SAFETY INSTRUCTIONS

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

Safety Overview

- Read and follow **ALL SAFETY INSTRUCTIONS** in this manual and any warning/caution labels on the unit (decals, labels or laminated cards).
- Read and understand ALL applicable OSHA (Occupational Safety and Health Administration) safety regulations before operating this unit.

Recognition

Recognize Safety Alerts
 *This is the safety alert symbol. When you see it in this manual or on the unit, be alert to the potential of personal injury or damage to the unit.*

DIFFERENT TYPES OF ALERTS

DANGER:
Indicates an immediate hazardous situation which if not avoided **WILL** result in serious injury, death or equipment damage.

WARNING:
Indicates a potentially hazardous situation which, if not avoided, **COULD** result in serious injury, death, or equipment damage.

CAUTION:
Indicates a potentially hazardous situation which, if not avoided, **MAY** result in minor or moderate injury or equipment damage.

SAFETY TIPS

- Carefully read and follow all safety messages in this manual and safety signs on the unit.
- Keep safety signs in good condition and replace missing or damaged items.
- Learn how to operate the unit and how to use the controls properly.
- **Do not** let anyone operate the unit without proper training. This appliance is **not** intended for use by very young children or infirm persons without supervision. Young children should be supervised to ensure that they do not play with the appliance.
- Keep your unit in proper working condition and do not allow unauthorized modifications to the unit.

QUALIFIED SERVICE PERSONNEL

WARNING:
Only trained and certified electrical, plumbing and refrigeration technicians should service this unit. **ALL WIRING AND PLUMBING MUST CONFORM TO NATIONAL AND LOCAL CODES. FAILURE TO COMPLY COULD RESULT IN SERIOUS INJURY, DEATH OR EQUIPMENT DAMAGE.**

Safety Precautions

This unit has been specifically designed to provide protection against personal injury. To ensure continued protection observe the following:

WARNING:
Disconnect power to the unit before servicing following all lock out/tag out procedures established by the user. Verify all of the power is off to the unit before any work is performed.

Failure to disconnect the power could result in serious injury, death or equipment damage.

CAUTION:
Always be sure to keep area around the unit clean and free of clutter. Failure to keep this area clean may result in injury or equipment damage.

Shipping And Storage

CAUTION:
Before shipping, storing, or relocating the unit, the unit must be sanitized and all sanitizing solution must be drained from the system. A freezing ambient environment will cause residual sanitizing solution or water remaining inside the unit to freeze resulting in damage to internal components.

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INTRODUCTION

CONTENT OF THIS INSTALLATION MANUAL

This installation manual provides a general outline of the procedures used to remove a defective compressor and replace it with the kit compressor.

Manual content includes the supplies and equipment needed; the procedure to remove the defective compressor, replace it with the kit unit; and to test the installation. At the end of the manual is a troubleshooting table which is preceded by a special procedure to replace compressors in the 1050XR and 155XR Cooling Units.

IMPORTANT: In preparation for replacing a compressor, it is strongly recommended that the Cornelius Warranty be read and understood. If the compressor is under warranty, contact Cornelius Inc; Service Department, One Cornelius Place, Anoka Minnesota 55303-6234 for compressor return shipment instructions. Phone: (612) 421-6120 or 1-800-238-3600 FAX: 612-422-3232.

APPLICABILITY TO EXISTING UNITS

This manual applies to replacement of all compressors in the field.

REQUIRED SUPPLIES AND EQUIPMENT

Supplies required are as follows:

Brazing alloy “Foes-Copper”, “Silfos’“or equivalent is required for copper-to-copper connections. These alloys contain about 15% silver. Brazing alloy. “Easy-flow” or equivalent is required for copper-to-steel connections. This alloy contains about 50% silver.

Flux for use with copper-to-steel connections.

Principal equipment needed for installing this kit is listed in the following table. Equivalent items may be substituted.

