AN EXCHANGE OF TECHNICAL INFORMATION
VOLUME 11 NUMBER 2 ABOUT CARRIER TRANSICOLD CONTAINER PRODUCTS **3rd/4thQtr 2006**

Inside This Issue

Tech*Fact* - *3 Phase Motors*

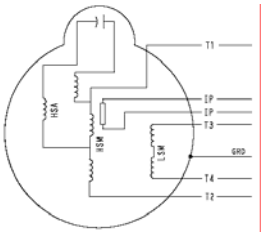
Carrier Transicold model number 69NT40-551-550 has three phase evaporator motors **(p/n 54-00615-20)**. Due to the newness of this offering along with the global availability of evaporator motors we have assembled the following instructions which can be used as a limp-home method with the installation of single phase motor.

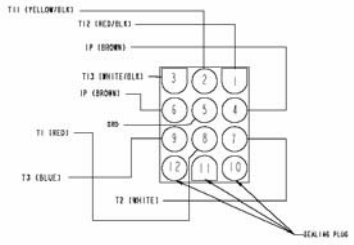
If a single phase motors is used as replacement the unit's software with detect the change and fail on its next pretrip. This will assure that the pretrip location can easily identify and make a proper repair (reinstalling a 3 phase motor).

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

1. Remove the failed 3-Phase motor from the unit and cut the plug from it.
   Note, leave approximately 6 inches (15 cm) of wire length.
2. Cut and discard the plug from the 1-Phase replacement motor.
3. Using butt splices and heat shrink tubing; connect the wires from the 1-Phase motor with the wires from the plug removed from 3-Phase motor as follows.

MOTOR WIRE	PLUG WIRE
T1 (yellow)	**T12 (red/black)**
T2 (white)	**T11 (yellow/black)**
T3 (blue)	**T2 (white)**
T4 (orange)	**T1 (red)**
GRD (green)	**GRD (green)**
IP (brown)	**IP (brown)**
IP (brown)	**IP (brown)**

