



Technical Features

System Installation,

Operation

&

Maintenance Manual

Through the Wall Packaged

Process Refrigeration

Systems

1444 BELLMILL ROAD, TILLSONBURG, ON, CANADA N4G 4G9
TEL-1-866-748-7786 FAX: 519-688-5962
E-mail: info@kooljet.com URL: www.kooljet.com



Lifting Instructions:

1. The Refrigeration Systems are equipped with integral mounting / lifting holes.
2. The unit base is also designed for the purpose of lifting units to the unit mounting framework.
3. Use all lifting lugs/forklift channels during lifting for safe installation.
4. Use Crane/ Forklift to lift and mount the through the wall unit in the wall mounting frame.

Installation Procedure:

1. The system should be placed on a level and even on the wall mounting frame base where it will not be subjected to damage by traffic.
2. *Kindly Refer **Figure A, Figure B and Figure C** for mounting details.*
3. Install the unit in the wall mounting framework, having 1” gap on three sides.
4. Secure the unit by fastening with Nuts & Bolts OR Threaded Rods through the unit mounting holes to the wall mounting frame.
5. Seal the gap on all four sides, so that no water or outside air can penetrate.
6. Locate the system so the Condenser and Evaporator air intake and discharge are not obstructed. Inadequate air supply results in reduction of the cooling capacity and eventually compressor failure.

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7. The system should be located in a clean environment, avoid excessive dusty location and follow a periodic cleaning schedule.
8. Minimum clearance of 12" for air inlet on all sides and 60" for warm air discharge is required.
9. Adequate clearance must be provided at the back and sides of the unit to allow access to refrigerant piping, compressor and electrical control panel.
10. Never place the unit in a location where excessive heat or corrosive materials are present.
11. Allow additional space at the compressor side of the unit to perform any maintenance work and access the service valves, refrigerant piping and electrical control panel.
12. Consideration in location should also be made for any objectionable compressor or fan noise.

Preliminary Inspection Checks:

1. Ensure no blockage for air intake for the Evaporators & Air cooled condensers.
2. Check the condition of the copper piping and brazed ends to ensure that there are no leaks.
3. Check that all electrical and refrigeration connections are tight and secure.
4. Check compressor crankcase oil level. The oil level should be between 1/8 to 1/2 full in the sight glass.

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5. Wire knockout must be within acceptable location. The electrical cable from the fused disconnect should not disturb any electrical components inside the electrical panel.
6. All electrical connectors used must be water tight.
7. Make sure the fins in evaporator and condenser are not damaged and that there is no blockage of air.
8. Confirm that the evaporator and condenser fan blades are not touching the fan guard or venturi panel.
9. Check the refrigerant pressure in the system.
10. Install the condensate drain hoses on the drain pan outlets.

Initial Start-Up:

1. Check the voltage/phase from the source before connecting.
On 3-phase systems, the phase protector must show **GREEN** light to be in correct phase. Otherwise unit will not start.
2. Start the system and check for correct fan rotation on the condenser and evaporator fan motors.
3. Adjust the thermostat according to the room required temp.

Give at least ONE Degree difference between the settings of the 2 stages (**DUALKOOL** SYSTEM) as the **KoolJet** refrigeration system operates on independent refrigeration circuits. Set Differential at 2 deg for both stages.

*(**EXAMPLE**- If Room Temp. required is 35F, set stage 1 for 35F and stage 2 for 36F. Set the differential at 2 deg. for both stages)*

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4. To start the system, turn the following toggle switches on:-
 - a) Toggle switch of thermostat / temperature controller.
 - b) Toggle switch on side of control panel for compressor 1 & 2.
5. Start the system and check for correct fan rotation on the condenser and the evaporator side.
6. After 1 hour of running, check the refrigerant charge by taking pressure readings for high and low side of the system. The sight glass should be free of bubbles.
7. Check the amperage draw for individual compressors. It should be with-in operating limits as shown on each compressor.
8. After 1 hour of running, check the refrigerant charge by taking pressure readings for high and low side of the system. The Liquid Line sight glass should be free of bubbles.
9. Check the amperage draw for individual compressors, fan motors. It should be with-in operating limits.
10. Check the superheat for the TX valve. It should be in the range of 8-10 °F at the evaporator outlet.
11. Pressure settings and differentials in H.P / L.P, fan cycling controls, thermostat, crank case pressure regulators and head pressure controls are **Factory set**.



System Defrosting:

1. Units are equipped with HOT GAS / AIR defrosting.
2. Defrost cycles start at specified times (adjustable in Electronic Controller) and terminate when the temperature of the evaporator coil indicates that the coil is free of frost.
3. During the **DEFROST CYCLE mode**, make sure there is no ice left on the evaporator coil surface after the defrost cycle is complete. Increase the number of defrost cycles, if necessary.

