



## Inside This Issue

## TechFact


## TechFact – Training Registration Changes for 2014

One key change to help encourage earlier course enrollment is the implementation of Early Registration discounts. If you register for a course before the Early Registration date, 10% discount on the course fee will be automatically applied at check out.

The start page for finding training has been improved to allow sorting of courses by location, course type or start date using the double arrows next to the column titles. A brief overview of the registration process is also included in the header. When you are ready to register, select the course you wish to attend using the register button on the left of the course details. This will bring up the detail page for the course.

1. The email address you enter on the first page should be verified before proceeding.
2. You will be asked to enter a password at the bottom of the course details page. This password can be anything you wish, but you should note the password you create. You will need to enter your password to go back into your registration at a later date and make changes if required.

When you submit your registration, you will immediately receive an email advising that we have received your request.



**Carrier**  
CLIMATE CONTROLS

## Container Training

Home Page

**Icon Legend**

- School Location Changed
- School Dates Changed
- School Cancelled

For 2014 Carrier Training old Container will changed how registration is carried out and payment will be made.

Over the last few years many people have requested to make payments by credit card to pay for training courses. An outside provider "Reg Center" will handle registration by credit card and payments.

When registering for a course in 2014 you will first be asked to enter an email address and you will need to create a password that allows you to come back and ensure that security is maintained. Once this is done once the system will request a second time of registering for additional courses or coming back to the system.

Registrations received before the Early Registration Deadline shows against a the course price.

To view a course description, or training for a school - click on "Register" in the list.

For further information about registering on refrigerated containers, please contact at: (715) 435-0441

Register Course Dates	Early Registration Deadline	Course Title	Course Type
Register 03/05/2014 - 03/05/2014	01/03/2014	3-Day Container	3-Day Container
Register 03/05/2014 - 02/07/2014	01/06/2014	3-Day Container	3-Day Container
Register 03/10/2014 - 02/11/2014	01/10/2014	2-Day Gen Set	2-Day Gen Set
Register 03/03/2014 - 03/04/2014	01/31/2014	2-Day Gen Set	2-Day Gen Set
Register 03/10/2014 - 03/07/2014	02/03/2014	3-Day Container	3-Day Container
Register 03/10/2014 - 03/14/2014	02/07/2014	3-Day Container	3-Day Container
Register 03/11/2014 - 03/13/2014	02/07/2014	3-Day Container	3-Day Container
Register 03/11/2014 - 03/12/2014	02/07/2014	Advanced 3-Day	Advanced 3-Day



**C2406 - 1 week Container Basic (English)**

Mon, March 10, 2014 8:00 a.m.  
 Mon, March 10, 2014 4:00 p.m. (Eastern Time)

City Name  
 Training location  
 On-site, from 1000  
 Urban Area  
[View all locations](#)

**Schedule**  
 Class will begin at 8:00 a.m.  
 Records will be transmitted daily at 6:00 p.m. on the last day of the program.

**Course Overview**

This 1-week course is tailored for a technician with one or more years' experience working on refrigerated equipment. The program will include information on and operation, service, and maintenance procedures.

Special emphasis will be placed on the participant's understanding of the capabilities of the various refrigeration systems (such as electronic control systems). Specific areas such as instrumentation, refrigeration and data retrieval, ammonia control systems, compression technology and electrical controls will be covered.

There will be hands-on sessions every day to translate the classroom learning into practice.

**Register Now**

or view training

**Actions**

[List all courses](#)

It also goes to the last advantage of early price.

**Contact Information**

Sharon Kline  
 Service Engineering Administrator  
 Carrier Training Center  
 410 West Avenue, New York, New York 10217  
 718 741 7670  
[skline@carrier.com](mailto:skline@carrier.com)

**Payment Information**

Courses fees are payable by credit card.

If you have training course code enter this on the first page of the registration form.

