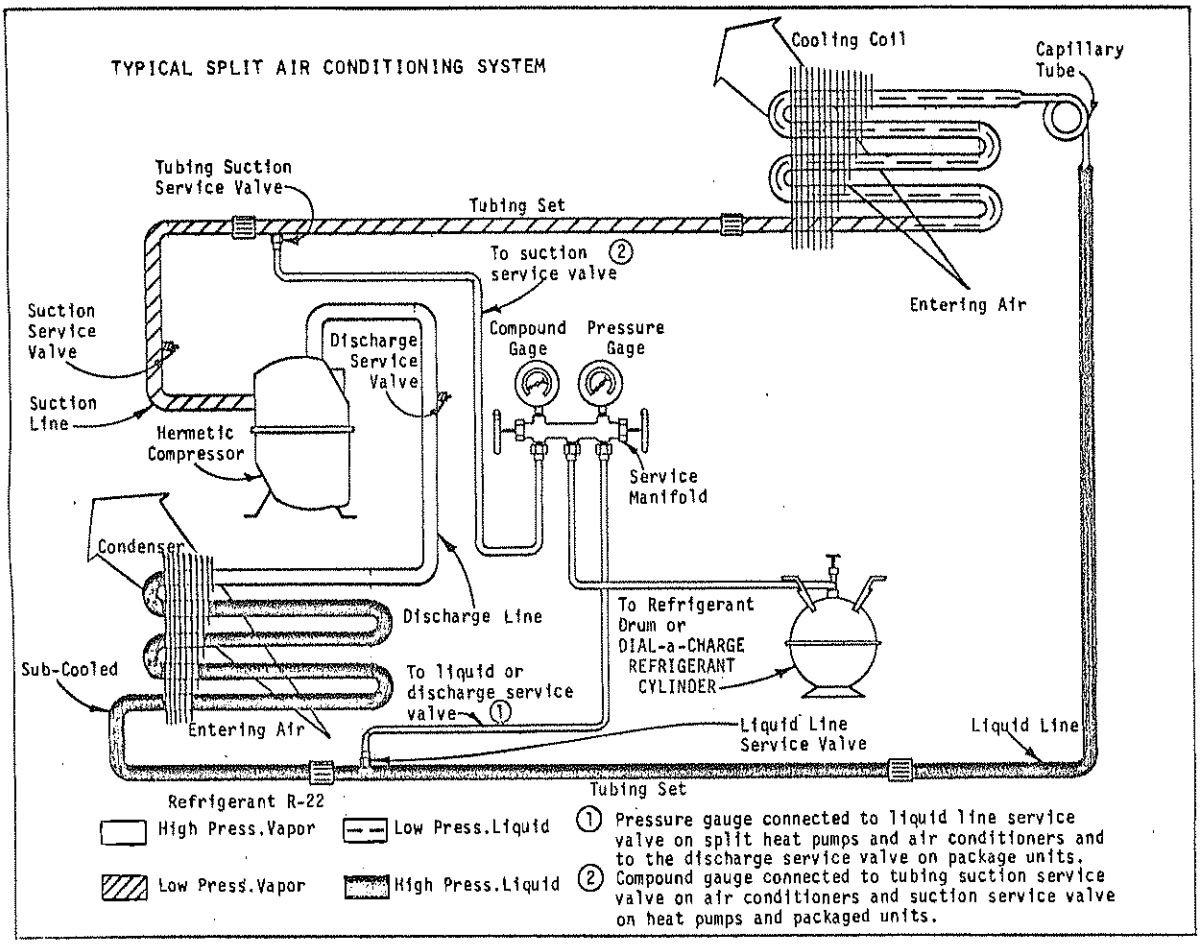
## CHECK REFRIGERANT USING A PRESSURE CURVE

*NOTE: Normal operating pressure curve charts are found inside the Installation Instructions for each unit.*

