Container Refrigeration

OPERATIONS, SERVICE, AND PARTS MANUAL

For

EverFRESH™

Controlled Atmosphere Option

T-374 Rev B

OPERATIONS, SERVICE, AND PARTS MANUAL

For

EverFRESH™

Controlled Atmosphere Option

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SECTION 1
SAFETY SUMMARY

1.1 General Safety Notices

The following general safety notices supplement specific warnings and cautions appearing elsewhere in this manual. These recommended precautions must be understood and applied during operation and maintenance of the equipment covered herein. The general safety notices are presented in the following three sections labeled: First Aid, Operating Precautions and Maintenance Precautions. A listing of specific warnings and cautions appearing elsewhere in the manual follows the general safety notices. Additional notices for Worker Safety, and High Voltage Safety are also included.

1.2 First Aid

An injury, no matter how slight, should never go unattended. Always obtain first aid or medical attention immediately.

1.3 Operating Precautions

Always wear safety glasses.

Keep hands, clothing and tools clear of the evaporator and condenser fans.

Wear appropriate personal protective equipment for the work being undertaken.

No work should be performed on the unit until all circuit breakers and start-stop switches are turned OFF, and power supply is disconnected.

In case of severe vibration or unusual noise, stop the unit and investigate.

1.4 Maintenance Precautions

Be sure power is turned OFF before servicing the EverFRESH^{TM} Controlled Atmosphere option. Tag circuit breaker and power supply to prevent accidental energizing of circuit. Do not bypass any electrical safety devices, e.g. bridging an overload, or using any sort of jumper wires.

Problems with the system should be diagnosed, any necessary repairs performed by qualified service personnel.

When performing any arc welding on the container unit or refrigerated compartment, disconnect all wire harness connectors from the modules in the control box. Do not remove wire harness from the modules unless you are grounded to the container unit frame with a static safe wrist strap.

1.5 Specific Danger, Warning and Caution Statements

To help identify the hazards presented on the container unit labels and explain the level of awareness each one carries, an explanation is given with the appropriate consequences:

DANGER - alert to an immediate hazard that WILL result in severe personal injury or death.

WARNING - alert to hazards or unsafe conditions that COULD result in severe personal injury or death.

CAUTION - alert to potential hazard or unsafe practice that could result in minor personal injury, product or property damage.

The following safety statements are applicable to the EverFRESH option unit used with any container unit and appear elsewhere in this manual. These recommended precautions must be understood and applied during operation and maintenance of the equipment covered herein.

⚠ WARNING

In case of electrical fire, open circuit switch and extinguish with CO_2 (never use water).

⚠ WARNING

Potential hazardous atmosphere and low oxygen levels may exist inside the container. Ventilate before entering. Stay away from doors and access panels while venting. Refer to Section 3.6.

⚠ WARNING

Before servicing the unit, make sure the Start-Stop switch (ST) is in the OFF position. Verify unit circuit breaker (CB-1) and external power sources are turned OFF and tagged to prevent accidental energizing of circuits.

⚠ WARNING

Do not inject gas into the container unless there is an exhaust port. Charging disk (part # 79-04098-03) has one port for injecting gas and one for exhaust. Both ports need to be opened. If the charging disk is not available, the manual fresh air vent must be opened. Damage to the unit and risk of personal injury exists if a pressure relief pathway is not established.

⚠ CAUTION

Do not run the Calibration tests under loaded conditions.

NOTICE

While the EverFRESH option is operating, the process of inducing ripening by introducing ethylene should not be performed.

NOTICE

It is required that the calibration procedure only be performed during pre-trip or when the container has been fully vented.

NOTICE

Prior to performing service work, a thorough review and understanding of the entire manual is recommended.

SECTION 2
INTRODUCTION

2.1 Introduction

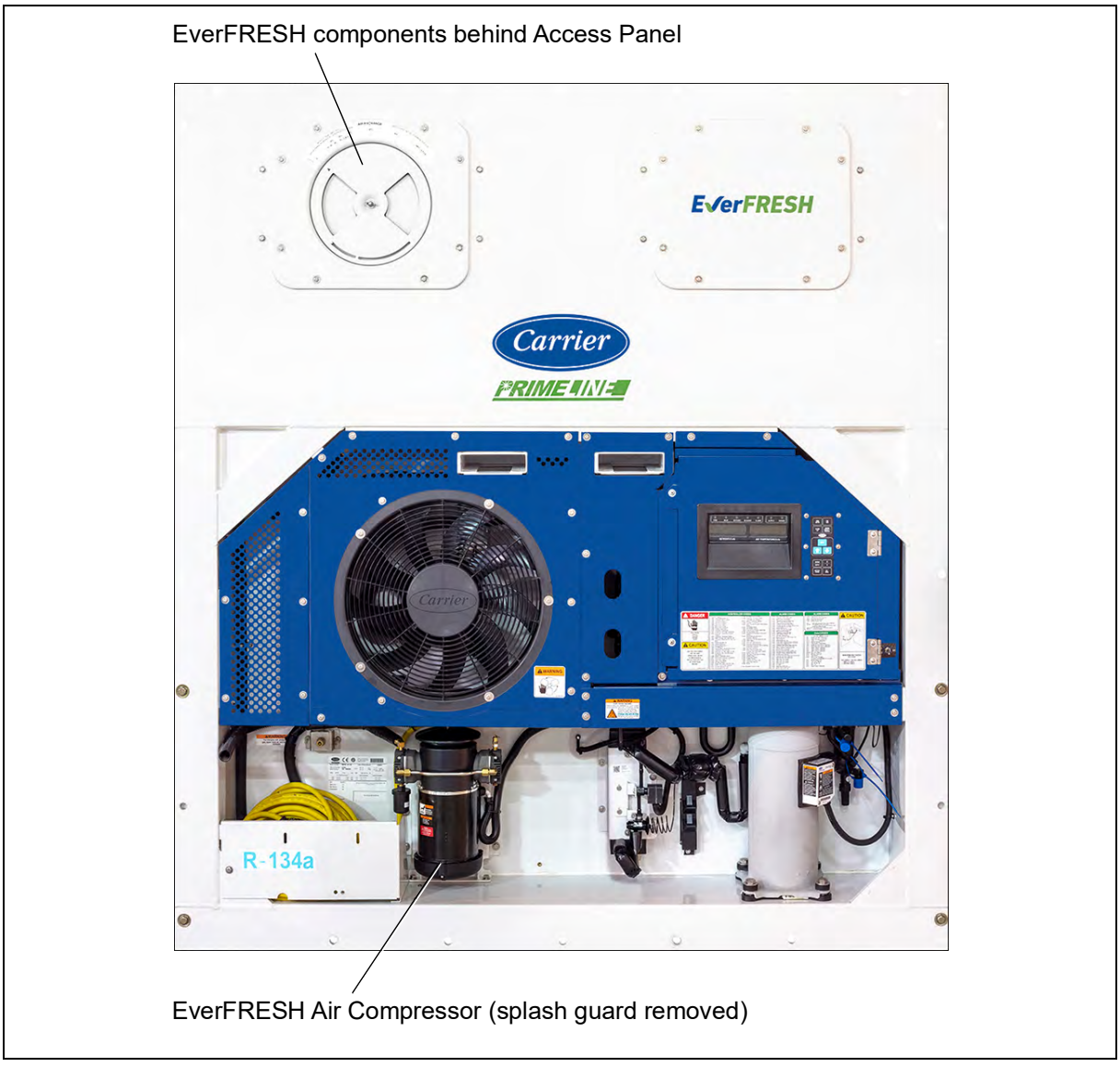
This manual contains information specific to the Carrier Transicold EverFRESH™ Controlled Atmosphere option. This manual is to be used in conjunction with the separately bound Operation and Service Manual and Service Parts Manual for the model of your particular refrigeration unit.

The EverFRESH system is able to control container atmosphere by supplying nitrogen and oxygen into the contained space and simultaneously controlling levels of O_2 and CO_2. This extends the produce ripening process, which increases shelf life and enables longer cargo routes for certain perishable commodities. The EverFRESH system also offers an optional package to actively inject CO_2 into the cargo space during transport.

2.2 Controlled Atmosphere Unit - Component Descriptions

The refrigeration unit is designed so that the majority of its components are accessible from the front (**Figure 2.1**). The air compressor for EverFRESH is located below the condenser behind a splash guard. A manually operated venting system is located in the upper left access panel. The panel may be removed to allow entry into the evaporator section where the atmosphere sensors, control valves, water separator and air filters are located.

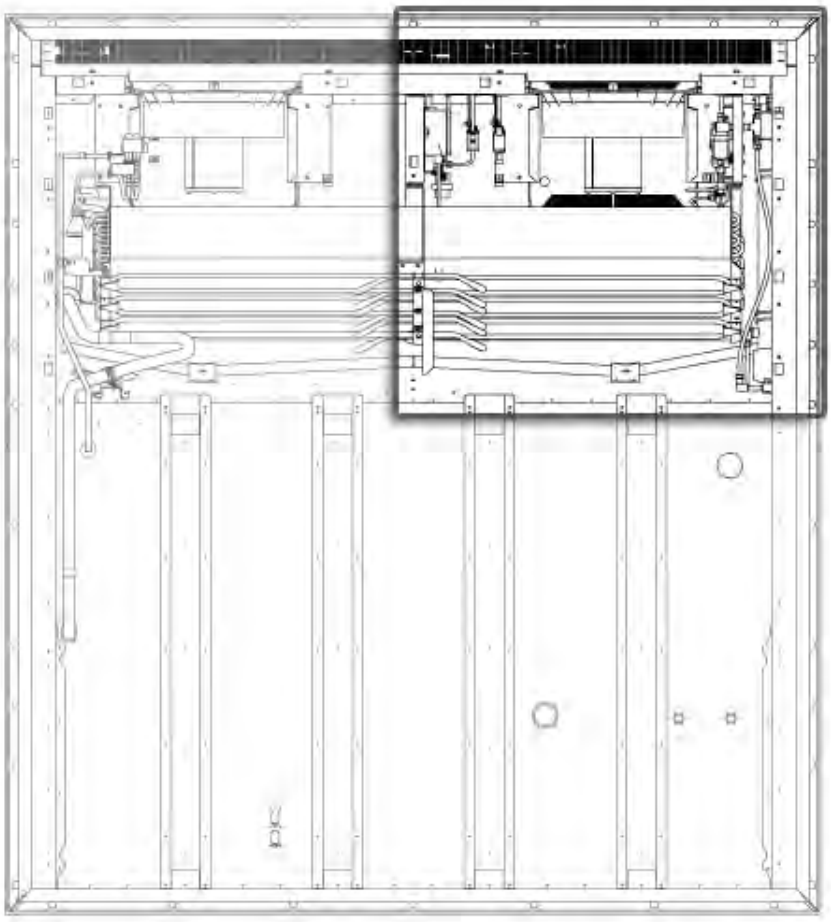
Figure 2.1 Refrigeration Unit - Front



Other than the air compressor, all of the components of the EverFRESH option are mounted in the evaporator section (**Figure 2.2**) in addition to the standard refrigeration unit components.

Figure 2.2 Refrigeration Unit - Evaporator Section (Upper Panel Removed)

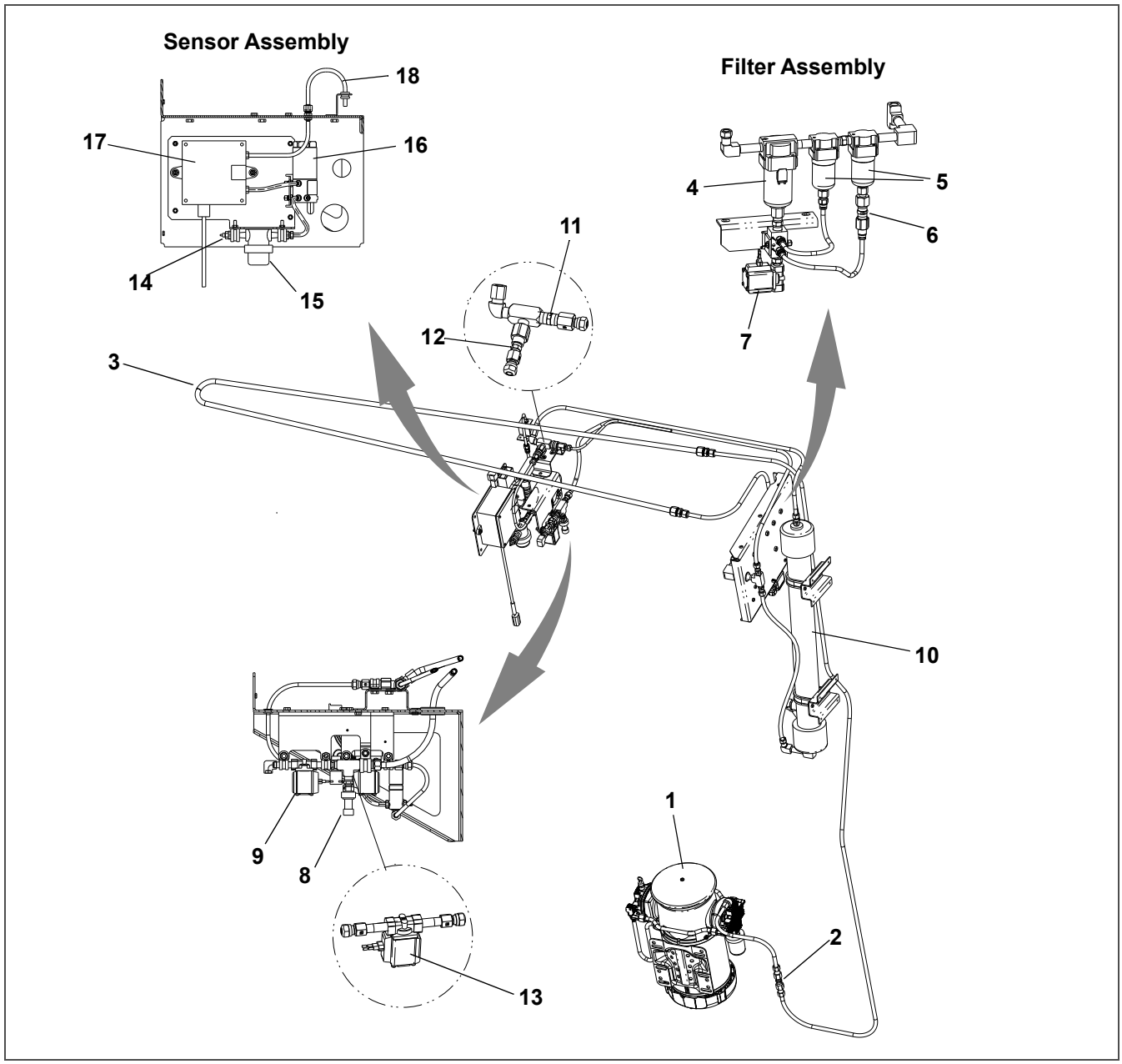
EverFRESH components located in evaporator section



These components (**Figure 2.3**) include the water separator, particulate filters, Water Drain Valve (WDV), Nitrogen Membrane Separator, EverFRESH Air Valve (EA) and EverFRESH Nitrogen Valve (EN), CO_2 and O_2 sensor package, and Membrane Pressure Transducer (MPT).

Air from within the container is passed to the O_2 sensor and CO_2 sensor. Data is then supplied to the controller. The controller calculates O_2 and CO_2 values in order to maintain the preset values.

Figure 2.3 EverFRESH Components



1) Air Compressor
2) Check Valve
3) Condensing Loop
4) Water Separator
5) Particulate Filters (2)
6) Check Valve
7) Water Drain Valve (WDV)
8) Membrane Pressure Transducer (MPT)
9) EverFRESH Air Valve (EA)
10) Nitrogen Membrane Separator
11) Nitrogen Supply Orifice
12) Nitrogen Sampling Orifice
13) EverFRESH Nitrogen Valve (EN)
14) Cargo Air Sensor Inlet
15) Cargo Air Sensor Filter Assembly
16) O_2 Sensor
17) CO_2 Sensor
18) Cargo Air Sensor Outlet

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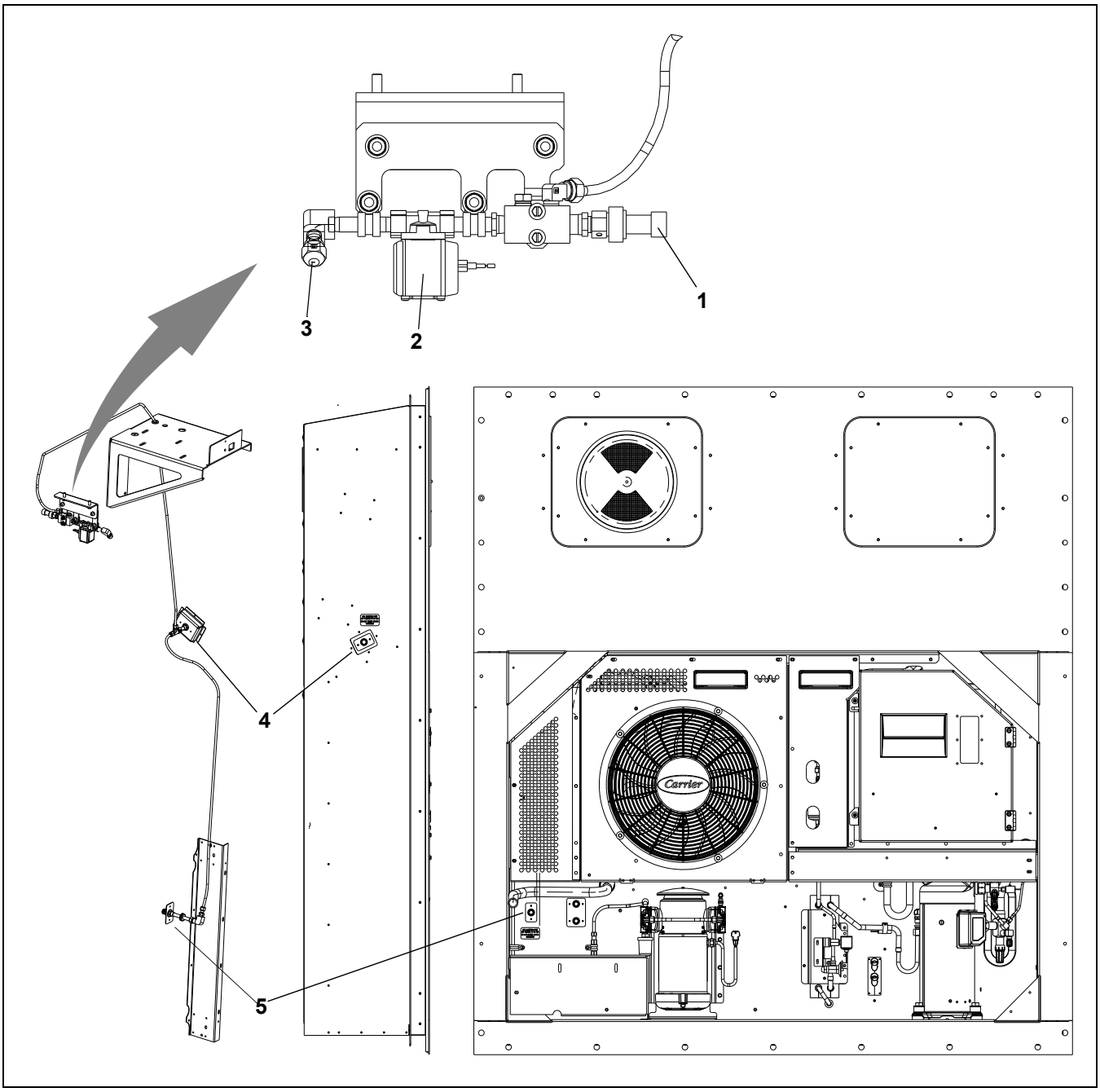
2.3 Optional CO_2 Injection System

There is an optional CO_2 injection kit that can be added to the system that allows CO_2 to be actively injected into the cargo space during transport. In this configuration, a CO bottle is used with a regulator to maintain an input pressure of 50 psig, not to exceed 100 psig. There are two CO_2 injection ports: one internal and one external. The connection is a 1/4” flare fitting with a Schrader valve.

Figure 2.4 CO2 Injection System



1) CO_2 Injection Pressure Transducer (IPT)
2) CO_2 Injection Solenoid Valve (CSV)
3) CO_2 Supply Orifice Cap
4) Internal CO_2 Port
5) External CO_2 Port

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2.4 System Data

Table 2–1 System Data

Component	Data	Detail
Air Compressor	Number of Cylinders	2
	Type	Three Phase Induction
	Weight	44 lbs
	Full Load Amps	1.34 amps 50Hz / 1.4 amps 60Hz.
	Voltage and Frequency	360 - 460 VAC 50 Hz +/-2.5Hz 400 - 500 VAC 60Hz +/-2.5 Hz
	Speed	1425/50 Hz 1725/60Hz RPM
	Horsepower	0.75
	Protection	Internal thermal protector
	Resistance	16.7 ohms +/- 10%
Solenoid Valves	Voltage and Frequency	18 to 30 VDC 50/60HZ +/-2.5Hz
	Amperage	nominal 250mA @ 24 VAC
	Type	AC / DC coil

2.5 Safety System and Protective Devices

Table 2–2 Safety and Protective Devices

Device	Device Setting
Compressor IP	Thermal
Compressor Pressure Relief Valve	147 psig +/- 3%
Control Fuses - Auto Blade Type SAE J1284	7.5 Amp
Motor Fuses - Ferraz Shawmut ATMR5	5 Amp

SECTION 3
OPERATION

3.1 Introduction

This section addresses the operating requirements for the EverFRESH^{TM} Controlled Atmosphere option. Operating parameters are not changed except for EverFRESH settings. For information pertaining to the operation of the refrigeration system, refer to the Operation and Service Manual for your particular model.

3.2 Operation

The EverFRESH option offers enhanced functionality to help slow the ripening process of perishable cargo by controlling Carbon Dioxide (CO_2) and Oxygen (O_2) levels to specified setpoints. This enables the fresh transport of perishables on longer voyages. The system controls the container atmosphere with a nitrogen membrane, a fresh air solenoid and an optional CO_2 injection kit.

During the nitrogen control mode, CO_2 and O_2 are replaced with nitrogen proportionally. EverFRESH also utilizes the cargo's natural respiration to control CO_2 and O_2 levels. Additionally, opening and closing a fresh air valve allows for raising O_2 levels and controlling CO_2 for high respiring cargos. An O_2 sensor monitors O_2 levels and allows the system to prevent O_2 levels from dropping below the lower setpoint. A CO_2 sensor provides CO_2 levels to the controller to allow the control algorithm to activate the required EverFRESH components. For low respiring cargoes requiring high CO_2 setpoints, the CO_2 injection system can be used to maintain CO_2 levels.

NOTICE

While the EverFRESH option is operating, the process of removing ethylene needs to be performed with external ethylene scrubbers.

3.3 EverFRESH Air and Gas Flow

The EverFRESH system (see **Figure 3.1**) uses an EverFRESH Air Compressor (EAC) mounted to the front of the refrigeration unit to increase the pressure of the air inside the system. The higher-pressure air will exit the compressor and go through a check valve that prevents moisture and debris from migrating back to the compressor in the off cycle. The warm, moisture laden air is brought inside the refrigerated space and passed through a condensing loop, consisting of a single piece of copper tubing located above the fan deck. As the compressed air is exposed to the cooler temperature of the cargo space, moisture will condense and be carried out to the filter assembly.

The filter assembly consists of a water separator and two particulate filters. Any of the condensed moisture will be removed at the water separator. Immediately after the water separator are two particulate filters that will remove any solid debris from the air stream. A check valve located after the second particulate filter prevents any water or debris from bypassing the filter. The condensate and any solid material will settle to the bottom of the filter assembly and be blown out of the line when the Water Drain Valve (WDV) opens. The water will drip onto the evaporator coil and down the defrost drain line. The WDV will energize during the initial unit startup when the air compressor starts. It will also open periodically during air compressor operation to remove accumulated condensate and again before the air compressor is disengaged.

Once the compressed air passes through the filter assembly it will be clean and dry and is piped to either the EverFRESH Air Valve (EA), or the Nitrogen Membrane Separator. The EverFRESH Air Valve (EA) maintains the desired oxygen levels inside the cargo space. When the controller detects that oxygen levels are dropping below the threshold setting, it will open the EA valve to force the clean, dry, pressurized, air into the cargo space. Since this air contains 21% oxygen, it will increase the concentration of oxygen available for respiration. Just before the EverFRESH Air Valve is the Membrane Pressure Transducer (MPT) where the controller will monitor system pressure and can determine if the Nitrogen Membrane Separator is maintaining good flow. When the EverFRESH Air Valve (EA) is closed, the clean, dry air will exit the particulate filter and enter the bottom of the Nitrogen Membrane Separator. Inside the separator, the air will enter thousands of tiny hollow fibers. The smaller, faster molecules of oxygen and carbon dioxide will pass through the walls of the membrane fibers, exit the separator through a port on the side, and then are exhausted out the front of the refrigeration unit to the atmosphere. The larger, slower nitrogen molecules stay trapped in the fibers until they exit the top of the separator.

