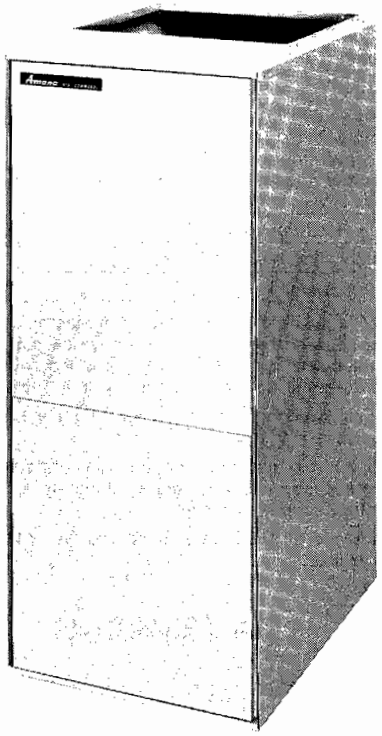
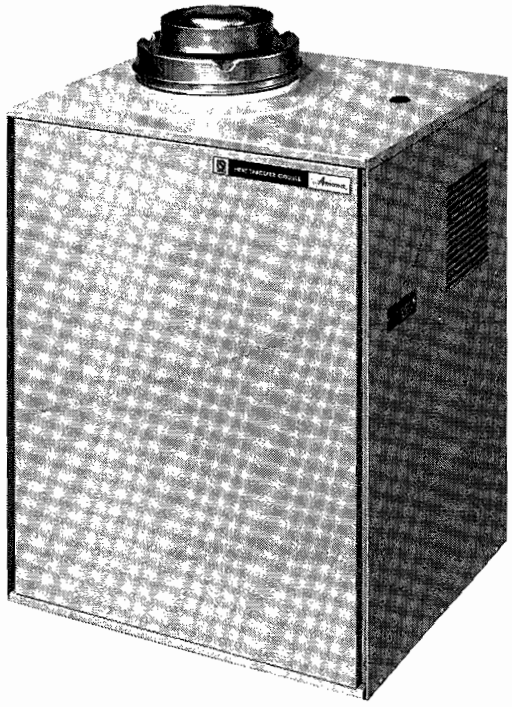
# NOTE TO THE INSTALLER: LEAVE THIS BOOKLET WITH THE OWNER

# Old INSTALLATION INSTRUCTIONS



INDOOR UNIT



OUTDOOR SECTION

## IMPORTANT — PRECAUTIONS

It is Owner's responsibility to provide the following:

1. Electrical connections — All electrical connections to be properly sized with overcurrent devices and conductor wires in accordance with the National Electrical Code, Canadian Electrical Code Standard CSAC221 and all existing local codes.
2. Gas connections — All gas connections to meet the National Fuel Code ANSI Z223.1-1974 and Z223.1a-1978 (NFPA54) or Canadian Gas Association Manual B-149-1 Installation Code for Gas Appliance must be followed in installing the gas piping.
3. Solution connections — All solution connections are to provide a continuous loop from the Amana Outdoor Section, to the Amana Indoor Section, and/or Amana Hot Water Tank, or both.
4. Hot water tank must not be used for or contain materials that are caustic, corrosive or flammable, and must be compatible with copper and polyethylene. Pressure must not exceed 100 psi.

## IMPORTANT NOTE TO THE OWNER

**It is important that you fill out the owner's registration card and mail it today. When filling in the registration card, be sure to include the Model, Manufacturing and Serial Numbers, plus the installation date.**

**Your warranty certificate is also supplied with the unit. Read the warranty carefully and note what is covered. Keep the warranty certificate in a safe place, so you can find it, if necessary.**

**If additional operating instructions are required, call the dealer through whom the purchase was made.**

**Keep these instructions for future reference.**

## IMPORTANT NOTE TO THE INSTALLER

**Before installing this unit please read this manual to familiarize yourself on the specific items which must be adhered to such as maximum external static pressure to unit, air temperature rise, min. or max. cfm and motor speed connections.**

**Affix these instructions, parts list and the Owners Information Manual adjacent to the indoor section.**

**NOTICE:** It is the Owners and Installer's responsibility to locate this equipment so as to provide safe and adequate access for future maintenance and service.

Printed in U.S.A.

Part No. A34144-2
Rev. 2

# SPECIFICATIONS

| Model ERGW0012-1A Outdoor Section<br>Mfg. No. P68191-1F | |
|---|---|
| Heating Max. BTUH Input<br>Heating Capacity BTUH** | 120,000<br>98,200 |
| Heating Capacity Input<br>Heating Capacity BTUH** | 100,000*<br>83,700 |
| Heating Min. BTUH Input<br>Heating Capacity BTUH** | 80,000<br>67,700 |
| Pump and Combustion Blower Motor H.P./RPM<br>Pumping Rate, GPM @ 21' Water Head | 1/5/3300<br>9 |
| Ignition — Ignitor Warm Up, Seconds<br>Lock Out Timing, Seconds | 45<br>15 |
| Temperature Rise Range °F | 60-90 |
| Heating solution required, with indoor section only and 60' of ⅞" OD pipe, gals.<br>(50% Ethylene Glycol and Distilled Water) | Approx.<br>5.5 |
| Heating solution required, with indoor section, water heater and 60' of ⅞" OD pipe, gals.<br>(50% Propylene Glycol and Distilled Water) | Approx.<br>6.5 |
| Gas Connection Male IPS | ½" |
| Electrical Data — 60 Hertz (a)<br>Voltage, Single Phase<br>Maximum Over Current Protection, Amps<br>Maximum Input Amps<br>Wire — Number and Minimum Size (AWG)<br>Ground Wire, AWG (Chassis Ground) | <br>115<br>15<br>8.1<br>(2) 14<br>(1) 14 |
| Shipping Weight, Approximate Pounds | 92 |
| Net Weight, Approximate Pounds | 83 |

| Model EBWC3612M-A, Indoor Section<br>Mfg. No. P68192-1F | |
|---|---|
| Heating Coil Face Area Square Feet<br>Rows Deep<br>Fins/inch<br>Tube O.D. inches | 3.06<br>3<br>16<br>⅜ |
| Air Circulating Blower Wheel — Quantity<br>Diameter x Width, Inches, Bore " | 1<br>10 x 7, ½ |
| Blower Motor, Direct Drive (With Oil Ports)<br>Type<br>Number Speeds | ⅓<br>PSC<br>3 |
| External Static Pressure Inches<br>Water Column | Min. .20<br>Max. .50 |
| Air Temperature Rise Range °F | 60-90 |
| Electrical Data — 60 Hertz (a)<br>Voltage Single Phase<br>Maximum Input Amps<br>Wire — Number and Minimum Size (AWG)<br>Ground Wire AWG | <br>115<br>9.7<br>2 — 14<br>1 — 14 |
| Optional Filter Rack Permanent (b) | 27⅝" x 21¾" x 1" |
| Shipping Weight, Approximate Pounds | 152 |
| Net Weight, Approximate Pounds | 140 |

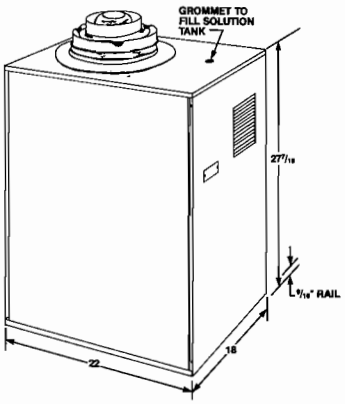
a. IMPORTANT — While the above data is presented as a guide, it is important to electrically connect properly size overcurrent devices and conductor wires in accordance with the National Electrical Code Canadian Electrical Code Standard CSAC221 and all existing local codes.

b. Filter is not supplied with unit, however, a filter(s) must be installed in the return air system.

*Input as shipped from factory with natural gas orifice plate. Unit may be rerated with factory supplied orifice plates. Unit may be field converted for LP Gas, with factory supplied orifices.

**Amana tests based on DOE test procedures. See nameplate for CGA certified output ratings.

## DIMENSIONS



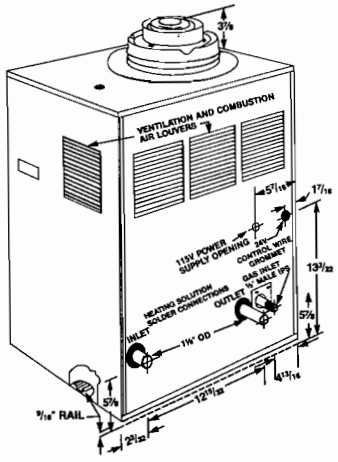
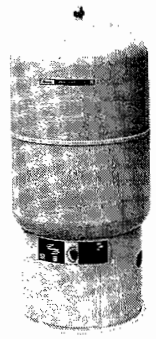




FIGURE 1

NOTE: ADJUST 1⅛ PIPE STUBS SO THEY PROTRUDE OUTWARD 2" BEFORE MAKING CONNECTIONS.



OPTIONAL HOT WATER TANK

FIGURE 4

### HOT WATER TANK CLEARANCE

| Operational | Service |
|---|---|
| Sides: 1" | 12" to |
| Front: 1" | access |
| Rear: 1" | opening |
| Top: 6" | of panels |

### OUTDOOR UNIT CLEARANCE

**Minimum**
Front: 36"
Sides: 6"
Rear: 12"
Top: Un-obstructed, 36"
Roof overhang permissible.

## DIMENSIONS

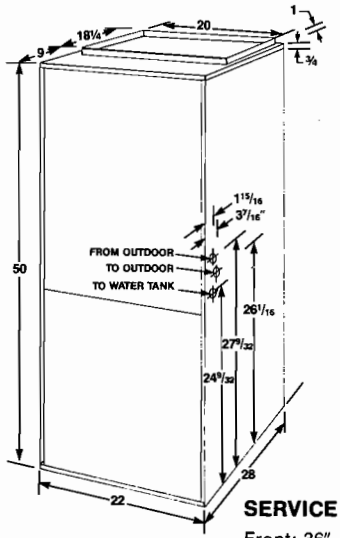



FIGURE 2

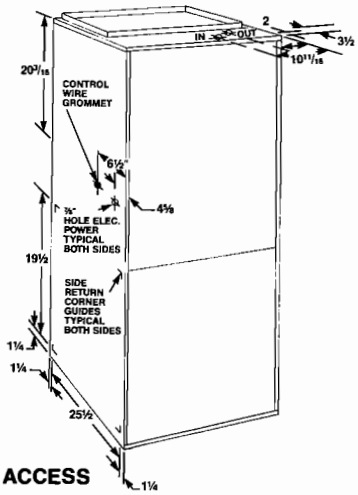



FIGURE 3

### SERVICE ACCESS

Front: 36"
Sides: 12"
Rear: 0"

Operational clearance 0" on all sides, top, bottom and duct work.

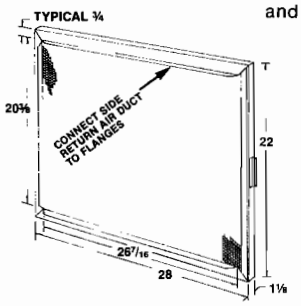
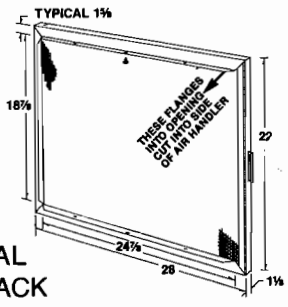



