CHARGE ASSIST™ PROCEDURE DETAILS

Charge Assist™ (CA™) Procedure with a Communicating Comfort Control

⚠ CAUTION

CONTAINS REFRIGERANT!

SYSTEM CONTAINS OIL AND REFRIGERANT UNDER HIGH PRESSURE. RECOVER REFRIGERANT TO RELIEVE PRESSURE BEFORE OPENING SYSTEM.

Failure to follow proper procedures can result in personal illness or injury or severe equipment damage.

⚠ WARNING

Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

The Communicating Comfort Control will auto configure the system size and airflow requirement at power-up. The CA™ Mode will set the indoor blower to 100%, override any blower delays and will turn on 2nd stage compressor. (Green LEDs **Y1** and **Y2** will be on. The Green **Status** LED will be turned off.)

Entering CA™ Mode when a heat pump is operating in the heating cycle will turn the system OFF for the minimum equipment OFF time of 5 minutes. After the 5 minute delay, the **CA™** control will run the 1st stage compressor for one minute, Green LED Y1 on. The **CA™** control will then stop the first stage compressor, enter a 1 minute delay, and start flashing the Green LEDs Y1 and Y2. Then the CA™ control will start the second stage compressor, Green LEDs Y1 and Y2 will then be ON. The **CA™** control now starts its Charge Assist™ mode.

STEP 1:

Press **MODE** button (See Fig. 1) for 2 seconds to enter the **CA™** mode. The **CA™** control takes control of the system and overrides the Communicating Comfort Control. The **Green STATUS** LED is turned OFF. The **CA™** control will now check the operating Conditions before continuing the **CA™** Mode.

NOTE: To stop the **CA™** mode at anytime, press the **MODE** button. The **CA™** control will then begin slowly flashing its Green **STATUS** LED indicating that the **CA™** control is now in its normal operating mode.

NEXT:

Outdoor Temperature (**ODT**) Must be between 65°F and 100°F.
If **ODT** is below **65°F** the **ODT**, **OUT OF RANGE**, Red LED will flash ON and OFF for 30 seconds. This error condition causes the **CHARGING** (STABILIZING) Amber LED to flash 2 times. The **CA™** control will then exit the **CA™** mode and the Green **Status** LED begins to flash slowly.

NEXT:

Liquid Line Temperature (Must be within range)

If this sensor is shorted or open - This error condition causes an 11 flash on **FAULT** LED.

NEXT:

Liquid Line Pressure (Must be above 50 psig R-22 systems)
If the liquid pressure is below 50 psig, the **LOW PRESSURE** Red LED will flash for 30 seconds. This error condition causes the **CA™** control to flash its **CHARGING (STABILIZING)** Amber LED 2 times. The **CA™** control will then exit the **CA™** mode and it then begins flashing its Green **Status** LED slowly.

STEP 2:

Enter Stabilization Routine (The **CHARGING** (STABILIZING) **Amber LED** will begin to flash.)
The **CA™** control will then indicate the time it will take for the refrigerant system to stabilize by flashing its **CHARGING** (STABILIZING) **Amber LED.** (See SUMMARY on page 7 for flash rate details.)

The **CA™** control may run the system for up to twenty minutes to insure the refrigerant system is at a steady operating state. Once the system is at a steady operating state the **CA™** control will enter the **Charging Routine.**

STEP 3:

CHARGING Routine, (The **CA™** control will now determine if the system is:)

Correctly Charged go to STEP 4		**Undercharged go to STEP 5**		**Overcharged go to STEP 6**	
				RECOVER LED	**ON**
CHARGING (STABILIZING) LED	**OFF**	ADD LED	**ON**	**SYSTEM LOCKED**	**OFF**
CHARGED LED	**ON**	CHARGED LED	**FLASHING**	**FOR 1 HOUR**	
STATUS LED	**FLASHING**	STATUS LED	**OFF**	**STATUS LED**	**OFF**

STEP 4:

IF the **CA™** control determines the system is correctly charged, the **CHARGING** (STABILIZING) **Amber LED** will be turned **OFF** and the **CHARGED Green LED** will be turned **ON**.
The **CA™** control will then exit the charge assist cycle and return the control of the system to the Communicating Comfort Control. The **Status Green LED** will be slowly flashing. The **CHARGED Green LED** will stay **ON** for 1 hour.

STEP 5:

ADD Routine If the **CA™** control determines refrigerant is required, the **ADD Amber LED** will turn **ON** and the Green **CHARGED LED** will begin **FLASHING** according to the **CHARGED Green LED** flash Rate Schedule.