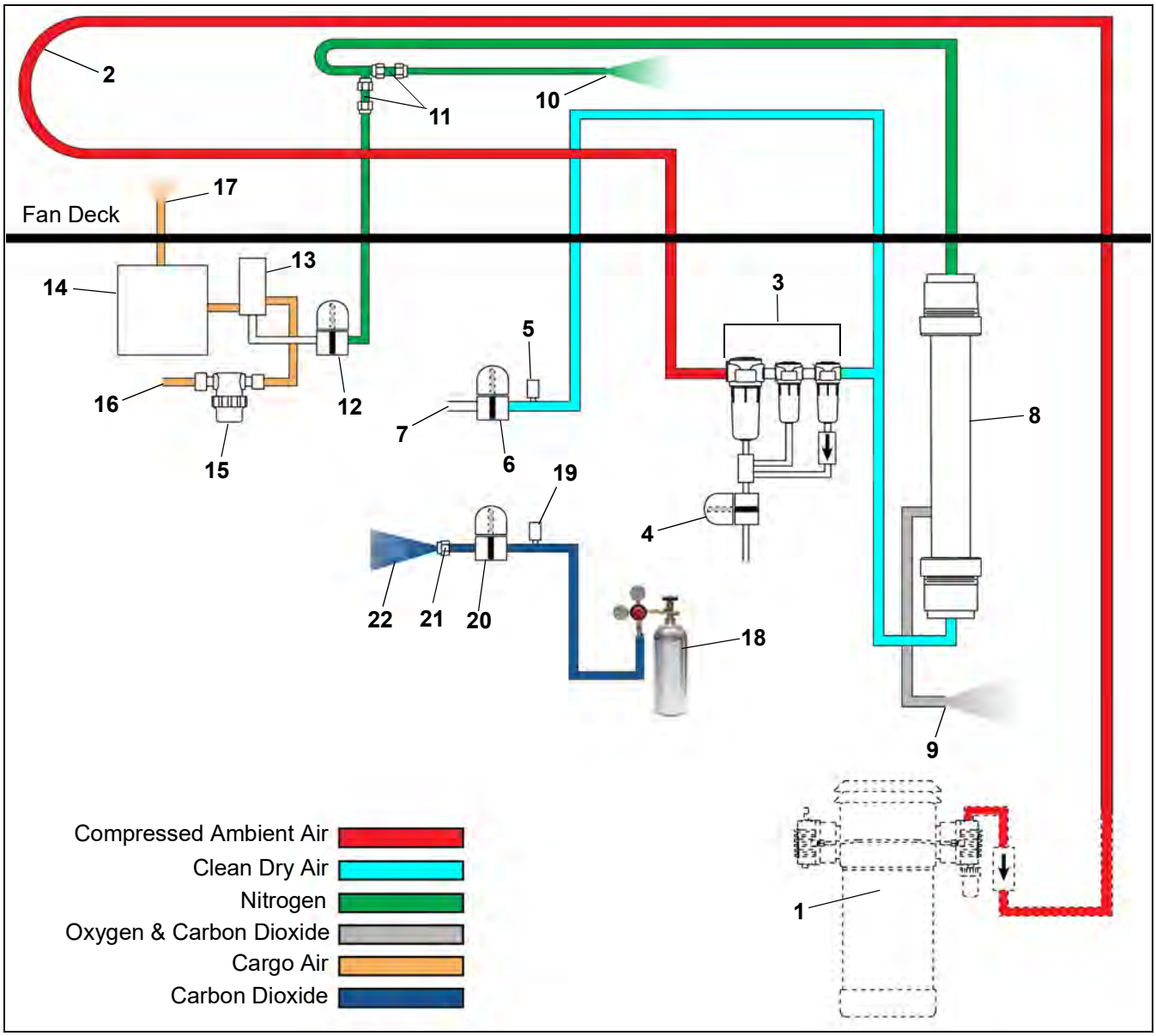
As the nitrogen leaves the separator, it is piped above the fan deck to the nitrogen orifices. The orifices provide a restriction that helps control the gas flow. The nitrogen supply orifice will regulate the flow of nitrogen out to the air stream where the evaporator fans will blow it across the evaporator and down into the t-slots where it will enter the

cargo space. The nitrogen sampling orifice regulates the flow of nitrogen to the EverFRESH Nitrogen Valve (EN). The controller will open EN to allow the gas to flow into the sensor package for testing at the O_2 sensor. Elevated amounts of oxygen indicate the nitrogen membrane may be clogged. EN is only energized during Pre-trip test P20-5 N2 Check. Otherwise, when EN is closed during normal operation, gas is forced out of the nitrogen supply orifice.

After having the oxygen level tested, the nitrogen will flow through the CO_2 sensor then be exhausted back into the cargo air stream above the fan deck.

On systems equipped with a CO_2 Injection option, the CO_2 Injection Valve (CSV) will control to the CO_2 setpoint. As CO_2 levels drop below the setpoint, the CSV will open to raise CO_2 levels.

Figure 3.1 EverFRESH Air and Gas Flow Diagram



1) Air Compressor
2) Condensing Loop
3) Water Separator & Particulate Filters
4) Water Drain Valve (WDV)
5) Membrane Pressure Transducer (MPT)
6) EverFRESH Air Valve (EA)
7) Fresh Air Supply to Cargo Space
8) Nitrogen Membrane
9) O_2 and CO_2 Sent to Ambient
10) Nitrogen Supply to Cargo Space
11) Nitrogen Orifices (supply and sampling)
12) EverFRESH Nitrogen Valve (EN)
13) O_2 Sensor
14) CO_2 Sensor
15) Sensor Filter Assembly
16) Cargo Air Sensor Inlet
17) Cargo Air Sensor Outlet
18) CO_2 Injection Bottle (not included with equipment)
19) CO_2 Injection Pressure Transducer (IPT)
20) CO_2 Injection Valve (CSV) - Option
21) CO_2 Supply Orifice Cap
22) CO_2 Supply to Cargo Space - Option

3.4 Pre-Trip Inspection

An EverFRESH Pre-Trip Inspection (PTI) is required to run prior to cargo being loaded in order to test operation of mechanical components and calibrate the sensors. EverFRESH efficiency is directly related to box integrity, so a PTI must only be performed with a well vented container box.

NOTE

A PTI should not be run after a frozen condition, including AUTO2.

3.4.1 Initiating a PTI

1. First, perform system maintenance checks. See **Section 6.1** PTI Preparation.
2. Press the PRE-TRIP key to access the Pre-trip selection menu.
3. Use the Arrow keys to display “AutCA” and then press the ENTER key. This allows for testing of components and calibration of O_2 and CO_2 sensors.
4. To skip the sensor calibrations and test only the mechanical components, use the Arrow keys to display “P20” then press the ENTER key.

3.4.2 PTI Individual Test Codes

When testing components and troubleshooting the system, individual Pre-trips can be initiated from inside the Pre-trip selection menu by selecting "P20". This code is for EverFRESH PTI machinery only. During the individual "P20" tests, sensor calibration will be skipped. Current readings for the EverFRESH Air Compressor (EAC) contactor and solenoid valves are taken internally on the ML5 controller.

Table 3–1 Pre-Trip Test Codes

Code	Component Tested	Test Sequence	Pass Criteria
Component Acronyms Referenced: Membrane Pressure Transducer (MPT), EverFRESH Air Compressor (EAC), Water Drain Valve (WDV), EverFRESH Air Valve (EA), EverFRESH Nitrogen Valve (EN)			
P20-0	Membrane Pressure Transducer (MPT) Test	Test initiates with all EverFRESH and refrigeration machinery off.	Validate the MPT. Verifies the sensor is not in alarm status and reading -5 to 5 psig.
P20-1	EverFRESH Air Compressor (EAC) Test	Start EAC and open WDV and run for 10 seconds. Close WDV and run up to 5 minutes or until pressure reaches 60 PSIG.	EAC Current draw > 1.0 amps. MPT in range 60 to 135 PSIG. EAC Contactor current in range 350 to 760 mA.
P20-2	EverFRESH Air Valve (EA) Solenoid Test	EAC continues running from previous test. Record MPT. Open EA for 5 seconds. Record MPT. Shut off EAC, wait 5 seconds and close EA.	MPT Pressure change > 40 PSI when EA opens. EA Current between 100 and 200mA.
P20-3	Water Drain Valve (WDV) Solenoid Test	Energize EAC and allow the system to run up to 5 minutes to build pressure. Record MPT. Open WDV and record pressure. Shut down the EAC. Wait 5 seconds, then check WDV current. At the end of the test, close WDV.	MPT Pressure change > 40 PSI when WDV opens. WDV Current between 100 and 200mA.

Table 3–1 Pre-Trip Test Codes

Code	Component Tested	Test Sequence	Pass Criteria
P20-4	CO_2 and O_2 Sensor Calibration	"CAL" will be displayed on the left display and a 10-minute countdown timer is displayed on the right display. The unit will run High Speed Evaporator Fans. **Note**: Calibration only run when AutCA selected. Skipped if P20 selected.	The CO_2 sensor and O_2 sensor will perform an auto calibration provided the sensor signal is valid and values are consistent with ambient air. **Error messages when calibration fails:** The CO_2 sensor will be validated and then needs to read between 0.9 and 1.15 VDC to ensure fresh air is present in the sensor prior to calibration. If the level is not reached, "NoCAL" message will be displayed. If CO_2 or O_2 calibration fails, "O2 Fail" or "CO2 Fail" will be on the display and the test will stop. The O_2 sensor will be validated to verify it is within a specific range suitable for calibration. If voltage is outside of this range, an "O2 Fail" message is displayed. During calibration, the stability of the sensor will be monitored and must be within 20mV over one minute to ensure the sensing chamber is properly flushed with fresh air. If it's not stable, a "NoCAL" message will be displayed. In the event of a "NoCAL", it indicates that fresh air is not going through the sensors. Verify there is no cargo in the contained space, the sensor filter is not clogged and sensor hoses are properly connected. Then re-run the Pre-trip "AutCA" test under the PRE-TRIP key menu.
P20-5	EverFRESH Nitrogen Valve (EN) Solenoid Test	Test will start with EAC off. Energize EN and wait 5 seconds. Energize EAC. Test will run up to an additional 300 seconds or until N_2 reaches acceptable limit. Then the EAC and EN will be de-energized.	EN current between 100 and 200mA. N2 concentration at minimum acceptable level.
PTI Run in Units Configured for Optional CO_2 Injection Kit			
P20-6	CO_2 Injection Valve Solenoid (CSV)	Open CSV and wait 5 seconds. Record CSV current.	CSV current between 100 and 200 mA.
P20-7	CO_2 Injection Pressure Transducer (IPT)	Shut off all machinery outputs. Validate the transducer is present. Validate transducer at 0.0 PSIG.	Validate IPT reads between -5 and 5 PSIG.

3.5 Enabling EverFRESH Operation

EverFRESH is activated via function code Cd71. This code allows the user to select a specific mode of operation and the associated parameters. The modes of operation are: FrESh, OFF, and PUrgE. Within each of these modes of operation are sub menus that have selectable parameters. Not all parameters are available in each sub menu.

When setting any mode of operation, the entire process must be followed to ensure all parameters are set. For example, the CO_2 injection option is turned on / off under FrESH mode after passing through the CO_2 and O_2 setpoint sub menus.

3.5.1 Activate Fresh Mode to Start Up the System

In **Fresh** mode, all EverFRESH operations are enabled and setpoints for CO_2 and O_2 can be edited. The CO_2 injection parameters in the **Fresh** mode menu are only available if unit configured with the CO_2 injection option.

NOTE

The CO_2 setpoint is the level of CO_2 allowed for the cargo. The range is 2 to 19% in 1% increments, with a default setting of 5%.

NOTE

The O_2 setpoint is the minimum level of oxygen allowed for the cargo. The range is from 3 to 17% in 1% increments; the default setting is 10%.

1. Press the CODE SELECT key on the keypad.
2. Press the Up or Down Arrow key until “Cd 71” is displayed, then press the ENTER key. The selection in the right display will blink.
3. Press the Up or Down Arrow key until “FrESh” is in the right display, then press the ENTER key.
4. The CO_2 setpoint is displayed. “CO2SP” appears in the left display with the setpoint value blinking in the right display. Use the Arrow keys to change the setpoint and press ENTER to confirm. Or, just press ENTER to keep the originally displayed value.
5. Next, the O_2 setpoint is displayed. “O2 SP” appears in the left display with its setpoint blinking in the right display. Use the Arrow keys to change the setpoint and press ENTER to confirm. Or, just press ENTER to keep the originally displayed value.
6. Next, “CO2iN” is displayed. Use the Arrow keys to toggle between “OFF” and “On” in the right display and press ENTER to confirm the selection. Select “On” to enable CO_2 injection or “OFF” to disable.

3.5.2 Activate Off Mode

When **Off** mode is selected, all EverFRESH operations will be disabled. The EverFRESH solenoids will be closed. This will be the default mode anytime a setpoint less than 1°C (33.8°F) has been selected. Whenever a setpoint less than 1°C (33.8°F) is selected, the current EverFRESH setting will be saved.

1. Press the CODE SELECT key on the keypad.
2. Press the Up or Down Arrow key until “Cd 71” is displayed.
3. Press the ENTER key. The selection in the right display will blink.
4. Press the Up or Down Arrow key until “OFF” is displayed and then press the ENTER key.

3.5.3 Activate or Deactivate Purge Mode

When **Purge** mode is active, it allows the user to suspend EverFRESH operations while pre-charging gas levels in the container. All EverFRESH control actions and alarm 929 is suspended in order to purge the container to a desired gas concentration. When activated, Purge mode stays active for a period of time selected from the Purge mode sub menu.

NOTE

The CO_2 setpoint is the level of CO_2 allowed for the cargo. The range is 2 to 19% in 1% increments, with a default setting of 5%.

NOTE

The O_2 setpoint is the minimum level of oxygen allowed for the cargo. The range is from 3 to 17% in 1% increments; the default setting is 10%.

1. Press the CODE SELECT key on the keypad.
2. Use the Arrow keys until “Cd 71” is displayed, then press the ENTER key. The selection in the right display will blink.
3. Use the Arrow keys until “PUrgE” mode is displayed, then press the ENTER key.
4. “CO2SP” appears in the left display with the CO_2 setpoint blinking in the right. Use the Arrow keys to change the CO_2 setpoint and press ENTER to confirm. Or, just press ENTER to keep the originally displayed value.
5. “O2 SP” appears in the left display with the O_2 setpoint blinking in the right. Use the Arrow keys to change the O_2 setpoint and press ENTER to confirm. Or, just press ENTER to keep the originally displayed value.
6. “PUrgE” is now in the left display. Use the Arrow keys to toggle the right display to “On” or “OFF”, then press the ENTER key.

   When “OFF” is selected, Purge mode is either not activated or terminated if it was previously activated.

   When “On” is selected, “tim” is in the left display with the current purge time flashing in 1 to 10 hour increments selectable in 1 hour intervals (default 5 hours) in the right display. The “tim” value is the amount of time EverFRESH will be held off to allow charging and settling of gases.
7. Use the Arrow keys to change the time value and press the ENTER key to confirm and enter Purge mode.
8. Purge mode is now active. During Purge mode, while the timer is counting down the display toggles between:
   - left display shows “PUrgE” and right display shows how much time remaining.
   - left display shows temperature setpoint and right display shows the supply air temperature.

   NOTE

   If there is an alarm in the alarm list, the Purge mode countdown will not be displayed but Purge mode is still enabled.
9. When the Purge mode timer expires, Fresh mode is enabled and the unit reverts to normal temperature control display. Purge mode is terminated on power cycle, trip start, defrost or pre-trip.
10. To view CO_2 and O_2 values during Purge mode, exit Cd71 by pressing the CODE SELECT key until Cd 71 is in the left display. Then, use the up arrow to bring up Cd44 and press the ENTER key.

3.5.4 Code 44 (Cd44)

Cd44 allows the user to view the following EverFRESH values: CO_2 setpoint, CO_2 percentage, O_2 setpoint, O_2 percentage, O_2 voltage and Membrane Pressure Transducer (MPT) pressure.

3.5.5 Display Cd44 Values

1. Press the CODE SELECT key on the keypad.
2. Press the Up or Down Arrow keys until “Cd 44” is in the left display, then press the ENTER key.
3. Press the Down Arrow key to toggle between the different values available in this sub menu.

CO_2 Setpoint	
CO_2 %	
O_2 Setpoint	
O_2 %	
O_2 Voltage (displayed in mV)	
Membrane Pressure Transducer (Bar / PSIG)	

3.6 Container Venting Procedure

⚠ WARNING

Potential hazardous atmosphere and low oxygen levels may exist inside the container. Ventilate before entering. Stay away from doors and access panels while venting. (Refer to Section 3.6)

1. Set the Start-Stop (ST) switch to the “I” position to turn the unit On.
2. Fully open the manual fresh air vent.

NOTE

Avoid any direct breathing of the venting gases from the manual fresh air vent.

3. Go to Cd71, select Fresh mode and set the operating parameters to 17% O_2. Refer to **Section 3.5.1**
4. Allow the refrigeration unit to run. This allows the evaporator fans to exchange low-oxygen level air with ambient air.
5. Monitor the container internal environment via Cd44. Refer to **Section 3.5.5**.
6. When the oxygen level reaches a safe level of approximately 20%, open both of the container rear doors and pull back the curtain to facilitate the clearing of the hazardous atmosphere. Step away from the container rear doors. Continue refrigeration operation for five minutes prior to entry or unloading of the container.

SECTION 4
TROUBLESHOOTING

4.1 Alarms

Alarm display is an independent controller software function. If an operating parameter is outside of the expected range or a component does not return a valid signal back to the controller, an alarm is generated. The EverFRESH™ Controlled Atmosphere option alarms are AL907, AL909, AL910, AL929, AL962, AL976, AL977, AL978, AL979, AL980, and AL981. For units configured with the CO_2 injection option, additional alarms AL982 and AL983 are available.

AL907	**Manual Fresh Air Vent Open**	
Cause:	For units equipped with EverFRESH and a Vent Position Sensor (VPS), the controller will monitor the manual fresh air opening at a pre-determined time. If during this time the manual fresh air vent is open and EverFRESH is active, an alarm will be generated. If alarm is active, the controller monitors the manual fresh air once per hour. Upon clearing the alarm, the controller goes back to monitoring at the pre-determined time.	
	Component	Vent Position Sensor (VPS)
	Troubleshooting	Manually reposition the vent to 0% and confirm using Cd45. If Cd45 is not reading 0%, perform a calibration of the panel. If a zero reading cannot be obtained, replace the defective VPS. If the unit is loaded, ensure the vent is closed. Note and replace the VPS on the next PTI. The alarm will not affect the EverFRESH system from operating.

AL909	**O2 Sensor Fault**	
Cause:	Triggered anytime the O_2 sensor reading is outside of the normal operation range, after an initial signal was detected.	
Action:	Control CO_2 by running the EverFRESH Air Compressor (EAC) and opening the EverFRESH Air Valve (EA). Controlling CO_2 via the EA will also prevent low O_2 and cargo loss. If both AL909 and AL910 are active, run the EAC and open the EA.	
	Component	O_2 Sensor, O_2 Amplifier
	Troubleshooting	Check Cd44 and scroll down to 02V. The O_2 sensor output will be displayed in millivolts (130mV to 4100mV is good range). Check wiring (refer to schematic), and check for bad connections or wires positioned improperly. If the O_2 sensor is available, remove the upper fresh air panel and evaporator motor and replace the sensor. If after replacing the sensor Cd44 reads outside of the normal range and AL909 continues, replace the amplifier. If parts are not available, turn the EverFRESH option off via Cd71 and open the manual fresh air vent.

AL910	CO2 Sensor Fault	
Cause:	Triggered anytime the CO_2 sensor reading is outside of the normal operation range, after an initial signal was detected.	
Action:	Control O_2 to setpoint. Controlling O_2 may allow CO_2 to increase, replace sensor as soon as possible. If both AL909 and AL910 are active, run the EverFRESH Air Compressor (EAC) and open the EverFRESH Air Valve (EA).	
	Component	CO_2 Sensor
	Troubleshooting	Check wiring (refer to schematic), and check for bad connections or wires positioned improperly. Check the voltage on the back of MD connectors pin MD09 (-) and MD03 (+12 VDC) with the controller energized. If 12 VDC is not available, check the controller. If 12 VDC is available, check the back of pin MD02 for a voltage between 1.0 - 4.7 VDC. If not present, replace the sensor. If part is available, remove the upper fresh air panel and evaporator motor and replace the sensor. If no part is available, take no action and service at next PTI.

AL929	Loss of Atmospheric Control	
Cause:	Triggered whenever the CO_2 level is above its upper limit by 1% for 45 minutes. Or, when the O_2 level is greater than 1% below its setpoint for longer than 30 minutes after the unit has been in range. The alarm is triggered off when the levels return to within the normal range.	
Action:	Enable Alarm LED. Open the fresh air vent and air compressor is enabled.	
	Setup	Verify all EverFRESH components are functioning properly by checking for EverFRESH alarms and running a P-20 PreTrip.
	Troubleshooting	If a component is not functioning properly, it will fail the appropriate P-20 sub test. Note components in order below.
	Component	Membrane Pressure Transducer (MPT)
	Troubleshooting	Remove the MPT. Turn on the container unit. Using Cd44, verify the MPT pressure reads between -5 psig and 5 psig. Outside this range, or if AL977 is active, replace the sensor.
	Component	EverFRESH Air Compressor (EAC)
	Troubleshooting	Verify EAC fuses FEF1, FEF2 & FEF3. Check P20 results for a failure mode: • Possible detected failure with EAC current consumption, check compressor motor windings, and verify voltage on all 3 phases. • MPT failure. Follow steps above. • Failure of AC contactor for EAC. Ohm contactor coil and check resistance across contactor legs, with power removed.
	Component	EverFRESH Air Valve (EA)
	Troubleshooting	A closed or plugged EA solenoid could prevent fresh air from entering the container. P20-2 tests the valve. Potential failure results: • MPT pressure fails to change when the valve is energized. Check for signs of blockage in the valve or piping. • EA current is not correct. Access function code Cd74 and perform a ML5 self-check to verify the controller is functioning properly. If it passes, perform an ohm check between the CA08 pin and TRX2 (ground) using the carrier service tool (part # 22-50485-00).

AL929	Loss of Atmospheric Control	
	Component	Water Drain Valve (WDV)
	Troubleshooting	A closed or plugged WDV or filter housing could prevent any air from entering the container. P20-3 tests valve operation. Potential failure results: • MPT pressure fails to change when the valve is energized. Check for signs of blockage by removing the WDV housing and particulate filter housings. Clean any debris. While removed, inspect the WDV and associated piping for blockage. • EA current not correct. Access function code Cd74 and perform an ML5 self-check to verify the controller is functioning properly. If it fails, replace the controller. If it passes self-check, replace the WDV.
	Component	EverFRESH Nitrogen Valve (EN)
	Troubleshooting	An open or leaky EN valve would allow N2 to go into the sensor sensing chamber, causing an inaccurate reading. P20-5 tests this valve. Potential failure results: • If tests fail, remove the EN and verify the valve is not clogged or damaged. • EA current is not correct. Access function code Cd74 and perform a ML5 self-check to verify the controller is functioning properly. If it fails, replace the controller. If it passes self-check, replace the EN.

AL962	Oxygen (O2) Out of Range	
Cause:	This is a notification alarm and does not pose a risk to fresh produce, however the benefit of atmosphere control will be lost. O_2 reaches pulldown limit and then O_2 exceeds 5% over setpoint for 30 minutes.	
	Component	Upper Fresh Air Panel
	Troubleshooting	Verify Upper Fresh Air Panel has not been opened.
	Component	EverFRESH Air Valve (EA)
	Troubleshooting	An EA that is stuck open can allow continuous flow of fresh air into the container when compressor on. Refer to troubleshooting in the AL929 alarm section.
	Component	Container Air Tightness
	Troubleshooting	Seal container where possible (access panels, rear doors, mounting hardware, etc).

AL976	Air Compressor Internal Protector Open	
Cause:	EverFRESH Air Compressor (EAC) internal protector opens.	
	Component	EverFRESH Air Compressor (EAC)
	Troubleshooting	Follow steps defined in AL929 EAC testing.
	Component	ML5 Controller
	Troubleshooting	Access function code Cd74 to perform an ML5 self-diagnostic test.

AL977	Membrane Pressure Transducer (MPT) Fault	
Cause:	When the EverFRESH Air Compressor (EAC) is running and pressure is not between -5 psig and 200 psig or the EAC has been OFF for five minutes and pressure is not within the range of -5 psig and 5 psig.	
	Component	Membrane Pressure Transducer (MPT)
	Troubleshooting	With the EverFRESH system off for 15 minutes, bring up function code Cd44 and scroll to "EF Pt". Verify that the value is between -5 psig and 5 psig. A "- - - - " value indicates a failed sensor or harness. Pressure outside of range indicates a bad sensor, replace the sensor.
	Component	ML5 Controller
	Troubleshooting	Access function code Cd74 to perform an ML5 self-diagnostic test.

AL978	Air Compressor Pressure Low	
Cause:	EverFRESH Air Compressor (EAC) engaged and Fresh Air Vent (FAV) and Water Drain Valve (WDV) are closed and compressor has been running for longer than 20 seconds and Membrane Pressure Transducer (MPT) Pressure < 75 psig.	
	Component	Membrane Pressure Transducer (MPT)
	Troubleshooting	With the EverFRESH system off for 15 minutes, bring up function code Cd44 and scroll to "EF Pt". Verify that the value is between -5 psig and 5 psig. A "- - - - " value indicates a failed sensor or harness. Pressure outside of range indicates a bad sensor, replace the sensor.
	Component	System Plumbing
	Troubleshooting	Inspect plumbing, hoses, fittings, check valve, and orifices for signs of leakage. Repair as required. With the compressor running, spray the pressure relief valve with soapy water. Replace if leaking. If a spare pressure relief valve is not available, try opening and closing the valve with an O-Ring on the valve to try and re-seat. See the condition for Membrane Pressure Transducer (MPT) Reading Low in the **EverFRESH Troubleshooting** section.

AL979	Air Compressor Pressure High	
Cause:	EverFRESH Air Compressor (EAC) engaged and Pressure > 135 psig.	
	Component	Membrane Pressure Transducer (MPT)
	Troubleshooting	With the EverFRESH system off for 15 minutes, bring up function code Cd44 and scroll to "EF Pt". Verify that the value is between -5 psig and 5 psig. A "- - - - " value indicates a failed sensor or harness. Pressure outside of range indicates a bad sensor, replace the sensor.
	Component	System Plumbing
	Troubleshooting	Inspect plumbing, hoses, fittings, check valve, and orifices for signs of blockage. Repair as required. See the condition for Membrane Pressure Transducer (MPT) Reading High in the **EverFRESH Troubleshooting** section.

