

SUPERSEDES BULL. TCI-507E DATED APRIL, 1965 AND TCI-532C DATED MARCH, 1966

ALWAYS USE THE INSTALLATION INSTRUCTIONS SHIPPED WITH THE EQUIPMENT. BULLETINS WITH AN EARLIER DATE SHOULD BE DISCARDED.

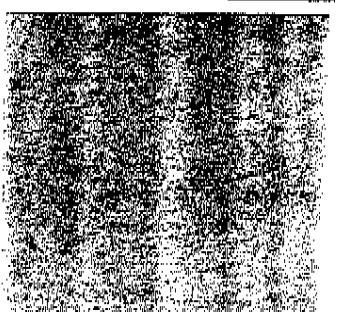
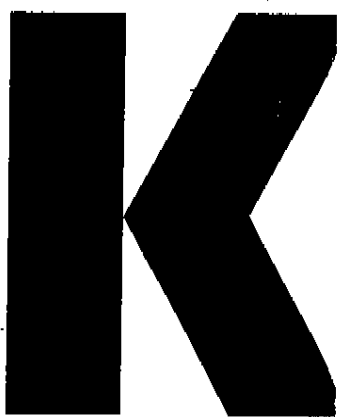
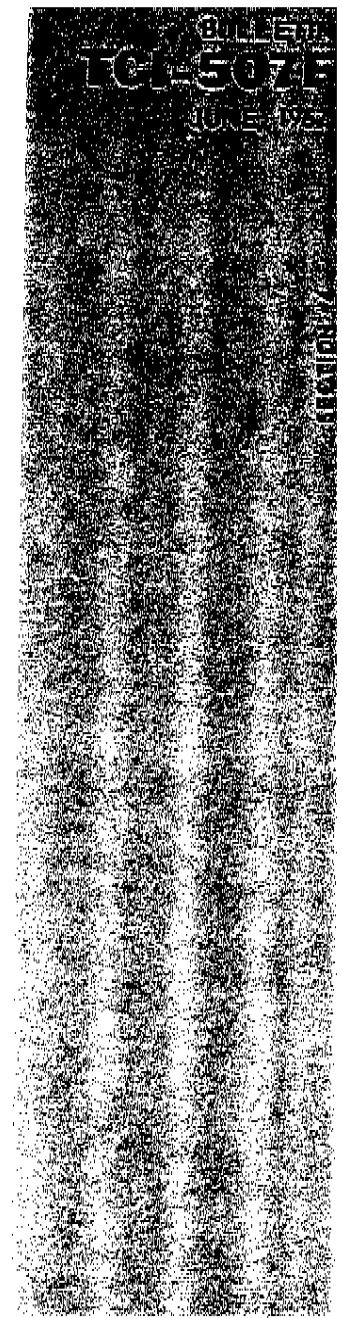
# THERMOBANK- COMPRESSOR SYSTEMS

- Refrigerant 12 - L12 Models (0° to -20° Box)
- Refrigerant 502 - L52 Models (0° to -30° Box)
- Refrigerant 22 - F22 Models (+10° to +35° Box)

## INSTALLATION INSTRUCTIONS

**KRAMER TRENTON CO. Trenton, N. J.**

54 YEARS OF CONTINUOUS ACHIEVEMENT IN HEAT TRANSFER



**READ THESE INSTALLATION INSTRUCTIONS ALL THE WAY THROUGH BEFORE STARTING WORK**

## THERMOBANK-COMPRESSOR SYSTEM

THIS EQUIPMENT SHOULD ONLY BE INSTALLED BY A COMPETENT REFRIGERATION MECHANIC

If the system is not equipped with Winterstat, it must be located where the air temperature will not go below +50° F. (L & F Models)

If the system is equipped with Winterstat, it may be located where the air temperature will drop as low as -40° F. (LS, LSH, LSEH, FS, FSH, & FSEH Models)

Do not remove shipping skid until compressor is at the actual point of installation. Do not use shipping skid as a permanent base.

### GENERAL PROCEDURE

1. **RIGGING:** Follow instructions in figures 12A and 12B on page 12. Use spreader bars when rigging.
2. Install Thermobank-Compressor in a level position on a firm support. If located near a wall, units 10 H.P. and larger should be placed at least 3 feet from it; units smaller than 10 H.P. at least 2 feet away.
3. **REFRIGERANT PIPING:** (See tables 4A and 5A). Refer to schematic piping diagrams, figures 9A, 9B, 10A and 11A. Refrigerant velocities in risers with upward gas flow must be sufficient for oil return. Install a "P" trap at the bottom of every riser. Install factory supplied drier, sight glass (if shipped unmounted), and expansion valve. Follow manufacturer's instructions included in expansion valve package.  
With multiple evaporators, branch suction lines from individual evaporators must "gooseneck" into the suction main. When using high temperature solder, pass dry nitrogen through the lines to prevent scaling.  
**PITCH HORIZONTAL SUCTION AND DISCHARGE LINES:** Pitch all suction lines and discharge lines at least 1/4" per foot in direction of flow. Use a spirit level to check the pitch.  
**SIGHT GLASS:** The sight glass (supplied) should be installed immediately adjacent the receiver outlet (King) valve, and before the drier or any other components. There should be a short straight run of tubing between the outlet of the King valve and the inlet of the refrigerant sight glass, with no elbows, bends, or other obstructions. If an additional sight glass is desired at the drier outlet or expansion valve, it should be procured locally.  
**HOT GAS LINE:** Hot gas lines must never be insulated.
4. **HOT GAS TEE:** On evaporators without heated drain pans (31° box or higher only), install hot gas tee (supplied) at inlet of the evaporator, after TXV. All TV units have heated drain pans.
5. **HOT GAS CHECK VALVES:** On multiple evaporator systems, or where more than one expansion valve is required, install hot gas check valves (supplied) in the branch lines as indicated, if not already factory installed.
6. **DRAIN LINES:** Make drain lines same diameter as the evaporator drain and pitch continuously at least 1/2" per foot. Hot gas and drain lines must be soldered together for their entire run within the refrigerator and through the insulated wall.
7. **LIQUID SOLENOID:** Supply and install liquid solenoid valve near expansion valve inlet if pumpdown cycle is required (see paragraph P page 6, and table 7A).
8. **HEAT EXCHANGER:** Install heat exchanger as close as possible to the point where the suction line goes through the insulated wall.
9. **WIRING CONNECTIONS:** Wire fused power supply to the power terminals in control box. Refer to wiring diagram in compressor control panel cover. Use separate fused disconnect switches if required by codes. In units with bank heaters connect a separate fused power supply to the heater and set Bank heater thermostat for 120°. Wire evaporator fan motor(s) and wire box thermostat in series with liquid solenoid valve to terminals in control panel as shown in wiring diagram.
10. **ELECTRICAL GROUND:** In order to guard against shock hazard, it is essential that a secure electrical ground be provided to unit chassis or control panel.  
Attach warning label No. 103 (included in instruction packet) to outside of fused disconnect switch or circuit breaker.
11. **FILL BANK:** Fill Bank with water through filler plug before starting system and cap immediately. In small units with Bank electric heater, it may be necessary to remove heater for filling; if so replace heater after filling Bank with water. Do not add any glycol or antifreeze. Set Bank heater for 120°.

