LRC Wine Units Installation Bulletin

Unit Assembled By: _____

Expansion Valve Adjusted to _____psig By: _____

Receipt and Inspection

Please Inspect items against Bill of Lading. Check carefully for concealed damage prior to accepting equipment. Any damages or shortages must be reported immediately to the carrier and LRC. Damages are the responsibility of the delivering carrier. An RMA (returned merchandise authorization) must be requested from LRC prior to return of any equipment.

Cautions

DISCONNECT ELECTRICAL SERVICE PRIOR TO WORKING ON UNIT. NEVER RUN AN UNCOVERED UNIT AS INJURY MAY RESULT.

EQUIPMENT SELECTION

Proper installation is necessary for optimum performance and customer satisfaction. Only experienced and qualified personnel who are familiar with local codes and regulations should install and maintain equipment. Equipment, piping, and electrical installation must adhere to local and nation codes as well as conform to good practices to ensure proper operation.

PLEASE NOTE: Use caution around equipment as sharp edges and coil surfaces can cause injury.

Condensing Unit Sizing and Configuration

This evaporator should be mated with an equivalent capacity condensing unit. The use of an oversized (or "extra capacity" over the evaporator rating) condensing unit is not recommended. The evaporator is equipped with a constant pressure expansion valve. When extra capacity is present in the system the evaporator will flood back refrigerant to the condensing unit leading to coil freeze up as well as possible compressor failure. It is better practice to undersize the condensing unit in relation to the evaporator for better system operation and reliability.

Refrigeration vs. AC Condensing Units – The wire room evaporators operate at temperatures/pressure below those normally seen by air conditioning compressors/condensing units. While a AC condensing unit will work for wine rooms it is recommended that a medium temperature refrigeration condensing unit be used. The lower temperatures seen in a wine room application can cause AC condensing units to operate outside the recommended ranges of the compressor manufacturer and lead to premature failure.

Suction Accumulators - LRC also recommends that a suction line accumulator be used to reduce the chance of liquid floodback to the compressor during off design conditions.

9435 Sorensen Ave, Santa Fe Springs, CA 90670 P 562.944.1969, F 562.944.4979

Line Sizing – The connection sizes of the LRC evaporators and those of the condensing unit are not necessarily the proper size for the installation. Always use the condensing unit manufacturer's recommendation for their equipment or the published ASHRAE charts. Oversizing or undersizing of the liquid and suction lines can lead to excessive energy consumption, low system performance or system failure. Always follow the guidelines for line sizing.

Room Construction

LRC wine room evaporator units should only be installed in areas where a vapor barrier has been installed. Failure to install a vapor barrier can and will result in the growth of mold and mildew in the walls and can lead to health problems and expensive remediation.

LRC DOES NOT RECOMMEND THE INSTALLATION OF A WINE UNIT IN A ROOM WITHOUT A VAPOR BARRIER UNDER ANY CIRCUMSTANCES.

WHILE LRC STRIVES TO PRODUCE A QUALITY PRODUCT AT ALL TIMES PROVISIONS IN THE WINE ROOM SHOULD BE LEFT FOR SYSTEM MAINTENANCE OR REPAIR BY LEAVING READY ACCESS TO THE EVAPORATOR UNIT.

LRC Coil reccomends that competent architects and other wine room construction experts be consulted when designing a wine room. Construction of wine rooms with concrete walls or in underground structures should be undertaken carefully with much forethought and planning. LRC's wine units are not designed for use in humid environments where vapor barriers are not present and LRC cannot be responsible for unit operation under such conditions..

Ducting (HS Unit Only)

The HS Unit is designed to handle 1 inch of static pressure drop. If runs will be shorter or contain many branches then the system performance should be watched carefully during startup. If the duct run is to be longer than 50 feet use larger diameter ducting to keep the maximum static pressure losses to 1 inch total. The system is capable of being operated with the fan motor speed reduced via a speed control to bring the system performance into balance. Please note that if the fan speed is reduced the evaporator capacity will be reduced correspondingly.

In addition please remember that the unit is moving air through insulated ducting. Thermal losses should be considered in the total capacity calculation. A minimum of R-8 insulation on the ducting should be used. For areas with high humidity and where the dewpoint can be in the range of 47-50 degrees it is recommended to use extra insulation. Extra capacity should be allocated if the unit and/or ducts are located in high temperature attic areas.

For low noise installations it is advisable to use the lowest duct velocities possible to avoid transmitting sound into a wine room. The air should be moved into the room at velocities in the range of 250-500 fpm to ensure quiet operation of the overall system. Standard practices of duct construction should be used with the emphasis on staying to the low side of possible air velocities.

