

New Instructions

450D

# Installation Instructions

GAS-FIRED AIR CONDITIONER



EPN 39450D1

Installation of the Model 450D Gas Air Conditioning Absorption unit consists of the following steps:

- I. Locate and mount absorption unit.
- II. Connect chilled water lines.
- III. Electrical connections.
- IV. Gas connections.
- V. Charge system with water.
- VI. Check-out and Operation.
- VII. Adjust gas input.
- VIII. Balance system.
- IX. Purge Non-Condensibles.

Each of the above steps is discussed in detail in this instruction. Read entire instruction before starting installation.

Remove four shipping bolts holding absorption unit to crate base before placing unit on permanent mounting slab.

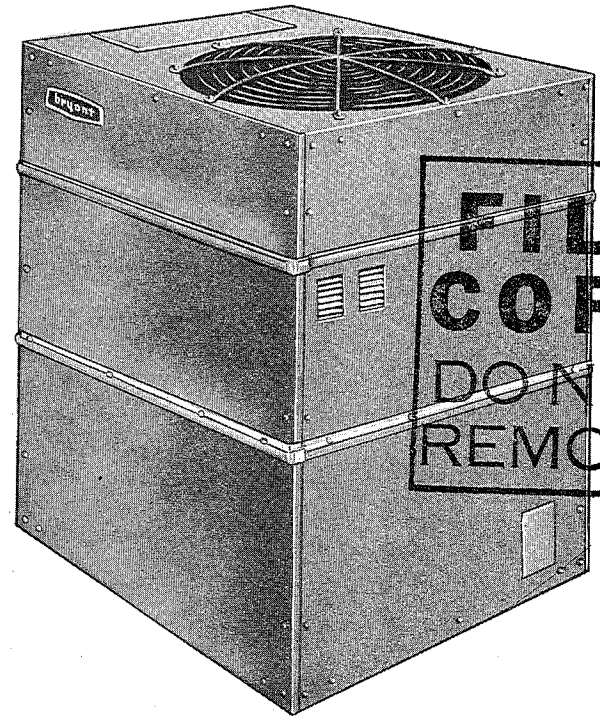
**NOTE:** Unit is shipped with condenser fan guard inverted. Remove, place with convex side up and fasten.

## I. LOCATE AND MOUNT ABSORPTION UNIT

The absorption unit may be located at ground level or on the roof. Consult local codes for information concerning proximity to property lines, height above roof, obstructions, etc.

### A. MOUNTING BASE

1. Use non-combustible materials.
2. Base should be large enough that unit will not overhang.
3. Poured concrete slab, minimum 4" thick, recommended for ground installation. On roof installations a metal plate is satisfactory. Leave 4" to 8" clearance between roof top and metal plate.
4. Mounting base should not obstruct drain holes in base angle of unit. Drainage required to dispose of rain, melting snow, etc.



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A. G. A. APPROVED



Certified in accordance with A.R.I. standard 250-58.

CERTIFICATION APPLIES ONLY WHEN USED WITH PROPER COMPONENTS AS SPECIFIED BY MANUFACTURER.

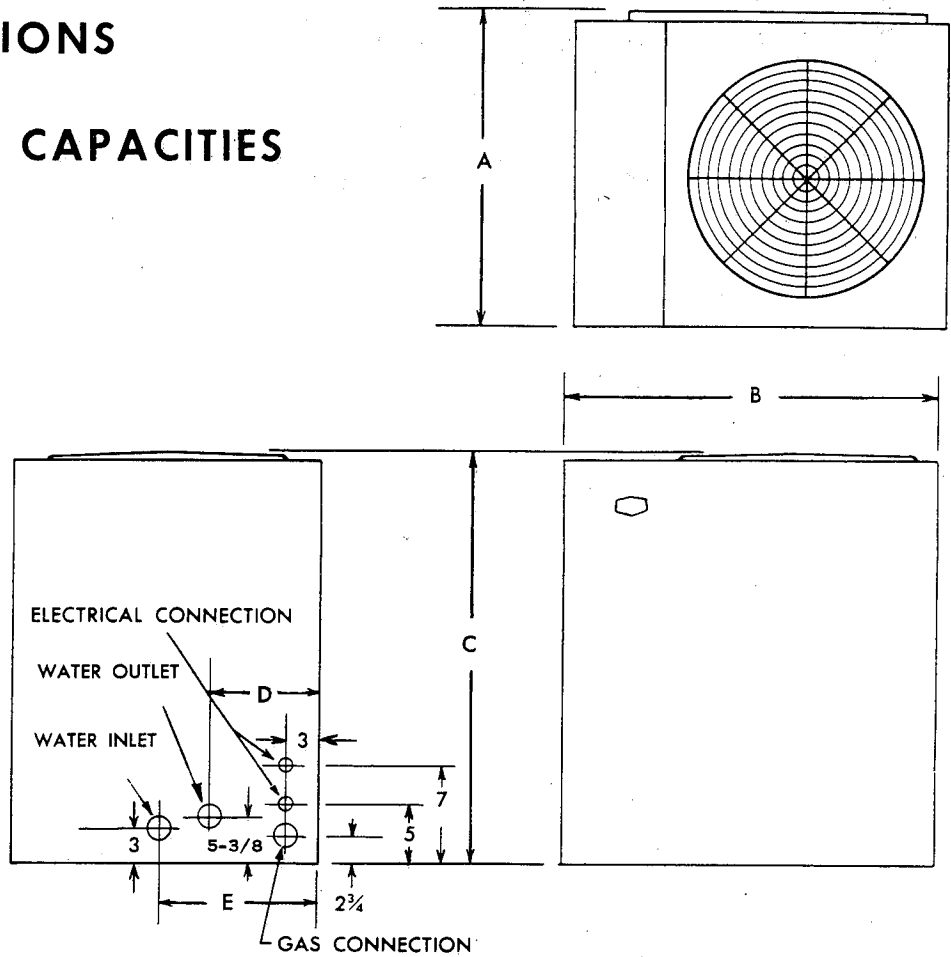
### B. CLEARANCES

See Figures 1 and 2 for typical locations.