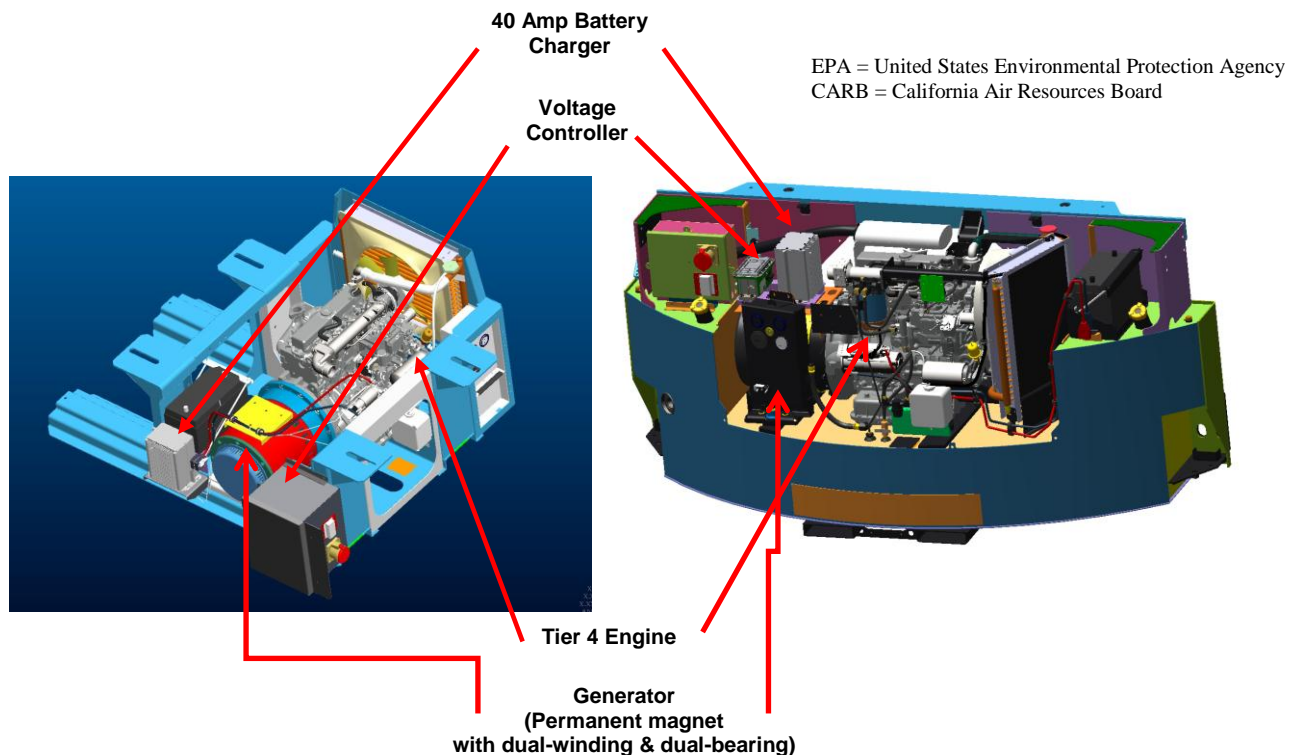
If you have questions contact our service

Approximately 30 days prior to the course start date, you will receive a second confirmation email advising that you have been accepted into the course. You should not make travel arrangements to attend the course until after you receive the second confirmation email.

The individual cancelation policy has been updated and is shown on the detail page for each course.

## TechFact - Tier 4 PowerLINE® with ecoFORWARD™ technologies

Carrier Transicold introduced the EPA Tier 4 compliant generator set option primarily for North America in 2013. To meet the U.S. EPA diesel emissions regulations, Carrier has incorporated the Kubota Tier 4 compliant engine in both the Undermount (UG) and Clip-On (RG) generator sets. Along with compliance, the Tier 4 genset comes standard with an automatic two-speed control, which provides up to 34% fuel savings compared to previous single speed units. The Tier 4 unit is compliant with CARB standards for the first seven years. To be used in California beyond 7 years, the unit requires the addition of Carrier's engine emission system (EES).



The changes consist of the following:

- Kubota 2.2 L engine (P/N 26-00136-04SV) providing 18.5 kW that complies with applicable EPA standards in the 8-19 kW class..
- 15 kW permanent magnet generator (P/N 54-00669-20) with a dual bearing. This is an ultra-high efficiency generator with 94% efficiency level. It is directly bolted to the engine, supplying nominal 50/60Hz power depending on the load requirement.
- Voltage Controller (P/N 12-00707-01) to maintain ISO voltage via two-speed and dual winding control. It is used to regulate voltage in order to keep the generator output within ISO limits.

The voltage controller has one green indicator light and one yellow indicator light on the side. When the green light is illuminated, it means that the voltage controller is receiving power. The yellow light will flash once per second if operating normally. Intermittent flashing as detailed below indicates a problem (refer to operations & service manual).

