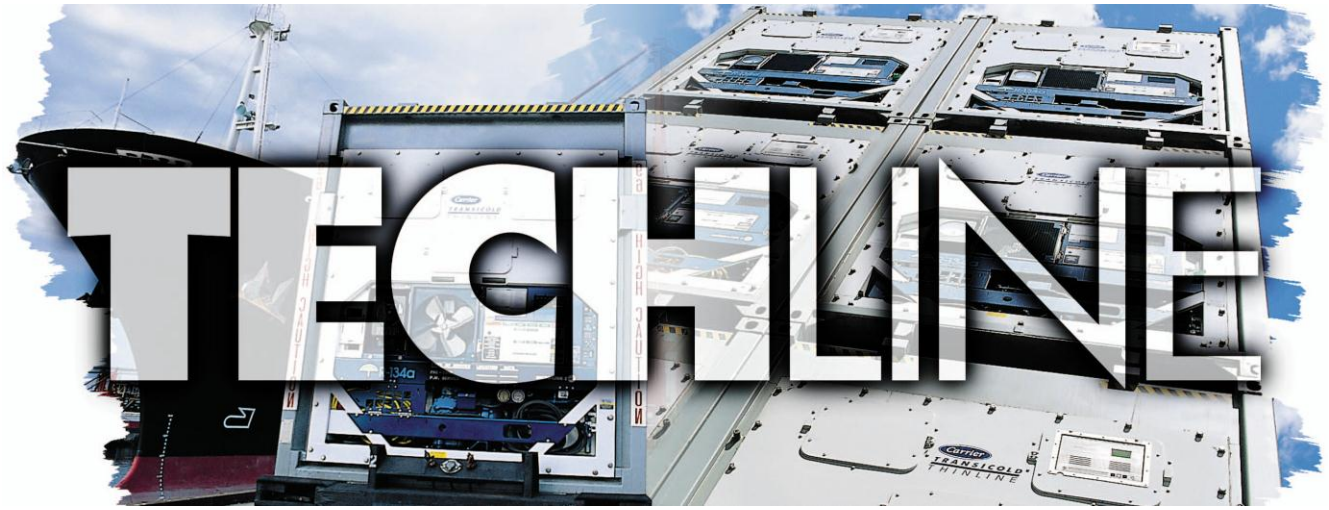
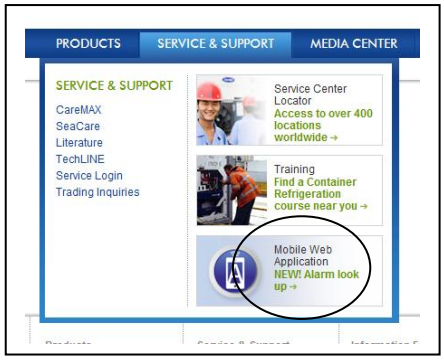


AN EXCHANGE OF TECHNICAL INFORMATION
VOLUME 20 NUMBER 1a ABOUT CARRIER TRANSICOLD CONTAINER PRODUCTS **June 2014**

Inside This Issue

Tech*Fact* – Online Alarm App

In May 2014, Carrier Transicold Global Container Refrigeration released a new mobile alarm lookup web application.



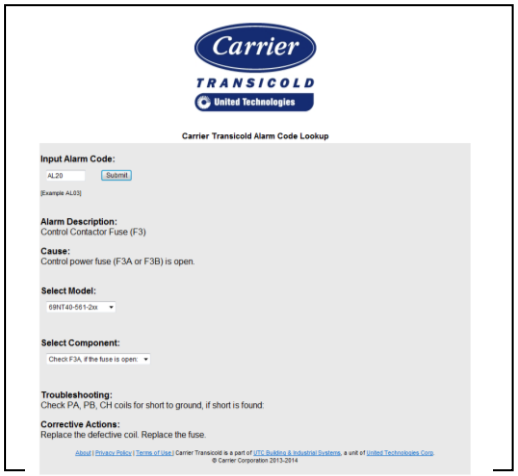
The application provides the basic alarm description, potential causes and repair actions. This simplifies troubleshooting and, in turn, saves technicians time by not having to find and refer to the manual.