1. Absorption unit should have a *minimum* clearance of 2 feet on *all* sides from any adjacent obstruction.
2. Avoid overhead obstruction. Place unit at least 2 feet from *plumb line* of any overhang.
3. Avoid locating the unit where hot condenser discharge air can impinge on nearby obstruction and mix with the cooler inlet air. This is particularly important when two units are placed side by side.

# DIMENSIONS

## RATINGS AND CAPACITIES



### DIMENSIONS

SIZE	A	B	C	D	E	WATER INLET	WATER OUTLET
36	40-3/8	48	53	5-5/16	15-1/2	1	1
54	46-3/8	56	60	7-1/16	18-3/8	1-1/4	1

MODEL		36-450 D	54-450 D
Cooling Capacity	BTUH	34,000	52,000
Heat Input	BTUH	120,000	180,000
Gas Connection Size	INCHES	1/2	3/4
Condenser Air Delivery	CFM	4,500	6,700
Water Flow (Min. Required)	GPM	7.5	11
Max. Frictional Loss Handled by Chiller Pump	FT HEAD	23	20
Max. Elevation of Coil Above Chiller	FT	22	22
Condenser Fan Motor	HP	1/3	1/2
115V, 60 Cy., 1 Phase			
Pump	HP	1/8	1/8
115V, 60 Cy., 1 Phase			
Minimum Wire Size*	AWG	14	12
Refrigerant	Type	717	717
	Amount	24	42
Approximate Shipping Weight	LB	1044	1544

\*NOTE: Satisfactory where distance, measured along wire path, between unit and connection into main panel does not exceed 100 ft. Where distances are longer, wire sizes should be increased accordingly.

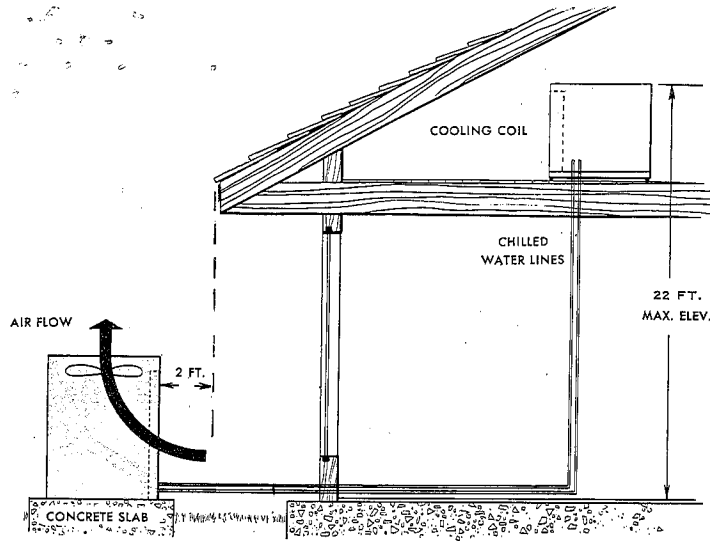


Figure 1

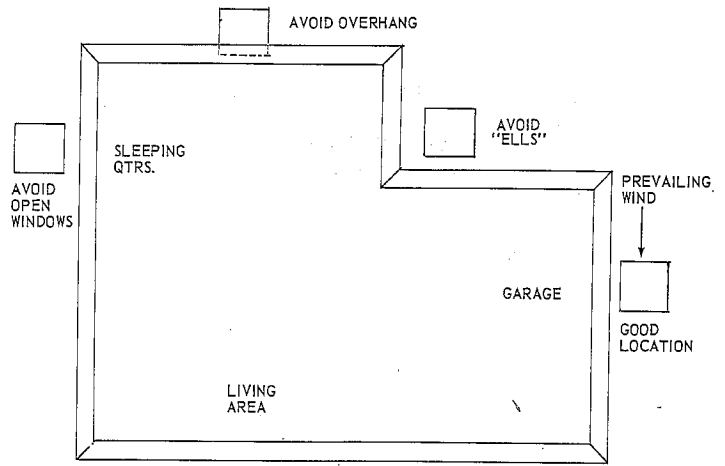


Figure 2

TABLE I - DISTANCE BETWEEN COIL AND CHILLER

NOMINAL PIPE SIZE	POLYETHYLENE Feet		COPPER Feet		GALVANIZED Feet	
	36	54	36	54	36	54
3/4	40	----	35	----	25	----
1	150 *	45	140 *	40	90 *	30
1-1/4	530 *	145 *	360 *	100*	370 *	90 *
1-1/2	1585 *	310 *	815 *	205*	770 *	190 *

NOTE: Values shown are for one direction only. Multiply by two to obtain the total length of pipe from chiller to coil and return.

\* Pipe lengths exceeding 75 feet may require additional chilled water additive. (See Section V, this instruction.

