## I - INTRODUCTION

The HS12 was introduced in 1977 for condominium, apartment housing and duplex housing applications. The unit contains 2 separate refrigerant systems which are circuited through a 50/50 split condensing coil. These circuits hook up to 2 independent indoor systems.

The unit adapts to both RFCII and expansion valve systems. Two RFCII orifices are shipped with unit for installation at evaporator coil. Expansion valve kit information is available in the evaporator section of the Engineering Handbook. Since these valves have a bleed-off feature, hard start kits are not necessarily needed. However, hard start kits are available and information can be found in the "Cross Reference Section" of the Lennox Repair Parts Handbook.

The refrigerant connections are compression fittings. Crankcase heaters (P-8-8852) are optional as well as a solid state PTC start device (LB-29901CA). A condenser guard package (LB-34206BA) is also available.

Figure 1 shows a cutaway of the HS12.

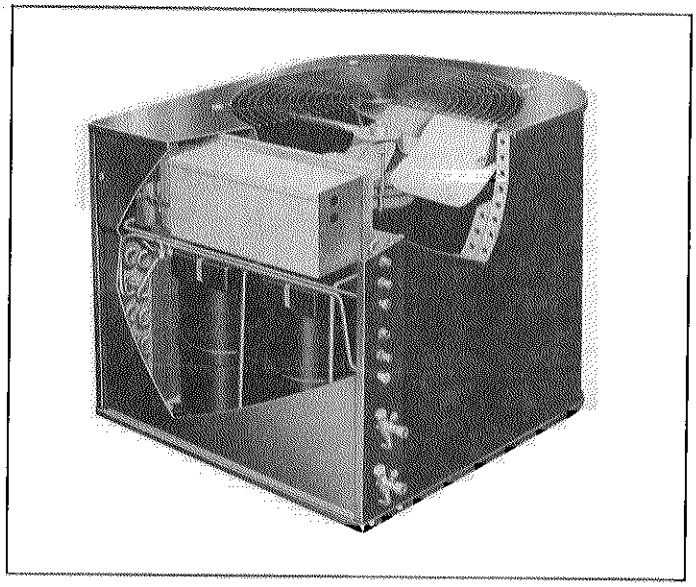


FIGURE 1

## II - UNIT INFORMATION

### A - Specifications

| Model No. | | | HS12-141/141 | HS12-211/211 | HS12-261/261 | HS12-311/311 |
|---|---|---|---|---|---|---|
| Condenser | Net face area (sq. ft.) | Outer coil | 11.8 | 11.8 | 11.8 | 15.1 |
| | | Inner coil | --- | --- | 7.8 | 7.2 |
| | Tube diameter (in.) & No. of rows | | 3/8 — 1 | 3/8 — 1 | 3/8 — 1.66 | 3/8 — 1.48 |
| | Fins per inch | | 14 | 20 | 20 | 20 |
| Condenser Fan | Diameter (in.) & No. of blades | | 20 — 4 | 20 — 4 | 20 — 4 | 20 — 4 |
| | Motor horsepower | | 1/4 | 1/4 | 1/4 | 1/3 |
| | Cfm (factory setting) | | 3200 | 3200 | 3200 | 3700 |
| | Rpm (factory setting) | | 1040 | 1040 | 1040 | 1060 |
| | Watts (factory setting) | | 280 | 290 | 290 | 400 |
| Refrigerant — 22 charge furnished | | | 2 lb-10 oz./2 lb-8 oz. | 2 lb-11 oz/2 lb-14 oz. | 3 lb-8 oz/3 lb-12 oz. | 3 lb-14 oz/3 lb-14 oz. |
| Liquid line (o.d. in.) connection | | | 3/8 comp. | 3/8 comp. | 3/8 comp. | 3/8 comp. |
| Suction line (o.d. in.) connection | | | 5/8 comp. | 5/8 comp. | 5/8 comp. | 3/4 comp. |
| Shipping weight (lbs.) 1 Package | | | 230 | 245 | 262 | 275 |

