TECHLINE

Tech*Fact* - eAutoFresh CO$_2$ Sensor Zero Calibration

Starting with software version 5146 and 5346, a hardware based calibration of the e-Autofresh CO$_2$ sensor was implemented. The procedure is run on units equipped with a calibration module by selecting Function Code 43, scrolling to "Test Mode," and pressing "ENTER".

If the sensor voltage on the CO$_2$ signal line is greater than 480mV, a CO$_2$ sensor is present and a "CAL" option will be displayed. This indicates a sensor is installed.

When "CAL" is displayed, the user can initiate the calibration by pressing the "ENTER" key. When the "ENTER" key is pressed, the display will alternate its display between "EPTY boX" and "Press Enter" for

up to 5 minutes. This is to ensure the user is aware that the box should be empty and free of cargo that could produce CO$_2$, resulting in a miscalibration. If the user doesn't select "ENTER," the unit will revert to normal control. If the user presses the code select key during these 5 minutes, the unit will revert to normal control. If "ENTER" is pressed and held for 5 seconds, the high speed evaporator fans will be energized and the vent position will be opened to 100 percent. "CAL" will flash on the display during calibration along with a 10 minute count down timer.

During the countdown, the CO$_2$ sensor voltage will be monitored. If the sensor input voltage is between 0.95 and 1.15 vdc range the sensor will reset to zero and check to assure the voltage output is between 0.95 and 1.05 vdc. A "Pass" message will be displayed for 5 minutes or until the user holds the code select key. If after 10 minutes the sensor voltage is not in the 0.95 to1.15 vdc range, then the test will fail. A "CAL Fail" message will display until the user either power cycles the unit or holds the code select key for 5 seconds.

The CO$_2$ sensor calibration test will also run concurrently within the P8-1 (perishable pull down test) pre-trip test adding no additional time to the test.

Perry Hoover

Tech*FAQ* – **Using USDA and Cargo Probes**

Often questions arise about the USDA probes setup procedures. The installation procedure consists of three parts: installation of the probes; configuration of the probes; and, calibration of the probes.

1) Installation of Probes: If equipped, the unit has the capability of recording three USDA probes and one cargo probe. The receptacles for plugging in the probes are located behind the left-hand hinge door on the inside of the container. The probe leads should be fed (plug end first) underneath the bottom hinged panel and up into the cavity behind the left-hand hinged panel. Plug the leads into the desired receptacle and ensure the outer ring on the plug is firmly tight. The probes are now installed.

2) Configuration of Probes: To check whether probes are configured for recording in the DataCorder, select the DataCorder probes using the "Alt Mode" key on the keypad. Once "dc" appears in the left screen, press "ENTER" and then scroll to "dc 03" for USDA 1, "dc 04" for USDA 2, "dc 05" for USDA 3 and "dc 14" for the Cargo Probe (fig. 1).

If 4 dashes (- - - -) appear in the screen (fig. 2), then the DataCorder is not configured to read the probes. If a temperature similar to the temperature inside the container appears, then the DataCorder is configured correctly. If the reading is present, proceed to calibration, or step 3.

(fig. 1)   (fig. 2)
Configured   Unconfigured

To configure the probes, connect laptop and open DataLine. From the Launch Pad screen, open system tools, (top right-hand button) and select DataCorder. From the DataCorder screen, select the configuration desired, e.g. 54 - SRS, RRS, USDA 1, 2, 3 and Cargo probe. Select "send" and exit DataLine. Confirm that the probes are now reading as previously described and proceed to step 3.

3) Calibration of Probes: To calibrate probes mix crushed ice and water to form a 0ºC mix. Place and swirl the probes in the mixture. Make sure the probes are well immersed and move for one minute to allow reading to settle.

Enter the "dc" mode from the keypad and view the USDA and Cargo probes fitted. If the reading is 0 ºC ($\pm$ 0.2 ºC), then the probe calibration is acceptable. This completes the calibration.

 If the reading is greater than 0.2 ºC from 0 ºC, recalibration of the probes is required. Connect laptop to unit and start DataLine. From the Launch Pad screen, select the probe calibration button (2nd button on the left). Ensure the connection between the laptop and the unit is good. In the probe calibration screen, the values will show x if the connection is not good.

