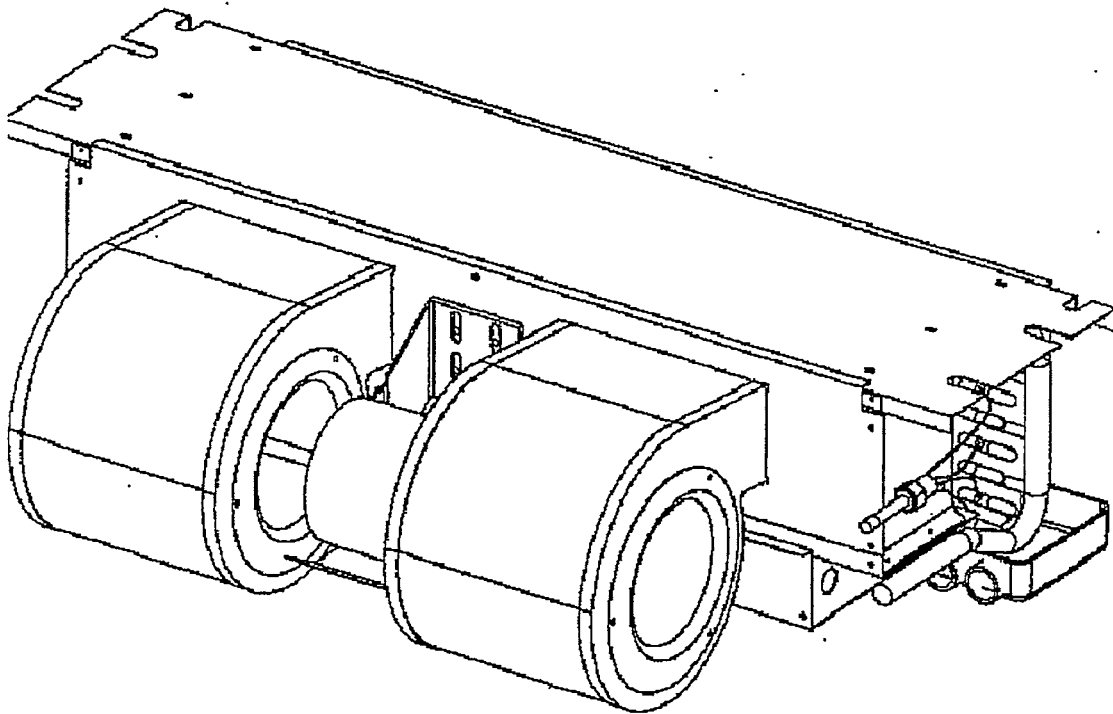


INSTALLATION & OPERATING INSTRUCTIONS



CEILING MOUNT AIR HANDLER AC SERIES



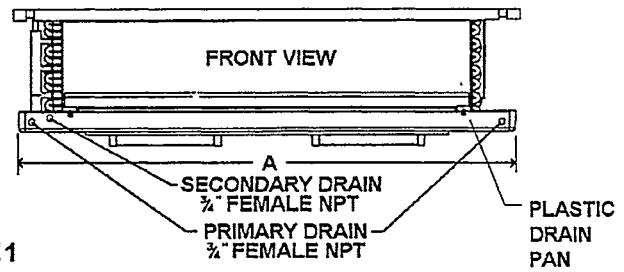
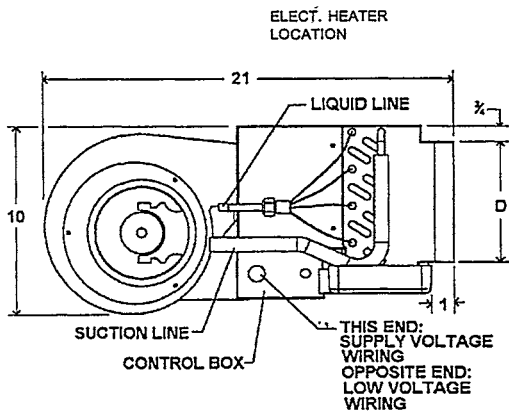
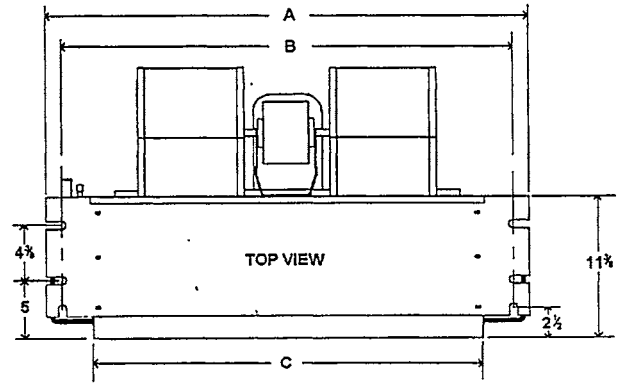
IO-162C