AL980	Fresh Air Valve (EA) Fault	
Cause:	When the system energizes the EverFRESH Air Valve (EA) solenoid and membrane pressure does not drop 40 psi, the alarm is triggered. The alarm triggers OFF when membrane pressure transducer (MPT) pressure drop is more than 40 psi when EA is opened.	
	Component	EverFRESH Air Valve (EA) Solenoid
	Troubleshooting	Run a P20 test to verify mechanical and electrical performance of the solenoid. If the electrical test fails, replace the valve. If the mechanical test fails, check for obstructions blocking system flow. Remove obstructions. If it still fails, replace the valve.
	Component	ML5 Controller
	Troubleshooting	Access function code Cd74 to perform an ML5 self-diagnostic test.

AL981	Water Drain Valve (WDV) Fault	
Cause:	When the system energizes the Water Drain Valve (WDV) and membrane pressure does not drop 40 psi, the alarm is triggered. The alarm triggers OFF when membrane pressure transducer (MPT) pressure drop is more than 40 psi when the EverFRESH Air Valve (EA) is opened.	
	Component	Water Drain Valve (WDV)
	Troubleshooting	Inspect WDV bowl and outlet piping for obstructions, clean components. Run P20 test to verify mechanical and electrical performance of solenoid. If the electrical test fails, replace the valve. If the mechanical test fails, check for obstructions blocking system flow. Remove obstructions. If it still fails, replace the valve.
	Component	ML5 Controller
	Troubleshooting	Access function code Cd74 to perform an ML5 self-diagnostic test.

AL982	CO2 Injection Failure	
Cause:	If unit is configured with the CO_2 injection option, this alarm is triggered when Cd71 is set to “On” to enable CO_2 injection and CO_2 is less than the CO_2 setpoint by 0.5% and IPT < 20 PSIG.	
	Component	CO_2 Supply
	Troubleshooting	Verify CO_2 supply is available and supplied at the recommended pressure.
	Component	CO_2 Injection Port Schrader Valve
	Troubleshooting	If proper pressure is available at the CO_2 injection supply port, verify that the Schrader valve is being depressed by the supply hose properly to allow flow.
	Component	CO_2 Injection Solenoid
	Troubleshooting	Run a P20 test to evaluate the solenoid and replace if test fails.

AL983	CO2 Injection Pressure Transducer Failure	
Cause:	If unit is equipped with the CO_2 injection option, this alarm is triggered when Cd71 is set to “On” to enable CO_2 injection and volts are not in the range of 0.5 to 4.95 VDC.	
	Component	CO_2 Injection Pressure Transducer (IPT)
	Troubleshooting	From function code Cd74, run a controller self-diagnostic test. Evaluate results to see if there is a controller or transducer issue. If there is a sensor issue, or the test passes, change the transducer.

4.2 EverFRESH Troubleshooting

This troubleshooting section is for the EverFRESH option only. Prior to testing the EverFRESH unit, verify that the refrigeration system is functioning properly.

Condition	Possible Causes	Recommended Actions
EverFRESH Air Compressor (EAC) Will Not Start	EAC contactor not engaging	Verify that temperature setpoint is in the correct range for EverFRESH to operate.
	EAC Internal Protector open	Check air compressor IP.
	Fuse F3 blown	Check fuse F3.
	EAC contactor engaging, but compressor not running	Check fuses FEF1, 2, 3.
		Check input power.
		Check motor resistance at the EAC connector.
EverFRESH Air Compressor (EAC) Running But Cycling ON / OFF	EAC shuts off every 45 minutes	Normal duty cycle.
	Internal Motor Protector	Check.
EverFRESH Air Compressor (EAC) Hums But Does Not Start	Low line voltage	Check voltage.
	Single phasing	Check power / fuses.
	Shorted or grounded motor windings	Check resistance.
	EAC seized	Check current.
Membrane Pressure Transducer (MPT) Reading Low	Dirty EAC intake filter	Replace the intake filter.
	Water separator housing / drain leaking	Remove the housing and clean debris. Verify that the WDV is closing.
	Particulate filter housing / drain leaking	Remove the housing and clean debris. Verify that the WDV is closing.
	Leaky valve	Remove the valve and attempt to remove obstruction. If this is unsuccessful, replace the valve.
	EverFRESH piping leak	Inspect piping for abrasions / cuts in piping. Verify all connections are tight. If unable to locate leak, remove the EAC discharge line and inject 80 psig of nitrogen or clean dry air into the system and check for leaks with soapy water. Ensure the unit locked out when performing this procedure.
	Air compressor defective or leaking	Perform a major / minor rebuild based on hours of operation.

Condition	Possible Causes	Recommended Actions
Membrane Pressure Transducer (MPT) Reading High	Water separator or air filters clogged	Remove housings and clean debris, verify WDV opening.
	EverFRESH piping blocked	Inspect plumbing, hoses, fittings, check valve, and orifices for signs of blockage. Repair as required.
	Nitrogen membrane defective	Operating the system for a period of time can “dry out” the membrane and increase efficiency. Run a Pre-trip “AUTO CA” test to check membrane efficiency. Allow the system to operate for one hour and check nitrogen levels. If nitrogen percentage is increasing, continue to dry out. If not, replace the membrane.
EverFRESH Air Compressor (EAC) Runs But O_2 Does Not Come Down	Fresh air vent open	Check vent, close.
	Leak in piping	Check system for leaks.
	Sensor defective	Check sensor alarms. Replace as needed.
	Nitrogen membrane defective	Run P20 test to validate nitrogen concentration.
	Container box not sealed	Perform pressure decay test.
	Leaky cylinder head	Perform minor rebuild.
EverFRESH Air Compressor (EAC) Runs But O_2 Does Not Come Up	EverFRESH Air Valve (EA) does not open	Check F3 fuse.
		Run a P20 PTI test. P20-2 will check for proper valve operation: electrical and mechanical.
	Water separator not draining	Clean inspect water separator housing.
	Particulate filters not draining	Inspect / replace particulate filters.
EverFRESH Air Compressor (EAC) Runs But CO_2 Does Not Come Down	Nitrogen membrane defective	PTI check. Refer to **Section 3.4**
CO_2 Does Not Come Up	Leaky container box	Inspect container, verify fresh air vents closed, if possible check curtain install.
	Produce not capable of raising CO_2	Some produce does not generate much CO_2 and needs to be pre-charged with gas. If charge leaks out can only be replaced by recharging.
In CO_2 Injection Mode And Not Maintaining Setpoint	Low CO_2 bottle pressure	Check bottle pressure gauge to ensure bottle delivering 50 PSIG. Verify hose from tank to CO2 injection input is depressing the Schrader valve on the inlet.
	Leaky container box	Inspect condition of the box. Verify the fresh air panel is closed. If possible, check condition of the curtain.
	CO_2 Injection Solenoid failure	Run a P20 test and check P20-6 results. Replace if necessary.
CO_2 Injection Pressure Transducer (IPT) Not Reading In Range	Restricted CO_2 input to the system	Remove CO_2 source and run a P20 test. Validate the results of P20-7. If it fails, replace the sensor.

SECTION 5
SERVICE

⚠ WARNING

Before servicing unit, make sure the Start-Stop switch (ST) is in the OFF position. Unit circuit breaker (CB-1) and external power sources are turned OFF and tagged to prevent accidental energizing of circuits.

⚠ WARNING

Potential hazardous atmosphere and low oxygen levels may exist inside the container. Ventilate before entering. Stay away from doors and access panels while venting. (refer to Section 3.6).

NOTICE

Prior to performing service work, a thorough review and understanding of the entire manual is recommended.

5.1 Maintenance Schedule

Table 5–1 Maintenance Schedule

Action	Reference Section
Pre-Trip	
Verify container meets leak specification.	Section 6.3.1
Replace poly sheet curtain.	Section 6.4
Run an "AutCA" to calibrate the O_2 sensor and CO_2 sensor and check mechanical integrity of components.	Section 3.4
Annually	
Replace sensor air filter. Inspect and clean water separator. Replace a sticker with date when making a filter change.	Section 5.6
Replace air compressor intake filter and particulate air filters. Replace a sticker with date when making a filter change.	Section 6.2
Check compressor for damage on air compressor coating and repair as needed. Areas affected should be sanded and repainted.	
5000 Hours	
Perform minor rebuild of air compressor.	Section 5.2.5

5.2 EverFRESH Air Compressor (EAC) Service

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

The air compressor (**Figure 2.1**) is an oil-less, two cylinder compressor mounted on the front of the unit next to the power cord.

5.2.1 Air Compressor Function Codes

Table 5–2 EverFRESH Function Codes

Code	Title	Description
Cd72	Air Compressor Hours Since Last Service	Cd72 displays the total hours of air compressor run time since last service. Cycle message “CA” “ChECk” on display when the timer exceeds 5000 hours since last reset until the timer reset again. The sub menus in this function code are “ACHrS” and “ReSEt”: “ACHrS” - Display air compressor run time since service. “ReSEt” - Press the ENTER key for five seconds to reset this value to 0.
Cd73	Air Compressor Total Operational Hours	Cd73 displays the total number of operational hours for the EverFRESH system and air compressor. The total hours are displayed in increments in 10 hours (i.e. 3000 hours will be displayed as 300). The sub menus in this function code are “ACHrt” and “ReSEt”: “ACHrt” - Display air compressor total run time. “ReSEt” - Press the ENTER key for five seconds to reset this value to 0.

5.2.2 Replacing the Air Compressor Filter

1. Rotate the filter housing a 1/4 turn counterclockwise and then pull down.

2. Remove the felt filter.

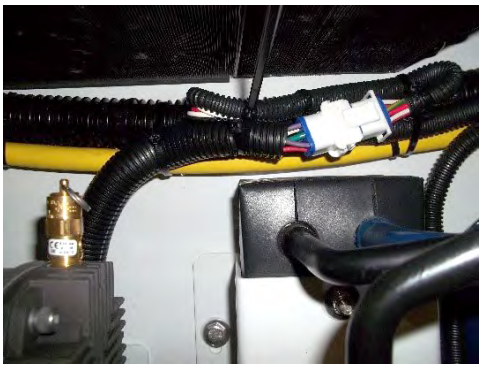
3. Clean any debris out of the filter housing.

4. Install the new felt filter and then replace the filter cap by pressing up into the slot and turn a 1/4 turn clockwise to lock.

5.2.3 Removing the Air Compressor

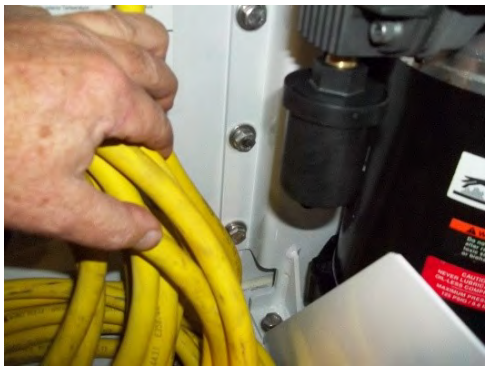
1. Remove the air compressor splash shield by removing the four 1/4” - 20 bolts.

2. Unplug the compressor power connector and cut the wire ties holding the harness in place.



3. Using a 5/8” wrench, remove the air compressor discharge line.

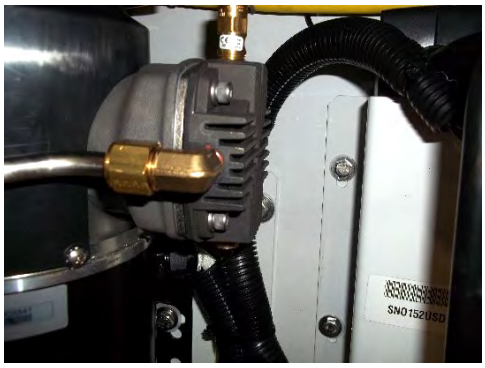
4. Using a 9/16” socket, remove the eight bolts securing the air compressor mounting bracket to the container frame.



5. Pull the air compressor with the bracket away from the container frame to complete removal.

5.2.4 Installing the Air Compressor

1. Place the air compressor with bracket in position and loosely install the upper right hand bolt to hold it in place.



2. Install the remaining seven bracket bolts and then torque to 30 to 35 ft-lbs. (41 to 47 Nm).

3. Install the discharge line. Tighten with a 5/8” wrench and then torque to 23 in-lbs. (2.6 Nm).

4. Connect the air compressor power connection and wire tie the harness to the drain line and yellow power cable. Maintain a drip loop on the power line prior to entering the compressor motor.

5. Replace the air compressor splash shield. Torque the four bolts to 60 in-lbs. (6.8 Nm).

5.2.5 Air Compressor Minor Rebuild

⚠ WARNING

Before proceeding with installation, set the ON/OFF switch and circuit breaker to OFF position. Disconnect power plug from the unit. Follow all local Lockout / Tagout Procedures.

Required Supplies

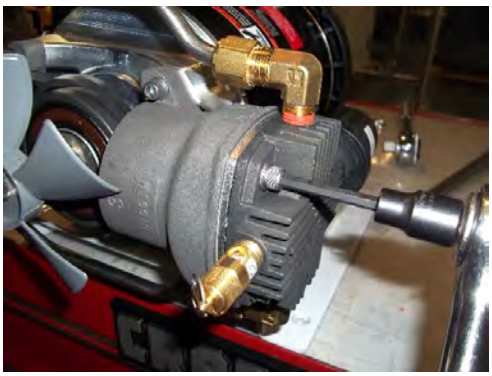
- Minor Rebuild Kit (part number 18-10185-20)
- Thread Locker, purchase local Loctite
- Torque Wrench capable of 200 in-lbs (22.6 Nm)
- Standard hand tools: 3/16” hex key, 3/4” wrench, phillips screwdriver, gasket removal tool

Procedure for Disassembly

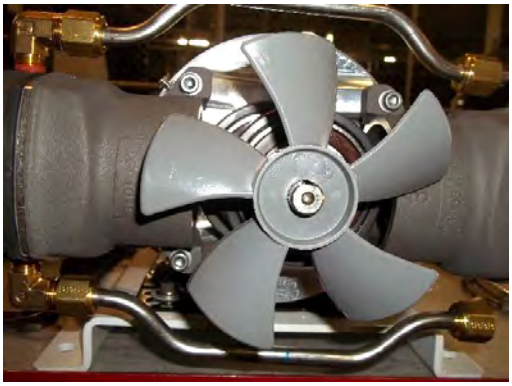
1. Remove eight phillips screws from the protective shield. Remove the shield. The fan is not part of a minor rebuild so use caution not to damage.

2. Loosen the two crossover pipe compression nuts for one of the heads using a 3/4” wrench.

3. Remove the head with loosened crossbar nuts using a 3/16” hex key. Remove the four head bolts and pull off the head assembly including valve plates. Discard bolts, do not reuse.



4. Remove crossbars from the air compressor using a 3/4” wrench.



5. Remove the cylinder from the air compressor by removing the 2 - 3/16” hex bolts and pulling off the piston. Use caution not to damage the fan. Discard bolts, do not reuse.

6. Remove the piston guide and rings from the piston.

7. Inspect the piston and cylinder walls for signs of damage, etching in either component.
   - If damage is minor, lightly honing the cylinder is acceptable.
   - If cylinder walls or piston are damaged, perform a major rebuild (kit #18-10185-21).
8. Remove the second head and cylinder, inspecting for damage following steps 3, 5, 6 and 7. If all components are satisfactory, complete the minor rebuild by reassembling.
9. Remove the old gasket material from the cylinder head and cylinder using a gasket removal tool. Ensure all parts are clean and free of debris.

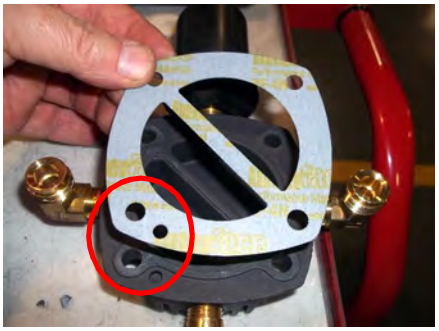
Procedure for Reassembly

1. Install silver rings on the piston first.

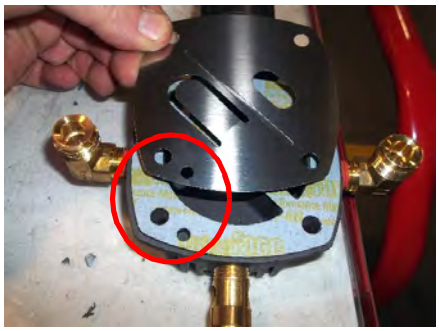
2. Install the black ring over the silver ring on the piston. Open slightly to get over the piston and slide into place. Offset the ring gap by 180 degrees.

3. Hold the piston rider rings in place and slide the cylinder over the piston. Hold in place with two hex key bolts provided in the kit. Rotate the compressor until the piston is at the top of the cylinder. Position the cylinder so the piston does not go beyond the top of the cylinder. Torque to 150 to 160 in-lbs. (17 to 18 Nm).

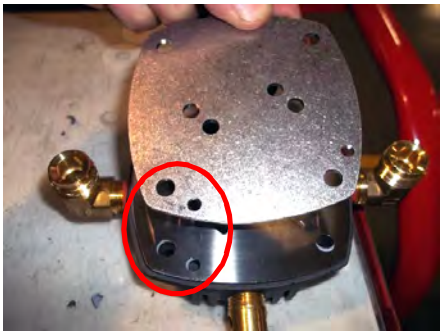
4. Lay the head upside down on a bench. Take the gasket with the material in the middle and place it on the head lettering up and align with the separation in the head and indicator hole.



5. Take the outlet valve plate with the line down the center and align with the indicator hole.

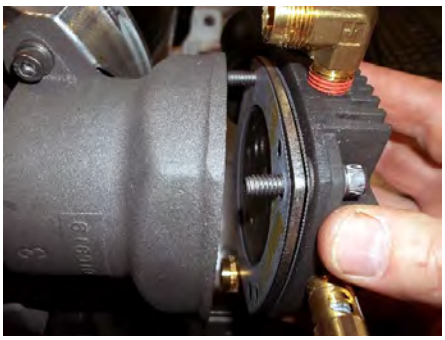



6. Reuse the valve plate by aligning the indicator hole on the plate to the discharge valve. When properly installed, two holes will cover the discharge valve and two holes the head is visible. If you cannot see the head on two adjacent holes, the backer plate is not installed properly.




7. Lay the gasket without material in the center on the backer plate. Align the two indicator holes.


8. Place head bolts into two of the holes to maintain alignment of the gaskets and plates and install the head onto the cylinder. Hand tighten the four head bolts. Then rotate the crankshaft to verify the piston does not hit the head. If it doesn't hit, torque the head bolts to 150 to 160 in-lbs. (17 to 18 Nm) and recheck. If the head does hit, return to step 3 and realign the cylinder.




9. Remove the old compression gaskets on the crossover tubes and replace the compression gaskets. Then install on the first head using a 3/4” wrench. Do not over tighten.


10. On the second head, repeat steps 4 through 8. When installing heads in step 8, ensure crossover pipes are properly seated into the head fittings prior to torquing head bolts. Tighten the crossover compression nuts. Re-torque the cylinder heads to 150 to 160 in-lbs. (17 to 18 Nm).
11. Replace the protective cover. Use thread locker on the eight screws holding the cover in place.


12. Reinstall the air compressor into the system.
13. Run the compressor for 10 minutes by setting the CO_2 and O_2 setpoints to 5% and turn on the EverFRESH option in Cd71.
14. Shut off the system and unplug main power to the container then re-torque heads to 150 to 160 in-lbs. (17 to 18 Nm).
15. Replace the splash shields.

5.2.6 Air Compressor Major Rebuild

⚠ WARNING

Before proceeding with installation, set the ON/OFF switch and circuit breaker to OFF position. Disconnect power plug from the unit. Follow all local Lockout / Tagout Procedures.

Required Supplies

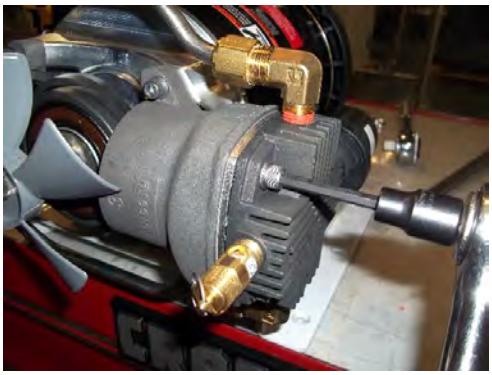
- Major Rebuild Kit (part number 18-10185-21)
- Two Arm Gear Puller
- Torque Wrench capable of 200 in-lbs. (22.5 Nm)
- Standard hand tools: 3/16” hex key, 3/4” wrench, phillips screwdriver, gasket removal tool
- Loctite, purchase locally

Procedure for Disassembly

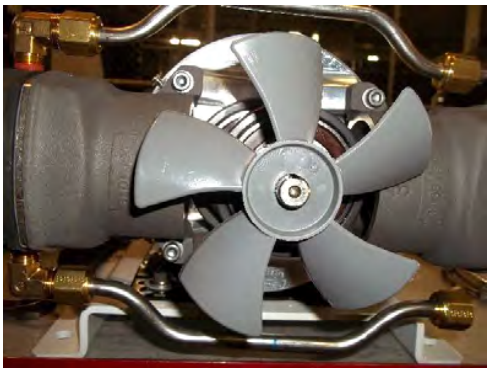
1. Remove eight phillips screws from the protective shield. Remove the shield.

2. Loosen the two crossover bar compression nuts for one of the heads using a 3/4” wrench.

3. Remove the head with loosened crossbar nuts using a 3/16” hex key. Remove the four head bolts and pull off the head assembly including valve plates. Discard all components except for the crossbar.



4. Remove crossbars from the air compressor using a 3/4” wrench.



5. Remove the cylinder from the air compressor by removing the 2 - 3/16” hex bolts and pulling off the piston. Use caution not to damage the fan. Discard all components except for the crossbar.

6. Remove the piston guide and rings from the piston and discard.

7. Remove the second head and cylinder.
8. Remove the fan by removing the clamp that secures the fan to the shaft.
9. Remove the fan by using a small puller. A new fan is provided with the rebuild kit so discard after removal.
10. Remove the c-clip from the shaft. This is not required for rebuild and can be discarded.
11. Slide the connecting rod removal tool (part # 07-00579-00) behind the connecting rod. Have the angled edge towards the motor. Rotate the tool so the open slot is parallel to the connecting rod.
12. Remove the connecting rods and piston using a Two Arm Puller and Puller Block.
13. Polish the motor shaft with a wire brush or fine sand paper to aid in installing the new connecting rods.
14. Remove the compressor fan cover on the rear of the air compressor and fan.
15. Place the air compressor on a press using a solid block to support the motor shaft.

16. Insert the key into the shaft and place a lubricant on the shaft. Place the crankshafts on the motor shaft, aligning the keyway with the crankshaft. Pistons need to be opposite each other and at a 90 degree position of the base.

17. Insert the gauge tool over the motor shaft and slowly press the press until the gauge is flush with the top of the motor shaft.

Procedure for Reassembly

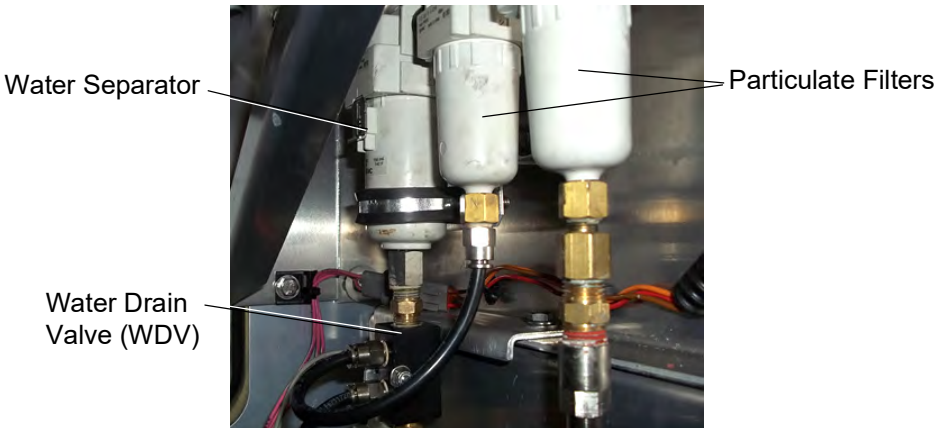
1. Remove the air compressor from the press and replace the rear fan and cover.
2. Refer to Air Compressor Minor Rebuild **Procedure for Reassembly**.

5.3 Filter Assembly

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

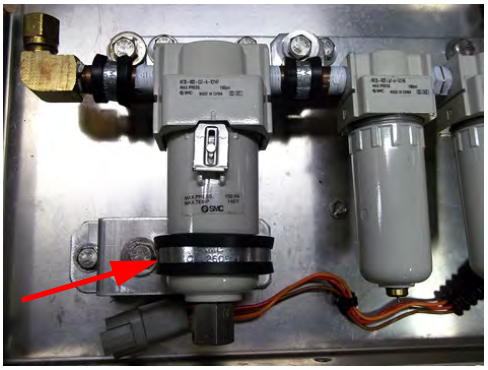
The filter assembly (**Figure 5.1**) consists of a water separator and two particulate filters. Any of the condensed moisture will be removed at the water separator. Immediately after the water separator are two particulate filters that removes solid debris from the air stream. The condensate and any solid material that settles to the bottom of the filter assembly is blown out of the line when the Water Drain Valve (WDV) opens.

Figure 5.1 Filter Assembly



5.3.1 Removing the Water Separator

1. Open the panel needed to gain access to the water separator (**Figure 5.1**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Remove the cushion clamp from the water separator bowl.



3. Pull down the locking clamp and turn a 1/4 turn clockwise, drop the bowl.

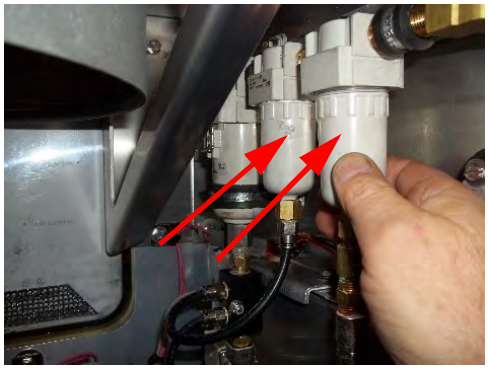
4. Remove the drain hose from the bottom of the bowl and pull out the bowl. Wash with soapy water and dry with a clean cloth.