FIGURE 5




OPTIONAL FILTER RACK

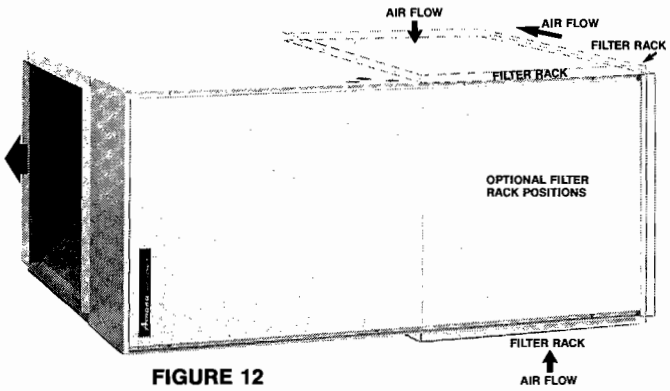



**FIGURE 12**
**HORIZONTAL AIR FLOW LEFT**

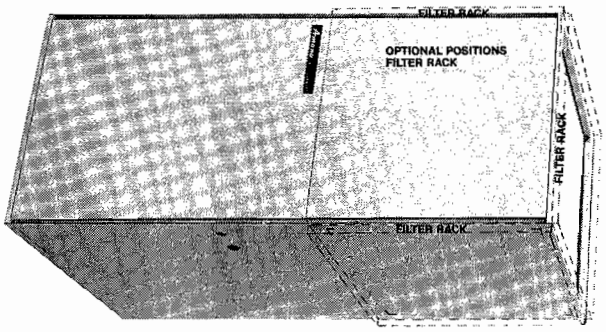



**FIGURE 14**
**HORIZONTAL WITH DOORS ON TOP**

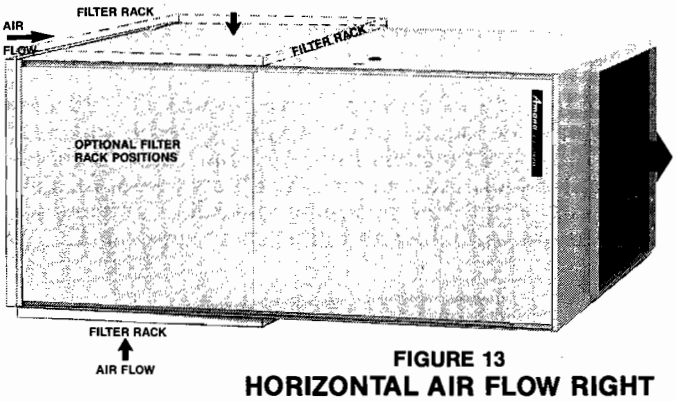
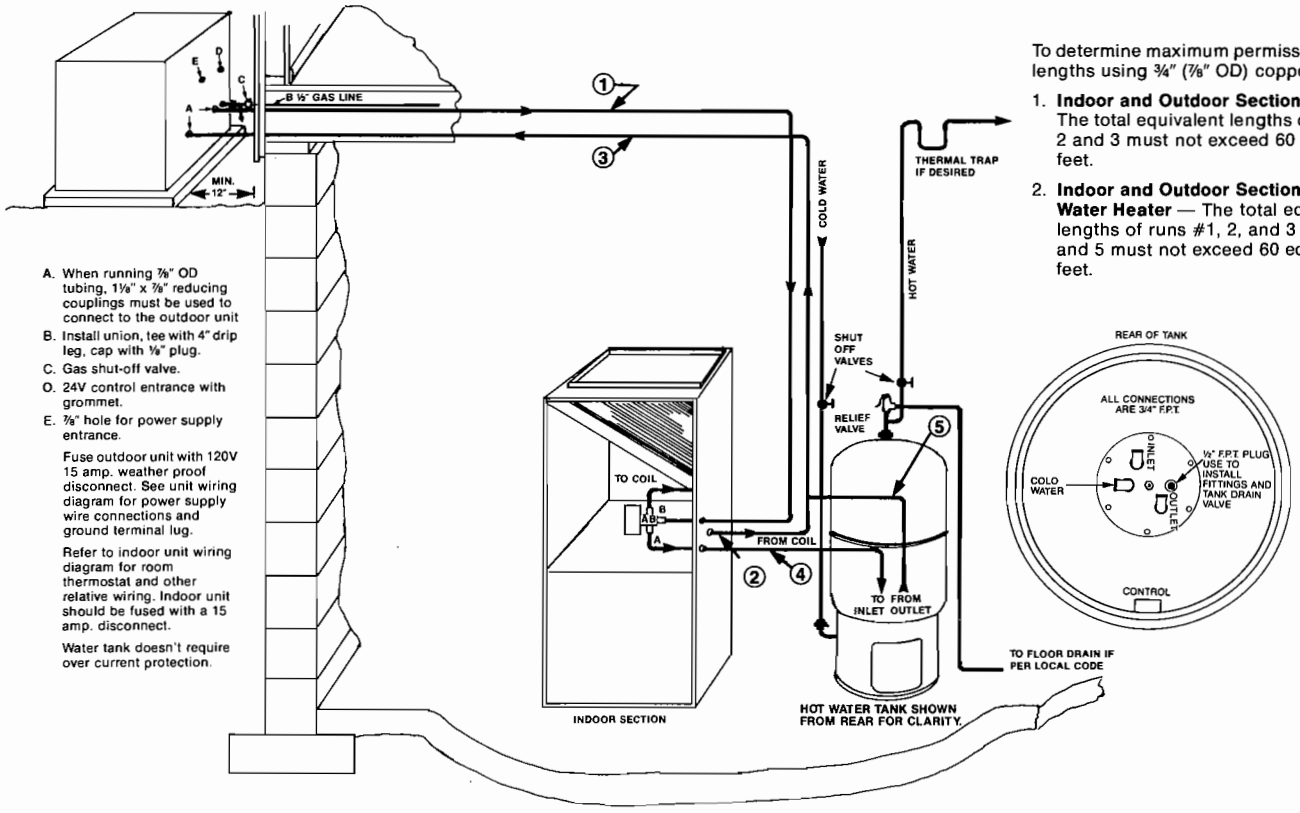



**FIGURE 13**
**HORIZONTAL AIR FLOW RIGHT**




A. When running ⅞" OD tubing, 1⅛" x ⅞" reducing couplings must be used to connect to the outdoor unit
B. Install union, tee with 4" drip leg, cap with ⅛" plug.
C. Gas shut-off valve.
O. 24V control entrance with grommet.
E. ⅞" hole for power supply entrance.

Fuse outdoor unit with 120V 15 amp. weather proof disconnect. See unit wiring diagram for power supply wire connections and ground terminal lug.

Refer to indoor unit wiring diagram for room thermostat and other relative wiring. Indoor unit should be fused with a 15 amp. disconnect.

Water tank doesn't require over current protection.

To determine maximum permissible piping lengths using ¾" (⅞" OD) copper:

1. **Indoor and Outdoor Sections Only** — The total equivalent lengths of runs #1, 2 and 3 must not exceed 60 equivalent feet.
2. **Indoor and Outdoor Sections Plus Hot Water Heater** — The total equivalent lengths of runs #1, 2, and 3 or #1, 3, 4 and 5 must not exceed 60 equivalent feet.

## HEATING SOLUTION PIPING

The heating solution piping should be made up with 7/8" OD (3/4") copper tubing and long sweep sweat elbows. Easy flow or equal solder may be used. Do not use silfos, silver solder or equal high temperature melting solders on the diverter valve connections.

The solution piping may be brought into the indoor air handler from both sides through knock-outs provided.

For an installation without the hot water heater, a restrictor pipe is provided with the air handler. Refer to the following pictures for upflow and counter flow installations.

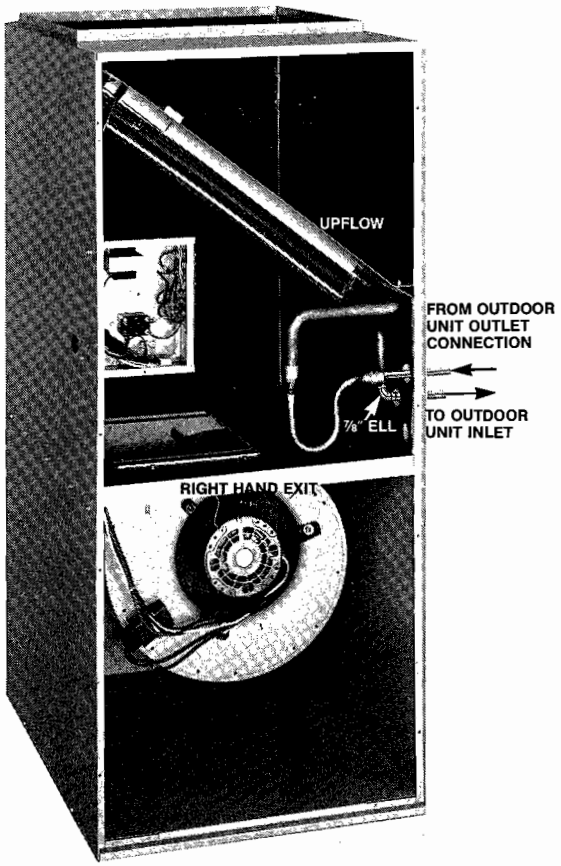



FIGURE 16

When the restrictor is used in the system (without hot water tank) in a counterflow system, it may be installed as shown in Figure 17.

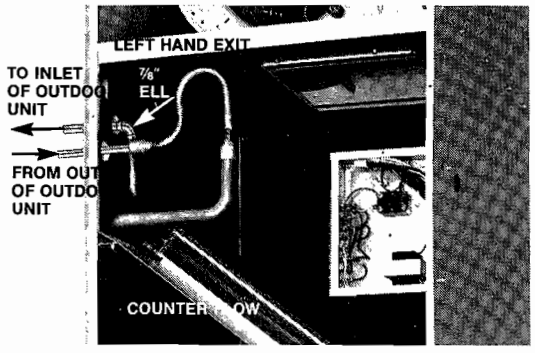



FIGURE 17

The following illustrations show how the diverter valve is installed in the indoor air handler.

The 7/8" ID (3/4") (C) elbow is not furnished with the unit. The diverter valve is provided with the hot water tank. Tail pieces are not furnished and must be field fabricated with sweat elbows as required.

**CAUTION:** Before any heat is applied to the diverter valve, set the manual opener lever to MAN. OPEN. This will protect the plug inside the valve by removing it from the heat. See Figure 18.

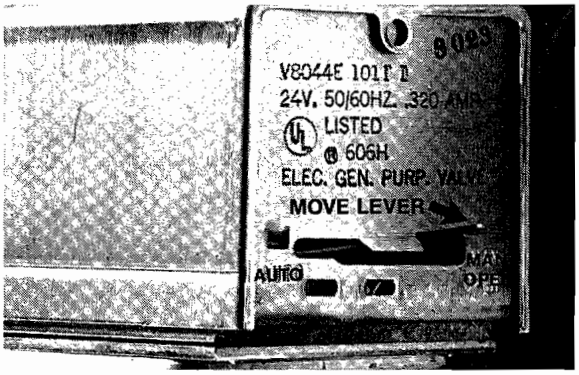



FIGURE 18

Refer to body of diverter valve, letters B, AB and A. They must be located as shown in Figure 19. Tail piece D (not furnished) installs into AB. Tail piece E (not furnished) installs into opening A. Elbow C (not furnished) onto coil outlet. Extend piping to outdoor unit and water tank as shown below and illustration on page 5.

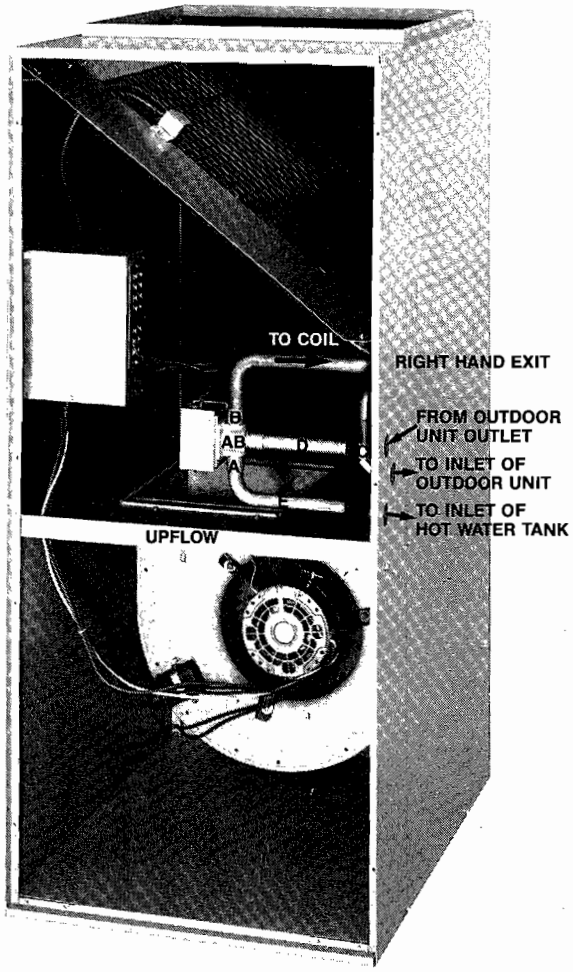



FIGURE 19

Refer to Figure 20 and 21 for right hand exit with restrictor tube and left hand exit piping for the diverter valve.

## DESCRIPTION

The Remote HTM® Plus System is a unique means of heating which supplies warm air through a duct system and having the option of also supplying domestic hot water. The gas heating unit is installed outdoors and, therefore, no indoor flue is required. A glycol solution heated in the HTM (Heat Transfer Module) is pumped through tubing to an indoor air handling unit which consists of a finned tube coil and blower to supply warm air through a duct system. A valve may be installed which will divert the heating glycol solution to a finned tube coil immersed inside a hot water tank to heat domestic tap water.

## RECEIVING

Upon receipt of the unit, the equipment should be inspected for any damage which may have occurred in transit. If damage is obvious, it should be noted on the carrier's freight bill and a request for inspection and settlement of claim made at once. Units are usually shipped F.O.B. and it is the consignee's responsibility to file damage claims.

## VENT CAP SEAL

Silicon RTV (Room Temperature Vulcanizing) Sealant should be used to fill gaps between flue cap, wrapper, and O rings, if required. Inspect after assembly to determine that all gaps have been sealed. Leaks can be detected by placing an inspection mirror below flue cap seal. The mirror is then moved around perimeter of flue cap. Look for fogging of mirror due to warm moist flue products striking the cooler mirror.