Made in the USA by:
Goodman Manufacturing Company, L.P.
2550 North Loop West Suite 400
Houston, Texas 77092

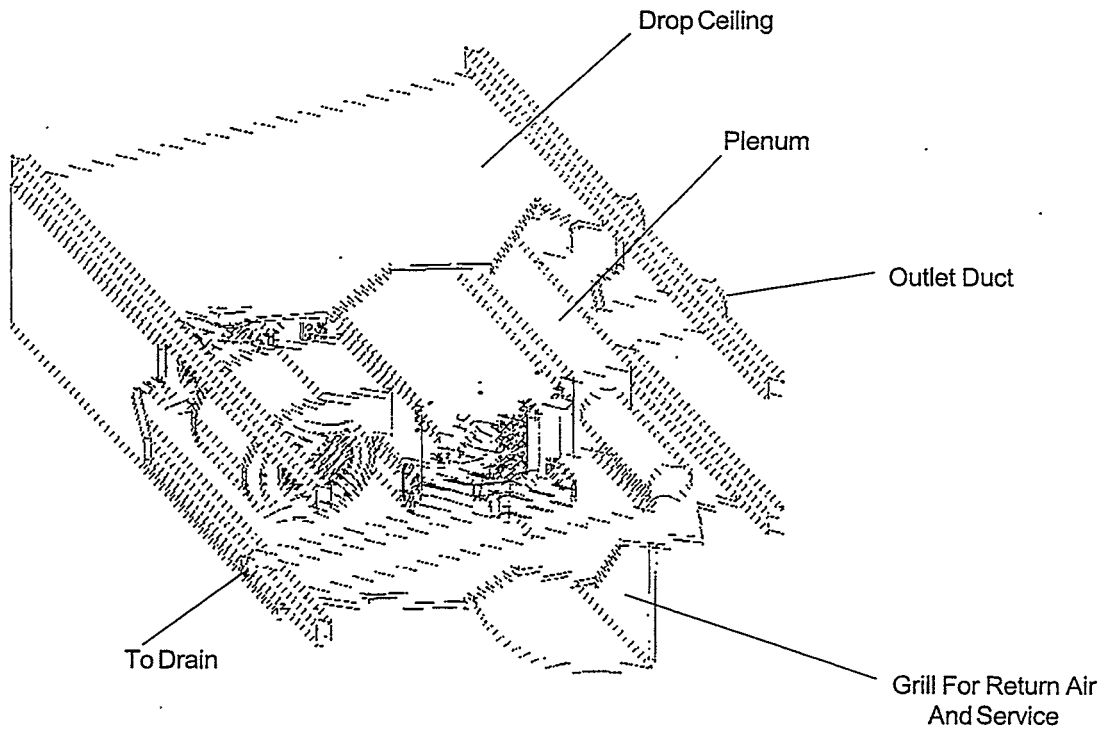
AC SERIES 4/02

Dimensions

| Model | A | B | C | D |
|-------|--------|----------|----|-------|
| AC 18 | 37 1/4 | 37 11/16 | 30 | 6 1/2 |
| AC 24 | 37 1/4 | 37 11/16 | 30 | 6 1/2 |
| AC 30 | 43 1/4 | 40 11/16 | 36 | 6 1/2 |
| AC 36 | 49 1/4 | 46 11/16 | 42 | 6 1/2 |



