Russell

sierra™

high sierra

COUNTER FLOW DEFROST

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

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INSPECTION

When the equipment is received, check the quantity of cartons and crates against the bill of lading.

· Inspect all containers for visible damage.
· Report any damage or shortages to the freight company immediately.
· It is the customer's responsibility to file a freight claim.
· Check the unit name plates to verify that the voltage and phase is correct before installation.

Installation and maintenance should be performed by qualified personnel who are familiar with local codes and regulations. Installers should have previous experience with this type of equipment.

CAUTION: Avoid contact with sharp edges and coil surfaces.

INSTALLATION

LOCATING CONDENSING UNITS

Condensing unit - Minimum clearances Drawing 1

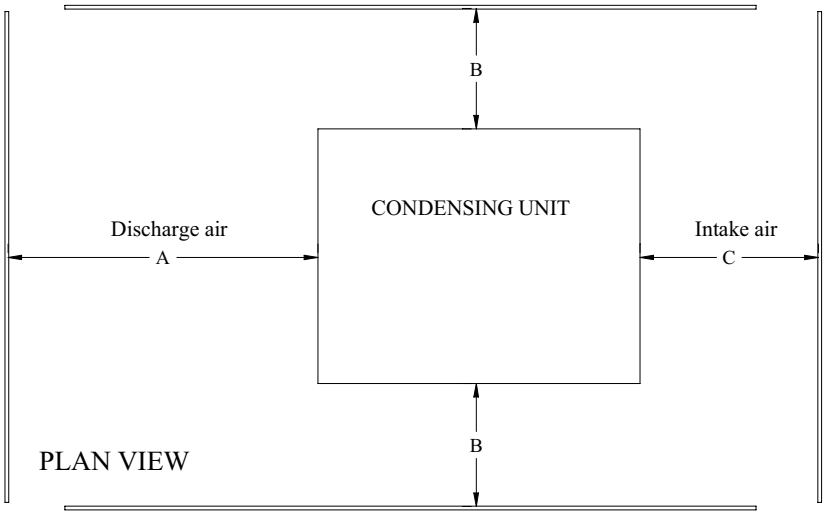


Table 1

HP	Minimum Dimensions (in)		
	A	B	C
1/2 - 2	60	24	36
3 - 6	72	24	36
8 - 15	72	30	48
20 - 40	48	48	48

Do not locate condensing units so that they are bordered on three or more sides by tall obstructions. Condensing units should be positioned so that the airflow through the condenser is the same as the prevailing winds. If strong variable winds are common, a wind deflector should be used on the discharge side of the unit. Be certain that there is adequate room around the unit for regular inspection and service. For multiple unit sites, do not locate units where the air discharge from one condensing unit will enter into the air intake of other units.

Roof mounted condensing units should be located above supporting walls, over storage areas or spaces not sensitive to noise or vibration. They must be adequately supported.

Pad mounted condensing units should be installed a minimum of 4 inches above ground level, away from windows, doors and other areas where noise may be a problem. All units must be level when mounted.

CONDENSING UNIT INSTALLATION (continued.)

Condensing units with spring mounted compressors are shipped with retainers under the compressor feet to prevent damage during shipment. For Copeland H and K body compressors, remove the retainers and loosen the mounting nut to allow 1/16” clearance between the nut and rubber spacer. For 3HP and larger units, the mounting nuts must be removed to insert the rubber spacer. Insert the rubber spacer over the mounting studs, replace the nut and tighten to within 1/16” of the spacer. DO NOT TIGHTEN THE NUTS AGAINST THE SPACER OR FOOT.

Units with iso-pad mounted compressors are shipped with the mounting nuts tight. These should be checked to make certain that they have not loosened during shipment.

LOCATING AND MOUNTING UNIT COOLERS

Determine the best location for the unit in the walk-in cooler or freezer. Consider the air pattern required to cover the entire space. For High Sierra Systems with two unit coolers, locate the unit coolers so that the piping runs from the suction and liquid line tees are equal in size and length.

Do not restrict the inlet or outlet air stream. **Place the unit cooler as far as possible from any door openings.** Direct the discharge air stream towards the door whenever possible. This will help to prevent warm, moist air from being drawn into the coil (Drawings 2, 3 and Table 2). Adequate clearances should be maintained around the unit cooler to allow for proper airflow through the unit and for regular maintenance and service to be preformed. For all Hot Gas defrost unit coolers, ensure that the drain pan is in contact with the Hot Gas drain pan loop after installation. If the drain pan is removed for any reason, **verify** that it has **physical contact** with the defrost loop when replaced.

The drain line should be pitched a minimum of 4" per foot to allow proper drainage and should exit the room as quickly as possible. Do not reduce the drain line size. Do not locate line bends, elbows or drain traps within the refrigerated space. **All drain lines must be trapped** outside of the enclosure where the temperature is never below 35 degrees. Drain lines should run to an open drain and should never be attached directly to a sewage or waste line. Drain lines must be protected from possible freezing. Freezer units must have copper drain lines that are heated and insulated.

Remove all packaging materials before lifting the unit into position. Be certain that the unit is not sitting on the drain fitting or refrigerant connections. All-Temp units should be hung using 5/16" minimum diameter, stainless steel support rods or fasteners at all hanging slots. Use minimum 3/8" hanger rods for Inter-Temp and Ultra-Temp models.

Tighten all fasteners securely. All units must be positioned level, flush with the ceiling and all gaps must be properly caulked. Allow minimum clearances on all sides of the unit cooler(s) as indicated in Table 2 (next page).

Recommended Minimum Dimensions

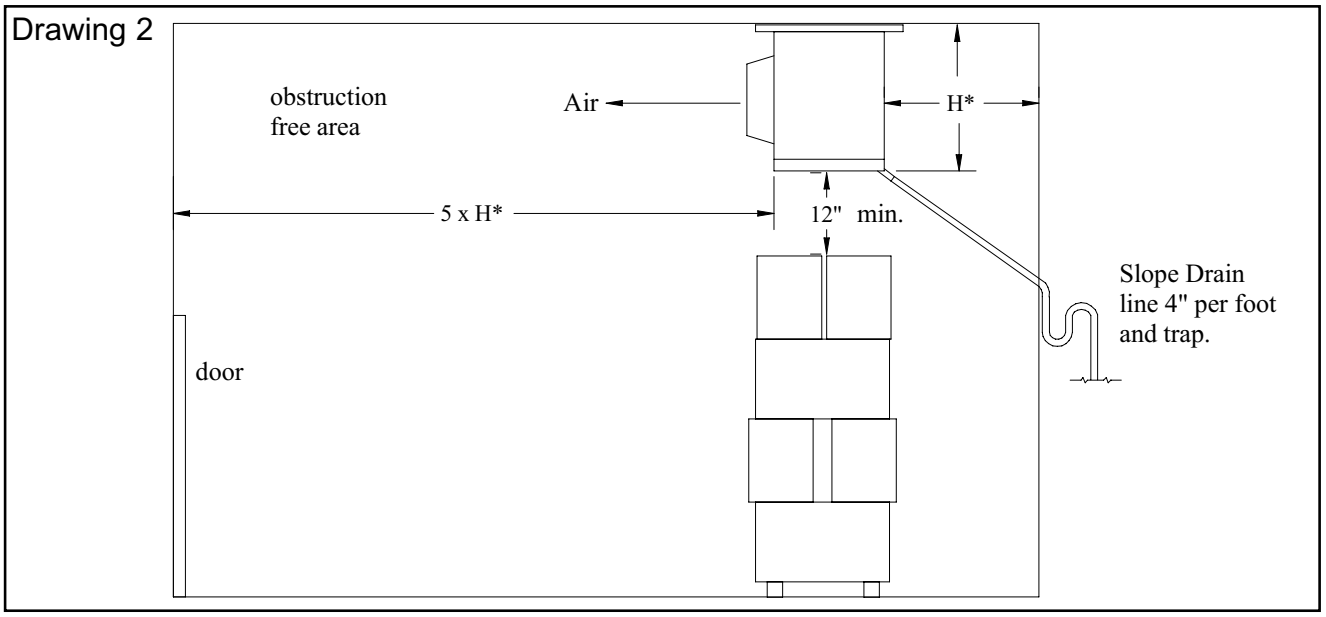
Table 2 Dimensions are in inches.