System Shut-Down:

1. **SHORT TERM SHUT DOWN** - Do not disconnect the power supply. Shut off the toggle switches mounted on the control panel or on the thermostat. With the power ON, only the crank case heaters will remain operational.
2. **LONG TERM SHUT DOWN** - Do not disconnect the power supply while the system is running. Shut off the toggle switches mounted on the control panel or on the thermostat. After turning the toggle switches OFF, the compressors will not stop immediately. It will take a few seconds to shut down. During this time the entire refrigerant in the low side of the system will be pumped down to the condenser/receiver. This insures that there will be no liquid charge on the suction side of the compressor and it is safe to restart anytime. All power may then be turned OFF.
3. Additional operational literature is enclosed for the temperature & defrost controller and other components used in the system.

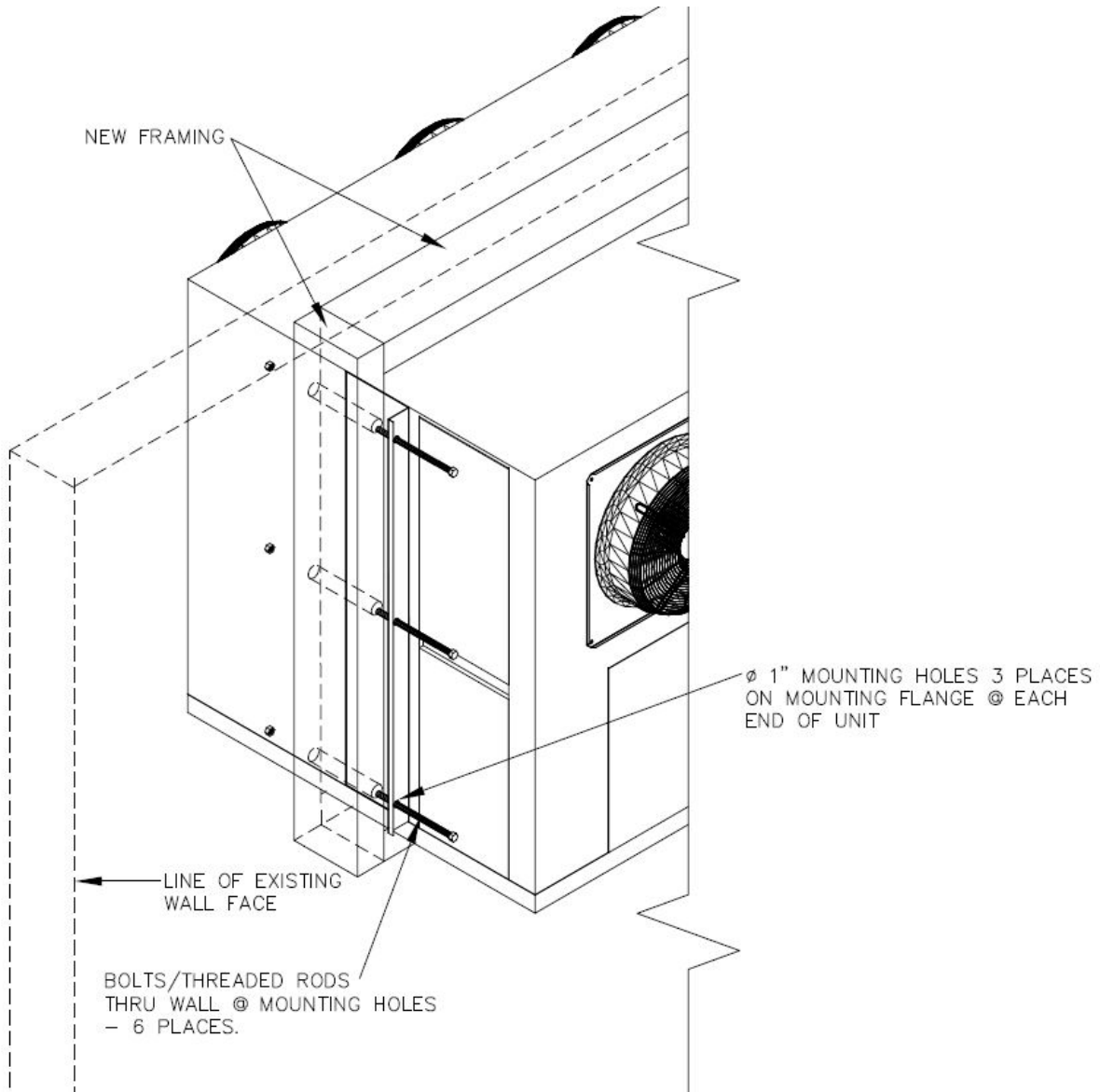
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THROUGH THE WALL UNIT - MOUNTING SCHEMATIC -
FIG. A