**FIGURE 1
LAYOUT FOR
AC 18, 24, 30, 36**



**FIGURE 2
DROP CEILING
INSTALLATION**

SPECIAL INSTRUCTIONS

This indoor coil contains the flowrator distributor assembly, which consist of a flare nut, distributor body, copper tubes feeding the coil, and the internal flow check piston. Reference the enclosed "Piston Sizing Chart" for mix-matching of outdoor/indoor units.

CHANGE THE PISTON

This coil is furnished with a flow control piston installed that matches the BTUH capacity of the coil. A piston size that is too small will cause starving and one that is too large will cause flooding. The following chart indicates the condensing unit capacity and the recommended piston size.

| MODEL | CONDENSING UNIT | | PISTON SIZE |
|-------|---------------------|-------------|-------------|
| | NOM. COOLING (BTUH) | PART NO. | |
| AC18 | 18,000 | BT 13690-04 | 52 |
| AC24 | 24,000 | BT 13690-01 | 59 |
| AC30 | 30,000 | BT 13690-05 | 65 |
| AC36 | 36,000 | BT 13690-06 | 71 |

If a combination is used that requires a piston size change, change the piston in the distributor on the indoor coil before installing the coil and follow the procedure shown below.

- Using a back-up wrench on the flare fitting, remove the 3/8" flare nut.
 - Using the back-up wrench on the distributor body, remove the 3/8" flare fitting and Teflon seal.
 - Using the wire provided with replacement pistons, run wire (hooked end) through hole in piston.
 - Hook nose end of piston and lift gently from distributor body.
 - Replace piston with one of proper size listed above, install piston with Teflon seal end of piston in distributor first. Do not force piston into distributor.
 - Replace 3/8" flare fitting with Teflon seal using back-up wrench on distributor body. Torque fitting with 8 to 10 ft. lb. Do not over tighten.
 - Replace 3/8" flare nut using back-up wrench on flare fitting. Torque 3/8" flare nut with 40 to 45 ft. lb.
 - Remove old piston size label from outside of distributor body. Remove new piston size label from poly bag new piston came in and install new size label on outside of distributor.
 - Check fitting for leaks after installation, evacuation and charging of the low side is complete.
- NOTE: With piston in distributor, seal end should be shown and should not be seen looking in end of distributor. Piston must be free to rotate and move up and down. Make sure piston is free to move in distributor body.

INTRODUCTION

WARNING: DO NOT CONNECT TO OR USE IN CONJUNCTION WITH THIS UNIT ANY DEVICES FOR THE PURPOSE OF SAVING ENERGY OR INCREASING OPERATING EFFICIENCIES, WHICH HAVE NOT BEEN TESTED AND APPROVED BY GOODMAN OR DESIGN CERTIFIED FOR USE WITH THIS UNIT. SERIOUS DAMAGE, REDUCED UNIT PERFORMANCE AND HAZARDOUS CONDITIONS MAY RESULT FROM THE USE OF DEVICES WHICH HAVE NOT BEEN APPROVED OR CERTIFIED BY GOODMAN.

This booklet contains the installation and operating instructions for your ceiling mount air handler. There are a few precautions that should be taken to derive maximum satisfaction from it. Improper installation can result in unsatisfactory operation or dangerous conditions and void the warranty. Read this booklet and any instructions packaged with accessories prior to installation. Give this booklet to the user and explain its provisions. The user should retain this booklet for future reference.