## LOCATION

The outdoor unit should be installed on a concrete slab at least 2″ larger than the unit on all sides. The front should be unobstructed for 36″ to allow for service clearance. Side clearances are 6″ minimum and the rear should face the building. 12″ minimum clearance is recommended for making piping connections. There must be no obstructions above the unit. A 36″ roof overhang is permissible, but avoid locating unit under house vents. Unit should be located at least 4 ft. from window or door. (FIG. 6)

Side and rear louvers must be unobstructed to assure adequate combustion and ventilation air. Adequate clearance around combustion air openings must be maintained.

Gutters or deflectors must be installed on the roof to prevent water from shedding on the unit.

The location of the outside unit should be picked to provide the most direct piping to the indoor air handler and the optional water heater. Consult the National Fuel Gas Code ANSI Z223.1-1980 for additional information regarding installation location.

## GAS CONNECTIONS AND PLUMBING

Local codes and the National Fuel Code ANSI Z223.1-1974 and Z223.1a-1978 (NFPA54) or Canadian Gas Association Manual B-149-1 Installation Code for Gas Appliance must be followed in installing the gas piping. Use a pipe joint compound resistant to both natural and liquified petroleum gases. Remove protective cap from ½″ IPS nipple and install a ground joint union, then a nipple, tee, plus a 4″ nipple with the lower end capped to make a drip leg. See sketch below. Galvanized pipe and fittings are not recommended.

The drip leg is important to prevent foreign matter and condensate from entering the gas valve. The cap may be removed to drain condensate from the line and drip leg.

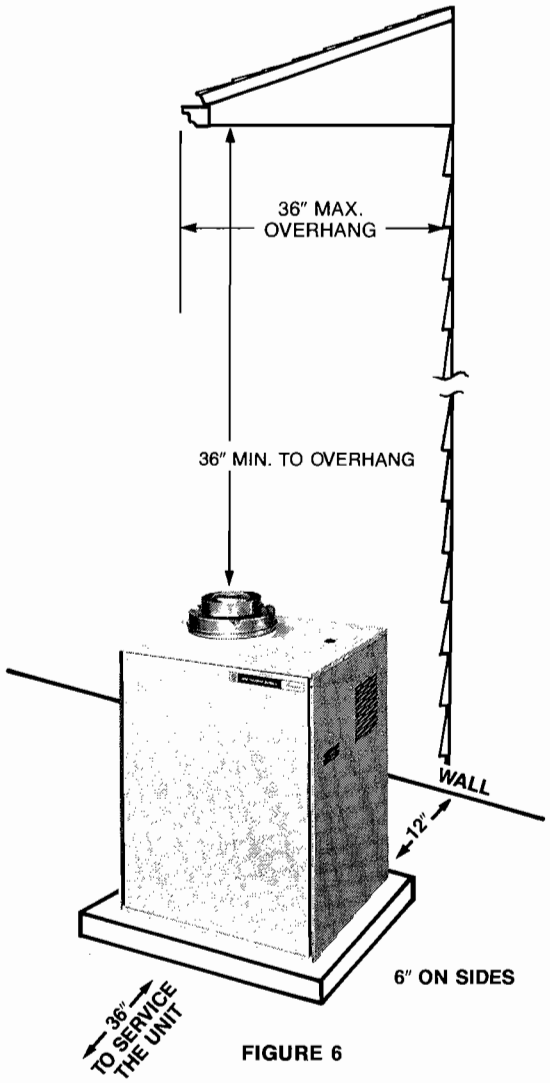
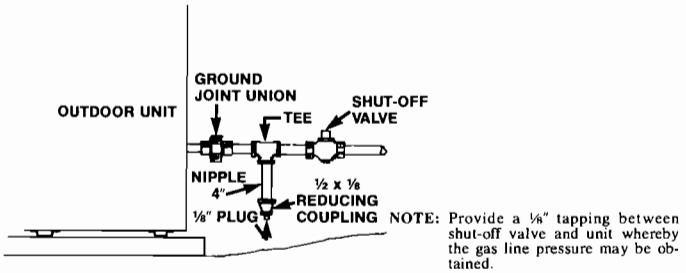



FIGURE 6




| INLET GAS PRESSURE | | |
|---|---|---|
| NATURAL | NORMAL 7″ | MIN. 4.0″, MAX. 10.5″ |
| PROPANE | NORMAL 11″ | MIN. 11″, MAX. 13.0″ |

FIGURE 7

The shut off valve should be located in a convenient location (within (6) six feet of unit) between the meter and the unit. Proper sizing of gas piping depends on the cubic feet per hour of gas flow required, specific gravity of the gas and the length of the run. Lay out the piping plan and refer to the code manual to obtain the correct pipe sizing for each branch run, etc.

## NOTE — IMPORTANT:

When installing the gas piping to the unit, be sure to hold the nipple extending out of the rear of the unit with a

pipe wrench. This will prevent the unit nipple and gas valve from rotating or causing undue strain on the combustion blower and motor.

## UNIT CONVERSION FOR L.P., TANKS AND PIPING

The unit referred to in this manual is shipped for operation on natural gas. To operate the unit on L.P., a conversion orifice plate must be installed. The re-rating air/gas orifice plates for natural gas and conversion plates are factory supplied with the unit. See unit instruction plate or "FUEL AND INPUT SELECTION" section for information regarding changing air/gas orifice plates.

All L.P. gas installations must conform to the safety standards of the National Board of Fire Underwriters (See NFPA Manual 58) or in Canada with Canadian Gas Association Manual B-149.1.

For satisfactory operation, the L.P. gas pressure must be 11 inch W.C. at the unit valve inlet under full load. Maintaining proper gas pressure depends on three main factors:

1. Vaporization rate, which depends on (a) temperature of the liquid, and (b) "wetted surface" area of the container or containers.
2. Proper pressure regulation. (Two-stage regulation is recommended from the standpoint of both cost and efficiency.)
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size required will depend on length of pipe run and total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and L.P. gas suppliers.

Please refer to the following illustration for typical L.P. gas installations.

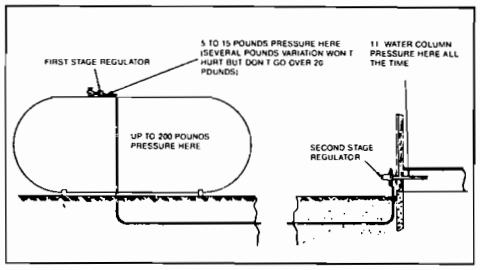



**FIGURE 8**

*Line Sizes, Tank Regulator To Building Regulator (10# Pressure)

| FLOW RATE | | COPPER TUBING (OD) | | | SCHEDULE 40 IPS | | |
|---|---|---|---|---|---|---|---|
| BTUH | CFH | ⅜" | ½" | ¾" | ⅜" | ½" | ¾" |
| 75,000 | 30 | 320' | | For pressure drop of 1 PSI | | | |
| 100,000 | 40 | 192' | | | | | |
| 125,000<br>150,000 | 50<br>60 | 128'<br>89' | | | | | |
| 175,000<br>200,000 | 70<br>60 | 68'<br>53' | 286' | | | | |
| 250,000 | 100 | 36' | 190' | | | | |
| 300,000 | 120 | 26' | 136' | | 255' | | |
| 400,000 | 160 | 15' | 80' | 270' | 147' | | |
| 500,000 | 200 | 9' | 55' | 160' | 98' | 300' | |
| 750,000 | 300 | | 26' | 69' | 49' | 145' | |

**FIGURE 9**

*Line Sizes Second Regulator to Appliance(s) (11" W.C.)

| FLOW RATE | | COPPER TUBING (OD) | | | SCHEDULE 40 IPS | | | |
|---|---|---|---|---|---|---|---|---|
| BTUH | CFH | ½" | ⅝" | ¾" | ½" | ¾" | 1" | 1¼" |
| 75,000 | 30 | 34' | 121' | 287' | 205' | 300' | | |
| 100,000 | 40 | 19' | 68' | 162' | 115' | 209' | | |
| 125,000 | 50 | 12' | 44' | 104' | 74' | 153' | | |
| 150,000 | 60 | 8' | 30' | 72' | 51' | 117' | | |
| 175,000 | 70 | | 22' | 53' | 38' | 75' | | |
| 200,000 | 80 | | 17' | 40' | 29' | 52' | | |
| 250,000 | 100 | | 11' | 26' | 18' | 29' | 251' | |
| 300,000 | 120 | | | 18' | 13' | 8' | 174' | |
| 400,000 | 160 | | | 10' | | | 98' | |
| 500,000 | 200 | | For pressure | | | | 63' | 247' |
| 750,000 | 300 | | drop of .55" wc | | | | 28' | 110' |

*These two tables are meant to be a guide line.
For further information refer to ANSI Z223.1-1974 and Z223.1a-1978, NFPA 54, or in Canada, to CGA B-149.2 Manuals.

## INDOOR UNIT AND WATER TANK LOCATION

The indoor unit and water tank must not be located more than 15 feet vertically above or below the outdoor section. The indoor air handler can be positioned horizontally, upflow or counterflow. **If in a horizontal or counter flow position, the blower motor must be rotated in its mount to position the oilers to the top for proper oiling.**

Place the indoor air handler unit in a location or position to meet the duct requirements. See duct sizing and installations section. Installation may be made at zero clearance from combustible material; however, access to the front panels must be provided to service the blower and controls.

The appliance shall not be installed directly on carpeting, tile or other combustible material, other than wood flooring.

If a water heater is to be installed either now or at a future date, allow room for installation on either side of the air handling unit.

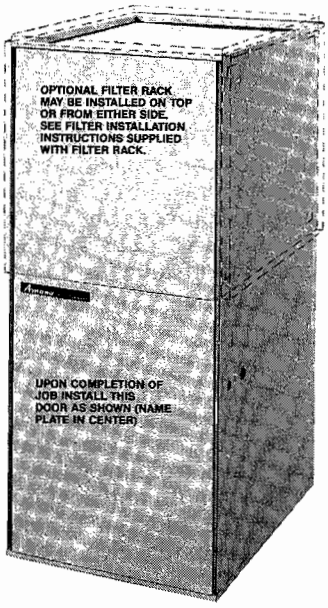
The water heater tank should be located in an area which will not be exposed to freezing temperatures.

The installation of the hot water tank must be accomplished in such a manner that if the tank or tank connection(s) should leak, the leakage flow of water or heating solution will not cause damage to the adjacent area or to the lower floors of the structure.

A suitable drain pan may be installed under the water heater tank when such locations can't be avoided. The drain pan may be 1½ inches deep and have a minimum length and width of at least 2 inches greater than the hot water heater tank's diameter. The drain pan should have ⅞" OD (¾") drain pipe and it should be piped to an adequate drain as per local code.

The optional filter rack may be installed as shown on the following sketches. See filter installation instruction.


**UPFLOW**
**FIGURE 10**




**COUNTER FLOW**
**FIGURE 11**

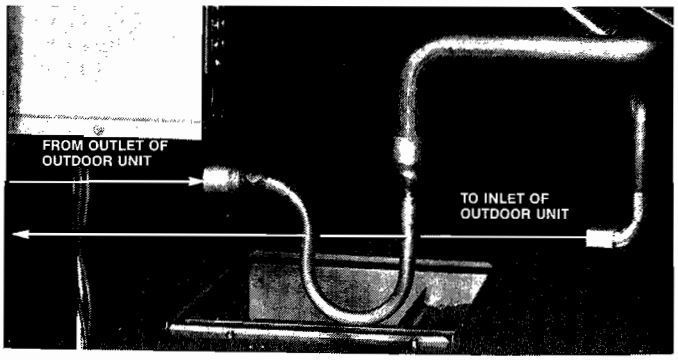



FIGURE 20

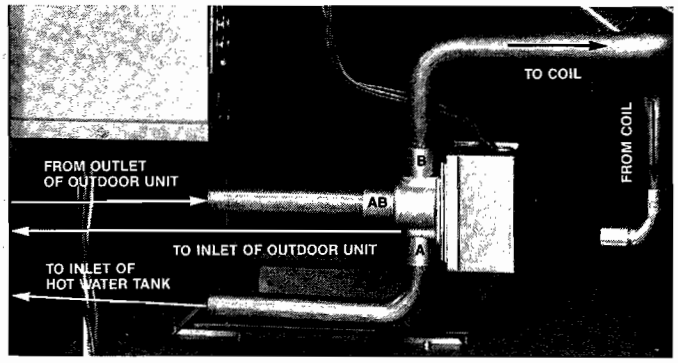
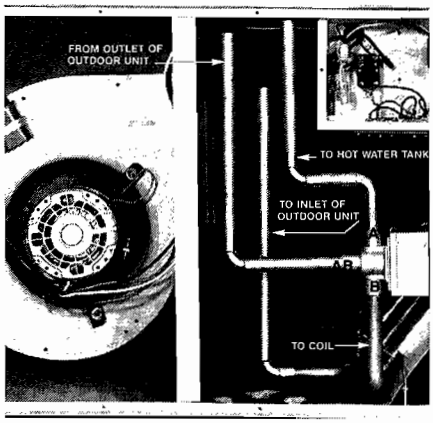
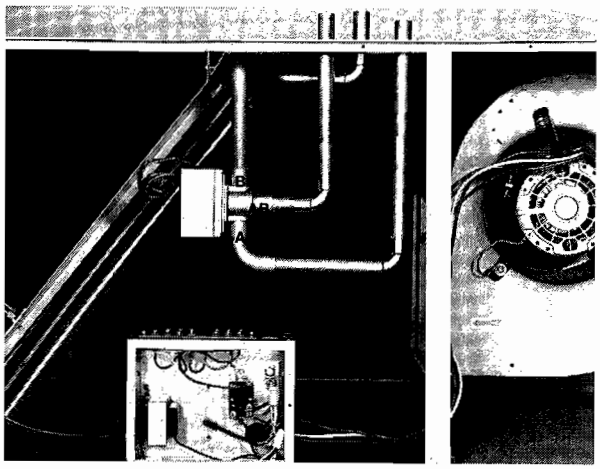



FIGURE 21

Refer to Figure 22 and 23 in relation to installing the diverter valve in the indoor air handling unit in the horizontal position. The diverter valve must be installed in vertical piping. Refer to page 6 regarding precautions.




