



Dantherm Cooling Inc.
ACG7 Controller

Revision History		
Revision Level	Description	Date
A	Initial Release	01MAR2018
B	Add Manual Instructions	27APR2018
C	Minor Updates	14AUG2019
D	Combine with Ethernet Manual	06OCT2020
Firmware Version		
The current version of firmware is 2.58 / 2.74 as of October 6, 2020		

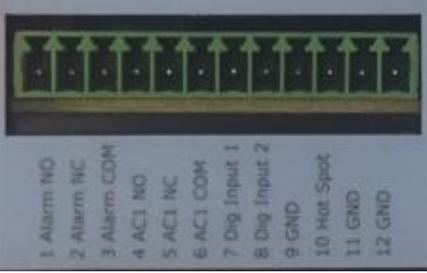
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General Overview	
	<p>The ACG-7 controller is used to control Dantherm Cooling Inc. air conditioners for the electronics cooling industry.</p> <p>The controller determines the operation of a compressor, internal fan, external fan, and heater based on the return air temperature compared with independent cooling and heating set points. For AC voltage applications, Lead-Lag feature is included with the ability to control and external air conditioner.</p> <p>The control board design, files, software, etc. are solely owned by Dantherm Cooling, Inc. and under Spartanburg, SC, USA control.</p>
	<p>The controller has two modes of operation.</p> <p>In VAC applications, the board communicates signals to external relays to operate the compressor and fans.</p> <p>In VDC applications, the ACG7 board works in connection with an inrush DC current board and Compressor Controller board to operate the DC compressor and DC fans.</p>
Approvals & Markings	
Agency Requirements	<p>The controls use UL recognized components and must meet UL air conditioner requirements (UL 1995 or UL 484). <u>Control board must be marked UL.</u></p> <p>RoHS compliant (no mercury or environmentally unfriendly metals or gases).</p> <p><u>Certification to electrical noise immunity standards and to FCC Part 15 Class B is required.</u></p>
Physical Specifications	
Physical Size	Control system is contained in a PC board. Actual size: 6.530" x 2.70"
Mounting	There are four mounting locations on the perimeter of the board. The diameters of the holes are 4.2 mm to allow the use of 4 mm fasteners. See production files for exact dimensioning.
Operational range	<ul style="list-style-type: none"> Storage temperature between -40 C and 80 C. Operational range between -40C and 60C Power input will be 12vdc for the controller



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Front Panel	<p>The controller used in this air conditioner is an Intelligent Thermal Controller designed for user operation through the front control panel.</p> 																																																																																																																									
Keypad & Display	<p>Pressing the “Up” button, scrolls through the menu of the controller;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Menu Item</th> <th style="width: 15%;">Displayed</th> <th style="width: 70%;">Function</th> </tr> </thead> <tbody> <tr> <td>Cooling Set Point</td> <td style="color: red; font-weight: bold;">Cool</td> <td>Change the cooling set point from 20 to 40°C</td> </tr> <tr> <td>Heating Set Point</td> <td style="color: red; font-weight: bold;">HEAt</td> <td>Change the heating set point from 0 to 15°C</td> </tr> <tr> <td rowspan="2">Alarm Codes</td> <td rowspan="2" style="color: red; font-weight: bold;">Err</td> <td>This menu will be available when one of the following errors is displayed;</td> </tr> <tr> <td> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>5</th> <th>High / Low Temp</th> <th>10</th> <th>Hotspot Sensor</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>DC Fan 1</td> <td>13</td> <td>Condenser Sensor</td> </tr> <tr> <td>7</td> <td>DC Fan 2</td> <td>16</td> <td>High Pressure</td> </tr> <tr> <td>8</td> <td>DC Comp</td> <td></td> <td></td> </tr> <tr> <td>9</td> <td>Return Sensor</td> <td></td> <td></td> </tr> </tbody> </table> <p>(other values do not indicate an error and are for factory use only)</p> </td> </tr> <tr> <td rowspan="2">Test</td> <td rowspan="2" style="color: red; font-weight: bold;">tEST</td> <td>Press the “up” button to move through the test steps. 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<p>Connections</p>	 <p>Form "C" alarm. Connect to 1 & 3 for Open during alarm, close during normal operation. Connect to 2 & 3 for Closed during alarm, open during normal operation.</p> <p>AC output. Connect to 4 & 6 for controlling external air conditioner. See separate document for lead / lag operation.</p> <p>Dig Input 1. When 7 & 9 are connected, unit will cool in override mode. See separate document for lead / lag operation.</p> <p>Dig Input 2. For use with a door switch to interrupt operation of the unit.</p> <p>Hot Spot Sensor. Connect Dantherm Cooling sensor to 10 & 11 for remote sensing operation.</p>
<p>SD Card / Data Logging</p>	<p>An SD card can be inserted into the controller for automatic data logging. The data file will be labeled "log.txt". This is useful for capturing field related issues over time. The card must be a 32GB or smaller, SD or SDHC. Larger sizes and SDXC are not supported.</p> <p>If needed, a heading of the log file ("loghdr.txt") can be obtained by contacting technical support, which assists in identifying the fields.</p>