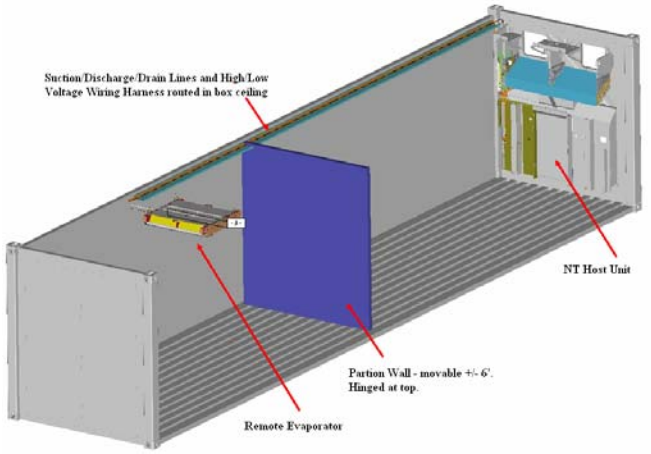




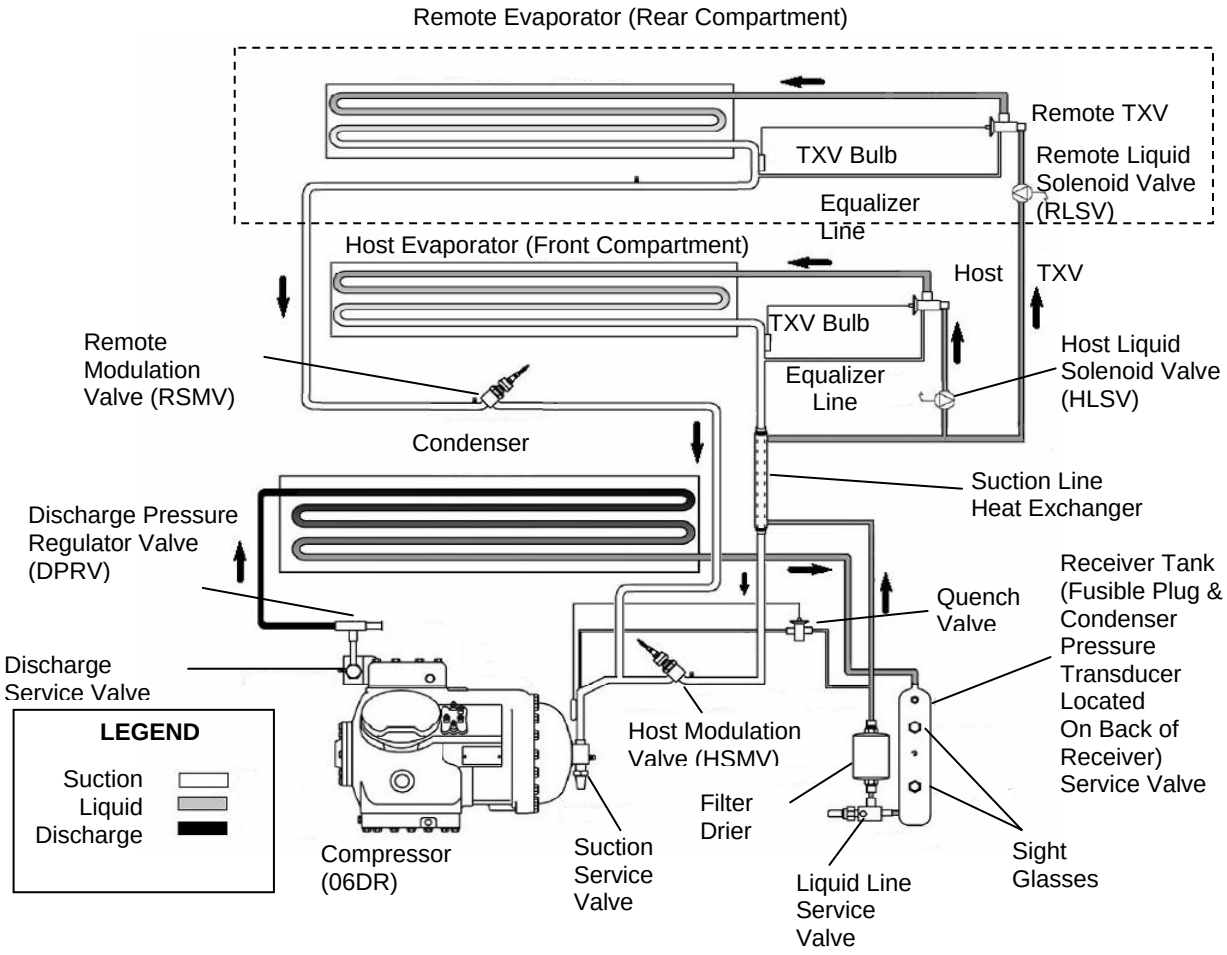
Cap the two extra plug wires from terminal 3 and 9 (white/black and blue), using closed end heat shrink tubing. ◄

Feature Article

ThinLINE™ DT



Refrigerant Flow Diagram



Feature Article – *ThinLINE™ DT (69NT40-541-304)*

Carrier Transicold announces the introduction of the new ThinLINE Multi Temp Container unit. The ThinLINE™ DT unit offers the ability to cool one part of a container and freeze another.

