January 2007

HUSSMANN®

INSTALLATION & SERVICE INSTRUCTIONS FOR

LPL – LPM – LPH

REMOTE UNITS

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P/N OII – LPL – LPM – LPH
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Introduction

The LPL, LPM, LPH remote, low profile, air cooled, outdoor condensing units are designed to be used with small refrigeration cabinets or walk-ins. They can be either rooftop or slab mounted. They come pre-wired and pre-piped. The following is a list of the standard design features of the unit:

STANDARD FEATRUES:

Outdoor housing
Compressor (both hermetic and semi-hermitic are available)
Rigid mount compressors
Condenser
Condenser fans
Low ambient fan thermostat
Insulated receiver
Crankcase heater
Head pressure control Valve
Dual Pressure Control
Liquid Line SV
Drier and Sight Glass
Compressor Shut-off Switch
Crankcase Heater Switch
Desuperheater Coil
Crankcase Pressure Regulator if required

OPTIONAL

The LP units have a number of options available. See OPTIONS section for a detailed discussion. A list of those available are as follows:

Spring Mounted Compressors
Vibrasorbers
Vibration Pads
Defrost Timer (Time-Time, Time Temperature varieties)
Temperature Control for Refrigeration Systems
Refrigerant Line Set
Electrical Line Set
Coated Condenser
Copper Finned Condenser
Crankcase Heater Thermostat
Crankcase Heater Relay

Inspection

Upon receipt of the unit, carefully examine the crating for damage. If crate is damaged, make a note on the delivery ticket before signing. Carefully remove shipping crate and examine unit for “concealed” damage. If damage is found, contact the delivery carrier immediately and have his agent prepare an inspection report for the purpose of filing a claim. THIS IS YOUR RESPONSIBILITY.

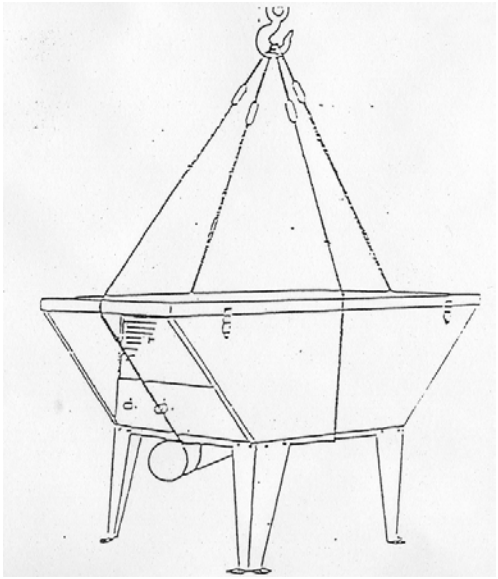
Location

The LP units should be located where they are level and easily accessed for service. When the unit is permanently located remove all shipping material.

The unit must be located such that there is an unobstructed air flow through the condenser for an unobstructed distance of 1 1/2 feet in front of the unit and 6 inches over the top of the unit. If placing more than one unit next to each other they should be at least 3 feet apart.

Rigging and Moving

When placing the unit on a roof, lift it by the base frame. Use a spanner bar to prevent excess stress on any of the sheet metal parts.



General Upkeep

Under normal conditions, after the unit is installed and running, very little maintenance should be required. However, the following list of housekeeping practices will assure trouble free operation.

Check the operation of the condenser fan motors. The fan blades must be tight and turn freely.

Oil the condenser fan motors periodically.

Set up a routine to clean the condenser.

Check the dual pressure control capillary tubes to make sure they are not rubbing.

Check the tubing and electrical lines for rubbing due to vibration.

Piping

***** Unit is under pressure. ****** Care should be taken when connecting piping. **********

In doing the interconnective piping, use only top quality refrigeration grade tubing of recommended wall thickness, follow good piping practices, and, if applicable, the jobs piping specifications. It is not the intention of this section to cover the subject in detail, but rather to highlight the areas requiring extra care, such as :

Brazing
Service Valves
Elbows
Piping Support
Quick Connects
Compressor Mount

Brazing

Refrigeration leaks in the field piping are probably the largest single cause of system failure. Careful and proper brazing, plus the use of an ultra-sensitive electronic leak detector, can minimize refrigerant leaks.

Use only clean dehydrated, sealed refrigeration grade copper tubing. All joints should be made with silver alloy brazing material, such as 15% sil-fos, 6% easy-flo or equivalent, commonly used for copper to copper, and 35% silver solder for ferrous joint brazing. Dry nitrogen should be allowed to trickle through the tubing during brazing to prevent the internal formation of copper oxides and carbon.

CAUTION – A pressure regulator must always be used with nitrogen has cylinders.

There are 4 reasons why leaks occur in a brazed joint:

1. Uneven or insufficient heat
2. Oxidized or dirty copper
3. Loose-fitting joints
4. Improper use of flux\

When a leaking brazed joint is found, it should be pulled apart, and cleaned and inspected before rebrazing. It is sometimes hard to tell if the brazing material is flowing properly into the joint. It may appear to form a neat seal around the outer edge of a joint, which may hold temporarily, but in a good brazing job the brazing material flows deeply and evenly though out the entire contact of the two pieces of tubing. This is assured by the proper application of heat during the brazing operation. The material flows toward the heat, so by placing the flame of the torch in the area before the end of the tube or fitting, you will cause the flow to go where it is needed.

Service Valves

Field installed service valves may be installed at several locations for ease of maintenance and reduction of service costs. These valves must be UL approved for a minimum of 410 psig working pressure.