CHECKING PRODUCT RECEIVED

Upon receiving the unit, inspect it for any damage from shipment. Claims for damage, either shipping or concealed, should be filed immediately with the shipping company. Check the unit model number, specifications, **electrical characteristics, and accessories to determine if they are correct.**

ORDERING PARTS

When reporting shortages or damages, or ordering repair parts, give the complete unit model and serial numbers as stamped on the unit's nameplate. Order parts through your local contractor.

I. SPECIFICATIONS

A. GENERAL

These Ceiling mount air handlers are available in cooling capacities of 1.5, 2, 2.5 and 3 nominal tons of cooling. Electric heat models are available in capacities of 5, 8 and 10 KW.

The units are designed to be installed in a horizontal position above a dropped ceiling. **Units are not to be installed outside the structure. These models are designed for INDOOR USE ONLY.**

The information on the rating plate is in compliance with the FTC and DOE rating for single phase units in the U.S.A..

IMPORTANT: The United States Environmental Protection Agency (EPA) has issued various regulations regarding the introduction and disposal of refrigerants in this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. Because these regulations may vary due to the passage of new laws we suggest that any work on this unit be done by a certified technician. Should you have any questions please contact the local office of the EPA.

B. MAJOR COMPONENTS

The unit includes a evaporator coil with flowrator assembly, an indoor blower and all necessary internal electrical wiring. The cooling system of these units is factory-evacuated, charged and performance tested. Refrigerant amount and type are indicated on rating plate.

II. INSTALLATION

A. GENERAL

1a. **INSTALLATION** — This product is designed and manufactured to permit installation in accordance with National Codes. It is the installer's responsibility to install the product in accordance with National Codes and/or prevailing local codes and regulations.

1b. **PRE-INSTALLATION CHECK-POINTS** — Before attempting any installation, the following points should be considered:

Structural strength of supporting members
Clearances and provision for servicing
Power supply and wiring
Air duct connections
Drain facilities and connections

2b. **LOCATION** - These units are designed to be installed in a horizontal position above a dropped ceiling. The location of the unit should be based on thorough consideration of the **PRE-INSTALLATION CHECK POINTS**.

B. INSTALLATION

1. Before locating the unit on the dropped ceiling, make sure that the strength of the ceiling and beams is adequate at the point to support the weight involved. This is very important and installers responsibility. The following list shows approximate weight of unit.

| MODEL | WEIGHT (lb.) |
|-------|--------------|
| AC18 | 59 |
| AC24 | 59 |
| AC30 | 69 |
| AC36 | 79 |

2. The unit should be mounded on a horizontal position above a dropped ceiling of adequate strength (see Figure 2)

3. The location of the unit should provide proper access for inspection and servicing.

C. DUCTING

Duct work should be fabricated by the installing contractor in accordance with local codes. Industry manuals may be used as a guide when sizing and designing the duct system - such as NESCA (National Environmental Systems Contractors Association, 1501 Wilson Blvd., Arlington, Virginia 22209).

DO NOT, UNDER ANY CIRCUMSTANCES, CONNECT DUCT WORK TO ANY OTHER HEAT PRODUCING DEVICE SUCH AS FIREPLACE INSERT, STOVE, ETC. UNAUTHORIZED USE OF SUCH DEVICES MAY RESULT IN FIRE, CARBON MONOXIDE POISONING, EXPLOSION, PERSONAL INJURY OR PROPERTY DAMAGE.

This unit should be placed as close to the space to be air conditioned as possible. Adequate clearance must be maintained as indicated in Section F "Clearances". Ducts should be run as directly as possible to supply and return outlets. Use of non-flammable weatherproof flexible connectors on both supply and return connections at unit to reduce noise transmission is recommended.

D. FILTERS

Filters are not provided with unit, and must be supplied and installed in the return air system by the installer. A field installed filter grille is recommended for easy and convenient access to the filters, for periodic inspection and cleaning. Filters must have adequate face area for the rated air quantity of the unit. The minimum filter size is 20" x 20" x 1".