Configuration of Fans

Fan – the fan may be operated in 2 different ways:

1. The fans are cycled with the thermostat. This is the recommended method both operation and energy consumption point of views. Be careful to have the temperature sensing probe in a prominent location within the room. If it is in a return duct the lack of airflow will lead to erroneous readings.
2. The fan is run all the time (not recommended). In this mode it is important to ensure that the fan is turned off every 1-2 hours for a drain cycle. The high static nature of the fan will trap water in the drain pan and can lead to the overflow of the drain pan internal to the unit. A drain (or burp) cycle is important to remove the water from the drain pan area.

Multiple units – if multiple units are to be installed on a single system the units (fans/liquid line solenoid valves) should be cycled on and off together. Cycling the units independently will result in the system failure. Consult the factory if multiple units on one system are going to be cycled independently – further controls will be required to prevent system failure.

Expansion Valve

The unit is equipped with a constant pressure expansion valve. This is done to keep the evaporator at a constant temperature during low load conditions to prevent wide humidity swings. If necessary to adjust connect a gauge set to the lines preferably close to the evaporator as possible. Set the valve pressure to the pressure that most closely corresponds to 38-40 deg F. This pressure setting gives a coil dew point of 55-60% humidity. To adjust the valve access the expansion device either through the access hole (HS models) or by reaching into the area where the valve is located (be sure to turn off all power to the unit before locating the valve). Turn the top hex nut (5/16 in) clockwise to raise the suction pressure and counter-clockwise to reduce the suction pressure.

R22 refrigerant should have the valve set to 61-65 psig.
R134a refrigerant should have the valve set to 27-33 psig.

Settings other than the above may result in relative humidity levels outside the normal 50-65% range. Do not operate the unit with an oversize condensing unit. If the unit is operated in this manner the coil may freeze and cause low humidity in the wine room and/or lack of airflow leading to over temperature conditions in the room.

Control Logic

For most applications the standard refrigeration pump down approach to control will work just fine. The condensing unit is equipped with an adjustable low pressure switch that is set for 25-30 degrees (equivalent pressure) below the set point. The controller then controls the 115vac solenoid valve on the evaporator. When the unit is running the pressure/temperatures will be within range. When the temperature setting is satisfied then the liquid line solenoid valve will close. After the refrigerant in the evaporator boils off the suction pressure will be begin to pump down. When the suction pressure goes below the set point on the low pressure switch then the condensing unit will shut down. When the room temperature rises above the set point the solenoid valve opens, and the coil is flooded with refrigerant and the pressure rises above the reset point and the system starts back on line. The control system should be programmed to keep the liquid line solenoid (and therefore the compressor) from cycling within 3 minutes. This is to keep the system from short cycling.

Configuration of Condensing Unit

Low pressure switch setting should be approximately 25-30 psi below the set point.

It is assumed that a standard equipment setup on the condensing unit will be used. Sight glass, receiver, liquid line filter and high pressure switch. For long runs or installation of the condensing unit in areas that can see large swings of temperature it is recommended that a head pressure control valve and an accumulator be used for system reliability.

Airflow Considerations

The wine room evaporators are designed to be located in the room to be cooled. For the RM unit it is permissible to duct the incoming and exiting are several feet. However care should be taken to make sure that the ducting does not restrict the airflow or the system may not perform properly. For WM/DQ/LPAQ/CE models ducting is not recommended.

Nominal system temperatures should be a 38 degree evaporator with the leaving air temperature at the duct spud of 48 degrees (with a 55 degree room). For rooms that do not have a 55 degree set point the temperature across the air handler should 7 -8 degrees F. Higher temperature splits are indicative of too much airflow. Lower temperatures are indicative of too little airflow.

For installations where the maximum humidity is desired to be maintained to a specific level the expansion valve may be adjusted up or down to achieve the desired level. In cases where the expansion valve is adjusted please ensure that the coil temperature does not drop to below 32 Deg F or coil freeze up may result.

Drain Line

Equipment must be installed level or with a slight angle toward the drain connection (maximum of ½ inch from end to end). Plastic or metal drain lines should be installed with a minimum pitch of 1/4" per foot slope. All condensate water must be disposed of properly in accordance with local codes and ordinances. Do not allow condensate water to accumulate or become a safety or biological hazard.

NOTE: On HS units a "P" trap (such as those used on sinks) must be installed. The P Trap should have a minimum of 2 inches of drop to act as a seal to the vacuum in the evaporator. In cases of multiple units attached to a common drain line a vent should be used to prevent the other units from affecting the condensate drainage from the other units.

Motors

Motors are lubricated for life and are thermally protected. Verify an inoperative motor by checking the voltage across the leads. If the motor fails to operate, replace the motor.