Elbows

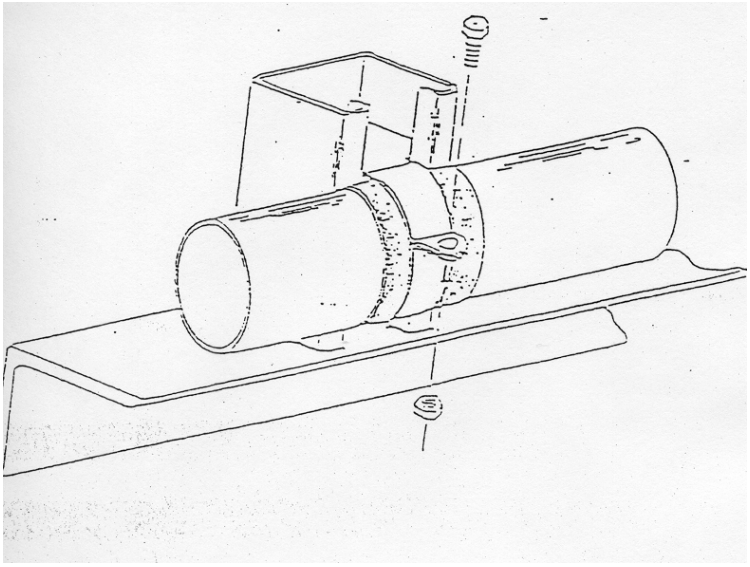
Long radius elbows are recommended because they create a lower pressure drop and because they are less susceptible to breakage. 45 degree elbows are not recommended.

Piping Support

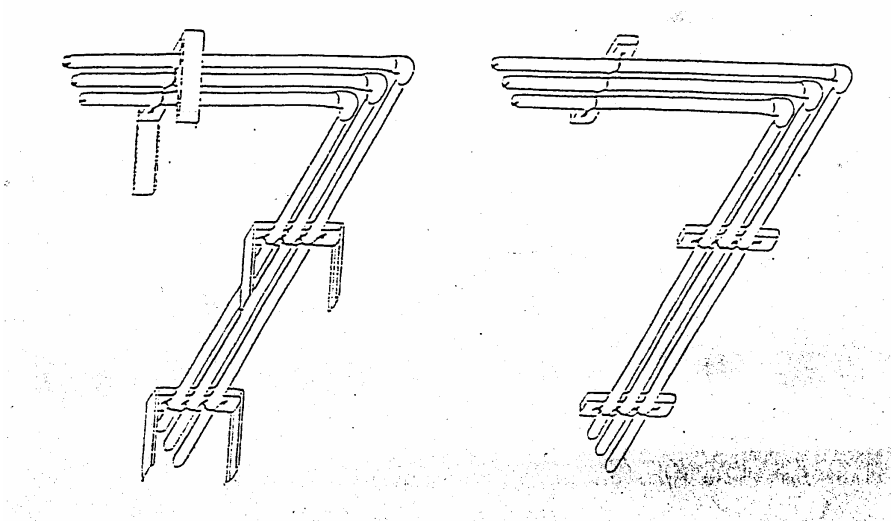
All piping must be supported to eliminate excessive line vibration. Vibration is transmitted to refrigeration piping by movement of the compressor to which it is connected, and by pressure pulsations as the refrigerant passes through the tubing. Insufficient and improper supporting of refrigerant piping can cause excessive line vibration which can result in:

1. Noise transmission to the other parts of the building
2. Vibration transmission to floors, walls, and ceilings
3. Vibration transmission back to the compressor and attached components
4. Line breakage

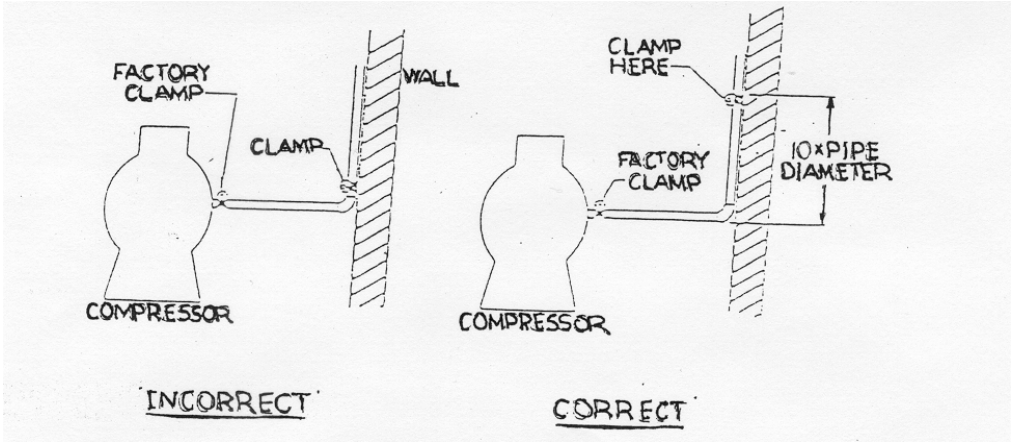
To eliminate the preceding conditions the following guidelines must be considered:



Normally, any straight run of tubing must be supported in at least two locations near each end of the run. Long runs require additional supports.



When changing direction in a run of tubing no corner should be unsupported.



Piping attached to a vibrating object (such as a compressor, or compressor base) must be supported in such a manner that it will not restrict the movement of the vibrating object. Rigid mounting, as shown below, will fatigue the tubing.

When a reduced riser is necessary, reduce the pipe on the high side of the riser only. A reduction of the low side backs up a large quantity of oil on the horizontal pipe run, not in the trap.

Thoroughly inspect all piping after the equipment is in operation and add supports wherever line vibration is significantly greater than most of the other piping. Extra supports are relatively inexpensive compared to refrigerant.

Insulating Piping

All refrigerant lines run outside the building should be protected from direct sunlight wherever practical and should be insulated to prevent excessive suction gas temperature rise and flashing ion the liquid line.

Line Sizing

Size refrigerant lines according to their equivalent length of run. Use the total equivalent length to figure the liquid line size. Due to the receiver capacity, the unit should not be located farther than 50 ft. from the evaporator. IF the lines exceed 50 ft. an auxiliary receiver will have to be added in the field. Liquid and suction line sizes should be as follows based on unit HP.