Simply enter the alarm number displayed on the unit into the input alarm code box and press Submit. The application will then provide the respective alarm description and cause.

For the specific models as listed below, selecting the model number and component (if applicable) in the application will provide detailed troubleshooting and corrective action as well.

69NT40-541-3xx	69NT40-541-4xx
69NT40-561-2xx	69NT40-561-3xx

Note, for these models, troubleshooting and corrective actions are model-specific; alarm descriptions and causes are typically applicable to ALL models.



Since this is a mobile web application, you do not need to purchase or download or install an app onto a smartphone. Click on the link at http://www.carrier.com/container under Service Support to immediately start the application. The URL below can also be used to create a direct link on your mobile device. (Refer to your device instructions). http://containeralarms.carrier.com/Railo/alarm_app/

Tech*Fact* - CareMAX™ Program

Due to the ongoing concerns of refrigerant contamination in the container refrigeration industry, Carrier Transicold has released the CareMAX™ refrigerant management program. CareMAX stands for Carrier Refrigerant Management Certificate of Excellence, and it is an in depth review of how a refrigeration service provider purchases, manages and uses refrigerant in its day to day operations. CareMAX covers all aspects of the chain of ownership of refrigerant in business life. From the manager to the most inexperienced office staff or technician, everyone has a part to play in achieving the CareMAX.

 # What is the goal of CareMAX? Carrier's CareMAX program is a quality assurance program aimed at minimizing further contamination of the world reefer fleet by the use of poor quality or contaminated refrigerant. It was developed in an effort to proactively address global concerns with regards to the quality of refrigerant being used by Carrier Transicold Service Providers.

 # How does CareMAX work? Carrier authorized service providers (ASPs) who pass the CareMAX audit demonstrate that they have refrigerant management policies in place that cover all aspects of handling refrigerant from the time of refrigerant purchase until the time of refrigerant use.
Companies are required to choose their supplier very carefully, making sure the standards of refrigerant purchased are of the highest quality through the receiving of a certificate of compliance (COA) and test analysis reports relating to the refrigerant they have purchased.

 # What is refrigerant purity level does CareMAX expect? There are many different refrigerant standards globally. No matter what standards suppliers adhere to, the CareMAX program requires that suppliers must meet the AHRI Standard 700 at a minimum. AHRI Standard 700 ensures that the refrigerant purity is 99.5% pure with a maximum moisture content of 10ppm or an acceptable agreed alternative. There are also other characteristics included in the AHRI Standard 700 but the purity and the moisture content are most critical.

 # What is the content of the CareMAX program? Areas of CareMAX program focus include: procurement, administration and practical application. Record keeping is also a key feature of the program, which helps to show how diligent the ASP is when it comes to handling refrigerant. Records expected to be maintained are: COA, cylinder recording and refrigerant testing, equipment maintenance registers, training registers and refrigerant logs covering usage, recovery and disposal of contaminated refrigerant.

 # Who can apply for the CareMAX program? Only Carrier ASPs are able to apply.

 # How does a Carrier ASP apply? Contact your local Field Service Manager expressing your interest in CareMAX and request a copy of the program requirements. The ASP will be expected to complete a self-audit using the detailed program requirements supplied and once the requirements are met and all required documentation has been submitted, the ASP will be ready for [Carrier] inspection. When the Carrier auditor confirms that all areas of the program requirements are met, the ASP will be listed in the service directory as a CareMAX-recognized service location.

Carrier Transicold will promote those ASPs that attain CareMAX program recognition. ASPs that pass the CareMAX audit will be highlighted within its Service Center network listings. ASPs that qualify to use the CareMAX program seal will be identified as doing everything possible to avoid using contaminated refrigerant.

Tech*Fact* -Heater Megohm

Over the years Carrier Transicold has published a number of articles with regard to heaters and megohm readings and when to change heaters. As part of our ongoing review of procedures, we are reissuing this procedure.