# THERMOBANK-COMPRESSOR SYSTEMS

12. The shipping nuts holding the compressor down on its springs must be removed or backed off so that they do not in any way interfere with compressor movement during operation.
13. Check all soldered, flanged, and gasketed joints and valve packing - both field and factory-made - for leaks. (See paragraph C)
14. Evacuate system using specified vacuum pump and vacuum gage. (See paragraph E)
15. Charge and recheck for leaks.
16. Check and adjust all controls as necessary. (See

pages 6 and 7)

17. Before starting, check the routing of armored cable and small diameter tubing so that vibration generated chafing, which might lead to leaks does not occur.  
Electrical connections which were securely tightened at the factory may have loosened during shipment. Check all connections, before starting, for tightness.
18. After starting, check all refrigerant piping, both field and factory assembled, for vibration and secure as necessary. Piping may require clamps to stop vibration that did not occur during factory inspection.

## DETAILED INSTRUCTIONS

For trouble-free operation and long compressor life, no moisture, air, or dirt must be present in the system.

### A OPENING OF SEALED LEADS

Do not open sealed refrigeration leads until the unit has warmed up to air temperature. This will prevent moisture from the air from condensing inside the tubing. Never leave lines open overnight. Solder caps on all open lines.

### B PIPING

When piping with components located in two different ambients, always pipe from the warmer to colder component.

### C LEAK TEST

After all refrigerant connections are made, add refrigerant till the system pressure is at least 30 PSI. Then pressurize with nitrogen (caution: always use pressure reducing regulator) to 150 PSI. Carefully leak test all factory and field made joints with electronic detector.

### D GASKETED JOINTS

Like all gaskets, refrigeration gaskets compress and sometimes require tightening. Therefore, it is highly advisable to recheck the entire system for leaks after the first ten days to two weeks of operation, with particular attention to all gasketed joints, and tighten as necessary.

### E EVACUATION

Connect a rotary vacuum pump\* to the gage port of the discharge service valve with copper tubing or vacuum hose, not less than 3/8" inside diameter. Compressor suction and discharge service valves must be open. Operate vacuum pump until a vacuum of 1500 microns absolute is obtained. Then break

vacuum with refrigerant. Repeat evacuation and stop the pump at 1500 microns. Again break vacuum with refrigerant. Evacuate for a third time until a vacuum of 500 microns is reached. Break vacuum with refrigerant.

\*Do not start the compressor while the system is under vacuum. Do not attempt to use the compressor as a vacuum pump. Use Cenco, Kinney, or Stokes vacuum pump and Stokes, McLeod, or General Electric Type M vacuum gage. Ordinary service gages for evacuation are not satisfactory.

### F CHARGING

#### (a) Without Winterstat

After the third evacuation, charge the system with the correct (R12, R22 or R502) refrigerant until the sight glass at receiver outlet is clear.

#### (b) With Winterstat

In compressors equipped with Winterstat maintain a head pressure of 120 PSI (R12) or 200 PSI (R22, R502) or higher during charging operation. Do this only by stopping the condenser fan or partially blocking the condenser with cardboard, not by increasing the Winterstat setting. When the sight glass is clear, add the refrigerant charge for Winterstat operation shown in tables 4A or 5A.

### G IMPORTANT INSTRUCTIONS FOR INITIAL START-UP OR RE-START AFTER LONG OFF-CYCLE WITH PUMPDOWN INOPERATIVE

**DO NOT JUST TURN MACHINES ON AND WALK AWAY!**

A compressor may be off for a long period of time without automatic pumpdown for the following reasons:



1. Stoppage on overload, oil safety, high head or other lock out device.
2. Disconnect switch inadvertently pulled.
3. Power failure.
4. New installation is charged but start-up delayed without pumping down.

During an extended shutdown resulting from any of the above conditions, or on initial start-up, liquid refrigerant may flood the evaporator or compressor crankcase. It is necessary to carefully clear these components of liquid to prevent damage to the compressors. This can be accomplished by doing the following:

1. Close liquid solenoid(s).
2. Stop evaporator fans.
3. Re-set those controls which may have tripped.
4. Operate the compressor in very short bursts, starting with 1 or 2 seconds and gradually increasing these periods until the liquid is cleared out. Use pumpdown switch where possible. Stop the machine instantly if knocking is observed.
5. Watch the oil level and suction pressure carefully. Rapid boiling of refrigerant in the crankcase may lower the oil level dangerously. Add oil if necessary. Do not operate continuously at extra low vacuum.
6. After you are sure the liquid refrigerant is boiled off, re-start evaporator fans and re-open liquid solenoids. Attend the system just as you would during initial startup. Do not just turn machines on and walk away.

#### (H) MOISTURE INDICATING SIGHT GLASS

The moisture indicating sight glass must be installed at the liquid outlet of the receiver. The moisture indicating element should be deep green for maximum dryness. If any other color is indicated, take the necessary steps to achieve maximum system dryness. Clean dry systems indicate first class workmanship.

#### (J) EVAPORATOR EXPANSION VALVE/S

Use only expansion valves furnished by Kramer Trenton Company. After box temperature has been brought down to normal, readjust evaporator expansion valve superheat to approximately 5°F. If frost becomes visible on the compressor body, turn superheat adjusting stem 1/2 turn in (clockwise) to increase superheat. Melt frost with external heat and repeat this procedure if frost reappears.

Long runs or high liquid lifts may produce flashing of the liquid at the expansion valve inlet. Check for this possibility before assuming valve is plugged or undersized.