Green LED	Fault	Possible Cause/Remedy
LED not illuminated	No power to the voltage controller	Contactors failed Check line side power on contactors
Yellow LED flash code	Fault	Possible Cause/Remedy
One Long-Two Short	Voltage Controller Fault	Failed voltage controller, replace
One Long-Three Short	Over Voltage Error	Engine speed, check
One Long-Four Short	Under Voltage Error	Engine speed, check
One Long-Five Short	Hot Start Error	Reset power to the unit
One Long-Six Short	Voltage Controller Fault	Failed voltage controller, replace
One Long-Seven Short	Voltage Controller Fault	Failed voltage controller, replace

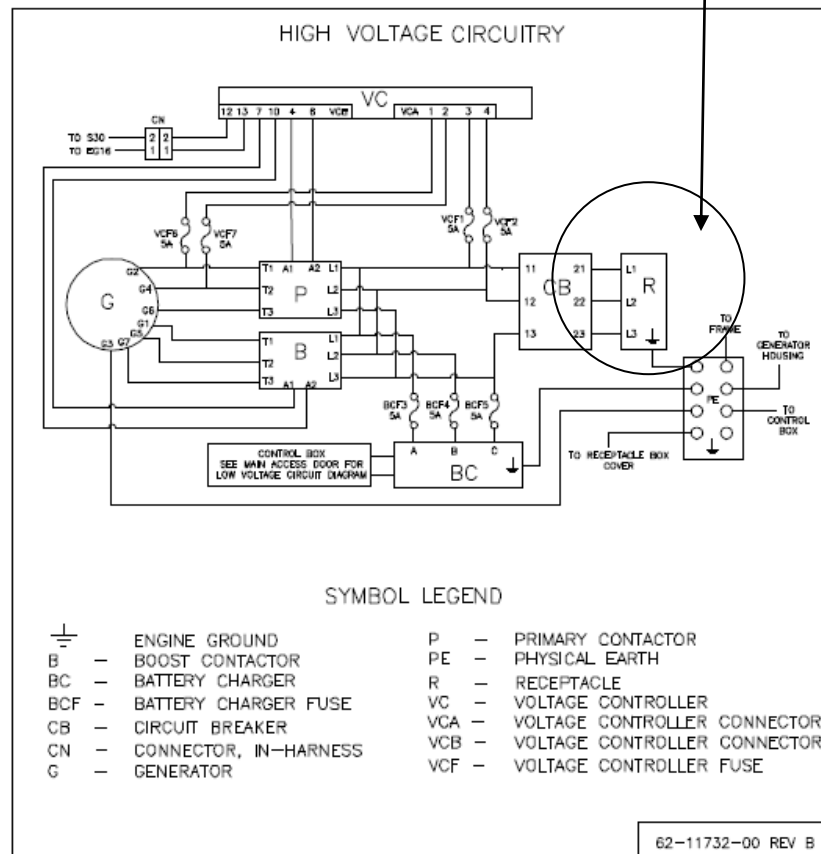
- Battery charger (P/N 12-00683-03) produces controlled charge of 40 Amps maximum and is designed not to overcharge the battery.
- Optional Engine Emission System: the ESS is a diesel particulate filter system, which replaces the existing muffler when installed. The option can be factory or field installed on either the RG or UG unit as required.



Generator Service: The only serviceable parts on the generator are the drive gear (metal), key, fan, and fan cover. If there is a problem with the generator, the entire generator should be replaced. The voltage measurement ranges between 2 receptacle legs (L1-L2, L2-L3, and L1-L3) are:

360 – 460 VAC at 50Hz – 1500 RPM  
400 – 500 VAC at 60Hz – 1800 RPM

The following schematic shows high voltage circuitry for the Tier 4 genset:



The basic operation and starting procedure remains the same as previous versions of Carrier Gensets. The units still have a toggle switch used for preheat. The preheat period is still a manual operation and dependent upon the ambient temperatures. After preheating and starting the engine using the “START” switch, the air intake heater will remain energized for 3 minutes after the release of the air intake heater switch. During this 3 minute heater “ON” period, the Amp meter in the control box will indicate a system discharge (40 Amps draw). On termination of the 3 minute heater “ON” period, the heater turns “OFF”, and the Amp meter will then indicate a positive charge to the battery.

Gensets will start at 50Hz. Once the unit is running, the voltage controller will read the voltage output of the generator and adjust accordingly, to keep the voltage within ISO limits. As the Container becomes loaded, voltage drops and current increases, the genset will switch windings or speed based on power demand and ambient conditions. The unit will typically run at 50Hz and will vary generator output via winding selection. The speed change to 60 Hz will typically occur when the ambient temperature is high and the unit is heavily loaded.