Required Equipment		
Item No.	**Name and Description**	**Use**
1	Torch, Oxy-fuel (acetylene, propane, etc.)	Brazing
2	Torch tips size No. 2 or 3	Brazing
3	Vacuum pump and gaging with 50-micron blank-off pressure. Alternately a pump having 28.5 in. HD minimum	Removing vapor from system
4	Refrigerant recovery system	Refrigerant recovery system
5	Charging cylinder, visual-indicating type with an appropriate refrigerant scale and temperature correction curve, or a closed container with an accurate scale. Charging equipment must be accurate to ± .25 oz.	Charging the reworked system
6	Pinch-off tool	To seal process lines after charging
7	Ammeter, clamp-on type 0-50 amp range	To measure power consumption
8	Voltmeter, 0-300VAC	To measure line voltage

Required Equipment (cont'd)		
Item No.	**Name and Description**	**Use**
9	Ohmmeter, 0-10 and 0-100,000 ohms ranges	To check resistance of electrical circuitry
10	Leak detector, capable of detecting at least 1/2 ounce/year. Alternate: halide torch, or "Snoop" fluid	To detect refrigerant leaks
11	Dry Nitrogen (-75° F dewpoint)	To purge system before evacuating
12	Tap line valve (two)	To make connection to refrigerant recovery system

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SERVICE AND MAINTENANCE

PROCEDURE TO REPLACE A COMPRESSOR

IMPORTANT: Do not change a compressor until it is proven inoperative. Refer to Figure 1 and the troubleshooting table at the end of this manual for guidance.

Removal of Refrigerant

In starting work, be advised that the following warnings, cautions and notes are directly applicable:

WARNING:
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work.

Failure to comply could result in serious injury, death or damage to the equipment.

CAUTION:
Do not vent refrigerant to atmosphere.

NOTE: Work in a well-ventilated area. Refrigerant is not toxic, but will displace air. Fumes from brazing contain toxic gases.

Remove refrigerant from an existing unit as follows:

1. Tag electrical conductors to compressor.
2. Disconnect compressor electrical connections.
3. At the compressor, install a tap line valve in the suction process line.
4. At the dual inlet drier, install a second tap line valve on the high-side process line.
5. Connect the tap line valves to the refrigerant recovery system and draw off the refrigerant.

REMOVAL OF EXISTING COMPRESSOR

1. Slide suction line insulation as far as possible away from work area to prevent heat damage.
2. Place heat shields around electric wiring, insulation, and painted surfaces to protect from accidental heat damage.

WARNING:
Refrigerant pressure must equal atmospheric pressure before heat is applied to the system tubing.

WARNING:
To avoid electrical shock even after electrical power has been disconnected from the Unit, discharge the start capacitor by momentarily touching both terminals at the same time using an insulated screwdriver.

WARNING:
To avoid eye injury, wear protective glasses or goggles while working with refrigerant or brazing.

WARNING:
To avoid possible personal injury, do not apply heat to a charged system.

3. With refrigerant pressure at zero PSI, use heat to separate suction and discharge lines from the compressor.
4. Remove cap tube and liquid lines from dual inlet dryer.
5. Remove compressor mounting clips or bolts.
6. Remove faulty compressor.

Electrical Burnout of Compressor

IMPORTANT: If failure of the compressor was caused by electrical burnout within the unit, refrigerant and oil likely have broken down to form a carbonaceous sludge which is corrosive to the system, and may be toxic. These contaminants are corrosive and must be completely removed from the system by flushing. If the system uses expansion valves, they must be replaced.

Proceed as follows to flush the system.

NOTE: Do not use R-11 refrigerant to flush.

WARNING:
Do not vent refrigerant to the atmosphere

1. Unsolder cap tube from evaporator coil inlet.
2. Connect refrigerant recovery system.
3. Connect a refrigerant source of the type noted on the serial plate.
4. Allow refrigerant to flush out condenser coil and discharge line.