E. CLEARANCES

These units are U.L. listed for installations with zero clearance to combustible materials, reference should be made to the marking on the particular unit being installed where specific information regarding clearances is provided. Access must be provided for servic-

ing the unit. If these units are installed in a removable ceiling panel, ample space must be provided for servicing the unit.

III. PIPING CONDENSATE DRAIN

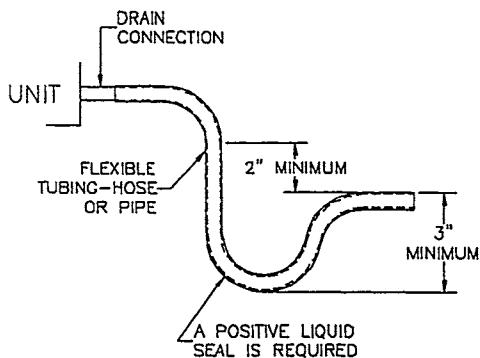


FIGURE 3

The condensate drain connection of the evaporator is a half coupling of 3/4" N.P.T. A trap must be provided to have proper condensate drainage. See Figure 3.

Install condensate drain trap as shown. Use 3/4" drain connection size or larger. **Do not operate without trap. Unit must be level or slightly inclined toward drain.**

TABLE 1

BRANCH CIRCUIT COPPER WIRE SIZE
(Base on 1% Voltage Drop)

| | | | | | | | | | |
|--|-----|----|----|----|----|----|----|----|----|
| SUPPLY WIRE TW (60C) LENGTH - FEET | 200 | 6 | 4 | 4 | 4 | 3 | 3 | 2 | 2 |
| | 150 | 8 | 6 | 6 | 4 | 4 | 4 | 3 | 3 |
| | 100 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 |
| | 75 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 |
| | 50 | 14 | 12 | 18 | 10 | 8 | 8 | 6 | 6 |
| | | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| BRANCH CIRCUIT AMPACITY | | | | | | | | | |

NOTE: (Wiring for unit only, no heat kit installed)

- Wire size based on 60°C rated wire insulation and 30°C Ambient Temp. (86°F).
- For branch circuit wiring (main power supply to unit disconnect), the minimum wire size for the length of run can be determined from Table 2 using the circuit ampacity found on the unit rating plate. From the unit disconnect to unit, the smallest wire size allowable in Table 2 may be used, **as the disconnect must be in sight of the unit.**
- For more than 3 conductors in a raceway or cable, see the N.E.C. for derating the ampacity of each conductor.

IV. ELECTRICAL WIRING GENERAL

All wiring should be made in accordance with the National Electrical Code in the U.S.A. Determine the availability of sufficient power to operate the unit. The voltage at the power supply should be checked to make sure it corresponds to the unit's RATED VOLTAGE REQUIREMENT. Wire sizes should be determined from the unit nameplate ampacity and in accordance with Table 1, the National Electrical Code. Under no circumstances should wiring be sized smaller than is recommended by either of these two sources.

The unit must be permanently grounded in accordance with local codes, or in the absence of local codes, with the N.E.C. ANSI/NFPA NO. 70-1987 or latest edition in the U.S.A. To wire units, make the following high and low voltage connections at either location.

1. High Voltage Wiring:

These units are designed for Single phase 208/230 Volt only, two leads should be connected to terminals L1 and L2 on the breaker in the electrical control section, using wire sizes specified in table 1.