1. Connect high pressure side of the gauge manifold to discharge line service port and suction side to service port on suction line.
2. Start the unit. Operate until pressures stabilize.
3. Using a thermometer, find the correct condenser entering air temperature. Read the suction and discharge pressure at gauge manifold.
4. On the normal operating pressure curve for the unit:
   a) Find the air entering outdoor temperature.
   b) Draw a line straight up through the outdoor unit and indoor unit pressure curves.
   c) Then find the high pressure recorded in the left hand column.
   d) Follow across until it crosses the temperature of outdoor entering air. Mark this point.
   e) Then find the suction pressure recorded in the right hand column.
   f) Follow across until it also crosses the temperature of outdoor entering air. Mark this point.
   g) If unit is properly charged and has proper air flow over indoor coil, the two marked points should fall between the Max and Min curves shown on the graph.
   h) On heat pumps, repeat procedure with unit operating in heating mode.
5. If pressure reading is more than 3 psig over proper value on the curve, system is overcharged. If this is the case, discharge a quantity of R-22 from the suction gauge port into a waste drum. Close valve and allow unit to run for a few minutes to stabilize pressures. *NOTE: Be sure to rule out all air system problems (dirty filters, closed or obstructed registers, plugged outdoor coil, etc.,) before making any charge adjustments.*
6. If the discharge pressure is more than 10 psig under the proper value shown on the chart, the system is undercharged. Check for leaks and recharge unit by weight method after making repairs.




EXAMPLES:
Cooling Cycle - 90°F O.D. Temp. w/75°DB/63°WB I.D. Temp. = 80 PSIG Suction and 284 Discharge Pressure.
Heating Cycle - 40°F O.D. Temp. w/70° I.D. Temp. = 60 PSIG Suction and 228 Discharge Pressure.




AIR CONDITIONING AND HEAT PUMP ON COOLING CYCLE

TROUBLESHOOTING — SYSTEM PRESSURE CHECK

Low Suction -- Low Head Pressure

1. Low charge.
2. Low indoor and outdoor temperature.
3. Restricted air flow over indoor coil.
4. Defective indoor fan motor.
5. Iced indoor coil.
6. Restricted liquid line, drier, or capillary tube.

High Suction -- Low Head Pressure

1. Defective or broken valves.
2. IPRV valve open.

Low Suction -- High Head Pressure

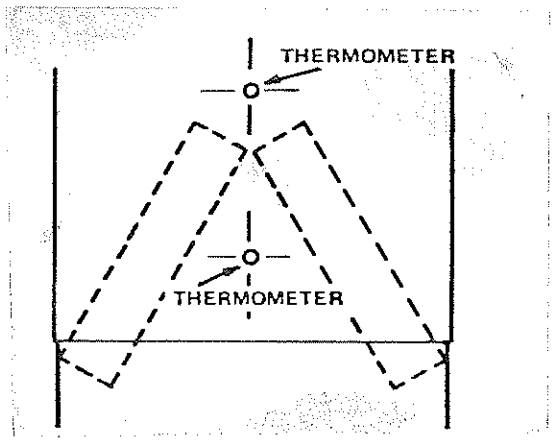
1. Partial restriction and then overcharged.

*NOTE: On a split heat pump the vapor line should be within 10 psig of the pressure in liquid line on cooling mode and within 10 psig of suction line on heating mode. If not, check for sticking check valves.*

High Suction -- High Head Pressure

1. High ambient.
2. Low outdoor air flow
3. Overcharged
4. Air in system.
5. Restricted condenser.

☐Check temperature difference over the coil.




1. Turn unit on and allow to operate for 5-10 minutes or until it seems to be functioning normally.
2. Insert a thermometer in the holes on the upstream and downstream side of the indoor coil.
3. The temperature difference (TD) between these two readings is the temperature drop across the coil. This should be 14°F-18°F. However, this will vary according to the temperature and humidity in the conditioned space.
   a. If the TD is lower, then the blower speed is too fast or something is wrong with the refrigeration system.
   b. If the TD is higher, then the blower speed is too slow or there is a restriction in the air flow (dirty filters, etc.).

SUPPLEMENTAL ELECTRIC HEAT

☐Turn off unit disconnect.

☐Check all electrical wiring for loose connections.

☐Check all wiring for damaged insulation.

☐Check amp draw as each heating element comes on.

☐Check total amp draw and record.