Installation of Kit

1. Polish tubing ends with emery cloth or a wire brush. Do not allow grit to enter tubing. Carefully wipe clean.
2. Insert cap tube 3 to 4 inches into the evaporator coil inlet and braze in place.
3. Fasten kit compressor in operating position with clips or bolts.
4. Insert suction, discharge and process lines into kit compressor. Do not braze at this time.
5. Install suction line drier (supplied with kit) in the vertical location in suction line located on the suction side of the compressor. Cut suction line and insert its end into drier.

CAUTION:
Dual inlet strainer/drier must be installed in horizontal position to avoid premature compressor failure.

NOTES:

A. Cap tube must not be cut off more than 2 inches. (Notch with file and break off).
B. Cap tube must not be inserted more than 1/2-Inch into dual inlet strainer/drier opening.
C. The compressor and dual inlet strainer/drier must not be uncapped more than ten minutes before brazing into system.

6. Replace dual inlet strainer/drier with strainer/drier from kit as follows:
   A. Install new inlet strainer/drier in horizontal position. Insert liquid, discharge process, and cap tube lines into drier.
   B. Do not insert cap tube more than 1/2- inch into drier. Do not braze at this time.

Nitrogen Flushing and Brazing

Flush the system with “dry” nitrogen (-75° F dewpoint) as follows:

1. Connect nitrogen source to suction process line and open discharge process line to purge system.
2. Purge system at least 10 Minutes.
3. Adjust nitrogen flow for not greater than 1 PSI through system to eliminate oxidation within tubing while brazing.

NOTE: Work in well ventilated area. Refrigerant is not toxic, but will displace air. Fumes from brazing contain toxic gases.

4. While nitrogen is flowing, braze all but last connection.
5. Disconnect nitrogen source.

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6. Braze last connection.
7. Clean flux from brazed connections with cold water.

TESTING

Pressurize the system and perform leak checks as follows:

1. Pressurize the system to saturation with clean refrigerant of the type specified on unit serial plate.
2. Leak-check the entire system.

NOTE: If a leak is suspected but cannot be detected, tape a poly or heavy paper envelope over the area to capture gas. Wait 10 minutes then check the content of the envelope for refrigerant.

NOTE: To maintain warranty, do not use line-tapping valves or poppet-type valves for system processing. These valves cause excessive restriction during evacuation and have a potential for leaks.

Charge the system as follows:

1. Connect refrigerant recovery system.
2. Recover refrigerant and evacuate to at least 100 microns.
3. Disconnect refrigerant recovery system.

NOTE: It should not be necessary to operate the refrigeration system to recharge it with liquid refrigerant.

4. Charge the system using the type of refrigerant and exact amount specified on the serial plate.
5. Apply electrical power to the unit.

IMPORTANT: The compressor kit includes start components (start capacitor, run capacitor, and/or start relay). These components must be used and installed prior to applying power to the unit.