Unit HP	Liquid Line	Suction Line
1/3 - ¾	¼	½
1 - 1 ½	3/8	5/8

For the run inside the refrigerators use the following guide:

Liquid Line – Maintain the size of the main liquid line tubing being run through at least on-third of the evaporators, then the size may be reduced to the next smaller size for the second-third, and to the next smaller size for the last third. Do not reduce below the evaporator's liquid line size.

Suction Line – Maintain the size of the main suction line tubing being run through at least one-third of the evaporators, then the size may be reduced to the next smaller size for the second-third, and to the next smaller size for the last third. Do not reduce below the evaporator's suction line size.

Equivalent Length – The equivalent length for all fittings and valve should be added to the actual length to tubing to determine the "Equivalent Length of Run." The equivalent lengths for globe valves, angle valves, and 90 degree elbows are listed in the following:

Equivalent Feet Table

Tubing Size	Glove Valve	Angle Valve	90 deg. Elbow Long Radius
½	17	6	0.9
5/8	18	7	1.0
7/8	22	9	1.4
1 1/8	29	12	1.7
1 3/8	38	15	2.3
1 5/8	43	18	2.6
2 1/8	55	24	3.3

Electrical

The LP units are designed for field wiring. IT IS VERY IMPORTANT FOR SAFETY TO YOU AND YOUR CUSTOMERS TO HAVE THE UNIT PROPERLY GROUNDED. The electrical installation should be done by a qualified electrician in accordance with the National Electrical Code and/or local codes.

Note: Connecting this unit to any electrical supply other than specified on the serial plate will void the warranty and may result in serious damage to the unit. The cabinet should be supplied with it own service.

Check the condensing unit nameplate specification to be sure the voltage and phase coincide with the power supply. Continuous or fluctuating voltage of more than 10% higher or lower than the compressor rated voltage may affect its operation. Consult the power company for a correction. The voltage should be checked under starting and running conditions at the compressor terminals.

The wiring diagram is on the inside of the electrical panel cover. All wiring is factory pre-wired.

Serial Plate Information

The serial plate is located on the cover of the electrical box. It has all the pertinent information needed for proper electrical installation. The serial plate should not be removed for any reason.

Fused Power Supply

A fuse power supply should be connected to the LP unit at the electrical box. The wire size must be capable of carrying the ampere load given on the unit nameplate as “Minimum Circuit Ampacity.” This ampacity has been calculated according to the National Electrical Code for the maximum load to be served (unit or electrical defrost). The “Maximum Branch Circuit Fuse Size” is also given.

Control Wring

The control wiring requirements (external to the electrical control box) will be shown on the wiring diagram. This will include the defrost thermostat and the temperature control. However, check each refrigerated fixture’s installation instructions. Such instructions should take precedence. A separate circuit may have to be supplied for the control wiring.

Condenser Fan Motors

The LP units feature two condenser fan motors. On fan is controlled by the fan delay thermostat while the fan in front of the compressor cycles on an off with the compressor.

Electrical Box

The electrical box comes pre-wired internally. Consult the wiring diagram for proper wiring of the control circuit. There is a power switch in the box for the compressor and a separate on for the crankcase heater.

Fan Delay Thermostat

The fan delay thermostat is connected to the left hand (as you face the unit from the electrical box side) fan motor and will leave this fan off at ambients below 65 degrees to insure proper condensing temperatures.

Solenoid Valve

The LP units come with the solenoid valve installed in the liquid line. The valve will need to be wired from the Electrical Box to the control circuit. Consult the wiring diagram for the proper wiring.

Dual Pressure Control

The dual pressure control is wired in series with the compressor and when used in a pumpdown system, (see setting up a pumpdown system)cycles the compressor.

Crankcase Heater

The crankcase heater is located under the motor end of the compressor. Its purpose is to keep the oil in the compressor warm so the refrigerant does not mix with it causing the refrigerant to wipe the oil out of the compressor.

Refrigeration

As stated previously, these units are designed to run refrigerated cabinets or walk-ins at high, medium, or low temperatures. The units are designed for outdoor applications only and are equipped with the controls for this application.

Service valves are all closed when shipped. Be sure that all service valves are fully open before attempting to start the compressor. Open all hand valves and energize all solenoid valves prior to leak testing and evacuating the complete system. Positioning of valves for evacuation is shown below.

POSITION OF VALVES FOR LEAK TESTING OR EVACUATION

Valve	Position
Receiver Outlet	Mid-Seat
Compressor Suction	Mid-Seat
Compressor Discharge	Mid-Seat
Liquid Line Solenoid	Open (energized)

If it should become necessary to leak test the system, please adhere to the following notice:

Because of the CFC atmospheric considerations being taken today, we ask that leak testing be done with refrigerant 22 mixed with nitrogen. If the condensing unit nameplate designates a refrigerant other than R-22 remove all R-22 from the immediate area to avoid confusion after leak testing and evacuating the unit. Recharge the unit with proper refrigerant.

Leak Testing

THE TEST GAS CYLINDER MUST BE EQUIPPED WITH A PRESSURE GAUGE AND REGULATOR SO THAT SYSTEM TEST PRESSURES DO NOT EXCEED MAXIMUM ALLOWABLE LIMITS. DO NOT EVER USE ANYTHING OTHER THAN A R-22/NITROGEN MIXTURE FOR LEAK TESTING.

Attach a refrigerant test gas cylinder to your service manifold and connect the manifold to the charging port on the liquid line valve. Charge an R-22/Nitrogen mixture into the system, raising the pressure to the remote unit's nameplate for the low side and high side pressures. Using an electronic detector, carefully check the entire system for leaks. Take special care to inspect all brazed and flare connections.