## II. CONNECT CHILLED WATER LINES

### A. MATERIALS

Refer to section on "Cold Weather Protection" at the end of this instruction.

#### 1. Piping

a. Polyethylene Plastic Pipe - use medium density flexible pipe whose wall thickness approximates Schedule 40 pipe (Commercial Standard CS 197-60). Pipe must be virgin plastic. Do not use pipe manufactured from re-claimed plastic.

b. Copper - satisfactory substitute.

c. Galvanized - satisfactory substitute.

#### 2. Fittings

a. Nylon - use when possible.

b. Brass - satisfactory substitute.

c. Galvanized - satisfactory substitute.

### B. PIPE LENGTH AND DIAMETER

Table I shows maximum length of pipe of different diameters that can be used between the pump discharge and the coil inlet and still maintain minimum allowable (design) water flow rate.

1. Multiply table values by two to obtain the total length of pipe from chiller to coil and return.

2. Length is measured along the pipe path and therefore includes vertical distance between the water coil and the chiller.

3. Lengths shown in Table I are based on using a total of eight elbows in the entire water line (chiller to coil and return). Lengths are predicated on the use of a Bryant matching water coil. For greater distances use larger pipe or add a pump.

## II. CHILLED WATER LINES (cont'd.)

### C. INSULATION

1. Insulate supply and return lines separately.
2. Material should be of good quality and be covered with a good vapor barrier. Armaflex or equivalent is recommended.

Wall thickness:

1/2" - south of 40° N. latitude

3/8" - north of 40° N. latitude

### D. HEIGHT OF COIL ABOVE ABSORPTION UNIT

Maximum vertical distance from chiller outlet to top of coil is 22 ft. for both sizes. For greater heights, a greater pumping head is required. Increasing the pipe size will not help.

### E. WATER COIL CONNECTIONS

1. If coil is located in warm air stream, do not connect polyethylene pipe directly to coil. Connect a minimum of 24" copper or galvanized pipe to both the coil inlet and outlet. Then connect the plastic pipe to these nipples.
2. On installations where the outside piping freezes and the coil is in a heated air stream, precautions must be taken to provide for water expansion. The connecting polyethylene plastic pipe acts as an expansion vessel if there is enough footage of this pipe in the heated space (space not subject to freezing). The following table shows the minimum lengths (total inlet and outlet) of plastic piping of various diameters that are required for both sizes of coils to provide adequate expansion volume.

Nominal Pipe Size	Length of Plastic Pipe	
	Unit	Size
	36	54
3/4	24	56
1	15	35
1-1/4	8.5	20
1-1/2	6.5	14.5

If the total plastic chilled water line footage in the heated space is not as long as the minimum values shown in the table, tee a vertical pipe of sufficient volume into either of the coil connections to provide for expansion, or the line should be drained.

### F. LEAK CHECK

Water should be added to the chiller, pump operated, and each joint checked for leakage. Do *not* add the chemical additive (shipped in container stored in chiller tank) to the water until after leak check is complete. It is convenient to check for leakage when charging the system with water. See Section V.

## III. ELECTRIC CONNECTIONS

1. Make all electric connections in accordance with the National Electrical Code and any local ordinances or codes that might apply.
2. Provide a separate power supply for the air conditioner.
3. Provide a fused disconnect switch within easy reach of the absorption unit.  
**Size 36**-use 30 amp. standard fuse or 15 amp. fuse-tron. **Size 54**-use 35 amp. standard fuse or 20 amp. fuse-tron.
4. The absorption unit is shipped fully wired from the factory. Connection of 115V power and low voltage connection to the thermostat control are required in the field. Before proceeding, inspect factory wiring for loose connections which may have resulted during shipment.
5. Figures 3 and 4 are wiring diagrams.

## IV. GAS CONNECTIONS

**Consult local gas company before making any gas connections. In case of conflict with this instruction, local requirements should be followed.**

Before selecting the size and type of pipe that is to be used for installing the absorption unit, be sure to check with local gas company for the necessary information. The size of the gas pipe to be used will depend upon the length of run and the allowable pressure loss established by the utility.

A wrench-type shut-off valve should be installed in the gas line within sight of, and convenient to, the 450D. Provide a ground joint union inside the unit case and upstream of the main gas supply regulator.

Install a drip leg trap in the gas supply riser leading to the unit.