#### (K) LUBRICATION

Check the oil sight glass in each compressor crankcase frequently after startup. If oil level is below

Table 4A - SUGGESTED LINE SIZES (O.D.) AND REFRIGERANT CHARGES

| REFRIGERANT 22 (Except ) |                             |   |       |                  |                         |                       |                               |
|--------------------------|-----------------------------|---|-------|------------------|-------------------------|-----------------------|-------------------------------|
| Model No.                | Total Equip Lgths In Ft. To | Suggested Line Sizes (Type "L" Copper Tube) |       |                  | Refrig. 22 Charge, Lbs. |                       | Oil Re-charge Pints Suniso 3G |
|                          |                             | Lia   | Sucr. | Hot Gas & Disch. | Less Winter-start       | Add. for Winter-start |                               |
| C¼F12*                   | 27                          | 3/8   | 5/8   | 1/2              | * 9.9                   |                       |                               |
|                          | 47                          | 3/8   | 7/8   | 1/2              | *11.1                   | * 3.3                 | 1.5                           |
|                          | 140                         | 3/8   | 7/8   | 5/8              | *16.0                   |                       |                               |
| C1F12*                   | 30                          | 3/8   | 7/8   | 1/2              | *10.5                   |                       |                               |
|                          | 82                          | 3/8   | 7/8   | 5/8              | *12.7                   | * 3.3                 | 1.5                           |
|                          | 115                         | 3/8   | 1-1/8 | 7/8              | *15.7                   |                       |                               |
| C1½F12*                  | 46                          | 3/8   | 7/8   | 5/8              | *15.6                   |                       |                               |
|                          | 65                          | 3/8   | 1-1/8 | 5/8              | *16.4                   | * 4.6                 | 4.5                           |
|                          | 150                         | 1/2   | 1-1/8 | 7/8              | *27.6                   |                       |                               |
| C2F22                    | 20                          | 3/8   | 5/8   | 1/2              | 15.6                    |                       |                               |
|                          | 38                          | 3/8   | 7/8   | 1/2              | 16.3                    | 7.4                   | 4.5                           |
|                          | 100                         | 3/8   | 7/8   | 5/8              | 18.7                    |                       |                               |
| C3F22                    | 56                          | 3/8   | 7/8   | 5/8              | 14.3                    | 9.8                   | 4.5                           |
|                          | 150                         | 1/2   | 1-1/8 | 7/8              | 25.7                    |                       |                               |
| C5F22                    | 26                          | 3/8   | 7/8   | 5/8              | 20.3                    |                       |                               |
|                          | 93                          | 1/2   | 1-1/8 | 7/8              | 26.1                    | 16.2                  | 5.5                           |
|                          | 147                         | 1/2   | 1-3/8 | 7/8              | 30.0                    |                       |                               |
| C7½F22                   | 46                          | 1/2   | 1-1/8 | 7/8              | 24.7                    |                       |                               |
|                          | 75                          | 1/2   | 1-3/8 | 7/8              | 26.6                    | 16.2                  | 6.0                           |
|                          | 132                         | 5/8   | 1-3/8 | 1-1/8            | 36.5                    |                       |                               |
| C10F22                   | 24                          | 1/2   | 1-1/8 | 7/8              | 37.2                    |                       |                               |
|                          | 40                          | 5/8   | 1-3/8 | 7/8              | 40.2                    | 25.6                  | 8.0                           |
|                          | 60                          | 5/8   | 1-3/8 | 1-1/8            | 42.4                    |                       |                               |
|                          | 110                         | 5/8   | 1-5/8 | 1-1/8            | 45.9                    |                       |                               |
| C16F22                   | 25                          | 5/8   | 1-3/8 | 1-1/8            | 70.2                    |                       |                               |
|                          | 44                          | 5/8   | 1-5/8 | 1-1/8            | 72.4                    | 40.4                  | 7.5                           |
|                          | 69                          | 7/8   | 1-5/8 | 1-3/8            | 84.0                    |                       |                               |
|                          | 150                         | 7/8   | 2-1/8 | 1-3/8            | 108.3                   |                       |                               |
| C20F22**                 | 28                          | 5/8   | 1-5/8 | 1-1/8            | 87.7                    |                       |                               |
|                          | 46                          | 7/8   | 1-5/8 | 1-3/8            | 95.6                    | 67.5                  | 16.0                          |
|                          | 120                         | 7/8   | 2-1/8 | 1-3/8            | 113.5                   |                       |                               |
| C25UF22                  | 34                          | 7/8   | 1-5/8 | 1-3/8            | 106.9                   |                       |                               |
|                          | 83                          | 7/8   | 2-1/8 | 1-3/8            | 118.6                   | 71.2                  | 9.0                           |
|                          | 110                         | 7/8   | 2-1/8 | 1-5/8            | 125.6                   |                       |                               |
| C30UF22**                | 20                          | 7/8   | 1-5/8 | 1-3/8            | 129.2                   |                       |                               |
|                          | 45                          | 7/8   | 2-1/8 | 1-3/8            | 135.2                   | 88.5                  | 15.0                          |
|                          | 75                          | 7/8   | 2-1/8 | 1-5/8            | 142.5                   |                       |                               |
|                          | 120                         | 1-1/8                                       | 2-5/8 | 1-5/8            | 173.9                   |                       |                               |
| C50UF22**                | 30                          | 7/8   | 2-1/8 | 1-5/8            | 199.0                   |                       |                               |
|                          | 55                          | 1-1/8                                       | 2-5/8 | 1-5/8            | 215.0                   | 172.0                 | 18.0                          |
|                          | 95                          | 1-1/8                                       | 2-5/8 | 2-1/8            | 231.0                   |                       |                               |
|                          | 130                         | 1-1/8                                       | 3-1/8 | 2-1/8            | 246.0                   |                       |                               |
| C75UF22**                | 26                          | 1-1/8                                       | 2-5/8 | 1-5/8            | 295.6                   |                       |                               |
|                          | 46                          | 1-1/8                                       | 2-5/8 | 2-1/8            | 303.8                   | 260.0                 | 27.0                          |
|                          | 100                         | 1-3/8                                       | 3-1/8 | 2-1/8            | 347.3                   |                       |                               |

\*R12, all others R22.

\*\* Multiple compressor systems.

For lengths of run longer than shown here, contact factory for line sizing recommendations and other supplementary instructions. Branch lines in multiple evaporator systems are sized like mains for small systems using the same model single evaporator. All horizontal lines must be pitched 1/4" per foot in the direction of flow. Risers must have a "P" trap at the bottom.