Unit cooler Height H	Air intake* clearance 1 x H	Side clearance 1 x H	Air discharge clearance 2 x H	Unit to floor 5 x H
15	15	15	30	75
19	19	19	38	95
25	25	25	50	125
32	32	32	64	160
50	50	50	100	180**

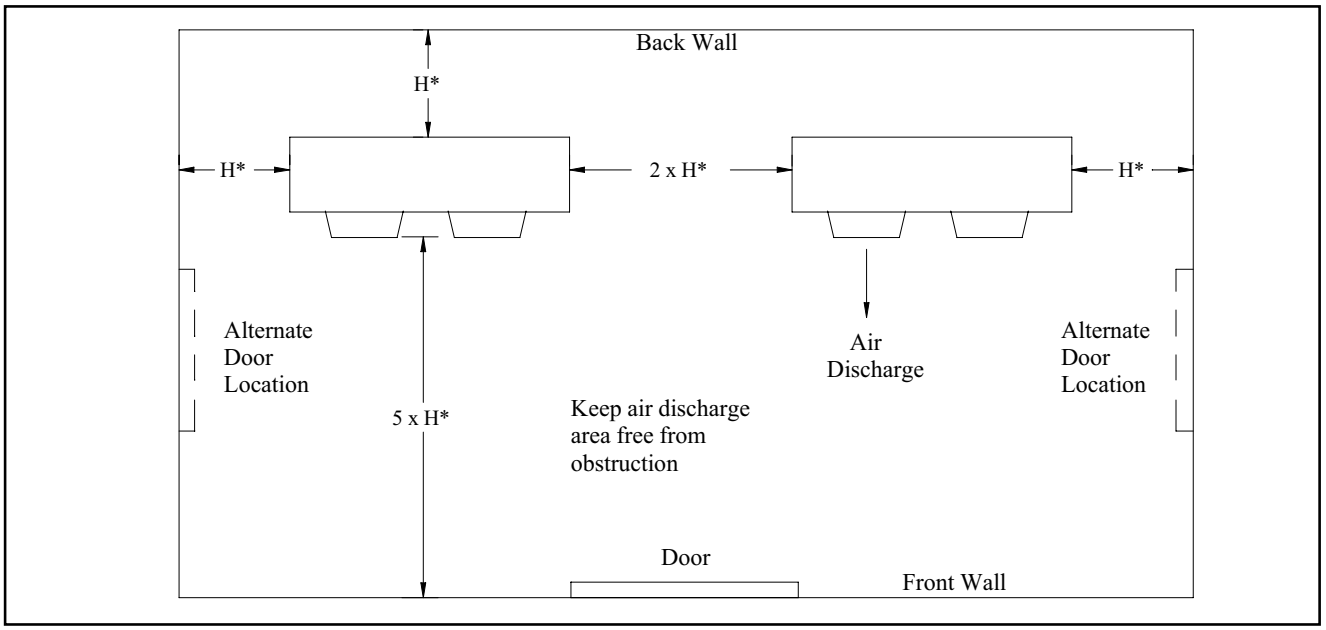
* Absolute minimum Distance

** 15' is adequate clearance for these models

Drawing 2



Drawing 3



FIELD WIRING

All field wiring must be done in compliance with local and national electrical codes. Use only properly sized Copper conductors. A system wiring diagram is located inside the condensing unit control box. Wire components as indicated on the diagram. The equipment nameplates are marked with electrical characteristics. All field wiring should enter the equipment through electrical conduit bushings. **Note**: All units must be grounded.

Before applying power to the units, check all connections to ensure they have not come loose during shipment. **Be certain that the power is disconnected before tightening any electrical connections.** Disconnect switches and evaporator branch circuit protection are supplied by the equipment installer and must conform to governing electrical codes. Air defrost systems are wired so that the evaporator fans run continuously. For electric defrost and High Sierra systems, the evaporator fans are cycled off during the defrost and re-cooling period.

Electric defrost unit coolers are supplied with a temperature sensing defrost termination switch that will end the defrost at a preset coil temperature. (Recommended time clock settings for electric defrost are 2 defrosts per day, with a twenty minute fail safe setting. Adjust according to job site conditions. Fewest possible defrosts for the shortest possible duration are desirable.)

A high limit control is provided to prevent overheating if there is a component failure. A fan delay control is installed to allow the water condensate on the fins to freeze before the evaporator fan motors start. **A pumpdown cycle is mandatory for all systems.**

For both Sierra and High Sierra systems, a liquid line solenoid is factory installed and wired to each unit cooler terminal board (multiple evap systems receive multiple solenoid valves). Follow the system wiring diagram (provided in the condensing unit). Connection to TB1-44 must be made to assure proper pumpdown function. The room thermostat is mounted on the unit cooler for single evaporator systems and supplied loose for multiple evaporator systems. Follow the system wiring diagram supplied in the condensing unit.

REFRIGERANT PIPING

Condensing units and unit coolers are thoroughly cleaned and dehydrated at the factory. Use only ACR (refrigeration grade) tubing that is dehydrated and sealed. Only use WROT Copper fittings, cast fittings are a source of refrigerant leaks. All liquid and suction elbows must be long radius types for minimum pressure drop. Refrigerant lines must be properly supported to prevent vibration and breakage. Tube clamps should have a gasketed liner to prevent abrasion of the tubing. Sierra and High Sierra must not exceed more then a 100' refrigerant line run.

Install all piping and components in accordance with local and national codes. Make refrigerant connections by using only hard or Silver bearing solder such as Silfos, Stay-Silv or higher Silver content brazing material. Slowly purge dry nitrogen through the tubing while brazing to prevent the formation of Copper oxide scale.

LIQUID LINE

Refer to the current ASHRAE Refrigeration Systems and Applications Handbook for assistance in determining appropriate liquid line sizes.

Horizontal and vertical liquid lines are normally the same diameter. However, pressure loss due to vertical lift may lead to flash gas that can inhibit proper TXV (and system) performance if not properly accounted for. Under sizing the liquid line can result in flash gas while over sizing the liquid line will unnecessarily increase the system charge requirement.

Sierra and High Sierra condensing units include Russell's patented finned receiver®, which is integrated into the air-cooled condenser. This finned receiver® also acts as an efficient liquid sub-cooler. An additional liquid to suction heat exchanger is not normally required. The liquid line must be insulated to obtain the maximum benefits of the subcooled liquid.