5. To install, follow removal steps in reverse.

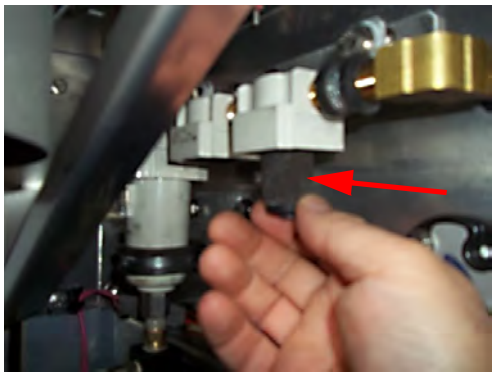
5.3.2 Replacing the Particulate Air Filters

1. Open the panel needed to gain access to the particulate air filters (**Figure 5.1**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.

2. Remove both filter housings by turning counterclockwise until free. Carefully lay down each housing to prevent damage to evaporator fins. When removing the second filter housing, the filter will come off with the housing.



3. Remove the first filter by rotating the filter counterclockwise. Once removed, install the new filter by rotating clockwise.



4. Remove the second filter from the filter housing by pressing up on the locking tab holding the filter in place.

5. Check both filter housings for debris and remove if required. Ensure nothing is blocking the bottom drain on the filter housings.
6. Insert the new filter into the second housing and install the new O-ring on the housing.

7. Then install the housing back onto the filter body by rotating clockwise until snug.

8. Replace the O-ring on the first filter housing and reinstall onto the filter body by rotating clockwise into the base.

5.3.3 Removing the Water Drain Valve (WDV)

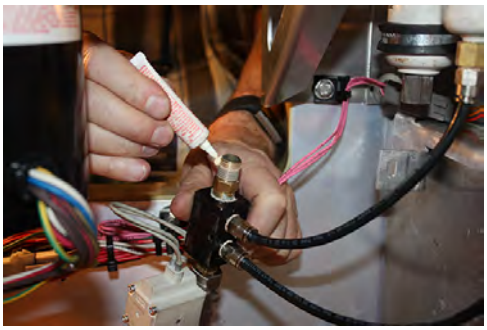
1. Open the panel needed to gain access to the Water Drain Valve (WDV) (**Figure 5.1**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Place cardboard on the evaporator to protect it from any components or tools that may fall.
3. Remove the bolt securing the drain valve manifold. The nut has a washer behind it so take care when removing.

4. Turn the stainless steel fitting on the bottom of the water separator using an 11/16” wrench while holding the brass fitting below with a 9/16” wrench.

5. Cut the supporting cable ties and cut the wire at the harness splice.

6. Disconnect the WDV by turning the WDV with a 3/4” wrench and using a 9/16” wrench to hold the mating connector.

7. To reinstall a WDV, place a Teflon paste on the brass fitting and follow the installation instructions in reverse.

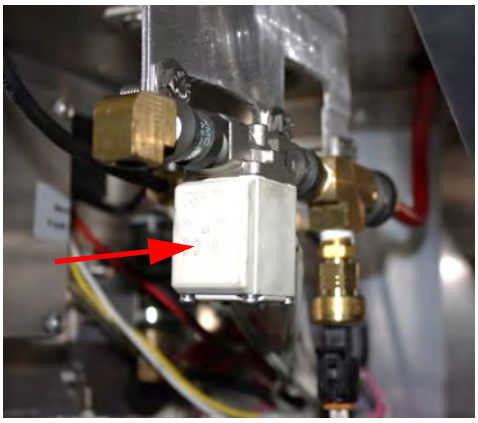


5.4 EverFRESH Air Valve (EA)

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

The EverFRESH Air Valve (EA) (**Figure 5.2**) maintains the desired oxygen levels inside the cargo space. When the controller detects that oxygen levels are dropping below the threshold setting, it will open the EA valve to force the clean, dry, pressurized, air into the cargo space.

Figure 5.2 EverFRESH Air Valve (EA)

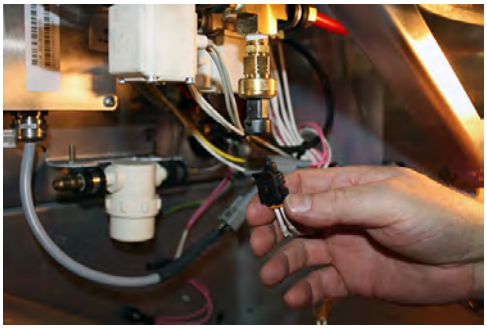


5.4.1 Removing the EverFRESH Air Valve

NOTE

Make note of the direction arrow on the valve body to ensure proper direction of flow.

1. Open the panel needed to gain access to the EverFRESH Air Valve (EA) (**Figure 5.2**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Place cardboard on the evaporator to protect it from any components or tools that may fall.
3. Disconnect the Membrane Pressure Transducer (MPT) harness.



4. Cut wire ties back to location where coil is spliced into the harness, cut the two lines at the harness crimp, then remove the EA inlet hose using a 9/16” wrench to hold the brass fitting and 5/8” wrench to turn the compression nut. Pull the hose away from the fitting.

5. Remove the three 1/4” x 20 screws with a 7/16” socket and remove the coil assembly.

6. To install, follow the removal steps in reverse.

NOTE

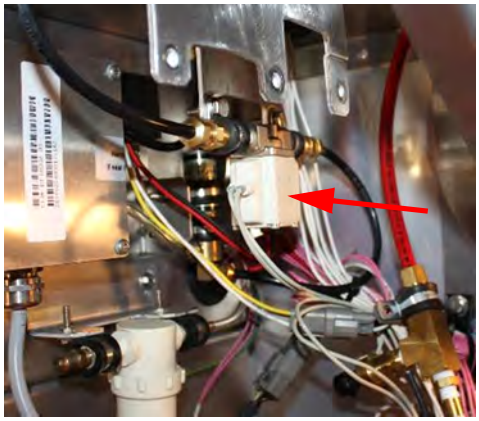
When reinstalling the EA, remove the fittings from the existing valve body and place on the replacement valve body. This is best suited to be completed on a work bench using wrenches. It is not recommended to place the valve body in a vice as it could distort the valve preventing it from functioning properly.

5.5 EverFRESH Nitrogen Valve (EN)

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

The EverFRESH Nitrogen Valve (EN) (**Figure 5.3**) opens to allow gas to flow into the sensor package for testing at the O_2 sensor.

Figure 5.3 EverFRESH Nitrogen Valve (EN)

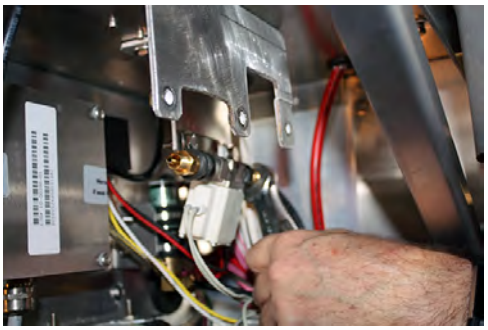


5.5.1 Removing the EverFRESH Nitrogen Valve

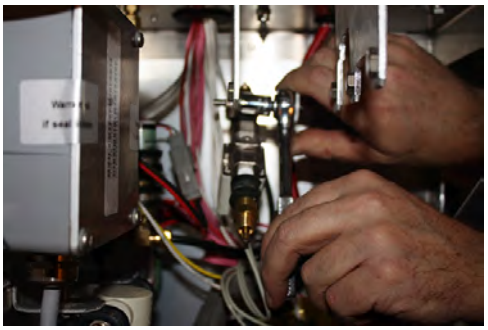
NOTE

Make note of the direction arrow on the valve body to ensure proper direction of flow.

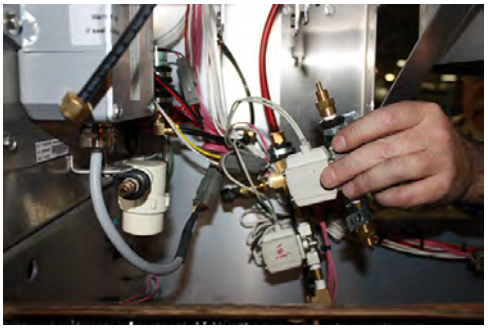
1. Open the panel needed to gain access to the EverFRESH Nitrogen Valve (EN) (**Figure 5.3**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Place cardboard on the evaporator to protect it from any components or tools that may fall.
3. When removing from the upper left access panel, remove the EA valve assembly first for easier access. Do not cut the wires on the EA coil. Removing the evaporator fan motor will allow for more space but not necessary. When removing from the back of the unit through the EverFRESH access panel, access to the components is easier.
4. Remove the hoses from both sides of the EN.



5. Cut the wire ties holding the EN coil wires to the harness back to where the coil is spliced into the unit. Then, cut the wires at the harness splice.
6. Remove the two 1/4” x 20 screws with a 7/16” socket and remove the coil assembly.



7. Remove the EN from the unit.



8. To install, follow removal steps in reverse.

NOTE

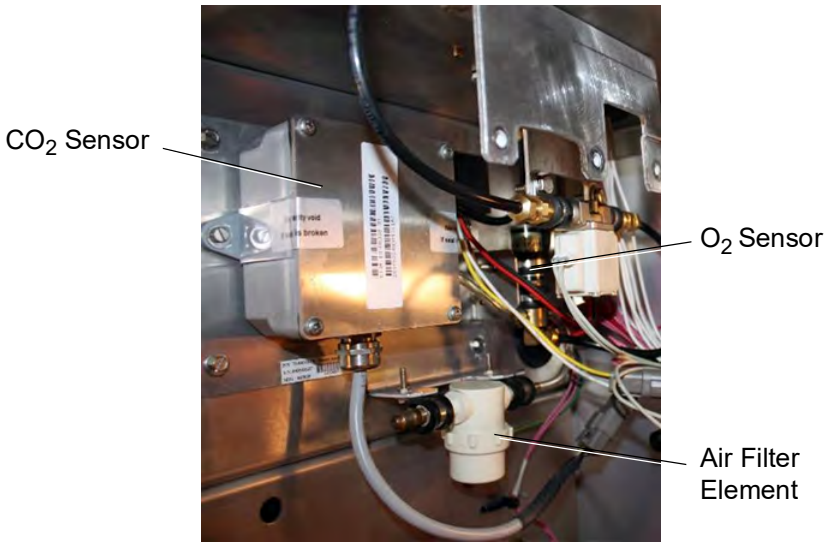
When reinstalling the EN, remove the fittings from the existing valve body and place on the replacement valve body. This is best suited to be completed on a work bench using wrenches. It is not recommended to place the valve body in a vice as it could distort the valve, preventing it from functioning properly.

5.6 Sensor Assembly

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

The sensor assembly (**Figure 5.4**) consists of an air filter, O_2 sensor and CO_2 sensor. The O_2 sensor monitors O_2 levels and allows the system to prevent O_2 levels from dropping below the lower setpoint. A CO_2 sensor provides CO_2 levels to the controller to allow the control algorithm to activate the required EverFRESH components.

Figure 5.4 Sensor Assembly



5.6.1 Replacing the Sensor Air Filter Element

1. Follow container venting procedures before performing any maintenance on the sensor air filter element. Refer to **Section 3.6**.
2. Open the panel needed to gain access to the sensor air filter element (**Figure 5.4**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
3. Unscrew and remove the filter cup from the bottom of the sensor air filter assembly.
4. Remove the filter element from the filter assembly.
5. Install the sensor air filter element by reversing the above steps. Tighten by hand only.

5.6.2 Removing the O_2 Sensor

1. Follow container venting procedures before performing any maintenance on the O_2 sensor. Refer to **Section 3.6**.
2. Open the panel needed to gain access to the O_2 sensor (**Figure 5.4**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
3. Remove the cushion clamp and screws that secure the O_2 sensor.
4. Cut the wire tie that secures the wiring to the O_2 sensor body.
5. Unplug the wiring connector from the receptacle.
6. Remove the O_2 sensor from the O_2 sensor housing.

7. Install the O_2 sensor by reversing the above steps.
8. Perform an “AutCA” procedure to calibrate the oxygen sensor prior to operation. Refer to **Section 3.4**.

5.6.3 Removing the CO_2 Sensor

1. Follow container venting procedures before performing any maintenance on the CO_2 sensor. Refer to **Section 3.6**.
2. Open the panel needed to gain access to the CO_2 sensor (**Figure 5.4**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
3. Remove the electrical connector and the inlet and outlet tubes from the body of the sensor.
4. Loosen the screws which holds the CO_2 sensor to the fan deck bracket.
5. Install replacement CO_2 sensor by reversing steps 2 and 3.
6. Perform an “AutCA” procedure to calibrate the CO_2 sensor. Refer to **Section 3.4**.

5.7 Replacing the EverFRESH Condensing Loop

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

1. Remove the back panel from the container unit.
2. Remove the rivets holding the return air deck in place.
3. Use a 11/16” and 13/16” wrench to remove the fittings on both ends of the condensing loop.
4. Cut the wire ties holding the condensing loop to the return air grill and remove the condensing loop.
5. Install in reverse: Use a 11/16” and 13/16” wrench to connect the condensing loop to the system piping.
6. Wire tie the condensing loop to the return air grille. Place a wire tie every 10 inches.
7. Replace the rivets in the return air deck.

5.8 Identifying and Replacing Orifices and Check Valves

The EverFRESH system has two orifices (**Figure 5.5**) and two check valves (**Figure 5.6**). The orifices, nitrogen supply and nitrogen sampling, are located above the fan deck in between the evaporator fan motors. The check valves are located near the compressor outside the container and on the particulate filter housing outlet.

Refer to **Figure 2.3** for location of the orifices and check valves in relation to all of the EverFRESH components.

Refer to Warnings in the beginning of this **Service** section before performing maintenance.

Figure 5.5 Nitrogen Supply and Nitrogen Sampling Orifices

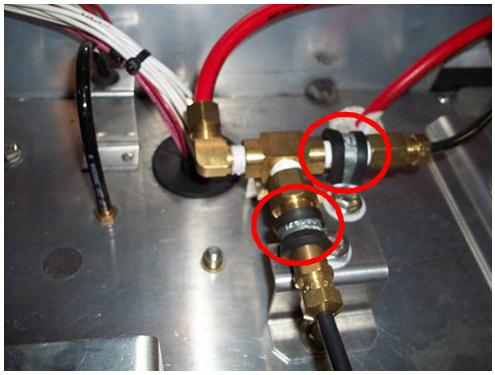
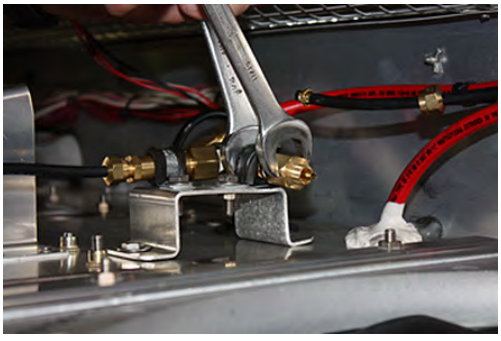


Figure 5.6 Check Valves

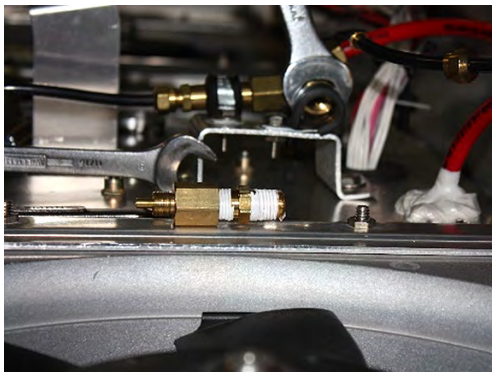
5.8.1 Replacing Nitrogen Supply Orifice

1. Open the panel needed to gain access to the orifice (**Figure 5.5**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Remove rivets from the return air panel and support in an upright position allowing access to orifices.
3. Using a 9/16” wrench on the air line fitting and an 11/16” wrench on the adjacent fitting, remove the air line.

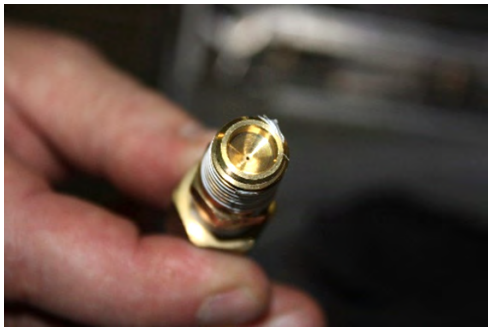
4. Place an 11/16” wrench on the Tee connector and an 11/16” wrench on the air hose connector and remove the air hose connector. The orifice is located under the cushion clamp. The orifice should come out with the air connector, if not it can be removed later by removing the cushion clamp and using a 9/16” wrench to remove.



5. Remove the orifice from the air line connector using a 9/19” and 11/16” wrench.



6. Re-Install in the opposite direction as remove. The orifice end of the connector faces away from the Tee when being re-installed.

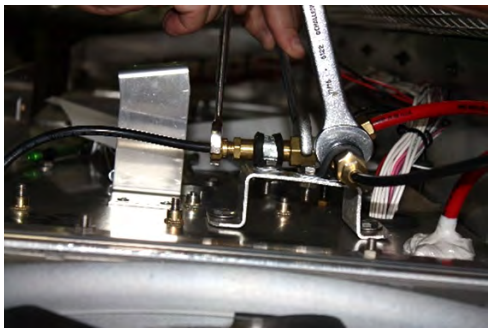


5.8.2 Replacing Nitrogen Sampling Orifices

NOTE

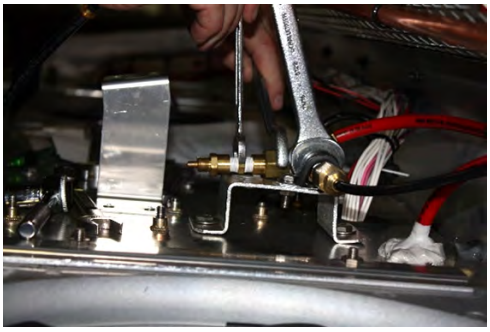
Extra care should be taken to not allow any material to contaminate the orifice.

1. Open the panel needed to gain access to the orifice (**Figure 5.5**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.
2. Remove rivets from the return air panel and support in an upright position allowing access to orifices.
3. Using a 9/16” wrench on the air line fitting and an 3/4” wrench on the adjacent fitting, remove the air line.



4. Remove the cushion clamp holding the sampling orifice in place.

5. Using a 3/4” wrench on the adapter connected to the Tee, remove the 7/16” orifice. Note the orifice is located opposite of the air line output. Remove the orifice from the air line connector using a 7/16” and 9/16” wrench.



6. Reinstall in the opposite direction as remove.

5.8.3 Replacing Air Compressor Check Valve

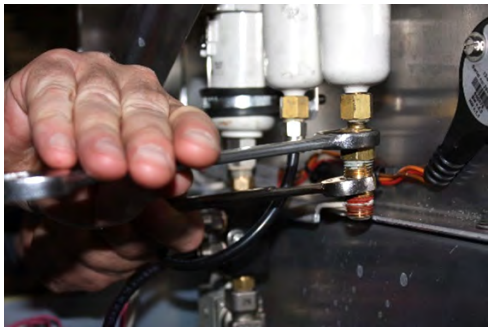
1. Remove the cushion clamp holding the air compressor check valve in place.
2. Using a 9/16” wrench on the air hose and a 5/8” wrench on the check valve, remove the air line from each side of the check valve.
3. Re-install the check valve in reverse order with the direction of flow indicator on the check valve going away from the air compressor.

5.8.4 Replacing Particulate Filter Check Valve

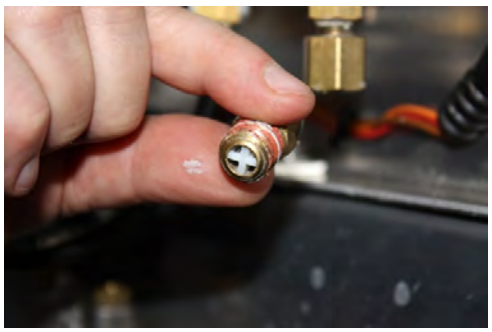
1. Open the panel needed to gain access to the check valve (**Figure 5.6**). This component can be accessed from the front of the unit through the upper left access panel, or from inside the container through the EverFRESH access panel door.

2. Place a 9/16” wrench on the check valve and a 5/8” wrench on the outlet hose. Turn the 9/16” counter clockwise to remove the outlet hose from the check valve.

3. Place a 5/8” wrench on the connector next to the orifice and a 9/16” wrench on the orifice. Rotate the 5/8” wrench counterclockwise removing the orifice.



4. Note the orientation of the check valve.



5. Reinstall in reverse order.

SECTION 6
EVERFRESH AND CONTAINER PRE-TRIP PREPARATION

6.1 Pre-Trip System Preparation

These instructions are provided for proper setup of the EverFRESH system prior to loading with cargo for controlled atmosphere loads. These instructions do not include box preparation.

⚠ WARNING

Before proceeding with preparations, set the ON / OFF switch and circuit breaker to OFF position. Disconnect the power plug from the unit. Follow all local Lockout / Tagout Procedures.

This procedure is for Pre-Trip Inspection on a container that is empty and fully vented.

Table 6–1 Pre-Trip Inspection

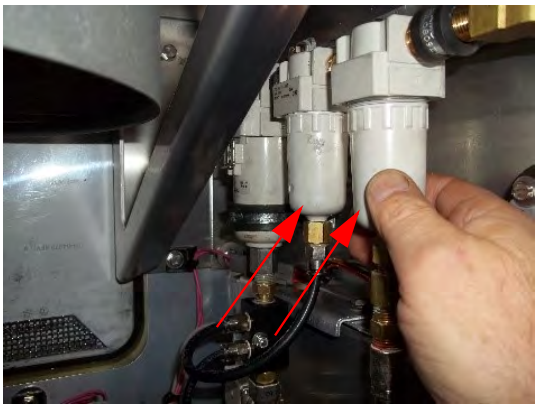
Procedure	
Check container for structural damage / clean T-bars of debris.	
Ensure floor drains are sealed.	
Ensure drain hose from evaporator section is not damaged.	
Ensure drain hose from evaporator section is filled with water.	
Change particulate filters on EverFRESH System.	
Ensure manual fresh air panel is equipped with collars (79-04064-00).	
Change Air Compressor Inlet filter.	
Ensure manual fresh air panel Multilingual label is in place (see label below).	
Tighten access panel bolts to 60 inch-lbs.	
Load latest Container software version (6303 or greater).	
Verify EverFRESH option is enabled via Code Cd71.	
Verify EverFRESH is operational via “AutCA” under PreTrip menu. See procedure below.	
Leak test box and ensure it meets leak specifications. See procedure below.	
Leak Test result _____ minutes	
Select the desired CO_2 and O_2 levels via Code Cd71.	

6.2 EverFRESH System Preparation

1. Replace the air compressor inlet filter. Refer to **Section 5.2.2** for procedure.

2. Enter the back of the container and locate the EverFRESH access panel. Open the access panel to expose the air filters and water separator.

3. Replace the two air filters in the water separator / air filter assembly. Refer to **Section 5.3.2** for procedure.



4. Close the access panel.
5. Run a Pre-Trip test of the EverFRESH option by choosing “AutCA” under the PTI menu.

6.3 Container Preparation

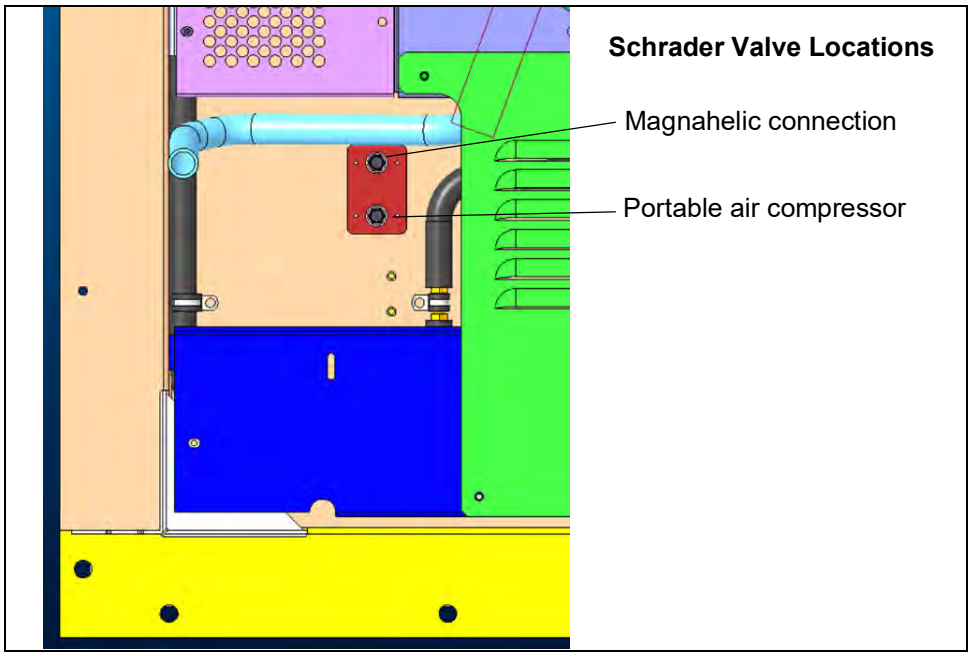
Check the rear container doors and door handles for proper operating condition. Check for proper installation of labels on the container and refrigeration unit. Always visually check the inside of the container for occupants prior to closing the doors.

6.3.1 Box Checkout / Leak Test

When using the EverFRESH system, the box must conform to leak rates in order to maintain control of the O_2 and CO_2 setpoints. The minimal box requirement is a pressure decay of 2 inch WG (50mm) to 1 inch WG (25mm) of four minutes or more for a 40 foot container. It is recommended that it be checked prior to the voyage.

To perform this check some units may be equipped with two pressure connection ports on the front of the unit. One of the ports is connected to a pressurized air supply and the other is connected to a Magnehelic pressure gauge. The pressure gauge monitors the container leakage rate. Refer to **Figure 6.1**.