RIGHT HAND AIR FLOW FIGURE 22




LEFT HAND AIR FLOW FIGURE 23

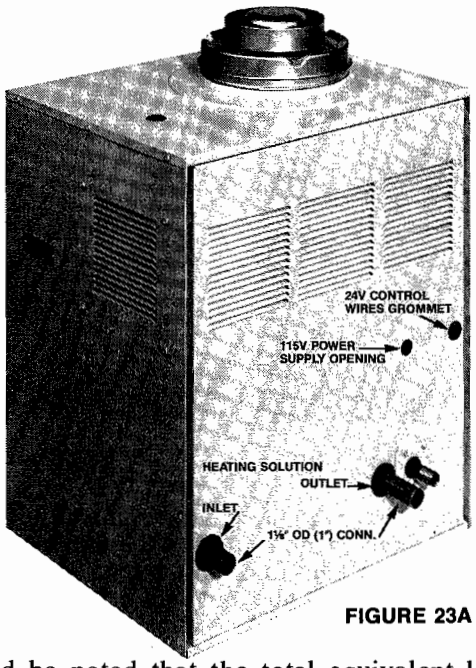



FIGURE 23A

It should be noted that the total equivalent length of supply and return piping must not exceed 60 feet and 15 feet of rise. All elbows should be the long radius type. Each elbow is equal to 1.25 feet of ⅞" OD (¾") pipe, a ⅞" tee is equal to 2 feet of pipe. For example: if eight elbows are used, then the actual length must not exceed 50 feet.

It will be necessary to use 1⅛" OD (1") tubing if 60 feet of pipe is not sufficient to complete the installation. ALWAYS MAKE A PIPING LAYOUT SO THE PIPING SIZE CAN BE DETERMINED PRIOR TO THE INSTALLATION.

**NOTE:** Before the solution piping is connected to the outdoor units, the two stubs must be adjusted to protrude 2" out of the cabinet. This dimension is factory set; however, the dimension can be greatly changed during shipping to its final destination.

The inlet and outlet heating solution connections on the outdoor unit are 1⅛" MALE OD (1"). When using ⅞" OD (¾") copper tubing a 1⅛" x ⅞" reducing coupling must be used to inter-connect to the ⅞" OD piping, refer to Figure 15 for a TYPICAL PIPED SYSTEM.

If a water heater is to be installed, refer to the installation instructions supplied with tank. **NOTE:** All external solution piping to the indoor, outdoor units and to the water heater tank must be insulated (⅜" wall Rubatex or equal).

## ELECTRICAL CONNECTIONS

Refer to page 2 regarding the location for the 115V and 24V control wires, openings or knockouts. See Figure 23A for outdoor unit connection openings. The indoor and outdoor units should be protected by a 15 amp overcurrent protection device. The outdoor should have a weather proof disconnect adjacent to the unit and a flexible liquid tight conduit run through the opening shown in Figure 24. Termination of the flexible conduit must be made with a connector to the opening provided in the rear of the control panel box. See "A" Figure 24. Size and run the three conductors (black, white and ground) to black and white wires and equipment ground lug as indicated in Figure 24. The 24V control wires should enter the outdoor unit through the rubber grommet. Wiring must be weather proof. (Conduit or 4 wire weather proof cable.)

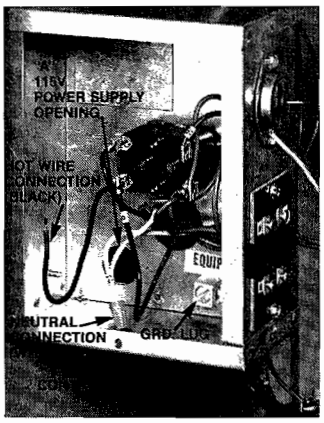



FIGURE 24

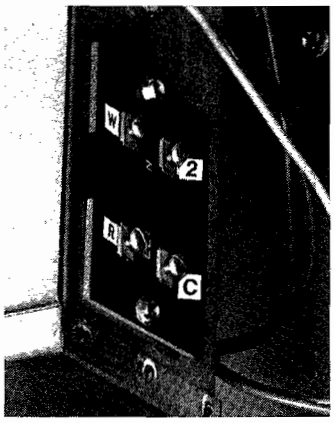



FIGURE 25

To electrically connect the indoor unit from the 15 amp (115V) disconnect switch, refer to the dimension sketch on page 2 for the entrance knockout. Enter the unit through the desired knockout and inter-connect with flexible conduit to open "A" Figure 26. Connect the hot side to the black wire and the neutral to the white wire. The equipment ground wire must be connected to ground lug.

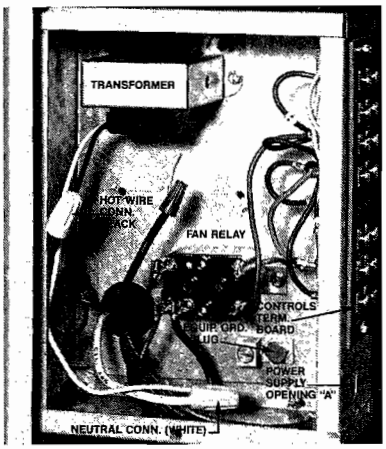



FIGURE 26

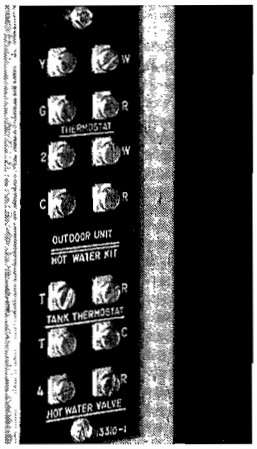



FIGURE 27

The unit wiring diagram(s) include the installation of the water heater. The junction box is located adjacent to the cold water inlet. See unit wiring adjacent to the cold water inlet. See unit wiring diagram to determine the terminals to which the two wires from the water heater have to be connected to in the indoor air handling unit.

**NOTE:** All 24V control wiring may be run with 18 gauge (min.) wires. The wiring diagram shown is a complete control system including air conditioning. If a system is applied for heating only (indoor and outdoor units) a heating only thermostat may be used and connected as shown below.

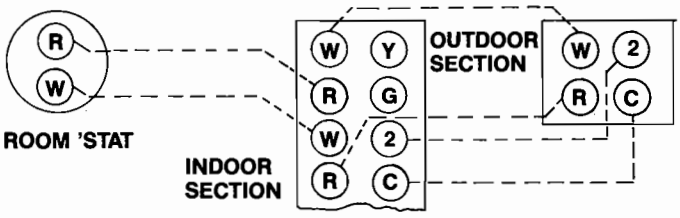



FIGURE 28

**NOTE:** The information shown in the ELECTRICAL CONNECTION section is only presented as a guide. It is important to electrically connect the units, properly size fuses or overcurrent protection devices and wires in accordance with the National Electric Code, ANSI/ NFPA No. 70-1981 and/or all existing local codes.

Field wiring shall conform with the temperature limitation for type T wire (63°F rise).

## ROOM THERMOSTAT
## (single stage cool and heat or heating only)

The room thermostat must be located in the space to be air conditioned. It should be approximately 5 feet above the floor and must not be subjected to cold or warm air from the supply grilles or exposed to the sun or superficial heat and undue vibration. Please refer to the installation instructions of the room thermostat for more explicit information.

## ROOM THERMOSTAT HEAT ANTICIPATOR

The heat anticipator in the room thermostat must be adjusted to obtain the proper number of heating cycles per hour. Set as called out on the unit wiring diagram. (Normal .8, information on wiring diagram takes precedence.)

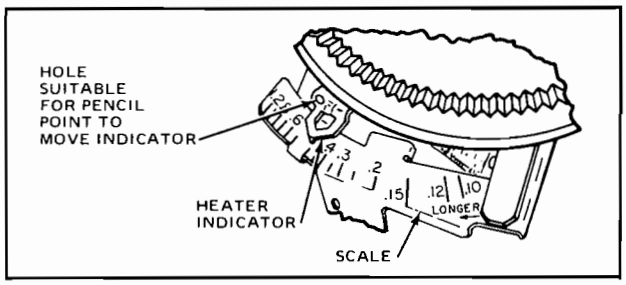



FIGURE 29

## DUCT SYSTEM SIZING

Use a recognized standard method for calculating heat loss and heat gain, room by room, as a basis for designing the duct system. ARI 230, NESCA Manual J, or the ASHRAE Guide and Data Book illustrate such methods.

The maximum external static pressures which may be applied, supply and return air ducts, grilles etc, are as shown on page 2.

The following general considerations should be taken into account:

1. The units should be as close as possible to those areas which are to be conditioned.
2. If fibrous glass ductwork is used, it must be U.L. approved as a Class 1 Air Duct with a minimum wall thickness of 1" and a 3¼ pound density.
3. Other recommendations for proper ductwork design and installation are as follows:

**NOTE:** It is not recommended that two indoor units discharge the supply air into a common duct. Each unit should have its own supply and return air duct system.

a. When ducts have insulation internally, the duct size must be increased by the two thicknesses of insulation. All seams and joints shall be airtight, smooth fitting and taped.

b. No abrupt increases, decreases, offsets or 90° turns without turning vanes.

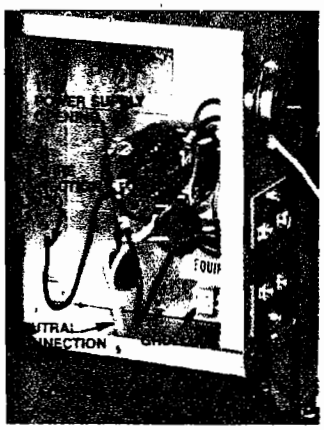


FIGURE 24

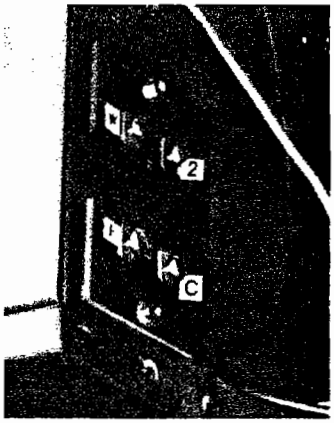


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FIGURE 26

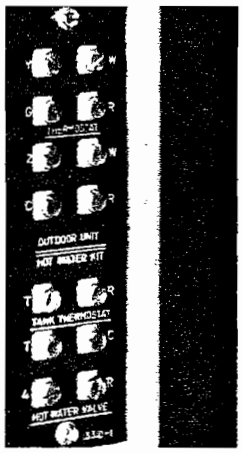

FIGURE 27

The unit wiring diagram(s) include the installation of the water heater. The junction box is located adjacent to the cold water inlet. See unit wiring adjacent to the cold water inlet. See unit wiring diagram to determine the terminals to which the two wires from the water heater have to be connected to in the indoor air handling unit.

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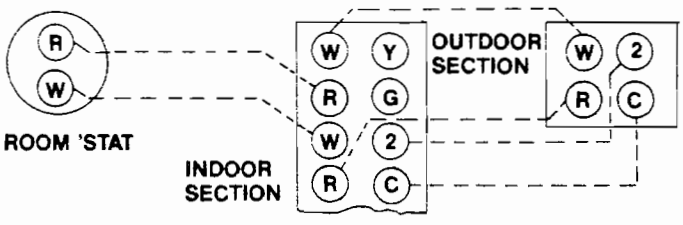


FIGURE 28

NOTE: The information shown in the ELECTRICAL CONNECTION section is only presented as a guide. It is important to electrically connect the units, properly size fuses or overcurrent protection devices and wires in accordance with the National Electric Code, ANSI/ NFPA No. 70-1981 and/or all existing local codes.

Field wiring shall conform with the temperature limitation for type T wire (63°F rise).