## TechFact – XtendFRESH™

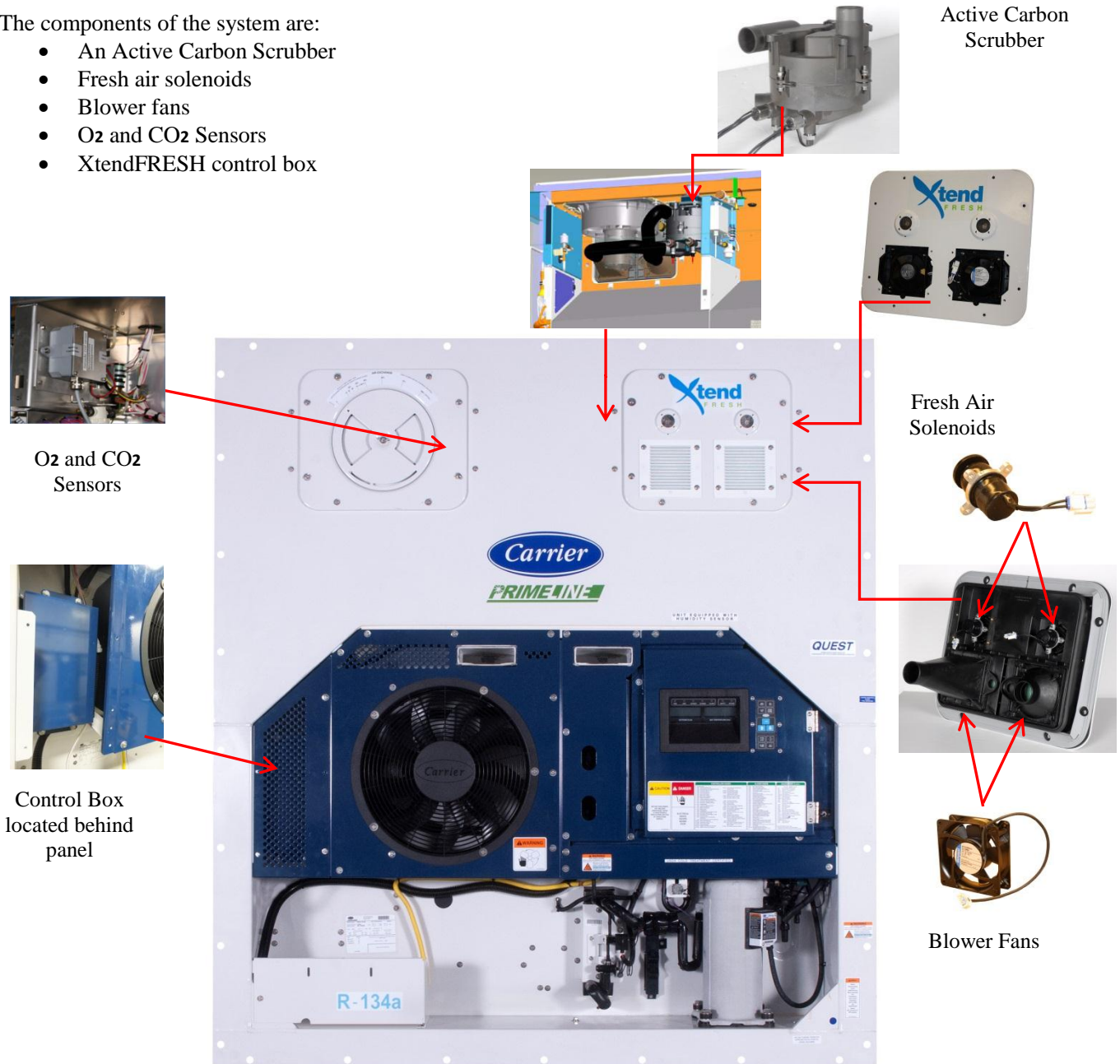
The XtendFRESH™ atmosphere control system is a modular option that offers enhanced functionality to help slow the ripening process of perishable cargo by removing ethylene and simultaneously controlling CO<sub>2</sub> and O<sub>2</sub> levels in multiple combinations, enabling the fresh transport of perishables on longer voyages. The system's ability to control the container atmosphere is performed with the use of a CO<sub>2</sub> and ethylene scrubber. In this article, we will review the key features and operation of the system.

