Inside This Issue

Tech*Fact* – Probe Check Logic

The purpose of the probe check logic is to perform a periodic check of the control sensors to detect malfunctions or drift in the sensed temperature; this is referred to as the runtime temperature probe diagnostic. The following enhancement was made (software rev 5x43) to the runtime logic to streamline the alarm reporting on non controlling temperature sensors.

Runtime Temperature Probe Diagnostic Logic
Units configured with four control temperature sensors will monitor the supply and return sensor pairs to determine if they agree with each other. Depending on the operating mode (perishable or frozen), the repeated disagreement of the sensor readings will trigger one of the following actions:

- In the perishable mode of operation both pairs of probes (supply and return) are monitored and if a probe disagreement is found (difference of the supply air sensors are greater then 0.5°C or the return air sensors are 2.0°C) in either pair it will trigger a defrost probe check followed by a probe diagnostic check (detailed below).

- In the frozen mode of operation only the return air probes are considered and the disagreement of those probes will trigger a defrost followed by the probe diagnostic check. This will occur when the difference between the RTS and the RRS is greater than 2.0°C. Probe disagreement of the non-controlling (supply air) probes will not trigger a defrost followed probe check.

Probe Diagnostic Check consists of running the evaporator fans for up to eight minutes to compare temperature probe readings.

It is executed during pretrip P5; or at the end of a defrost IF the defrost was triggered by a 'Runtime Temperature Probe Diagnostic Logic' failure as previously described above.

After running the evaporator fans and comparing the temperature results for both pairs of probes (STS/SRS, RTS/RRS) one of the following actions is taken:

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- In perishable mode of operation: If the supply probes agree and the return probes agree then all supply and return sensors are valid and the unit returns to normal control. If the supply probes disagree and the return probes agree, then control on the valid supply air probe is based on comparative logic of the other probes. If the probe check is being run as part of pretrip P5, then an alarm will be triggered for the invalidated supply air probe, but if probe check was initiated by the **run time defrost probe check** then no alarm will be triggered and the unit will operate on the valid control probe.

If the supply probes agree and return probes disagree, then invalidate the worst return air probe based on comparative logic of the probes. If the probe check is being run as part of pretrip P5, then an alarm will be triggered for the invalidated probe, but if probe check was initiated by the **run time defrost probe check** then no alarm will be triggered.

- In frozen mode of operation: If the supply probes disagree and the return probes agree then no action will be taken. If the supply probes agree and the return probes disagree then control on the valid return air probe based on comparative logic of the other probes. If the probe check is being run as part of pretrip P5, then an alarm will be triggered for the invalidated probe, but if this is a **run time defrost probe check** then no alarm will be triggered.

■ *Perry Hoover*

Tech*Fact* – PrimeLINE® LIV (Liquid Injection Valve)

Starting with model number 69NT40-561 with a PID greater than 1815 (except 1816) the LIV is no longer included in the unit due to the advancement of the unit control logic. The purpose of the LIV was to cool the compressor under certain operating conditions. With this the latest software, 5343, the electronic expansion valve (EVX) will now perform this function.

Under typical operation the microprocessor controls the superheat leaving the evaporator via the EVX, based on inputs from the evaporator temperature

sensor (ETS) and the evaporator pressure transducer (EPT). The microprocessor transmits electronic pulses to the EVX stepper motor, which opens or closes the valve orifice to maintain the superheat set point. If the following conditions occur during operation the controller will switch from controlling suction superheat to controlling dome temperature using the discharge temperature sensor:

- Ambient temperature greater than 37.8°C
- Return air temperature less than -17.8°C
- Compressor Discharge Temp. greater than 117.7°C

The dome temperature control logic will use the EVX by supplying additional refrigerant beyond what can be vaporized by the evaporator in order to provide cooling to both the evaporator coil and the compressor dome.