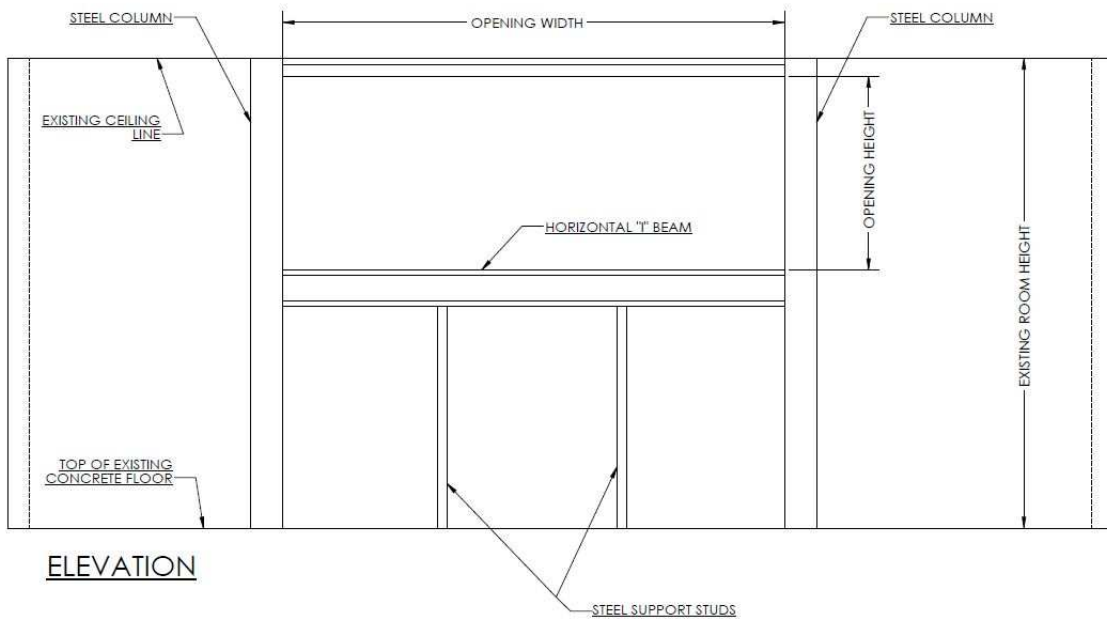
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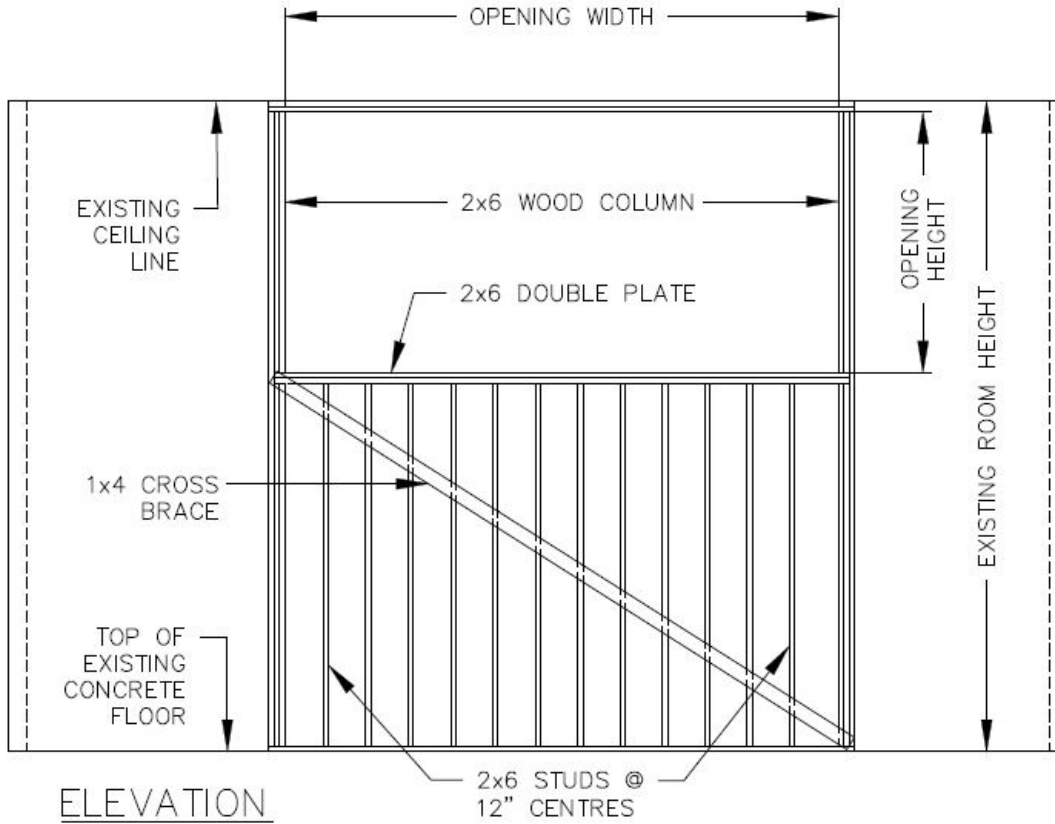
THROUGH THE WALL UNIT - STEEL MOUNTING FRAME -
FIG. B