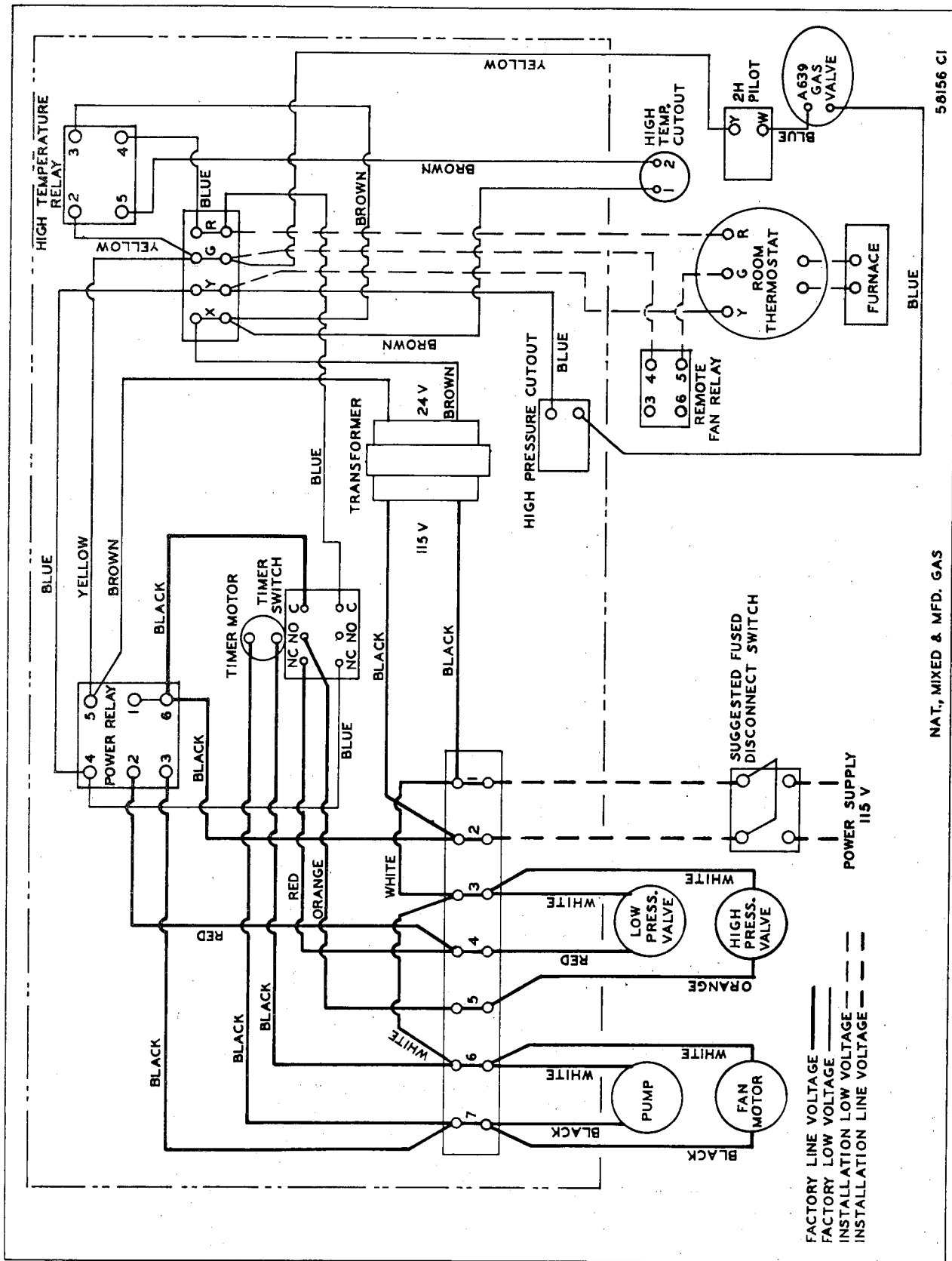
After gas pipe connections have been made, purge the lines and check for leakage. Use a soap and water solution or other such material. Never use matches, candles, flame or other source of ignition to check leakage.

### PILOT

The pilot assembly is equipped with a fixed orifice designed to give correct input at 3" w.c. gas pressure. The pilot supply line is equipped with a regulator and factory adjustment of this regulator should be satisfactory in all cases. The manual shut-off valve for the pilot gas supply is incorporated in this regulator.

To light pilot:

1. Shut off main electric power and remove lower front panel from unit.
2. Be sure manual shut-off valve to the burners is closed. Also close the manual shut-off valve to the pilot.
3. Wait five minutes.
4. Open manual shut-off valve to pilot, and light pilot with taper through the pilot hole on front of generator.



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Figure 3 - Wiring Diagram - City Gases