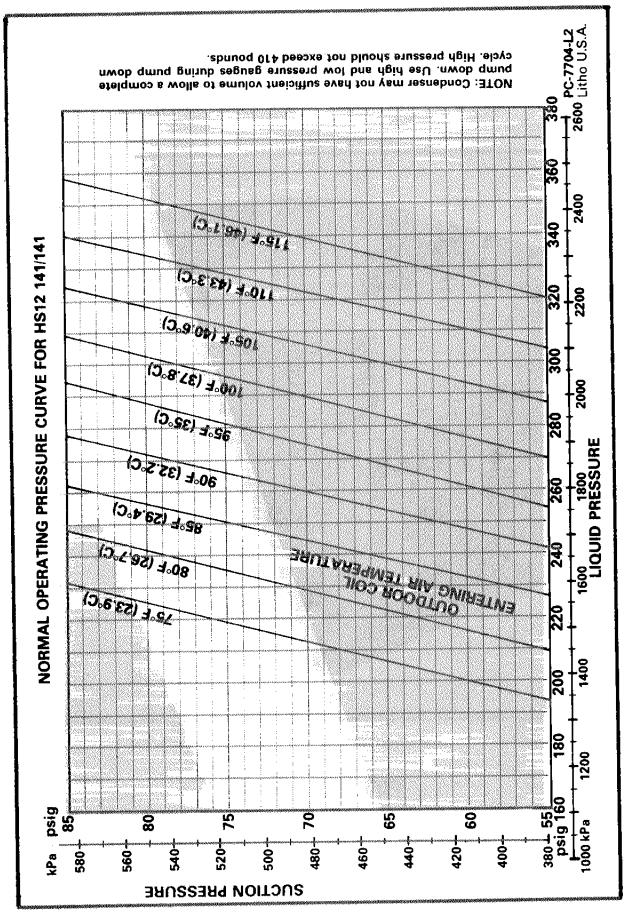
### B - Electrical Data

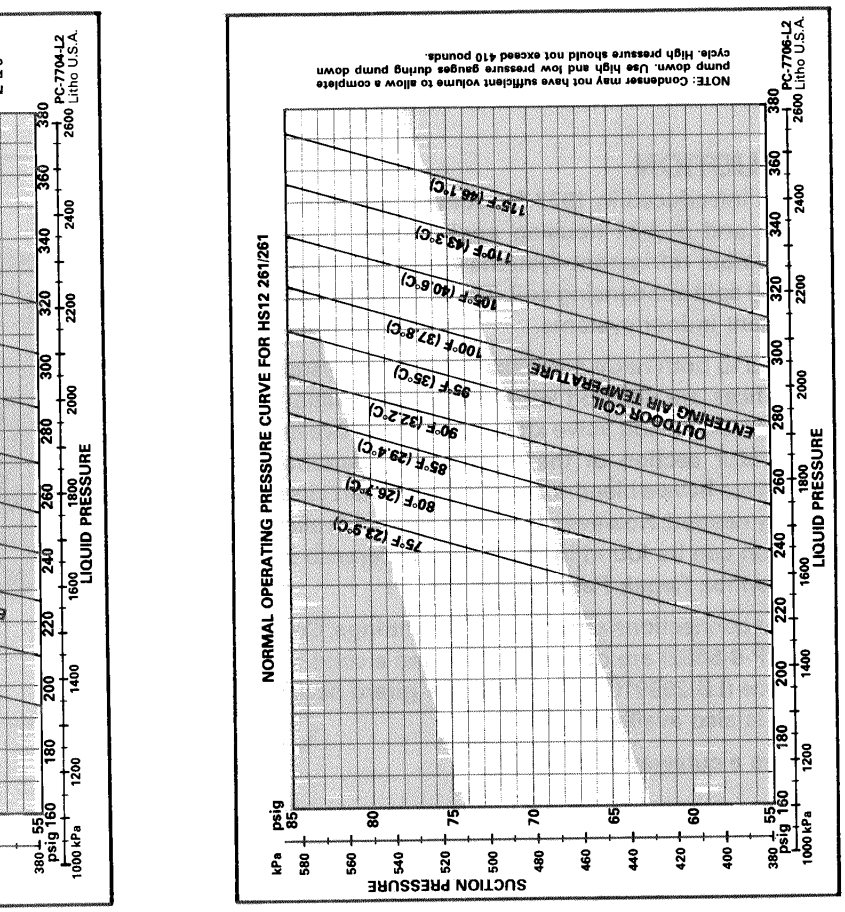
| Model No. | | HS12-141/141 | HS12-211/211 | HS12-261/261 | HS12-311/311 |
|---|---|---|---|---|---|
| Line voltage data | | 208/230v 60 hz — 1ph | 208/230v 60 hz — 1ph | 208/230v 60 hz — 1ph | 208/230v 60 hz — 1ph |
| Compressors (2) | Rated load amps | 7.6/7.6 | 11.3/11.3 | 12.6/12.6 | 15.9/15.9 |
| | Power factor | .94/.94 | .93/.93 | .96/.96 | .92/.92 |
| | Locked rotor amps | 40/40 | 57/57 | 61/61 | 85/85 |
| Condenser fan motor | Full load amps | 1.6 | 1.6 | 1.6 | 2.2 |
| | Locked rotor amps | 2.6 | 2.6 | 2.6 | 3.8 |
| *Minimum circuit ampacity | | 11.1/11.1 | 15.7/15.7 | 17.4/17.4 | 22.0/22.0 |

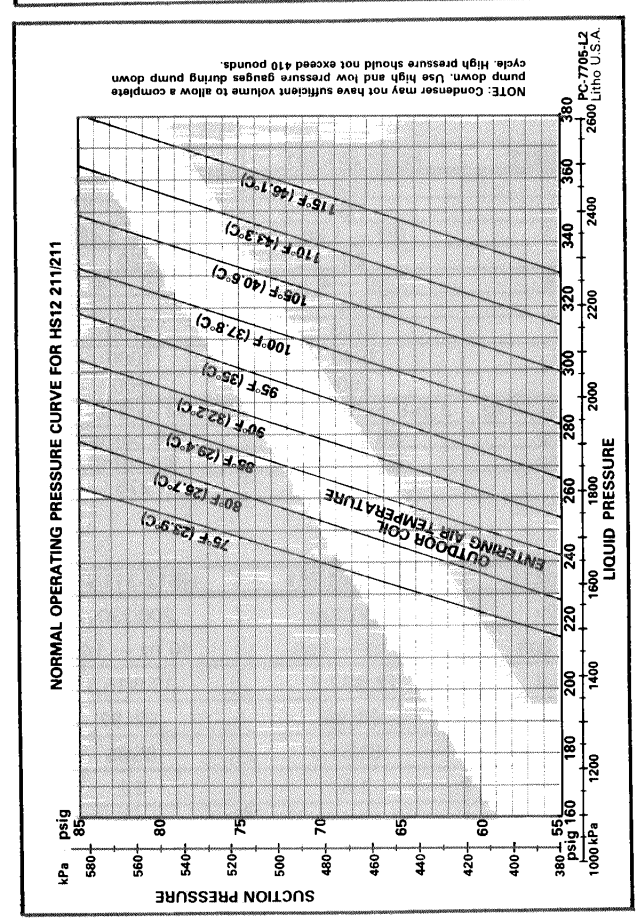
* Refer to National Electric Code manual to determine wire, fuse and disconnect size requirements.