Figure 6.1 Pressure Connection Ports



If the ports are not available, then a Manual Fresh Air panel disc assembly (part # 79-04098-03) with two charging ports should be installed. Refer to **Figure 6.2**.

Figure 6.2 Disc Assembly (79-04098-03) with Charging Ports

Prior to performing the leak test:

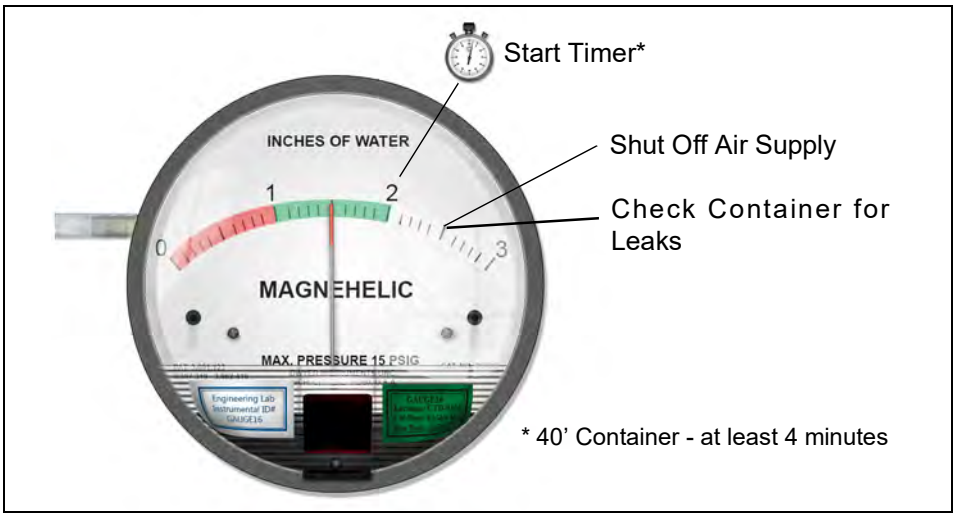
- Seal the floor drains with plugs.
- Ensure the unit condensate drain line is filled with water.
- Ensure the manual fresh air vent panel is tightly closed.
- Insert plug in drain hose. Install container curtain at the rear door.
- Seal the door shut.

Install the door curtain (part number 76-50036-01) into the curtain track installed in the rear of the container. For instructions, refer to **Section 6.4**. Always use a new curtain as a small rip in the curtain can result in a failure of the test.

After connecting the gauges, turn on the air supply and regulate the air pressure to 40-60 psi. When the Magnehelic gauge reads 2.5 inches of water gauge, shut off the air supply. **Do not exceed 3.5 inches of WG**.

Monitor the Magnehelic pressure gauge for the drop in air pressure in the container. When the Magnehelic pressure gauge reads 2 inches, start a timer. When the Magnehelic pressure gauge reads 1 inch of WG, stop timing. The amount of time expired should be no less than four minutes or more for a 40 foot container. If it is less than the required time, then the container needs to be checked for leaks. Re-pressurize the box to 2.5” WG and spray potential leak areas with soapy water and seal leaks. Note the typical external and internal leak areas to check as described in the following paragraphs.

Figure 6.3 Magnehelic Gauge (Kit # 07-00177-20)

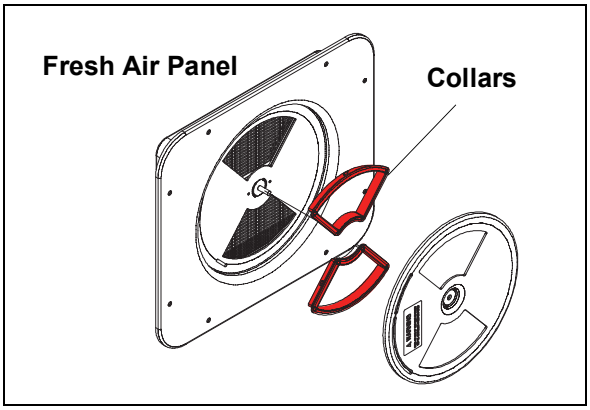


External Checks:

Check for leaks with the following recommended checks. Re-pressurize the container to 2 inches water gauge and look for leaks at the following areas using soapy water (mixture of dish detergent and water) looking for bubbles.

- Inspect the evaporator unit access panels. Check that gasket is properly in place. Tighten the access panel bolts to 60 inch-lbs. and caulk if necessary.
- Inspect at the defrost drain outlet line. If leaking, complete other checks and re-inspect internally.
- Inspect the unit / container box joints. Caulk if necessary.
- Inspect the through-wire bulkhead connections. Secure and caulk if required.
- Inspect the container floor drains under the container (if accessible). If leaking, complete external checks and reinspect internally.
- Inspect the rear door seals. Ensure curtain is properly installed (curtain should be visible throughout the perimeter of the doors if installed without a curtain track). Remove and install new curtain. De-pressurize the container prior to opening the container.
- Ensure Manual Fresh Air Panel is equipped with collars (Part # 79-04064-00).

Figure 6.4 Fresh Air Panel Collars



Internal Checks:

Remove pressure within the container and perform the inspections listed below. On completion of the checks and any associated repairs, it is recommended to test the unit again to verify it now meets the required level.

- Inspect the curtain for any rips. Replace curtain.
- Inspect the container floor drains. Ensure they are properly sealed. Standard drains can not be used.
- Inspect the defrost drain outlet line. Confirm drain line is filled with water.
- Inspect for any internal wall damage. Repair and caulk as required
- Inspect floor to side wall joint, floor to front bulkhead joint for any damage. Repair and caulk as required

6.4 Container Curtain

⚠ WARNING

Potential hazardous atmosphere and low oxygen levels may exist inside the container. Ventilate before entering. Stay away from doors and access panels while venting. Refer to Section 3.6.

Required Tools:

- CA Curtain Wedge Tool (pack of 5: 07-00573-00PK5)
- Curtain Clips (pack of 50: 34-50093-01)
- Sharp Hand Cutting Tool (purchase local)

* Contact your local CAP representative for quantities

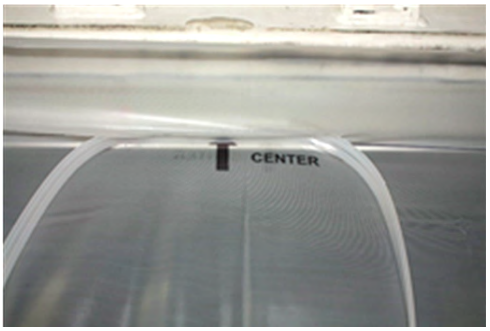
Kit 76-50036-02:

- Curtain (58-04153-02)
- Ribbon (58-66775-00)
- Warning label (69NT--35--1618)
- Instructions (62-11921-00 Rev C)

6.4.1 Installing the Curtain

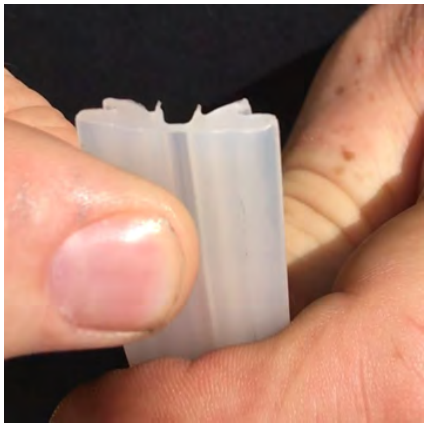
1. Open the rear doors of the container box and inspect the curtain track for dirt or damage (edges on track). Clean dirt and remove any sharp edges found on the track.

2. Fully unfold the door curtain. Align the arrow with the “CENTER” at the midpoint of the door opening (Figure 2a). Ensure “CENTER” can be read as this is the outside of the curtain.

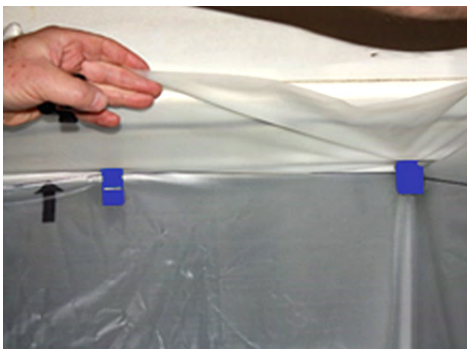


NOTE

The flat side of the ribbon is pressed into the track.



3. Use retaining clips to align the polysheet curtain line on the curtain into the track across the top of the container. Using the line will keep the curtain square.



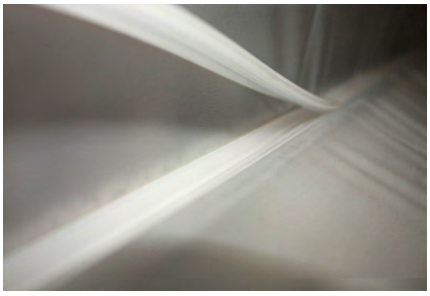
4. Unroll the curtain ribbon and mark the mid-point.
5. At the midpoint of the ribbon, insert the curtain ribbon into the ribbon channel at the “CENTER” arrow on the curtain.
6. Press the ribbon into the back of the curtain track and seat the front of the ribbon into the track by pushing on the outer edge of the track.

NOTE

Use care when removing the retaining clips to avoid damaging (tearing) the curtain.

7. Insert the curtain into the side channels and across the bottom rail using the retaining clips as required. Make sure the curtain is stretched tight across the opening. Eliminate any folds or wrinkles that can lead to air leakage.

8. Use the Ribbon install tool to finish inserting the curtain ribbon.
9. Repeat steps 3 - 8 on the other side of the door.
10. At the ribbon mating point overlap, by approximately 6 inches (15 cm) and carefully cutoff the excess ribbon allowing for the overlap. Make sure that the ribbon is completely inserted and the curtain is secure.



11. Place warning label on the outside of the curtain.

SECTION 7
PRE-GASSING PROCEDURE

⚠ WARNING

Do not inject gas into the container unless there is an exhaust port. Charging disk (part# 79-04098-03) has one port for injecting gas and one for exhaust. Both ports need to be opened. If the charging disk is not available, the manual fresh air vent must be opened. Damage to the unit and risk of personal injury exists if a pressure relief pathway is not established.

7.1 Initialize EverFRESH Atmospheric Conditions

The purpose of this procedure is to create optimal conditions that have been studied and shown to slow the ripening cycle of some commodities by the use of nitrogen (N_2) and carbon dioxide (CO_2) gas cylinders.

Procedure:

1. Install the Carrier Transicold disk with charging ports (part # 79-04098-03) if available. Refer to **Figure 6.2**. Connect the charging hose and leave the second port open.
2. If Carrier Transicold disk is not installed, open the manual fresh air vent to allow for charging of gas.

   For units equipped with a Vent Position Sensor (VPS):

   a. Bring up Cd71 on the display and set to Off mode to disable all EverFRESH operations.

   b. Bring up Cd45 and open the manual fresh air vent until the display reads 10 CFM.

   For units not equipped with a Vent Position Sensor (VPS):

   a. Open the manual fresh air vent until the indicator points to approximately 9 CFM.
3. Bring up Cd71 and enable Purge mode. This is done to establish the amount of time to purge the unit of O_2 and CO_2. Refer to **Section 3.5.3** for procedure.

   NOTE

   If not using Purge mode, the CO_2 and O_2 levels can be viewed in Cd44.
4. Purge mode is now active.
5. To establish a lower level of O_2 in the unit, charge the container with N_2 gas to displace the excess O_2. Connect the hose from the N_2 regulator to the unit equipped gas injection port. Then, start releasing N_2 gas until the O_2% reaches the desired level.

   NOTE

   If injection pressure is too high, there is a risk of clearing the unit defrost condensate trap. If this happens, the condensate trap will need to be refilled with water. If condensate trap has been cleared of water, then a leak exists that will hinder atmosphere control.
6. To establish the proper level of CO_2 in the unit, charge with CO_2 gas. Connect the purging hose to the CO_2 regulator. After injection, the sensor may read much lower than this for at least 30 minutes.

   NOTE

   Increasing the CO_2 pressure too high will run the risk of freezing the regulator. Due to mixing and sensor lag, the CO_2 level will continue to rise for some time after stopping the CO_2 regulator.
7. Once the Purge mode timer is expired, remove the gas injection hose connections and close the manual fresh air vent. If gas concentrations reach desired levels prior to the timer expiring, set Purge mode in Cd71 to OFF prior to closing the manual fresh air vent. When the timer is expired or Purge mode is set to OFF to disable it, the unit will revert to Fresh mode using the setpoints entered for Purge mode.

SECTION 8
SCHEMATICS & DIAGRAMS - STANDARD UNITS

Figure 8.1 Legend, Standard Units

LEGEND

ZONE	SYMBOL	DESCRIPTION
L11	AC	— AIR COMPRESSOR CONTACTOR
H20	AMBS	— AMBIENT SENSOR
H22	C	— CONTROLLERS
J1	CB1	— CIRCUIT BREAKER 460V
D1	CB2	— OPTIONAL CIRCUIT BREAKER 230V (DVM OPTION) TERMINAL BLOCK WHEN CB2 NOT PRESENT
N10,L13	CF	— CONDENSER FAN CONTACTOR
L8,P1	CH	— COMPRESSOR CONTACTOR
F13,G13,R10	CM	— CONDENSER FAN MOTOR
E26	COS	— C02 SENSOR
T4	CP	— COMPRESSOR MOTOR
H20	CPDS	— DISCHARGE TEMPERATURE SENSOR
M2	CS	— CURRENT SENSOR
R8	DHTL	— DEFROST HEATER – TOP LEFT
R9	DHML	— DEFROST HEATER – MIDDLE LEFT
	DHBL	— DEFROST HEATER – BOTTOM LEFT
T8	DHMR	— DEFROST HEATER – MIDDLE RIGHT
T9	DHBR	— DEFROST HEATER – BOTTOM RIGHT
	DHTR	— DEFROST HEATER – TOP RIGHT
P20	DM	— DISPLAY MODULE
K25	DPT	— DISCHARGE PRESSURE TRANSDUCER
F20	DTS	— DEFROST TEMPERATURE SENSOR
C25	DUV	— DIGITAL UNLOADER VALVE
D1	DVM	— DUAL VOLT MODULE (OPTIONAL)
F3	DVR	— DUAL VOLTAGE RECEPTACLE (OPTIONAL)
J11	EA	— EVERFRESH FRESH AIR VALVE
T6	EAC	— EVERFRESH AIR COMPRESSOR
H26	EEV	— EVAPORATOR EXPANSION VALVE
L14,L15,N12	EF	— EVAPORATOR FAN CONTACTOR (HIGH SPEED)
T12,T15,E15 F15,G15,H15	EM	— EVAPORATOR FAN MOTOR
J10	EN	— EVERFRESH N2 SAMPLE
P25	EPT	— EVAP. PRESSURE TRANSDUCER
P11,L14	ES	— EVAPORATOR FAN CONTACTOR (LOW SPEED)
D20	ETS	— EVAPORATOR TEMPERATURE SENSOR (SUCTION)
J12	ESV	— ECONOMIZER SOLENOID VALVE
B23,B24,D7	F	— FUSE
	FLA	— FULL LOAD AMPS
G24	FC	— FERRITE CLAMP
N6	FEF	— FUSE EVERFRESH
G9	HPS	— HIGH PRESSURE SWITCH
N8,L16	HR	— HEATER CONTACTOR
L25	HS	— HUMIDITY SENSOR (OPTIONAL)
E16	HTT	— HEAT TERMINATION THERMOSTAT
C19	ICR	— INTERROGATOR CONNECTOR REAR
E15,F13,G15	IP	— INTERNAL PROTECTOR
B18,C18	MPT	— MEMBRANE PRESSURE TRANSDUCER
B25	OS	— O2 SENSOR
D25	OSM	— O2 SENSOR AMPLIFIER
L7,K8,N1	PA	— UNIT PHASE CONTACTOR
K7,L8,N3	PB	— UNIT PHASE CONTACTOR
G5	PF	— POWER FILTER
J20,K20,L20	PR	— PROBE RECEPTACLE (USDA OPTION)
M25	PTC1	— PTC FOR VENT POSITION SENSOR (UPPER)
E20	RRS	— RETURN RECORDER SENSOR
E9	RS1	— CONTROLLER RELAY (WATER DRAIN VALVE)
E9	RS3	— CONTROLLER RELAY (N2 SAMPLE VALVE)
E10	RS4	— CONTROLLER RELAY (FRESH AIR VALVE)
J11	RS7	— CONTROLLER RELAY (AIR COMPRESSOR CONTACTOR)
E20	RTS	— RETURN TEMPERATURE SENSOR
R25	SPT	— SUCTION PRESSURE TRANSDUCER
F20	SRS	— SUPPLY RECORDER SENSOR
F5	ST	— START–STOP SWITCH
F20	STS	— SUPPLY TEMPERATURE SENSOR
J9	TC	— CONTROLLER RELAY (COOLING)
J7,J8	TCP	— CONTROLLER RELAY (PHASE SEQUENCING)
J15	TE	— CONTROLLER RELAY (HIGH SPEED EVAPORATOR FANS)
J16	TH	— CONTROLLER RELAY (HEATING)
B4	TL	— TRIPLINK (OPTION)
J13	TN	— CONTROLLER RELAY (CONDENSER FAN)
M3	TR	— TRANSFORMER
D3	TRANS	— TRANSFORMER AUTO 230/460 (OPTION)
E12	TS	— CONTROLLER RELAY (ECONOMIZER SOLENOID VALVE)
J15	TV	— CONTROLLER RELAY (LOW SPEED EVAPORATOR FANS)
M25	VPS	— VENT POSITIONING SENSOR (UPPER) (OPTION)
J14	WCR	— WETTING CURRENT SENSOR (OPTION)
J9	WDV	— WATER DRAIN VALVE
E14	WP	— WATER PRESSURE SWITCH (OPTION)

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Figure 8.2 Schematic, Standard Units - Page 1

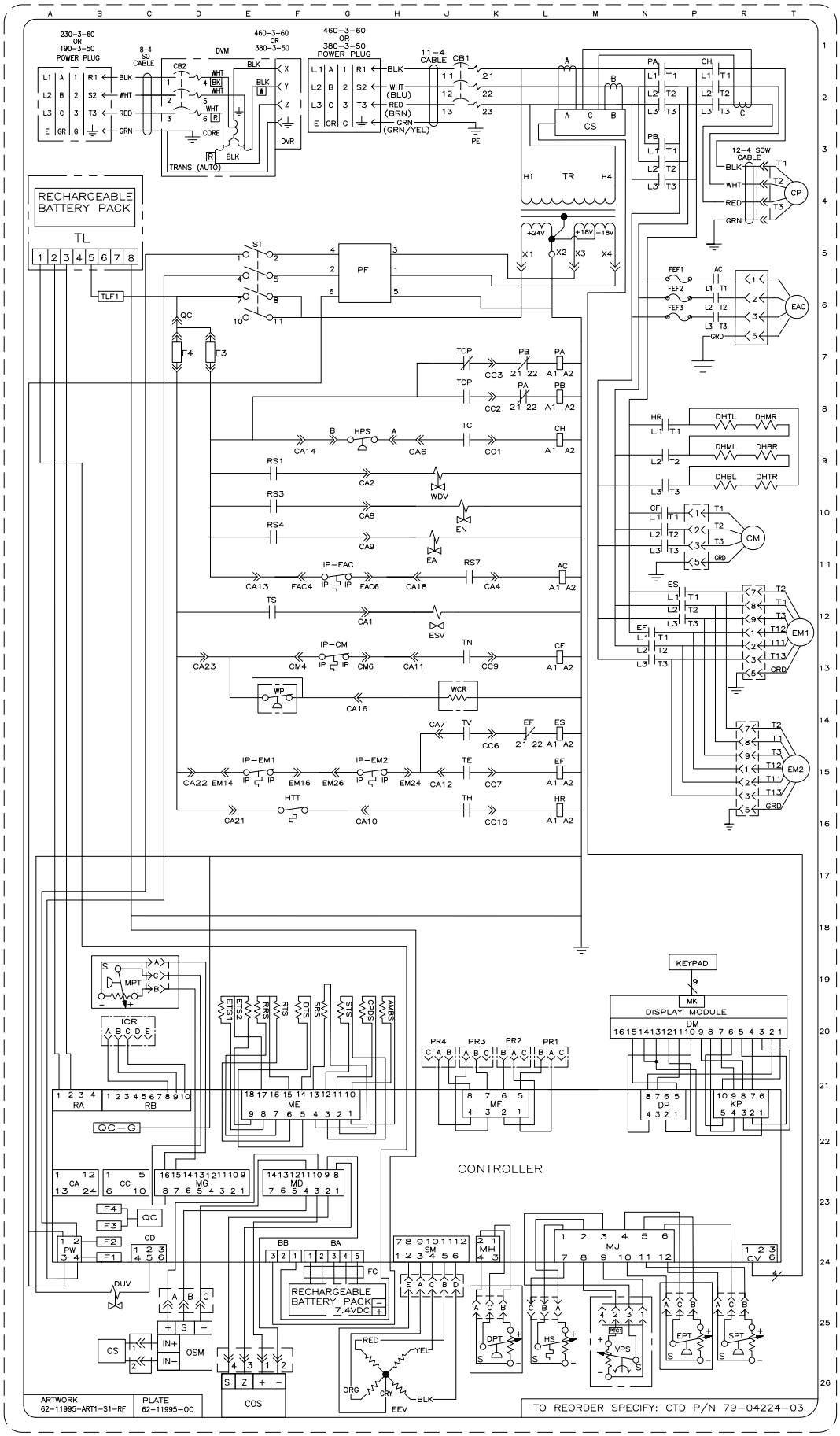


Figure 8.3 Schematic, Standard Units - Page 2

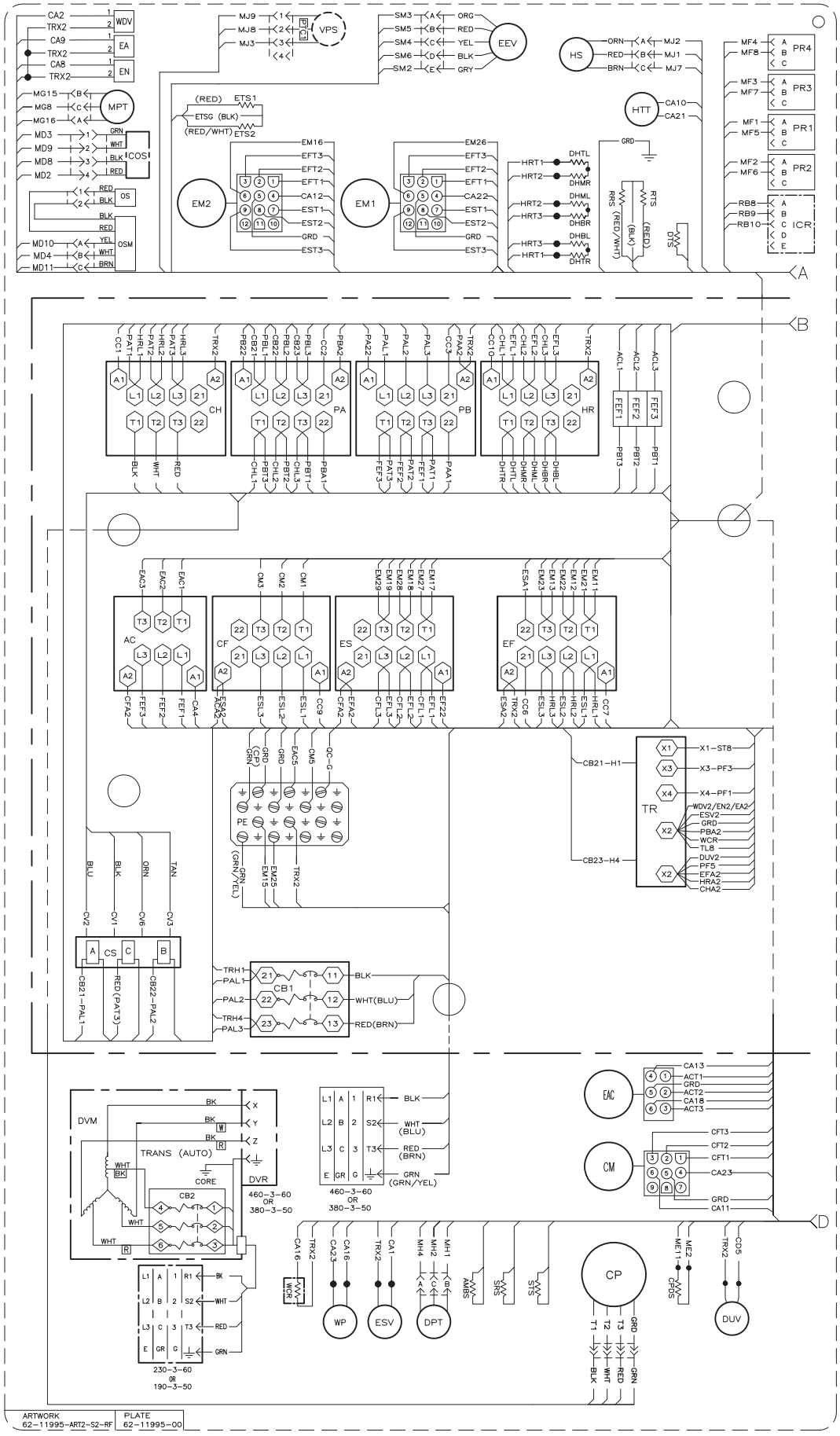
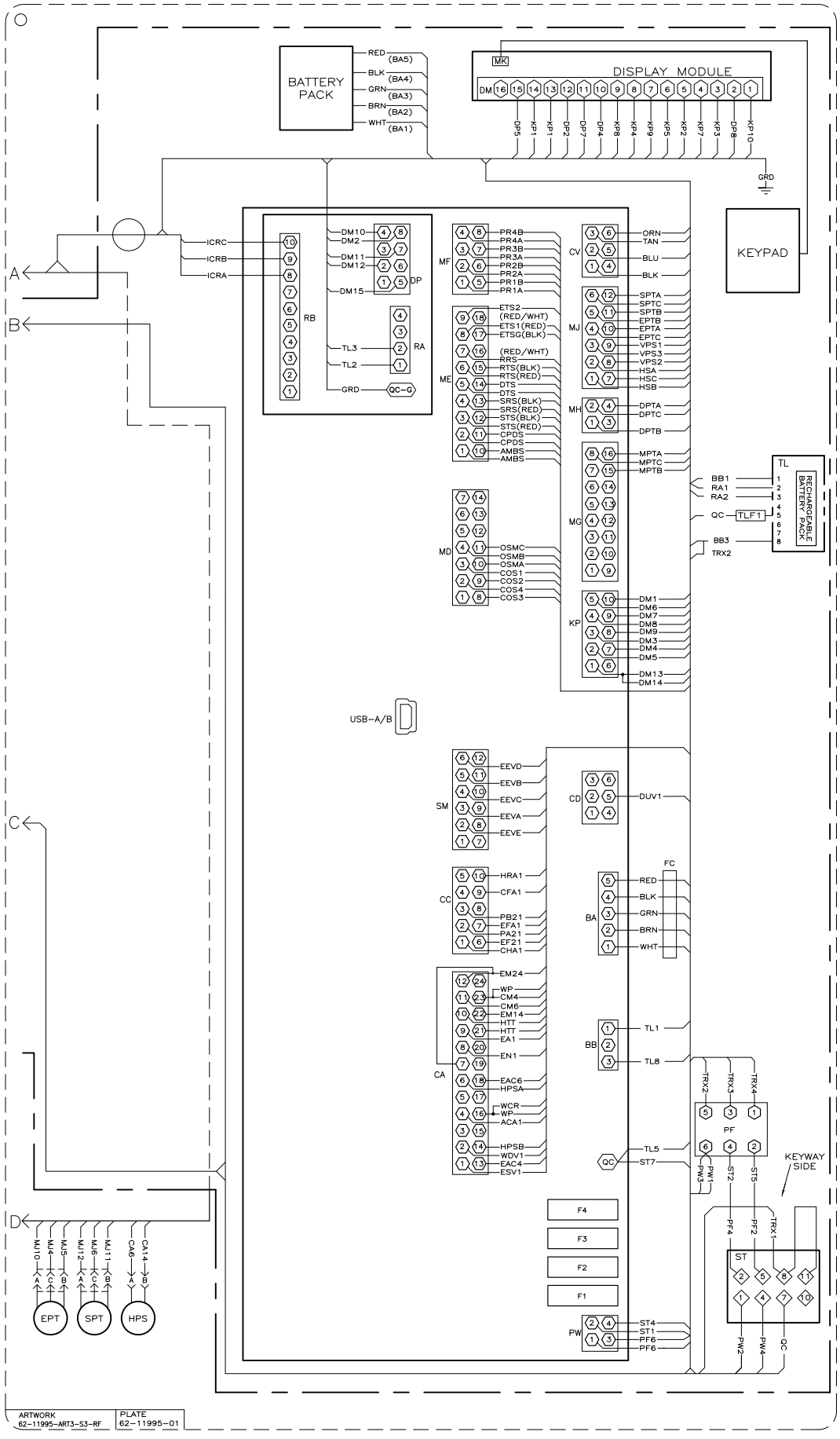