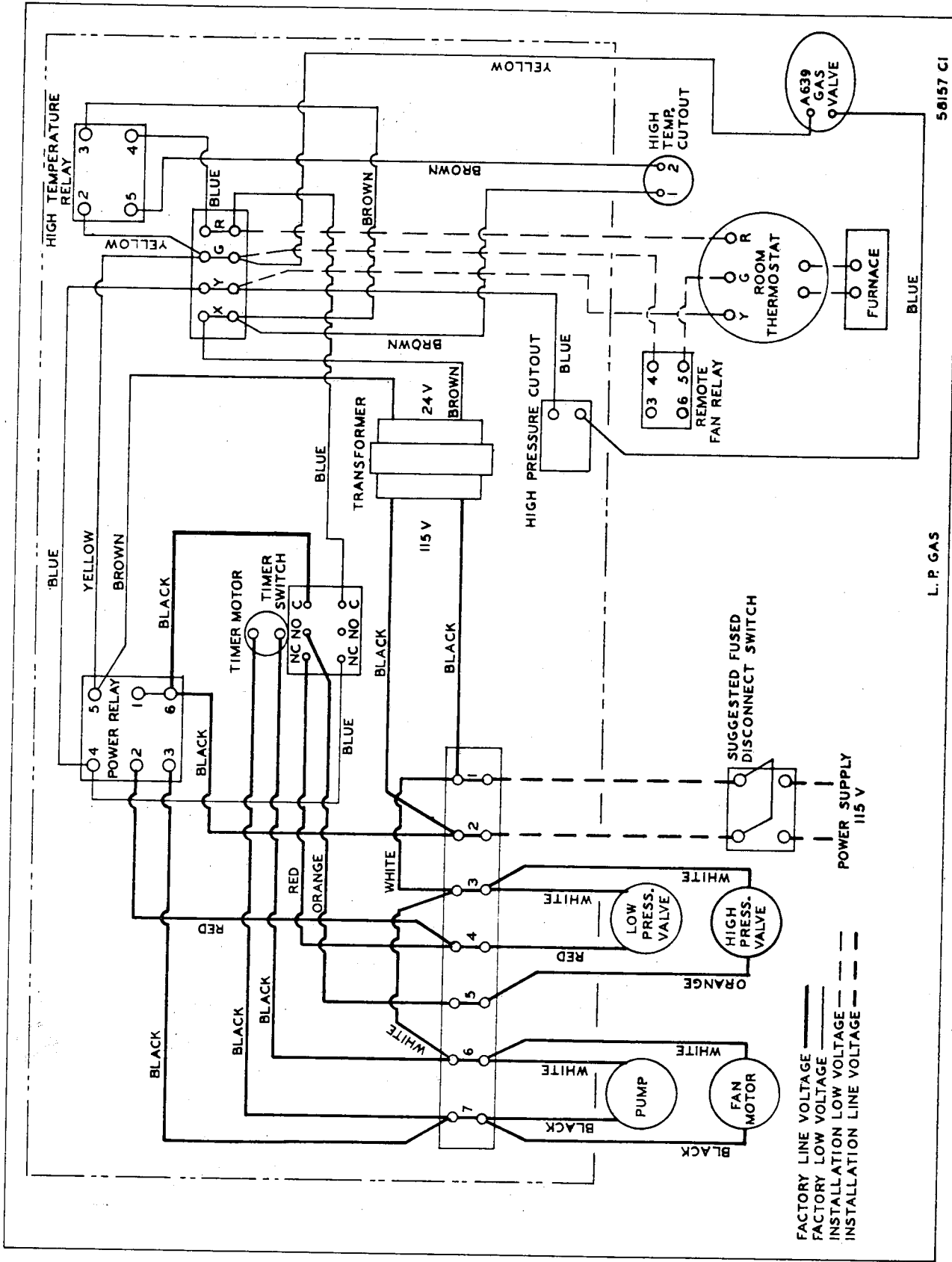
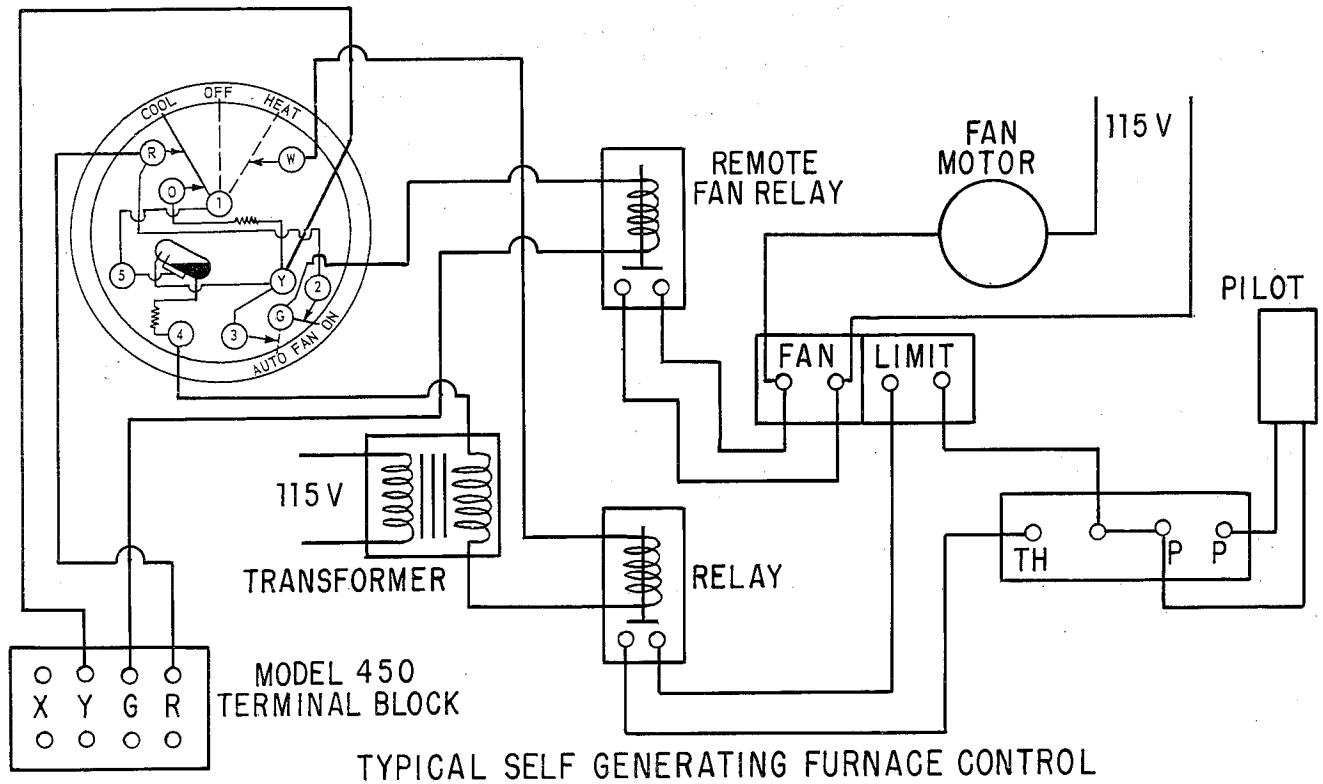