# THERMOBANK-COMPRESSOR SYSTEMS

Table 5A

## SUGGESTED LINE SIZES (O.D.) AND REFRIGERANT CHARGES

| REFRIGERANT 12 |                               |   |       |                  |                         |                      |                               | REFRIGERANT 502 |                               |   |       |                  |                          |                      |                               |      |
|----------------|-------------------------------|---|-------|------------------|-------------------------|----------------------|-------------------------------|-----------------|-------------------------------|---|-------|------------------|--------------------------|----------------------|-------------------------------|------|
| Model No.      | Total Equiv. Lgths. in Ft. To | Suggested Line Sizes (Type "L" Copper Tube) |       |                  | Refrig. 12 Charge, Lbs. |                      | Oil Re-charge Pints Suniso 3G | Model No.       | Total Equiv. Lgths. in Ft. To | Suggested Line Sizes (Type "L" Copper Tube) |       |                  | Refrig. 502 Charge, Lbs. |                      | Oil Re-charge Pints Suniso 3G |      |
|                |                               | Liq.  | Suct. | Hot Gas & Disch. | Less Winter-stat        | Add. for Winter-stat |                               |                 |                               | Liq.  | Suct. | Hot Gas & Disch. | Less Winter-stat         | Add. for Winter-stat |                               |      |
| C1L12          | 20                            | 3/8   | 5/8   | 1/2              | 8.3                     |                      | C1½L52                        | 13              | 3/8                           | 5/8   | 1/2   | 9.4              |                          | 7.8                  | 4.5                           |      |
|                | 65                            | 3/8   | 7/8   | 1/2              | 10.0                    | 3.3                  |                               | 60              | 3/8                           | 7/8   | 1/2   | 11.4             | 7.8                      |                      |                               | 4.5  |
|                | 100                           | 3/8   | 7/8   | 5/8              | 11.5                    |                      |                               | 166             | 1/2                           | 1-1/8                                       | 5/8   | 21.4             |                          |                      |                               |      |
| C1½L12         | 35                            | 3/8   | 7/8   | 1/2              | 9.2                     |                      | C2L52                         | 35              | 3/8                           | 7/8   | 1/2   | 11.3             |                          | 7.8                  | 4.5                           |      |
|                | 51                            | 3/8   | 7/8   | 5/8              | 9.8                     | 4.5                  |                               | 58              | 3/8                           | 1-1/8                                       | 5/8   | 12.3             | 7.8                      |                      |                               | 4.5  |
|                | 110                           | 3/8   | 1-1/8 | 5/8              | 12.4                    |                      |                               | 132             | 1/2                           | 1-1/8                                       | 7/8   | 19.9             |                          |                      |                               |      |
| C2L12          | 25                            | 3/8   | 7/8   | 1/2              | 8.8                     |                      | C3L52                         | 17              | 3/8                           | 7/8   | 5/8   | 12.5             |                          | 10.0                 | 5.5                           |      |
|                | 65                            | 3/8   | 1-1/8 | 5/8              | 10.5                    | 4.5                  |                               | 50              | 1/2                           | 1-1/8                                       | 5/8   | 15.5             | 10.0                     |                      |                               | 5.5  |
|                | 115                           | 3/8   | 1-1/8 | 7/8              | 12.6                    |                      |                               | 120             | 1/2                           | 1-3/8                                       | 7/8   | 20.7             |                          |                      |                               |      |
| C3L12          | 30                            | 3/8   | 1-1/8 | 5/8              | 11.0                    |                      | C6L52                         | 28              | 1/2                           | 1-1/8                                       | 7/8   | 20.6             |                          | 12.3                 | 6.0                           |      |
|                | 55                            | 3/8   | 1-1/8 | 7/8              | 12.0                    | 8.3                  |                               | 60              | 1/2                           | 1-3/8                                       | 7/8   | 24.1             | 12.3                     |                      |                               | 6.0  |
|                | 155                           | 1/2   | 1-3/8 | 7/8              | 22.0                    |                      |                               | 130             | 5/8                           | 1-5/8                                       | 7/8   | 33.4             |                          |                      |                               |      |
| C6L12          | 20                            | 3/8   | 1-1/8 | 7/8              | 18.0                    |                      | C8L52                         | 21              | 1/2                           | 1-3/8                                       | 7/8   | 33.5             |                          | 24.5                 | 8.0                           |      |
|                | 55                            | 1/2   | 1-3/8 | 7/8              | 22.0                    | 13.0                 |                               | 50              | 5/8                           | 1-5/8                                       | 7/8   | 38.4             | 24.5                     |                      |                               | 8.0  |
|                | 90                            | 1/2   | 1-5/8 | 1-1/8            | 24.4                    |                      |                               | 66              | 5/8                           | 1-5/8                                       | 1-1/8 | 39.9             |                          |                      |                               |      |
|                | 125                           | 5/8   | 1-5/8 | 1-1/8            | 33.0                    |                      |                               | 166             | 7/8                           | 2-1/8                                       | 1-1/8 | 73.6             |                          |                      |                               |      |
| C7½L12         | 45                            | 1/2   | 1-3/8 | 7/8              | 23.8                    |                      | C12L52                        | 16              | 1/2                           | 1-3/8                                       | 7/8   | 42.1             |                          | 35.8                 | 7.5                           |      |
|                | 75                            | 1/2   | 1-5/8 | 1-1/8            | 26.8                    | 18.5                 |                               | 30              | 5/8                           | 1-5/8                                       | 7/8   | 44.6             | 35.8                     |                      |                               | 7.5  |
|                | 200                           | 5/8   | 2-1/8 | 1-1/8            | 45.9                    |                      |                               | 45              | 5/8                           | 1-5/8                                       | 1-1/8 | 46.4             |                          |                      |                               |      |
| C10L12         | 30                            | 1/2   | 1-5/8 | 1-1/8            | 30.9                    |                      | C15L52                        | 26              | 5/8                           | 1-5/8                                       | 1-1/8 | 59.1             |                          | 47.5                 | 7.5                           |      |
|                | 65                            | 5/8   | 2-1/8 | 1-1/8            | 36.9                    | 29.4                 |                               | 81              | 7/8                           | 2-1/8                                       | 1-1/8 | 76.4             | 47.5                     |                      |                               | 7.5  |
|                | 130                           | 7/8   | 2-1/8 | 1-3/8            | 63.5                    |                      |                               | 123             | 7/8                           | 2-1/8                                       | 1-3/8 | 87.0             |                          |                      |                               |      |
|                | 170                           | 7/8   | 2-5/8 | 1-3/8            | 77.5                    |                      |                               | 155             | 7/8                           | 2-5/8                                       | 1-3/8 | 95.0             |                          |                      |                               |      |
| C15L12**       | 20                            | 5/8   | 1-5/8 | 1-1/8            | 50.7                    |                      | C18L52                        | 25              | 5/8                           | 1-5/8                                       | 1-1/8 | 67.9             |                          | 63.1                 | 9.0                           |      |
|                | 50                            | 5/8   | 2-1/8 | 1-3/8            | 54.6                    | 36.0                 |                               | 66              | 7/8                           | 2-1/8                                       | 1-1/8 | 81.8             | 63.1                     |                      |                               | 9.0  |
|                | 90                            | 7/8   | 2-1/8 | 1-3/8            | 71.4                    |                      |                               | 95              | 7/8                           | 2-1/8                                       | 1-3/8 | 88.3             |                          |                      |                               |      |
|                | 250                           | 7/8   | 2-5/8 | 1-5/8            | 115.5                   |                      |                               | 150             | 7/8                           | 2-5/8                                       | 1-3/8 | 102.2            |                          |                      |                               |      |
| C20L12**       | 25                            | 5/8   | 2-1/8 | 1-1/8            | 51.3                    |                      | C24L52**                      | 48              | 7/8                           | 2-1/8                                       | 1-3/8 | 103.4            |                          | 75.5                 | 19.0                          |      |
|                | 55                            | 7/8   | 2-1/8 | 1-3/8            | 62.3                    | 36.0                 |                               | 71              | 7/8                           | 2-5/8                                       | 1-3/8 | 109.1            | 75.5                     |                      |                               | 19.0 |
|                | 70                            | 7/8   | 2-5/8 | 1-3/8            | 66.2                    |                      |                               | 130             | 1-1/8                         | 2-5/8                                       | 1-3/8 | 147.2            |                          |                      |                               |      |
|                | 155                           | 7/8   | 2-5/8 | 1-5/8            | 89.8                    |                      |                               | 230             | 1-1/8                         | 3-1/8                                       | 1-5/8 | 189.9            |                          |                      |                               |      |
| C30L12**       | 25                            | 7/8   | 2-1/8 | 1-3/8            | 89.3                    |                      | C36L52**                      | 26              | 7/8                           | 2-1/8                                       | 1-3/8 | 118.9            |                          | 98.3                 | 17.0                          |      |
|                | 80                            | 7/8   | 2-5/8 | 1-5/8            | 103.3                   | 62.6                 |                               | 51              | 7/8                           | 2-5/8                                       | 1-3/8 | 125.2            | 98.3                     |                      |                               | 17.0 |
|                | 100                           | 7/8   | 3-1/8 | 2-1/8            | 109.5                   |                      |                               | 71              | 1-1/8                         | 2-5/8                                       | 1-5/8 | 142.9            |                          |                      |                               |      |
|                | 190                           | 1-1/8                                       | 3-1/8 | 2-1/8            | 169.6                   |                      |                               | 130             | 1-1/8                         | 3-1/8                                       | 1-5/8 | 168.4            |                          |                      |                               |      |
| C54L52**       | 25                            | 7/8   | 2-1/8 | 1-3/8            | 89.3                    |                      | C54L52**                      | 37              | 1-1/8                         | 2-5/8                                       | 1-5/8 | 168.4            |                          | 110.0                | 25.0                          |      |
|                | 80                            | 7/8   | 2-5/8 | 1-5/8            | 103.3                   | 62.6                 |                               | 71              | 1-1/8                         | 3-1/8                                       | 1-5/8 | 183.0            | 110.0                    |                      |                               | 25.0 |
|                | 100                           | 7/8   | 3-1/8 | 2-1/8            | 109.5                   |                      |                               | 100             | 1-3/8                         | 3-1/8                                       | 2-1/8 | 217.6            |                          |                      |                               |      |
|                | 190                           | 1-1/8                                       | 3-1/8 | 2-1/8            | 169.6                   |                      |                               | 195             | 1-3/8                         | 3-5/8                                       | 2-1/8 | 279.5            |                          |                      |                               |      |