Overview of the Dual Temperature system:
The Mulit Temperature Container System for 40' containers consists of a ThinLINE Host unit, Model # 69NT40-541 and a Remote Evaporator mounted at center of rear compartment approximately 30 feet from the back of the Host unit. The Front Compartment (Host Unit) can operate in either Frozen or Perishable modes. The set point range for the Host unit is -22° F. to 86 ° F. (-30° to 30° C.). The Rear compartment operates in Perishable mode only, with a set point range +28° F. to 70° F. (-2° to 21° C.). To divide the 2 compartments there is an insulated partition wall hinged to box ceiling. This partition wall can be moved 12' +/- 6' (3.6 m +/- 1.8m) in either direction to accommodate different load sizes to allow full utilization of the container.
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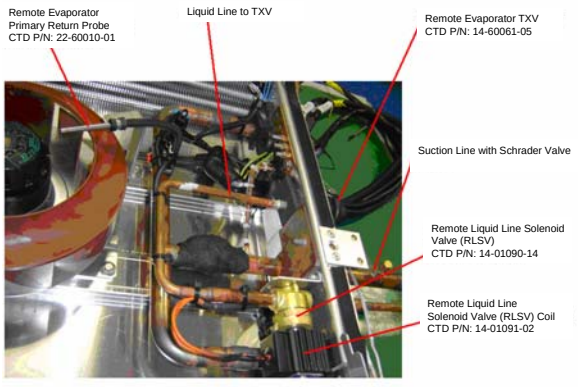
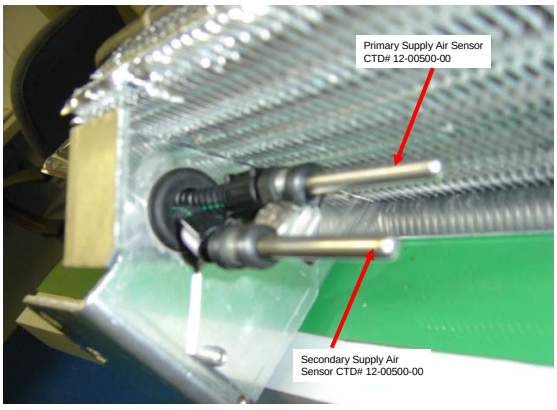
New Components – Host Unit
The Multi Temp Host unit is a standard 69NT40-541 ThinLINE unit with the addition of several new parts. There is an additional Remote Suction Modulation Valve (RSMV) p/n: 14-00263-00, mounted below Host Suction Modulation Valve (HSMV). This RSMV is the same valve as the standard ThinLINE SMV, and is driven by the ML2i type SMV power pack (p/n: 10-00388-00). Additionally a Host Liquid Line Solenoid Valve (HSLV), p/n: 14-01090-14 and Solenoid Valve Coil, p/n: 14-01091-02 has been added to control refrigerant flow to the host unit.

Remote Evaporator Section:
The rear Remote Evaporator, p/n: 79-66633-00 is mounted to the container ceiling and is protected from impact damage by a Stainless Steel cage. Refrigerant flow to the Remote Evaporator is controlled by the Remote Liquid Line Solenoid Valve (RSLV) p/n: 14-01090-14 and Remote Liquid Line Solenoid Valve Coil p/n: 14-01091-02. The Remote Evaporator TXV, Remote Evaporator Primary Return, Primary Supply and Secondary Supply Air sensors are all mounted inside the Remote Evaporator housing. Condensate is channeled away from the evaporator through dual drain hoses that have drain heaters installed to prevent freeze-up. Condensate then drains from the container via integral drains in the container wall. The Remote Compartment Refrigerant piping and wiring harness are mounted in box ceiling recess to guard against damage.





Feature Article – *ThinLINE™ DT (69NT40-541-304)*

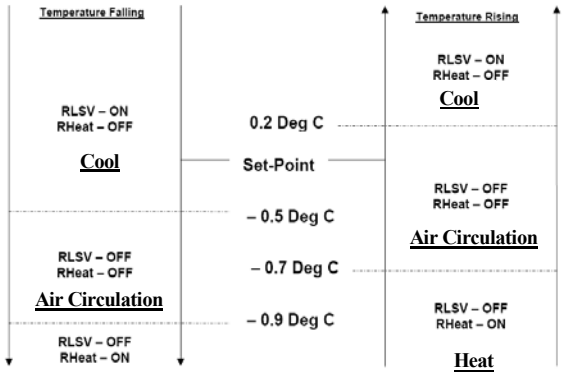
Unit Operation:
To power on the rear unit the user must first power on the Host unit and arrow down to code select 52 on the keypad and select the "enter" key. The right display will display "off". Press the arrow key until "on" is displayed and press "enter". In doing so you will enter the Multi-Temp select / user display function menu for the remote compartment. You can change the set point and/or defrost intervals by scrolling, entering and selecting the desired option. You can also scroll through the other display only options as shown in the table below.

Display	Description	User Action
SEtPt	Remote Supply Set point	Remote Compartment Set Point Change
PSPLy	Remote Supply Air Temperature	Display Only
SSPLy	Remote Secondary Supply Temp.	Display Only
rEtUR	Remote Return Air Temperature	Display Only
dtS	Remote Defrost Temp. Sensor	Display Only
rESV	Remote SMV Position	Display Only
dFrST	Remote Defrost Interval	User Selectable 3,6,12 or 24 Hours
rEnbl	Remote Enable Temperature	Factory Default Setting
rtΔ	Remote Minimum Temp. Delta	Factory Default Setting

When the remote evaporator unit is active the Temperature Display will alternate between Host and Remote compartment values. Remote compartment values will be denoted with an "r" in Lower Left Hand corner of Left Hand display.