### Structural Overview:

The XtendFRESH system consists of several new components that control the oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>) as well as removing ethylene within the container during the voyage.

The components of the system are:

- An Active Carbon Scrubber
- Fresh air solenoids
- Blower fans
- O<sub>2</sub> and CO<sub>2</sub> Sensors
- XtendFRESH control box



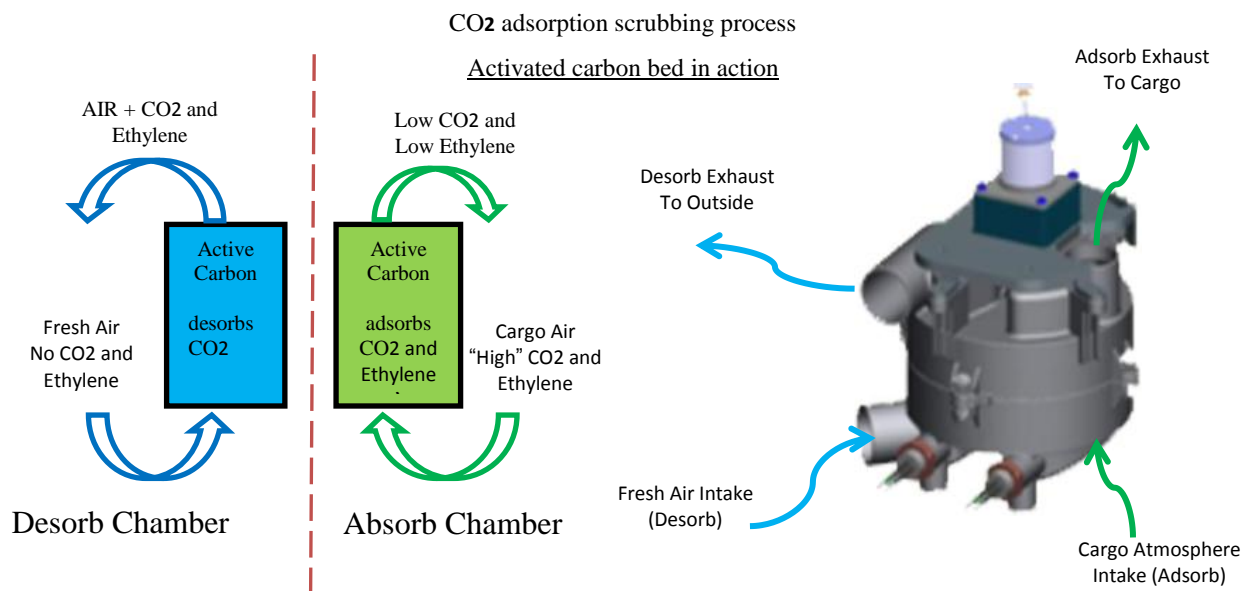
XtendFRESH™ Unit



---

## Operational Overview:

In the “XtendFRESH” mode, the system scrubs the internal cargo air. During the process, CO<sub>2</sub> and ethylene are removed from the container. The system then maintains pre-set values for oxygen and carbon dioxide by opening and closing of mechanical air vents or by fresh air exchange across the scrubber assembly.



**Modes of operation:** When setting any mode of operation, the entire process must be followed to ensure all parameters are set.

The function codes are specific parameters for operation or a visible display of component conditions. The function codes for XtendFRESH are Cd44 and Cd43. Cd44 displays the XtendFRESH values set for the CO<sub>2</sub> and O<sub>2</sub> sensors. Cd43 is used to select the mode of operation and the associated parameters, OFF, XtendFRESH, TEST.

1. **OFF:** In the “OFF” mode, all XtendFRESH operations will be disabled. The XtendFRESH vents will be closed, and the scrubber will remain off. This will be the default, anytime a frozen mode of operation has been selected.
2. **XtendFRESH:** The user can activate the feature and set the control parameters in this mode. With XtEND shown in the right display window, pressing “ENTER” will activate a submenu. From the submenu user can set values for the oxygen limit (O2LM) and carbon dioxide limit (CO2LM) values.
  - O2LM -- is the minimum level of O<sub>2</sub> that is allowed for the cargo. The range is from 3% to 21% in 1% increments, the default setting is 10%.
  - CO2LM -- is the maximum level of carbon dioxide that is allowed for the cargo. The range is from 0% to 19% in 1% increments, the default setting is 0 %.
3. **TEST MODE:** Upon entering TEST MODE there are two options available (TEST, and CAL). Each of the different modes are explained in detail below. Use the up or down arrow keys to select either the TEST, or CAL option.