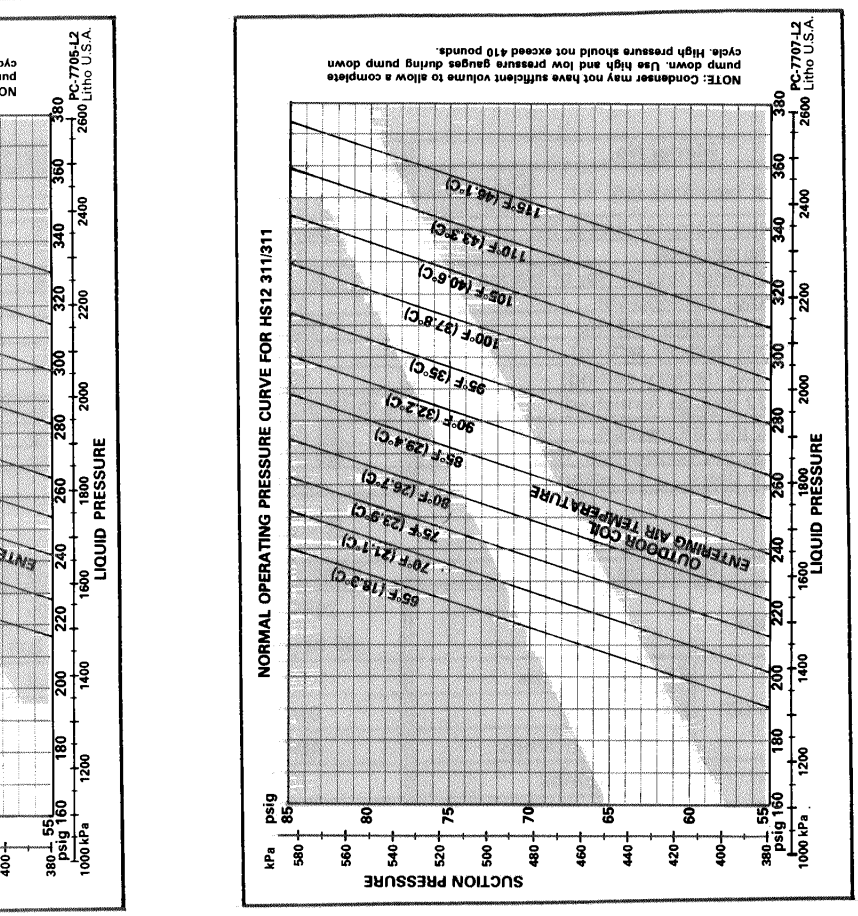
NOTE - Extremes of operating range are plus 10% and minus 5% of line voltage.

# C - Pressure Curves



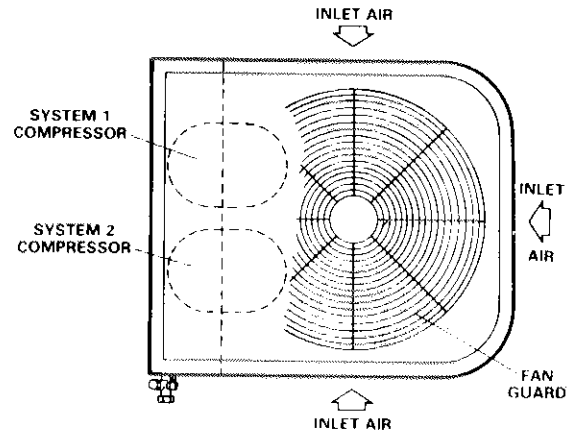



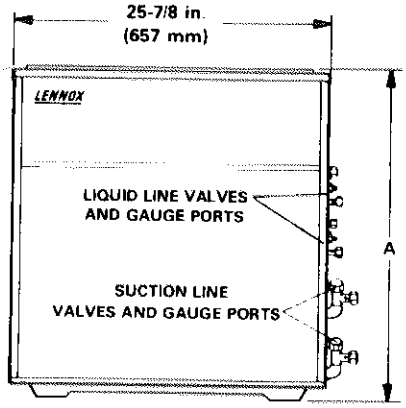



## D - Dimensions

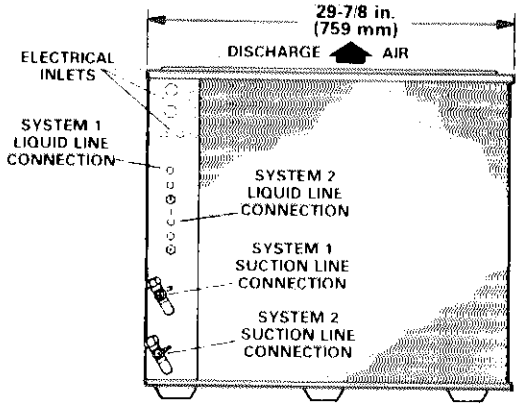
# UNIT DIMENSIONS

| MODEL NO. | DIMENSION A | |
|---|---|---|
| | in. | mm |
| HS12-141/141<br>HS12-211/211 | 26-1/2 | 673 |
| HS12-261/261 | 26-1/2 | 673 |
| HS12-311/311 | 33-1/2 | 851 |