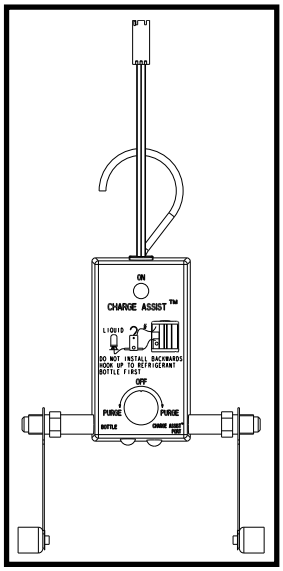
(See SUMMARY on page 7 for flash rate details.)

NOTE: For Automated charging, use BAYCAKT001AA. When utilizing a Charging accessory Solenoid Kit (BAYCAKT001AA) refer to the instructions in the kit for proper hook up. When the Amber **ADD** LED is ON the **CA™** control board provides a 24 VAC power for the accessory solenoid. The **CA™** control will turn off the 24 VAC power when the Amber **ADD** LED goes off.

When refrigerant is being added, the **CA™** control will **exit** the Charge Assist™ cycle if the liquid line pressure **does not increase by 4 psi in 50 minutes or** if the liquid line pressure **does not get within the 20 psi of the required charged pressure within 1 hour.**

Note: For Manual Charging
Once sufficient charge has been added, the Amber **ADD LED** will turn **OFF** and the Green **CHARGED LED** will be turned **ON.** When the Amber **ADD LED turns OFF; stop adding refrigerant.** The Green **CHARGED** LED will stay on for 5 minutes while the unit runs. The **CA™** control will now exit the Charge Assist™ cycle and returns control to the Communicating Comfort Control.

Charge Assist™ Solenoid Kit
BAYCAKT001



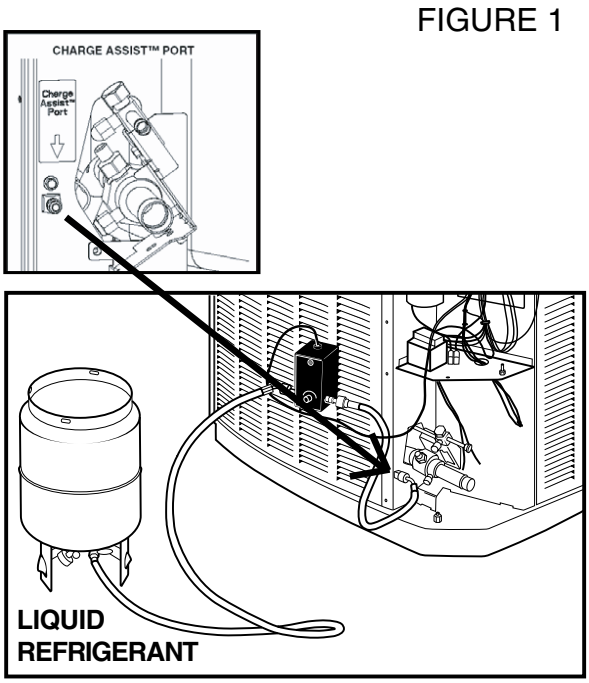
Use for Auto Charging
See 18-HH15D1-1

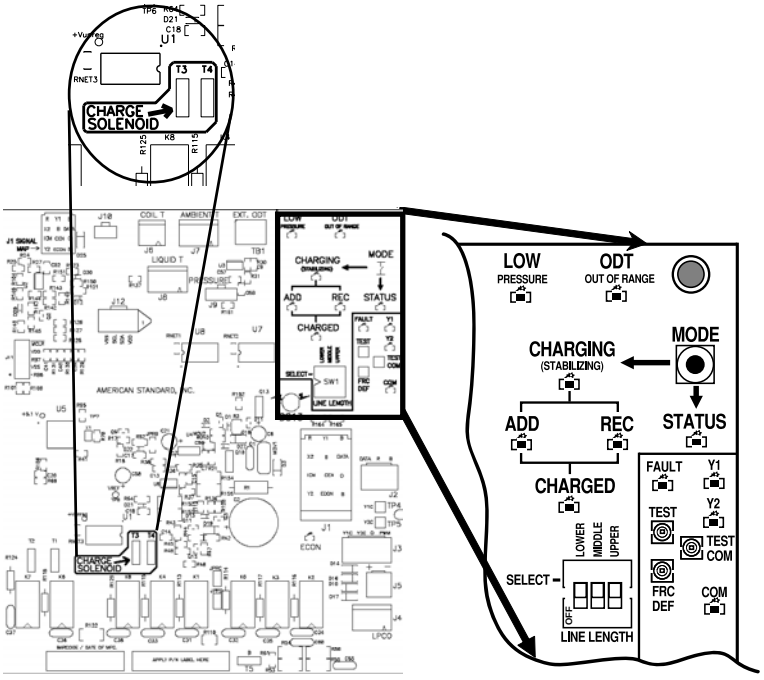
STEP 6:

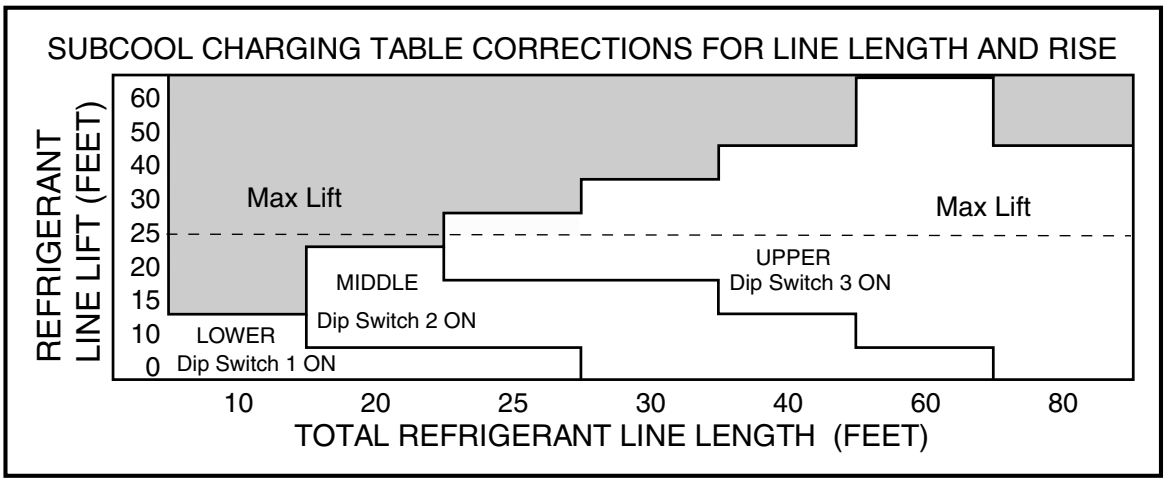
Recover Routine
If the **CA™** control determines there is excessive refrigerant in the system, the **REC** Red **LED** will be turned ON. The **CA™** control will lock the system off for one hour and it will then exit the **CA™** cycle. The **REC** Red **LED** will stay ON for 1 hour. The **CA™** control lock out period can be stopped by pressing the MODE button for 1 second. Status LED will be off during lockout.

NOTE: On the **Charge Assist™ control** set the LINE LENGTH DIP SWITCHES before running system or entering **CA™ Mode.**
Refer to the Service Facts for additional information.

FIGURE 1







NOTE: **Personality Module (PM)** contains model specific information needed for system operation - **Do Not Remove.**

NOTE: The word **'WAIT'** will be displayed on the Communicating Comfort Control when the system is in the **CA™** mode. The Communicating Comfort Control does not control the system operation when the system is running in the **CA™** Mode. Any changes in the Communicating Comfort Control programming made during the **CA™** mode of operation will become effective after the **CA™** mode ends.

Charge Assist™ (CA™) Procedure for a NON-Communicating 24VAC Control System

24 VAC STEP 1:

Installations using indoor units with 24 volt require the technician to set up the Variable Speed (VS) Air Handler or VS Furnace with the DIP switches for the size of the equipment installed. (Unit tonnage, CFM per ton 350, 400, 450 required, the blower delays and Heating airflow) **CA™** cycle is compatible with ENHANCED Mode.

24 VAC STEP 2:

A technician must set the indoor system control to call for the **SECOND STAGE of COOLING**. The indoor **CONTROL** must be **set low enough** to ensure the system continues to run in **SECOND STAGE of COOLING** throughout the **CA™** mode cycle. The CA™ control will exit the **CA™ mode CYCLE** if the system control does not stay in the **SECOND STAGE** cooling cycle. (The **CA™** Control must see 24 Volts AC call on both Y1 and Y2.)

24 VAC STEP 3:

Press the mode button on the **CA™** board and follow the **CA™** procedures starting with **STEP 1** in the **Communicating Comfort Control Section** above.