6. Operate the unit for a short period. The evaporator should frost entirely.

Refrigeration Circuit and Components

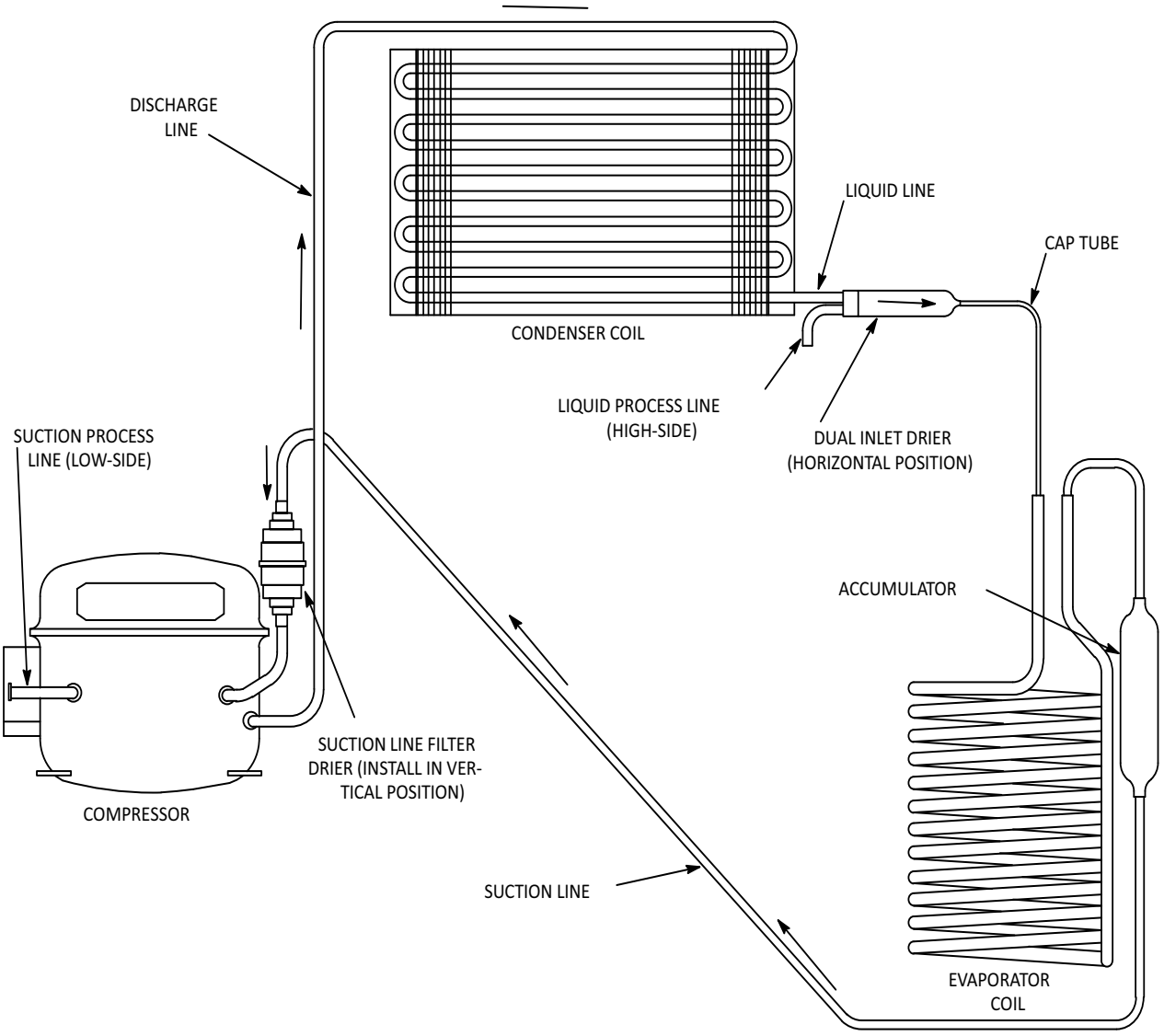

Figure 1.

7. Remove electrical power to the unit.
8. Using a crimp tool, Pinch off suction process line tube twice starting from free end. Leave crimp tool applied to inner pinch.
9. Disconnect refrigerant source.
10. Cut suction process line tube approximately 1/2 inch from outer pinch and fill open end with copper brazing alloy.
11. Remove crimp tool.
12. Repeat steps 8 and 9 on high-side process line.
13. Apply electrical power to the unit, and allow it to operate. Check for correct operation.

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Installing Kit In 105XR and 1550XR Cooling Units

To install a kit in either the 1050XR and 1550XR cooling units, proceed as follows:

⚠ WARNING:
Disconnect power to the unit before servicing. Follow all lock out/tag out procedures established by the user. Verify all power is off to the unit before performing any work.

Failure to comply could result in serious injury, death or damage to the equipment.