During the dome temperature control the suction superheat entering the compressor is 0.6°C to –2.0°C maintaining a discharge superheat at 70°C to 74°C and a dome temperature of 132.1°C to 133.3°C.

The dome temperature control logic will disengage when:

- Return air temperature is greater than -17.8°C
- Ambient temperature less than 37.8°C
- Compressor turns off

Software version 5343 and greater will not operate the LIV if it already exists in the unit and as such will not test for it during pretrip P6.

■ *Nadir Guenane*
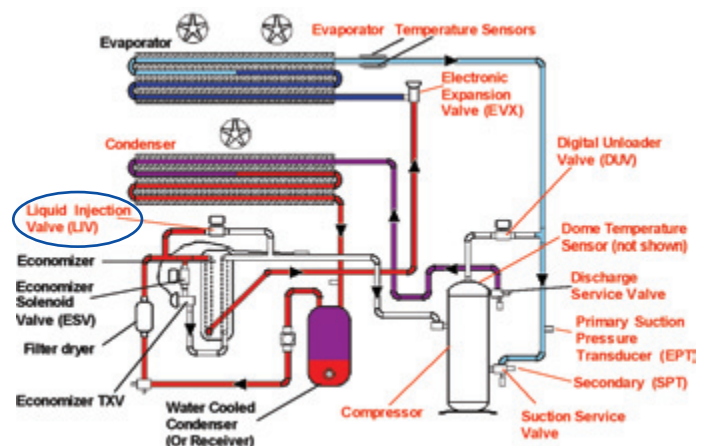
Feature Article – Dual Speed Genset

Carrier Transicold would like to announce that we now have an EcoDrivenSM dual speed option for both the 69UG and 69RG PowerLine model generators sets with PIDs (parts identification number) greater than 1400. The EcoDriven dual speed option is available currently as an OEM installed option and shortly will be available as a field installable option for all Tier 4i generator sets through the Performance Parts Group.

The functionality of the EcoDriven dual speed option is controlled by the addition of a toggle switch for selecting the operating mode, a countdown timer (DT/dual speed) inside the control box, in conjunction with the programmed electronic governor module which is found on all tier 4i engines.

When the switch is in the "Power Mode" position, the unit runs continuously at 1800 RPMs, 60 Hz operations (normal operating mode).

When the switch is moved to the "Economy Mode" position, a countdown timer will be initialized, during which the unit will be running at 1800 RPM. After 2 hours of operation, 12 vdc power will be sent to the Electronic Control Governor (EG) via pin # 15 and the control logic within the EG will throttle down the engine to 1500 RPM, 50 Hz operation.

This speed reduction results in increased fuel economy, reducing the unit's carbon footprint and lowering its operating costs. The circuitry for the dual speed operation is very simple and does not involve a lot of components, and as such, troubleshooting is quick and easy.

If the unit has been running for the required countdown time and is reported as not throttling down in Economy mode the following checks can be made:

First check for 12 vdc at the power mode switch positions DS1 and DS2. If power is found check for 12 vdc at pin 15 of the EG. If no power is found then the countdown timer is suspect. If power is found check the electronic governor and associated component.

To confirm the operation of the system other then the electronic timer: Power the unit off and remove the end of wire EG15-DTNO at the timer and connect it to the NC position of the timer. If the circuitry and the components (other than the timer) are functional, the unit will operate at 1500 RPM.

If unit operates at both speeds, and the operational time was confirmed, then the timer needs to be replaced. Power cycling the gen set off will reset the timer. The countdown timer can only be confirmed by allowing the unit to run for the required 2 hours time.