## ROOM THERMOSTAT
### (single stage cool and heat or heating only)

The room thermostat must be located in the space to be air conditioned. It should be approximately 5 feet above the floor and must not be subjected to cold or warm air from the supply grilles or exposed to the sun or superficial heat and undue vibration. Please refer to the installation instructions of the room thermostat for more explicit information.

## ROOM THERMOSTAT HEAT ANTICIPATOR

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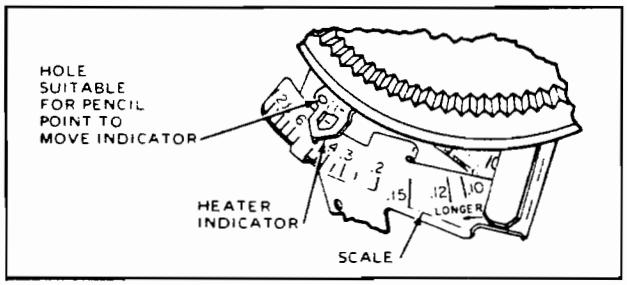



FIGURE 29

## DUCT SYSTEM SIZING

Use a recognized standard method for calculating heat loss and heat gain, room by room, as a basis for designing the duct system. ARI 230, NESCA Manual J, or the ASHRAE Guide and Data Book illustrate such methods.

**The maximum external static pressures which may be applied, supply and return air ducts, grilles etc. are as shown on page 2.**

The following general considerations should be taken into account:

1. The units should be as close as possible to those areas which are to be conditioned.
2. If fibrous glass ductwork is used, it must be U.L. approved as a Class 1 Air Duct with a minimum wall thickness of 1" and a 3¼ pound density.
3. Other recommendations for proper ductwork design and installation are as follows:

**NOTE: It is not recommended that two indoor units discharge the supply air into a common duct. Each unit should have its own supply and return air duct system.**

a. When ducts have insulation internally, the duct size must be increased by the two thicknesses of insulation. All seams and joints shall be airtight, smooth fitting and taped.

b. No abrupt increases, decreases, offsets or 90° turns without turning vanes.

c. Large ducts shall not have dimensions whereby the larger dimensions are greater than 4 times the shorter dimensions. Stiffening of ducts should have standing seams or additional reinforcing angles.

d. Air velocities in main ducts for residential application should not exceed 1000 FPM and for branches 800 FPM.

e. Branch ducts must have volume control dampers, with outside locking devices, to allow the system to be properly balanced. Be sure to use proper take-off fittings for branch runs.

f. Supply and return air grilles must be of sufficient size, number and location to prevent objectionable drafts, plus providing balanced air circulation.

g. Supply and return air branch ducts shall have a minimum dimension of 6" round or equal.

h. All ductwork must be supported with metal straps to prevent sagging.

6. A vinyl coated fireproof cloth connection should be employed on both the supply and return air duct at the unit.

7. The duct installation and airflow must be adjusted to obtain a temperature rise within the range specified on the unit rating plate. See specifications in relation to minimum and maximum external static pressures.

## DUCTWORK INSULATION

Indoor supply and return ducts exposed to near outdoor temperature must be insulated with a minimum of 2" fiberglas or equal. Ductwork exposed to the outdoor elements must have two inches of insulation and a weatherproof barrier.

Inside ductwork within the conditional space may be insulated with ½" fiberglas internally or externally with a vapor barrier.

Vapor barriers, such as aluminum foil, or equal, shall lap a minimum of three inches at all longitudinal and butt joints. These joints must be securely sealed and stapled. All punctures, tears, or imperfections in vapor barrier must be patched with same material and adhesive.

Ductwork in or below a slab floor must be completely encased in not less than 2 inches of concrete and shall be insulated and vapor-sealed in addition to the slab perimeter insulation. Insulation shall be a minimum of 1", one pound density, fiberglas or equal.

All insulating must be performed in a workmanlike manner and installed in a fashion as recommended by the manufacturer of the insulation and vapor barrier manufacturer.

## GLYCOL HEAT TRANSFER SOLUTION

**NOTE:** The system must be charged with a glycol heat transfer solution.

If the water heater tank is in the system, a **propylene** glycol solution MUST be used. Inhibited propylene glycol is available from the manufacturer of the units, Chemical Supply Houses or Recreational Vehicle dealers where it is used for winterization of water systems for storage. It is available under various trade names such as Dowfrost, UCAR Foodfreeze 35, Solarguard, etc. This is very low in toxicity, being acceptable for *use* in the food processing industry. If a water heater is not in the system, an ethylene glycol solution may be used (without anti-leak additive).

De-ionized distilled water should be used to formulate the solution. A 50% by volume solution can be used down to (minus) −25°F for propylene glycol and (minus) −30°F with ethylene glycol. If colder temperatures are apt to be encountered, especially if the system is shut down for any extended period of time, the solution may be increased to 55% glycol.

## SOLUTION CHARGING PROCEDURE

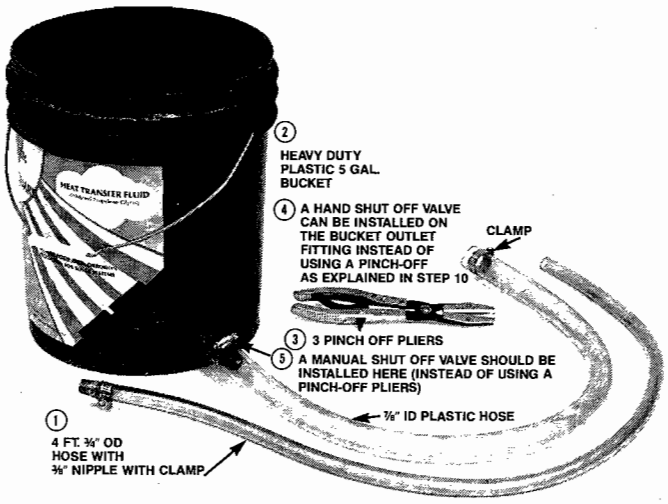



**FIGURE 30**

Figure 30 illustrates the items which are required to charge the system with glycol solution.

1. Four feet of transparent ¾" OD hose with a ⅜" nipple secured with a hose clamp.
2. A heavy duty five gallon plastic bucket with a shut-off valve and four feet of ⅞" ID hose attached with a fitting near the bottom. **NOTE:** A six foot long hose may be used to siphon over the top of the bucket. (Not recommended.)
3. Three pairs of pinchoff pliers. (KD No. 45) or equal.
4. Six inches of 18 gauge jumper wire.
5. Sufficient glycol and distilled water to fill the system. See page 2 for approximate quantity.

Proceed as follows:

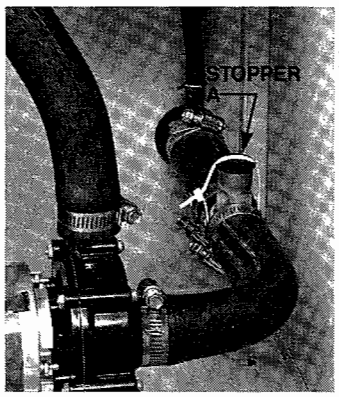



**FIGURE 31**

1. Disengage both indoor and outdoor electrical disconnect switches.
2. Remove the stopper A from the charging tee and attach the hose from the bucket with the hose clamp. See Figure 31.
3. Remove the flue cap, sound ring and the plug from the top of the module plus the plastic plug from the top of the cabinet. See Figure 32. Remove the rubber grommet from the top of the plastic expansion tank.

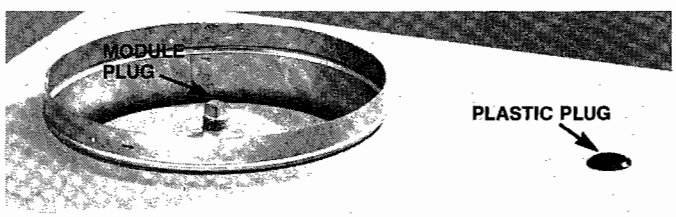



**FIGURE 32**

4. Install the ¾" hose with the ⅜" nipple in the module plug opening. Insert the hose in opening of cabinet top and down through the opening in the expansion tank. Hose end should be half ways down in the tank and pointing towards the side wall.

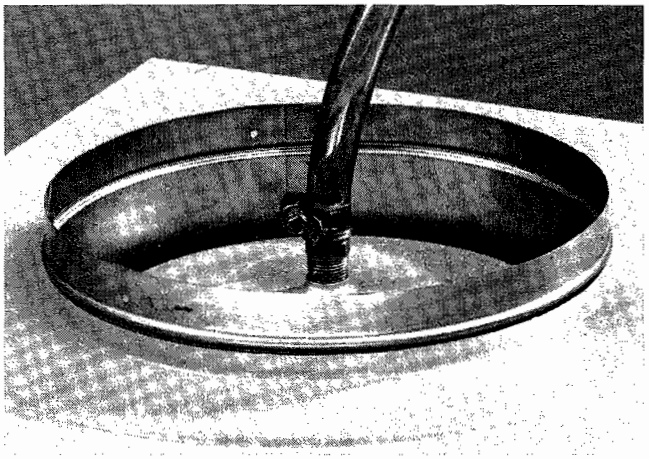


FIGURE 33

5. Disconnect the electrical wire plug from the ignition module and tape the end of this plug. Cover the gas valve with plastic sheeting to prevent any glycol solution from spilling onto it. See Figure 36.

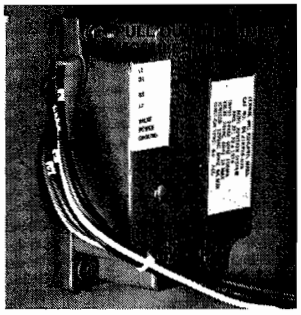


FIGURE 34

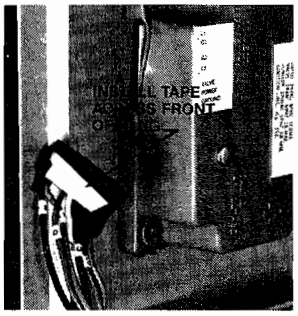


FIGURE 35

6. Fill the bucket with the 50% mixture of heating glycol solution and place on top of outdoor unit and open the valve on the bucket.
7. Engage the indoor unit disconnect switch. Install a jumper wire between W and R of the outdoor unit. **NOTE:** If the hose is not attached near the bottom of the bucket and the solution has to be drawn out with the hose over the top of bucket, it will be necessary to elevate the top of the hose. Install a funnel and start filling to prime the pump. Let liquid flow through into the expansion tank until it is (¼) one quarter full, place hose in bucket.

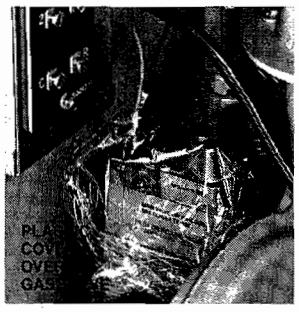


FIGURE 36

8. Pinch off the hoses between the module top and the expansion tank A plus the hose B (See Figure 37 and 38 for hoses A and B) between the charging tee and the vent tube to the expansion tank.
9. The automatic gas valve must be in the OFF position. Set room thermostat above room temperature. Fill bucket with premixed solution and place on top of unit.

**NOTE:** If the hose is not attached near the bottom of the bucket, it will be necessary to elevate the end and fill it to prime the pump. Let liquid flow through into the expansion tank until it is (¼) a quarter full. Place hose in bucket and secure.

10. Close the disconnect for the outdoor unit to start the pump. Add pre-mixed solution to the bucket as required to maintain a liquid seal on the hose in the bucket.

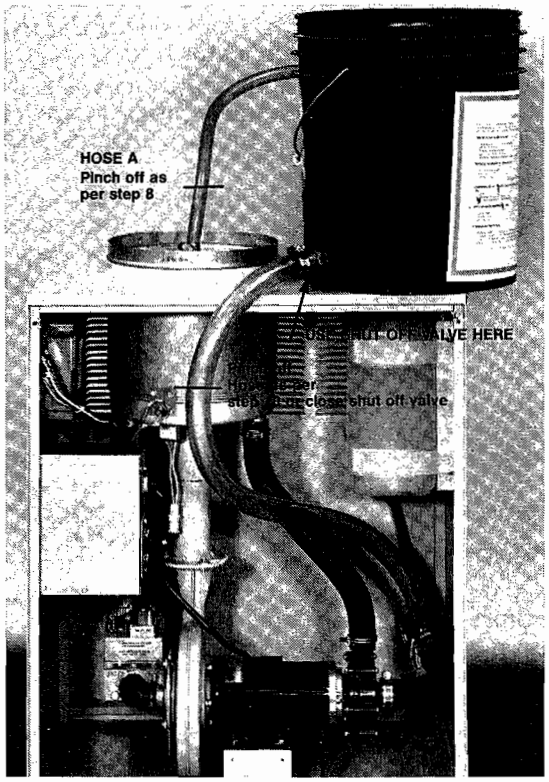



FIGURE 37

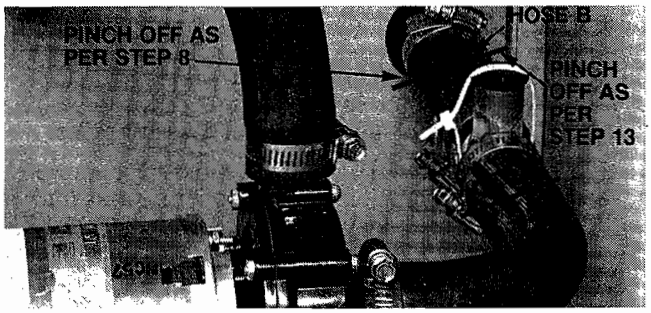



FIGURE 38

Air will be forced out of the system and into the expansion tank. When the expansion tank is half full, remove the pinch-off pliers on hose B.