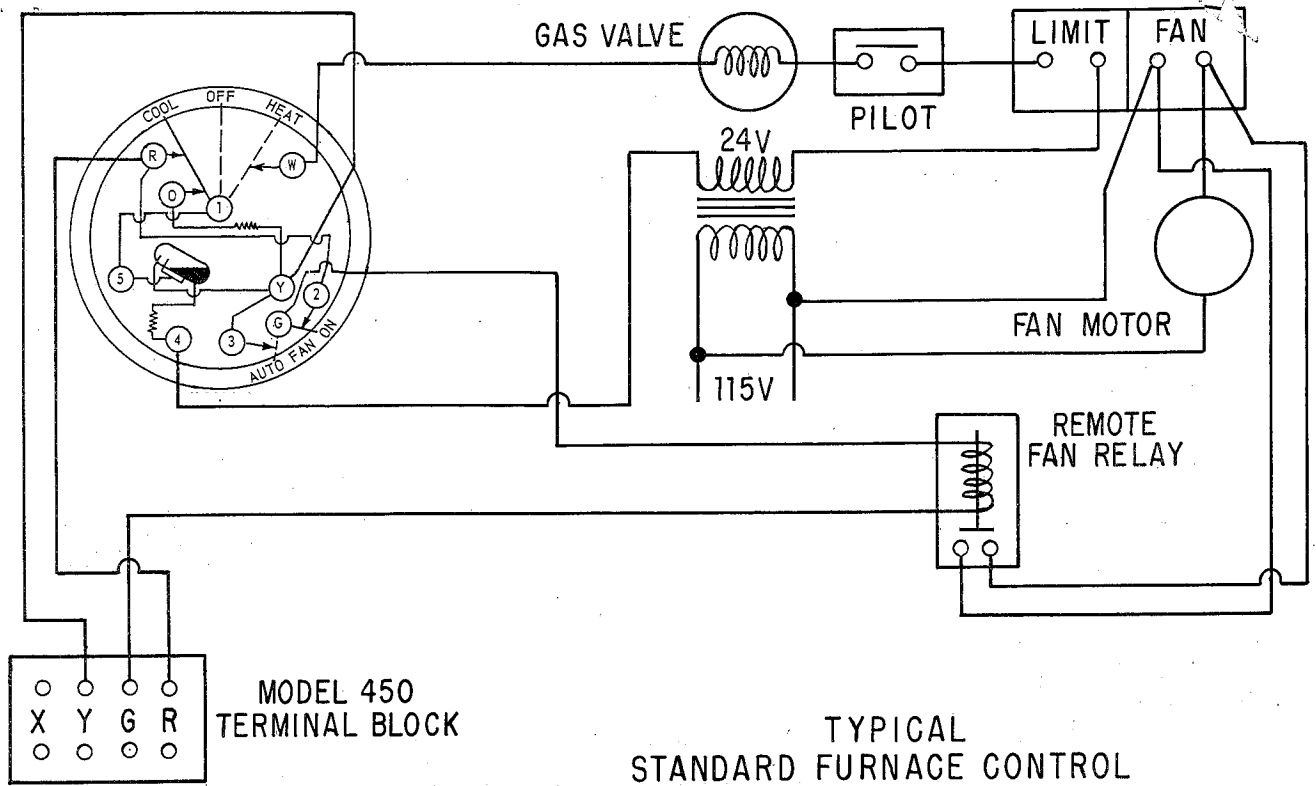
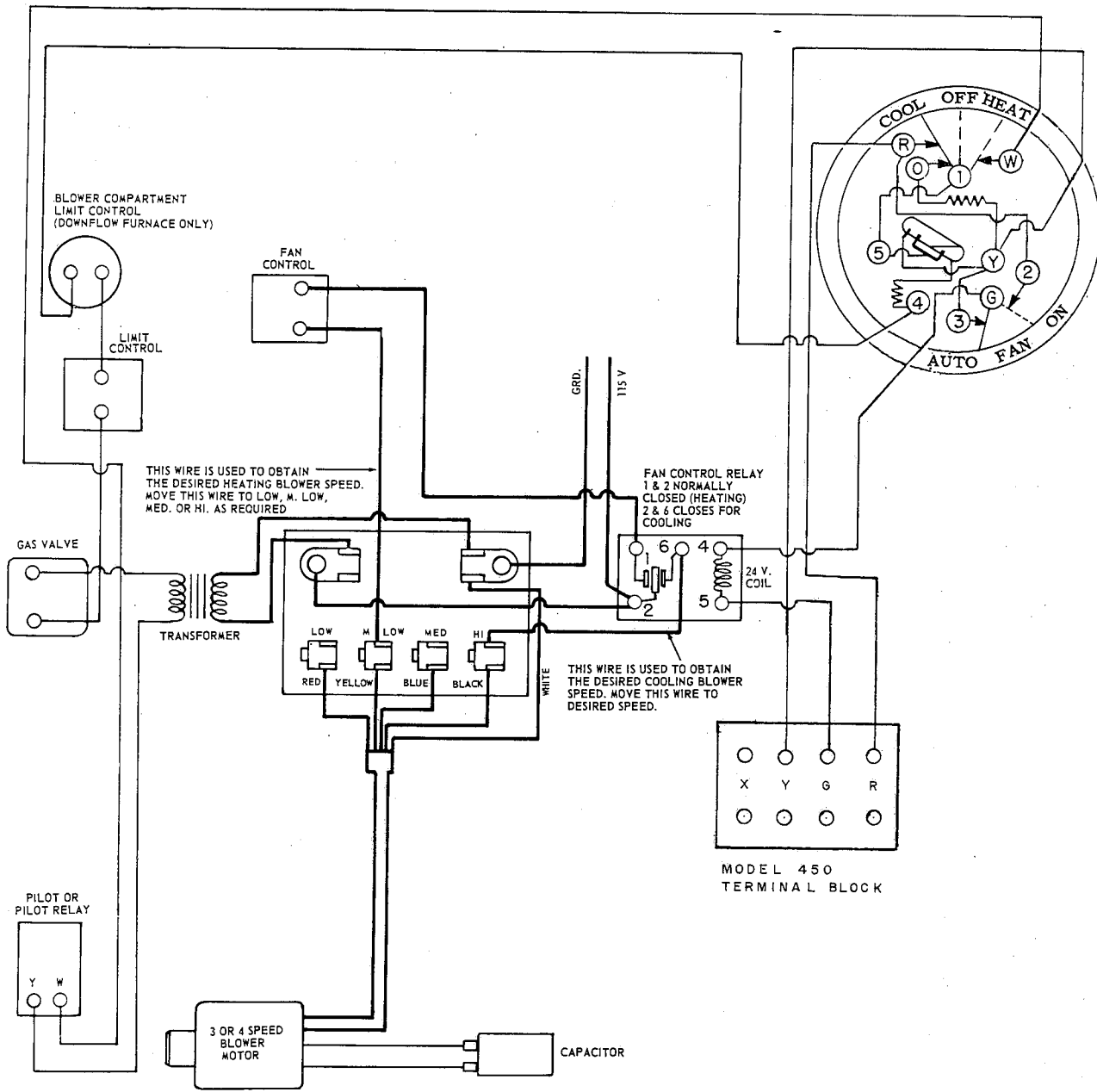