◼ *Gary Barkowski*

Electronic Module

Dual Speed Timer

Power Mode Switch
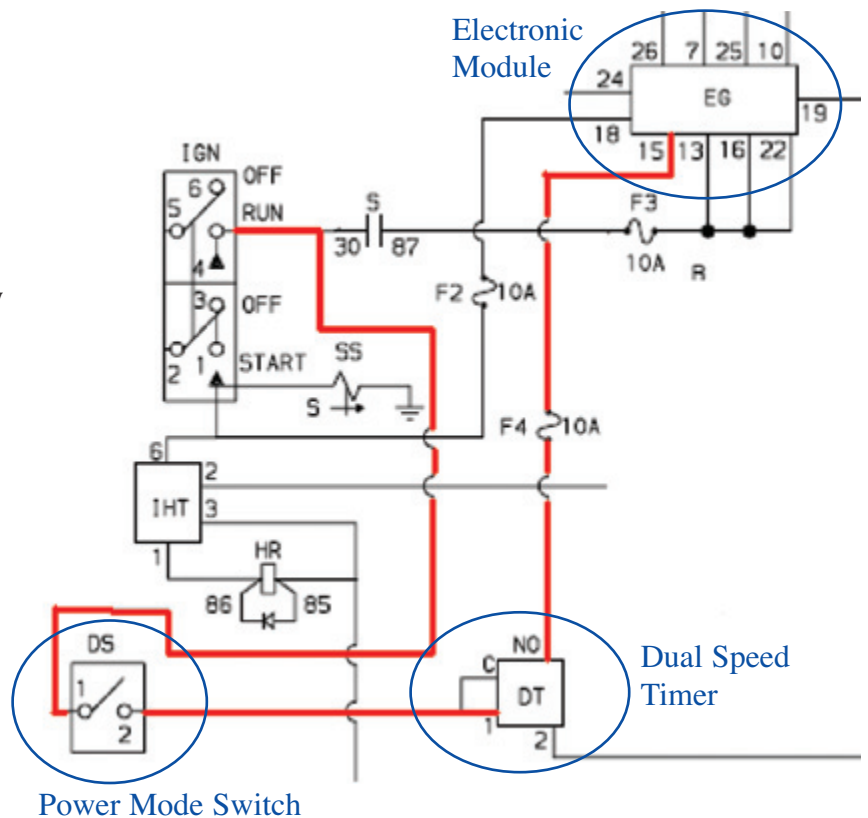
Tech*Fact* – Part Returns (10X Goal)

As announced in our 4th quarter, 2007 TechLine, and expanded upon in bulletin CTR-SER08-003, it should be crystal clear that Carrier Transicold's commitment to product quality has never been higher.

Service Center and customer support is essential to our achievement of our 10X Quality goal. As stated in previous bulletin CTR-SER08-003, all failed parts must be tagged with failure information, retained for 120 days from date of failure and properly packaged for return shipment in the event that the part is requested for evaluation.

In the Carrier Transicold Service Organization, the Service Center is the source of information from the field operation. Listed are some observations to include in the collection of warranty parts that will help in the failure evaluation.

Document the Application: In some cases the same part numbers are used in multiple applications on the unit. For example, the following parts can be used in four applications on the 69NT40 unit:

Contactors; p/n 10-00431-06 (EF, ES, HR, CF)
Solenoid coil; p/n 14-01091-04 (LIV, ESV, ORSV, XBSV)

To determine the root cause of the failure we need to understand its application. Consider the evaporator motor contactor versus heater contactor. Both of these applications use the same part but the characteristic around the operation of each contactor is different (i.e. run time and amp draw are different in each case).

Document the investigation: Details of the field analysis is essential in determining root cause of a component failure. All test results completed in the field to determine the fault need to be documented on both the part and the warranty claim.

In example, for a solenoid coil an ohm reading needs to be taken. When performing the check assure the coil is un-actuated and is at ambient temperature. Document the findings on both the failed coil as well as the failure tag.

Check to assure the coil is complete (i.e. Missing Spacer, Missing O-rings etc) and check to see if the coil screw was properly torqued. (Either missing parts, i.e., o-ring or excessive torque will cause damage to coil which results in moisture ingression and failure of the coil.)