C A U T I O N: Before starting this procedure, MAKE SURE the START/STOP switch and circuit breakers are in the OFF position, and the unit is disconnected from power unless otherwise advised.

All of the following checks should be carried out using a 500v Meg-ohm tester.

1. Connect the ground wire from the insulation tester to a fixed ground point, **preferably the ground plate in the control box.**
2. At the load side of the heater contactor, check the insulation resistance to ground and proceed as follows:
   a. Readings above 2Mohm – **Take no action and end procedure.**
   b. Readings below 1Mohm – **Go to step 3 to identify failed heater.**
   c. Readings between 1 and 2 Mohm –
      i. Reconnect unit to power and power unit on, and set the unit set point to a minimum of 10°C higher than the current temperature of the container to allow the unit to go into heat.
      ii. Allow the unit to pull up to the set temperature selection and maintain for 10-15 minutes.
      iii. Power unit off.
      iv. Allow unit to cool to ambient temperature. C A U T I O N: Before starting this procedure, MAKE SURE the START/STOP switch and circuit breakers are in the OFF position, and the unit is disconnected from power.
      v. Repeat Megger test, Readings above 1 Mohm - Take no action and end procedure. If insulation has dropped below 1 Mohm go to step 3.

3. Identify faulty heater as follows:
   d. On units with a heater access panel, open the access panel and cut out all wire splices to isolate all heaters inside of the unit.
      i. Repeat Megger check on each individual heater as follows:
         1. Connect the 'Ground' clip to the outer metal sheath of the heater and the test clip to one of the wires from the same heater. Test and replace any heater where the Megger reading at this test is below **1Mohms.**
   e. For units without a heater access panel this is a two-step process.
      i. Remove all 6 connections from the Heater (HR) contactor load side, which splits the six heaters into three separate pairs.
      ii. Identify the three wires, DHTL, DHML, DHBL - one from each load connection.
      iii. Repeat Megger check on each pair of heaters to identify the faulty heater pair:
         1. Connect the ground clip from the insulation tester to a fixed ground point on the unit, preferably the ground plate in the control box.
         2. Connect the test clip to one of the wires from step ii above.
         3. Test all three wires and replace any heater pair that has readings below 1Mohms.
   f. If unit is loaded and heater cannot be immediately replaced,
      1. Identify the wire at opposite end of the faulty heater pair, DHTL - DHTR, DHML - DHMR, DHBL - DHBR.
      2. Isolate the two wires.
      3. Reconnect the remaining good wiring pairs to their original connections.
      4. Unit will fail PTI test P1-0 at the next pre-trip inspection. Repair action can be taken at that time.
   g. If the unit is empty,
      1. With the heater pair identified, remove the unit back panel inside the container.
      2. Identify the center point connection for the heater pair (black wiring from heaters) either against the unit back wall or in the wiring loom.
      3. Cut the splice to separate the two heaters.
      4. Carry out a Megger check on the two heaters in the same way as for units with heater panel.
      5. Replace any heater where the Megger reading at this test is below 1Mohms.
   h. If all heaters are above the acceptable limit with the wiring disconnected, then this indicates that the fault was in one or more of the wire splices that were removed.
   i. Reconnect all wiring using new splices and heat shrink where needed.
   j. Heat shrink used MUST have a 'melt-able' liner to ensure that the connections are properly sealed when shrunk. This can be seen as a 'Ring' of melt liner pushed from under the heat shrink at each end of the shrink tube.
   k. Failure to use melt liner heat shrink allows moisture to 'wick' up under the heat shrink and cause a leakage path.

Tech*Tip* - Electrical Troubleshooting for Tier 4 Genset Voltage Control Circuit

The following procedures are intended to assist the technician in the electrical troubleshooting for the Tier4 Genset voltage control circuit. **WARNING:** Before proceeding with the troubleshooting, make sure to follow your company's standard safety procedures for working with electrical components.