Evacuation

After the system is proven leak tight, thoroughly evacuate the system according to the following procedure:

Discharge the refrigerant-nitrogen mixture, allowing it to blow from the system as rapidly as possible, into an empty cylinder. Be sure that all service valves and solenoid valves are open to allow all the mixture to be discharged.

Connect a deep-drain vacuum pump to both the high and low side of the system. Pull a vacuum on the system to at least 1500 microns.

Break the vacuum by adding refrigerant into the system until the pressure is above 0 PSIG> Always charge the refrigerant line into the system through a new drier in the charging manifold line. A 16 cubic inch drier is sufficient for this purpose.

Repeat steps 2 and 3 two more times, the third time evacuating the system to 500 microns.

Charging the System

The following procedure should be adhered to when charging the system.

Make certain the liquid line charging port in the liquid line cutlet valve of the receiver tank is closed by running the valve stem all the way out until it is backseated. Connect the manifold gauge on the refrigerant drum to the high side valve on the compressor. The connection at the valve port should be capable of loosening so that the charging lines can be purged.

Open the high side valve on the manifold gauge. Partially open the valve on the refrigerant drum and allow a small amount of refrigerant to escape through the loosened connection until the charging line is purged of air, then tighten the connection.

Partially open the high side valve. Slowly open the refrigerant tank valve until it is fully open and charge liquid into the system. Pull a vacuum on the system to at least 1500 microns.

Connect the suction side of the manifold gauge to the suction side valve on the compressor. Open the outlet valve on the receiver and the suction valve to let the refrigerant flow through the unit. Loosen the charging hose at the suction side of the manifold gauge and allow some refrigerant to bleed off to remove air from the hose then retighten. Open all valves correctly and start the system. Because this is the initial startup of the compressor, watch and listen for any peculiar performance, sudden pressure changes, or malfunctions. Turn the compressor off at the first sign of trouble. It all appears to be correct proceed as follows:

Watch the discharge pressure gauge closely. A rapid rise in pressure may indicate the condenser is filling with liquid and the system pumpdown capacity has been exceeded. Stop charging if this occurs.

If suction and discharge gauges, including the sight glass, indicate insufficient refrigerant charge, continue adding refrigerant gas only through the compressor suction service valve.

During the entire charging operation, check the compressor oil level closely. If the sightglass does not clear up after a sufficient amount of time, close the charging tank valve, and front seat the liquid line valve.

Continue charging gas through the suction valve until the required refrigerant charge is in the system. Do not overcharge, see above . Open the liquid line valve

When sufficient refrigerant is in the system, stop the compressor, back seat the valves on the compressor, close the charging tank valve, disconnect the manifold gauge, and put the valve caps back on.

Start the system and observe the oil level in the compressor. The oil level sightglass should be ½ full.

DO NOT ADD ADDITIONAL REFRIGERANT TO THE SYSTEM UNTIL IT HAS HAD A CHANCE TO SETTLE DOWN AND REFRIGERATION TEMPERATURES ARE BEING REALIZED.

Charging the system with Head Pressure Control Valve

Additional refrigerant charge equal to the back flooding capacity of the condenser coil is required for outdoor units. Without this additional charge the unit will not run properly especially at times of large ambient temperature swings.

Follow steps above, in “Charging the System”.

Measure the air temperature entering the condenser.

For the LP outdoor units refer to the table below using the column headed by the temperature closest to that which you have measured. Add by weighing in the additional quantity of pounds of refrigerant indicated for the model. There is a label on the unit giving this same information.

Winter charge for LP Units with Head Pressure Ctrl Valve

R-12, R-134a, R-22, R-502, R-404a

Refrigerant charges by pounds that must be added above and beyond a clear sight glass

Ambient	1/3 to 1 ¾ HP Unit
90	3 #
80	3 #
70	2.75 #
60	2.5 #
50	2 #
40	1.5 #
30	1 #
20	.5 #
10	.25 #
0	0

Compressor

The LP units use hermetic or semi-hermetic compressors depending on the unit model number. The semi-hermetic compressors are mounted on rubber waffle pads which make the compressor solid mounted. Do not loosen the bolts and nuts holding the compressor.

All of the compressors are protected by external current overload protectors which automatically reset.

THE SERVICE VALVES ARE CLOSED WHEN SHIPPED. BE SURE THAT ALL VALVES ARE OPENED BEFORE ATTEMPTING TO START THE COMPRESSOR.

Check all valve, packing stem, and flare connections to be sure they are tight.

Desuperheater Coil

The unit is provided with a desuperheater coil which is a coil of tubing the acts as a “pre-cooler” before the condenser.

Head Pressure Control Valve

The head pressure control valve is a pre-set, non-adjustable type. Its function is to divert the refrigerant to the receiver when the head pressure falls below the setting so that proper head pressure is maintained in the system and liquid is feeding the thermostatic expansion valve.

Crankcase Pressure Regulator

Some of the low temperature, semi-hermetic, R-502 or R-404A remote units require a crankcase pressure regulator in the suction line. The CPR is set for 12 psi. The purpose of the valve is to maintain a low suction pressure on start-up so that the compressor will start properly. On start-up, the valve will hold the suction pressure at the desired setting unit the suction pressure has dropped below the setting, then the valve will open.

If it becomes necessary to check or reset the setting, the case must be warm such as after a defrost cycle or from an initial warm case condition. Put a suction compound gauge on the compressor suction valve, start the compressor. If the pressure needs to be reduced turn the adjustment screw clockwise, or, counter clockwise to raise the pressure. DO NOT SET THE VALVE BASED ON THE NAMEPLATE AMPERAGE RATING AS THE PRESSURE SETTING WILL BE TOO HIGH AND THE COMPRESSOR WILL NOT START PROPERLY.

Pumpdown System on the Remote Unit

Operation: The pumpdown system shuts off the flow of refrigerant in the high side liquid line when the case cycles off or during a defrost cycle and pumps the refrigerant from the evaporator into the condenser and receiver.