How to Use the Amprobe.

a. Release pointer by moving pointer lock button to left.
b. Turn rotary scale selector until highest current range appears in window.
c. Press trigger button to open jaws.
d. Encircle conductor with open jaws.
e. Release finger pressure on trigger to allow probe jaws to close about the conductor before attempting to read meter.
f. Read scale. If pointer indicates below 40 amps, set the rotary scale selector to the next lower range until a reading is obtained in the upper half of the scale.

1. Snap the amprobe around one hot lead in the heating unit vestibule. Set the amprobe so the face can be seen.
2. Turn on unit disconnect and watch the indicator on the amprobe. It should make a definite jump as each heating element comes on. The jumps should equal the number of elements in the furnace. For safety purposes, there is no need to touch the amprobe, which will be quite close to the fuse block.
3. Turn off unit disconnect and remove amprobe.
4. Replace unit panel.

NOTE: If all elements do not come on, there could be two possible causes.

1. One stage is bad.
2. The system has an outdoor thermostat which is holding out one or more elements.

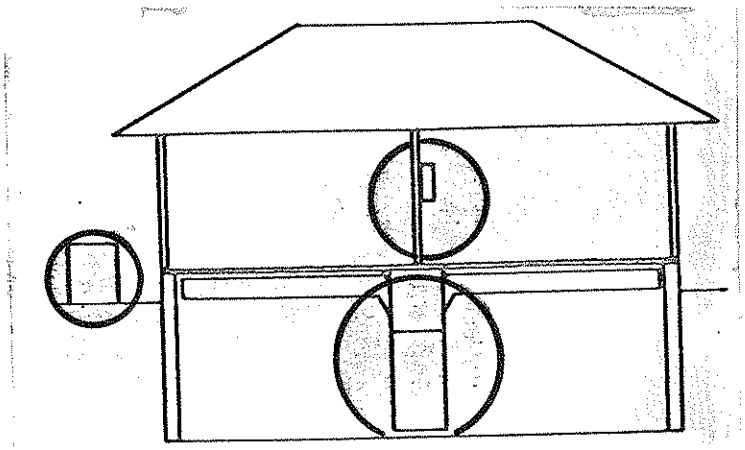
NOTE: There is no limit check for basic maintenance electric heat.

BASIC MAINTENANCE—HEAT PUMP

This section will cover the necessary steps to make a planned service call on a homeowner with a heat pump system. Two planned service checks are advocated each year. One would be a cooling check, the other a heating check. The check for cooling should be made when outdoor temperatures are above 70°F. The heating check should be made when outdoor temperatures are below 55°F.

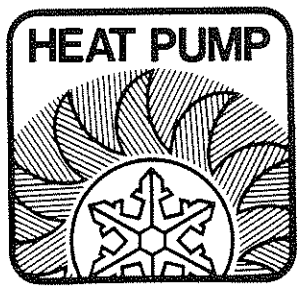
The check sheet is written in the sequence that the various checks should be performed on the maintenance call. The use of the check sheet will assure the serviceman that he has completed all the necessary checks in an efficient manner, saving steps as he goes along.

The service procedure for both heating and cooling is divided by the areas where components are normally located, example living area (thermostat), basement or utility room, (indoor unit). The final area is outdoors (outdoor unit). The check sheet has space to record the make and model of the indoor and outdoor units. If possible, the year of manufacture should also be determined. This information then becomes part of the permanent file in the dealer's office for possible future sales. The serviceman should also indicate whether the homeowner has other accessories such as a humidifier or electronic air cleaner. This is good information to aid in future sales.



CHECK SHEET—HEAT PUMP— HEATING

The heat pump check sheet for heating is similar to the cooling check sheet. Refer to the cooling check procedures just described and the Troubleshooting Procedures section for added reference.




DEALER_____ADDRESS_____

CUSTOMER_____ADDRESS_____

DATE_____PERSON_____ _____

EQUIPMENT MAKE AND MODEL_____

SERIAL NO._____DATE INSTALLED_____

NOTES_____

# HEAT PUMP DESIGN, INSTALLATION, AND START-UP CHECK LIST

This check list is designed to aid in the installation and maintenance of Bard heat pumps. NOTE: You must observe local codes and weather conditions which vary in different areas of the country.