FRONT VIEW




SIDE VIEW

## E - Optional Fan Control Kit (LB-35985BA)

The HS12 is built so the condenser fan runs off system 2 whenever system 2 is on, even though system 1 may have initiated the demand. The Fan Control Kit assures that condenser fan operation is charged to the system that initiated the demand. If the initial system shuts off while the other system is operating, the fan usage will automatically shift. Figure 2 illustrates the wiring hook-up.

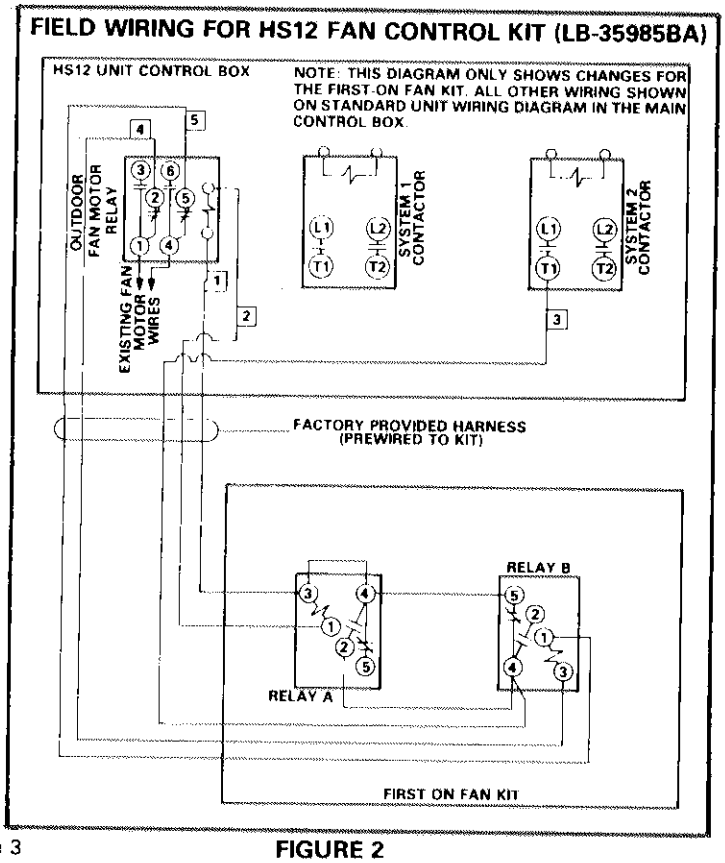


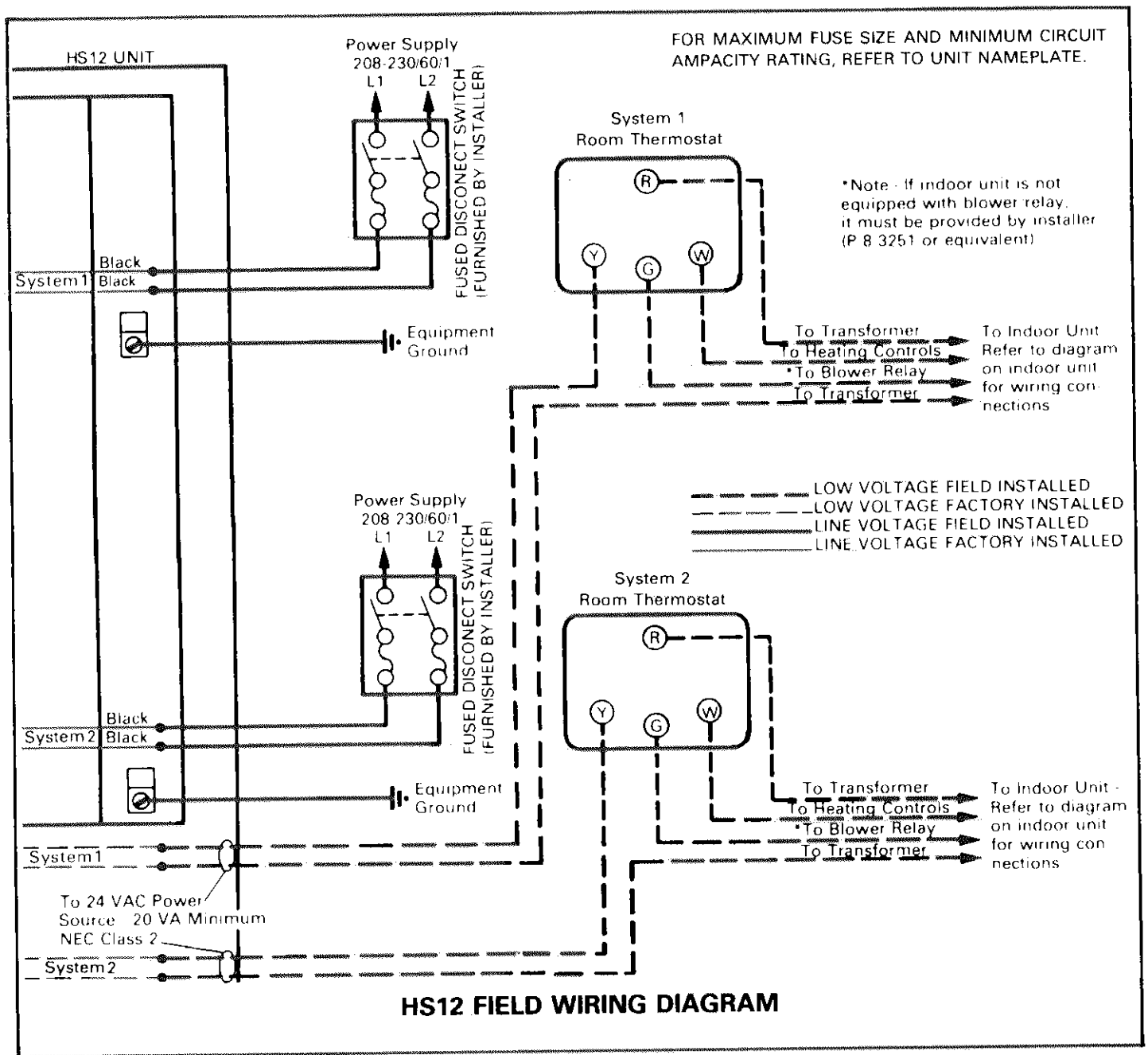

FIGURE 2

## F - Field Wiring

High voltage leads provided in make-up area of control box are labeled for connection to power supply. It is imperative that the power supplies be in phase; otherwise the Outdoor Fan Relay could be subject to damage. See Figure 3. Ground lugs are provided in high voltage make-up area.