Purpose: The pumpdown system is designed such that nearly all the refrigerant in the evaporator is pumped beyond the compressor leaving the low side of the system with little refrigerant in it and at a very low pressure.

Because refrigerant will mix with the oil in a system, the oil can easily be wiped out of the compressor at start up. The crankcase heater is used to help keep the refrigerant out of the oil and the pumpdown system puts the refrigerant beyond the compressor so the refrigerant can not mix with the compressor oil.

At high ambients, with the very low pressure on the suction side, the compressor starts much more easily.

Setting up the Pumpdown System

The controls involved in the pumpdown system are the temperature control located on the case and the solenoid valve and dual pressure control located on the remote unit.

The high side of the dual pressure control is factory pre-set at 350 psi. Should the system develop excessive high pressure, the pressure will trip out the compressor. The pressure control will automatically reset itself.

To set the low side cut-in on the dual pressure control, hook up a pressure gauge to the suction side of the compressor. Start the compressor and let the case pull down to the desired temperature. Then set the temperature control to cycle off at this temperature. When the temperature control cycles off, the solenoid valve will shut off the liquid line and stop the flow of refrigerant into the evaporator. The compressor will continue to run, pumping the refrigerant out of the evaporator. Watch the pressure gauge.

As the pressure drops towards a vacuum, adjust the low side cut-out of the dial pressure control to shut off the compressor at about 2 psi. Do no let it pump into a vacuum. Set the differential adjustment from 10 psi – 15 psi. The compressor may come on during the off cycle of the case but this is only to pump out the evaporator.

When the temperature control cycles the cabinet back on, the solenoid valve will open the liquid line raising the suction pressure and the compressor restarts.

Dual Pressure Control Settings

The dual pressure control supplied are:
Low Pressure: open on drop, close on rise
High Pressure: open on rise, close on drop
The controls are of the automatic reset type, the switch is single pole-single throw.

Low Pressure Control Settings (PSIG)

Refg.	Coldest Expected Ambient Temperature							
	+30°F		+ 20°F		+10° F		0° F	
	cut in	cut out	cut in	cut out	cut in	cut out	cut in	cut out
R-132a	26	2	18	2	12	2	7	2
R-12	28	2	20	2	14	2	9	2
R-22	54	2	43	2	32	2	25	2
R-502	31	2	31	2	31	2	31	2
R-404a	70	2	56	2	44	2	33	2

	-10° F		-20°F		-30°F	
R-22	16	2	0	2	4	6*
R-502	22	2	15	2	2	2
R-12	4	6*	0	10*	6*	10*
R-404a	24	2	16	2	10	2

(Values with * are in inches of mercury)

The high pressure side of the control is pre-set and should not be changed. There is a fixed differential of 55 psig =/- 5 lbs.

High Pressure Control Settings (PSIG)

Refrigerant	Control Settings
R-22, R-502, R-404a	350 PSIG.
R-12, R-134a	250 PSIG.

*When operating R-404Aunits in condensing temperatures above 120°F high sidepressure setting should be adjusted to 430 PSIG.

Drier

The LP unit has a drier installed in the liquid line. If the drier needs to be replaced make sure the replacement has an equal or greater cubic foot capacity.

Sight Glass

The LP unit has a sight glass installed in the liquid line after the drier. The sight glass also has a moisture indicator.

Options

Spring Mounting

The semi-hermetic compressors can be supplied with spring mounting. The compressor is banded for shipping when the springs are used. Remove the shipping band. DO NOT LOOSEN THE COMPRESSOR MOUNTING BOLT AS THESE ARE FACTORY PRE-SET FOR PROPER RIDING ON THE SPRINGS. The feet of the compressor should be approximately one (1) inch above the base plate.

Vibrasorbers

When using spring mounted compressors, vibrasorbers in the liquid and suction lines must be used to prevent line breakage that can be caused by the compressor starting and stopping. Vibrasorbers are not necessary when the compressor is rigid mounted.

Vibration Pads

If the unit is mounted on a roof or slab and vibration is being transmitted through the wall or ceiling, vibration pads are available to mount under the feet of the unit. These wafter pads are about one inch thick.

Defrost Time Clock

As stated before, there are a number of defrost timers available that are either time initiated – time terminated or time intiated – temperature terminated. On the next pages you will find descriptions of the operation of timers available for the LP units.

03-S-269 or 03S-072

The timer must be adjusted to the proper time of day when the unit is started. The timer is adjusted by turning the knurled adjustment knob in the center of the dial face counter-clockwise until the time indicator corresponds with the correct time of day. Defrost pins come with the clock to set the number of defrosts required at the proper time. Check the pins for tightness. The timer will require re-adjusting after a power failure or the unit's supply is turned off for extended periods of time. If an additional defrost is required due to ambient or cabinet usage conditions, additional pins can be added to the clock. It is best to put the defrosts during the night or at a time when the cabinet has the lowest usage.

Defrost can be time initiated and temperature terminated with these models of timers. Consult the wiring diagram for the proper installation of the control circuit and the defrost termination thermostat. If the thermostat should fail, the timer is equipped with a failsafe to terminate the defrost on time.

The failsafe is set by moving the pointer in the center of the clock dial face to the desired time. The 03S269 timer is a 48 hour clock while the 03S072 is a 24 hour clock. Be sure the pins are set at the proper times.

03-S-334 or 03-S-335

The timer must be adjusted to the proper time of day when the unit is started. The timer is adjusted by turning the knurled adjustment knob in the center of the dial face counter-clockwise until the time

indicator corresponds with the correct time of day. Defrost pins come with the clock to set the number of defrosts required at the proper time. Check the pins for tightness. The timer will require re-adjusting after a power failure or the unit's supply is turned off for extended periods of time. If an additional defrost is required due to ambient or cabinet usage conditions, additional pins can be added to the clock. It is best to put the defrosts during the night or at a time when the cabinet has the lowest usage.