Let the pump continue to circulate the solution and purge air into the expansion tank. When the expansion tank is (¾) three quarters full, pinch off the hose C or close the valve on the bucket. (See Figure 37).

11. After air has stopped coming into the expansion tank, if a water tank is installed, release the lever on the diverter valve to allow it to return to the AUTO position. (See Figure 18.) Turn the knob on the water heater thermostat to the extreme counter clockwise position for a few minutes to get any remaining air out of the air handling coil. After five minutes turn hot water tank thermostat to the HOT position to circulate the solution through the tank hot water coil.

12. Partially open the pinch-off on hose A — Figure 37. This will remove the air that might be collected in the top of the module. When all air is completely out of the system, again pinch off hose A and open the disconnect switch for the outdoor unit.
13. Install two pinch-offs, one on either side of the charging tee and remove the hose and bucket. Install the rubber stopper into the charging tee opening and secure with a wire tie. Remove the two pinch-off pliers. See Figure 38.
14. Pinch off the inlet and outlet hoses to the module. Also, pinch off the hose from the top of the module to the expansion tank. Place shop towels in the top of the module surrounding the module plug opening to soak up any solution spillage. Remove the hose assembly. Apply pipe joint compound to plug and install in module.
15. Remove all pinch off pliers.
16. Remove the jumper wire between R and W.
17. Remove tape from ignition wire plug and install in ignition module receptacle.
18. Set water tank thermostat in the middle of the NORMAL range.
19. Open the disconnect switch for the indoor unit.
20. Close the disconnect switch for the outdoor unit.
21. After the indoor unit disconnect switch has been open for a minimum of one minute, the electronic module should be in the reset mode.
22. Remove the plastic cover from the gas valve and turn gas valve to ON. See Figure 39. (Manual gas valve must be open.)
    Install plastic plug on top of cabinet and also reinstall the rubber grommet in the top of the plastic expansion tank.

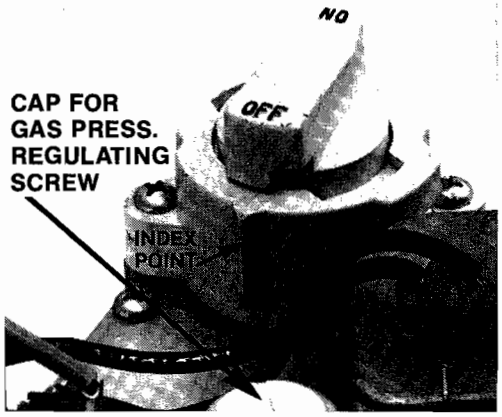



FIGURE 39

23. Install the fiber glass sound ring and the flue cap.
24. Engage the indoor unit electrical disconnect. The system should go into the heating mode by having ignition . . . that is if all the air was bled from the gas line to the unit. It may take several cycles to obtain ignition. Refer to following start up information.

## TYPE GAS AND INPUT SELECTION PLACING UNIT IN OPERATION NG OR LP GAS

The outdoor unit is factory equipped with a natural gas orifice plate sized for a nominal 100,000 BTUH input. It may be field rerated or converted so it can be used with L.P. gas. To rerate or convert to L.P. gas only the air/gas orifice plate has to be changed.

Plates furnished are as follows:

| Natural Gas (factory installed) | Additional Orifice Plates | | |
|---|---|---|---|
| | Propane | Natural | Propane |
| 100M | 100M | 80M<br>120M | 80M<br>120M |

**IMPORTANT:** If unit is rerated, change blower motor speed. Follow instructions as outlined on wiring diagram furnished with unit or this manual.

To change the gas/air orifice plate proceed as follows after the unit electrical switch has been disengaged and the gas valve has been closed.

1. Loosen screws A (3) with ¼" box or open end wrench.
2. Remove screw B.
3. Pull gas/air orifice plate out.
4. Install the new plate selected from the tabulation above. All plates are identified by type gas and BTUH gas input. Install plate with stamping towards the valve.
5. Install screw B and tighten screws A. All screws must be drawn up evenly. DO NOT OVER TIGHTEN OR STRIP THE SCREWS.

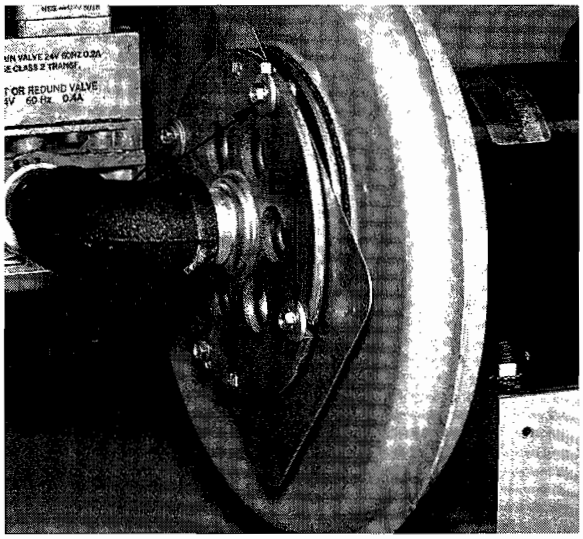


FIGURE 40

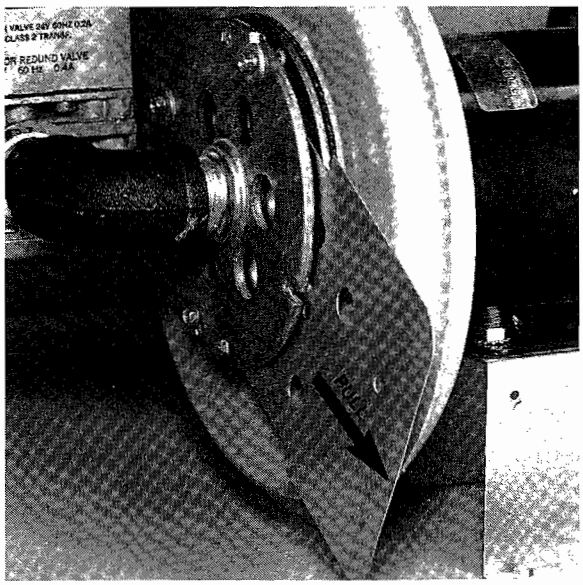



FIGURE 41

6. Remove ⅛" IPS plug from the gas valve and install a ⅛" IPS fitting. Connect a hose between negative side of a manometer or U tube and the fitting.

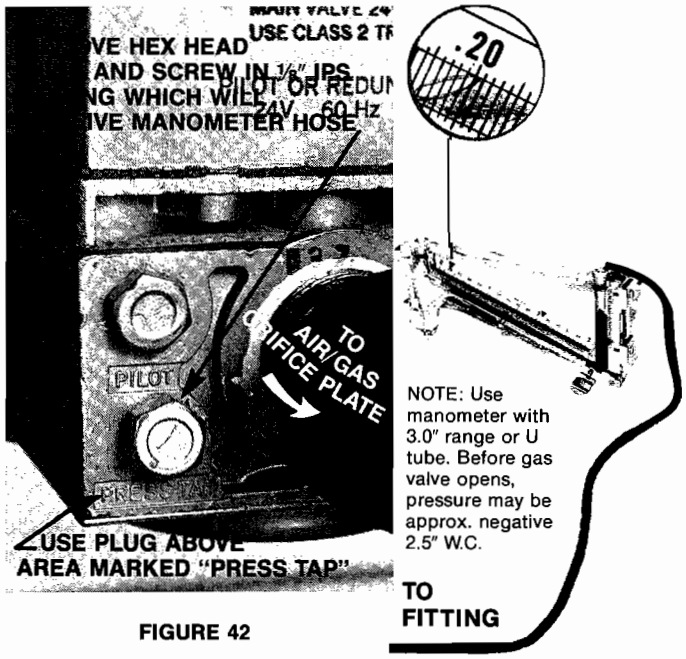



FIGURE 42

7. **CAUTION:** Do not short any 24V leads to ground. A direct short may cause the ignition module or transformer to be replaced. These two components are not to be repaired in the field.

8. There will be air in the gas supply line after testing for leaks on a new installation. Therefore, the air must be bled from the line by cracking open the ground joint union until pure gas is expelled. Tighten union and wait for five minutes until all gas has been dissipated in the air. BE CERTAIN THERE IS NO OPEN FLAME IN THE VICINITY DURING AIR bleeding procedure. The unit is placed in operation by closing the main electrical disconnect switches for the outdoor unit and the indoor air handler.

   Turn on manual gas valve and rotate automatic gas valve to the ON position. Refer to Figure 39 regarding gas valve knob and index point.

   Turn the room thermostat setting to a point above the room temperature, set the selector switch to HEAT and the fan switch to AUTO. The solution pump/combustion blower motor should start. There probably is still some air in the gas supply line if ignition does not take place.

   The unit will shut off in approximately 15 seconds. It will be necessary to move the room thermostat system switch to OFF (without hot water tank in the system) or disengage the air handler disconnect switch (with hot water tank in the system) for at least one minute to allow the ignition module to reset itself. It may take several cycles before the flame is established.

   The air circulating blower will keep running after the heat transfer module is off, that is, until the fan stat contacts open. Put the unit through several cycles of about three minutes on and five minutes off. The resultant expansion and contraction of the solution will expel any air that might be in the system.

9. Read the negative gas pressure on the manometer. It should read negative .20 inches water column.

   If the reading is higher than negative .10 inches (close to zero) the input will be high. If the reading is lower than negative .30 (further away from zero), the input will be reduced. Readings within these tolerances (plus or minus .10 inches) will allow approximately a ±3% BTU input change from the normal.

   If the negative pressure doesn't read −.20" remove the cap (see Figure 39) from gas valve and turn adjusting screw accordingly. Replace cap before taking reading.

10. Input to this unit should never exceed the BTUH as shown on the rating plate. Check the gas meter for input to the unit as shown below.

    **NOTE:** On outdoor equipment the gas input will vary with the temperature of the gas. Rated input will be at approximately 10°F. With warmer ambient and gas temperatures, the input will be decreased. For example, at 70°F the input will decrease 12%.

    a. Refer to the one cubic foot dial and observe how long it takes for the dial to make one revolution.
    b. On a 120,000 BTUH unit it should take 32 seconds for the one cubic foot dial to complete one revolution.
    c. Refer to the gas rate chart to determine the cubic feet per hour.
    d. Locate 32 seconds on chart. Follow line across the column under one (1) cubic foot test dial. There we find the value of 113 cubic feet.
    e. Contact the local gas company to obtain the calorific value of the gas supplied.
    f. Multiplying the calorific value of the gas x 113 = BTUH input to unit.

       Example: 1050 x 113 = 118,650. This test concludes that the unit is operating satisfactorily.