Item	Part	Checks	Potential Causes
1	Receptacle (R)	Check output voltage at Receptacle R (L1-L2, L2-L3, L1-L3) (50Hz: 360 − 460 VAC, and 60Hz: 400 − 500 VAC)	Faulty Receptacle (Replace)
2	High Voltage Wires (from Circuit Breaker to Receptacle)	Check if wires/terminals are connected (Check Continuity for each leg)	Loose connections (Tighten)
3	Circuit Breaker (CB)	Test the output power from Circuit Breaker CB (21-22, 22-23, 21-23)	Faulty Circuit Breaker (Replace), Circuit Breaker (CB) is in the OFF position
		Verify Circuit Breaker (CB) is in the ON position	
		Test the input power to the Circuit Breaker CB (11-12, 12-13, 11-13)	
4	High Voltage Wires (from Primary and Boost Contactors to Circuit Breaker, Voltage Controller, Fuse Blocks, Generator, and Battery Charger)	Check if wires/terminals are connected (Check Continuity for each leg)	Loose connections (Tighten)
5	Primary (P) or Boost (B) Contactor. Allow genset to run 5 minutes prior to testing	Visually verify Primary (P) or Boost (B) Contactor is energized (wait 10-20 seconds after start-up)	Faulty Contactor/Faulty Voltage Controller/Faulty Fuses/Faulty Generator (Replace)
		Test the output voltage from Primary (P) or Boost (B) Contactor (L1-L2, L2-L3, L1-L3) (50Hz: 360 − 460 VAC, and 60Hz: 400 − 500 VAC)	
		Test the input voltage to Primary (P) or Boost (B) Contactor (T1-T2, T2-T3, T1-T3) (300 − 600 VAC)	
		Test Voltage between terminals A1-A2 of Contactors. Engaged contactor (Primary or Boost) shall be supplied with ~24VDC; Dis-engaged 0VDC.	if Not, check 24VDC circuit/Faulty Voltage Controller (Replace)
6	Voltage Controller (VC) and Fuses	Verify VCF6 Fuse is not blown (Check Continuity for each leg across fuse, outside of circuit; inside of circuit if not running)	Blown Fuse (Replace)
		Verify VCF7 Fuse is not blown (Check Continuity for each leg across fuse, outside of circuit; inside of circuit if not running)	Blown Fuse (Replace)
		Verify VCF1 Fuse is not blown (Check Continuity for each leg across fuse, outside of circuit; inside of circuit if not running)	Blown Fuse (Replace)
		Verify VCF2 Fuse is not blown (Check Continuity for each leg across fuse, outside of circuit; inside of circuit if not running)	Blown Fuse (Replace)
		Verify Voltage Controller has power (powered by high voltage) - verify green light is illuminated	Faulty Voltage Controller, Blown VCF6 or VCF7 Fuse, Loose connections, Faulty Generator (Replace)
		Verify Voltage Controller has green light illuminated and yellow light flashing at 1 Hz (Yellow light flashing sequence other than at 1 Hz per second indicates a fault condition)	One Long–Two Short à 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)
		Verify that the Connectors to the Voltage Controller are secured (Snapped in place and do not easily pull out)	Check if the connectors are pushed in all the way
			Remove connectors and inspect terminal pin insertion depth (all the same)
			Check to see if wires/terminals are connected (Check)
7	Generator (G)	Test the electrical resistance of the Primary and Boost Generator windings (Using high accuracy ohm meter): - T1, T2, T3 (Primary Contactor) - Primary wires should have similar resistances - T1, T2, T3 (Boost Contactor) - Secondary wires should have similar resistances	Wires from the generator could not be spliced correctly into the harness going into the box (Check)
			Generator itself is miss-wired internally or has an issue (Replace)
			Loss of rotor magnetism (Replace)
			Open in stator windings (Replace)
			Short circuited (Replace)

Tech*Fact* – Trouble Shooting P6-7 (DUV/DLV)

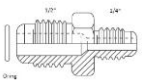
PrimeLINE® Standard Unit (DUV) – This procedure was updated from the TL2014_06 release.

A failed digital unloader valve (DUV), which is normally closed, or an internal seal failure of the compressor can result in the unit running continually in the fully loaded mode causing it to undershoot its set point temperature.