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THROUGH THE WALL UNIT - WOODEN MOUNTING FRAME -
FIG. C

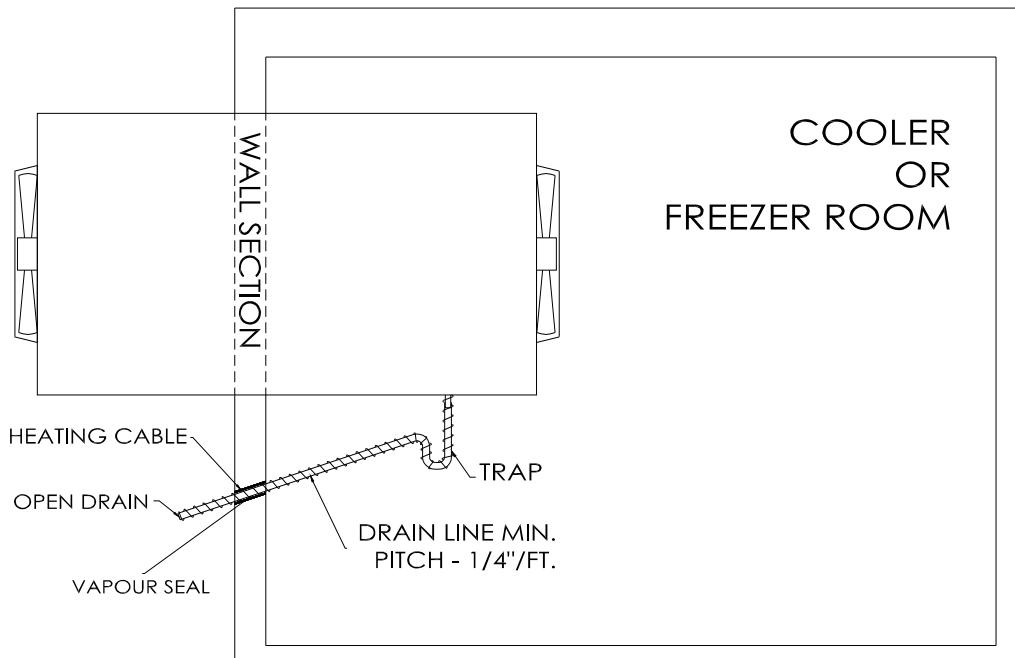


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CONDENSATE DRAIN LINES - COOLERS & FREEZERS

Refer to the following diagram for the proper condensate line mounting from the unit to the drain.



1. Either Copper or Steel drain piping should be used for **freeze protection**.
2. Provide a minimum $\frac{1}{4}$ " **per foot pitch slope** for proper drainage.
3. Drain line should be as large as Refrigeration System's drain connection.
4. We recommend a **U-trap** on the drain outlet to avoid any air intake from room.
5. For freezer rooms, drain line must be wrapped with **self-regulating** heating wire and covered with closed cell insulation. Heater must run continuously.
6. The drain pan fitting **MUST** be included when heating & insulating drains line.
7. A heat input of **20 Watts** per linear foot for 0°F and **30 Watts** per linear foot for -20°F room will adequate.
8. Inspect drain pan periodically to insure **free drainage** of condensate.