\*\* Multiple Compressor Systems. Pumpdown mandatory - See paragraph (P) page 6.

For lengths of run longer than shown here, contact factory for line sizing recommendations and other supplementary instructions. Branch lines in multiple evaporator systems are sized like mains for small systems using the same model single evaporator. All horizontal lines must be pitched 1/4" per foot in the direction of flow. Risers must have a "P" trap at the bottom. Line sizes are based on 1962 ASHRAE GUIDE for R12, DuPont RT31A for R502.

**K**

sight glass, add enough Suniso 3G oil to bring oil level into the middle of the sight glass.

If, after adding oil, the oil level again drops or repeated tripout on oil safety occurs, check cutout setting of low pressure switch, pipe sizing, pitch, evaporator flooding and for the possibility of floodback into the compressor (see Bulletin RI-645). Oil separator if supplied, should have a hot return line.

It is strongly recommended that regular scheduled inspections of the oil level in all compressors be made.

### L FAN BEARINGS ON BELT DRIVE CONDENSERS

Fan bearings must be greased every six months with Esso Beacon 325. Grease fittings are located inside the removable panel. Use low pressure guns only for greasing.

### M PURGING OF NON-CONDENSIBLES

Non-Condensibles are present when the receiver pressure is normal (R12 - 95 PSI) (R22, R502 - 165 PSI) or higher than normal and the receiver is cool to the touch. If the receiver pressure is normal and the receiver is warm to the touch, non-condensibles are not present.

A purge valve at the receiver is furnished on all air cooled units.

To purge non-condensibles, open the purge valve wide for 4 to 8 seconds while the compressor is operating; close the valve and repeat again after 3 to 4 minutes. Repeat this procedure until the receiver warms up and the head pressure drops to normal.

Purge water-cooled units with compressor off. Purge from receiver purge fitting if supplied. All others purge from discharge service valve of the compressor.

### N PRESSURE SWITCH SETTINGS

(a) The high pressure cut-out is set at (220 PSI - R12) (360 PSI - R22, R502).

(b) The low pressure switch is factory set as follows:

|                        |                      |
|------------------------|----------------------|
| R12 (Cut-in - 2" Vac.) | (Cut-out - 18" Vac.) |
| R22 (Cut-in - 20 PSI)  | (Cut-out - 5 PSI)    |
| R502 (Cut-in - 12 PSI) | (Cut-out - 0 PSI)    |

Refer to table 7A to determine if resetting is necessary for automatic recycling pumpdown.