The Remote Supply probe will always be used for controlling temperature in the Remote compartment. The Supply/Return light is for the Host unit only and will indicate the Host units associated control probe. The IN-RANGE light will illuminate when both compartments are in range.

In the cool mode of operation, when the Remote Compartment Supply probe temperature reads 1.8° F. (1° C.) above Remote compartment set point the Remote Liquid Line Solenoid Valve (RLSV) will open allowing refrigerant to flow to the Remote TXV. As the liquid refrigerant passes through the variable orifice of the Remote TXV, some of it vaporizes into flash gas. Heat is absorbed from the return air by the balance of the liquid refrigerant, causing it to vaporize in the Remote Evaporator coil. The vapor then flows through the Remote Suction Modulation Valve (RSMV). The Remote TXV maintains a constant superheat at the Remote Evaporator coil regardless of load conditions. During periods of low load, the RSMV will begin to close decreasing the flow of refrigerant to the compressor reducing its cooling capacity. When the unit reaches set point temperature the Remote Liquid Line Solenoid Valve (RSLV) will close stopping the flow of refrigerant. The unit will now operate in an air circulation mode with the evaporator fans only. If the Remote Supply probe senses a Remote Supply temperature 1.4° F. (0.9° C.) below the Remote set point the Remote heater relay energizes providing power to the Remote Evaporator heaters providing heat to the Rear Compartment. When the Remote Supply temperature reaches set point minus 1.1° F. (0.7° C.) the Remote Heater relay will de-energize and remote heating will terminate. When the temperature raises to 0.3° F. (0.2° C.) above set point the unit will again go into the cool mode of operation by reenergizing the RSLV, repeating the cycle.



Feature Article – *ThinLINE™ DT (69NT40-541-304)*

Remote Compartment Defrost
The Remote Compartment Timed defrost is independent of the Host unit. Initiation of a manual defrost will cause both compartments to enter defrost. The remote compartment defrost will be terminated based on the remote DTS (Defrost temperature sensor). As a safety, the remote HTT (heat temperature thermostat) is wired in series with the Heater contactor for safety.

Alarms – AL04
A new Remote Compartment alarm AL04, has been added to the current Alarm list indicating a fault has occurred in the Remote compartment refrigeration system. AL04 is a general fault alarm only. The specific fault alarms are stored in the Remote Alarm List, "**rAL**", accessible through ALT. MODE. AL04 will light the Alarm light and stay lit until the fault is corrected.

Specific Remote Compartment Alarms (see below), are stored and accessed through the ALT. MODE key. To access the Remote Alarm List, "**rAL**", press the ALT. MODE key once, and using the arrow keys scroll through DataCORDER menu until "rAL" is displayed in the Left display window. Then press Enter. rAL will display the individual component alarm that triggered AL04. The rAL alarm numbers coincide with Host alarm numbers, (i.e. – rAL 22 Remote Evap. Fan Motor (IP) safety open, is the same as AL22 Host Evap. Motor (IP) Fan safety open.

Alarm #	Description
rAL15	Remote Evaporator Loss of Cool
rAL22	Remote Evaporator Motor IP Failure
rAL26	All Remote Sensor Failure
rAL52	Remote Alarm List Full
rAL54	Remote Primary Supply Sensor Failure
rAL56	Remote Primary Return Senor Failure
rAL59	Remote Evaporator HTT Failure
rAL60	Remote Evaporator DTS Failure
rAL61	Remote Evaporator Heater Failure
rAL70	Remote Secondary Supply Sensor Failure

New Pretrips:
The following New Pretrips have been added to perform diagnostic checks on main components of Remote compartment. These will be run in sequence with the Host unit when Code 52 (cd52) is enabled (ON). ◄

Pretrip #	Title
P1-2	Remote Heater Test
P4-2	Remote Evaporator Fans On Test
P5-6	Remote Evaporator Fans Direction Test
P6-7	Host Liquid Line Solenoid Valve (HSLV) Open Test
P6-8	Remote Liquid Line Solenoid Valve (RSLV) Close Test
P6-9	Remote Liquid Line Solenoid Valve (RLSV) Open Test
P6-10	Remote Suction Modulation Valve (RSMV) Close Test
P6-11	Host Liquid Line Solenoid Valve (HSLV) Close Test

Tech*FAQ* - Scroll Compressor P/N History

Carrier Transicold introduced its EliteLINE and StreamLINE units fitted with scroll compressor during the second half of year 2001. As part of its continuous product improvement efforts and in response to the dynamic market changes, the compressor took some internal as well as some external design changes through the last couple of years.