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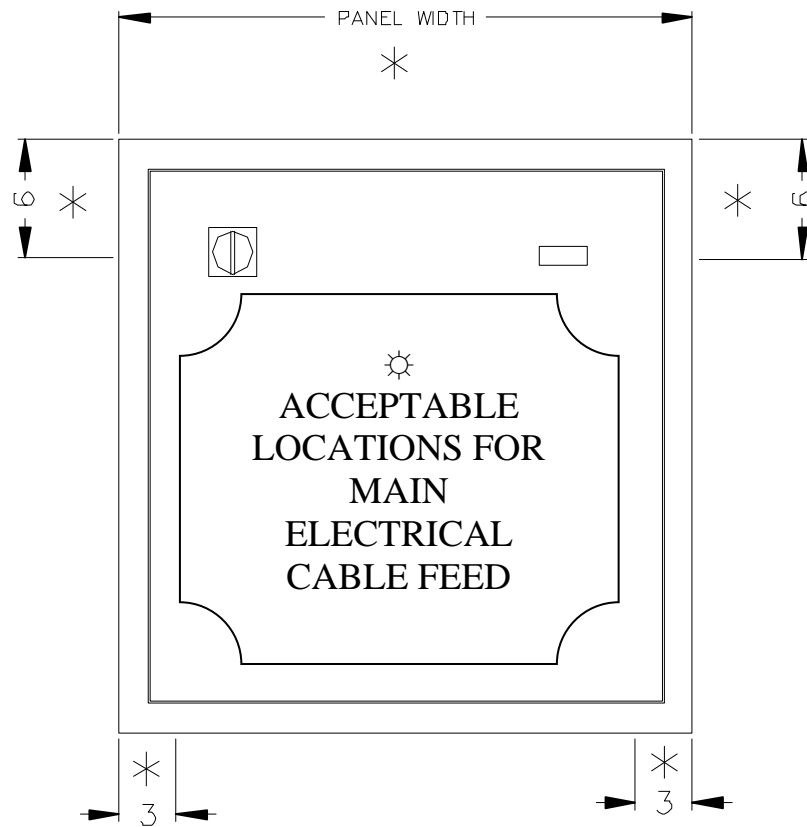
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MAIN ELECTRICAL CABLE LOCATION

Refer to the following diagram for the acceptable location for the main electrical cable entry points in the electrical control panel.



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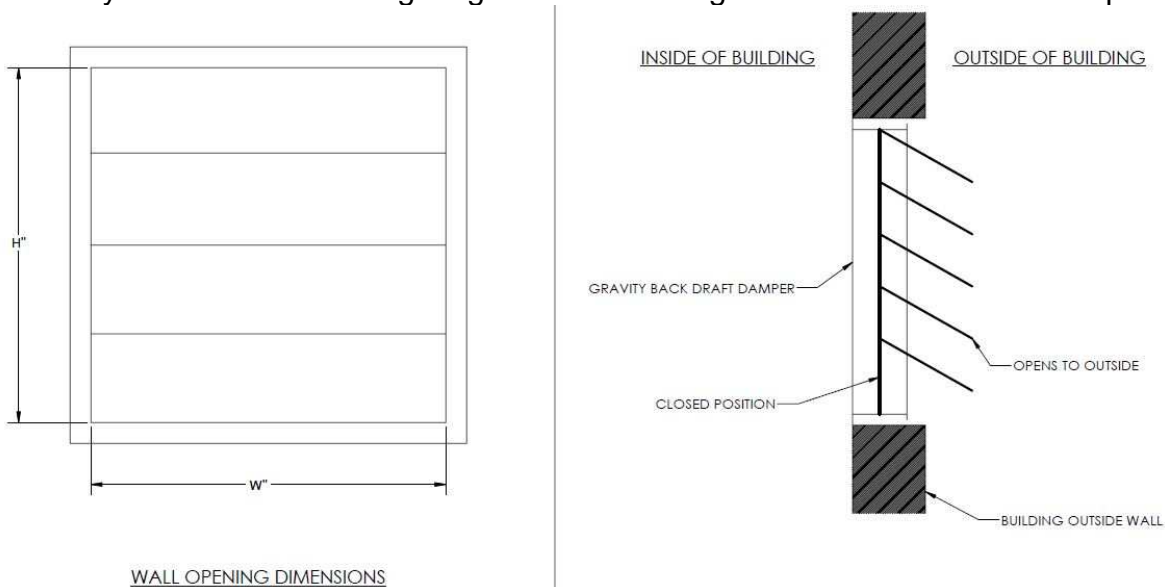
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GRAVITY/BACK DRAFT RELIEF DAMPER - **FREE COOLING OPTION ONLY**

Kindly refer to the following diagram for mounting the Back Draft Relief Damper.