Note on unit wire sizing & fuse selection - Minimum circuit ampacity and maximum fuse size are listed on the unit rating plate and in the Engineering Handbook. The unit supply wire size must be obtained from the appropriate Table 310 in the National Electric Code Book. Lennox recommends using the Maximum Fuse Size listed to prevent nuisance tripouts.

Low voltage connections are made at the terminal strip located in the low voltage junction box.




**HS12 FIELD WIRING DIAGRAM**

**FIGURE 3**

## III - REFRIGERANT SYSTEM

Liquid valves, suction valves and service gauge ports are located on the outside of cabinet. Refer to Figure 4. The valves do not backseat. The gauge ports can not be shut off by back seating the valve.

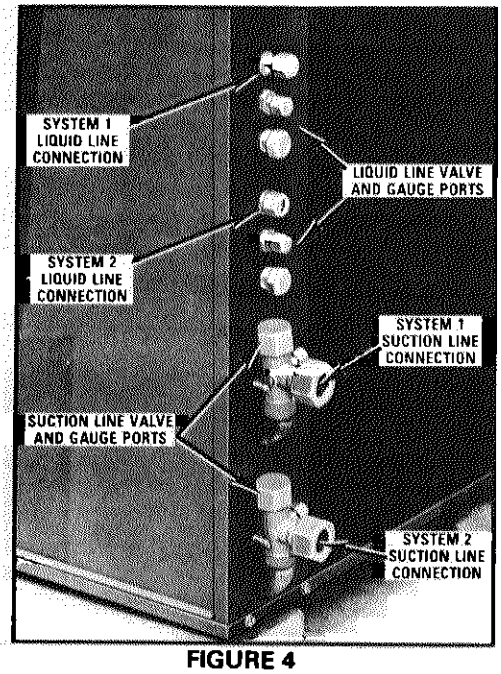



FIGURE 4

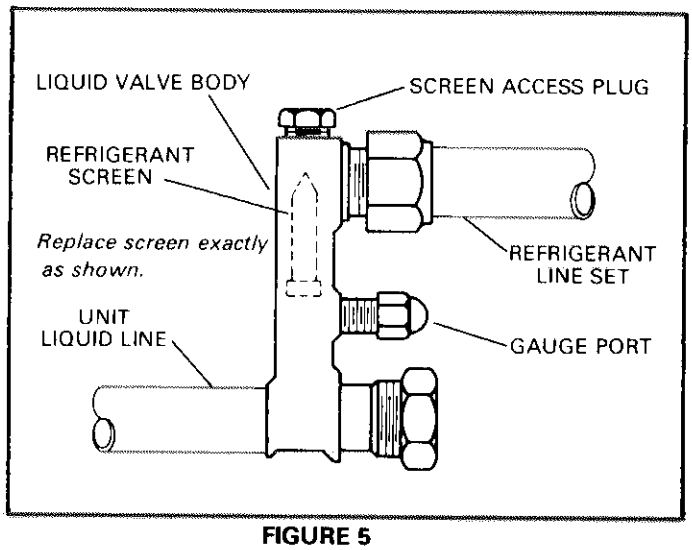



FIGURE 5

This unit may be pumped down so that repairs can be made on the low side of either system without losing the complete refrigerant charge. Special liquid line gauge ports are provided in the unit liquid lines between the condenser coil and liquid valve for system pumpdown.