2. Low Voltage Wiring: See Figure 4 for cooling unit with electric heat, Figure 5 for heat pump with electric heat.

Connect 24V. wires from the thermostat to the corresponding wires in control box using No. 18 AWG as follows:

| LEAD | THERMOSTAT | NOTES |
|-------|------------|------------------------------------|
| PINK | R (24V) | - |
| GREEN | G (FAN) | - |
| - | Y | TO CONDENSING UNIT 24V CONNECTIONS |
| WHITE | W | - |
| BLUE | - | TO CONDENSING UNIT 24V CONNECTIONS |
| BROWN | E | TO BE USED FOR EMERGENCY HEAT ONLY |

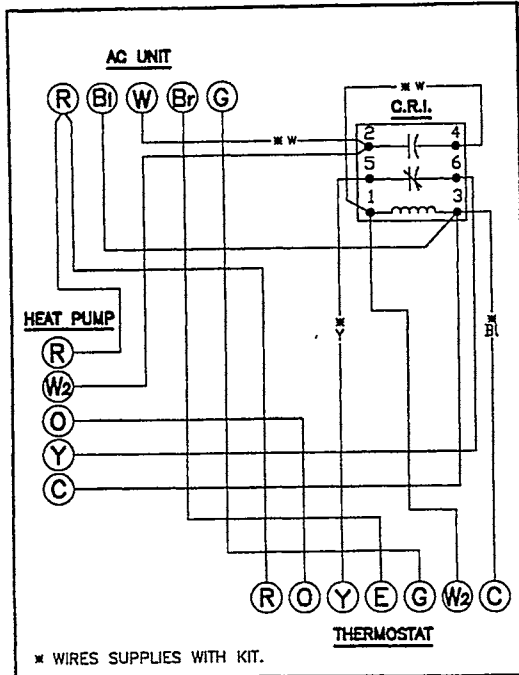


Figure 4

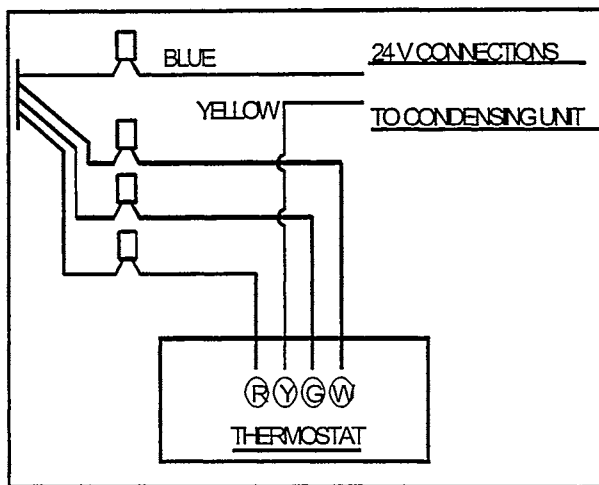


Figure 5
 Electrical Installation Diagram For Cooling
 Electrical Installation Diagram For Heat pump
 unit with Electric Heat.
 With Electric Heat.

NOTE: In case of heat pump failure, switch to "E" on T'stat for emergency heat.

3. Internal Wiring
 A diagram of the internal wiring of this unit is located under the electrical box cover. If any of the original wire as supplied with the appliance must be replaced, the wire gauge and insulation must be same as original wiring.
4. Transformer is factory wired for 230 volts on 208/230 volt models. See wiring diagram for 208 volt wiring. For 208V operation, move the white transformer lead from 240V to 208V tap.

| MODEL | THERMOSTAT HEAT ANTICIPATOR SETTING |
|------------------|-------------------------------------|
| AC18, 24, 30, 36 | 2 |

MAINTENANCE

- 1) **Room Thermostat** - This is the device that controls the operation of your heating and/or cooling unit. It senses the indoor temperature and signals the equipment to start or stop maintaining the temperature you have selected for your comfort. The room thermostat should be in a central, draft free inside wall location for best operation. Do not place any heat producing apparatus such as lights, radio, etc., near the thermostat as this will cause erratic operation of the comfort system.
- 2) **Air Filter(s)** - All central air moving comfort systems must include air filter(s). These filters will be located either in the equipment or in the return air duct system upstream of the equipment. The filter(s) removes dust and debris from the air thus helping to keep your conditioned space clean. More important, the filter keeps dust and debris from collecting on heat transfer surfaces thus maintaining optimum equipment efficiency and performance. Inspect and clean or replace filters every month. This routine maintenance procedure will pay big dividends in reduced operating cost and reduced service expense. Never operate comfort equipment without filter(s).
- 3) **Fuses and/or Circuit breakers** - This comfort equipment should be connected to the building electric service in accordance with local and National Electric codes. This electrical connection will include over current protection in the form of fuses or circuit breakers. Have your contractor identify the circuits and the location of over current protection so that you may be in a position to make inspections or replacements in the event the equipment fails to operate. Keep replacement fuses of the proper size on hand.