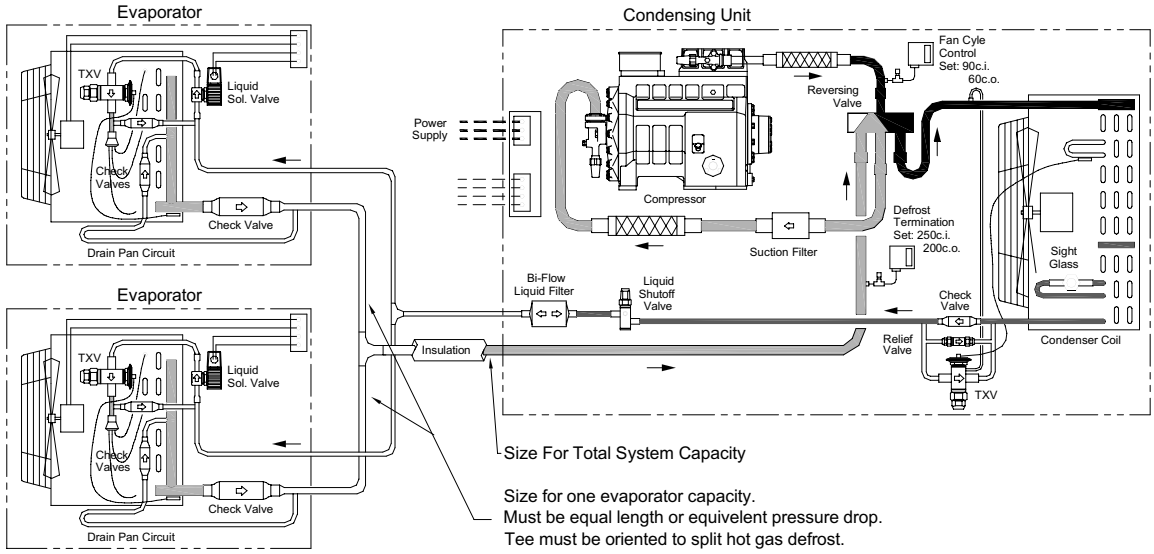
SUCTION LINES

The suction line and it's components must be carefully selected and installed. The suction line must be sized to maintain a balance of adequate refrigerant velocity, to allow for good oil return, and a low pressure drop that will prevent excessive capacity loss. The optimal line size will result in a reasonable refrigerant velocity and a minimum pressure drop. Total suction line pressure loss should not exceed 2°F equivalent loss. For best system performance, the suction line should be insulated.

Suction line risers should be no larger in diameter than the horizontal pipe run. Refer to the current ASHRAE Refrigeration Systems and Applications Handbook for correct suction line and riser sizing. Horizontal suction line runs should slope in the direction of flow, 1 inch per ten feet of length. All suction lines should be insulated as soon as they exit the refrigerated space. Install a 1/4-inch schrader fitting near the evaporator outlet to assist in accurate super-heat readings. All suction line risers should be trapped to facilitate oil return. Additional P-Traps are required for every 15 feet of elevation. Oil traps should be the same diameter as the suction line riser that it attaches to.

MULTIPLE EVAPORATOR PIPING

High Sierra systems involving multiple evaporators require that piping runs be of equal length to each evaporator. The line runs must be of equivelent length from the bull-head tees to each unit cooler. This will ensure proper distributon of hot gas to each unit cooler during the defrost cycle. Reference the drawing below for further clarification.



LEAK TESTING

After all refrigerant connections are made, add the proper system refrigerant until the pressure is 25 to 35 PSI. Then pressurize with dry nitrogen up to 120 PSI. Always use a pressure reducing regulator. Wait 30 minutes for the refrigerant to reach all parts of the system. Use an electronic leak detector to inspect all connections and system components. Repair any leaks that are found and re-check until all leaks are eliminated. Leave the system pressurized over night. Once the system is tight, it must be evacuated before charging.

EVACUATION

Proper installation procedures must include a deep evacuation of the system. A clean/dry system is essential when charging refrigerant. **Open all service valves.** The high vacuum method is the most effective procedure for assuring a clean and dry system. It requires the use of a two-stage high vacuum pump, an electronic high-vacuum gauge and 3/8" minimum OD copper tubing. Use a high vacuum sealant on all lines and connections. **Clean** and **dry** DEEP VACUUM OIL is essential for proper system evacuation.

This step is required **FOR SIERRA/HIGH SIERRA SYSTEMS:**

Evacuation access fitting:

AREA 1: From the compressor service valve (including the compressor head) through the condenser up to the liquid line module; Connecting to the port on the compressor discharge valve gets this area.

AREA 2: From the liquid line module to the liquid line solenoid; connecting to the liquid line "King" valve port gets this area on Sierra system. The connection will not properly evacuate area 1, above, since evacuation would have to be pulled through the check valve in the module, which will have about 1 PSI restriction. However, on High Sierra systems a pressure tap at the connection for the terminator pressure control evacuates the liquid line since this connection is downstream of the module.

AREA 3 : From the liquid line solenoid to the compressor (including the crankcase) connecting to the suction service port gets this area.

The need for this clarification has arisen from the fact that some systems have experienced high head pressure because non-condensables were left in the system when these procedures were not followed.

All systems - continued

Connect the vacuum lines to both the high and low-pressure sides of the system. Run the vacuum pump until the gauge reaches 500 microns for newly installed systems. With the pump still running, shut off the high vacuum line valve. The vacuum gauge should not exceed (1500 microns or less) after two minutes once the pump is closed off, though the pressure will increase slightly even on the most leak-free system. Open the compressor service valves and pull a continuous vacuum for a minimum of 4 hours. Pulling the vacuum overnight is highly recommended (mandatory for 5 HP systems and larger). Do not allow the system to stand at high vacuum without the vacuum pump operating. Do not start the compressor while the system is under a vacuum.

CHARGING

Both Sierra and High Sierra systems are designed to operate with minimum refrigerant charge and minimum head pressures. - Low head pressures are normal at low ambient conditions.

Make the charging line connection with a hose that is purged of air, through a filter drier. Break the vacuum with the proper system refrigerant. Charge liquid refrigerant into the high side of the system. This should enable the system to operate. Add refrigerant charge as necessary to achieve **a clear sight glass** with the system close to normal operating condition, whether it is winter or summer. Ambient temperature is not relevant to the charging procedure.

IMPORTANT! *Sierra and High Sierra systems are critical charge systems. Be careful,* **DO NOT OVERCHARGE**!

CHARGING continuation...

Refrigerant can be added most rapidly by introducing liquid directly into the liquid line down stream of the liquid line valve. Close the liquid line intermittently and add refrigerant directly into the port on the side of the **liquid line** valve until the sight glass is clear.
NOTE: Some new refrigerants require liquid charging only.

Be extra diligent not to log liquid in the accumulator, if one is present in the system. An accumulator is not recommended for Sierra or High Sierra systems. They can negatively impact the charging procedure of these systems. Liquid build-up in the accumulator may result from improper charging. Once in the accumulator the refrigerant returns very slowly. Depending on how much is accumulated, how much frost is on the accumulator (frost acts as an insulator so the refrigerant boils off slower), ambient temperature, etc..., this excess refrigerant can cause significant problems.

START UP

Install gauges on the system to check both high and low pressures. Using the gauges, verify that the low-pressure control is properly set (3 PSI cut out, 15 PSI cut in).

Pump down the system by closing the liquid line solenoid and the service valve to verify that there is no objectionable increase in head pressure.

Be certain that the fan cycling control is properly adjusted. At the correct setting the cut-out setting should be 30 PSI above the design suction pressure. The cut-in setting should be 30 PSI above the cut out pressure.

THIS STEP IS REQUIRED FOR HIGH SIERRA ONLY

Move the high side gauge to the defrost termination schrader valve on the suction line and start a defrost cycle. Verify that the defrost terminates at 250 PSI, adjust the termination control if necessary. Set the time clock defrost fail-safe to ***A MAXIMUM OF 10 MINUTES*** *and an initial setting of 2 defrosts per day.*

Check the evaporator superheat after the system has run long enough to reach a balanced state. Low temperature systems normally operate most efficiently at a superheat settings that range from 6 to 8 degrees at design room temperature. Medium temperature rooms normally operate from 8 to 10 degree evaporator superheat. Adjust expansion valves only if necessary.