When tEST is shown in the display, pressing the “ENTER” key will energize the contactor to start the blower fans and the scrubber motor. A visual / physical check is required to confirm the operation. After completion of the tEST, the unit will return to the previous mode of operation.

When “CAL” is shown in the display, pressing the “ENTER” key will activate an additional sub menu for CO<sub>2</sub> sensor calibration (COCAL) or the O<sub>2</sub> Sensor calibration (O2CAL). Use the up or down arrow keys to select the option.

Pressing and holding the “ENTER” key while the selected test “COCAL” or “O2CAL” is displayed will activate the sensor calibration. When “Epty box” is displayed, confirm the box is empty, then press and hold the “ENTER” key until the calibration time begins (approximately 10 seconds). This will energize high speed evaporator fans and the fresh air vents will be opened. “CAL” will be flashed on the display during calibration, along with a 10 minute countdown timer.

### **XtendFRESH Alarms:**

The alarms associated with the system are alarms 09, 10 and 29. Alarm 09 is for the O<sub>2</sub> sensor and alarm 10 is for the CO<sub>2</sub> sensor. If either sensor is determined to be invalid, its associated alarm will be generated. The alarm will remain active until the sensor reading is determined to be valid. Alarm 29 is generated when the unit has gone out of range (O<sub>2</sub> falls 1% below set point and/or CO<sub>2</sub> rises 1% above set point) for more than 90 minutes. The alarm is triggered off when the levels return to within the normal range.

During an alarm condition resulting from a faulty CO<sub>2</sub> sensor, the controller will open the fresh air solenoids. If the fault condition is a result of the O<sub>2</sub> sensor, the controller will use an estimated O<sub>2</sub> value, based on the ambient air O<sub>2</sub> level (21 %) minus the CO<sub>2</sub> level in the cargo return air.

### **Container Preparation:**

When using the XtendFRESH system, the box must conform to certain maximum permissible leak rates, in order to maintain control of the container environment. Pressurize the container above 2 inches of water column, and then measure the time required for the pressure to decay from 2 inch WG (50mm) to 1 inch WG (25mm). The acceptable time span is 8 minutes or more for a 40 foot container and 4 minutes or more for a 20 foot container. If the test results indicate unacceptable leakage rates, then sealing of the container box is required. The maximum allowable leakage rate must be maintained for the system to reach and maintain the desired O<sub>2</sub> and CO<sub>2</sub> set points.

To check for container leaks, please perform the following:

- Check for proper installation of poly sheet curtain.
- Check the units drain line and fill with water, if necessary.
- Check for proper installation of the unit access panels.
- Check unit/container box joints and caulk if necessary.
- Inside the container, check floor drains, check floor to side wall joint, floor to front bulkhead joint, side wall to front bulkhead joint and ceiling to front bulkhead, repair or caulk as necessary.

This article gives you a general review of the unit. More detail on the **XtendFRESH** product and benefits listed below can be found in our October ContainerLINE® newsletter found at our website, <http://www.carrier.com/container>. If you have any questions, please contact your regional service engineer, or plan to attend a Carrier Transicold training school in 2014.

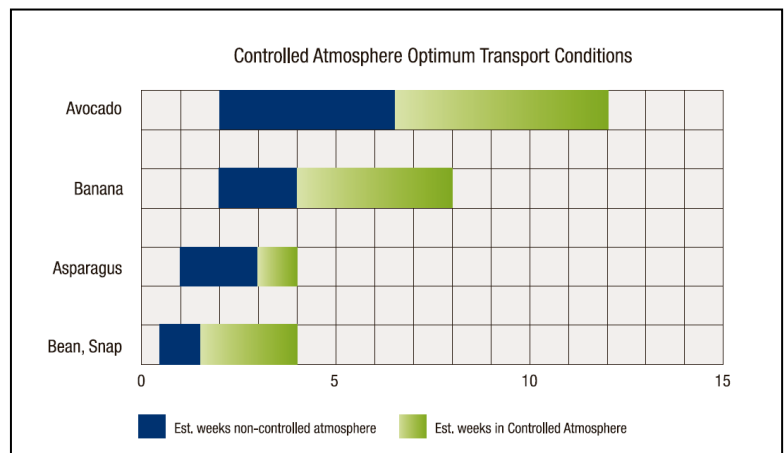
### **XtendFRESH Benefits:**

Longer shelf life

Longer voyages

Slower ripening

Maintain optimum quality



Source: University of California at Davis and the former Davis Fresh Technologies, LLC.