1. Remove rear access grille (opposite syrup line connections) to expose compressor terminal cover.
2. Remove compressor terminal cover.
3. Perform electrical check on compressor to confirm compressor malfunction.
4. If compressor is faulty, drain water from evaporator tank.
5. Remove back panel (opposite syrup line connections) for access to compressor. See Figure 2.
6. Remove screws securing electrical box to rear panel.

⚠ WARNING:
Do not vent refrigerant to atmosphere

7. Install one tap line valve on suction process line on the compressor, and a second tap line valve on the high-side process line located on the dual inlet strainer/drier.
8. Connect refrigerant recovery system.
9. Using refrigerant recovery system, remove refrigerant.
10. At each side panel, remove screws which support cabinet bulkhead to which evaporator is secured.
11. In front panel, loosen, but do not remove screws which support cabinet bulkhead to which evaporator tank

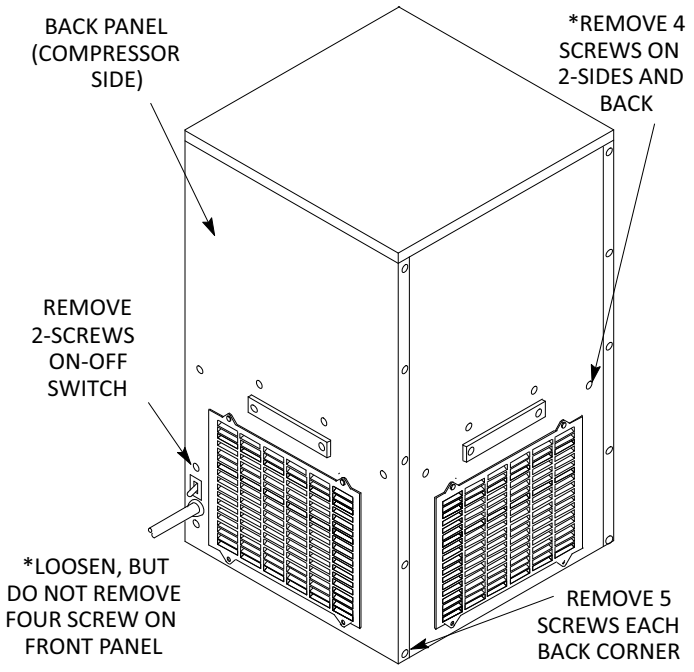

Figure 2 Cooling Unit Panels

12. To gain clearance between top of compressor and cabinet bulkhead, raise cabinet bulkhead up from 3/4 to 1 inch and prop with a piece of 1 x 2 inch wood cut to length.
13. At the compressor, remove hex head bolts, grommet spacers and grommets securing compressor to the base.
14. Slide the compressor toward the rear of the cooling unit, allowing compressor to slide off base mounting pads to gain maximum clearance between top of compressor and cabinet bulkhead.
15. Refer to main text of this manual for procedure to replace a compressor.
16. Using new grommet spacers and grommet kit, secure the compressor in place.
17. Connect electrical wiring to compressor and attach protective cover.
18. Apply electrical power to unit.
19. Start and run system for about 5 minutes. Evaporator should frost entirely over.
20. Remove electrical power from unit.
21. Pinch off and weld process lines as described in main text.
22. Fasten cabinet bulkhead in position using removed and loosened screws.
23. Fill evaporator tank with water.
24. Install top cover.
25. Apply electrical power to unit.
26. Operate unit.

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TROUBLESHOOTING

IMPORTANT: Only qualified personnel should service internal components or electrical wiring.