Figure 4 - Wiring Diagram - LP Gases



Wiring Diagram Showing Thermostat and Model 450 Terminal Block with Typical Furnace Installation.



TYPICAL  
FURNACE WITH MULTI-SPEED TAPPED BLOWER

Wiring Diagram



## V. CHARGING THE SYSTEM WITH WATER

*Caution:* Do not run the pump dry. Freezing conditions will not damage the pump, but do not attempt to operate pump when chiller or chilled water lines are frozen.

1. Remove belt from condenser fan.
2. Turn off main manual gas shut-off valve.
3. Remove top cover from water chiller tank. Remove container of chilled water additive stored in tank.
4. Fill tank with tap water until distribution pan at top is covered with water. A garden hose is useful for this operation.
5. Disconnect line at chiller inlet. (When installing the chilled water lines, it is advisable to leave this connection open until lines have been flushed). Start pump. Allow pump to operate until all foreign matter has been flushed from the pipes. *It is recommended that the garden hose be used to supply water continuously to the tank during this cleaning period.*
6. Turn off pump. Make pipe connection to chiller inlet.
7. Refill the chiller tank with tap water and remove garden hose.
8. Start pump and, while water is circulating, check for leaks throughout the chilled water system.
9. Adjust the water level in the chiller while the pump is still running. This is accomplished by removing the water level pipe cap as shown in Figure 5. When water ceases to drain, the level is properly adjusted. Replace the drain cap. Turn off the pump. (If no water flows when the drain cap is removed, refill the tank and repeat the draining operation to adjust the water level).
10. Add chilled water additive (packed in chiller tank). The package supplied is sufficient for chilled water systems containing up to 20 gallons of water. For systems larger than 20 gallon capacity, add one-half (1/2) package for each additional 10 gallon capacity or fraction thereof. (Consult Bryant distributor for estimating chilled water circuit capacities).
11. Replace the lid on the chiller tank.
12. Replace the condenser fan belt. Adjust tension.
13. The system is now ready to operate.

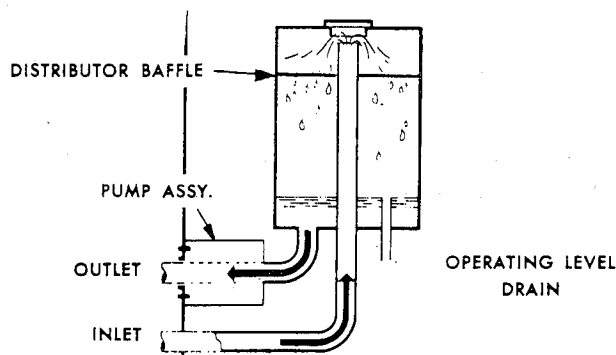


Figure 5

## VI. CHECK-OUT AND OPERATION

1. Be sure the condenser fan guard has been installed properly.
2. Be sure main manual gas valve is off. Light pilot as described on instruction plate.
3. Set thermostat to "Cool"; set thermostat fan switch to "Auto"; and set thermostat below room temperature.
4. Turn on main electric switch to unit.
5. Observe condenser fan operation; adjust belt tension if necessary.
6. Check indoor fan operation by turning thermostat fan switch to "on" for continuous fan operation. Move thermostat above room temperature and observe that the indoor fan remains on.
7. To place the system in operation, open the main manual gas valve, replace the front panel (all panels), and set the thermostat at the desired temperature.