Wiring

The nameplate contains the units electrical characteristics. The unit MUST be properly grounded and all wiring should be in accordance with applicable local and national codes.

Maintenance

HS Units - The HS wine unit evaporator is not equipped with a air filter due to the remote nature of the installation. LRC recommends that an air filter be installed in an easily accessible area to minimize the dirt and lint build up on the coil.

In Room Evaporators - the unit should be periodically inspected for lint and soil accumulation. The time frame for inspections should be on a 1 month basis during initial system installation and commissioning. Based on the results seen in that particular installation the interval may be adjusted to reflect actual installation conditions. In the event that the coil needs to be cleaned use only neutral pH type cleaners. Acidic or Alkaline cleaners can remove the coil and pan coating and lead to system failure. Inspect drain pan and fan areas for proper condensate drainage.

All LRC wine units have a coated coil and drainpan. The coating is hydrophbobic (repells water) and anti-microbial (prevents bacterial/algae growth). If cleaning is needed use only neutral pH cleaners. Use of alkaline or acidic cleaners will strip the coating from the coating and void any warranties.

Replacement Parts
LRC Coil Co. recommends the use of authorized factory parts to maintain this unit. The use of non factory parts can lead to possible safety or performance issues. Contact LRC Coil for replacement parts. Please be prepared to provide complete model and serial numbers when ordering parts.

Defrost/Drain Cycle
The unit does not require a defrost cycle since by design the coil does not go below freezing. However if the fan is always left on a drain cycle must be included in the daily operation to ensure that the drain pan can empty of water. At least 1 time per 2 hours the fan should be cycled off for at least 1 minute to allow time for water to drain from the unit.

Drain Pan
The unit is equipped with an internal drain pan. In the event that the unit is installed over an occupied area or above sensitive contents LRC recommends that a secondary drain pan be installed. For assistance with secondary drain pans contact the Factory.

Controls –
Simple Thermostat – Wire thermostat to the solenoid valve and fan motor. The condensing unit and fan will cycle on it's own adjustable low pressure switch (pump down type of system).

For installations where the unit is located in an area that could suffer major damage in the event of a drain pan overflow it is recommended that a secondary drain pan be utilized with a water sensor in series with the fan or a remote control device to signal a problem with the unit.

Note on Temperature Controls: For Fan always on conditions it is best to put the temperature probe of the controller into the return air duct for best results. For systems where the fan and/or condensing unit cycles with the thermostat a sensor is better placed in the room in a location that will allow good airflow. LRC does not recommend the use of a wine bottle filled with water with a probe inside. This type of sensing system can cause wide swings of the wine room air temperature

in order to stay within the resolution of the temperature controller. These swings can be drastic enough to cause damage to the wine over time.

TROUBLE SHOOTING

Temperature Split – Design Intent

When troubleshooting a wine room refrigeration system please keep in mind that all LRC wine room evaporators have been designed to operated with a 38 degree coil (saturated temperature), 48 degree leaving air temperature and a 55 degree room (inlet air temp). At this point the humidity in the room will maintain a maximum of 55-65%. The final humidity level will be determined by the suction temperature that the AXV is maintained at – therefore it's possible to "tune" the maximum humidity in the room after a room has been commissioned.

Complaint – coil freezing up

- Check suction pressure. Equivalent pressure for all refrigerants should be 38 degrees (with 55 degree room) or 17 degrees below that of the desired room temperature.
    - Adjust constant pressure expansion valve.
- If unable to move the suction pressure to desired setpoint.
    - Review condensing unit sizing in relation to the evaporator capacity. Possible causes are that the condensing unit has too much capacity and thus is overpowering the expansion valve.
    - Expansion valve may be faulty – contact factory.

Suction Line is frosty back to the condensing unit

- Review condensing unit sizing in relation to the evaporator capacity. Possible causes are that the condensing unit has too much capacity and thus is overpowering the expansion valve.
- Check airflow for restriction or the proper amount. Low airflow can cause a properly sized system to underperform and frost up the suction line. Increase airflow through the unit.

Suction pressure is too low (less than 38 degrees) –

- Adjust the AXV valve to the saturation pressure that is equivalent to 38 degrees (i.e. 63 psig for R22, 33 psig for R134a).
    - Note: the adjustment nut is a 5/16" hex. Do not remove the larger brass nut on the opposite end of the valve or failure of the valve will result.
    - Note: the adjustment nut is accessible from the outside of the unit on the HS series units.
- - If unable to adjust the pressure on the system (the suction pressure remains too low) please contact the factory.