*WARNING - Condenser coil may not have sufficient volume to allow a complete pump down. Always connect a high pressure gauge to the liquid line gauge port during system pump down. High pressure must not exceed 300 psig.*

### HS12 EXPLODED VIEW

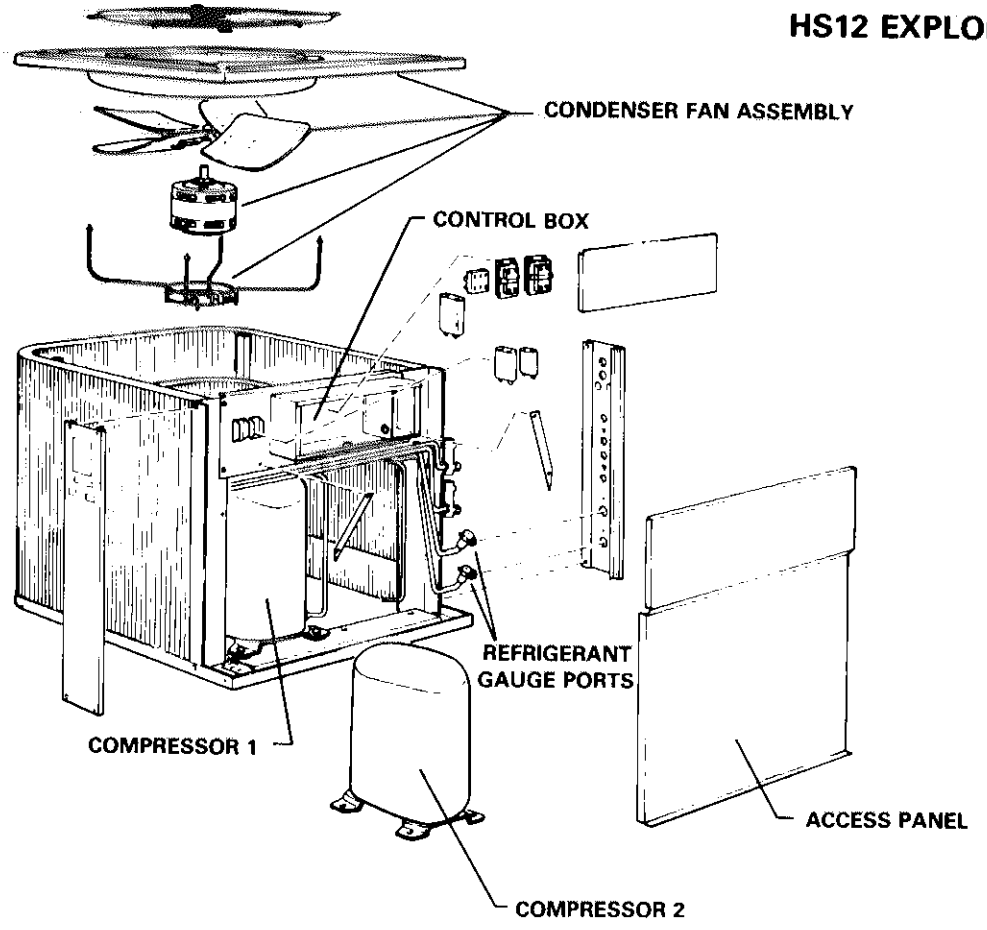



FIGURE 6

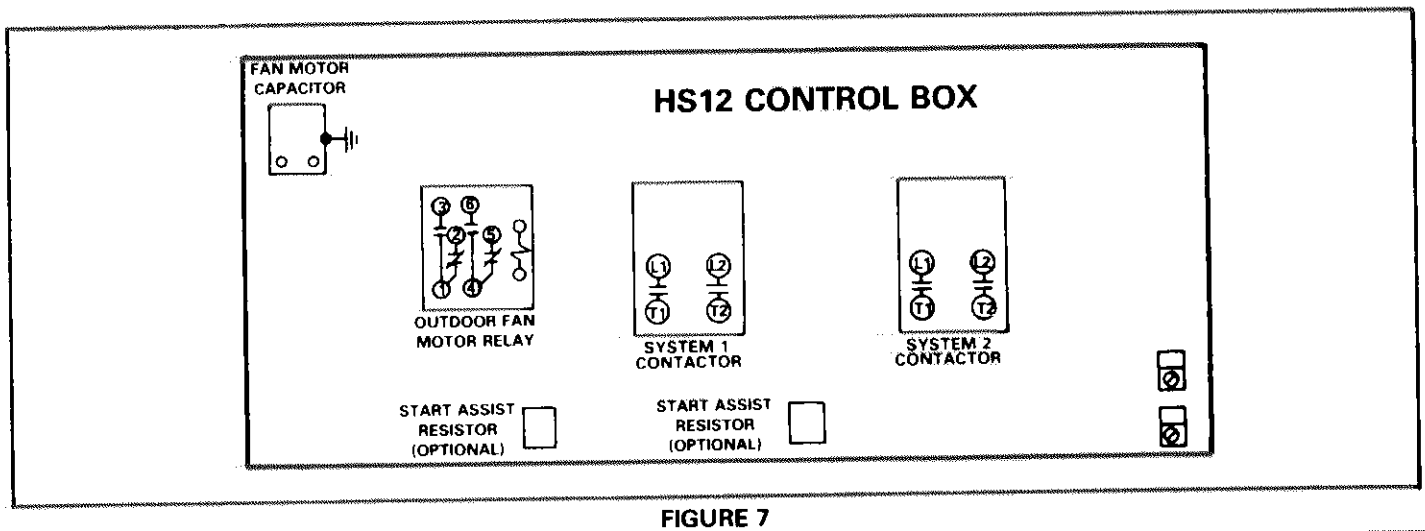



**FIGURE 7**

Each unit is furnished with a normal operating pressure curve. The curve uses suction pressure, discharge pressure and outdoor temperature comparison. To use the chart, first check suction pressure, then move over to the outdoor temperature and finally down to the discharge pressure. If the discharge pressure is within five pounds of this reading, the unit is properly charged, providing the three conditions meet in the unshaded area of the chart. If they meet in the shaded area, there is something wrong with the system and further checks are needed.