**High Temperature Cut-Out.** The high temperature circuit includes a high temperature control located on right side of generator plus a high temperature relay (lockout relay) located in control box. If the generator becomes overheated the contacts in the high temp control open, causing the high temp relay to go into lockout position. The gas valve closes, the fans and pump stop, and they will not recycle until the lockout relay is reset. To reset lockout relay turn electric power off and then back on. **Be sure to locate and correct cause for high temp cut-out.**

## VII. ADJUST GAS INPUT

Gas input should agree with that shown on the rating plate of the unit. The burners are equipped with fixed orifices intended to give the correct gas input with a manifold pressure of 2.6" w.c., using 1030 BTU natural gas of 0.63 S.G. **Before lighting burners, inspect to be sure that they have not become dislodged or cocked during shipment and installation.**

To measure gas input, proceed as follows:

1. Adjust primary air if necessary.
2. Measure the gas input at the meter. Be sure all other gas appliances are turned off. Input at the burners may be increased or decreased slightly by adjustment of the regulator in the burner supply line.

*Caution:* Prolonged operation of the unit should not be attempted with the front panel off. The unit may be run for short periods with the panel removed.

## VIII. BALANCE THE SYSTEM

After the unit is in operation and the input has been measured and adjusted to agree with the rating plate requirements, balance the system.

Any approved method of checking the air flow over the water coil may be utilized. Reference is made to the Bryant Service Manual on Gas Air Conditioners for a review of standard methods.

## IX. PURGE NON-CONDENSIBLES

Purging is accomplished through Valve "A" as shown in Figure 6, and at Valve "D" at the purge pot.

Operate unit for a minimum of 15 minutes. While still operating, proceed as follows:

1. Open Valve "D" at purge pot about 1/8 turn. Solution trapped in valve body will appear as soon as valve opens. If non-condensibles are present they will follow this surge of solution. When solution re-appears in quantity the non-condensibles trapped in the purge pot will have been released. Close Valve "D".

2. Attach purge line to Valve "A" as shown in Figure 6 and place free end of purge line in bucket of water.

3. Open Valve "A" about 1/8 to 1/4 turn. If non-condensibles are present, bubbles will rise to the surface of the water in the bucket.

4. Leave Valve "A" open until the bubbles cease and ammonia starts to escape through the purge line. Presence of ammonia will be clearly indicated by a sharp, crackling sound (the sound of absorption). Close Valve "A".

The installation should now be complete.

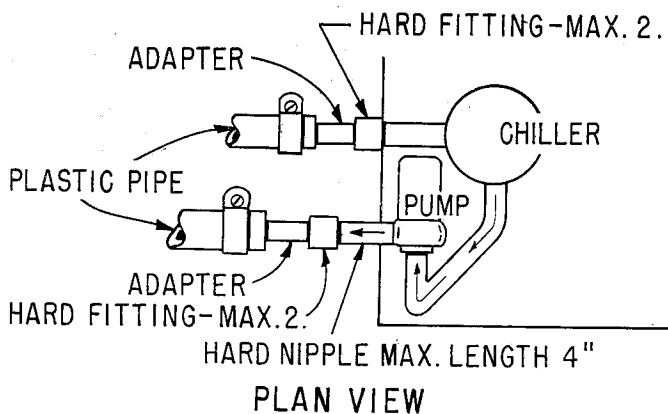


Figure 7

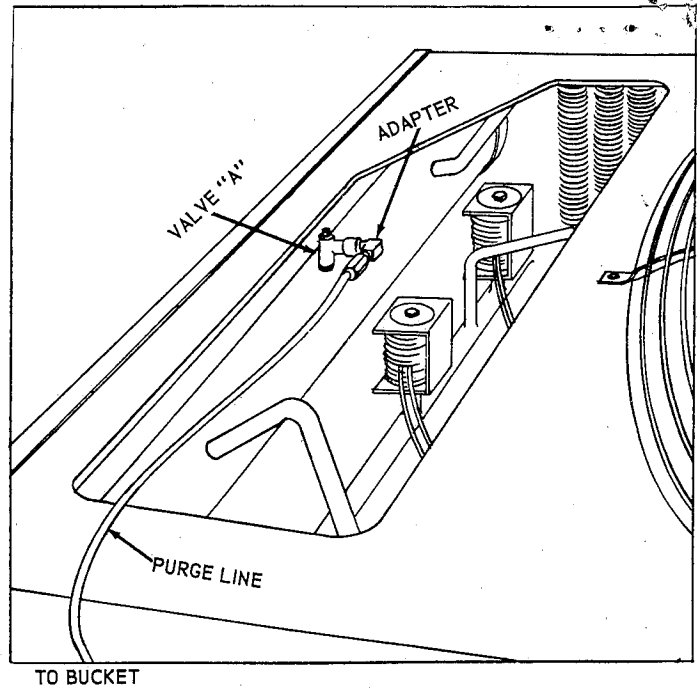


Figure 6

## FREEZING WEATHER PROTECTION

### 1. GAS AIR CONDITIONER

The Gas Air Conditioner has built-in freeze protection sufficient to protect the chiller and pump plus a small amount of external hard (non-plastic) pipe as shown in Figure 7.

### 2. CHILLED WATER PIPES

If hard pipe is used (instead of plastic) for the chilled water lines, be sure that adequate steps are taken to prevent these pipes from bursting when they are subjected to freezing temperatures.

Consult Bryant Distributor.

### 3. BRYANT COIL

If the Bryant coil used with the absorption unit is subject to freezing it must be protected. Consult Bryant distributor for recommended procedure to follow.

### 4. OPERATION AT FREEZING TEMPERATURES

If the air conditioning system is required to operate under freezing conditions, consult your Bryant Distributor for special procedures to follow.