Wine Room Temperatures are too high

If the room temperature is not satisfying check the system pressures and temperatures

Evaporator temperature should be 38 degrees (+/- 1-2 degrees)
Air temperatures should be 48 degree leaving/55 degree entering for a 7 degree split

- For HS units if the split is less than 7 degrees the most likely cause is too much airflow (too little restriction of the system). If this is occurring a motor speed control should be added to the fan motor circuit and the motor slowed down until the 7 degree split is achieved.
- For HS units if the split is greater than 7 degrees the ducting should be examined for restrictions. While the unit will still operate with larger splits there may be ramifications to the room humidity.
- For other units without ducting the temperature differences should be 7 degrees by design. Contact the factory for situations where this occurring.

Note: Please note that if the unit is running 100% of the time and the room is not cooling please consider the possibility of a vapor barrier not being present and moisture is migrating into the room. A quick test is to install a bucket or other container on the drain line for the unit. If a vapor barrier is not present in the room the condensate will continue to build up. For rooms with a proper vapor barrier installation very little condensate should build up. The second possibility is that the unit selected is too small and cannot provide the needed cooling. Please relook at the design assumptions for the system.

Unit "leaking water" –

For HS units "leaking water from the base of the unit or water building up in the ducts is symptomatic of the unit not having enough static pressure restriction on the system and is flowing too much air. This problem will also show up as the room not cooling or the temperature split across the unit as being less than the desired 7 degrees.

- Check to ensure that there is a slight ¼ inch per foot of slope of the unit toward the drain fitting.
- Install a motor speed control on the fan to bring the airflow down to achieve a 7 degree split on the unit.

Code	Description	Min	Max	Unit of Measure	Default	Factory rec.
/C	ambient probe calibration	.-127	127	C/F	0	Default
/2	measurment stability	1	15	-	4	Default
/4	selection of probe to display	0	1	-	0	Default
/5	selection C/F	0	1	-	0	1
rd	control differental	0	19	C/F	2	1
r1	min. set allowed	-50	127	C/F	-50	40
r2	max set allowed	-50	127	C/F	60	65
r3	enable alarm	0	1	-	0	Default
r4	automatic variation of setpoint	-20	20	C/F	3	0
c0	compressor start delay	0	15	min.	0	Default
c1	min. time between 2 starts	0	15	min.	0	4
c2	min. compressor off	0	15	min.	0	4
c3	min. compressor on	0	15	min.	0	4
c4	duty cycle safety relay	0	100	min.	0	Default
cc	contious cycle duration	0	15	hours	4	Default
c6	alarm bypass	0	15	hours	2	Default
d0	type of defrost	0	3	-	0	2
dI	interval between 2 defrosts	0	199	hours/min	8	0
dt	end defrost temp.	-50	127	C/F	4	-50
dP	max. defrost duration	1	199	min./s	30	Default
d4	defrosting at insturment on	0	1	-	0	Default
d5	defrost delay	0	199	min.	0	Default
d6	display off during defrost	0	1	-	1	0
dd	post defrost dripping time	0	15	min.	2	0
d8	alarm bypass after defrost	0	15	hours	1	Default
d9	defrost priorty over comp. times	0	1	-	0	Default
dC	time bias	0	1	-	0	Default
A0	alarm/fan differential	0	19	C/F	0	Default
AL	shift low temp. alarm threshold	0	127	C/F	0	Default
AH	shift highh temp. alarm threshold	0	127	C/F	0	100
Ad	temp. alarm delay	0	199	min.	0	Default
A4	digital input configuration	0	4	-	0	Default
A7	alarm input detection	0	199	min.	0	Default
F0	fan operation mode	0	1	-	1	0
F1	fan on temp.	-50	127	C/F	5	Default
F2	fans off with compressor	0	1	-	1	Default
F3	fans off during defrost	0	1	-	1	Default
Fd	fans time-out post dripping	0	15	min.	1	Default
H0	serial address	0	199	-	1	Default
H1	enable defrost/malfunction relay	0	1	-	1	Default
H2	disable keypad	0	1	-	1	Default
H4	disable buzzer	0	1	-	0	Default
L1	control setpoint	-50	127	C/F	4	Default

Shaded areas are left at default setting

to access the parameters press set key for (5) sec. menu displays select (PS) and enter (22) press set key to confirm.

LRC Coil Company

Warranty

We're proud of the workmanship that goes into every LRC product. Because of our exacting design and manufacturing standards, and our thorough testing prior to shipping, we unconditionally guarantee our products to be free from manufacturing defects for one year.
Note: You must contact the factory at (562) 944-1969 with regard to all warranty issues. Failure to contact LRC prior to servicing the equipment may void the warranty.