Both of these can be checked out by running pre-trip test P6-7. When running P6-7, the controller is looking for the differences in pressure and current draw between loaded mode and unloaded mode to make a judgment. If there are no differences, then it will show fail.

To confirm what caused the test to fail, perform the following additional test.

1. Connect manifold gauge set to discharge (DSV) and suction (SSV) service valves.
2. Front seat the SSV and pump down the compressor.
3. Front seat the DSV valve to isolate the compressor.
4. Disconnect DUV from the top of compressor and install a ½ to ¼ flared adapter / Oring (pn 40-50076-00sv).



5. Using R134a or Nitrogen, pressurize the line to 50 psi (3.5 bar) at the adapter connection and close supply at the tank. Pressure should hold as the valve is normally closed. If pressure drops, check for leaks at the installed fitting (40-50076-00sv); repair and retest. If pressure increases at the suction service valve and decreases at the pressure supply; the valve is leaking and should be replaced. If no leak proceed to step 6.
6. Energize DUV by removing coil and placing a magnet on the valve stem opening the valve. If the pressure does not increase at the SSV and decrease at the supply, replace the valve as it did not open.

   If a magnet is not available, a jumper procedure can be used as follows:
   Remove all 4 controller fuses (F1, F2, F3a, F3b).
   Remove the KA6 wire from KA controller connector on the front of the controller.
   Disconnect the X1 wire from the 24VAC side of transformer (black wire) and locate it away from the transformer.
   Jumper between the black transformer wires to the KA6 wire removed from the connector.
   Connect power to unit and turn circuit breaker on (DUV coil is now energized).
   Pressure should drop.
   Power circuit breaker off, reconnect wires and reinstall fuses.

If the valve opens and closes properly, the failure mode is with the compressor and it should be changed at the earliest opportunity.

PrimeLINE® unit with EDGE technology (P6-7) / (DLV/ DUV):

The PrimeLINE unit with EDGE technology models 69NT40-561-300 – 399 (manual# 365), also has a digital loader valve (DLV normally closed). A failed digital loader valve will result in the unit's inability to cool due to a reduction in refrigerant flow where a failed digital unloader valve / DUV (normally closed) will result in the unit undershooting its set point due to its inability to unload the compressor.

Both of these valves can be checked out by running pre-trip test P6-7. If pre-trip test P6-7 fails then the following checks need to be made to identify which of the valves has failed.

1. Connect manifold gauge set to Discharge and Suction service valves.
2. Using Code 41, Service function, Valve Override Control as follows:
   Set the tIM (Override Time to ~5 minutes)
   Set the PCnt: Detailed below
   Display Code 03, Compressor Motor Current

By monitoring the compressor amperage and pressure, the technician can determine which component has failed.

Set the PCnt (100%setting – DLV Capacity TEST)

If: If the compressor is able to load, the compressor amperage and the discharge pressure will rise and the suction pressure will drop – DLV is okay. If discharge pressure does not rise, the DLV should be replaced.

The Digital Loader Valve Solenoid coil cycles: 0 to 0.6 amp DC (AC/DC current clamp)

Set the PCnt (20%setting – DUV Modulation TEST).

If: If the compressor is able to unload, the compressor amperage and discharge pressure drops and the suction pressure will climb – DUV is okay. If the discharge pressure does not decrease after the valve energizes, replace the DUV.

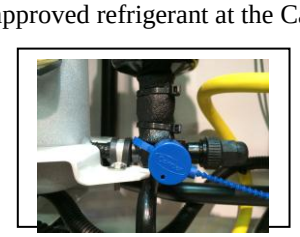
Unloader Valve Solenoid coil cycles: 0 to 0.4 amp AC (AC/DC current clamp)