Preserve all parts for investigation. All associated parts need to returned as part of the investigation. For example, when you remove the failed component that is spliced into the wire harness, such as the heaters or sensors, cut the replacement part upstream of the original splice, including it with returned part as this could also be a possible cause of the failure.

All accessories must be returned with every failed component. For example, with the solenoid coil the o-rings, spacers, valve screws must be returned. Place the accessories into the yellow envelope supplied in every replacement coil package. Do not re-use the accessories during the change-out.

Using a permanent pen marker, document the unit information on both the failed part and the return material tag.

Read the instructions. Always read the installation instructions prior to installing the part even if you have installed the part before, as procedures may change as we learn from our evaluation.

As can be seen above, a lot of questions can be answered from the root cause analysis. The advance documentation of all information from unit serial number, specific component and the field analysis results will assist in determining root cause of the failure and associated corrective actions.

■ *Mark Donahoe*

Tech*FAQ* – DataLine Acronyms

The following is a listing of the acronyms used when viewing DataLine downloads.

ACRONYM	DESCRIPTION	APPLICABLE PLATFORM (ML -)			
		ML1	ML2	ML2i	ML3
SP	Setpoint Change	Y	Y	Y	Y
DS	Defrost Start	Y	Y	Y	Y
DE	Defrost End		Y	Y	Y
PS	Pre Trip Start	Y	Y	Y	Y
PE	Pre Trip End		Y		
DHS	Dehumidification On	Y	Y	Y	Y
DHE	Dehumidification Off	Y	Y	Y	Y
HS	Humidification On		Y	Y	Y
HE	Humidification Off		Y	Y	Y
AL	Alarm	Y	Y	Y	Y
NEW SW	Software Upgrade Completed		Y	Y	Y
NEW SN	New Controller serial number		Y		
NEW ID	New Container Number entered		Y	Y	Y
TS	Trip Start	Y	Y	Y	Y
ECON S	Economy Mode On		Y	Y	Y
ECON E	Economy Mode Off		Y	Y	Y
BULB S	Bulb Mode On		Y	Y	Y
BULB E	Bulb Mode Off		Y	Y	Y
Dal	Datacorder Alarm		Y	Y	Y
OFFwb	Power Off without battery fitted		Y	Y	Y
OFF	Power Off with battery fitted	Y	Y	Y	Y
Onwb	Power On without battery fitted		Y	Y	Y
ON	Power On with battery fitted	Y	Y	Y	Y
NWF	Datacorder Communication failure		Y	Y	Y
NWR	Datacorder Communication restored		Y	Y	Y
CA_SP	Controlled Atmosphere Setpoint change		Y	Y	
CA_PS	Controlled Atmosphere Pre Trip Start		Y	Y	
CA_PE	Controlled Atmosphere Pre Trip End		Y	Y	
CA_LS	Controlled Atmosphere Lock Out On		Y	Y	
CA_LE	Controlled Atmosphere Lock Out Off		Y	Y	
CA_NEW_SW	Controlled Atmosphere New Controller serial number		Y	Y	
CA_NEW_SN	Controlled Atmosphere New Container number entered		Y	Y	
CA-DL	Controlled Atmosphere Door Lock Energised		Y	Y	
CA_UL	Controlled Atmosphere Door Lock de-energised		Y	Y	
CA_VS	Controlled Atmosphere Venting Started		Y	Y	
CA_VE	Controlled Atmosphere Venting Completed		Y	Y	
Rm_SP	New Setpoint Entered Remotely			Y	Y

■ *Paul Gray*

Tech*Tip* – Omnidrive for Vista

The Omnidrive Pro and Omnidrive Pro USB that are distributed through PPG have a driver pack for versions up to Windows XP.

If Windows Vista is required you can download one of the following from the CSM-Products web site at http://www.csm-products.com/html/support/downloads.htm#omnipro.