The liquid valves have in-line refrigerant strainers. This strainer should be checked should any of the following conditions occur: if the refrigerant system becomes contaminated for any reason, when foreign residue or particles enter the system, if a high liquid pressure gauge reading is registered at the liquid valve gauge port or when the refrigerant system has been opened for component replacement. Replacement strainers are available (68A4101).

Remove and replace strainer as follows:

1 - Pump down low side of system.
2 - Remove strainer access plug from valve body using caution to prevent contaminants and foreign particles from entering refrigerant system.
4 - Install replacement screen in valve body as shown in Figure 5.
5 - Replace access plug in valve body and tighten.
6 - Restore system to normal operation.

## IV - COMPONENTS

Figure 6 shows an exploded view of an HS12.

### A - Control Box (Figure 7)

1 - **Compressor Contactors**
Energize respective compressor upon demand.
2 - **Outdoor Fan Motor Relay**
Determines what system the condenser fan motor runs off of. Isolates the two systems.

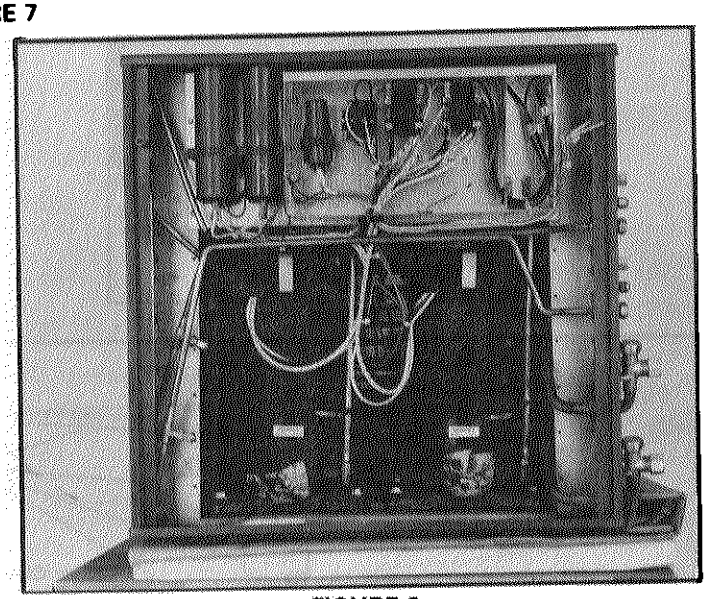


**FIGURE 8**

### B - Compressor Compartment (Figure 8)

1 - **Compressors**
Each compressor is equipped with an internal pressure relief valve. This valve opens at a discharge and suction differential of 450 psig ± 50. All the compressors, except the 141, are also equipped with an internal overload. The 141 compressor uses an external overload.
2 - **Crankcase Heater (Optional)**
A crankcase heater is available (P-8-8852). It is energized continuously.