GAS RATE – CUBIC FEET PER HOUR

| Seconds for one Revolution | SIZE OF TEST DIAL ¼ cu. ft. | ½ cu. ft. | 1 cu. ft. | 2 cu. ft. | 5 cu. ft. | Seconds for one Revolution | SIZE OF TEST DIAL ¼ cu ft | ½ cu ft | 1 cu ft | 2 cu ft | 5 cu ft |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10 | 90 | 180 | 360 | 720 | 1800 | | | | | | |
| 11 | 82 | 164 | 327 | 655 | 1636 | 36 | 25 | 50 | 100 | 200 | 500 |
| 12 | 75 | 150 | 300 | 600 | 1500 | 37 | — | — | 97 | 195 | 486 |
| 13 | 69 | 138 | 277 | 555 | 1385 | 38 | 23 | 47 | 95 | 189 | 474 |
| 14 | 64 | 129 | 257 | 514 | 1286 | 39 | — | — | 92 | 185 | 462 |
| 15 | 60 | 120 | 240 | 480 | 1200 | 40 | 22 | 45 | 90 | 180 | 450 |
| 16 | 56 | 113 | 225 | 450 | 1125 | 41 | — | — | — | 176 | 439 |
| 17 | 53 | 106 | 212 | 424 | 1059 | 42 | 21 | 43 | 86 | 172 | 429 |
| 18 | 50 | 100 | 200 | 400 | 1000 | 43 | — | — | — | 167 | 419 |
| 19 | 47 | 95 | 189 | 379 | 947 | 44 | — | 41 | 82 | 164 | 409 |
| 20 | 45 | 90 | 180 | 360 | 900 | 45 | 20 | 40 | 80 | 160 | 400 |
| 21 | 43 | 86 | 171 | 343 | 857 | 46 | — | — | 78 | 157 | 391 |
| 22 | 41 | 82 | 164 | 327 | 818 | 47 | 19 | 38 | 76 | 153 | 383 |
| 23 | 39 | 78 | 157 | 313 | 783 | 48 | — | — | 75 | 150 | 375 |
| 24 | 37 | 75 | 150 | 300 | 750 | 49 | — | — | — | 147 | 367 |
| 25 | 36 | 72 | 144 | 288 | 720 | 50 | 18 | 36 | 72 | 144 | 360 |
| 26 | 34 | 69 | 138 | 277 | 692 | 51 | — | — | — | 141 | 355 |
| 27 | 33 | 67 | 133 | 267 | 667 | 52 | — | — | 69 | 138 | 346 |
| 28 | 32 | 64 | 129 | 257 | 643 | 53 | 17 | 34 | — | 136 | 340 |
| 29 | 31 | 62 | 124 | 248 | 621 | 54 | — | — | 67 | 133 | 333 |
| 30 | 30 | 60 | 120 | 240 | 600 | 55 | — | — | — | 131 | 327 |
| 31 | — | — | 116 | 232 | 581 | 56 | 16 | 32 | 64 | 129 | 321 |
| 32 | 28 | 56 | 113 | 225 | 563 | 57 | — | — | — | 126 | 316 |
| 33 | — | — | 109 | 218 | 545 | 58 | — | 31 | 62 | 124 | 310 |
| 34 | 26 | 53 | 106 | 212 | 529 | 59 | — | — | — | 122 | 305 |
| 35 | — | — | 103 | 206 | 514 | 60 | 15 | 30 | 60 | 120 | 300 |

FIGURE 42

On Propane gas installations there is no gas meter to measure the cubic foot per hour gas consumption. It, therefore, becomes necessary to take a manifold pressure reading. It should read negative .20" W.C.

11. **NOTE:** The total external static pressure must be checked on the indoor air handling unit to determine if it falls within the maximum and minimum allowable duct static pressures as found in the specification section. Also, the air temperature rise on heating must fall within the range shown on the rating plate and in the specifications.

The indoor blower is not designed to deliver proper air quantities (CFM) against statics other than those listed.

Too great an external static pressure will result in insufficient air that can cause icing of the coil (refrigeration cycle) and/or too high a temperature rise (heating cycle), whereas too much air can cause poor humidity control (refrigeration cycle) and/or too low a temperature rise (heating cycle). Too much air can also cause motor overloading. In either case, this constitutes a poorly designed duct system.

To determine proper air movement, proceed as follows:

1. Using a draft gauge (inclined manometer) measure the static pressure of the return duct at the inlet of the unit (negative pressure).
2. Measure the static pressure of the supply duct (positive pressure).
3. Add the two readings together.

Recheck the air delivery on heating by placing the unit in operation with the thermostat set high enough to give continuous firing and the fan selector on "AUTO". Install a thermometer in both the supply and return ducts close to the unit. Read after the temperatures have stabilized. The rise (difference between readings) in °F. must fall within the range shown on the rating plate. If the rise is too low, check for proper blower motor wiring in the control panel. If the rise is too high, also check the blower motor wiring for proper speed selection. If blower motor wiring is correct, then it will be necessary to alter the duct system to increase or decrease the static resistance for the correct air flow.

12. When the gas input is increased by using an alternate orifice plate furnished with unit, the heating cfm **must** be increased. When the gas input is reduced by using an alternate orifice plate, the heating cfm must be reduced. Refer to the unit wiring diagram for information on changing the indoor blower motor speed.

### ESP " W.C., CFM, TR (Temp. Rise) DATA @ 10°F*

| ESP " W.C. | Input 120M | | Input (100M) 120M | | | Input (80M) 100M | | |
|---|---|---|---|---|---|---|---|---|
| | Hi. Spd. | TR °F | Med. Spd. | TR °F | | Low Spd. | TR °F | |
| .5 | 1375 | 66 | 1130 | (69) | 80 | 880 | (71) | 88 |
| .4 | 1430 | 64 | 1150 | (67) | 79 | 900 | (70) | 86 |
| .3 | 1485 | 61 | 1170 | (66) | 78 | 905 | (69) | 86 |
| .2 | 1540 | 59 | 1180 | (66) | 77 | 910 | (69) | 85 |

FIGURE 43

The above information on TR is when the unit is firing at the BTUH INPUT as shown in the tabulation. Full firing is when the incoming gas temperature is approximately 10°F. At 70°F incoming gas the heating capacity is decreased approximately 12%.

### COOLING CFM

Usually rated cfm for cooling is 800, 1125 and 1250 CFM for 24,000, 30,000 and 36,000 BTUH systems respectively. Therefore, the duct work has to be designed accordingly and in conjunction with the pressure drop across the cooling A coil and in relation to the allowable external pressure for the air handling unit.

*ESP" W.C. = External Static Press. Inches Water Column.

### STATIC PRESSURE DROP ACROSS "A" COIL VERSUS CFM

| E.S.P. In W.C. | ECFC24AOM-B | | ECFC30AOM-B | | ECFC36AOM-B | |
|---|---|---|---|---|---|---|
| | Wet | Dry | Wet | Dry | Wet | Dry |
| .10 | 720 | 920 | 675 | 865 | 865 | 1225 |
| .15 | 920 | 1170 | 875 | 1100 | 1100 | 1560 |
| .20 | 1075 | 1370 | 1015 | 1300 | 1300 | 1835 |
| .25 | 1210 | 1540 | 1145 | 1470 | 1475 | 2075 |
| .30 | 1330 | 1700 | 1265 | 1625 | 1625 | 2300 |

FIGURE 44

For example: The pressure drop across a 30M BTUH (wet) coil is .25" w.c. @ 1145. (See Figure 44.) Therefore, the total external static pressure for the supply and return ducts, return air filter, registers may be .25" w.c. (coil .25" w.c. + .25" w.c. for the duct system = a total external static pressure to the unit of .50" w.c.). The air handling unit should deliver 1130 CFM on medium blower motor speed.

Use a recognized standard method for calculating heat loss and heat gain, room by room, as a basis for designing the duct system. ARI 230, NESCA Manual J, or the ASHRAE Guide and Data Book illustrate such methods.

The maximum external static pressures which may be applied, supply and return air ducts, grilles etc. are as shown on page 2.

### COOLING COIL INSTALLATION

The above coils may be used as cooling coils in a field fabricated plenum or using the factory coil cabinet for an upflow application.

The 20" wide factory coil cabinet (upflow) may be used by altering the outlet duct flanges on the indoor air handling unit. See Figure 45.

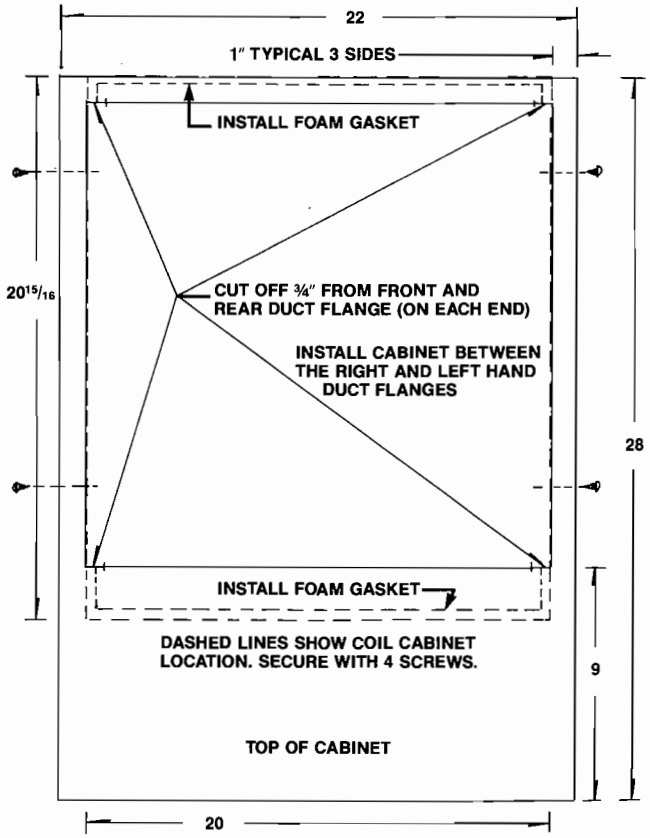



FIGURE 45

Assemble the coil cabinet, install coil into the cabinet as per instructions supplied with components. Refer to outdoor condensing unit installation instructions regarding refrigerant piping, evacuation and charging procedures.

## COIL — COUNTER-FLOW APPLICATION

For a counterflow coil cabinet application the counterflow coil cabinet and the air handling unit duct flanges must be altered as shown in Figure 46. Refer to NOTES in the sketch for alteration of flanges.

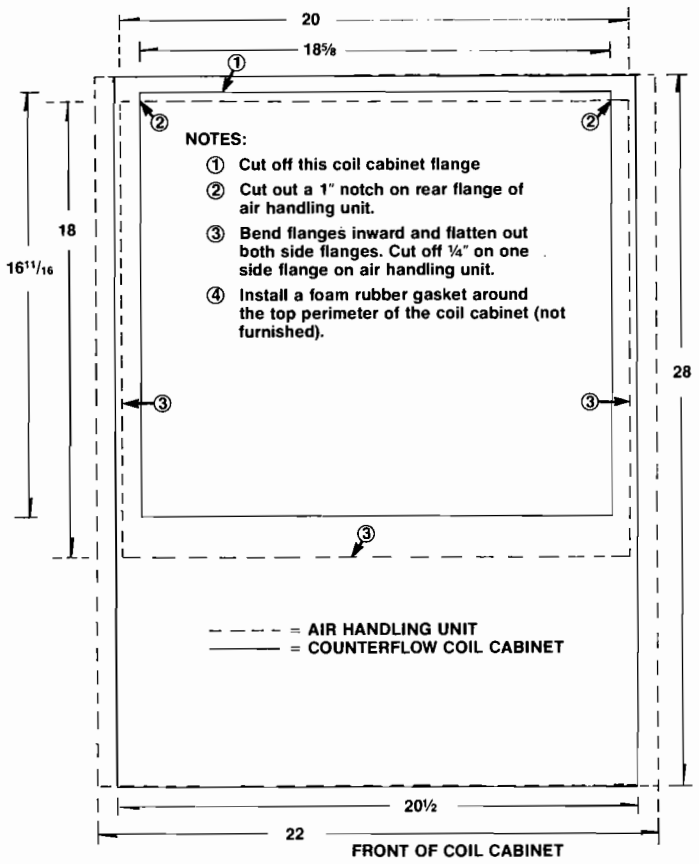



FIGURE 46

## COIL — HORIZONTAL APPLICATION

For a horizontal cooling coil application, use the EZ24CTH, EZ29CTH and EZ35CTH coil housing assembly. Fabricate a sheet metal transition to interconnect the coil housing and the duct flanges of the air handler. Access doors of air handler are recommended to be on top or on the side.

When the air handling unit and cooling coil are located over a finished ceiling an auxiliary drain pan MUST be installed under the entire assembly. A separate ¾" drain line should be run to a drain and terminated according to local codes.

## GENERAL HEATING CYCLE INFORMATION

When the room thermostat is set to HEAT and the fan to AUTO, the system will go into the heating if it is set at a temperature setting higher than the room temperature.

The heating relay in the outdoor unit will close when the contacts in the room thermostat make and thereby starting the pump/combustion blower motor plus energizing the electronic ignition module. The igniter is heated for 45 seconds at which time the gas valve opens. Ignition occurs and the flame is established. The presence of flame is sensed through an electronic signal.

If flame is not established within 15 seconds, power to the gas valve is broken.

The unit will continue to fire until the room thermostat is satisfied at which time the ignition control is de-energized closing the gas valve and the pump/combustion blower motor stops.

The air circulating blower motor starts and stops in response to the fan thermostat which is a thermally responsive disc thermostat clamped to the heating coil of the air handler. When the coil becomes warm from the solution, the disc thermostat closes which completes the circuit to the blower motor heating speed.

The circuitry in the room thermostat when in the cooling mode, will close the cooling contacts and simultaneously pull in the blower relay to energize the cooling speed and break contacts to the heating speed.

When the thermostat fan switch is set to the ON position, the blower relay activates the cooling speed. It is necessary, that if the fan switch is in the ON position during the heating mode, the blower speed is equal or greater than the normal heating speed.

When the heating cycle is completed, the heating coil cools down and the fan stat opens the circuit to the heating speed.

The electronic ignition module timing sequence starts over with the gas valve closing and the igniter restarting on its 45 second heat up interval, if there is a power or gas interruption.

If the companion water heater is connected into the system, the water heater thermostat takes precedent over the room thermostat temperature setting. The diverter valve motor is energized, when the tank thermostat closes, and drives the solution valve to the water heating position. The diverter valve motor will again drive the valve to the air heating mode when the water heater thermostat is satisfied.