Figure 8.4 Wiring Diagram, Standard Units



SECTION 9
SCHEMATICS & DIAGRAMS - UNITS WITH CO2 INJECTION

Figure 9.1 Legend, Units with CO2 Injection

LEGEND

ZONE	SYMBOL	DESCRIPTION
L11	AC	— AIR COMPRESSOR CONTACTOR
H20	AMBS	— AMBIENT SENSOR
H22	C	— CONTROLLERS
J1	CB1	— CIRCUIT BREAKER 460V
D1	CB2	— OPTIONAL CIRCUIT BREAKER 230V (DVM OPTION) TERMINAL BLOCK WHEN CB2 NOT PRESENT
N10,L13	CF	— CONDENSER FAN CONTACTOR
L8,P1	CH	— COMPRESSOR CONTACTOR
F13,G13,R10	CM	— CONDENSER FAN MOTOR
E26	COS	— C02 SENSOR
T4	CP	— COMPRESSOR MOTOR
H20	CPDS	— DISCHARGE TEMPERATURE SENSOR
M2	CS	— CURRENT SENSOR
J11	CSV	— C02 INJECTION VALVE
R8	DHTL	— DEFROST HEATER — TOP LEFT
R9	DHML	— DEFROST HEATER — MIDDLE LEFT
	DHBL	— DEFROST HEATER — BOTTOM LEFT
T8	DHMR	— DEFROST HEATER — MIDDLE RIGHT
T9	DHBR	— DEFROST HEATER — BOTTOM RIGHT
	DHTR	— DEFROST HEATER — TOP RIGHT
P20	DM	— DISPLAY MODULE
K25	DPT	— DISCHARGE PRESSURE TRANSDUCER
F20	DTS	— DEFROST TEMPERATURE SENSOR
C25	DUV	— DIGITAL UNLOADER VALVE
D1	DVM	— DUAL VOLT MODULE (OPTIONAL)
F3	DVR	— DUAL VOLTAGE RECEPTACLE (OPTIONAL)
J11	EA	— EVERFRESH FRESH AIR VALVE
T6	EAC	— EVERFRESH AIR COMPRESSOR
H26	EEV	— EVAPORATOR EXPANSION VALVE
L14,L15,N12	EF	— EVAPORATOR FAN CONTACTOR (HIGH SPEED)
T12,T15,E15 F15,G15,H15	EM	— EVAPORATOR FAN MOTOR
J10	EN	— EVERFRESH N2 SAMPLE
P25	EPT	— EVAP. PRESSURE TRANSDUCER
P11,L14	ES	— EVAPORATOR FAN CONTACTOR (LOW SPEED)
D20	ETS	— EVAPORATOR TEMPERATURE SENSOR (SUCTION)
J12	ESV	— ECONOMIZER SOLENOID VALVE
B23,B24,D7	F	— FUSE
	FLA	— FULL LOAD AMPS
G24	FC	— FERRITE CLAMP
N6	FEF	— FUSE EVERFRESH
G9	HPS	— HIGH PRESSURE SWITCH
N8,L16	HR	— HEATER CONTACTOR
L25	HS	— HUMIDITY SENSOR (OPTIONAL)
E16	HTT	— HEAT TERMINATION THERMOSTAT
C19	ICR	— INTERROGATOR CONNECTOR REAR
E15,F13,G15	IP	— INTERNAL PROTECTOR
E19	IPT	— C02 INJECTION PRESSURE TRANSDUCER
B18,C18	MPT	— MEMBRANE PRESSURE TRANSDUCER
B25	OS	— 02 SENSOR
D25	OSM	— 02 SENSOR AMPLIFIER
L7,K8,N1	PA	— UNIT PHASE CONTACTOR
K7,L8,N3	PB	— UNIT PHASE CONTACTOR
G5	PF	— POWER FILTER
J20,K20,L20	PR	— PROBE RECEPTACLE (USDA OPTION)
M25	PTC1	— PTC FOR VENT POSITION SENSOR (UPPER)
E20	RRS	— RETURN RECORDER SENSOR
E9	RS1	— CONTROLLER RELAY (WATER DRAIN VALVE)
E9	RS3	— CONTROLLER RELAY (N2 SAMPLE VALVE)
E10	RS4	— CONTROLLER RELAY (FRESH AIR VALVE)
F11	RS5	— CONTROLLER RELAY (C02 INJECTION VALVE)
J11	RS7	— CONTROLLER RELAY (AIR COMPRESSOR CONTACTOR)
E20	RTS	— RETURN TEMPERATURE SENSOR
R25	SPT	— SUCTION PRESSURE TRANSDUCER
F20	SRS	— SUPPLY RECORDER SENSOR
F5	ST	— START—STOP SWITCH
F20	STS	— SUPPLY TEMPERATURE SENSOR
J9	TC	— CONTROLLER RELAY (COOLING)
J7,J8	TCP	— CONTROLLER RELAY (PHASE SEQUENCING)
J15	TE	— CONTROLLER RELAY (HIGH SPEED EVAPORATOR FANS)
J16	TH	— CONTROLLER RELAY (HEATING)
B4	TL	— TRIPLINK (OPTION)
J13	TN	— CONTROLLER RELAY (CONDENSER FAN)
M3	TR	— TRANSFORMER
D3	TRANS	— TRANSFORMER AUTO 230/460 (OPTION)
E12	TS	— CONTROLLER RELAY (ECONOMIZER SOLENOID VALVE)
J15	TV	— CONTROLLER RELAY (LOW SPEED EVAPORATOR FANS)
M25	VPS	— VENT POSITIONING SENSOR (UPPER) (OPTION)
J14	WCR	— WETTING CURRENT SENSOR (OPTION)
J9	WDV	— WATER DRAIN VALVE
E14	WP	— WATER PRESSURE SWITCH (OPTION)

ARTWORK 62-12270-ART5-S5-RA | PLATE 62-12270-02

Figure 9.2 Schematic, Units with CO2 Injection - Page 1

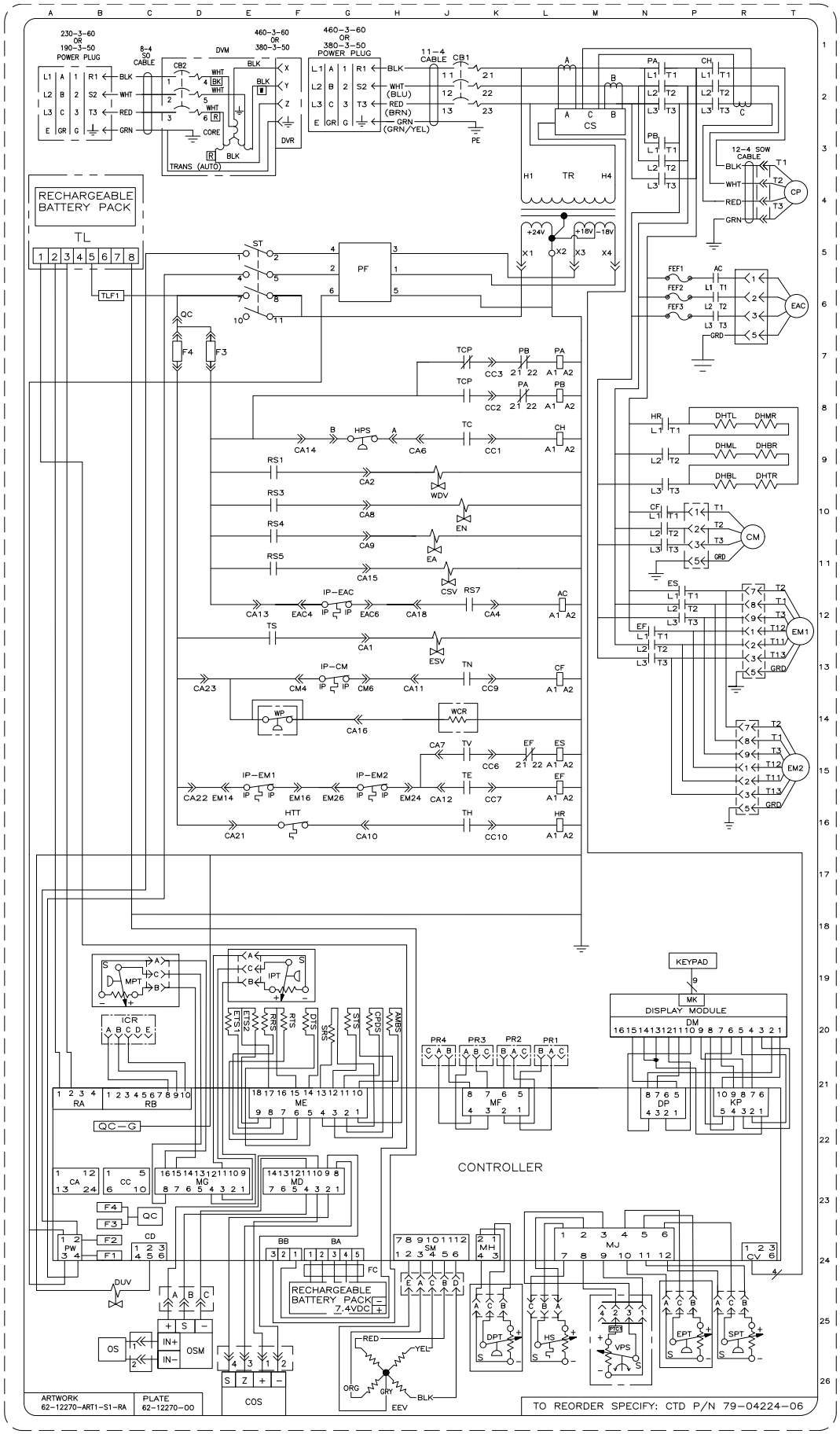


Figure 9.3 Schematic, Units with CO2 Injection - Page 2

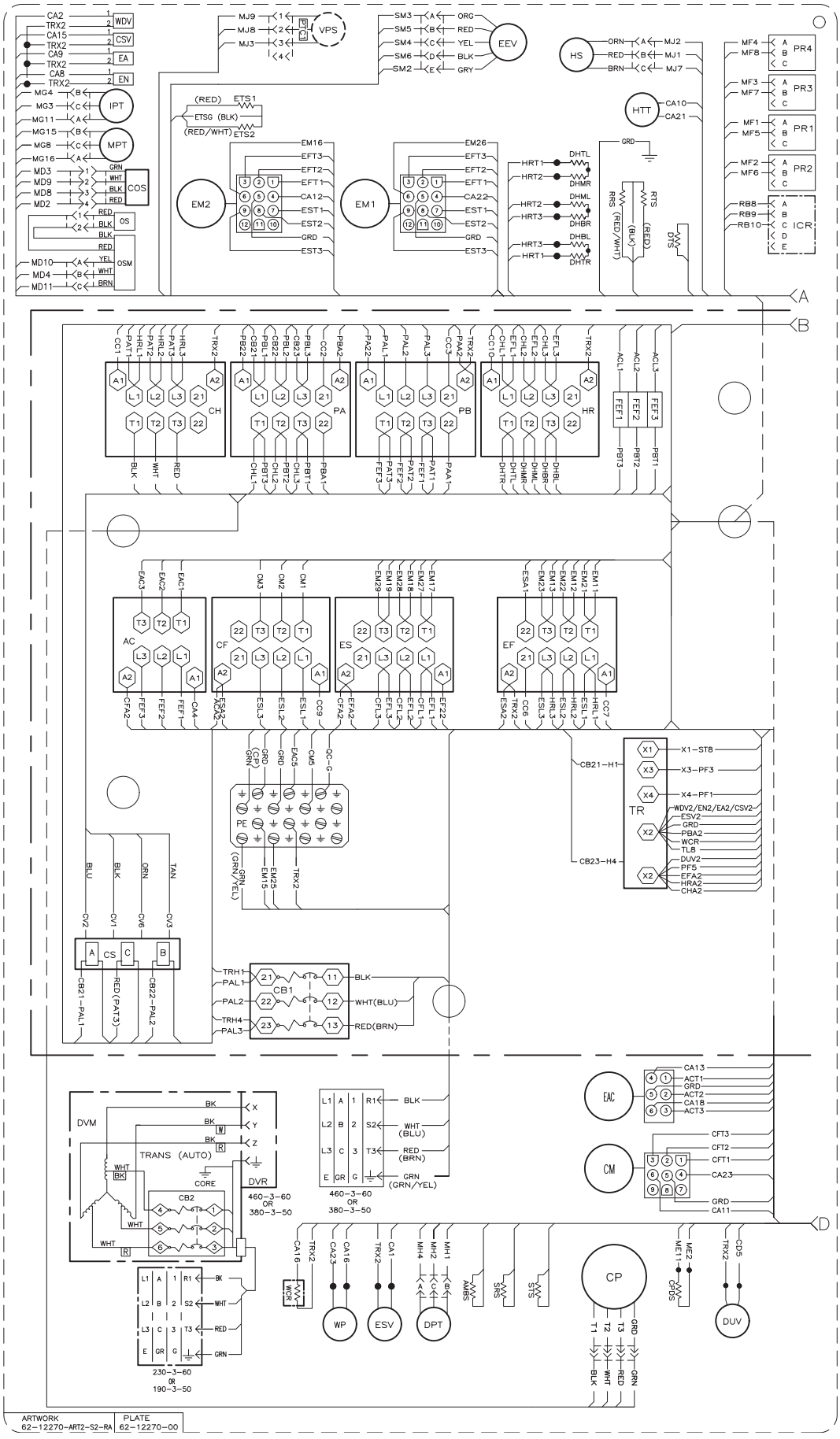
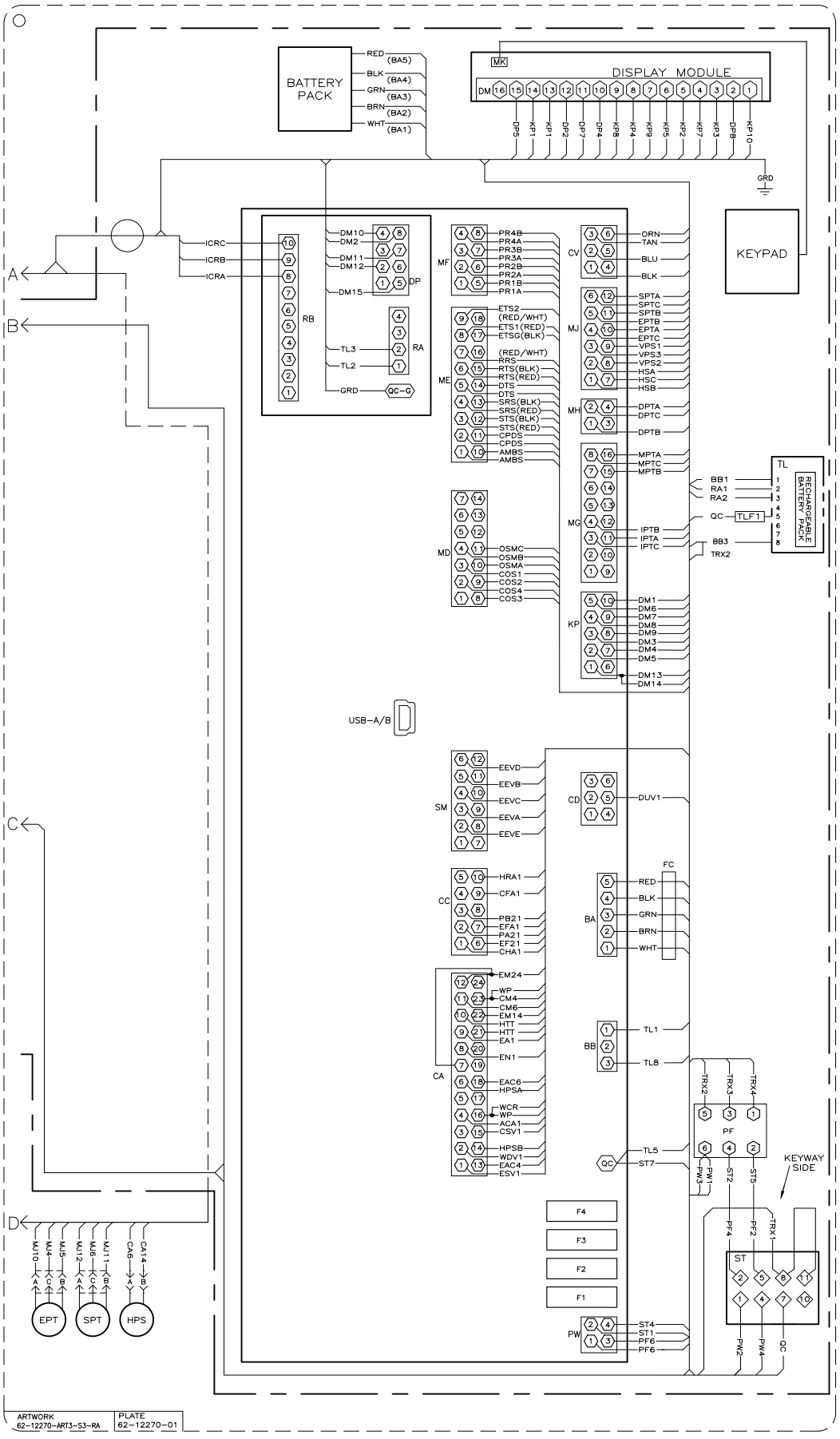


Figure 9.4 Wiring Diagram, Units with CO2 Injection



SECTION 10
SERVICE PARTS LIST

10.1 Ordering Instructions

All orders and inquiries for parts must include: Parts Identification Number (PID), Model Number, Unit Serial Number, Part Number, Description of part as shown on list and Quantity required. Address all correspondence for parts to the following address:

CARRIER TRANSICOLD DIVISION
Replacement Components Group, TR-20
P.O. Box 4805, Syracuse, New York 13221
or FAX to: (315) 432-3778

10.2 Letter Designations

The following letter designations are used to classify parts throughout this list:

A/R = As Required

N/A = Not Available

NS = Not shown in illustration

NSS = Not sold separately - Order next higher assembly or kit

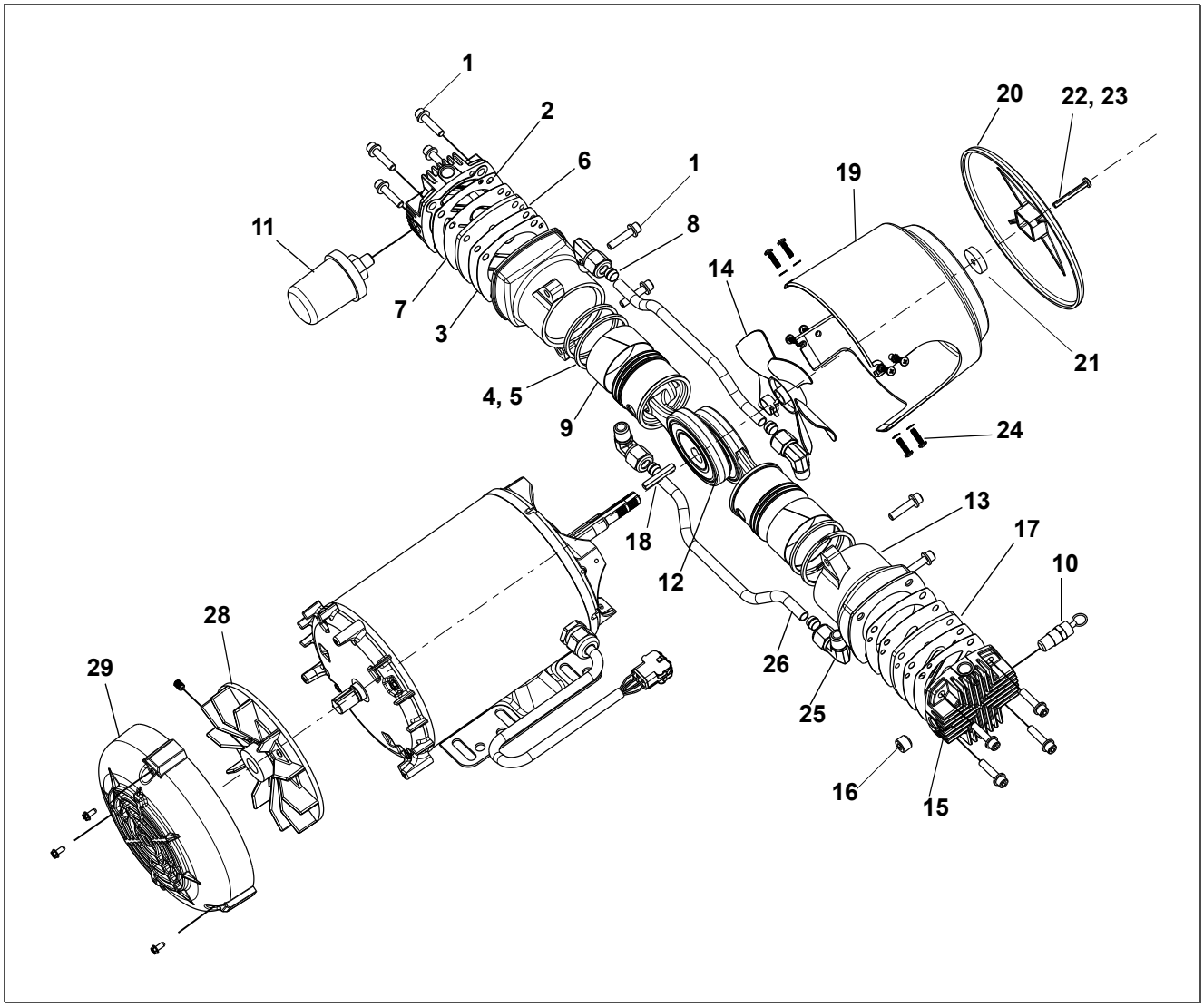
PID = Parts Identification Number − essential to identify unit configuration.

PL = Purchase Locally

SST = Stainless Steel - 300 Series unless otherwise specified.

SV = Suffix SV - added to part number designates service replacement part.