These design changes resulted in different compressor part numbers which are described below. Note, new replacement compressors are always backward compatible with the previous parts; however, the old compressor can/should not be used as a replacement for a newer part number.

Compressor P/N 18-00095-20SV was replaced with P/N 18-00095-21SV which was in use until the end of year 2004. Both of these compressors were used on units with oil separator, model numbers 69NT40-531-XXX and 69NT40-551-001 through 69NT40-551-399.

Compressor P/N 18-10128-20 was introduced at the beginning of year 2005 with the introduction or the units' model 69NT40-551-400 and above. These model units had no oil separator, and the new compressor was internally redesigned with reduced oil circulation rate (ROC). This compressor was universal replacement for all scroll unit models. Note that previous compressors (non ROC) were not to be used in units that were without the oil separator.

Compressor P/N 18-10134-21 was introduced in late September of 2005 with the redesigned sight glass. This compressor was universal replacement for all scroll unit models. The compressor replacement kit included an elbow fitting to accommodate coupling of the oil return line if used in an older unit (with an oil separator).

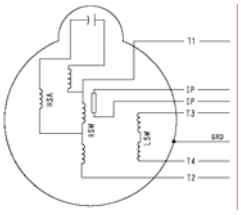
Compressor P/N 18-10134-23 is the current compressor which is same as the 18-10134-21 but without the terminal box. When 18-10134-23 is used as a replacement compressor, the existing unit compressor terminal box must be reused. This compressor is universal replacement for all scroll unit models. ◄

Tech*FAQ* - Evaporator Motor (54-00585-20)

When evaluating an evaporator for possible failure you should check the resistance values of the high and low speed windings,IP circuit and if any grounding conditions are present.

The white (T2) and yellow wires (T1) are connected to the high speed winding; the resistance value should be approximately 13 Ohms. The low speed winding is connected to the blue (T3) and orange (T4) wires and the resistance value is approximately 40 Ohms. The brown wires (IP) are for the internal protections and should read zero Ohms or very close. When checking for a motor for ground none of the wires should a resistance value.

When replacement of the motor is necessary, be sure to include the Mylar washer (PN 58-04066-00) between the motor and the stator housing when reassembling. This protects the two dissimilar metals from premature corrosion. ◄



Tech*FAQ* - Heater Megohm Reading Procedure

From time to time we have been requested to identify means of checking the heater in the container unit. Following is recommended guidelines to be used:

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

All of the following checks should be carried out using a 500v Megohm tester.

1. Connect the ground wire from the insulation tester to a fixed ground point on the unit.
2. At the load side of the heater contactor check the insulation resistance to ground and proceed as follows:
    a. Readings above 2Mohms – Take no action
    b. Readings below 1Mohms – Proceed to step 7
    c. Readings above 1Mohm but below 2Mohms - 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. Allow the unit to pull up to the set temperature selection and maintain for 10-15 min
3. Power unit off

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

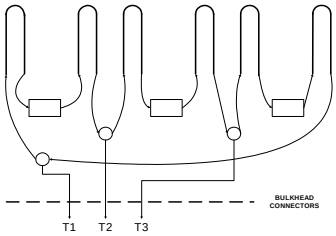
4. Repeat megger test
    A. Readings above 2Mohms - No further action required
    B. Readings below 2Mohm - Proceed to step 5
5. Readings below 2Mohm
    A. Locate the heater wiring terminal splices inside of the unit by removing the heater access panel. If the unit does not have a heater access panel then individual isolation is completed by removing the rear panel at the back of the unit.
    B. Cut out all wire splices to isolate all heaters
6. Repeat Megger check on each individual heater as follows:
    A. Connect the 'Ground' clip to the outer metal sheath of the heater
    B. Connect the test clip to one of the wires from the same heater
    C. Press the button and note the reading
7. Replace any heater where the megger reading at this test is below 2Mohms.

It 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.