## A. BUILDING CONSTRUCTION

- ☐ 1. Attic spaces are vented.
- ☐ 2. Ceilings have a minimum of 8" to 10" of insulation.
- ☐ 3. Cold walls have a vapor barrier and full wall insulation.
- ☐ 4. Floors over unconditioned spaces have 4" insulation batts. This includes heated spaces above garages.
- ☐ 5. Slabs have vertical or horizontal slab insulation per F.H.A. standard.
- ☐ 6. Crawl spaces are dry and the ground is covered with plastic for moisture control.
- ☐ 7. Exposed basement walls are to be firred out and insulated with batts or polystyrene.
- ☐ 8. All windows and outside doors are tight and have storm sash or thermopane double glazing.
- ☐ 9. All outside doors are weather stripped.
- ☐ 10. All fireplaces have dampers closed when not in use.

## B. OUTDOOR UNIT

- ☐ 1. Make sure the voltage requirements of the outdoor unit corresponds to the voltage available. Nameplate_____Actual_____
- ☐ 2. Check the outdoor unit's mounting for proper height for defrost drainage during winter operation.
- ☐ 3. Check the unit for level, squareness on its pad.
- ☐ 4. Check for a clean coil without crimped tubing.
- ☐ 5. Check fuses for proper size and type.
- ☐ 6. Check all electrical connections for tightness.
- ☐ 7. Should have power to the crankcase heater at least 60 minutes per ton or 4 hours, whichever is greater.
- ☐ 8. Check refrigerant connections for tightness and leaks.
- ☐ 9. Check fan for free turning.
- ☐ 10. Check the location, and properly set the outdoor thermostats to the calculated balance points of the heat loss calculations.
- ☐ 11. Check for refrigerant tubing that might be rubbing high pressure switch, capillary tube, etc.

*On retrofits be sure the blower wheel and blower compartment are clean.

## C. INDOOR UNIT

- ☐ 1. Check to make sure your indoor unit is a matching unit to the outdoor unit.
- ☐ 2. Check for proper sized heater and voltage.
- ☐ 3. Check all electrical connections for proper connection and tightness.
- ☐ 4. Check fan for free turning.
- ☐ 5. Check for proper speed tap on the fan motor to obtain required CFM.
- ☐ 6. Check for a clean coil that is installed properly.
- ☐ 7. Check for clean air filters in proper position and proper size.*
- ☐ 8. Check condensate drain pan for proper location and that the drain line is clear and contains a trap.
- ☐ 9. Check supply and return plenum attachment to the air handler for tightness and seal.
- ☐ 10. Check excess refrigerant tubing that there are no vertical loops or low spots for oil traps.

## D. AIR DISTRIBUTION SYSTEM

- ☐ 1. Have flexible duct connection for noise control.
- ☐ 2. All supply branches should have an accessible butterfly damper or good equivalent register damper for balancing purposes.
- ☐ 3. Visually inspect all ductwork for tight joints and proper installation. Have at least 100 square inches free area per ton for return plenum.
- ☐ 4. All ductwork in unconditioned spaces is insulated. (Cold basements, crawl spaces, attics, garages, knee wall areas, etc.)
- ☐ 5. With only the indoor fan on, adjust branch dampers for proper CFM air flow.
- ☐ 6. Check supply and return openings for squareness, proper distance from walls, ceilings and floors, adequate diffusion, and clear of furnishing obstruction.

## E. THERMOSTAT

- ☐ 1. Make sure you have the proper thermostat for the installation.
- ☐ 2. Check location for external heat or cold influence.
- ☐ 3. Check for level.
- ☐ 4. Visually inspect mercury bulbs for cracks and discoloration.
- ☐ 5. Check wiring connections for accuracy and tightness.
- ☐ 6. Check temperature indicator to a reliable source.
- ☐ 7. Check for drafts from stud space behind thermostat.
- ☐ 8. Check control circuit amperage:_____A
- ☐ 9. Check heating anticipator setting.

F. PUTTING THE UNIT INTO OPERATION

☐ 1. Leak test refrigeration connections.

☐ 2. With the thermostat "off" and power "on" to the system, manually put the fan switch on and check for operation.

☐ 3. Depending upon the outdoor temperature, start up the heat pump in the proper mode and allow it to stabilize if it has refrigerant in it.

☐ 4. Recheck power supply voltage.

a. Check voltage on both load and supply side of contactor with compressor running.