24 VAC STEP 4:

After the **CA™** control exits the **CA™ mode** CYCLE, the technician must then return the NON-COMMUNICATING 24 volt indoor CONTROL to the desired customer setting.

Charge Assist™ Fault LED & Alert Codes

FAULT LED (RED)		Alert # on Comfort Control
OFF	Standby	Not reported to the Comfort Control
1 Flash	Excessive Communication CRC Errors	90
	No Communication	91
2 Flash	Defrost Fault A	Not reported to the Comfort Control
3 Flash	Defrost Fault B and/or C	Not reported to the Comfort Control
4 Flash	Defrost Fault A and (B and/or C)	Not reported to the Comfort Control
5 Flash	Ambient Temperature Sensor Fault	67
	(Out of Range- Open or Shorted)	
6 Flash	Coil Temperature Sensor Fault	67
	(Out of Range- Open or Shorted)	
7 Flash	LPCO Fault	79
	(Open outside of Defrost Cycle)	
10 Flash	Y2 without Y1	Not reported to the Comfort Control
	Miswire (24 volt mode only)	
11 Flash	Liquid Temperature Fault	Not reported to the Comfort Control
	(Out of Range- Open or Shorted)	
12 Flash	Liquid Pressure Sensor Fault	Not reported to the Comfort Control
	Voltage out of Range (Open or Shorted)	
13 Flash	External ODT Sensor Fault	Not reported to the Comfort Control
	(Out of Range- Open or Shorted)	
14 Flash	Bad or Missing PM	114
15 Flash	Duplicate OD temperature sensor	Not reported to the Comfort Control

The last four fault codes will be displayed sequentially. There is a 2 second pause between faults and 4 second pause between sequences. Cycle power or 24 volt to outdoor unit to clear Faults.

SUMMARY OF THE CHARGE ASSIST™ MODULE AND ITS LED's

LOW PRESSURE **LED (RED)**
Liquid Pressure must be above 50 psig to enter CA™. Below 50 psig - turn on LOW Pressure LED for 30 sec. and flash CHARGING RED LED 5 times per sec for 2 sec. Exit CA™.

ODT OUT OF RANGE **LED (RED)**
Ambient Temperature must be above 65°F to enter **CA™**. Below 65°F- flash ODT 'Out of Range' LED 1 sec. ON/OFF for 30 sec. and flash CHARGING LED 5 times per sec. for 2 sec. Exit **CA™**.

COM LED (AMBER)
OFF- no power, ON solid at power-up, Flash device count when in communication (number of communicating products connected in system), Rapid flashes followed by a pause indicates disrupted communications (CRC errors).

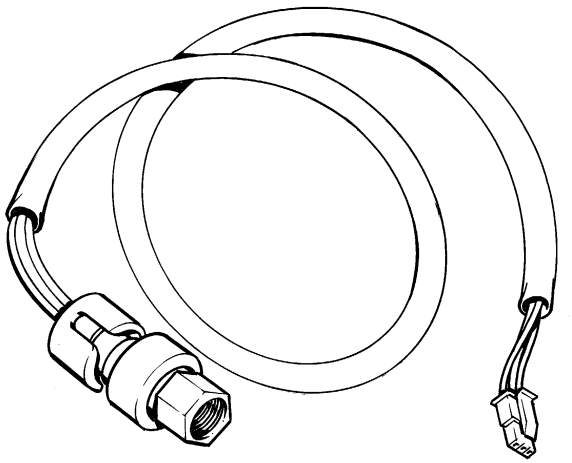
Y1 LED (GREEN)	
ON	1st stage compressor request
Y2 LED (GREEN)	
ON	2nd stage compressor request
STATUS LED (GREEN)	
Fast Flash	At Power Up ~ 20 seconds
Slow Flash	Standard operation
OFF	Charge Assist™ mode
LitePort LED (GREEN)	
Occasional flash	For transmitting LitePort data

CA™ procedure allows 1 hour to get within 20 psi of "Charged" and 50 minutes to move 4 psi, Otherwise Time Out