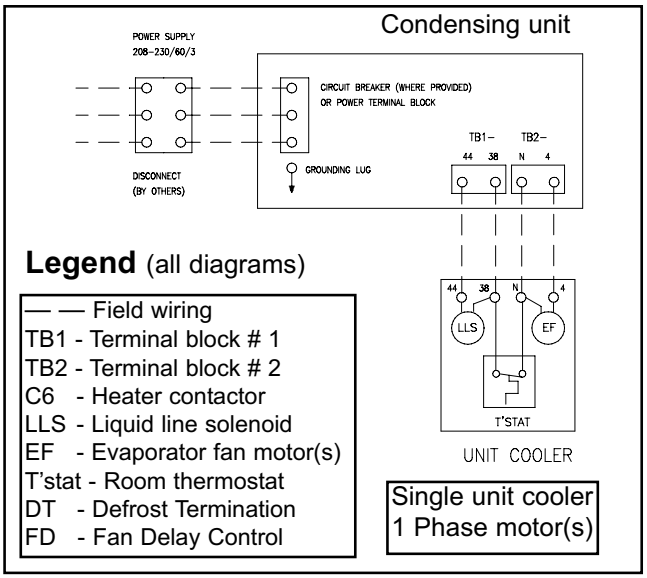
GENERAL MAINTENANCE

Disconnect all electrical power to the unit before inspecting or cleaning. Unit coolers and condensing units should be checked periodically and cleaned of all dirt or grease accumulation. Fan blades and guards may require more frequent cleaning. Remove debris from the condenser coil using a brush or vacuum cleaner. All fan motors are life lubricated and do not require periodic oiling. Do not use ammonia or other cleaning agents that are corrosive or react with Copper or Aluminum.

If the liquid line filter is replaced High Sierra system, it must be replaced with a **Bi-Flow filter**.

TYPICAL FIELD WIRING DIAGRAMS

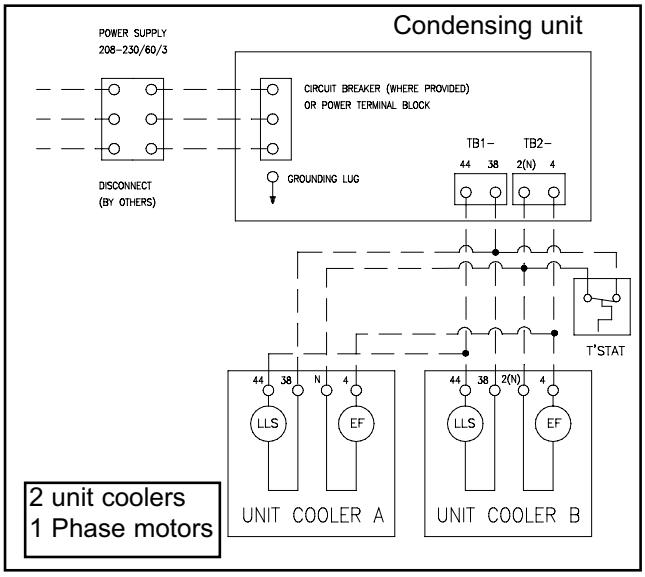
HIGH SIERRA COUNTER FLOW DEFROST



Legend (all diagrams)

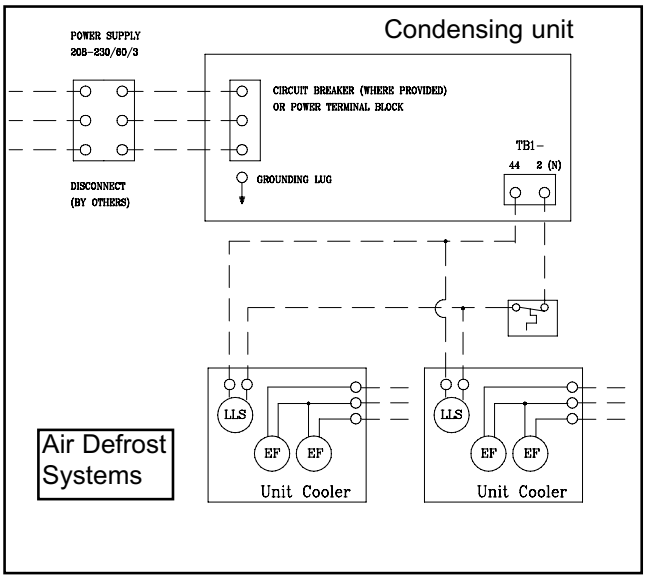
— — Field wiring
TB1 - Terminal block # 1
TB2 - Terminal block # 2
C6 - Heater contactor
LLS - Liquid line solenoid
EF - Evaporator fan motor(s)
T'stat - Room thermostat
DT - Defrost Termination
FD - Fan Delay Control

Single unit cooler
1 Phase motor(s)

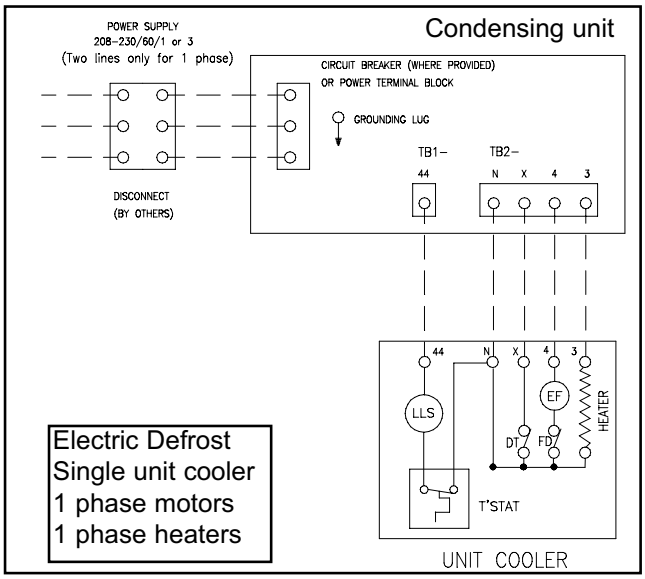


2 unit coolers
1 Phase motors

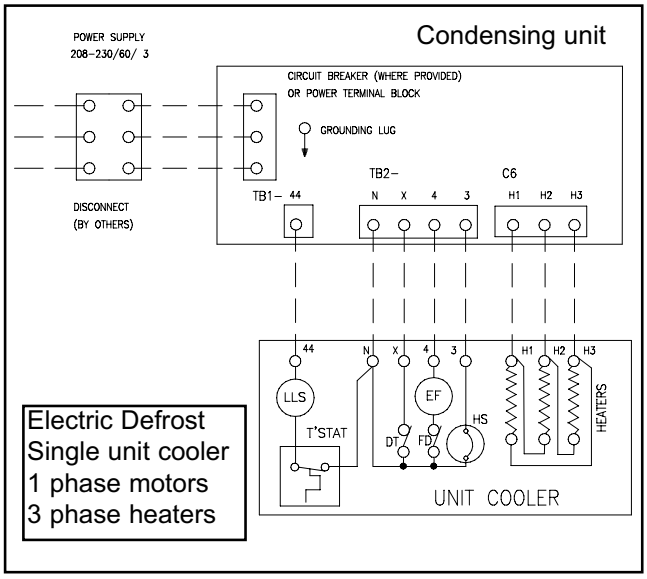
SIERRA SYSTEMS



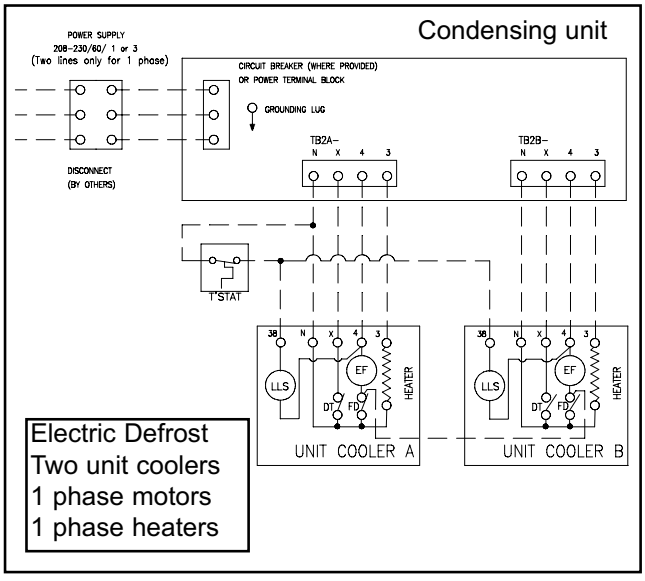
Air Defrost
Systems



Electric Defrost
Single unit cooler
1 phase motors
1 phase heaters



Electric Defrost
Single unit cooler
1 phase motors
3 phase heaters



Electric Defrost
Two unit coolers
1 phase motors
1 phase heaters

*See page 5 for wiring instructions.