11 Parts List for Compressor Kits



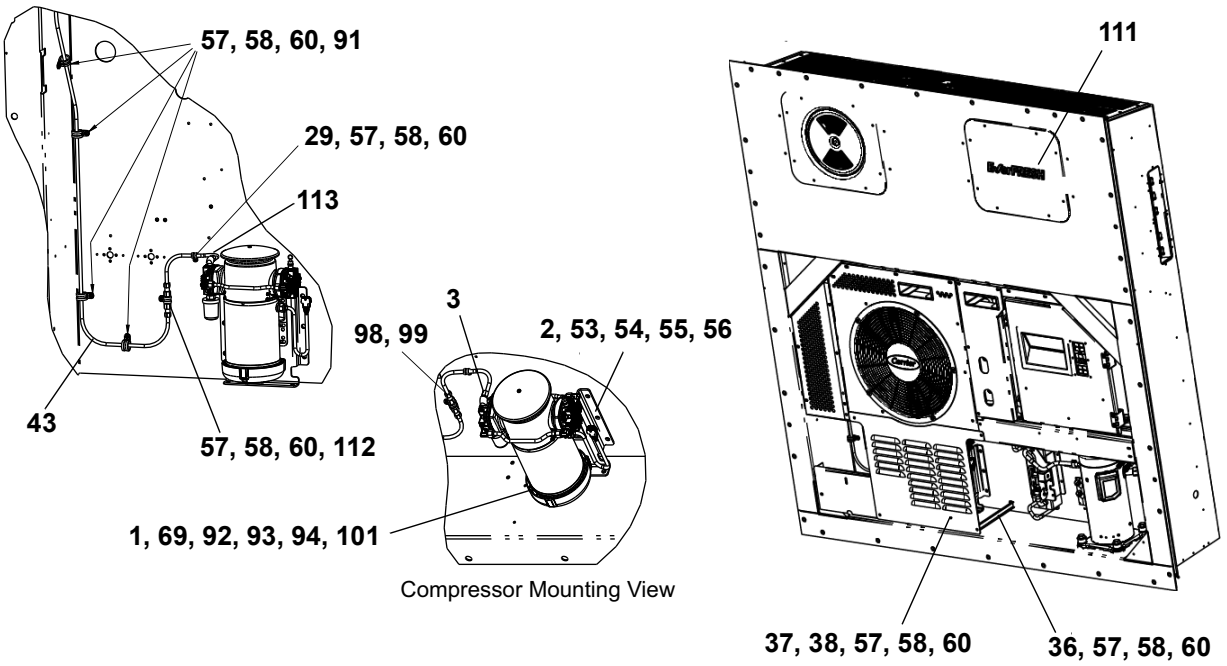
Item	Part Number	Description	Qty
	18-10185-20	Minor Rebuild Kit - Includes:	1
1	NSS	1/4-20 Shcs Head / Cylinder Bolts	12
2	NSS	Gasket-Head	2
3	NSS	Gasket-Cylinder	2
4	NSS	Piston Seal	4
5	NSS	Piston Ring	4
6	NSS	Valve Cylinder Side of Valve Plate	2
7	NSS	Valve Head Side of Valve Plate	2
8	NSS	Compression Sleeve	4
9	NSS	Rider Ring	2
10	18-10185-31	Relief Valve 10.1 Bar	1
11	18-10185-30	Filter And Housing Assembly with 1/4 NPT	1

11 Parts List for Compressor Kits

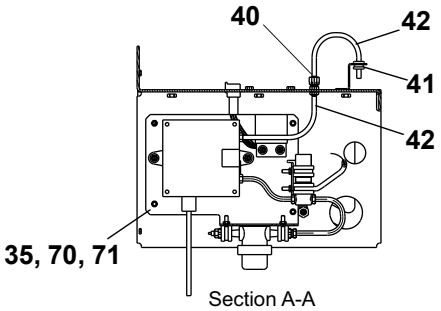
	18-10185-21	Major Rebuild Kit - Includes	1
12	NSS	Rod Assembly (Includes Eccentric & Piston)	2
13	NSS	Cylinder	2
14	NSS	Fan And Spring Clamp	1
15	NSS	Head	2
16	NSS	Brass Pipe Plug 1/4	1
17	NSS	SS Valve Plate	2
18	NSS	Machine Key	1
	18-10185-22	Shroud Assembly - Includes:	1
19	NSS	Shroud	1
20	NSS	Motor End Shield	1
21	NSS	Spacer, V.O.Rated	1
22	NSS	Washer Flat #10	1
23	NSS	Plastite #10-14 X 1.50	1
24	18-10185-33	8-32 X 0.375 SST Truss Head Screw	8
25	18-10185-34	Elbow Fitting	4
26	18-10185-35	Manifold Tube (Includes 2 Sleeves Item #8)	2
11	18-10185-30	Filter And Housing Assembly with 1/4 NPT	1
NS	18-10185-32	Filter Media	1
10	18-10185-31	Relief Valve 10.1 Bar	1
28	18-10185-36	Motor Fan Assembly	1
29	18-10185-37	Motor Fan Cover / Hardware	1

18-10185-00

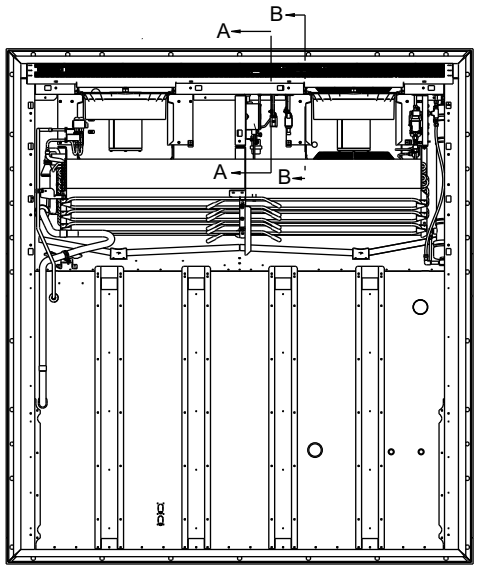
12 Parts List for EverFRESH Kit, ML5

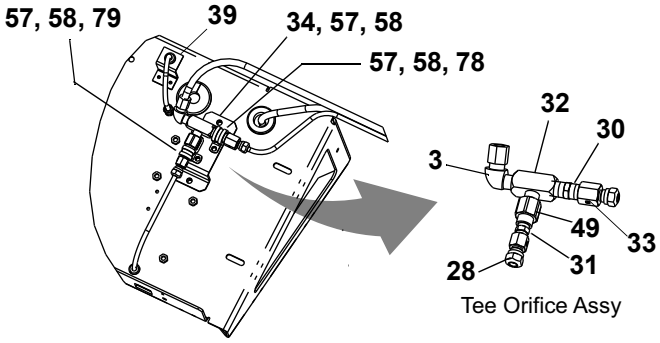


Compressor Mounting View



Section A-A





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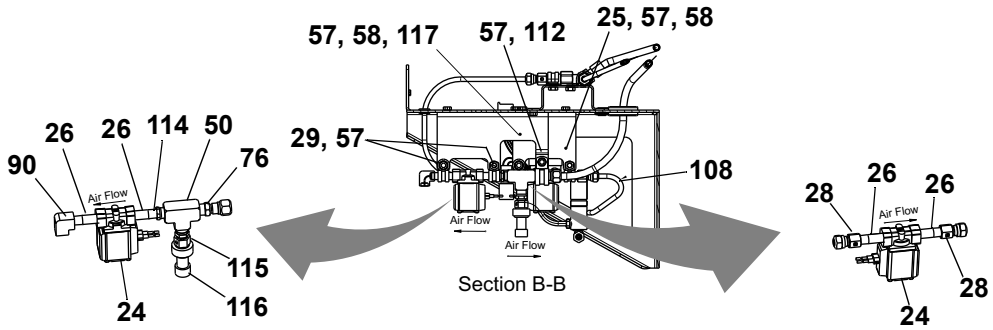
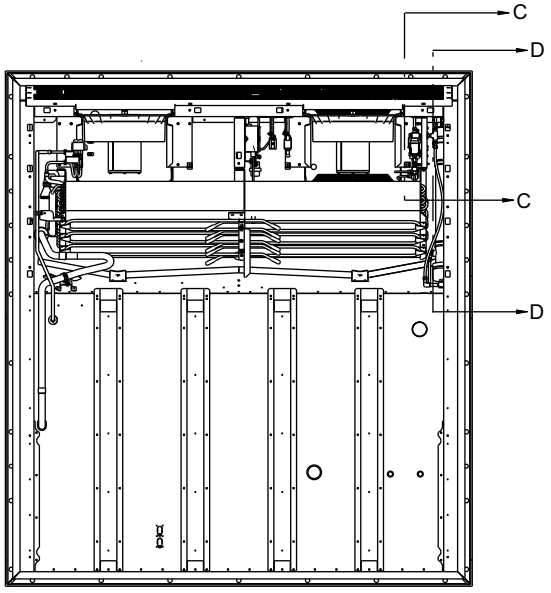


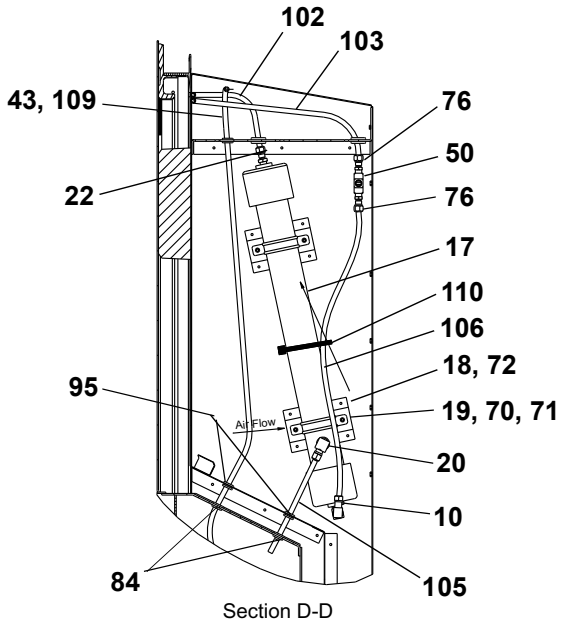
EverFRESH Air Valve (EA)

Section B-B

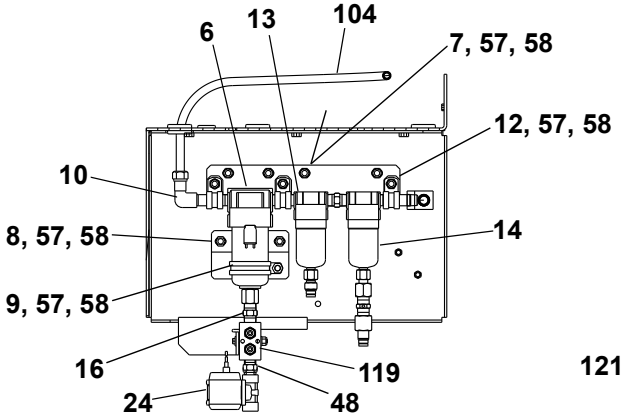
EverFRESH Nitrogen Valve (EN)

12 Parts List for EverFRESH Kit, ML5

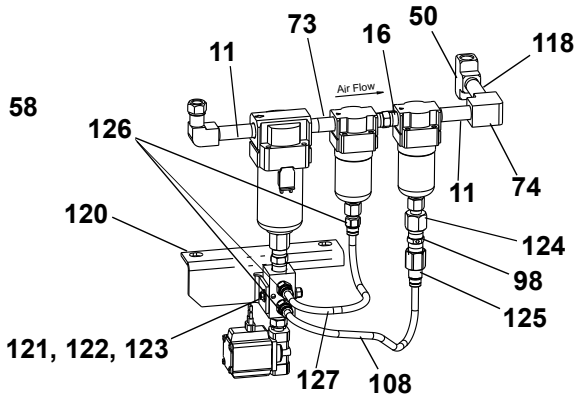




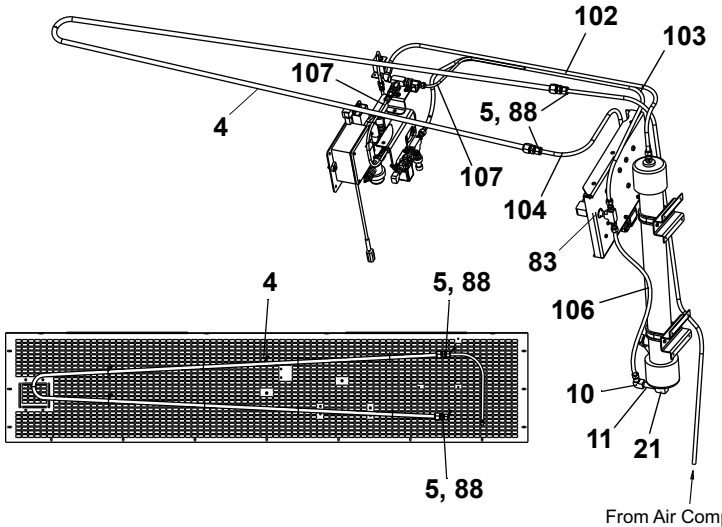
Section D-D



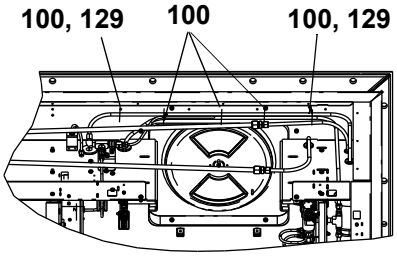
Section C-C



H2O Separator / Air Filter Assy



From Air Compressor



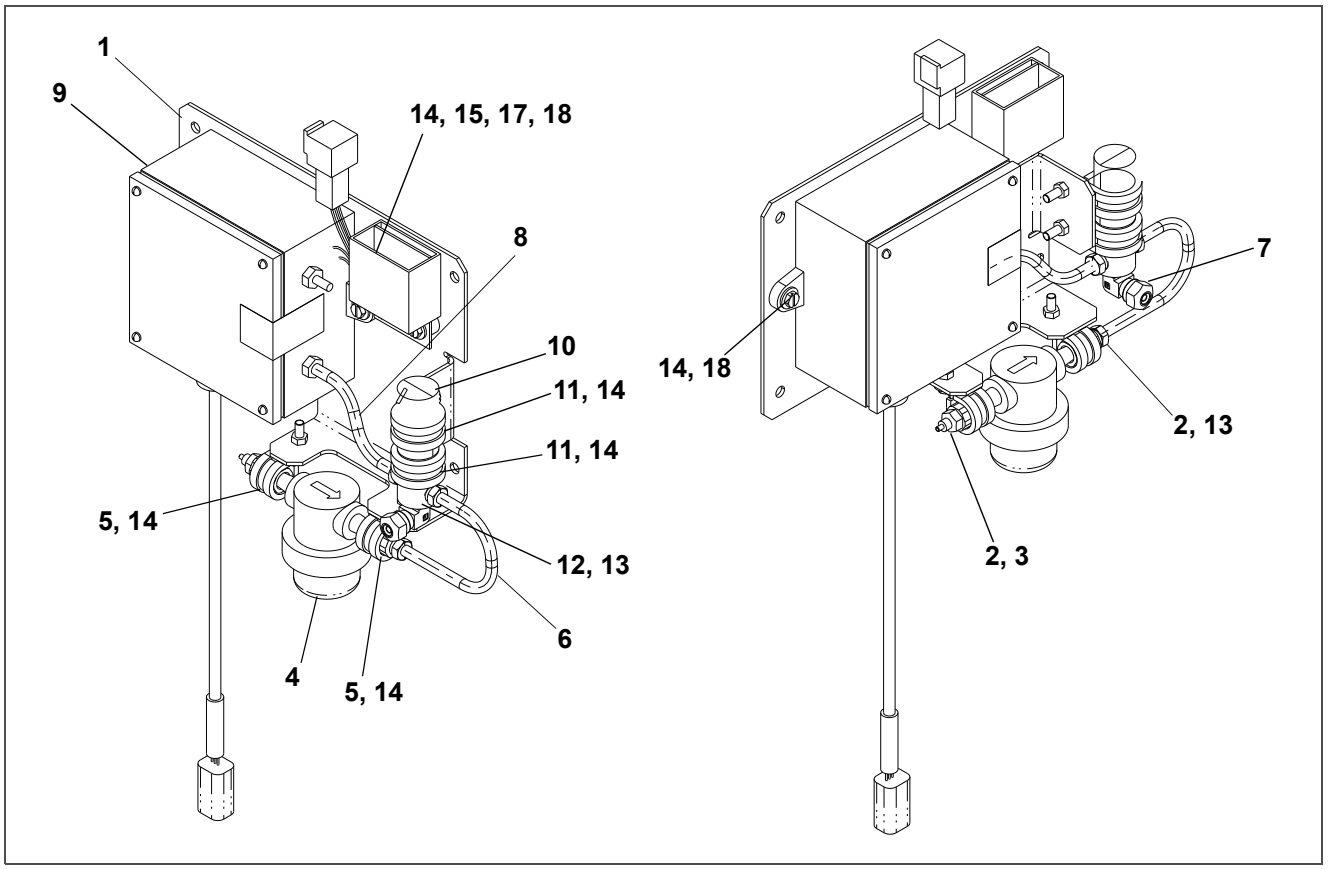
12 Parts List for EverFRESH Kit, ML5

Item	Part Number	Description	Qty
1	18-10185-00	Compressor	1
2	86-05336-01	Bracket Assembly	1
3	40-00342-03	Elbow, Male	2
4	56-09581-00	Tube, Heat Trans	1
5	40-00789-00	Adapter	2
6	30-00554-00	Separator - Includes:	1
	30-00554-20	O-Ring	1
7	68-18588-00	Bracket	1
8	68-18642-00	Bracket	1
9	34-00373-73	Clamp	1
10	40-00671-00	Fitting	2
11	40-01176-04	Nipple	3
12	44-00102-51	Clamp, Cushioned	3
13	30-00558-00	Filter - Includes:	1
	30-00558-20	O-Ring	1
	30-00558-21	Filter	1
14	30-00558-01	Filter - Includes:	1
	30-00558-20	O-Ring	1
	30-00558-22	Filter	1
16	40-00067-02	Nipple, Hex	2
17	65-00230-00	Separator	1
18	68-18538-00	Bracket	2
19	66-U---1--5732-19	Clamp, Tube	2
20	40-00342-05	Elbow, Male	1
21	40-00060-09	Elbow, Male	1
22	40-00343-03	Connector, Male	1
24	40-00792-00	Valve, Solenoid	3
25	68-18563-01	Plate, Mounting	1
26	40-01176-03	Nipple	4
28	40-00345-01	Connector	3
29	34-00373-53	Clamp, Tube	5
30	40-00790-00	Orifice	1
31	40-00790-01	Orifice	1
32	40-00249-01	Tee, Male Branch	1
33	40-00345-02	Connector	1
34	68-18564-00	Channel	1
35	79-04035-01	Sensor Assembly (See **Parts List for Sensor Assembly**)	1

12 Parts List for EverFRESH Kit, ML5			
36	68-18541-01	Brace, Support	1
37	68-18542-00	Grille	1
38	42-00174-132	Gasket	1
39	68-14739-00	Bracket	1
40	40-00640-00	Union, Bulkhead	1
41	58-00065-84	Grommet	1
42	58-04497-01	Tube	2
43	58-05188-01	Tube	1
48	40-00067-04	Nipple, Hex	1
49	40-00794-00	Coupling, Pipe	1
50	40-00107-02	Tee	2
53	34-00807-06	Screw, Cap Hxhd	8
54	34-00663-13	Washer, Lock	8
55	66-U---1--5321-17	Washer, Plain	8
56	34-06053-02	Washer	8
57	66-U---1--5361-25	Screw, Cap Hxhd	32
58	66-U---1--5321-7	Washer, Plain	32
60	34-06053-00	Washer	9
69	34-06053-15	Washer	6
70	66-U---1--5321-8	Washer, Plain	8
71	66-U---1--5371-6	Screw, Mach Hxhd	8
72	34-00928-09	Rivet, Blind	8
73	40-01176-05	Nipple	1
74	40-00512-04	Elbow, Union	1
76	40-00343-02	Connector, Male	3
77	58-00065-28	Grommet	1
78	34-00373-07	Clamp, Tube	1
79	34-00373-05	Clamp, Tube	1
83	58-00065-27	Grommet	3
84	58-00065-14	Grommet	3
85	58-00065-51	Grommet	1
88	40-00601-09	Tube, Support	2
89	58-00065-48	Grommet	1
90	40-00512-00	Elbow, Union	1
91	44-00102-57	Clamp, Cushioned	4
92	34-06212-13	Washer, Plain	6
93	34-00792-08	Screw, Cap Hxhd	6
94	34-00663-12	Washer, Lock	6

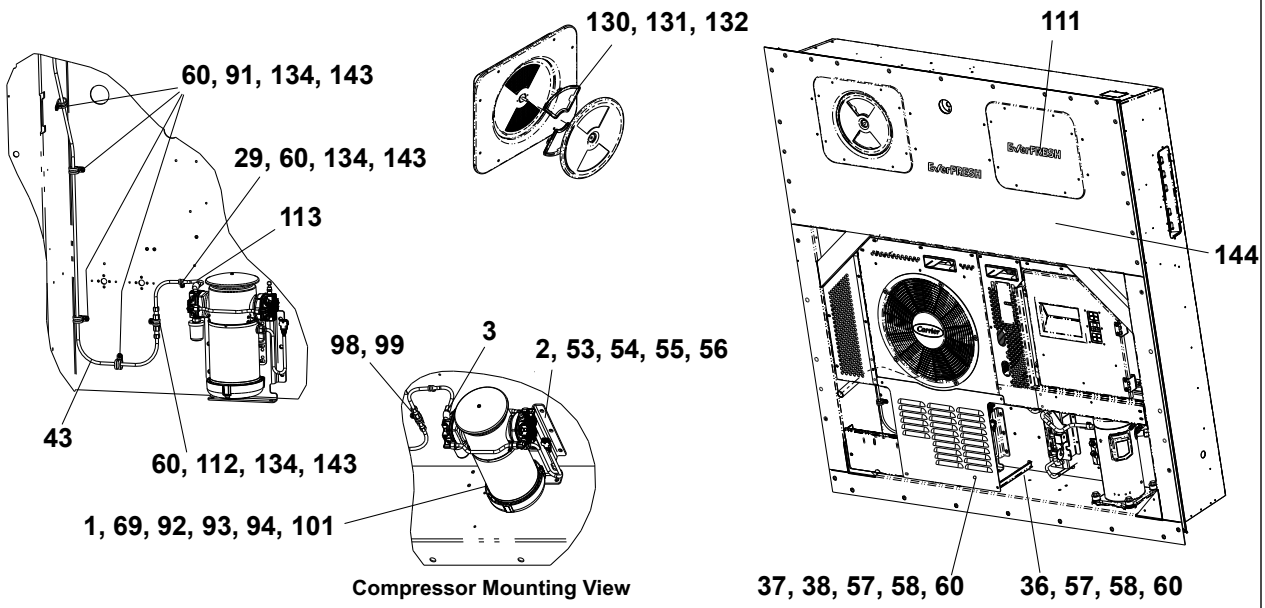
12 Parts List for EverFRESH Kit, ML5			
95	58-00065-100	Grommet	2
98	40-00795-00	Valve, Check	2
99	40-00345-04	Connector, Fem	2
100	58-00079-02	Sta-Strap	5
101	58-04026-138	Protector	2
102	58-00508-70	Tube	1
103	58-00508-92	Tube	1
104	58-00508-104	Tube, Black	1
105	58-00508-105	Tube	1
106	58-00508-106	Tube	1
107	58-00507-24	Tube, Black	2
108	58-00507-16	Tube, Black	2
109	42-00425-163	Insulation, Tube	1
110	58-00079-00	Sta-Strap	1
111	62-66172-00	Label	1
112	44-00102-53	Clamp, Cushioned	2
113	58-05188-02	Tube	1
114	40-00121-01	Bushing	1
115	06DA-403---844	Valve Assembly	1
116	12-00352-08	Transducer	1
117	68-18639-00	Bracket	1
118	40-01176-07	Nipple	1
119	48-00515-00	Manifold	1
120	68-18640-00	Bracket	1
121	66-U---1--5371-11	Screw, Hexhd	1
122	34-06212-08	Washer, Plain	2
123	34-00667-08	Nut, Self Lock	1
124	40-00253-01	Adapter	1
125	40-00796-00	Fitting	1
126	40-00616-00	Connector, Male	3
127	58-00507-13	Tube, Black	1
129	58-04316-00	Base, Mounting	2
			77-04012-01

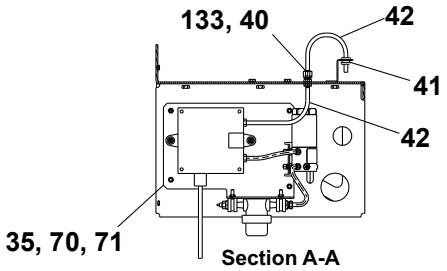
13 Parts List for Sensor Assembly

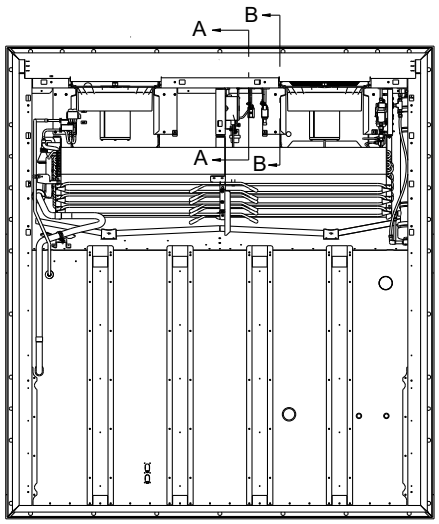


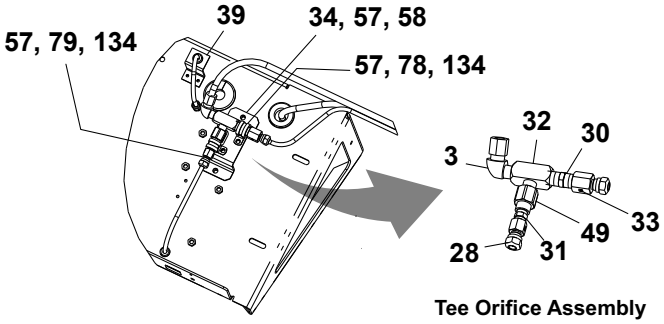
Item	Part Number	Description	Qty
	79-04035-01	Sensor Assembly - Includes:	1
1	68-17351-00	Plate	1
2	40-00297-00	Coupling	2
3	40-00108-03	Coupling	1
4	30-00415-01	Filter Assembly	1
5	34-00373-07	Clamp, Tube	2
6	58-04497-05	Tube	1
7	40-00342-00	Elbow, Male	1
8	58-04497-06	Tube	1
9	10-00398-01	Sensor	1
10	10-00344-01	Sensor	1
11	34-00373-61	Clamp, Tube	2
12	48-00297-01	Housing	1
13	--KA--70PP-048	Fitting, Hose	3
14	66-U---1--5371-6	Screw, Mach HXHD	8
15	12-00346-01	Relay, Amplifier	1
17	58-04152-01	Washer, Spacer	2
18	66-U---1--5321-8	Washer, Plain	4
			79-04035-01