### P RECYCLING PUMPDOWN MANDATORY

Recycling pumpdown (thermostat controlling liquid solenoid valve, not furnished), must be used on the following:

(a) All systems equipped with Winterstat.

(b) All multiple compressor systems (\*\* - see tables 4A and 5A) with or without Winterstat.

(c) On each system where two or more systems serve the same refrigerator - with or without Winterstat.

Pumpdown cycle is not complete until low pressure switch is set with gage in accordance with table 7A.

### Q OIL SAFETY SWITCH SETTINGS

The non-adjustable oil safety switch is factory set to trip when the oil pressure drops below 9 PSI.

### R WINTERSTAT

The unit must be equipped with Winterstat if the ambient temperature drops below +50°. Units with Winterstat may be used in ambients as low as -40° F.

Winterstats are factory adjusted to maintain (110 PSI - R12) (180 PSI - R22, R502) head pressure.

### S BANK HOLDBACK VALVE SETTING

The bank holdback valve is factory set to maintain a crankcase pressure of (5-10 PSI R12) (10-15 PSI R22, R502) during defrost. If floodback from the Bank during defrost is observed, reduce holdback valve setting. Remove protective cap and turn adjusting stem in (clockwise) to raise crankcase pressure, or out (counterclockwise) to reduce crankcase pressure. Do not adjust holdback valve without gauge on suction service valve. Do not leave holdback valve with cap off.

### T TIMER ADJUSTMENTS

#### (a) Duration of Defrost

Although the factory timer setting is 10 minutes, the actual time required may be longer depending on box conditions. The timer therefore must be adjusted as necessary to produce complete defrost. Excessive duration of defrost can be recognized by steaming of the coil surface and snow formation on the ceiling in front of the coil, or on the fan. Insufficient duration of defrost is indicated by ice accumulation on the coil or in the pan.

#### (b) Duration of Post Defrost

The post defrost time on the timer should be sufficiently long to ensure reduction of evaporator pressure to (10 PSI - R12) (20 PSI - R22, R502) before returning to normal refrigeration. The post-defrost duration is factory set for 4 minutes, but since this period varies with coil and piping

# THERMOBANK-COMPRESSOR SYSTEMS

Table 7A  
PRESSURE SWITCH SETTINGS FOR PUMPDOWN CYCLE

| Lowest Winter Temp. or<br>Lowest Box Temp.<br>Expected | REFRIGERANT 12 |          | REFRIGERANT 22 |          | REFRIGERANT 502 |          |
|--|----------------|----------|----------------|----------|-----------------|----------|
|  | Cut-In         | Cut-Out  | Cut-In         | Cut-Out  | Cut-In          | Cut-Out  |
| +30°   | 25             | 12       | 50             | 30       | 60              | 37       |
| +20°   | 18             | 7        | 40             | 20       | 47              | 28       |
| +10°   | 12             | 0        | 30             | 10       | 37              | 15       |
| 0°   | 7              | 5" Vac.  | 20             | 5        | 28              | 9        |
| -10°   | 3              | 10" Vac. | 13             | 0        | 20              | 5        |
| -20°   | 2" Vac.        | 15" Vac. | 8              | 5" Vac.  | 13              | 0        |
| -30°   | 8" Vac.        | 20" Vac. | 3              | 10" Vac. | 7               | 5" Vac.  |
| -40°   | 13" Vac.       | 20" Vac. | 3" Vac.        | 15" Vac. | 2               | 11" Vac. |

DO NOT ATTEMPT TO SET THE CUT-OUT OF THE LOW PRESSURE SWITCH BELOW 20" VAC.

volume it should be rechecked with a gage on the evaporator pressure tap, when the system is in operation.

## U EVAPORATOR FAN SWITCH

**CAUTION:** Sometimes the user wants to be able to work in the freezer or cooler with the evaporator fans off. No switch for turning off the evaporator fans should be installed unless that switch also closes the liquid solenoid simultaneously with stopping the evaporator fans. The fan pumpdown in the control panel is factory wired to perform this function.

## V MULTIPLE SYSTEMS: (MORE THAN ONE COMPRESSOR SYSTEM FOR ONE REFRIGERATOR)

Synchronize all defrosting timers so that defrost of all units will occur at the same time. Before this is done reconnect all timers for continuous operation so that they will remain synchronized regardless of compressor running time. This is done as follows:

- The wires on the bottom screw of Terminal No. 4 (counting from the left) of the time clock, should be disconnected and spliced together and insulated.
- Add a jumper from Terminal No. 2 to Terminal No. 4.
- The presence of the jumper indicates the change has already been made.

## W TEMPORARY SYSTEM SHUT DOWN

Use the fan-pumpdown switch only to turn the unit off. The unit may safely stay off this way for long periods even though the box warms up.

**IMPORTANT:** If the compressor is turned off in any other manner, i.e., by the main disconnect switch or by the compressor switch in the control panel, be sure

to follow step (G) on page 3 when starting, to minimize likelihood of compressor damage.

**CAUTION:** If unit should short-cycle (turn on more than once each hour) either the valve plates or the hot gas or liquid solenoid valves, or the oil separator float valve are leaking and a qualified refrigeration service man should be called to correct the trouble.

## X SERVICING AND REPLACEMENT PARTS

Keep this instruction bulletin for later reference in the event servicing should be required.

When ordering replacement parts from the factory, be certain to mention the model number and the serial number marked on the Kramer nameplate and clearly describe by number, function description and size, the item required. This will facilitate prompt handling of your order.

Date of failure is defined as date of return to Kramer Trenton Co. of inoperative part.

## Y WARRANTY

### (a) One Year Warranty Card

When installation is completed, fill out and have warranty card signed by authorized person, and mail to Kramer Trenton Co.

### (b) Four Year Additional Warranty

A four year additional warranty on the motor compressor only may be purchased. The application forms and prices are in the warranty packet sent with each system. Follow instructions on the Application Form.

### (c) Cause For Warranty Withdrawal

Any deviation from correct installation and service practice, operation outside of recommended temperature range, and specifically that outlined in these instructions, will be sufficient cause for withdrawing all warranties.

**K**

## SUGGESTED AIR CIRCULATION FOR BLAST FREEZING OR COOLING

**AIR MOVEMENT THROUGH PRODUCT FOR FREEZING OR COOLING:**  
It is possible to provide more than adequate mechanical refrigeration in a freezer and still observe inadequate cooling effect in terms of excessively slow freezing of product or excessively warm box temperature.

The refrigerated air does not automatically flow to the warmest portions of the box. It must be directed there by proper location of the evaporator and positioning of product. Baffles may be required to direct the refrigerated air to those portions of the box where needed to utilize its refrigerating effect.