HIGH SIERRA - Sequence of operation.

Refrigeration cycle

The High Sierra counter flow defrost system is unique in design. It operates like most conventional systems during the refrigeration cycle. As cooling is called for, the compressor, condenser fan(s), evaporator fans and liquid line solenoid valve are all energized.

Refrigerant vapor exits the compressor discharge port, moves through the High Sierra reversing valve and into the air-cooled condenser. As ambient air flows through the condenser, the refrigerant vapor gives up it's heat, becomes liquid and moves through the patented Sierra Finned Receiver® and liquid sub-cooler.

The sub-cooled liquid refrigerant exits the sub-cooler, passing through the High Sierra check valve / TXV valve assembly, leaving the condensing unit via a bi-flow liquid filter.

The liquid refrigerant enters the evaporator, flowing through a factory mounted solenoid valve. It passes through the expansion valve to be boiled off in the coil, providing cooling for the box. The vaporized refrigerant returns through the suction line, the reversing valve and suction filter into the compressor suction port.

As with any normal pump-down system, when the room temperature satisfies the thermostat, it de-energizes the liquid line solenoid, causing the system to pump down and cycle off.

Counter flow defrost cycle

The defrost timer initiates the counter flow defrost cycle. The number of defrost cycles is set by the installer. (The recommended frequency is one to two defrosts per day with the fail safe override set at 10 minutes. A normal defrost cycle lasts from 3 to 7 minutes.)

Upon the signal from the defrost timer, the reversing valve switches modes and the evaporator fan motors are turned off. The liquid line solenoid remains energized.

The direction of refrigerant flow is now reversed, as are the functions of the evaporator and condenser. The reversing valve diverts the compressor discharge through, what was formerly the suction line, back towards the evaporator. A suction line check valve, (factory mounted), routes the discharge gas through the evaporator drain pan circuit and into the coil tubes, thus providing the heat source for the counter flow defrost.

The evaporator, now acting as the condenser, converts the discharge gas into liquid, releasing large amounts of heat, defrosting the coil(s) very quickly.

The liquid refrigerant then exits the coil through the distributor, and the factory mounted TXV bypass check valve. It moves through the liquid line, the bi-flow liquid filter, through the condenser TX valve and into the system condenser (now acting as the evaporator). The liquid refrigerant is then boiled off and returned to the compressor as suction gas, passing first through the reversing valve and suction filter.

The defrost cycle is ended when the system pressure reaches the termination point at the defrost control (located in the condensing unit). The installer must verify that the coil **clears completely of all frost and ice**. If the defrost cycle terminates before all frost has been completely removed from the coil, the defrost termination pressure control setting may be increased incrementally until the coil defrosts properly (maximum setting 300 psi). The recommended defrost termination setting is 250 psi with a 50 psi differential.

Counterflow defrost cycle - continued

After the refrigeration cycle resumes, the evaporator fan motors remain off during the cool down period (**never less than two minutes**). This allows all condensate to drain before the fan motors are energized, thus preventing water from blowing off the coil and into the room.

Notes:

1. The condensing unit pressure relief valve is provided to regulate potential excessive pressures that may develop in the liquid line during extended shut down periods. It does not come into play during the refrigeration or defrost cycles.

2. The condensing unit TX valve is factory set and should **not** be field adjusted.

3. The evaporator fan delay control is located in the condensing unit control panel.

High Sierra Piping

Diagram 4

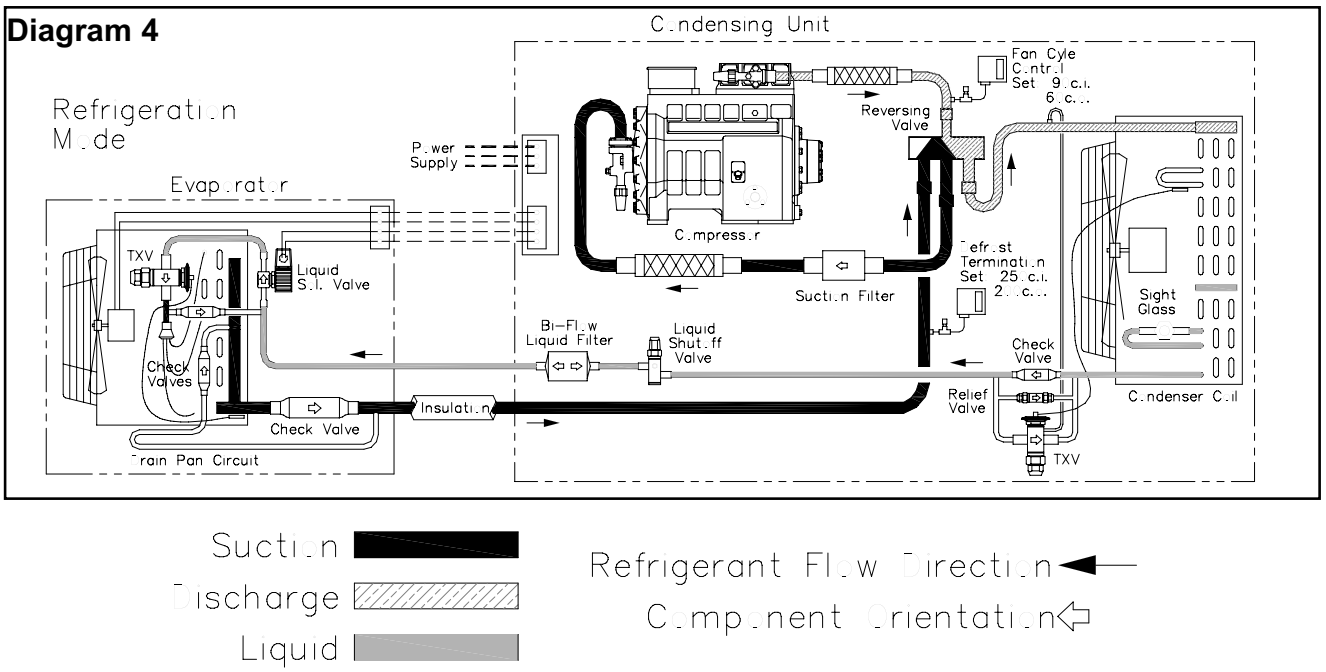
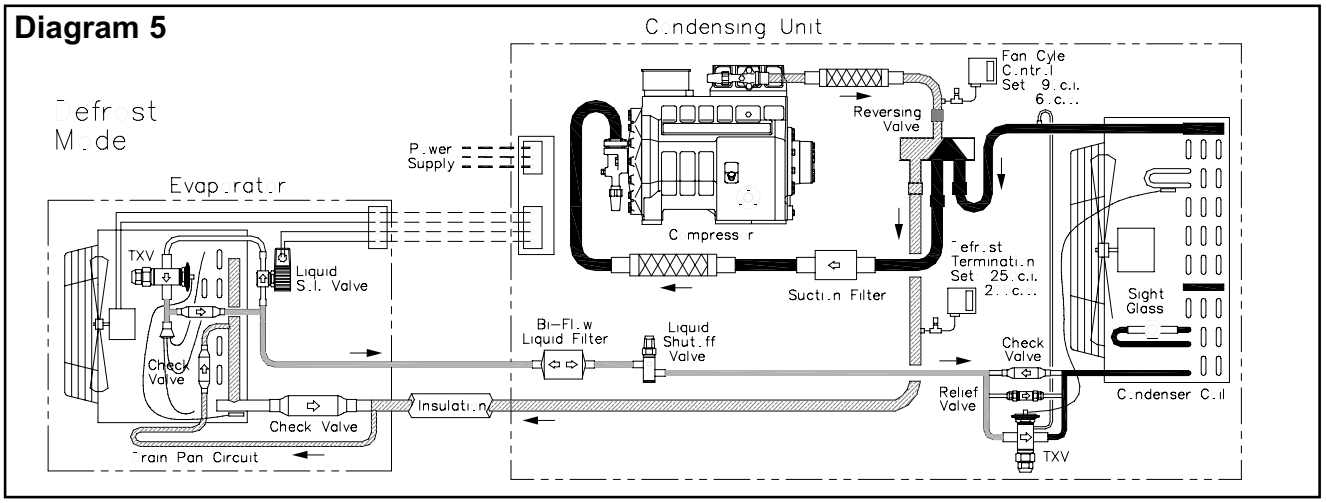