---

### **TechFact – Pre-trip P6-5 (Compressor Leak Test)**

PrimeLINE® unit Pre-trip P6-5 ensures that the compressor holds pressure, assuming the EEV, DUV and ESV are not leaking.

At the start of pre-trip P6-5, the compressor will run a pump up / pump down test. On completion, the compressor is turned off for 62 seconds. If suction side pressure holds for 10 seconds with less than an 8 psi rise in suction pressure, pre-trip test P6-5 passes, otherwise, the test fails.

A failed test could be the result of a leaking valve, failure of the suction pressure transducer or a leaking compressor. With this, you should first check the transducer by removing and comparing its output reading when placed at atmospheric pressure. If the transducer is okay, you should proceed to run pre-trip P7 (High Pressure Test). P7 is the pre-trip check to test the high pressure switch of the compressor. A leaking compressor will not generate the parameters needed to complete this pre-trip successfully. If it passed P7, then you should trouble shoot each of the valves listed above, for leaks.

---

### **TechFact – SALT ASSAULT**

Understanding the cause of metal corrosion in the marine industry should go a long way toward acknowledging the need for preventative maintenance of reefer machinery.

Sodium chloride found within sea water directly attacks the reefer metals through chemical and/or electrochemical corrosion.

Chemical corrosion and oxidization of the reefer begins when sodium chloride mixes with moisture and increases acidity levels on the metals. Simply put, this starts an oxidization process of the metal through a breakdown of the ions at the atom level of the metal.

Electrochemical corrosion is when two dissimilar metals are bridged forming an electrode (anode/cathode) process between the metal and, or alloys causing galvanic corrosion. When salt deposit forms between these dissimilar metals, it acts as a catalyst, intensifying the galvanic relationship corroding the metal, resulting in rust. In order to prevent rust we must safeguard against the natural eroding relationship between metals and alloys by preventing settling of salt on the reefer components.

Carrier Transicold manufactures reefers using quality marine paints and separation materials between dissimilar metals and alloys.

During the reefers' life-cycle, these protective marine paints are exposed to environmental and operational forces such as UV light, handling impact, heating, debris during road transport and the biggest culprit being sea water. It is imperative and logical that any salt deposits, paint chips, structure damaged or paint flacks to the reefers' environmental protection layers during its life must be washed and continuously maintained at every possible chance. Continuous washing off of salt deposits to prevent the onset of corrosion to the reefer must be a standard practice with in the marine industries to protect metal or alloyed components.

All too often, we see reefers with extreme salt deposits that are left unattended. Example of a compressor with excessive salt formation:



As an industry, this practice needs attention. As a leading manufacturer of marine reefer products, we strongly recommend that the practice of washing reefers be adopted as a standard preventative maintenance requirement.

---

### **TechFact – Software Release Update**

Listed below are the software release versions for operating and working with Carrier Transicold units. Prior to upgrading units you should seek agreement from the equipment owners.

Recip (ML2i/ML3, 5157) / Scroll (ML2i/ML3, 5358)  
Reciprocating Unit (ML2) – 1207  
Controlled Atmosphere – 3115  
DataLINE – 2.2 / DataBANK – 0513  
Menu - 0115

After completing a software upgrade, it is important for the user to check the user selectable controller selections. (i.e. defrost setting, set point, etc.).



**TechLINE is a publication of Carrier Transicold**  
**Editor / Contributor:** Perry Hoover

**Contributors:** Dean Bouch, Mark Donahoe, Nadir Guenane, Mark Rogers, David Whyte

**Thanks to all who supported this release.**



## TechFact: 2014 Training Schedule.

The following list shows the planned formal Carrier Transicold container schools for 2014. These schools are attendance-controlled to ensure that the high quality level of training is maintained. Registering early has two benefits. First you take advantage of the early registration discount, and second a seat is reserved for you for courses that fill up quickly.

After registering on <http://www.carrier.com/container>, (in the Service and Aftermarket Support / training section), you will receive an email informing you that we have received your registration request. You will receive a second final confirmation email approximately 30 days prior to the course. You should not make any guaranteed reservations for travel and accommodations until you have received the confirmation email.