Defrost is time initiated and time terminated with these models of timers. Consult the wiring diagram for the proper installation of the control circuit. To increase or decrease the length of time for the defrost cycle, move the pointer in the center of the clock dial face to the desired time. These timers are 24 hour clocks.

03-S-279 or 03-S-319

The timer must be adjusted to the proper time of day when the unit is started. The timer is adjusted by turning the pointer in the center dial face counter-clockwise until it lines up with the correct time of day. The timer will require re-adjusting after a power failure or the unit's supply is turned off for extended periods of time.

The timer is provided with "ON" and "OFF" trippers to initiate and terminate defrost. Two sets of trippers are provided with the timer but the timer can accommodate up to 12 operations per day.

To set up a defrost

Loosen the screw on the 'ON' tripper and place the tripper on the edge of the dial face at the time you wish the unit to turn on. Tighten the tripper securely. When the timer is powered on, the normally open contacts will close and the normally closed contacts will open.

Loosen the screw on the 'OFF' tripper and place the tripper on the edge of the dial face at the time you wish the unit to turn off. Tighten the tripper securely. Consult the wiring diagram for the proper installation of the control circuit. To increase the length of defrost, spread the trippers further apart. Make sure the trippers are secure after adjusting.

The following is a table of specifications for the defrost time clocks described:

Huss PT. #	Paragon #	Type Defrost	Defrost Frequency	Adj. Range Fail Safe	Norm Open	Norm Close	Amp. Rate
03S335 (230 volt)	8045-20B	Time	1 to 6per day min. of 4 hrs. between starts	4-110 min in 2 min increments	1	1	40/2 HP
03S334 (115 volt)	8045-00B						
03S319 (230 Volt)	4002-20B	Time	1 to 7 per day ** min of 1 ½ hrs between starts	Min of 90 min.	1	1	40/1 HP
03S279 (115 Volt)	4001-00B						

03S072 (230 Volt) 03S269 (115Volt)	8145-20B E357-00B	Time or Temp	1 to 6 per day Min of 4 hrs Between starts	4-110 min. in 2 min increm.	1	1	208-230V 40A,2HP

** Two trippers (enough for one defrost per day) furnished with timer.

Temperature Control –

A temperature control is packed with the condensing unit anc can be used for cycling the refrigeration system. The control has a range of -30° to 50°F with an adjustable differential of 3°F to 12°. It is rated for 240V, 8A 48LRA, and a pilot duty of 125VA from 24 to 600 VAC and is single pole switch.

Electrical Line Set

Electrical line sets are available when connecting the LP unit to a Hussmann – Gloversville remote cabinet. Power is brought to the cabinet and the line set is installed between the cabinet and the remote unit. Consult the wiring diagram for proper wiring.

Refrigeration Line Sets

The refrigeration line set is provided with quick connects to mount to the remote condensing unit. The refrigeration line sets are shipped with the Hussmann Gloversville remote cabinet and depending on the model number are either factory installed and sealed at the case or provided with quick connects on each end for installing. Care should be taken when uncoiling the line set.

Line sets range from 15’ to 50’ at 5’ increments. They consist of the suction line and liquid line taped together for heat exchange, insulation, and mating quick connects to the remote unit. For the proper connection, lubricate the rubber seal in the male half with refrigeration oil. Thread coupling halves together by hand to insure proper mating of threads. Use proper size wrenches (on coupling body hex and on union nut)and tighten unit coupling bodies until “bottom” or a definite resistance is felt. Using a marker or ink pen, mark a line length-wise from coupling to coupling, then tighten an additional 1/6 to ¼ turn. The misalignment of the line will show the degree of tightening. This final turn is necessary to insure that the knife edge metal seal bites into the brass seat of the coupling halves, forming the leak proof joint.

Coated Condenser

For those areas that are exposed to high concentrations of salt air or adverse conditions that would affect aluminum fins, there are condensers that are available with the aluminum fins coated to help prevent corrosion of the fins.

Copper finned Condenser

For those areas that are exposed to high concentrations of salt air or adverse conditions that would affect aluminum fins and even aluminum fins that have been coated, there are condensers available with fins made out of copper which are not affected by the adverse conditions as easily.

Crankcase Heater Thermostat

The crankcase heater thermostat is located on a bracket mounted to the backside of the electrical box. The thermostat will not allow the crankcase heater on until the ambient it senses is 32°F. In turn, it will not turn off the heater until it senses 58°f.

Crankcase Heater Relay

The crankcase heater relay will turn off the crankcase heater when the compressor is in operation even if the ambient that the crankcase heater thermostat is sensing is below 32°F.

Trouble Shooting Chart

TROUBLE	PROBABLE CAUSE	SOLUTION
Compressor will not start, not noise	1. Power disconnected	1. Check fuse or breaker
	2. Defective or shorted wire	2. Locate break or short
	3. Defective overload, relay, or capacitor	3. Replace
	4. Defective liquid line solenoid	4. Replace
	5. Defective or mis-set dual pressure control	5. Reset or replace
	6. Defective temperature control	6. Replace
Compressor will not start, cuts out on overload	1. Low Voltage	1. Check voltage at compressor to assure adequate wiring has been provided.
	2.Defective relay or capacitor	
	3. CPR incorrectly set	3. Set to manufacturer's specs
	4. Defective compressor	4. Replace
High Head Pressure	1. Restricted condenser air flow	1. Clean condenser or remove air flow restriction
	2. Defective condenser fan motor	2. Replace
	3. Air or non-condensable gases in system	3. Leak check, change drier, evacuate, and recharge
	4. CPR incorrectly set	4. Set to manufacturer's specs
	5. Refrigerant flooding back to compressor	5. Check TEV setting or refrigerant charge