Diagram 5



Typical High Sierra replacement parts- Low Temp. Models*

Comp. Type	Cond. Unit Model No.	Rev. Valve PART#	Strainer PART#	Cond. Unit TXV (c.u.)	Liquid Filter PART#	Condenser		Low Pres. Control	High Pres. Control	Fan Cycle Control
						230V Motor	Blade			
Hermetic	RHH100L44	21012	123277001	SBFSE-AA-Z	104471048	102540004	119103001	24464232	204464208	204464002
	RHH165L44	21012	123277001	SBFSE-A-Z	104471049	102540004	119103001	24464232	204464208	204464002
	RHH215L44	21012	123277001	SBFSE-B-Z	104471049	102540004	119103001	24464232	204464208	204464002
	RHH315L44	21012	123277001	SBFSE-C-Z	104471046	102540004	119103001	24464232	204464208	204464002
Semi-Hermetic	RHS075L44	21012	123277001	SBFSE-AA-Z	104471048	102540004	119103001	24464232	204464208	204464002
	RHS100L44	21012	123277001	SBFSE-A-Z	104471048	102540004	119103001	24464232	204464208	204464002
	RHS150L44	21012	123277001	SBFSE-A-Z	104471049	102540004	119103001	24464232	204464208	204464002
	RHS200L44	21012	123277001	SBFSE-B-Z	104471049	102540004	119103001	24464232	204464208	204464002
	RHS250L44	21012	123277001	SBFSE-B-Z	104471046	102540004	119103001	24464232	204464208	204464002
	RHS300L44	21012	123277001	SBFSE-C-Z	104471046	102540004	119103001	24464232	204464208	204464002
Discus	RHD300L44	16506	123277002	SBFSE-C-Z	104471046	201006007	213266000	24464232	204464208	204464002
	RHD400L44	16506	123277002	EBSSE-6-Z	104471047	201006007	213266000	24464232	204464208	204464002
	RHD500L44	16506	123277002	EBSSE-6-Z	104471047	201006007	213266000	24464232	204464208	204464002
Scroll	RHO200L44	21012	123277001	SBFSE-A-Z	104471049	201006007	213266000	24464232	204464208	204464002
	RHO250L44	21012	123277001	SBFSE-B-Z	104471046	201006007	213266000	24464232	204464208	204464002
	RHO300L44	21012	123277001	SBFSE-B-Z	104471046	201006007	213266000	24464232	204464208	204464002
	RHO301L44	21012	123277001	SBFSE-C-Z	104471046	201006007	213266000	24464232	204464208	204464002
	RHO400L44	21012	123277001	SBFSE-C-Z	104471047	201006007	213266000	24464232	204464208	204464002
	RHO500L44	16506	123277002	EBSSE-6-Z	104471047	201006007	213266000	24464232	204464208	204464002
	RHO600L44	16506	123277002	EBSSE-6-Z	104471047	201006007	213266000	24464232	204464208	204464002
Discus	DHD5L44	21054	123277003	EBSSE-6-Z	104471047	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD6L44	21054	123277003	EBSSE-7 1/2-Z	104471047	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD8L44	21054	123277003	EBSSE-10-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD9L44	21054	123277003	EBSSE-10-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD10L44	21000	123277004	EBSSE-13-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD12L44	21000	123277004	EBSSE-13-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD15L44	21000	123277004	EBSSE-13-Z	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
Scroll	DHO6L44	16506	123277002	EBSSE-6-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO8L44	21054	123277003	EBSSE-6-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO10L44	21054	123277003	EBSSE-10-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO13L44	21054	123277003	EBSSE-10-Z	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
Discus	VHD15L44	21049	123277005	OSE-21-Z	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD22L44	21049	123277005	OSE-21-Z	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD27L44	21055	123277005	OSE-30-Z	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD30L44	21055	123277005	OSE-30-Z	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD44L44	21055	123277005	OSE-45-Z	104471022†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD54L44	21056	Contact	(2) OSE-30-Z	104471022†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD60L44	21056	Factory	(2) OSE-30-Z	104471022†	110204000	210385000	204464041 Hi/Lo Combo		204464002

* Parts may vary based upon specific operating conditions.

† V-Series filter is not Bi-Flow Design. Part number is for replaceable core filter (shell only). Core Part# 14471034 (may require more than one core)

Russell Part #	Description
21065	Rebuild kit for Russell Part#16506
21066	Rebuild kit for Russell Part#21054
21067	Rebuild kit for Russell Part#21000
21068	Rebuild kit for Russell Part#21056
21070	O-Ring Kit for Russell Part# 21012
21072	O-Ring Kit for Russell Part#16506
21073	O-Ring Kit for Russell Part# 21054
21074	O-Ring Kit for Russell Part# 21000
21075	O-Ring Kit for Russell Part# 21049
21076	O-Ring Kit for Russell Part# 21055
21077	O-Ring Kit for Russell Part# 21056
21079	PILOT ASSY/MANIFOLD for Russell Part# 21054
21080	PILOT ASSY/MANIFOLD for Russell Part# 21000
21063	PILOT ASSY/MANIFOLD for Russell Part# 21049
204464020	HIGH SIERRA Defrost Termination Control
104799015	HIGH SIERRA Evap Fan Delay Control
204464004	HIGH SIERRA Condensing Unit Fan Cycle Control
104799020	HIGH SIERRA RELAYS R1 & R2 (Same number for each)
104799010	HIGH SIERRA Defrost Timer