Probe calibration gives the user three options for calibrating the probes.
i.) Internal – The user selects a fixed ice bath temperature between –1.0ºC and +1.0ºC that applies to all probes.
ii.) External – The user specifies the offset of each probe (between $\pm$ 2.0ºC).
iii.) Auto – DataCorder calibrates the correct offset for each probe selected using an ice batch temperature of 0.0ºC. The user cannot select probes or values. The selection is automatic.
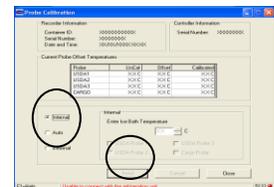
Once the method of calibration is set, push "send" to complete the calibration. Installation and Calibration is now completed and the container is ready for loading of cargo.

Paul Gray

Feature Article – Alarm List

Listed below is an updated summary list of the Controller Alarms and associated actions. For greater detail refer to the unit's operational manual.

| ThinLine swr 5100	EliteLine swr 5300	PrimeLine swr 5300	Alarm	Assessment	Action
		AL03	Loss of Superheat Control	Superheat below 1.67 F (0.5 C) for five minutes, compressor is running, EVXV is at 0% open and compressor pressure ratio is > 1.8	Display Alarm Only
AL04			Remote Evaporator Failure	Remote SMV is > 20% and temp across the coil is less than 1°C	Display Alarm Only
AL05	AL05	AL05	Manual Defrost Switch Failure	Switch closed for 5 minutes.	Disable MDS
AL06	AL06	AL06	Keypad or Harness Failure	Controller detects continuous keypad activity.	Keypad disabled ex ALARM/LIST
AL07	AL07	AL07	Fresh Air Vent Open with Frozen Setpoint (Opt)	VPS reading greater than 0 CMH in froxen mode. (Disabled if AL 50 is active)	Display Only
		AL08	High Compressor Pressure Ratio	Discharge /suction pressure ratio high.	Engage CLC logic (detailed below)
AL10	AL10	AL10	CO2 Sensor Failure (Opt)	CO2 sensor voltage out of range (0.9v<>4.7v)	Vent opens to preselect
AL11	AL11	AL11	Evaporator Fan Motor #1 Internal Protector (Opt)	Configured for single evap operation (open IP)	One fan operation only
AL12	AL12	AL12	Evaporator Fan Motor #2 Internal Protector (Opt)	Configured for single evap operation (open IP)	One fan operation only
	AL13		IOE Communication Failure	Controller lost communication with I/O board	Failure Action Cd#29 (detaled below)
	AL14	AL14	Phase Sequence Failure -- Electronic	System is unable to determine the correct phase relationship.	Overridden by Pressure Delta (AL17)
AL15	AL15		Loss of Cooling	Fails to achieve temp delta across evap. coil	Failure Action Cd#29 (detaled below)
	AL16	AL16	Compressor Current High	Current draw 15% over maximum for 10 minutes in last hour.	Display Alarm Only
	AL17	AL17	Compressor Pressure Delta Fault	Compressor fails to generate sufficient pressure differential.	Failure Action Cd#29 (detailed below)
	AL18	AL18	Discharge Pressure High	Discharger Pressure over limits	Display Alarm Only
	AL19	AL19	Discharge Temperature High	Dome temp. exceeds limits	Engage CLC logic (detailed below)
AL20	AL20	AL20	Control Circuit Fuse Open (F3)	24VAC contactor circuit fuse open.	Shutdown
AL21	AL21	AL21	Microprocessor Fuse Open (F1 or F2)	18VAC control circuit fuse open.	Comp. On / Off temp. controll
AL22	AL22	AL22	Evap Fan Motor Internal Protector	Opening of motor internal protector.	Shutdown
AL23			KA2-KB10 Jumper Disconnected	Auto Transformer IP open if so equipped, or missing jumper.	Failure Action Cd#29 (detaled below)
	AL23	AL23	Loss of Phase B	Low current draw on phase B	Shutdown
AL24			Compressor Motor Internal Protector	Opening of the motor internal protector	Failure Action Cd#29 (detaled below)
	AL24	AL24	Compressor Motor Safety	Compressor not drawing any current	Failure Action Cd#29 (detaled below)
AL25	AL25	AL25	Condenser Fan Motor Internal Protector	Opening of motor internal protector	Failure Action Cd#29 (detaled below)
AL26	AL26	AL26	All Sensosr Failure: Supply & Return Probes	All control probe temperature sensors out of range	Failure Action Cd#29
AL27	AL27	AL27	Analog to digital accuracy	Failure to calibrate the A/D	Failure Action Cd#29