GRAVITY DAMPER INSTALLATION INSTRUCTIONS

1. The Gravity Damper shipped loose with the Kooljet Refrigeration Systems, should be installed to avoid room pressurization during Free Cooling Mode.
2. The Gravity Damper MUST be installed in the vertical position. The damper louvers should be placed horizontally to the unit base.
3. The Gravity Damper opening should be made as per the drawing sent in the Approval Drawings package.
4. The Gravity Damper must be installed to the outside wall, so that the room air can be released to the atmosphere.
5. The Gravity Damper should be mounted from the inside the building.
6. The damper louvers should open towards the outside of the building.
7. Make sure the damper louvers move freely without any obstruction or struggle.

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GENERAL SEQUENCE OF OPERATION

1. Supply the power to the main electrical control panel.
2. If the phase sequence is correct and full line voltage is present on all three phases, phase loss monitor relay will energize and indicator light glows GREEN.
3. Turn ON both toggle switches for Compressor # 1 and Compressor # 2.
4. This energizes the liquid line solenoid valve(s), which allows the refrigerant to flow to the low pressure side.
5. Low pressure control will close when pressure rises above the cut-in setting of the LP controller.
6. The compressor contactor energizes, after the time delay. Both the compressors will start in sequence.
7. Evaporator fans will start with the compressor # 1.
8. Condenser fans will start in sequence as the high side pressure builds up.
9. The Room temperature will gradually decrease to the desired set point.
10. Once the liquid temperature reaches the set point, the temperature controller will de-energize the liquid line solenoid valve, stopping the refrigerant flow through the evaporator.
11. Now system will go into PUMP-DOWN mode, pumping the refrigerant from the low side to the high side. This will take few seconds.
12. Once the pressure drops below the cut-out setting on the LP controller, the contacts in LP controller will open and compressor(s) will stop.
13. When the Room temperature is close to the desired set point, the Compressor # 2 will stop before compressor # 1.
14. Never turn off the main power without turning off the compressor toggle switch. This will not pump the refrigerant down to the receiver and could cause the liquid slugging to the compressor upon starting.

Note: Before turning the main disconnect ON, set/verify the HP/LP controls, fan cycling controls, low ambient controls and the temperature controller as per the settings.

*The installation & start-up on **KOOLJET** refrigeration systems should only be performed by qualified refrigeration technicians. The system must be installed in accordance with all valid codes, regulations and local by-laws.*

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KOOLJET STANDARD WARRANTY

Thank you for choosing **KOOLJET Refrigeration** System.

We appreciate your business!!

Subject to the terms and conditions as per the quote, we offer a general warranty for the first year after original installation of **KOOLJET** product(s).

THIS WARRANTY WILL COVER THE FOLLOWING:-

1. We will supply free of charge any component part(s) of our product found to be defective in materials or workmanship.
2. Any replacement part(s) so supplied will be warranted for the balance of our product's original warranty.
3. The part(s) to be replaced must be made available in exchange for the replacement part(s) and reasonable proof of the original installation date of the product must be presented in order to establish the effective date of the warranty, failing which, the effective date will be based upon the date of manufacture plus thirty (30) days.
4. Any labor, material, refrigerant, transportation, freight or other charges incurred in connection with the performance of this warranty will be the responsibility of the owner at the current rates and prices then in effect.
5. This warranty may be transferred to a subsequent owner of the product.

THIS WARRANTY DOES **NOT COVER THE FOLLOWING:-**

1. Damages caused by accident, abuse, negligence, misuse, riot, fire, flood, or Acts of God.
2. Damages caused by operating the product in a corrosive atmosphere.
3. Damages caused by any unauthorized alteration or repair of the system affecting the product's reliability or performance.
4. Damages caused by improper matching or application of the product or the product's components.
5. Damages caused by failing to provide routine and proper maintenance or service to the product.
6. Expenses incurred for the erecting, disconnecting, or dismantling the product.
7. Parts used in connection with normal maintenance.
8. Products no longer at the site of the original installation.
9. Products installed or operated other than in accordance with the printed instructions, with the local Installation or building codes and with good trade practices
10. Products lost or stolen.

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WARRANTY TERMS

1. No one is authorized to change this WARRANTY or to create on our behalf any other obligation or liability in connection with our product(s).
2. There is no other representation, warranty or condition in any respect, expressed or implied, made by or binding upon us other than the above or as provided by provincial or state law and which cannot be limited or excluded by such law, nor will we be liable in any way for incidental, consequential, or special damages however caused.
3. The provisions of this additional written warranty are in addition to and not a modification of or subtraction from the statutory warranties and other rights and remedies provided by Federal, Provincial or State law.

If you have any questions please feel free to call us anytime on our Toll Free Line
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Service / Maintenance Instructions

An Ounce of Prevention is Worth a Pound of Cure.