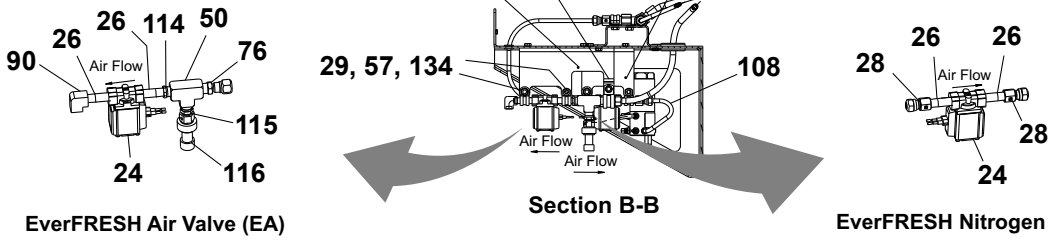
14 Parts List for EverFRESH Kit, ML5, MCHE



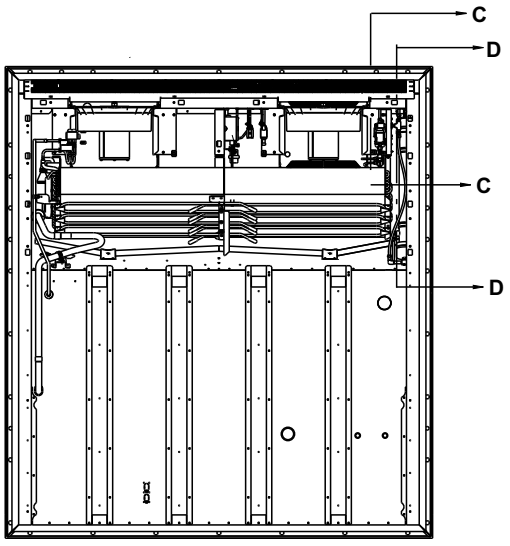


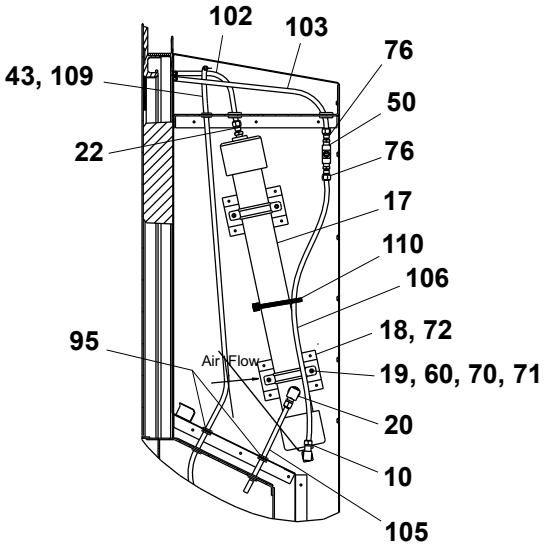




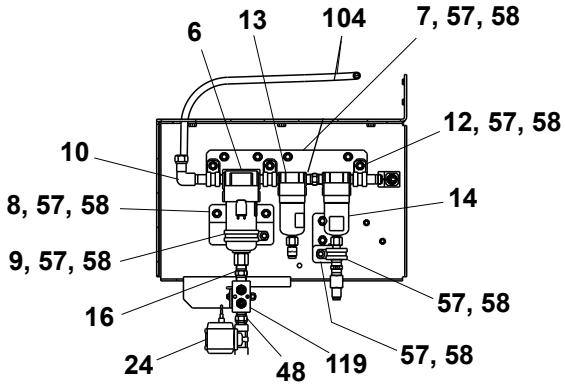


14 Parts List for EverFRESH Kit, ML5, MCHE

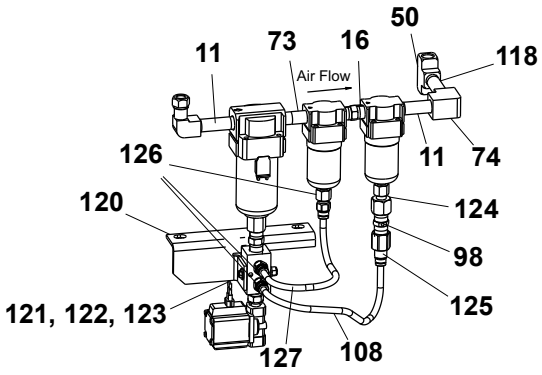




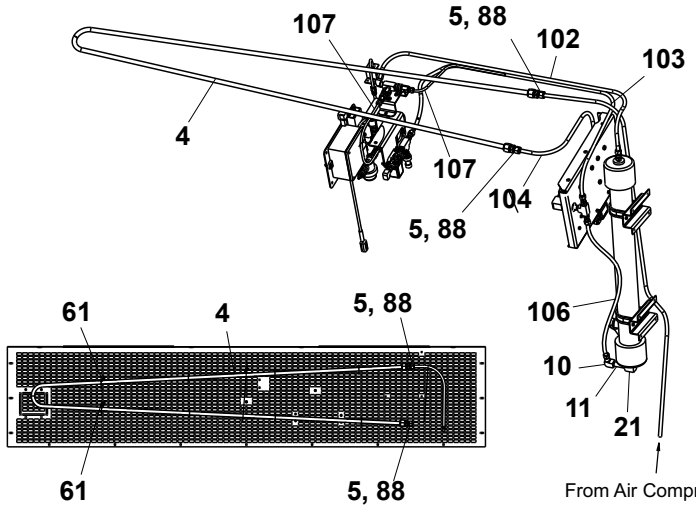
Section D-D

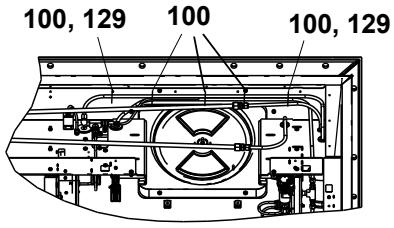


Section C-C

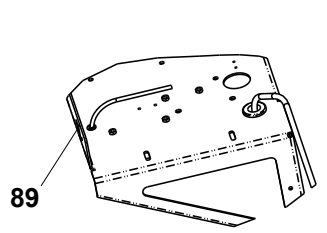


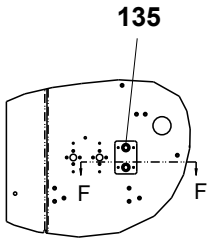
H2O Separator / Air Filter Assembly

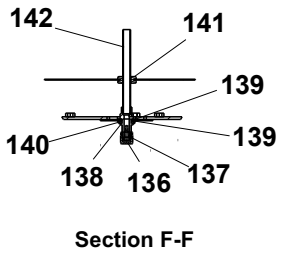




14 Parts List for EverFRESH Kit, ML5, MCHE







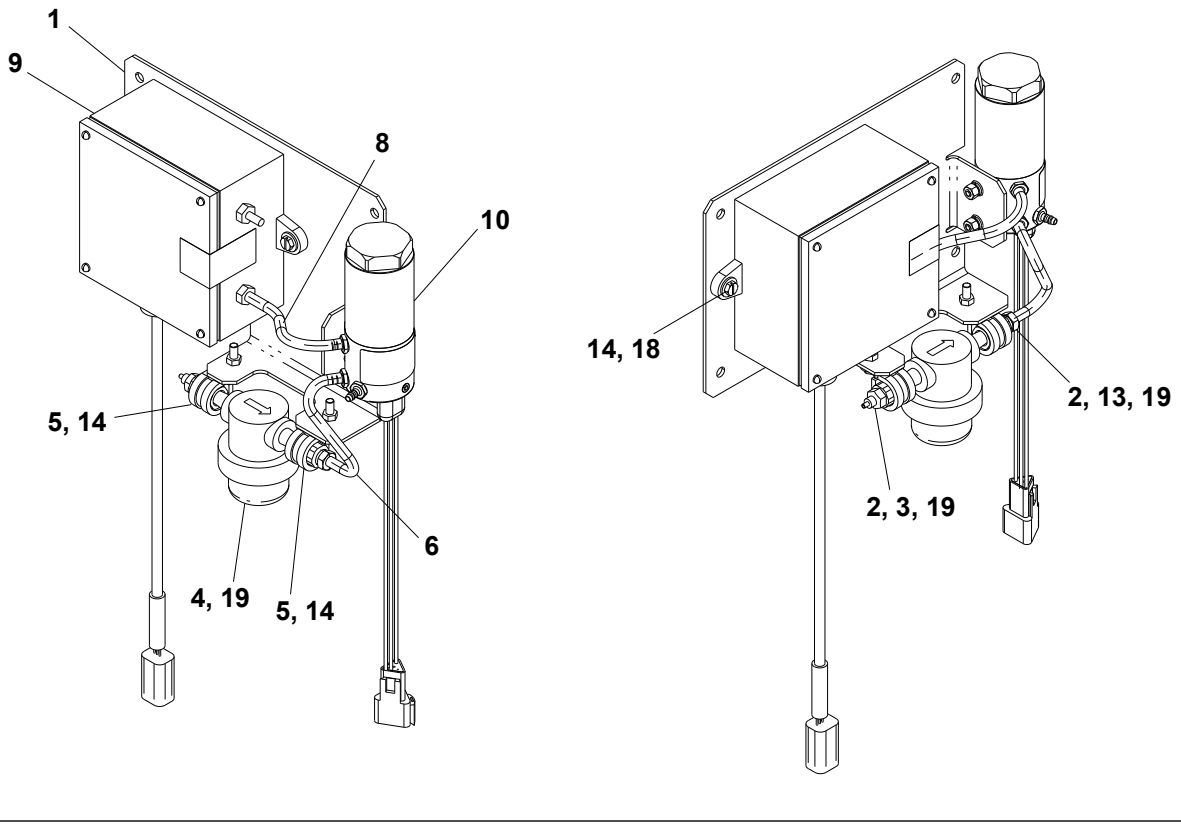
Item	Part Number	Description	Qty
1	18-10185-00	Compressor	1
2	68-18687-00	Bracket	1
3	40-00342-03	Elbow, Male	2
4	56-09581-00	Tube, Heat Trans	1
5	40-00789-00	Adapter	2
6	30-00554-00	Separator - Includes:	1
	30-00554-20	O-Ring	1
7	68-18588-00	Bracket	1
8	68-18642-00	Bracket	1
9	34-00373-75	Clamp, Tube	1
10	40-00671-00	Fitting	2
11	40-01176-04	Nipple	3
12	44-00102-51	Clamp, Cushioned	3
13	30-00558-00	Filter - Includes:	1
	30-00558-20	O-Ring	1
	30-00558-21	Filter	1
14	30-00558-01	Filter - Includes:	1
	30-00558-20	O-Ring	1
	30-00558-22	Filter	1
16	40-00067-02	Nipple, Hex	2
17	65-00230-00	Separator	1
18	68-86414-00	Bracket	2
19	66-U---1--5732-19	Clamp, Tube	2
20	40-00342-05	Elbow, Male	1
21	40-00060-09	Elbow, Male	1
22	40-00343-03	Connector, Male	1
24	40-00792-00	Valve, Solenoid	3
25	68-18563-01	Plate, Mounting	1
26	40-01176-03	Nipple	4
28	40-00345-01	Connector	3

14 Parts List for EverFRESH Kit, ML5, MCHE			
29	34-00373-53	Clamp, Tube	5
30	40-00790-00	Orifice	1
31	40-00790-01	Orifice	1
32	40-00249-01	Tee, Male Branch	1
33	40-00345-02	Connector	1
34	68-18564-00	Channel	1
35	79-66787-01	Sensor Assembly (See **Parts List for Sensor Assembly (MCHE)**)	1
36	68-18541-01	Brace, Support	1
37	68-18542-01	Grille	1
38	42-00174-134	Gasket	1
39	68-14739-00	Bracket	1
40	40-00640-00	Union, Bulkhead	1
41	58-00065-84	Grommet	1
42	58-04497-01	Tube	2
43	58-05188-01	Tube	1
48	40-00067-04	Nipple, Hex	1
49	40-00794-00	Coupling, Pipe	1
50	40-00107-02	Tee	2
53	34-00807-08	Screw, Cap Hxhd	8
54	34-00663-13	Washer, Lock	8
55	66-U---1--5321-17	Washer, Plain	8
56	34-06053-02	Washer	8
57	66-U---1--5361-25	Screw, Cap Hxhd	26
58	66-U---1--5321-7	Washer, Plain	19
60	34-06053-00	Washer	13
61	58-00969-00	Wire Tie	9
69	34-06053-15	Washer	6
70	66-U---1--5321-8	Washer, Plain	8
71	66-U---1--5371-6	Screw, Mach Hxhd	8
72	34-00928-09	Rivet, Blind	8
73	40-01176-05	Nipple	1
74	40-00512-04	Elbow, Union	1
76	40-00343-02	Connector, Male	3
78	34-00373-07	Clamp, Tube	1
79	34-00373-05	Clamp, Tube	1
88	40-00601-09	Tube, Support	2
89	58-00065-48	Grommet	1
90	40-00512-00	Elbow, Union	1

14 Parts List for EverFRESH Kit, ML5, MCHE			
91	44-00102-72	Clamp, Cushioned	4
92	34-06212-13	Washer, Plain	6
93	34-00792-06	Screw, Cap Hxhd	6
94	34-00663-12	Washer, Lock	6
95	58-00065-100	Grommet	2
98	40-00795-00	Valve, Check	2
99	40-00345-04	Connector, Fem	2
100	58-00079-02	Sta-Strap	5
101	58-04026-138	Protector	2
102	58-00508-70	Tube	1
103	58-00508-107	Tube	1
104	58-00508-104	Tube, Black	1
105	58-00508-105	Tube	1
106	58-00508-106	Tube	1
107	58-00507-24	Tube, Black	2
108	58-00507-16	Tube, Black	2
109	42-00425-163	Insulation, Tube	1
110	58-00079-00	Sta-Strap	1
111	62-66172-00	Label	1
112	44-00102-53	Clamp, Cushioned	2
113	58-05188-02	Tube	1
114	40-00121-01	Bushing	1
115	06DA-403---844	Valve Assembly	1
116	12-00352-08	Transducer	1
117	68-18639-00	Bracket	1
118	40-01176-07	Nipple	1
119	48-00515-00	Manifold	1
120	68-18640-00	Bracket	1
121	66-U---1--5371-11	Screw, Hxhd	1
122	34-06212-08	Washer, Plain	2
123	34-00667-08	Nut, Self Lock	1
124	40-00253-01	Adapter	1
125	40-00796-00	Fitting	1
126	40-00616-00	Connector, Male	3
127	58-00507-13	Tube, Black	1
129	58-04316-00	Base, Mounting	2
130	58-05137-00	Collar	2
131	42-66643-00	Gasket	2

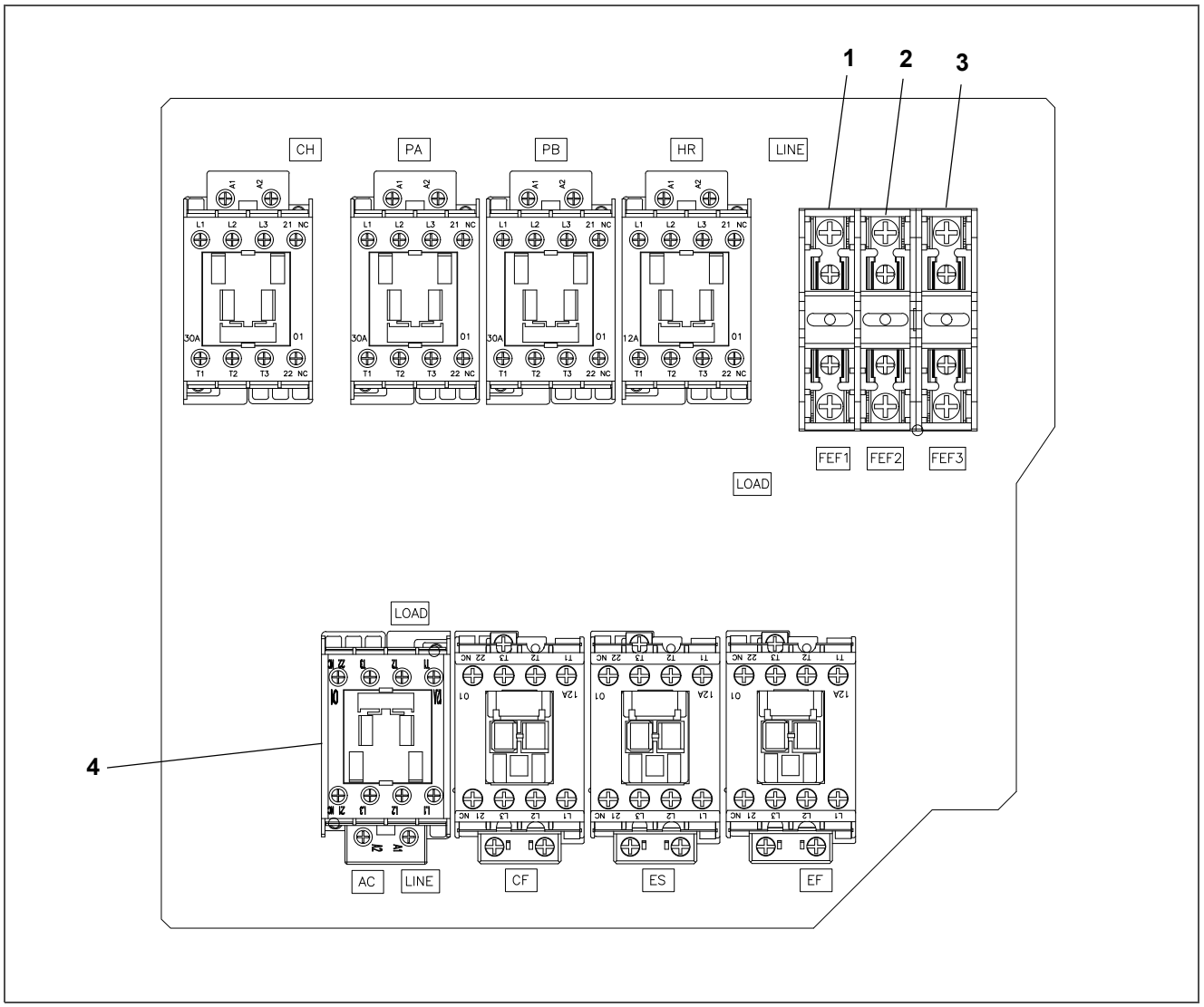
14 Parts List for EverFRESH Kit, ML5, MCHE			
132	--PF--20----21	Sealer	.0005
133	40-00601-05	Tube, Support	1
134	66-U---1--5321-3	Washer, Plain	13
135	69NT--35--7892	Plate	1
136	--DD--19CA-061	Cap	2
137	--EC--39DM-070	Core	2
138	40-00483-01	Fitting, Bulkhead	2
139	34-06053-07	Washer	4
140	34-00663-14	Washer, Lock	2
141	58-00065-12	Grommet	2
142	99TS0628CK004500	Tube, Straight	2
143	66-U---1--5361-50	Screw, Cap Hxhd	6
144	69NT--35--1618	Label	1
			77-66037-02

15 Parts List for Sensor Assembly (MCHE)



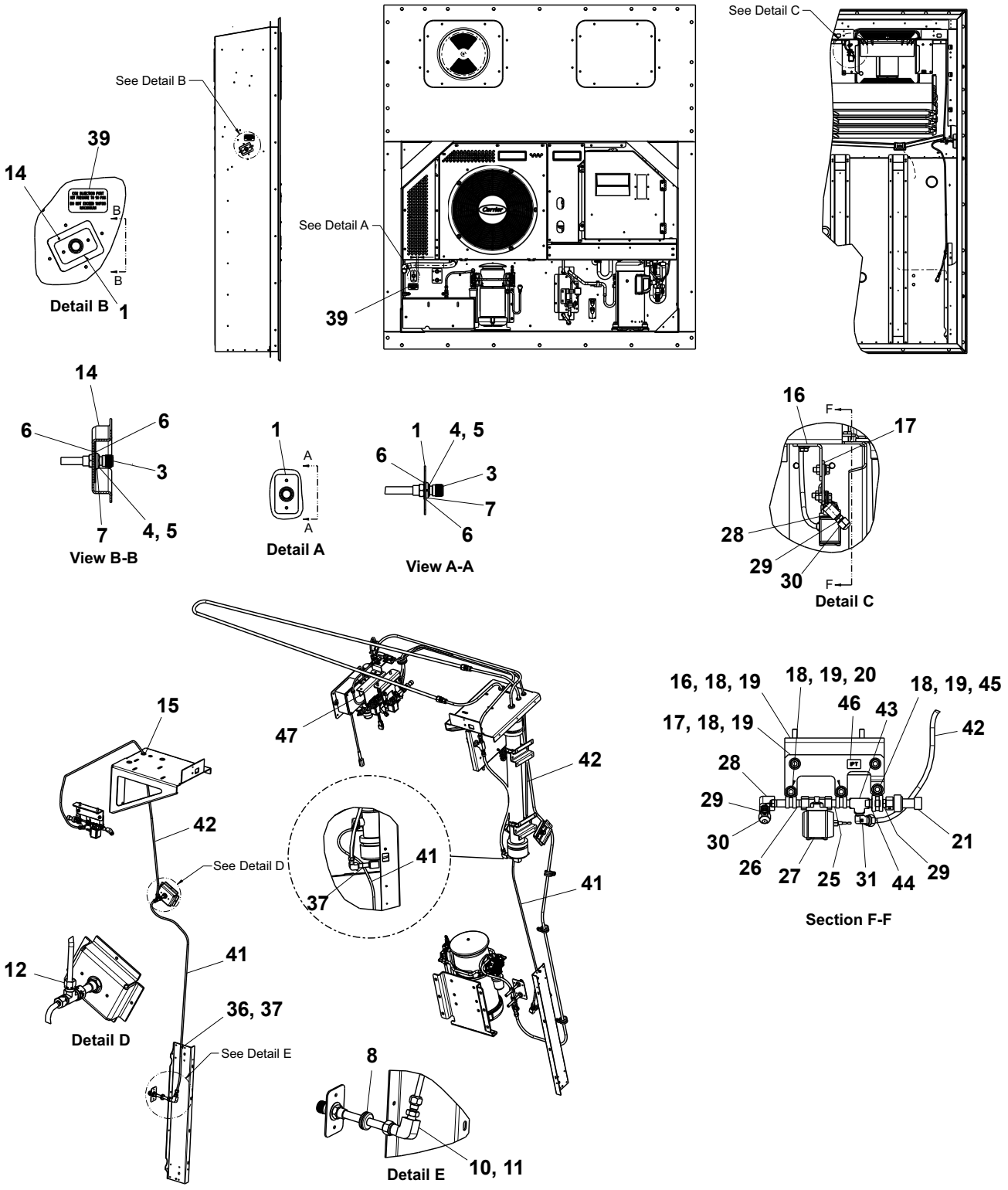
Item	Part Number	Description	Qty
	79-66787-01	Sensor Assembly - Includes:	1
1	68-17351-01	Plate	1
2	40-00297-00	Coupling	2
3	40-00108-03	Coupling	1
4	30-00415-01	Filter Assembly	1
5	34-00373-07	Clamp, Tube	2
6	58-04497-08	Tube	1
8	58-04497-07	Tube	1
9	10-00398-01	Sensor	1
10	12-00852-01	Sensor Assy	1
13	--KA--70PP-048	Fitting, Hose	1
14	66-U---1--5371-6	Screw, Mach HxHd	4
18	66-U---1--5321-8	Washer, Plain	2
19	30-00415-20	Bowl	1
20	30-00415-21	Gasket (not pictured)	1
21	30-00415-22	Filter (not pictured)	1
			79-66787-01

16 Parts List for Control Box Components



Item	Part Number	Description	Qty
1	22-04043-01	Fuse FEF1	1
2	22-04043-01	Fuse FEF2	1
3	22-04043-01	Fuse FEF3	1
4	10-00431-00	Air Compressor AC Contactor	1

17 Parts List for CO2 Injection Kit (Option)



17 Parts List for CO2 Injection Kit (Option)

Item	Part Number	Description	Qty
1	68-18715-00	Plate	2
3	--DD--19CA-061	Cap	2
4	--EC--39DM-070	Core	2
5	40-00483-01	Fitting, Bulkhead	2
6	34-06053-07	Washer	4
7	34-00663-14	Washer, Lock	2
8	58-00065-12	Grommet	1
10	40-00671-00	Fitting	1
11	40-00343-01	Connector, Male	1
12	40-00805-00	Tee, Union	1
14	68-18744-00	Bracket, Mounting	1
15	58-00065-14	Grommet	1
16	68-18723-00	Bracket	1
17	68-18792-00	Bracket	1
18	66-U---1--5361-25	Screw, Cap Hxhd	7
19	66-U---1--5321-7	Washer, Plain	7
20	34-00373-53	Clamp, Tube	2
21	12-00352-08	Transducer	1
25	40-01176-03	Nipple	1
26	40-01176-02	Nipple	1
27	40-00792-00	Valve, Solenoid	1
28	40-00512-00	Elbow, Union	1
29	40-00108-03	Coupling	2
30	40-00806-00	Cap, Flare	1
31	40-00342-00	Elbow, Male	1
36	58-04316-00	Base, Mounting	1
37	66-U---1--3882	Wire Tie	10
39	62-12272-00	Label	2
41	58-00507-79	Tube, Black	1
42	58-00507-95	Tube, Black	1
43	40-00107-01	Tee	1
44	40-01137-03	Adapter	1
45	34-00373-07	Clamp, Tube	1
46	62-10530-55	Label	1
47	62-10530-54	Label	1

77-04044-01

China RoHS per SJ/T 11364-2014

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属板部件	O	O	O	O	O	O
塑料部件	O	O	O	O	O	O
加热部件	O	O	O	O	O	O
马达与风扇组件	X	O	O	O	O	O
接触器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
传感器	X	O	O	O	O	O
阀组件	O	O	O	O	O	O
电缆线	O	O	O	O	O	O
标签与绝缘材料	O	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

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