• Omnidrive Professional (Parallel interface) / Drive pack version required V2.41 (1.2MB)
• Omnidrive Professional USB / Drive pack version required V3.11 (1.83 MB)

■ *David Whyte*

Tech*Fact* – AL06 Enhancement

With software versions 5X42 and greater, a new detection method is used for the keypad Alarm 06.

On previous versions Alarm 06 occurred after sensing of a keypad selection lasting longer then five minutes. The five minutes selection was chosen to allow for the user to scroll through the set point changes from top of the temperature scale to the bottom using the arrow keys.

The alarm will now go active if either of the arrow keys is active continuously for more than 50 seconds. This feature was enabled by the reduction in the scroll time through the temperature scale.

The alarm will also go active if any key other than an arrow key is active continuously for more than 15 seconds (i.e. holding of the °F / °C key). If the alarm is accidentally triggered when working on the keypad it can be cleared by selecting the ALARM LIST key followed by either ARROW KEY or by power cycling the unit.

If the alarm occurs all inputs to the controller from the keypad other then the ALARM LIST key are ignored.

■ *Perry Hoover*

Tech*Tip* – Software Release Update

> Scroll (ML2i/ML3) – 5343
>
> Reciprocating Unit (ML2i / ML3) – 5143
>
> Reciprocating Unit (ML2) – 1207
>
> Controlled Atmosphere – 3112
>
> DataLine – 1.8
>
> DataBank – 0512

The software can be downloaded from Transcentral within the Carrier Transicold Website at http://www.container.carrier.com. DataLine can only be upgraded from the site if you have an original installed copy.

Prior to upgrading a unit you should always receive permission from the end user.

Tech*Fact* – 2009 Training

JANUARY	Class Type	Location
12 – 16	1-Week Container	Santa Marta, Colombia
FEBRUARY		
04 – 06	3-Day Container Product Update	Mombasa, Kenya
09 – 13	1-Week Container	Abidjan, Ivory Coast
MARCH		
02 – 06	1-Week Container	Tacoma, WA
10 – 12	3-Day Container Product Update	Montreal, Canada
11 – 13	3-Day Container Product Update	Limassol, Cyprus
16 – 18	3-Day Container Product Update	Dubai, UAE
17 – 19	3-Day Container Product Update	Norfolk, VA
23 – 27	1-Week Container	Altamira, Mexico
APRIL		
13 – 17	1-Week Container	Santo Domingo, DR
15 – 17	3-Day Container Product Update	Savannah, GA
21 – 23	3-Day Container Product Update	Busan, Korea
27 – 29	3-Day Container Product Update	Vancouver, British Columbia
27 – 29	3-Day Container Product Update	Buenos Aires, Argentina
MAY		
06 – 08	3-Day Container Product Update	Lima, Peru
11 – 15	1-Week Container	Guayaquil, Ecuador
11 – 15	1-Week Container	Singapore
18 – 22	1-Week Container	Qingdao, China
25 – 29	1-Week Container	Lisbon, Portugal
JUNE		
01 – 05	1-Week Container	Santo Tomas, Guatemala
01 – 05	1-Week Container	Long Beach, CA
08 – 12	1-Week Container	Savannah, GA
08 – 10	3-Day Container Product Update	Rotterdam, The Netherlands
11 – 11	1-Day Container	Rotterdam, The Netherlands
15 – 17	3-Day Container Product Update	Liverpool, UK

For additional information visit the Carrier Transicold Training Web site at www.container.carrier.com

Tech*Fact* – Unit Run Time

With software version 5X43 and greater the unit's run time was added to code select Cd16, which was previously the compressor run hours only.

By selecting function code Cd16 the display will show the compressor motor hours. By pressing the enter key the display will show "AC" (alternating current) on the left and run hours on the right (1 segment = 10 hours).

The compressor run time hour meter can be reset to zero by pressing and holding the enter key for five seconds. The unit run time meter cannot be reset.

■ *Perry Hoover*

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