TROUBLE	PROBABLE CAUSE	SOLUTION
Warm storage	1. Temperature or pressure control not set properly	1. Reset
	2. Restricted condenser air flow	2. Clean condenser or remove air flow restriction
	3. Short of refrigerant	3. Leak check, change drier, evacuate and recharge
	4. Too much refrigerant	4. Reset
	5. TEV incorrectly set	5. Reset
Compressor runs continuously, product too cold	1. Defective control	1. Replace
	2. Control feeler tube not in positive contact	2. Assure proper contact
	3. Short of refrigerant	3. Leak check, change drier, evacuate, and recharge
Compressor runs continuously, product too warm	1. Short of refrigerant	1. Leak check, change drier, evacuate, and recharge
	2. Inefficient compressor	2. Replace
Frost back to compressor	1. TEV incorrectly set	1. Reset
	2. Overcharged with refrigerant	2. Consult manufacturer's specs, leak check, change drier, evacuate, and recharge
	3. Evaporator fans not running	3. Check fans
	4. Evaporator iced	4. De-ice

All Hussmann Self-contained cases have a full one year parts and labor warranty from the date of installation. In addition, self-contained cases carry a one-time compressor replacement warranty for a period of 5 years from date of installation. The original compressor will be replaced once at no charge if at any time during the 5-year period immediately following the case installation, the compressor fails due to a manufacturing defect. Labor is covered only for the first year after case installation. Failures that occur as a result of poor maintenance or cleaning practices will not be honored under the extended compressor warranty.

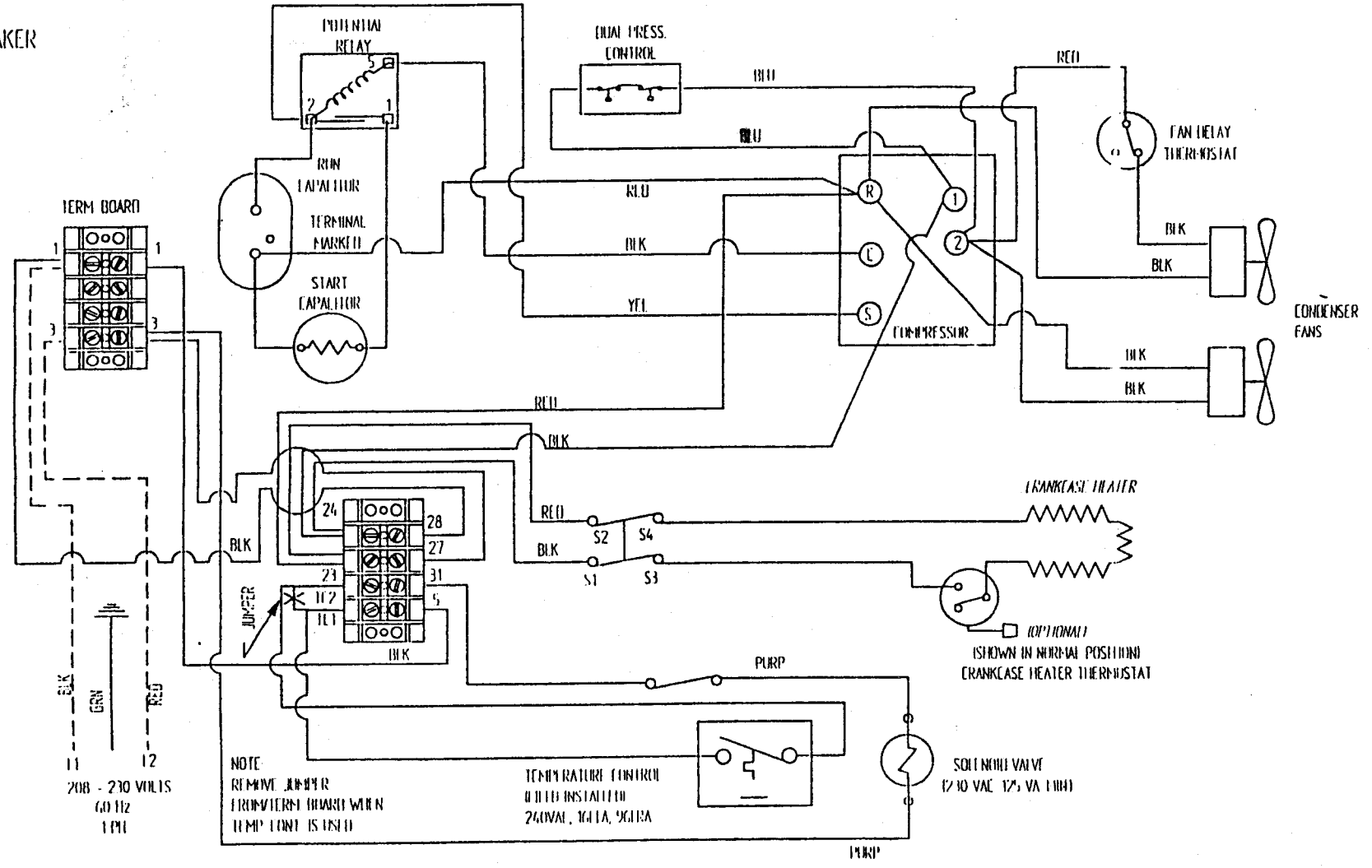
Its important to notify Hussmann of the date the case is put into service. A warranty registration card will be provided with the equipment. It is extremely important to complete the card and drop it in the mail. If this information is not provided within 30 days of installation, the case manufacture date will be the starting point of the warranty.

Labor submitted for coverage under the one-year warranty must be reasonable and be within the hourly rate range charged for the geographic area where the equipment is located. If a charge is considered excessive, Hussmann reserves the right to adjust the charge to an acceptable level. Hussmann may review adjusted claims within 30 days if petitioned by the submitting contractor.