JANUARY	Program	Location	Language(s)	Course Number
	No classes scheduled			
<b>FEBRUARY</b>				
3 - 5	3-Day Container Product Update	Santo Domingo, DR	Spanish	2401
5 - 7	3-Day Container Product Update	Agadir, Morocco		2402
10 - 11	2-Day Genset	Agadir, Morocco		2403
<b>MARCH</b>				
3 - 4	2-Day Genset	Long Beach		2404
5 - 7	3-Day Container Product Update	Long Beach		2405
10 - 14	1-Week Container	Seattle, WA		2406
11 - 12	2-Day Container Product Update	Brisbane, Australia		2407
11 - 13	3-Day Container Product Update	Mexico City, Mexico	Spanish	2408
24 - 25	2-Day Genset	Savannah, GA		2409
25 - 27	3-Day Container Product Update	Rio Grande, Brazil		2410
26 - 28	3-Day Container Product Update	Savannah, GA		2411
26 - 28	Part A - 3 Day Refrigerated Container Basic	Melbourne, Australia		2412
<b>APRIL</b>				
7 - 9	3-Day Container Product Update	Montreal, Canada		2413
8 - 10	3-Day Container Product Update	Montevideo, Uruguay	Spanish	2414
10 - 11	2-Day Genset	Montreal, Canada		2415
15 - 16	2-Day Container Product Update	Rotterdam, Netherlands		2416
22 - 24	3-Day Container Product Update	Talcahuano, Chile	Spanish	2417
23 - 25	3-Day Container Product Update	Houston, TX		2418
<b>MAY</b>				
5 - 6	2-Day Genset	Callao, Peru	Spanish	2419
5 - 7	3-Day Container Product Update	Perth, Australia		2420
7 - 9	3-Day Container Product Update	Callao, Peru	Spanish	2421
12 - 16	1-Week Container	Oakland, CA		2422
21 - 22	2-Day Container Product Update	HCMC, Vietnam		2423
21 - 22	2-Day Container Product Update	Felixstowe, UK		2424
21 - 23	3-Day Container Product Update	Livorno, Italy		2425
26 - 30	1-Week Container	Port Klang, Malaysia		2426
<b>JUNE</b>				
9 - 11	Part A - 3 Day Refrigerated Container Basic	Port Moresby, New Guinea		2455
9 - 13	1-Week Container	Chicago, IL		2427
9 - 13	1-Week Container	Puerto Barrios, Guatemala	Spanish	2428
16 - 20	1-Week Container	Odessa, Ukraine		2429
17 - 18	2-Day Container Product Update	Aarhus, Denmark		2430
18 - 20	3-Day Container Product Update	Buenos Aires, Argentina	Spanish	2431
23-28	1-Week Container	Guayaquil, Ecuador	Spanish	2432
<b>JULY</b>				
	No classes scheduled			
<b>AUGUST</b>				
11 - 13	Part A - 3 Day Refrigerated Container Basic	Tauranga, NZ		2433
14 - 15	2-Day Container Product Update	Tauranga, NZ		2434
20 - 22	3-Day Container Product Update	San Antonio, Chile	Spanish	2435
26 - 28	3-Day Container Product Update	Bangkok, Thailand		2436
26-28	3-Day Container Product Update	Jacksonville, FL		2437
<b>SEPTEMBER</b>				
1 - 3	3-Day Container Product Update	San Jose, Costa Rica	Spanish	2438
4 - 5	2-Day Genset	San Jose, Costa Rica	Spanish	2439
17 - 18	2-Day Container Product Update	Pusan, Korea		2440
22 - 26	1-Week Container	West Africa		2441
24 - 25	2-Day Container Product Update	Bremerhaven, Germany		2442
<b>OCTOBER</b>				
1 - 2	2-Day Container Product Update	Cape Town, South Africa		2443
6 - 10	1-Week Container	Durban, South Africa		2444
7 - 9	3-Day Container Product Update	Fos Sur Mer, France		2445
13 - 15	3-Day Container Product Update	Barcelona, Spain	Spanish	2446
16 - 17	2-Day Container Product Update	Ismir, Turkey		2447
20 - 22	3-Day Container Product Update	Itajai, Brazil		2448
20 - 24	1-Week Container	Long Beach, CA		2449
<b>NOVEMBER</b>				
10 - 14	1-Week Container	Xiamen, China	Chinese	2450
11 - 12	2-Day Container Product Update	Salalah, Oman		2451
20 - 21	2-Day Container Product Update	Yokohama, Japan		2452
26 - 27	2-Day Container Product Update	Davao, Philippines		2453
<b>DECEMBER</b>				
1 - 3	3-Day Container Product Update	Cartagena, Colombia	Spanish	2454