Typical High Sierra replacement parts - R-Series Medium Temp. Models*

Comp. Type	Model Number	Reversing Valve	Rev. Valve Strainer	Cond. Unit TXV	Repl. Core Liquid Filter	Condenser		Low Pres. Control	High Pres. Control
						230V Motor	Blade		
Hermetic	RHH075H22	21012	123277001	SBFVE-AA-C	104471048	102540004	119103001	24464232	204464208
	RHH100H22	21012	123277001	SBFVE-A-C	104471048	102540004	119103001	24464232	204464208
	RHH151H22	21012	123277001	SBFVE-A-C	104471049	102540004	119103001	24464232	204464208
	RHH201H22	21012	123277001	SBFVE-B-C	104471049	102540004	119103001	24464232	204464208
	RHH251H22	21012	123277001	SBFVE-B-C	104471046	102540004	119103001	24464232	204464208
	RHH301H22	21012	123277001	SBFVE-C-C	104471046	102540004	119103001	24464232	204464208
	RHH401H22	21012	123277001	SBFVE-C-C	104471047	205051004	213266000	24464232	204464208
	RHH500H22	21012	123277001	SBFVE-C-C	104471047	205051004	213266000	24464232	204464208
	RHH050M44	21012	123277001	SBFSE-A-C	104471048	102540004	119103001	24464232	204464208
	RHH075M44	21012	123277001	SBFSE-A-C	104471048	102540004	119103001	24464232	204464208
	RHH101M44	21012	123277001	SBFSE-B-C	104471048	102540004	119103001	24464232	204464208
	RHH150M44	21012	123277001	SBFSE-B-C	104471049	102540004	119103001	24464232	204464208
	RHH201M44	21012	123277001	SBFSE-C-C	104471049	102540004	119103001	24464232	204464208
	RHH300M44	21012	123277001	SBFSE-C-C	104471046	102540004	119103001	24464232	204464208
	RHH400M44	16506	123277002	EBSSE-6-C	104471047	205051004	213266000	24464232	204464208
Semi-Hermetic	RHS050H22	21012	123277001	SBFVE-AA-C	104471048	102540004	119103001	24464232	204464208
	RHS075H22	21012	123277001	SBFVE-AA-C	104471048	102540004	119103001	24464232	204464208
	RHS100H22	21012	123277001	SBFVE-A-C	104471048	102540004	119103001	24464232	204464208
	RHS150H22	21012	123277001	SBFVE-A-C	104471049	102540004	119103001	24464232	204464208
	RHS200H22	21012	123277001	SBFVE-B-C	104471049	102540004	119103001	24464232	204464208
	RHS300H22	21012	123277001	SBFVE-C-C	104471046	102540004	119103001	24464232	204464208
	RHS400H22	21012	123277001	SBFVE-C-C	104471047	205051004	213266000	24464232	204464208
	RHS050M44	21012	123277001	SBFSE-A-C	104471048	102540004	119103001	24464232	204464208
	RHS100M44	21012	123277001	SBFSE-A-C	104471048	102540004	119103001	24464232	204464208
	RHS200M44	21012	123277001	SBFSE-B-C	104471049	102540004	119103001	24464232	204464208
	RHS300M44	21012	123277001	SBFSE-C-C	104471046	102540004	119103001	24464232	204464208
	RHS400M44	16506	123277002	EBSSE-6-C	104471047	205051004	213266000	24464232	204464208
Scroll	RHO200M44	21012	123277001	SBFSE-C-C	104471049	205051004	213266000	24464232	204464208
	RHO250M44	21012	123277001	SBFSE-C-C	104471046	205051004	213266000	24464232	204464208
	RHO300M44	21012	123277001	SBFSE-C-C	104471046	205051004	213266000	24464232	204464208
	RHO301M44	16506	123277002	EBSSE-6-C	104471046	205051004	213266000	24464232	204464208
	RHO400M44	16506	123277002	EBSSE-6-C	104471047	205051004	213266000	24464232	204464208
	RHO500M44	16506	123277002	EBSSE-6-C	104471047	205051004	213266000	24464232	204464208
	RHO600M44	21054	123277003	EBSSE-6-C	104471047	205051004	213266000	24464232	204464208
	RHO650M44	21000	123277004	EBSSE-7 1/2-C	104471066	205051004	213266000	24464232	204464208

* Parts selection may vary based upon specific operating conditions.

Medium Temp models are only available for warm ambient locations.

Typical High Sierra replacement parts- D-Series and V-Series Medium Temp. Models*										
Comp. Type	Model Number	Reversing Valve	Rev. Valve Strainer	Cond. Unit TXV	Bi-Flo† Liquid Filter	Condenser		Low Pres. Control	High Pres. Control	Fan Cycle Control
						230V Motor	Blade			
Discus	DHD5H22	16506	123277002	EBSVE-8-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD7H22	21054	123277003	EBSVE-11-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD8H22	21054	123277003	EBSVE-11-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD10H22	21054	123277003	EBSVE-15-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD12H22	21000	123277004	EBSVE-15-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD5M44	21054	123277003	EBSSE-10-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD6M44	21054	123277003	EBSSE-10-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD7M44	21054	123277003	EBSSE-10-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD8M44	21000	123277004	EBSSE-13-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD10M44	21000	123277004	EBSSE-13-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHD12M44	21049	123277005	EBSSE-13-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
Scroll	DHO6M44	16506	123277002	EBSSE-7 1/2-C	104471047	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO7M44	21054	123277003	EBSSE-10-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO8M44	21054	123277003	EBSSE-10-C	104471066	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO10M44	21000	123277004	EBSSE-13-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
	DHO13M44	21000	123277004	EBSSE-13-C	104471193	205051004	213266000	204464041 Hi/Lo Combo		204464002
Discus	VHD15H22	21000	123277004	EBSVE-20-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD20H22	21049	123277005	EBSVE-20-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD25H22	21049	123277005	OVE-30-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD30H22	21049	123277005	OVE-30-C	104471022†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD35H22	21055	123277005	OVE-40-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD40H22	21055	123277005	OVE-40-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD50H22	21055	123277005	(2) OVE-30-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD60H22	21056	Contact Factory	(2) OVE-30-C	104471032†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD70H22	21056	Contact Factory	(2) OVE-40-C	104471033†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD80H22	21057	Contact Factory	(2) OVE-40-C	104471033†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD15M44	21049	123277005	OSE-21-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD20M44	21049	123277005	OSE-21-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD25M44	21055	123277005	OSE-30-C	104471021†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD30M44	21055	123277005	OSE-30-C	104471022†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD35M44	21055	123277005	OSE-30-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD40M44	21056	Contact Factory	OSE-35-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD50M44	21056	Contact Factory	OSE-45-C	104471031†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD60M44	21056	Contact Factory	OSE-45-C	104471032†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD70M44	21057	Contact Factory	(2) OSE-30-C	104471033†	110204000	210385000	204464041 Hi/Lo Combo		204464002
	VHD80M44	21057	Contact Factory	(2) OSE-35-C	104471033†	110204000	210385000	204464041 Hi/Lo Combo		204464002

* Parts selection may vary based upon specific operating conditions.

† V-Series filter is not Bi-Flow Design. Part number is for replaceable core filter (shell only). Core Part# 14471034 (may require more than one core)

Medium Temp models are only available for warm ambient locations.