	AL28		Low Suction Pressure	Suction pressure is below 2 psia and AL66 is not active.	Failure Action Cd#29
		AL28	Low Suction Pressure	Low evaporator pressure	Compressor off for three minutes.
AL29	AL29	AL29	eAutoFresh Failure (Opt)	CO2 or O2 level above limit and the vent open 100% for 90 min.	Display Alarm Only
AL50	AL50	AL50	Fresh Air Position Sensor VPS (Opt)	Vent position unstable for > 4 min.	Display Alarm Only
AL51	AL51	AL51	Alarm List Failure	EEPROM hardware error detected for 3 seconds.	Display Alarm Only
AL52	AL52	AL52	Alarm List Full	Alarm history list contains 16 alarms.	Display Alarm Only
AL53	AL53	AL53	Battery Pack Failure	Battery pack low voltage/charge fail/battery test fail.	Display Alarm Only
AL54	AL54	AL54	Primary Supply Air Sensor Failure (STS)	Outside -50 to +70_C (--58_F to +158_F) or failed probe check	Revert to SRS or RTS (-2 C / 3.6 F)
AL55	AL55		Datacorder Lock Out	The DataCorder locked out due to controller resets	Disable DataCorder.
		AL55	Input / Output Failure	Controller Failure	Replace controller
AL56	AL56	AL56	Primary Return Air Sensor Failure (RTS)	Outside -50 to +70_C (--58_F to +158_F) or failed probe check	Revert to RRS or STS
AL57	AL57	AL57	Ambient Temperature Sensor Failure (AMBS)	Outside -50 to +70_C (--58_F to +158_F) or failed probe check	Display Alarm Only
AL58	AL58	AL58	Compressor High Pressure Safety (HPS)	High Pressure Switch open > 1 min.	Compressor off, cycles on HPS
AL59	AL59	AL59	Heat Termination Thermostat Safety (HTT)	Heat Termination Thermostat Open	Heaters disabled
AL60	AL60	AL60	Defrost Termination Sensor Failure (DTS)	HTT open or DTS fails to open afer 2 hrs of defrost, DTS fails to close after 1.5 hrs of comp. run with a return temp. of 7 C (45 F).	Defrost controlled by (RTS)
AL61	AL61	AL61	Heaters Failure	Improper current draw from heater turn on or off.	Display Alarm Only
AL62	AL62	AL62	Compressor Circuit Failure	Improper current draw from comp. turn on or off	Display Alarm Only
AL63	AL63	AL63	Current Over Limit	Can not maintain total system current draw below user selected limit.	Unit capacity reduction
AL64	AL64		Discharge Temperature Over Limit	Outside -60 C to +175 C (--76 F to + 347 F)	Display Alarm Only
		AL64	Dome Temperature Over Limit	Out of range or dome temp. = amb. temp. after 10 min. of comp. run	Display Alarm Only
AL65	AL65	AL65	Discharge Pressure Transducer Failure (DPT)	Out of range 73cm HG to 32 Kg/cm2 (30" HG to 460 psig)	Display Alarm Only
AL66	AL66		Suction Pressure Transducer Failure SPT (Opt.)	Out of range 73cm HG to 32 Kg/cm2 (30" HG to 460 psig)	Display Alarm Only
		AL66	Evaporator Pressure Transducer (EPT)	Out of range 73cm HG to 32 Kg/cm2 (30" HG to 460 psig)	Minimum SMV Capacity.
AL67	AL67	AL67	Humidity Sensor Failure	Sensor outside valid range of 0% to 100%.	Dehumidification disabled.
AL68			Condenser Pressure Transducer Failure (CPT)	Out of range 73cm HG to 32 Kg/cm2 (30" HG to 460 psig)	Disable (CPC)
AL69	AL69		Suction Temperature Sensor Failure CPSS	Outside -60 C to +125 C (--76 F to + 258 F)	Display Alarm Only
		AL69	Primary Evaporator Temperature Sensor	Outside -60 C to +125 C (--76 F to + 258 F)	Revert to ETS2
AL70	AL70	AL70	Secondary Supply Sensor (SRS)	Outside -50 C to +70_C (--58_F to +158_F) or failed probe check	Display Alarm Only
AL71	AL71	AL71	Secondary Return Sensor (RRS)	Outside -50 C to +70_C (--58_F to +158_F) or failed probe check	Display Alarm Only
"ERR"	"ERR"	"ERR"	Internal Microprocessor Failure (1 - 9)	Controller self check. This is an indication the controller needs to be replaced.	Display "ERR" # 1 to 9
Entr stpt	Entr stpt	Entr stpt	Enter Set Point	User must enter a set point value before unit will operate.	Display
LO	LO	LO	Low Main Voltage	Low main voltage, Less than 75% of proper value.	Display
dAL70 -91	dAL70 -91	dAL70 -91	DataCORDER alarms	Refer to Service Operations Manaual for the DataCORDER Alarms	Display