"CHARGED" LED (GREEN)	
ON	Charge is Correct
BLINKING	1 sec. ON/OFF = 15-20 PSI off target 3/4 sec. ON/OFF = 10-15 PSI off target 1/2 sec. ON/OFF = 5-10 PSI off target 1/4 sec. ON/OFF = 0-5 PSI off target
"CHARGING" (STABILIZING) (AMBER LED)	
BLINKING	1 sec ON/OFF = 6-20 minutes away from a steady operating state. 3/4 sec. ON/OFF = 5-6 minutes away from a steady operating state. 1/2 sec. ON/OFF = 2-4 minutes away from a steady operating state. 1/4 sec. ON/OFF = 1/2 - 2 minutes away from a steady operating state.
"RECOVER" (RED LED)	
ON	Exit Charge Assist™ - need to recover refrigerant
"ADD" (AMBER LED)	
ON	System requires refrigerant charge (Control has turned on the 24 volt AC output) Use Charge Assist™ Tool (#BAYCAKT001AA)

Liquid Line Pressure Transducer
Voltage to Pressure Reference Chart

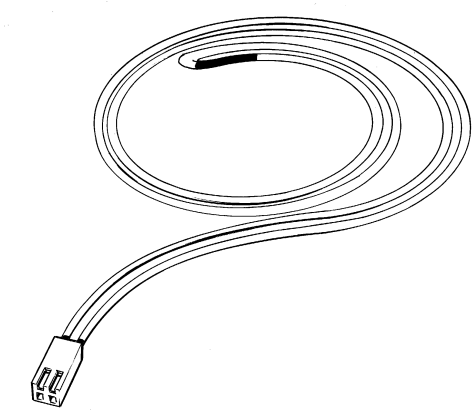
Liquid Line Pressure Transducer



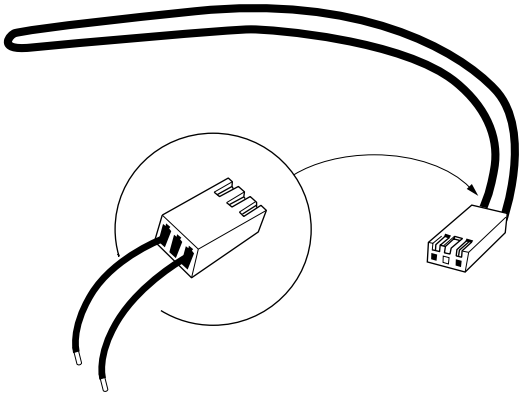
DC Volts	Pressure (PSIG)
0.81	31
0.91	41
1.00	51
1.10	60
1.20	70
1.32	82
1.42	92
1.52	101
1.62	111
1.72	120
1.81	130
1.91	140
2.03	152
2.13	161
2.23	171
2.33	181
2.43	190
2.52	200
2.65	212
2.74	222
2.84	231
2.94	241
3.04	250
3.14	260
3.26	272

Sensor Resistance Reference Chart

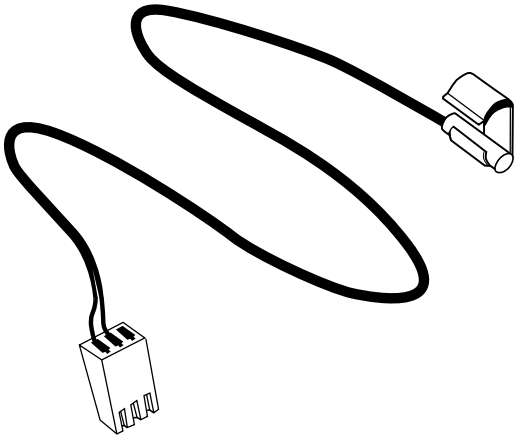
Coil Sensor



Ambient Sensor



Liquid Line Sensor



T deg F	T deg C	Thermistor Resistance (OHMS)
0	-17.78	83247
5	-15.00	71108
10	-12.22	60916
15	-9.44	52333
20	-6.67	45076
25	-3.89	38927
30	-1.11	33703
35	1.67	29253
40	4.44	25452
45	7.22	22198
50	10.00	19405
55	12.78	17002
60	15.56	14930
65	18.33	13138
70	21.11	11586
75	23.89	10238
80	26.67	9065
85	29.44	8043
90	32.22	7150
95	35.00	6368
100	37.78	5682
105	40.56	5079
110	43.33	4548
115	46.11	4079
120	48.89	3665
125	51.67	3298
130	54.44	2972
135	57.22	2683
136	57.78	2629
137	58.33	2576
138	58.89	2525
139	59.44	2474
140	60.00	2425
141	60.56	2377
142	31.11	2330
143	61.67	2284
144	62.22	2239
145	62.78	2195
146	63.33	2153
147	63.89	2111
148	64.44	2070
149	65.00	2030
150	65.56	1990