**SLOW:** Figure 8A shows racks of product to be frozen so positioned that the cold air from the evaporators can not get through the product. The return air to the evaporator is very cold and the equipment is performing correctly but the owner may not achieve his desired result of freezing product because the cold air from the evaporator does not traverse the product.

**BETTER:** Adding a false ceiling or baffle as in Figure 8B will not ensure air motion over the product, unless the product is stacked so the cold air can get through the product to rapidly remove its heat.

**BEST:** Stacking the product as shown in Figure 8C with spacers will allow free air circulation around each of the packages. By using packaging material which allows heat from the product to flow readily to the cold air, the refrigeration system will perform the maximum work on the product and produce the desired rapid cooling or freezing of the product.

**AIR CIRCULATION FOR STORAGE:** The same air circulation problem may be produced in a storage freezer if the product is so positioned that it prevents cold air from the evaporators from circulating through the box. This results in the section of the box immediately adjacent the evaporators becoming very cold, with the rest of the box and its product becoming warm.

**EVAPORATOR POSITION IN BOX:** The evaporator should be positioned to blow toward doors or other openings to minimize entry of humid air into the freezer or cooler.

The evaporator, false ceilings and baffles, if used, should be located to allow for adjustment, lubrication, inspection and servicing of fans, motors, belts, bearings and expansion valves while the product is in position. Figure 8D shows one possible arrangement.

★Motors, Fans, Expansion Valves, etc. accessible for inspection and servicing though box is loaded.

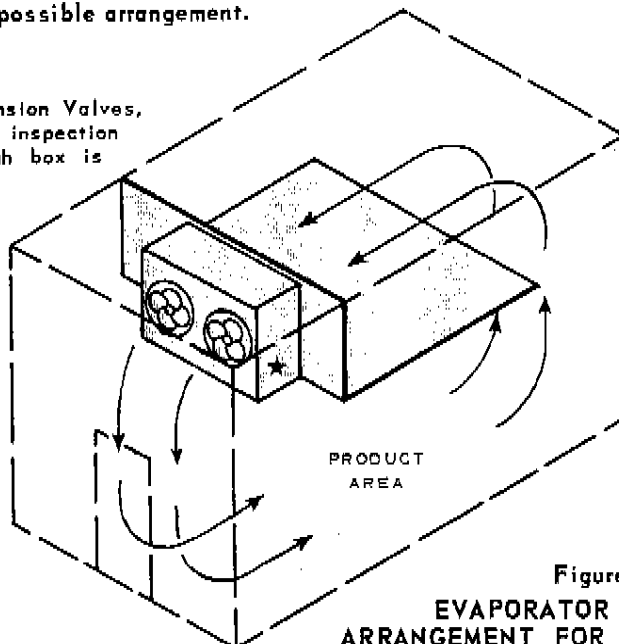
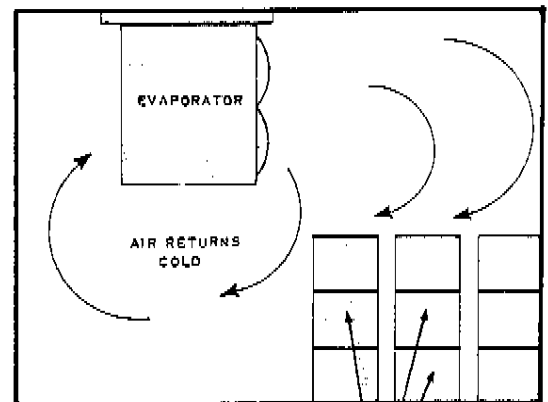


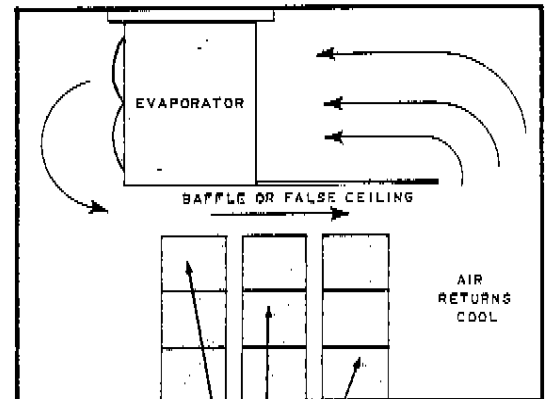
Figure 8D

EVAPORATOR AND Baffle  
ARRANGEMENT FOR BEST ACCESSIBILITY



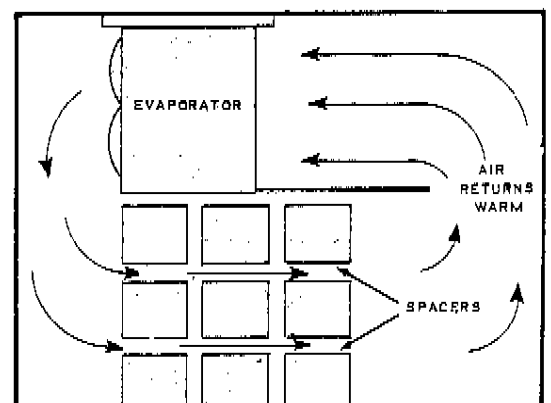
Air does not flow through product. The product does not freeze.

Figure 8A - SLOW



Air flows over but not through product. The product freezes slowly.

Figure 8B - BETTER



Air flows over and through product. PRODUCT FREEZES.