WARNING

- a) **Do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance so as to prevent the risk of property damage or personal injury.**
- b) **Have your contractor point out and identify the various cut-off devices, switches, etc., that serve your comfort equipment. There is a switch that will cut off energy to your heating system. Know where they are so that you may cut off the flow of energy in the event of overheating.**
- 4) **Periodic Checkup and Service-** This product is designed to provide many years of dependable, trouble-free comfort when properly maintained. Proper maintenance will consist of annual checkups and cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic checkup and cleaning can result in excessive operating cost and/or equipment malfunction.

TROUBLESHOOTING CHART

WARNING: DISCONNECT ALL POWER TO UNIT BEFORE SERVICING

| SYMPTOM | POSSIBLE CAUSE | REMEDY |
|---|---|--|
| High head-low suction | a. Restriction in liquid line or capillary tube | a. Remove or replace defective component |
| High head-high or normal suction | a. Dirty condenser coil b. Overcharged c. Condenser fan not running | a. Clean coil b. Correct system charge c. repair or replace |
| Low head-high suction | a. Incorrect capillary tube b. Defective compressor valves | a. Replace evaporator assembly b. Replace compressor |
| Unit will not run | a. Power off or loose electrical connection b. Thermostat cut off calibration set too high c. Defective contactor d. Blown fuses or tripped breaker e. Transformer defective f. High or low pressure control open (Optional) g. Compressor overload contacts open | a. Check for unit voltage at contactor in unit b. Reset c. Check for 24 volts at contactor coil replace if contacts are open d. Replace fuse or reset breaker e. Check wiring-replace transformer f. Reset high pressure control or check unit charge High pressure control opens at 425psi Low pressure control opens at 25psi g. Replace compressor NOTE: Wait at least 2 hours for overload to reset |
| Condenser fan runs, compressor does not | a. Loose connection b. Compressor stuck, grounded or open winding/open internal overload c. Low voltage connection | a. Check for unit voltage at compressor check and tighten all connections b. Wait at least 2 hours for overload to reset if still open, replace the compressor c. At compressor terminals, voltage must be within 10% of nameplate voltage when unit is operating |
| Low suction-cool compressor | a. Low indoor airflow | a. Increase speed of blower or reduce restriction-replace air filters |
| Compressor short cycles | a. Defective overload protector b. Unit cycling on low pressure control | a. Check for correct voltage/replace overload b. Check refrigerant charge and airflow |
| Registers sweat | a. Low airflow | a. Increase speed of blower or reduce restriction-replace air filters |
| High suction pressure | a. Excessive load b. Defective compressor | a. Recheck load calculation b. Replace |
| Insufficient cooling | a. Improperly sized unit b. Improper airflow c. Incorrect refrigerant charge d. Incorrect voltage | a. Recalculate load b. Check (should be approximately 400 cfm/ton) c. Charge per unit service panel d. At compressor terminals, voltage must be within 10% of nameplate voltage when unit is operating |
| Evaporator coil freezing or frosting | a. Low airflow b. Low refrigerant charge c. Operating unit in cooling mode below 65 degrees F outdoor temperature | a. Check (should be approximately 400 cfm/ton), dirty air filters, all duct outlets open b. Properly charge unit c. Install or check low ambient control, should be open below 65 degrees F outdoor temperature |



1850



1851

1852