To ensure top cooling performance and efficiency of your **KoolJET** Refrigeration System, periodically maintain the following:-

1. Check Liquid Line Sight Glass for both circuits for refrigerant level while unit is in operation. The sight glass should be clear and free of bubbles.
2. Check all Condenser and Evaporator Fan Motors for noises, vibration, etc.
3. Check Condenser and Evaporator Coil Fins for dirt. If blocked clean the coil surface.
4. Clean dirt from the Fins regularly with compressed air or pressure washer. While cleaning, make sure that fins should not damage.
5. System Cleanliness.
6. Mechanical Checks for Compressors, Valves and Brazed Joints.
7. Electrical checks with and without all electrical supplies isolated.
8. Check visually that all copper piping and other components are intact.
9. Visually check that all power cables and feed lines are properly connected.
10. Check for any oil spots, especially near the compressor and condenser joints and face surface.
11. Check system superheat, sub-cooling, compressor & other motor Amps, discharge temp, HP/LP settings, head pressure settings and system charge at every start-up after long time shut-off.

For Any Questions, Call **KoolJET** Customer Service at **1-866-748-7786**

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TROUBLE SHOOTING GUIDE

When trouble develops in **KOOLJET** refrigeration system, the cause is not always easy to pinpoint since the system contains many components and controls. To aid the operator or maintenance man in analyzing the trouble, follow the troubleshooting guide to detect the actual fault.

TROUBLE: System fails to start

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. No power	Fuses or circuit breaker Open at main disconnect	Check circuit for shorts or grounds. Replace fuses or close circuit breaker after fault is corrected.
2. No power on motor terminal	Thermal overloads open	Check motor circuit and motor for grounds or starter open shorts. Correct fault. If overloads tripped due to compressor overloading, find reason.
3. Red light glows/Blinks on voltage/Phase monitor.	Low voltage	Check the incoming voltage with voltmeter. Re-adjust the voltage in the monitor.
4. Test for burned-out holding coil or broken contacts	Defective Contactor	Repair or replace contactor
5. Full voltage at motor terminals but motor does not run	Burned-out motors or compressor	Replace Motors/Compressor
6. No power on terminals of starter holding coil of contactor	Open control circuit	Locate open operating or safety control and determine cause.
7. Compressor hums but doesn't start.Fuseblow.	Seized compressor	Replace compressor
8. Condenser Motor hums but does not start. Fuses will blow	Single phase condition/ Motor Seized	Find cause such as blown fuse and take corrective action
9. Red Light Blinks on the Phase Monitor	Loss or reverse sequence of phases (Faulty Wiring). Low or High Incoming Voltage.	Interchange any two incoming wires. Readjust the voltage selector switch

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TROUBLE: Compressor “short-cycles”

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Compressor operates normally but starts and stops frequently	Intermittent contact in electrical circuit	Replace faulty Control or reset timer
2. Compressor operates normally but starts and stops frequently	Low pressure controller differential set too close	Reset differential
3. Valve may hiss when closed. Also temperature change in refrigerant line through valve.	Leaky liquid line solenoid valve	Repair or replace solenoid valve
4. Dirty or iced evaporator	Reduced liquid flow due to: a) Dirty liquid filters b) Blocked Pumps c) Faulty Pump	Clean or defrost evaporator. Check filters and pump.
5. Excessively high discharge pressure. Compressor cuts off on high pressure cut-out	Insufficient condensing pressure	Check operation of condenser fan.
6. High discharge pressure	Overcharge of refrigerant	Remove excess Refrigerant
7. High discharge pressure	Non-condensable gases	Purge system
8. Normal operation but frequent starting and stopping on low pressure cut-out	Lack of refrigerant	Check for leaks, repair and recharge
9. High discharge pressure	Condenser coil restrictive	Clean the fins of the condenser.
10. Suction pressure too low, frosting at strainer	Restricted liquid line strainer or solenoid stop valve	Replace strainer or valve
11. Motor starts and stops rapidly	Faulty condenser motor	Repair or replace motor

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TROUBLE: Suction pressure too high

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Compressor runs continuously	Excessive evaporator Load.	Reduce load. Check for excessive fresh water infiltration, poor insulation.
2. Suction line abnormally cold.	Expansion valve overfeeding. Liquid flooding to compressor.	Regulate superheat. Check remote bulb attachment to suction line.
3. Suction line abnormally cold.	Expansion valve stuck open. Liquid flooding to compressor.	Repair or replace valve.
4. Abnormally cold suction line.	Expansion valve too large. Liquid flooding to compressor.	Check valve rating, replace if necessary.
5. Noisy compressor, reduced capacity.	Broken valves in compressor.	Replace compressor.