- **Code Select #29:-- In Perishable mode if option A or B is selected, action will revert to selection C (evaporator fans only). In frozen mode, all options will revert to selection D (Shutdown)**
- **CLC (Compressor Limit Cycle) -- High comp pressure ratio and High Dome Temp will cause the compressor is cycled off for a period of time from three to five minutes.**

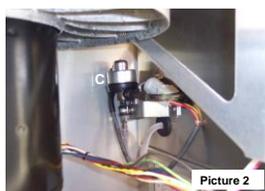Nadir Guenane

Tech*FAQ* – **Electronic Expansion Valve**

What actions can I take if the electronic expansion valve or controller fails enroute and a part is not available?

In the case of a defective EEV Coil or damaged controller, it's possible to open/close EEV by using a magnet.

1. Connect suction pressure gauge to monitor pressure (If controller OK, use function code CD12).
2. Disconnect EEV and remove Cap (item A and B, Picture 1).
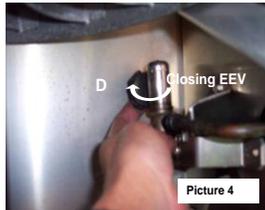3. Remove EEV coil (item C, Picture 2).
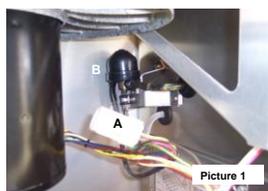
Picture 1

Picture 2

4. Turn magnet item D, picture 3 and 4 around stem to open or close valve. 10 turns is approximately 0.1 bar.

Opening EEV
Picture 3

Closing EEV
Picture 4

Nadir Guenane

Tech*FAQ* – **2009 Training**

Listed are the planned training schools for the remainder of 2009. Minimum requirement is 12 students to avoid cancellation. Please check to ensure the class has met this requirement prior to confirming your reservations.

Class Dates	Register By	Class Type	Location
09/02/2009 – 09/04/2009	8/3/2009	Advanced 3-Day Container Product Update	Haifa Bay, Israel
09/07/2009 -- 09/09/2009	8/7/2009	Advanced 3-Day Container Product Update	Port Said, Egypt
09/15/2009 -- 09/17/2009	8/14/2009	Advanced 3-Day Container Product Update	Christchurch, NZ
09/22/2009 -- 09/24/2009	8/21/2009	Advanced 3-Day Container Product Update	Sydney, Australia
10/06/2009 -- 10/08/2009	9/7/2009	Advanced 3-Day Container Product Update	Cape Town, South Africa
10/19/2009 -- 10/23/2009	9/18/2009	1-Week Container	Savannah, GA
10/26/2009 -- 10/30/2009	9/28/2009	1-Week Container	Fortaleza, Brazil
11/04/2009 -- 11/06/2009	10/5/2009	Advanced 3-Day Container Product Update	Long Beach CA
11/25/2009 -- 11/27/2009	10/26/2009	Advanced 3-Day Container Product Update	Shenzhen, China
11/30/2009 -- 12/04/2009	10/30/2009	1-Week Container	Davao, Philippines
12/08/2009 -- 12/10/2009	11/9/2009	Advanced 3-Day Container Product Update	Miami, FL
12/14/2009 -- 12/18/2009	11/16/2009	1-Week Container	San Jose, Costa Rica

For additional information or status of any of the schools visit the Carrier Transicold Training Web site at http://www.container.carrier.com

Tech*Fact* – **Software Release Update**

Scroll (ML2i/ML3) – 5346
Reciprocating Unit (ML2i / ML3) – 5146
Reciprocating Unit (ML2) – 1207
Controlled Atmosphere – 3113
DataLine – 1.8
DataBank – 0512

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

You should always receive permission from the end user prior to upgrading a unit.

Tech*Fact* **– Pass It Along**

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