



**WELBILT®**

*Bringing innovation to the table*



# Refrigeration Start-up & Adjustments

## Condensing Units

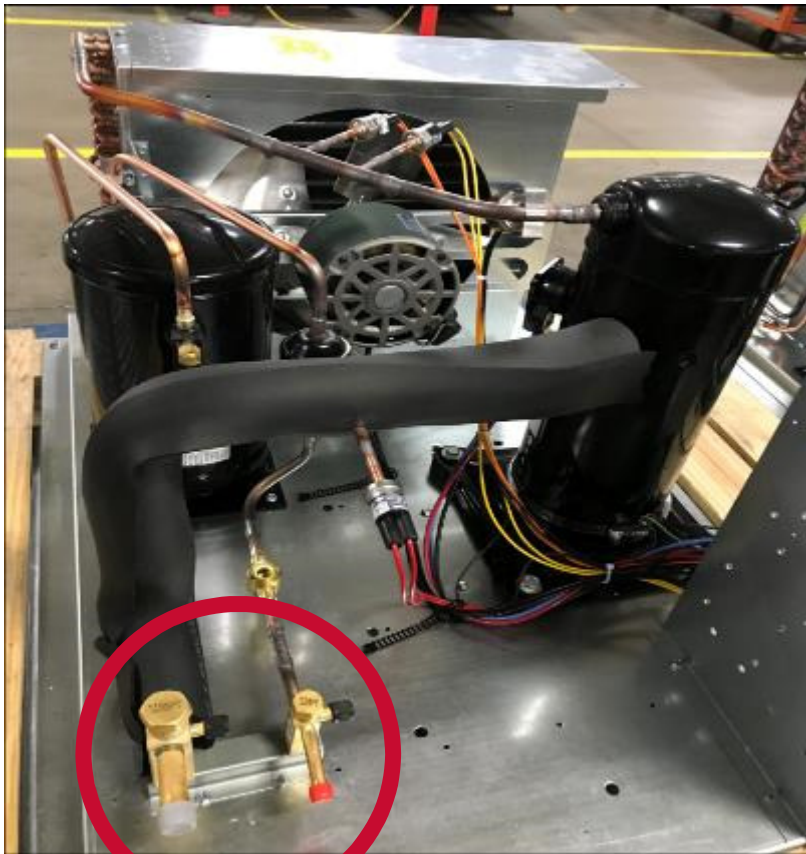
- **PR – Pre Assembled Remote (Nitrogen Charged).** Hard piped.
- **PC – Pre Charged with Freon to support 50' line run.** Hard piped.
- **PCL – Pre Charged with Line Set Utilizes quick connect fittings.**



# Condensing Units

## Three Valves

### Base Mount



### Receiver Tank



# Evaporator Coils

Two Valves

Expansion

Solenoid





## Condensing Units

### Leak Testing “PR” model systems:

- Entire system.
- Open both liquid and suction service base mount valves and the receiver tank valve.
- Ensure solenoid valve is open using magnet or energizing the solenoid coil.
- Add 50 PSI refrigerant, then pressurize with dry nitrogen to 250 PSI equalized on both high and low side.
- Allow thirty minutes for refrigerant to reach all parts of the system.
- Check all joints and components with an electronic leak detector.
- Release/reclaim nitrogen charge.





## Condensing Units

### Evacuation of “PR” model systems:

- Entire system is being evacuated.
- Ensure all valves including solenoid valve are all open.
- Connect vacuum pump to the liquid and suction service valves at the condensing unit.
- Maintain vacuum for a minimum of 4 hours evacuating the system to 250 microns.
- Perform a vacuum decay test for a minimum of ten minutes to ensure the system is leak free and dry.

## Condensing Units

### Charging “PR” model systems:

- Freon should be added to the system through the liquid line base mount service valve.
- **Do not charge liquid refrigerant into the suction service valve!**
- The initial charge should be determined by weight and sight glass indication.
- Start the system.
- If the condensing temperature is 105°F or greater, charge the system until the sight glass clears.
- If the condensing temperature is below 105°F, reduce the condenser face surface area to raise the discharge pressure above 105°F and charge to a clear sight glass.
- Return to a full condenser face area when charging is complete.

## Condensing Units

### Leak Testing “PC” model systems:

- Line sets and evaporator coil only.
- Leave the liquid and suction service base mount valves closed, the condensing unit is charged with refrigerant.
- Ensure solenoid valve is open using a magnet or energizing the solenoid coil.
- Add 50 PSI refrigerant, then pressurize with dry nitrogen to 250 PSI equalized on both high and low side.
- Allow thirty minutes for refrigerant to reach all parts of the system.
- Check all joints and components with an electronic leak detector.
- Release/reclaim nitrogen charge.





## Condensing Units

### Evacuation of “PC” model systems:

- Leave base mount service valves closed, the condensing unit has been evacuated and charged.
- Ensure the solenoid valve is open.
- Connect vacuum pump to the liquid and suction service valves at the condensing unit.
- Evacuate the line set and evaporator coil to 250 microns and maintain vacuum for a minimum of 4 hours.
- Perform a vacuum decay test for a minimum of ten minutes to ensure the system is leak free and dry.
- Open receiver tank and liquid line base mount valve to release the factory charge.
- Ready to start, open suction line base mount valve once started.