TROUBLE: Suction pressure too low

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Bubbles in sight glass.	Lack of refrigerant.	Check for leaks then charge system.
2. Compressor short-cycles.	Evaporator dirty or iced up.	Clean or thaw the ice.
3. Temperature change in liquid line before and after filter-drier.	Clogged liquid line filter-drier.	Replace cartridge/Filter.
4. No flow of refrigerant through valve.	Expansion valve sensing element has lost charge.	Replace sensing element.
5. Loss of capacity.	Obstructed expansion valve.	Clean valve.
6. Liquid too cold.	Contacts on controller stuck in closed position.	Repair or replace control.
7. Compressor short-cycles.	Compressor capacity control range set too low.	Reset control range.

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TROUBLE: Discharge pressure too low

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Air temperature at outlet too low.	Too much air over the condenser.	Adjust fan cycling controls.
2. Bubble in sight glass.	Lack of refrigerant.	Check for leaks. Add refrigerant.
3. Suction pressure rises faster than 35 kPa (5 lbs) per minute after Compressor shuts down.	Broken or leaky Compressor valves.	Replace Compressor.
4. Low discharge pressure	Low Ambient Package or Fan Cycling set wrong.	Inspect valve, readjust if Necessary.

TROUBLE: Discharge pressure too high

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Air temperature at outlet too high	Insufficient supply of ambient air to condenser.	Increase air supply, adjust fan cycling controls.
2. Water temperature at outlet too low.	Fouled tubes in shell-and-tube condenser. (Water cooled condenser only)	Clean tubes.
3. Temperature difference between air in and out too large, low air volume.	Air passages through air-cooled condenser dirty.	Clean condenser.
4. Low air volume.	Scaled coil surface.	Correct air or water flow. Clean coil surface.
5. Very hot condenser.	Non-condensable in system.	Purge system.
6. Very hot condenser.	Overcharge of refrigerant.	Remove excess refrigerant.

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TROUBLE: System short of capacity

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Expansion valve hisses.	Flash gas in liquid line.	Add refrigerant.
2. Temperature difference in liquid line before and after strainer or valve.	Clogged strainer or stop valve.	Clean or replace.
3. Reduced liquid flow.	Ice or dirt in evaporator.	Defrost coil or clean.
4. Short-cycling or continuous operation.	Expansion valve stuck or obstructed.	Repair or replace valve.
5. Superheat too high.	Excess pressure drop in evaporator.	Rest thermostatic expansion valve.
6. Short-cycling or continuous operation.	Improper superheat adjustment.	Adjust thermostatic expansion valve.
7. Short-cycling or continuous operation.	Expansion valve improperly sized.	Replace with correct valve.

TROUBLE: Compressor or system noisy

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Motor vibration.	Motors bearings gone	Replace Motor
2. Compressor cuts out on oil	Lack of oil.	Add oil. (Semi hermetic compressors)
4. Squeaky seal during operation.	Dry or scored seal.	Check oil level; replace seal. (Semi hermetic compressors)
5. Compressor knocks.	Internal parts loose or broken.	Overhaul compressor. (Semi hermetic compressors)
6. Compressor knocks, abnormal cold suction line.	Liquid floods back to compressor.	Check rating and adjustment of expansion valve. Replace valve if defective.
7. Compressor or motor jumps on base.	Compressor or motor loose on base.	Tighten hold-down bolts.

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8. Piping vibrates.	Improper piping support.	Relocate, add, or readjust hangers and supports.
9. Water valve chatters or hammers.	Water regulating valve is dirty, water pressure too high. (Water Cooled)	Clean valve; reduce supply pressure.

TROUBLE: Compressor runs continuously

SYMPTOMS	POSSIBLE CAUSE	CORRECTIVE ACTION
1. High temperature of liquid to be cooled.	Excessive load.	Check for excessive warm liquid infiltration, or for inadequate insulation of pipes.
2. Low temperature of liquid to be cooled.	Thermostat set too low or defective.	Reset or repair thermostat.
3. Low temperature of liquid to be cooled.	Welded contacts or stuck electrical control in motor starting circuit.	Repair or replace faulty control.
4. Bubbles in sight glass.	Lack of refrigerant.	Repair leak and charge system.
5. High discharge pressure.	Overcharge of refrigerant.	Remove excess Refrigerant.
6. Compressor noisy or operating at abnormally low discharge pressure or abnormally high suction pressure.	Leaky valves inside the compressor.	Overhaul / Replace compressor.
7. Low temperature of the liquid to be cooled.	Solenoid valve stuck open.	Repair valve.

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