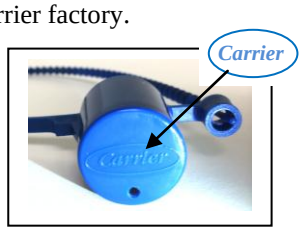
Tech*Fact* – **Anti Tamper System**

In conjunction with our July 2012 TechLINE article (***Refrigerant Quality Awareness***) and the April 2014 ContainerLINE article ***(Anti Tamper System Assures Refrigerant Quality)***, Carrier Transicold has introduced an anti-tamper refrigerant seal system to help ensure a higher level of refrigerant integrity and traceability for container refrigeration systems. The anti-tamper system is designed to help prevent unauthorized refrigerants from being used in Carrier Transicold container units, addressing industry concerns about risks associated with

unit contamination by improper or counterfeit refrigerants.
The anti-tamper system consists of three onetime use seals (cap and beaded cable tie) made of a robust material for marine application. The seals are highly visible blue seals with the Carrier logo molded on the cap.
They are placed securely on the three service ports at the factory and the ports cannot be accessed without breaking the seal.

If all three Carrier blue seals are intact, it will communicate an immediate message to the service technician that the unit has been charged with the approved refrigerant at the Carrier factory.





Tech*Tip* – Humidity Sensor Troubleshooting on the PrimeLINE® unit

In July 2011, we issued a service bulletin CTR-SER11-003 "Alarm Troubleshooting" advising service centers that if one of the listed sensors shorts, then multiple alarms could occur due to the failed sensor consuming the available power.

An earlier indicator that the sensor may be failing can be noted with the buildup of ice on the compressor, which is typically the result of a failed electronic expansion valve (EEV), but it could also be the result of the shorted sensor consuming the input intended for the DPT, which controls the EEV.

One of the primary failures that could result in this is with the humidity sensor. Detailed below is the process that can be used in diagnosing a humidity sensor which may begin to fail.

1. While unit is powered on, open the control box and locate the ETS2 wiring on the KH electrical connector within the controller.
2. Unplug the KH electrical connector, measure the dc voltage across the controller pins annotated as KH3 (positive probe) and KH2 (negative probe) for a duration one minute. Note down the average voltage measured as V1.
3. Locate the Discharge Pressure Transducer (DPT) and the electrical connector that contains three wires labeled as DPTA – ECP3, DPTB – ECP1 and DPTC – ECP2.
4. Unplug the DPT connector from the transducer and measure the dc voltage across the DPT electrical connector from wires labeled as DPTB – ECP1 (positive probe) and DPTA – ECP3(negative probe) for a duration of one minute. Note down the minimum voltage measured as V2.
5. Resume the wiring connection of KH electrical connector and DPT electrical connector.
6. If V2 is less than or equal to [(V1*2) – 0.3Volts], power off the unit to unplug humidity sensor and proceed to step 7. Else, proceed to step 9.

   Example 1: V1 (average) measured is 2.49Vdc
   V2 (minimum) measured is 4.98Vdc
   No action is required, since V2 is more than [(V1*2) – 0.3Volts], proceed to step 9.
   Example 2: V1 (average) measured is 2.51Vdc
   V2 (minimum) measured is 4.71Vdc
   Unplug humidity sensor and proceed to step 7, since V2 is less than or equal to [(V1*2) – 0.3Volts]
7. Power up unit again and repeat the measurement from step 1 to step 5.
8. If V2 increases and is greater than [(V1*2) – 0.3Volts] after humidity sensor is unplugged, a conclusion can be drawn to replace humidity sensor. Else, proceed to step 9.

   Example 3: V1 (average) measured is 2.51Vdc
   V2 (minimum) measured is 4.95Vdc
   Replace humidity sensor, since V2 increases after humidity sensor is unplugged and is more than [(V1*2) – 0.3Volts]
   Example 4: V1 (average) measured is 2.51Vdc
   V2 (minimum) measured is 4.71Vdc
   No action is required, since V2 does not increase after humidity sensor is unplugged, reconnect sensor and proceed to step 9.
9. Power cycle the unit and resume operation or trouble shooting of the unit if required.

Tech*Fact* – Software Release Update

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

Recip (ML2i/ML3, 5159) / Scroll (ML2i/ML3, 5358)
Reciprocating Unit (ML2) – 1207
Controlled Atmosphere – 3115
DataLINE – 2.2 / DataBANK – 0513 / Menu - 0115

5359 scheduled for July

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.).

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