8. Reconnect all wiring using new splices and heat shrink.

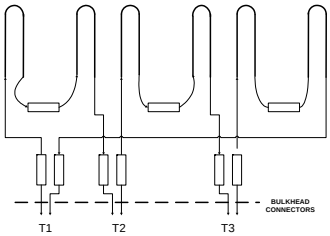
Heat shrink used MUST have a ‘melt-able’ liner to ensure that the connections are properly sealed when shrunk, This can be seen as a 'Ring' of melt liner pushed from under the heat shrink at each end of the shrink tube. Failure to use melt liner heat shrink allows moisture to 'wick' up under the heat shrink and can cause a leakage path. ◄

With HTR access Panel



Or

Without HTR access panel



Tech*FACT* - *EliteLine Training Video*

Carrier Transicold container now offers a training video for its EliteLINE model unit (P/N 62-50586).

This video is designed for service personnel who work with EliteLINE units, and covers the following major areas.

1) The modes of operations
2) The ML3 controller
3) Operational checks that can be performed on the unit.
4) Refrigeration repair

This video can now be ordered on the Carrier Transicold publications shopping cart. ◄

Tech*FACT* - *2007 School Schedule*

Listed below is the planned schedule for Container training courses offered in 2007. Refer to the *2007 Worldwide Customer Training* brochure (62-03198) for the course descriptions, enrollment details and fees. This information is also available on the Internet at http://www.container.carrier.com ◄

JANUARY	Program	Location
FEBRUARY		
5 - 9	1-Week Container	Savannah, GA
12 - 14	3-Day Container Update	Haifa Bay, Israel
MARCH		
5 - 9	1-Week Container	Tacoma, WA
14 - 16	3-Day Container Product Update	Busan, Korea
21 - 23	3-Day Container Product Update	Itajai, Brazil
19 - 21	3-Day Container Product Update	Singapore
APRIL		
9 - 11	3-Day Container Product Update	Norfolk, VA
16 - 20	1-Week Container	Long Beach, CA
MAY		
2 - 4	3-Day Container Product Update	Istanbul, Turkey
7 - 9	3-Day Container Product Update	Gdynia, Poland
14 - 16	3-Day Container Product Update	Chicago, IL
14 - 16	3-Day Container Product Update	Miami, FL
21 - 23	3-Day Container Product Update	Qingdao, China
JUNE		
5 - 7	3-Day Container Product Update	Vladivostok, Russia
6 - 8	3-Day Container Product Update	Montevideo, Uruguay
11 - 13	3-Day Container Product Update	Egypt
12 - 14	3-Day Container Product Update	Buenos Aires, Argentina
18 - 22	1-Week Container	San Pedro Sula, Honduras
18 - 22	1-Week Container	Bangkok, Thailand
20 - 22	3-Day Container Product Update	Long Beach, CA
25 - 29	1-Week Container	Paita, Peru
AUGUST		
8 - 10	3-Day Container Product Update	Panama

Tech*FAQ* – *Bio-diesel Fuels*

There have been a number of inquiries about the use of bio-diesel fuels in Carrier Transicold Generator equipment with Kubota engines. A bio-diesel fuel is a processed fuel derived from biological sources such as new or waste vegetable oil. The fuel is rated with a "B" factor which states the amount of bio-diesel fuel in the mix. For example, fuel containing 20% bio-diesel is labeled B20. Pure bio-diesel is referred to as B100.

The maximum allowable limit of bio-diesel blend to be used in the CTD unit is 5%, (this corresponds to a rating of B5). The use of any higher percentages of bio-diesel may result in damage to the fuel system, and/or engine.

There are global standards (ie ASTM) for bio-diesels, however these standards are difficult to enforce. Therefore, care must be taken when using bio-diesels. Bio diesel is hydroscopic meaning that it attracts water. Water in the fuel system can result in a multitude of problems with the engine. The main concern is corrosion of vital fuel system components such as fuel pumps, injector pumps, fuel nozzles, etc.

Other concerns that should be considered when using an unknown quality of bio-diesel would be with the plastic and rubber fuel lines. Over time these fuel lines will degrade, causing leaks. The fuel lines must be converted over to lines approved for use with methanol or those designed to be specifically for bio-diesel compatibility. ◄

Tech*Tip* - *Pozi Drive Screw Driver*

Carrier Transicold contactors utilize a pozi-drive screw for retainment of the screw in the contactor. Pozidriv screws have slots cut into the face of the screw head to set them apart from a standard Phillips screws. Pozidriv screw will not torque out offering dependable cross-sectional strength and fast efficient installation. Standard Phillips drivers should not be used with Pozi-drive screws. Pozidriv screwdrivers are locally available. ◄

Tech***Line*** **is a publication of Carrier Transicold**

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