WARNING:
If repairs are to be made to a product system, remove quick disconnects from the applicable product tank, then relieve the system pressure before proceeding. If repair to be made to the CO_2 system, stop dispensing, shut off the CO_2 supply, then relieve system pressure before proceeding. If repairs are to be made to the refrigeration system, make sure electrical power is disconnected from the unit**.**

Trouble	Probable Cause	Remedy
COMPRESSOR COOLS BUT IS VERY NOISY, ESPECIALLY WHEN STARTING	A. Broken suspension spring. B. Loose crankshaft extension.	A. Change compressor. B. Change compressor.
COMPRESSOR OPERATES BUT REFRIGERATION SYSTEM DOES NOT COOL	A. Discharge or suction tube is loose.	A. If noise can be tolerated, compressor need not be changed. (Noise will not affect performance or life of the compressor).
COMPRESSOR OPERATES BUT REFRIGERATION SYSTEM DOES NOT COOL	A. Refrigerant leak. B. If compressor is moderately noisy, and no leaks are evident, suspect broken valve.	A. Repair refrigerant leak. B. Change compressor
COMPRESSOR STARTS AND OPERATES FOR A FEW SECONDS, THEN STOPS	A. Compressor overheated. B. Possibly caused by lint-filled condenser coil.	A. Clean condenser coil with a vacuum cleaner, low-pressure compressed air, or a soft brush. B. Allow compressor to cool and restart.

COMPRESSOR WILL NOT STAR	A. Low line voltage at Unit.	A. Check line voltage across “C” and “R” terminals on the compressor. Voltage cannot be more than 10 percent below nominal.
	B. Loose or disconnected electrical connections.	B. Check connections. Remove electrical power and perform continuity check.
	C. Faulty start capacitor (if used).	C. Visually examine start capacitor for bulged top or side which indicates excessive heat. If no bulge is visible, check amp draw. If little or no current is drawn, the capacitor is open and must be replaced.
	D. If capacitor is faulty, look for an inoperative start relay or low line voltage.	D. Replace start relay or remedy low voltage.
	E. Overload protector open.	E. Check overload protector and replace if open.
	F. Capacitance of starting capacitor is marginal	F. Increase starting capacitor capacitance by 15 percent and try to start compressor. **IMPORTANT: Substitute capacitor must have same or higher voltage rating then existing capacitor. An alternate method is to wire in parallel a capacitor having 15 percent of the Mfd. (capacitance) of the existing capacitor. If this fails, replace compressor.**
	G. Inoperable start relay.	G. To check start relay, jumper No. 1 terminal on the start relay to No. 2 terminal. If compressor starts, start relay is faulty. Replace start relay.
	H. Low voltage.	H. At compressor, remove cover and measure voltage between “C” (top terminal). Voltage for 230 volt compressor must be greater than 200 VAC. Voltage for 115 volt compressor must be greater than 100 VAC. If voltage is low, upgrade power source.
	I. Inoperative run capacitor.	I. Inspect run capacitor for bulges, cracks, or other evidence of deformation. If found, assume capacitor is faulty and replace. If not found, test as follows: A. Measure line voltage at compressor. B. Measure amp draw of compressor. C. Using formula, find capacitance. For 60 Hz Units: Mfd = 2650 x Amps divided by voltage. D. For 50 Hz Units: Mfd = 3180 x Amps divided by voltage. E. If calculated value is 10 percent higher or lower than rated value, replace run t

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COMPRESSOR WILL NOT START (CONT'D)	J.	Grounded or shorted compressor motor windings	K. With power removed from Unit and electrical connections disconnected from the compressor, check resistance between compressor terminals and bare metal of compressor. Use ohmmeter set on 100,000 ohm scale. There should be no continuity. If a reading is found, replace the compressor. To check for shorted windings, set ohmmeter to 10 ohm scale: A. Connect one test lead to "C" (top terminal) and other test lead to "R" terminal; reading should be approximately 1-1/2 ohms. B. Remove lead from "R" terminal and connect it to "S" terminal; reading should be 3-1/2 to 5 ohms. C. Disconnect test lead from "C" and connect it to the "R" terminal; reading should be exactly the sum of the previous two readings. If not, an "open" or "short" exist in the windings. Replace compressor.