MODEL NUMBER	ALL-TEMP²B - MODELS AA, AE (AFTER APRIL, 2004)	PART NUM.
ALL MODELS	MOTOR, SHADED POLE, 1/20 HP, 1550 RPM, 115 V.	102540003
	MOTOR, SHADED POLE, 1/20 HP, 1550 RPM, 208-230 V.	102540004
	MOTOR, SHADED POLE, 1/20 HP, 1550 RPM, 460 V.	102540005
ALL MODELS	FAN GUARD, PLASTIC, BLACK, 12"	119647000
ALL MODELS	FAN GUARD, WIRE, EPOXY COATED, BLACK, 12"	201006011
ALL MODELS	MOTOR MOUNT	21062000
ALL MODELS (OPTIONAL)	MOTOR, PSC, 1/20 HP, 1550 RPM, 115 V., (3 MFD CAPACITOR NOT INCL.)	108178001
	MOTOR, PSC, 1/20 HP, 1550 RPM, 230 V., (2 MFD CAPACITOR NOT INCL.)	108178002
	CAPACITOR, 3 MFD, FOR 1/20 115 V. PSC MOTOR	202163010
	CAPACITOR, 2 MFD, FOR 1/20 230 V. PSC MOTOR	202163009
ALL "AE" MODELS	DEFROST CONTROL, DEFROST TERMINATION, (TIMER RESET) 2 WIRE	103079010
ALL "AE" MODELS	DEFROST CONTROL, FAN DELAY, 2 WIRE	103079009
1 - 6 FAN AE MODELS	HEATER SAFETY SWITCH, 2 WIRE	103079003
AE14-37B, AE16-36B, AE16-41B, AE16-46B	DEFROST HEATER, CORE, 500 WATTS, 26-1/4" LENGTH, 208-230/460 V.	206240006
	DEFROST HEATER, DRAIN PAN, 500 WATTS, 21" LENGTH, 208-230/460 V.	200172042
AE24-72B, AE24-85B, AE26-92B	DEFROST HEATER, CORE, 1000 WATTS, 44-1/4" LENGTH, 208-230/460 V.	206240008
	DEFROST HEATER, DRAIN PAN, 1000 WATTS, 39" LENGTH, 208-230/460 V.	200172044
AE26-60B, AE26-75B	DEFROST HEATER, CORE, 800 WATTS, 40-1/4" LENGTH, 208-230/460 V.	206240007
	DEFROST HEATER, DRAIN PAN, 800 WATTS, 35" LENGTH, 208-230/460 V.	200172043
AE34-105B, AE36-120B, AE36-140B	DEFROST HEATER, CORE, 1500 WATTS, 62-1/4" LENGTH, 208-230/460 V.	206240009
	DEFROST HEATER, DRAIN PAN, 1500 WATTS, 57" LENGTH, 208-230/460 V.	200172045
AE44-140B, AE46-164B, AE46-185B	DEFROST HEATER, CORE, 2000 WATTS, 80-1/4" LENGTH, 208-230/460 V.	206240010
	DEFROST HEATER, DRAIN PAN, 2000 WATTS, 75" LENGTH, 208-230/460 V.	200172046
AE54-180B, AE56-210B	DEFROST HEATER, CORE, 2500 WATTS, 97-3/4" LENGTH, 208-230 V.	206240011
	DEFROST HEATER, DRAIN PAN, 2500 WATTS, 93" LENGTH, 208-230/460 V.	200172047
AE64-215B, AE66-245B, AE66-280B	DEFROST HEATER, CORE, 3000 WATTS, 115-3/4" LENGTH, 208-230/460 V.	206240012
	DEFROST HEATER, DRAIN PAN, 3000 WATTS, 111" LENGTH, 208-230/460 V.	200172048

ALL-TEMP²B - HINGED END PANEL UNITS (AFTER APRIL, 2004)		
1 FAN AA, & AE MODELS	VENTURI, 20" LENGTH	8519104
AA28-76B, -97B, -122B, AA26-70B, -87B, AE26-60B, AE26-75B	VENTURI, 34" LENGTH	8519241
AA28-106B, -134B, AA26-115B AE26-92B, AE24-85B	VENTURI, 38" LENGTH	8519242
3 FAN AA & AE MODELS	VENTURI, 56" LENGTH	8519243
4 FAN AA & AE MODELS*	VENTURI, 74" LENGTH	8519244
5 FAN AA & AE MODELS*	VENTURI, 92" LENGTH	8519245
6 FAN AA & AE MODELS*	VENTURI, 110" LENGTH	8519246
1 FAN AA, & AE MODELS	DRAIN PAN, 27" LENGTH	8519592
AA28-76B, -97B, -122B, AA26-70B, -87B, AE26-60B, AE26-75B	DRAIN PAN, 41" LENGTH	8519593
AA28-106B, -134B, AA26-115B AE26-92B, AE24-85B	DRAIN PAN, 45" LENGTH	8519594
3 FAN AA & AE MODELS	DRAIN PAN, 63" LENGTH	8519595
4 FAN AA & AE MODELS*	DRAIN PAN, 81" LENGTH	8519596
5 FAN AA & AE MODELS*	DRAIN PAN, 99" LENGTH	8519597
6 FAN AA & AE MODELS*	DRAIN PAN, 117" LENGTH	8519598
SHORT	HINGED END PANEL	8518612
LONG	HINGED END PANEL	8518613
ACF Model 1 Fan Evaps	Hot Gas Drain Pan Assembly w/ loop	12297800
ACF Model 2 Fan (Short) Evaps	Hot Gas Drain Pan Assembly w/ loop	12297900
ACF Model 2 Fan (Long) Evaps	Hot Gas Drain Pan Assembly w/ loop	12298000
ACF Model 3 Fan Evaps	Hot Gas Drain Pan Assembly w/ loop	12298100
ACF Model 4 Fan Evaps	Hot Gas Drain Pan Assembly w/ loop	12298200
ACF Model 5 Fan Evaps	Hot Gas Drain Pan Assembly w/ loop	12298300

High Sierra Systems
Additional Service, Installation and Trouble Shooting Tips

In the event of freezing drain pan Problems: Check the following

1. Verify that the unit cooler has been installed in a way insuring the drain pan is slightly pitched towards the drain connection. This will provide positive drainage of the condensate.

2. The surface of the drain pan **must** be touching the Hot Gas drain pan tubes, located in the bottom of the unit cooler. Later model units have the drain pan loops welded to the drain pan.

3. The High Sierra system has a time initiated and pressure terminated defrost. The pressure switch is factory set at 250# Cut In pressure and 200# Cut Out pressure. If the 250 pound setting does not clear the coil, the setting may be raised to a higher pressure, **but no higher than 300 pounds** (use high pressure gauge for this check). The time clock should have a **maximum** of (3) three defrosts per 24 hours. (We suggest the clock be set for 1 to 2 defrosts per 24 hours). The time clock fail safe should be set at 10 minutes **maximum**. 1 to 2 defrosts per 24 hours will ensure a longer defrost, 3-5 minutes in length.

4. The evaporator fans should have a two minute delay after defrost. This control is located in the condensing unit control panel. If the delay setting is less than two minutes, it should be corrected.

5. Check drain pan for straightness, if warped, the pan may have to be replaced.

6. Check the Hot Gas Loop, it should be straight and must make contact with the drain pan.

7. Evaporator Drain lines must be installed with copper tubing, wrapped with heat tape, insulated and trapped. The trap should be located outside of the freezer.

8. Superheat setting must be checked, 8°F @ coil, 20°F to 40°F at the compressor.

9. Refrigerant charge, charge to clear sight glass after room is within 10° of desired temperature.
DO NOT OVER CHARGE.

10. Check the expansion valve bulb on the outdoor unit, it must be clamped tightly in the proper location.

11. Fan Cycling control, Fan on at 90 psi. off at 60 psi.

Russell High Sierra System Data Sheet

Date: _____ Contractor: _____

High Sierra C.U. Model #_____ Serial # _____

Evaporator Coil Model #_____ Serial # _____

1. Discharge pressure before defrost _____lbs. After defrost _____ lbs.

2. Suction pressure before defrost _____ lbs. After defrost _____ lbs.

3. Superheat @ Coil before defrost _____ °F After defrost_____°F

4. Compressor Superheat before defrost _____°F After defrost_____°F

5. Sight glass condition before _____ after defrost_____ (clear or bubbles)

6. Suction Temperature reading across reversing valve IN_____ OUT_____

7. How long did the defrost last _____ Time clock fail safe setting _____

8. What was the defrost termination pressure _____ lbs.

9. How many defrosts per day_____

10.Coil condition after defrost _____

11. Condenser fan cycling control: Cut in _____ Cut Out _____

12. Fan Delay setting (should be no less than 2 minutes in duration) _____

pn: 122300059

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