_____load _____line

b. Check amperage draw on compressor

_____nameplate_____actual

c. Check amperage draw on outdoor fan

_____nameplate_____actual

d. Check amperage draw on indoor fan

_____nameplate_____actual

☐ 5. Check refrigerant piping for vibrations, both outdoors and inside.

☐ 6. In the air conditioning mode, checking the refrigerant charge with the following reading:

a. Outdoor entering dry bulb temperature _____

b. Indoor return air dry bulb temperature _____

c. Indoor supply air dry bulb temperature _____

d. Indoor return air wet bulb temperature _____

e. Low side pressure _____

f. High side pressure _____

☐ 7. If the ambient outdoor temperature is above 20 degrees when checking charge:

a. Check charge with system performance tables.

b. Weigh in the proper charge (by nameplate) if there is any question.

☐ 8. If the ambient outdoor temperature is below 20 degrees when checking the charge:

a. Only accurate way is to dump the entire charge and weigh in proper amount. See installation instructions and/or nameplate for proper charge.

☐ 9. Manually put the unit into the defrost cycle from the heating mode and check for proper operation as to coil blockage on initiation with the temperature bulb at 32 degrees and a termination temperature of 57 degrees.

☐ 10. Checking the air flow on the indoor unit. On a heat pump, we would like to have 400 CFM per ton. See Bard specification sheet for exact CFM.

a. On air conditioning we would expect to have a temperature drop across the coil of 16 degrees. Higher than an 18 degree drop would indicate not enough air flow and a temperature drop of less than 14 degrees would indicate too much air flow.

The temperature drop is_____F

b. On any mode or only manual fan operation, you can use an incline gauge to take static pressure and refer to the appropriate fan performance chart to determine CFM static pressures.

1) Supply_____in.wc.

2) Return_____in.wc.

3) Total_____in.wc.

4) Static pressure drop_____in.wc.

_____cfm(dry coil)

c. The most accurate way of determining CFMs is to operate the system in the Resistance Heat mode. Use the following formula:

$$\text{AIR FLOW} = \frac{\text{OUTPUT (BTU)}}{\Delta T°F \times 1.08} = \_\_\_\_\_ \text{CFM}$$

Where the output is the measured voltage, times the measured amperage giving the wattage, wattage times 3.413 BTU/Watt or 3413 BTU/Kw gives output.

$\Delta T$ is the temperature increase across the air handler. Care must be taken on the discharge temperature that it is taken out of sight of the heaters to eliminate the radiant heat influence of the heaters.

1.08 is a sensible heat constant.

☐ 11. Check the thermostat for accuracy and calibration.

a. If the thermostat's accuracy is off but is constant, you can manually adjust the dials to the proper temperature.

b. If the calibration of the thermostat is off, you must replace it and check out the new one for proper operation.

☐ 12. With the first stage heat mercury bulb only made, you should have the heat pump operating but no heaters on.

When second stage heating makes, you should bring on whatever amount of heat W2 controls unless you have installed outdoor thermostats to hold off part of the heating elements.

☐ 13. First stage cooling will energize the contactor and bring on the compressor and outdoor fan.

☐ 14. Check your work areas to make sure you leave them clean and that all panels and screws have been refastened to the equipment.

☐ 15. Power ON before leaving.

G. CUSTOMER INFORMATION

☐ 1. Explain the operation of the equipment in each mode to the customer. Demonstrate how to put the system into resistance heat mode on the thermostat. Explain what the customer can expect when the unit goes into defrost. The outdoor fan stops, and when coming out of defrost, there will be a cloud of water vapor coming out of the unit. Also explain thermostat's functions, e.g., emergency heat switch and emergency heat light, compressor malfunction and need to call serviceman.

☐ 2. Explain the customer's responsibilities and maintenance requirements as to frequent checking of the air filters, oiling motors, checking belts, and foreign matter blockage of the coils. It should be emphasized that a yearly preventative maintenance service call could help avoid large future repair bills and extend the operating years of the equipment.

☐ 3. Homeowner's responsibilities as to keeping outdoor unit free of ice and snow accumulation, and to watch for iced up coil due to defrost malfunctioning.

☐ H. OWNER'S MANUAL LEFT WITH UNIT