Figure 8C - BEST



# THERMOBANK-COMPRESSOR SYSTEMS

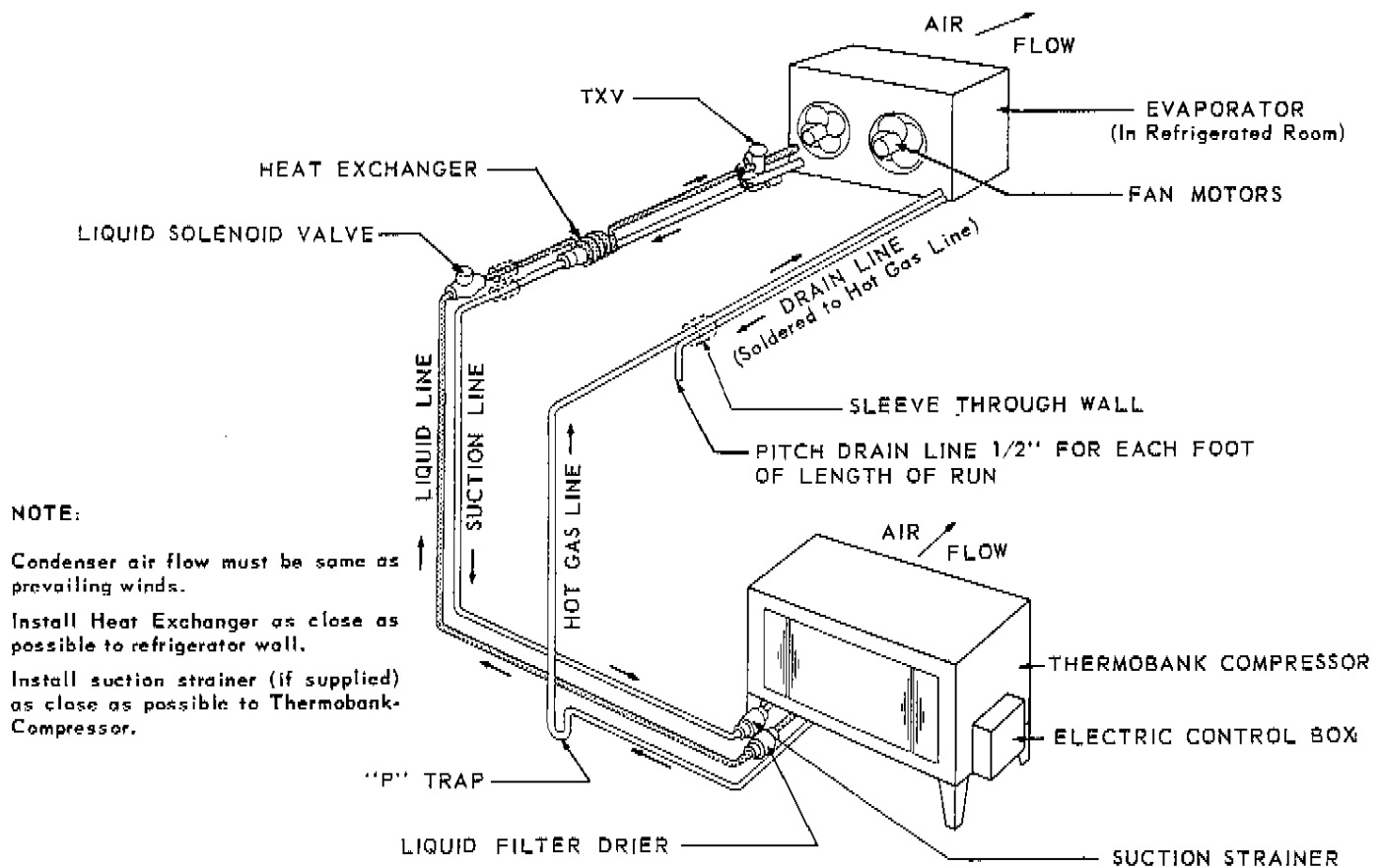


Figure 9A  
SCHEMATIC PIPING DIAGRAM FOR "L" & "F" THERMOBANK-COMPRESSORS  
USING EVAPORATOR WITH HEATED DRAIN PAN

**NOTE:**

Condenser air flow must be same as prevailing winds.

Install Heat Exchanger as close as possible to refrigerator wall.

Install suction strainer (if supplied) as close as possible to Thermobank-Compressor.

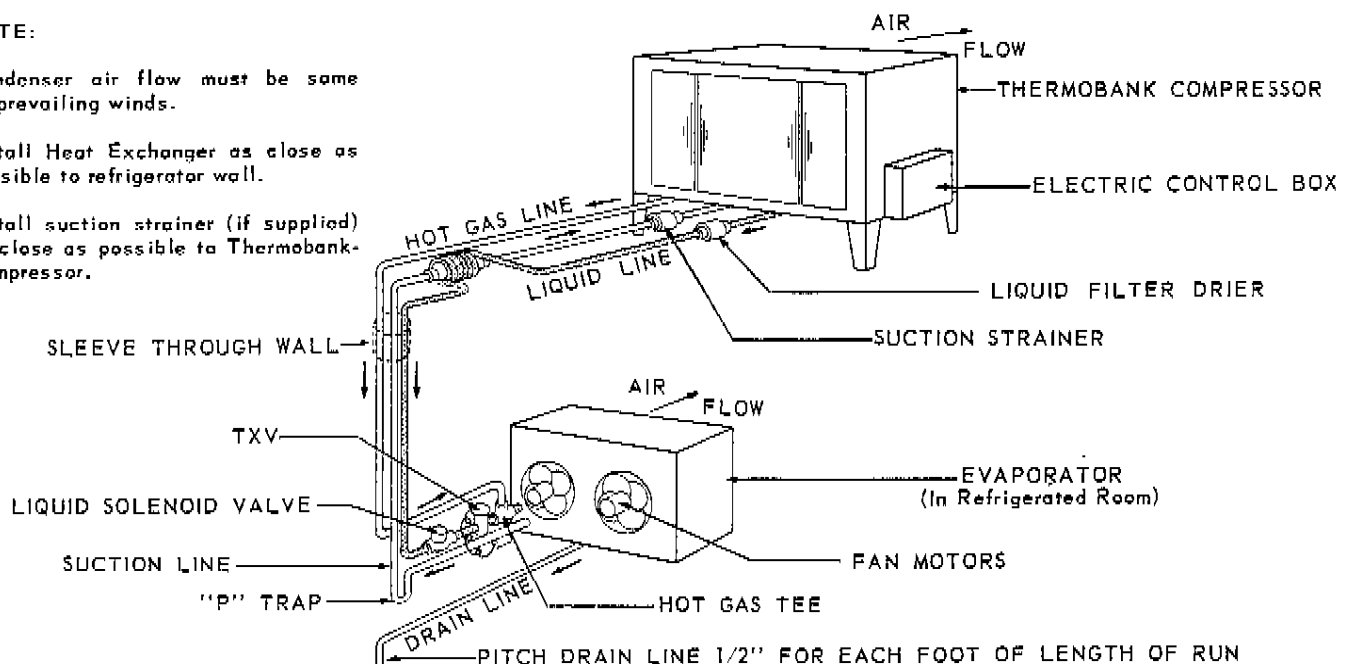


Figure 9B  
SCHEMATIC PIPING DIAGRAM FOR "F" THERMOBANK-COMPRESSOR  
USING EVAPORATOR WITH UNHEATED DRAIN PAN  
(For Box Temperatures 31°F And Higher)