### Reset After Lock-out:

Should ignition not be achieved, for any reason, within the 15 second lockout period, it is necessary to break power to the electronic ignition module. If a water heater is not used, it is only necessary to turn the room thermostat down below the room temperature for thirty seconds and then resetting to the desired temperatures. However, if a water heater is used, either thermostat may be closed. Therefore, it is necessary to disengage the electrical disconnect to the air handling unit. Power must be off for 30 seconds then engage switch to try for ignition.

### System Limit Controls:

The solution limit control sensing capillary measures the temperature of the solution in one of the module tubes. The normally closed contacts of this control will open when the solution reaches a pre-determined temperature which is above normal. See Figure 47 for location of this limit control.

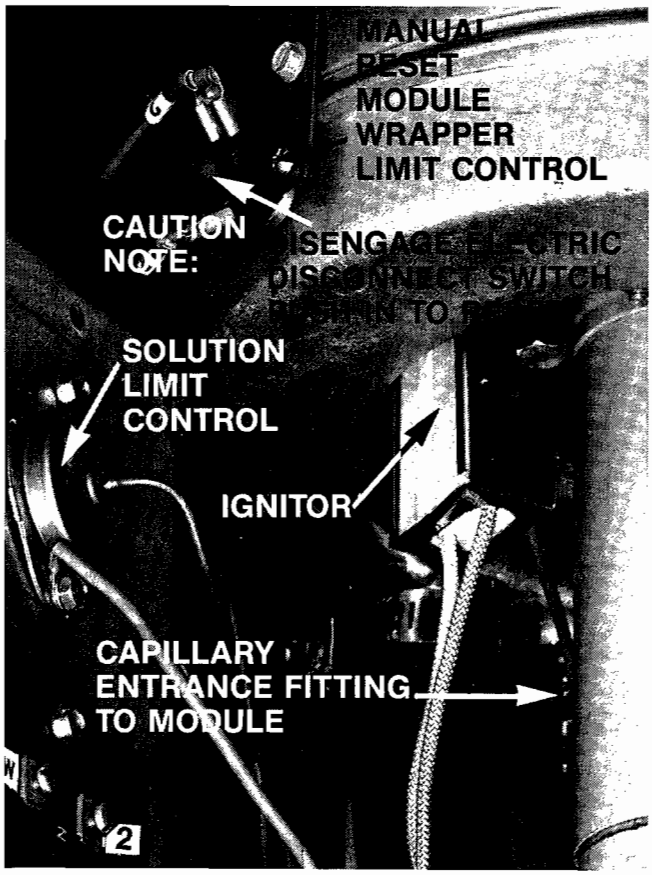



FIGURE 47

The normally open contacts in this control will close and cause the heating relay to stay energized so the solution pump can continue to run and cool the heating solution.

The normally closed contacts, which are now open, will interrupt the circuit to the electronic ignition module. The system will go through the normal ignition and heating cycle after the solution has been cooled and the limit control resets itself.

The cause for the overheated solution must be corrected (dirty filters, inoperative blower motor in the indoor air handler, insufficient ductwork, air in the solution piping, coil or module). The heating circuitry is broken when the room thermostat and/or the water heater thermostat is satisfied.

A secondary manual reset module wrapper limit control is secured to the lower portion of the heat transfer module. It is activated by a very high module temperature, such as, the system loss of the solution charge or a very low charge or air trapped in the solution area of the module. The control will stop the entire unit.

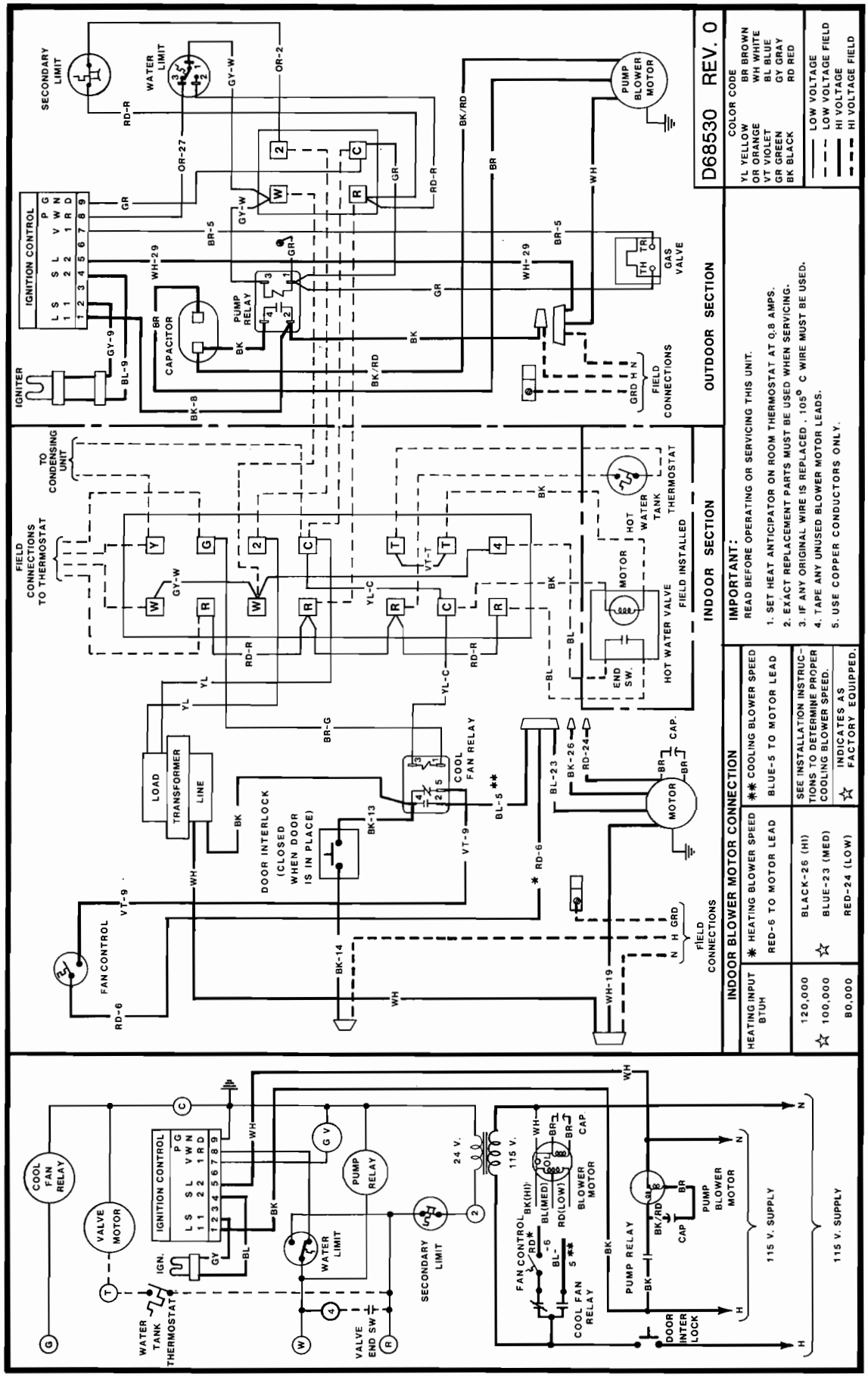
It must be manually reset to again start the unit. The unit should be reset just once. If the unit goes out on limit again, the reason which caused the control to open must be ascertained and repaired. See Figure 47 for reset button . . . **CAUTION:** Disconnect the outdoor unit electrical disconnect switch before pushing in the reset button. If unit doesn't start after pushing in the reset button and engaging the electric switch, the module may still be too hot. Wait 30 minutes and try again. If the limit must be replaced, a small amount of heat conductive compound M2755-20 must be applied to face of disc.

## CLEANING OF FLUE PASSAGEWAYS

1. Turn the electrical disconnect switch to the "OFF" position to de-energize the outdoor unit.
2. Close the manual gas valve. Remove the flue cap from the unit. Lift it upward.
3. Clean the outside of module fins with a stiff bottle brush. Do not damage fins or tubing.
4. Vacuum dirt and debris from bottom of module (between outer wrapper and fins).
5. Replace flue cap. Open manual gas valve. Turn electrical disconnect switch to the "ON" position.

## WARNING

Flue gas passageways are to be cleaned only by a qualified service man.




**SYSTEM WIRING DIAGRAM**

# FUNCTIONAL PARTS LIST

**Model ERGW0012-1A Outdoor Unit**

| Part No. | Description | Qty. |
|---|---|---|
| A34193-1 | Hose, Suction, Inlet Pipe to Tee | 1 |
| B13288-1 | Hose, Module Outlet | 1 |
| B13341-1 | Hose, Suction, Pump to Tee | 1 |
| B13284-1 | Hose, Pump Discharge | 1 |
| C62763-1 | Hose, Tee to Exp. Tank | 1 |
| B11709-3 | Limit Control, Auto Reset | 1 |
| B12152-1 | Limit Control, Man., Reset | 1 |
| B13294-1 | Wiring Harness, Ignition | 1 |
| D54809-1 | Tank, Expansion | 1 |
| D68176-1 | Flue Cap Weldment | 1 |
| C62844-1 | Pad, Silencer (Top of HTM) | 1 |
| C63024-1 | Bracket, Pad, Silencer (Top of HTM) | 1 |
| B13449-1 | O Ring, Flue Cap to HTM Wrapper Seal | 1 |
| D68304-1 | Ignition Control Module | 1 |
| C59914-3 | Plate, Orifice, 80M, Nat. | 1 |
| C59914-5 | Plate, Orifice, 100M, Nat. | 1 |
| C59914-7 | Plate, Orifice, 120M, Nat. | 1 |
| C59914-15 | Plate, Orifice, 80M, LP | 1 |
| C59914-17 | Plate, Orifice, 100M, LP | 1 |
| C59914-19 | Plate, Orifice, 120M, LP | 1 |
| C62753-1 | Heat Transfer Module | 1 |
| A34224-1 | Gasket, Ignitor | 1 |
| B11736-1 | Burner, Weldment | 1 |
| C62859-1 | Top Transition Tube | 1 |
| B13361-1 | Ignitor | 1 |
| B13374-1 | Gasket Burner | 1 |
| B11727-2 | Relay, SPDT | 1 |
| B13292-1 | Terminal Board | 1 |
| D67890-4 | Capacitor, Pump, 15 mfd 370V | 1 |
| A33721-1 | Gasket, Fan Scroll | 1 |
| A34232-1 | Gasket, Transition | 1 |
| B11793-1 | Gasket, Mixer | 1 |
| C62858-5 | Transition Tube, Bottom | 1 |
| C59915-1 | Base Mixer | 1 |
| M2755-20 | Heat Conductive Compound | AR |

**Model ERGW0012-1A Outdoor Unit**

| Part No. | Description | Qty. |
|---|---|---|
| C59916-1 | Plate, Mixer | 1 |
| C62530-2 | Gas Valve, Redundant | 1 |
| D54450-5 | Combustion Blower | 1 |
| D68269-1 | Pump/Motor Assy. | 1 |

**Models EGWH0040D-A or EGWH0040X-A Hot Water Tank**

| Part No. | Description | Qty. |
|---|---|---|
| D68220-1 | Valve, 3-Way Diverter | 1 |
| R1610-15▲ | Thermostat | 1 |
| * | Heat Exchanger, Double Wall | 1 |
| * | Gasket, Heat Exchanger | 1 |
| R1610-13● | Thermostat | 1 |

**Filter Rack D67724-2**

| Part No. | Description | Qty. |
|---|---|---|
| C48556-22 | Filter, Permanent Washable 27⅝"x21¾"x1" | 1 |

**Model EBWC3612M-A Indoor Unit**

| Part No. | Description | Qty. |
|---|---|---|
| C61942-1 | Bracket, Motor Mtg. | 1 |
| D55812-27 | Blower Housing | 1 |
| D67233-7 | Blower Wheel | 1 |
| D68250-1 | Motor Blower | 1 |
| D67118-6 | Capacitor, 5 mfd 370V | 1 |
| B13123-1 | Relay, SPDT | 1 |
| B13310-1 | Terminal Board | 1 |
| M3317-1 | Transformer, 40VA 115V | 1 |
| B13301-1 | Restrictor, Copper Pipe Heating Solution | 1 |
| B13387-1 | Fan Control | 1 |
| D68282-1 | Coil, Heating | 1 |

Specifications, part numbers and quantities are subject to change without notice.
*Order by description.
The following must accompany the order when ordering in warranty parts: proof of purchase receipt plus model, manufacturing and serial numbers.
AR as required.
Order from your installing dealer.

▲ Thermostat for Model EGWH0040D-A
● Thermostat for Model EGWH0040X-A

# NOTES

| | MODEL NO. | MFG. NO. | SER. NO. |
|---|---|---|---|
| Dealer Name _____ | Indoor Section _____ | _____ | _____ |
| Address _____ | Outdoor Section _____ | _____ | _____ |
| City _____ State _____ | Hot Water Heater _____ | _____ | _____ |
| Phone No. _____ | Service Phone No. _____ | | |