## Condensing Units

### Leak Testing “PCL” model systems:

- Open receiver tank and liquid line base mount valve to release factory charge.
- Ensure solenoid valve is open using a magnet or energizing the solenoid coil.
- Allow thirty minutes for refrigerant to reach all parts of the system.
- Check all joints and components with an electronic leak detector.

### Evacuation of “PCL” model systems:

- PCL systems do not require evacuation.
- Ready to start, open suction line base mount valve once started.



## Pre-Start Checks

- Verify all service valves are fully open (**including the receiver tank valve**).
- Ensure all refrigerant and electrical connections are tight.
- Verify all wiring and piping is properly routed and secured.
- All fan motors and mounting brackets are tight.
- The condensing unit base and evaporator coil are properly secured.
- Expansion valve bulb should be mounted in the 3, 4, 8 , or 9:00 position on the suction line.

## Pre-Start Checks



**Correct**



**Incorrect**

## Pre-Start Checks



INCORRECT



CORRECT

## Pre-Start Checks



INCORRECT



CORRECT





## Operational Start-Up

- The first 2-4 hours of operation after initial start-up is a critical time.
- Do not start the system in a vacuum.
- Do not just start the system and leave.
- Pressure values, compressor and evaporator superheat, and inspection for excessive vibrations and loose connections are some checks that must be performed prior to leaving the system.
- Do not leave the system unattended until normal operating conditions are achieved.

## Start-Up Procedure

Operate the system for a minimum of two hours and perform the following checks:

- Check compressor discharge and suction pressures to ensure they are within normal operating ranges.
- Check liquid line sight glass for proper refrigerant charge (based off of 105°F condenser coil).
- Check the voltage and amperage at the compressor terminals. Voltage must be within +10% or -5% of the rating indicated on the condensing unit name plate. On three phase compressors, verify there is a balanced load.
- Check crankcase heater operation.
- Set the defrost time and verify the defrost initiation settings.
- Verify temperature control settings, adjust if necessary.
- Check compressor and evaporator superheat, adjust if necessary. A minimum superheat of 20°F is required at the compressor. Evaporator superheat for coolers (6-10 degrees) and freezers (4-8 degrees).
  
- After all system checks have been checked, properly adjusted, and verified, replace all schrader caps, service valve caps, electrical box covers, housing, etc...

# Operating Pressures



# Operating Pressures

## Medium Temp – Cooler (35 °F)

- Suction pressure 50-55 PSI
- Use PT chart for proper discharge pressures
- If applicable, reference low ambient control settings
- Recommended Superheat 6-10



# Operating Pressures

## Low Temp – Freezer (-10 °F)

- Suction pressure 10-14 PSI
- Use PT chart for proper discharge pressures
- If applicable, reference low ambient control settings
- Recommended Superheat 4-8



# Start-Up Procedure

## System Start-up Checklist

Date System Installed: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Installer and Address: \_\_\_\_\_

Phone Number: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Start-Up Service Agency: \_\_\_\_\_

Phone Number: (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_

Freezer Piping				
Inspection Feature	Data	Accept	Reject	Action Required
Suction Lines Insulated:				
Oil Trap at Base of Suction Riser:				
Copper Drain Lines Sloped Min 1/2" ft:				
Piping Supported Every 5':				
Copper drain line heater attached, working, and insulated:				
Copper Drain Line Trapped Outside Freezer Space:				



# Start-Up Procedure

Freezer Condensing Unit				
Inspection Feature	Data	Accept	Reject	Action Required
Model Number:				
Serial Number:				
Electrical Volts:				
Electrical Phase:				
Amperage @ L1:				
Amperage @ L2:				
Amperage @ L3:				
Ambient Temp:	°F			
Comp. Discharge Pressure:	PSIG			
Comp. Suction Pressure:	PSIG			
Suction Line Temp @ Comp.:	°F			
Discharge Line Temp @ Comp.:	°F			
Comp. Superheat:	°F			
Defrost Setting (4 day/45 min):				
All electrical connections are tight:				
Unit base properly supported:				
Fans Running & No Vibration:				
All guards, covers attached:				
Refrigerant Sight Glass Clear:				
Comp. Oil Level @ ½ Sight Glass:				
Comp. Mounting Clips Removed:				
Suction line insulated fully and properly supported:				

# Start-Up Procedure

Freezer Evaporator				
Inspection Feature	Data	Accept	Reject	Action Required
Evaporator installed with nylon bolts with proper airflow clearance:				
Model Number:				
Serial Number:				
Electrical Volts:				
Electrical Phase:				
Suction Line Temp @ Evap:	°F			
Evap Superheat:	°F			
Thermostat Set:	°F			
Operating Temp:	°F			
TXV Bulb Properly Mounted:				
All guards, covers attached:				
All electrical connections are tight:				
Defrost Heater Amp Draw:	A			