### C - Condenser Coil Compartment

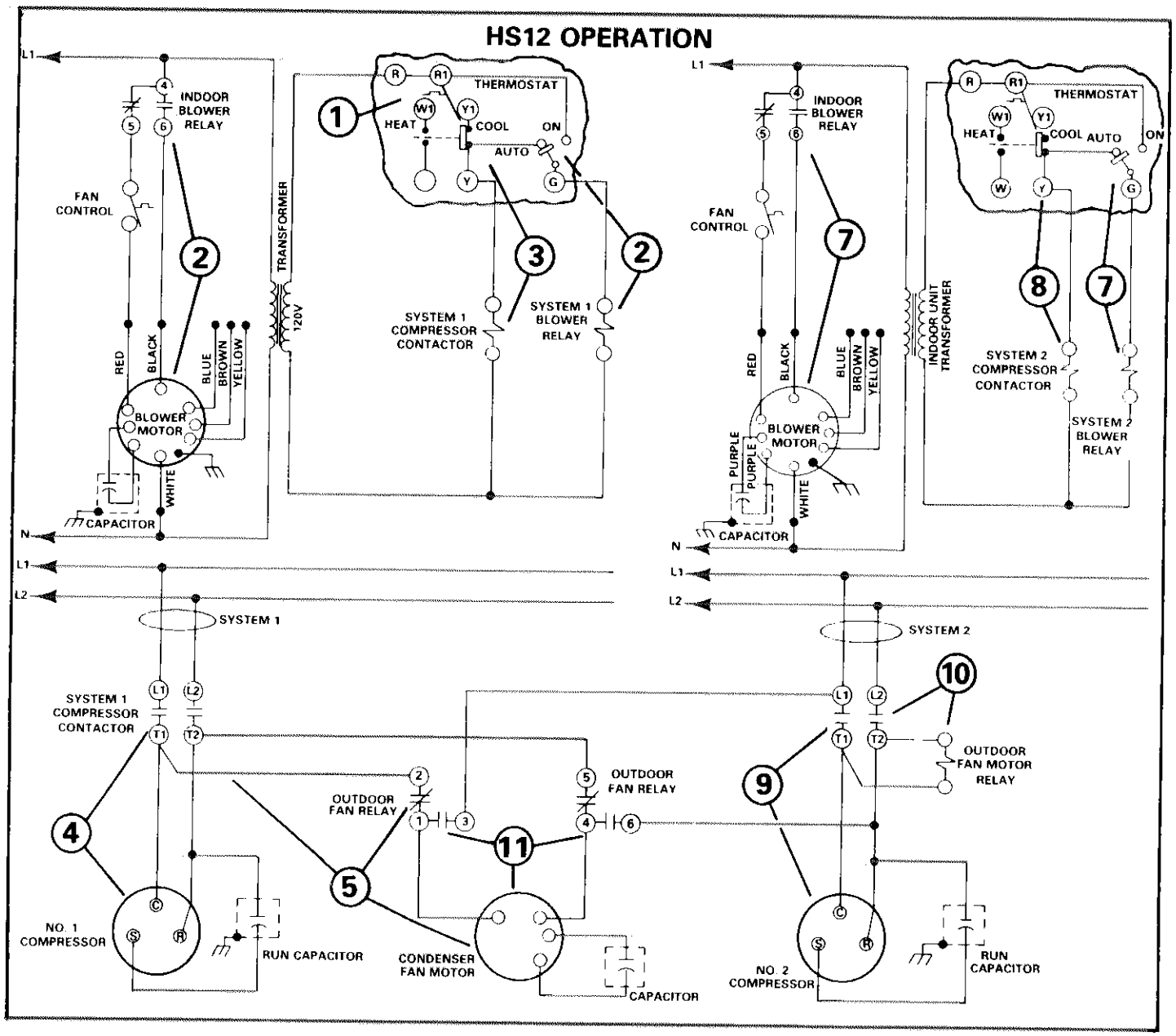
The unit utilizes a draw through coil with vertical discharge. Fan motor is prelubricated for an extended period of operation. Some motors employ ball bearing motors which need no further lubrication. Check motor for lubrication requirements.

# V - SCHEMATIC WIRING DIAGRAM OPERATING SEQUENCE

Each of the steps within this section are labeled in the diagram.

## HS12 Operation

1 - The System 1 thermostat makes on a cooling demand.
2 - If the System 1 thermostat is set on "Auto", the Blower Relay is energized. The Blower Relay closes its N.O. contacts to energize the Blower Motor at cooling speed.
3 - The System 1 thermostat also energizes the System 1 Compressor Contactor.
4 - System 1 Compressor Contactor closes its N.O. contacts to energize NO. 1 Compressor.
5 - System 1 Compressor Contactor also energizes the Condenser Fan Motor through the N.C. contacts of the Outdoor Fan Relay.
6 - The System 2 thermostat makes on a cooling demand.
7 - If the System 2 thermostat is set on "Auto", the Blower Relay is energized. The Blower Relay closes its N.O. contacts to energize the Blower Motor at cooling speed.
8 - The System 2 thermostat also energizes the System 2 Compressor Contactor.
9 - System 2 Compressor Contactor closes its N.O. contacts to energize the No. 2 Compressor.
10 - System 2 Compressor Contactor also energizes the Outdoor Fan Relay.
11 - The Outdoor Fan Relay closes its N.O. contacts to energize the Condenser Fan Motor through System 2. The motor will continue to operate off of system 2 until that thermostat is satisfied.



# HS12 with Fan Control Kit (LB-35985BA)

**System 1 on first:**

1 - The system 1 thermostat makes on a cooling demand.
2 - If the system 1 thermostat is set on "Auto", the Blower Relay is energized. The Blower Relay closes its N.O. contacts to energize the Blower Motor at cooling speed.
3 - The system 1 thermostat also energizes the System 1 Compressor Contactor.
4 - System 1 Compressor Contactor closes its N.O. contacts to energize No. 1 Compressor.
5 - System 1 Compressor Contactor also energizes the Condenser Fan Motor through the N.C. contacts of the Outdoor Fan Relay. In addition it energizes "B" Relay.
6 - "B" Relay then opens its N.C. contacts. This prevents the Outdoor Fan Relay from being energized should system 2 start. Fan operation will remain on system 1 until its demand is satisfied.

**System 2 on first:**

7 - The system 2 thermostat makes on a cooling demand.
8 - If the system 2 thermostat is set on "Auto", the Blower Relay is energized. The Blower Relay closes its N.O. contacts to energize the Blower Motor at cooling speed.
9 - The system 2 thermostat also energizes the System 2 Compressor Contactor.
10 - System 2 Compressor Contactor closes its N.O. contacts to energize the No. 2 Compressor.
11 - System 2 Compressor Contactor also energizes "A" Relay and Outdoor Fan Relay through the N.C. contacts of "B" Relay.
12 - The Outdoor Fan Relay closes its N.O. contacts to energize the Fan Motor.
13 - "A" Relay latches on through its N.O. contacts to keep the Outdoor Fan Relay energized. Fan operation will remain on System 2 until its demand is satisfied.

## HS12 WITH FAN CONTROL KIT