When submitting a claim for compressor replacement, it is necessary to give the model and serial number of both the compressor being replaced and the new compressor. A receipt showing this information and the core credit (if applicable) should be included with the claim.

USE H.A.C.R TYPE BREAKER

NOTE:
USE COPPER, COPPER CLAD ALUMINUM, OR ALUMINUM CONDUCTORS ONLY.



MODELS
LPLO100RH, RD, RP
LPLO100REH, RD, RP
LPLO150RH, RD, RP
LPLO150REH, RD, RP

WIRING LEGEND

——— FACTORY WIRING

– – – – FIELD WIRING

REV ED #	REV DATE	REV BY
-	-	-

TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL ±1/2" DECIMAL .000" ANGULAR 1° TWO PLACE ± SPACES .064"

ATTACHED BY

TO MATCH

DRAWN BY DWW

DATE DRAWN 6/89

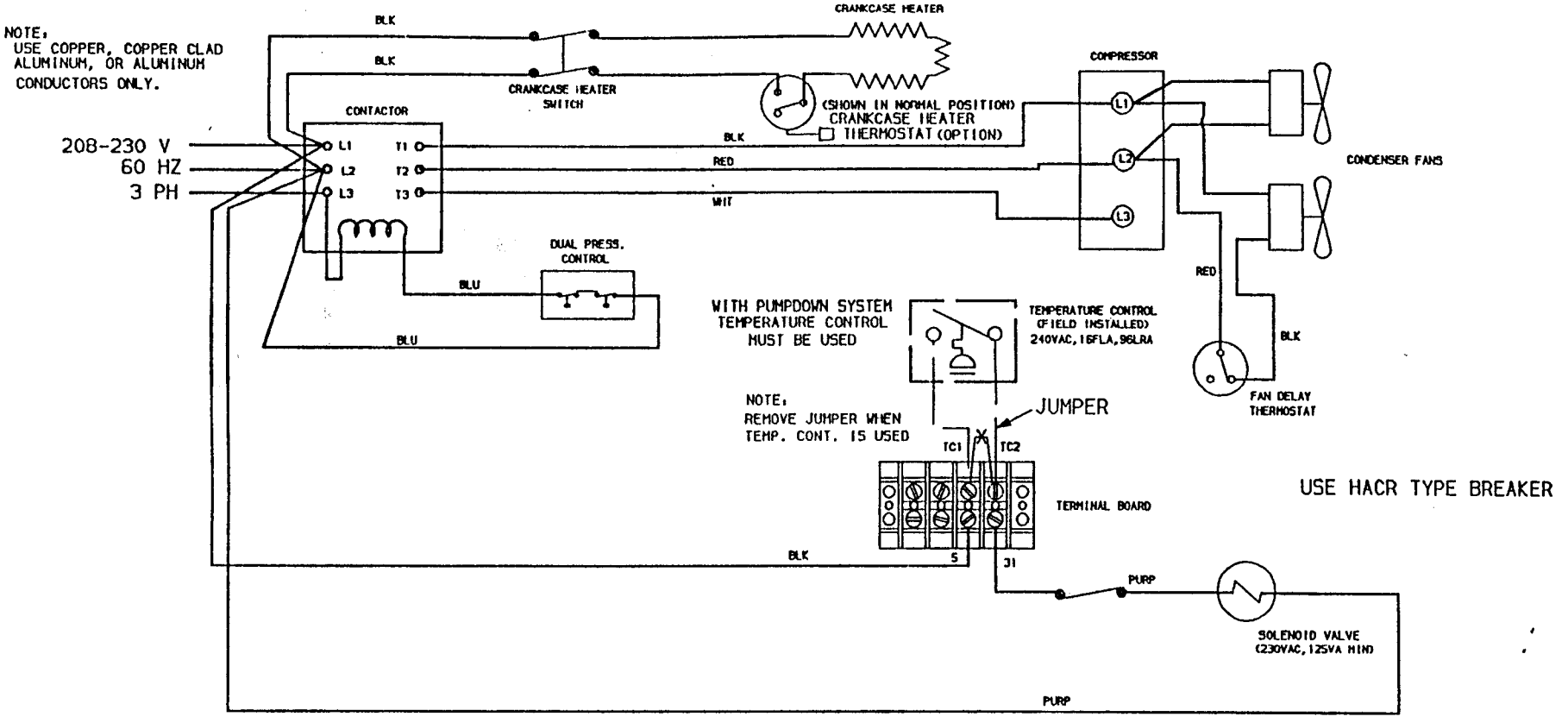
APPROVED BY

SCALE NONE SHEETS 1 OF 1

HUSSMANN
GLOVERSVILLE, NY 12078

WIRING DIAGRAM

M100-1704



NOTE: COMPRESSOR MOTOR PROTECTED UNDER PRIMARY SINGLE-PHASE CONDITIONS

MODEL
LPL01001FK
LPL01005RK
LPL01501FK
LPL01505RK

WIRE LEGEND

——— FIELD WIRING
——— FACTORY WIRING FOR FACTORY INSTALLED OPTIONS
——— FACTORY WIRING

REV.	DATE	BY	E.C.N.
	XX/XX/XX	XXX	XXXX

MATERIAL: XXXXXX-XX

SHEET SIZE: B

SIZE: XXXXXXXXXX

DIE NO. XXXX-XXXX

TOLERANCES UNLESS OTHERWISE SPECIFIED. FRACTIONAL ± 1/32" DECIMAL ± 0.031" ANGULAR ± 1° HOLE LOCATION & SPACING ± 1/64"

SCALE:

FINISH XXXXXXXXXX

HUSSMANN®
Bloomsville, N.Y. 12078

TITLE: WIRING DIAGRAM

TYPE CODE	DRAWN	CWW	DWG. NUMBER	REV.
X	DATE	06/89	M100-1705	X
	CHECKED	XXX		