User Connections	
Physical Size	<p>On the front of the ACG7 controller, there are up to five interface ports for user functionality.</p> <ul style="list-style-type: none"> • 12 pin connector • LED with user interface • TTL Connector • SD Card • Three LED diagnostic indicators • Ethernet Connection
12 Pin Connector	<p>The 12 pin connection on the front of the controller is for interfacing to optional features of the air conditioner including:</p> <ul style="list-style-type: none"> • Alarm • External A/C contactor relay • Digital inputs for external input • External temperature sensor input <p>The Alarm is a form “C” type with a common, normally open, and normally closed. Pin 3 is common. Pin 1 is closed during regular operation and opens during alarm. Pin 2 is open during regular operation and closed during alarm. Alarming functions is found in the alarm section of this document.</p> <p>An External relay output is provided to operate a second “lag” unit. This can be configured based on temperature control though the TTL.</p> <p>The digital inputs are used to operate features of the controller as configured by the customer. Examples include the use of a door switch to disable functions of the air conditioner when the door is open.</p> <p>The external / hot spot sensor is used for monitoring temperature in other locations of the cabinet. When a 2.7 kOhm NTC thermistor is connected to the hot spot connection (pin 10 & 11) the controller will automatically use this for operation. If the sensor fails or is disconnected, the controller will use its internal sensor for operation.</p>

User Interface																																																																																	
LED with user interface	<p>The LED interface shows the return temperature in standby mode. Three buttons (“Up”, “Enter”, “Down”) are located next to the LED interface.</p> <p>Pressing the “Up” or “Down” button activates the menu structure.</p> <p>Pressing the “enter” button on the desired heading will enter that sub menu.</p> <p>Pressing “enter” in any sub menu returns back to the main temperature display.</p>																																																																																
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TTL Connection	<p>The TTL connection is set up to be used with a serial connection program. The following default settings are use.</p> <div style="border: 1px solid gray; padding: 10px; margin: 10px 0;"> <p style="text-align: center; font-size: small;">Tera Term: Serial port setup</p> <p>Port: <input type="text" value="COM1"/></p> <p>Baud rate: <input type="text" value="57600"/></p> <p>Data: <input type="text" value="8 bit"/></p> <p>Parity: <input type="text" value="none"/></p> <p>Stop: <input type="text" value="1 bit"/></p> <p>Flow control: <input type="text" value="none"/></p> <p>Transmit delay <input type="text" value="0"/> msec/char <input type="text" value="0"/> msec/line</p> <p style="text-align: right;"> <input type="button" value="OK"/> <input type="button" value="Cancel"/> <input type="button" value="Help"/> </p> </div> <p>Pressing the “enter” key will display the main menu:</p> <pre style="font-family: monospace; font-size: small;"> ----- Dantherm US ACG7 Controller v- 2.30 ----- S - System Status O - Override Mode B - Display AC Comp. Config. T - Display AC Fan1 Config. E - Display Heater Config. A - Display AC Fan2 Config. R - Display DC/EC Fan1 Config. W - Display DC Comp. Config. Y - Display Controller Config. C - Configure System D - Dump config. to SD Card F - Display AC Ext. Config. M - Start Test Mode L - Display Alarm Mapping I - Display DC/EC Fan2 Config. </pre> <p>Selecting the appropriate key will take you to the sub menu.</p> <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr style="background-color: #cccccc;"> <th>Key</th> <th>Sub Menu</th> <th>Options / Description</th> </tr> </thead> <tbody> <tr><td>S</td><td>System Status</td><td>Current status of system level operation</td></tr> <tr><td>O</td><td>Override Mode</td><td>Override individual components in system</td></tr> <tr><td>B</td><td>Display AC Comp. Config.</td><td>Current settings of AC Compressor</td></tr> <tr><td>T</td><td>Display AC Fan 1 Config.</td><td>Current settings of AC Evap Fan</td></tr> <tr><td>E</td><td>Display Heater Config.</td><td>Current settings of Heater</td></tr> <tr><td>A</td><td>Display AC Fan 2 Config.</td><td>Current settings of AC Cond. Fan</td></tr> <tr><td>R</td><td>Display DC Fan 1 Config.</td><td>Current settings of DC Evap Fan</td></tr> <tr><td>W</td><td>Display DC Comp. Config.</td><td>Current settings of DC Compressor</td></tr> <tr><td>Y</td><td>Display Controller Config.</td><td>Current settings of controller</td></tr> <tr><td>C</td><td>Configure System</td><td>Change current settings for any item</td></tr> <tr><td>D</td><td>Dump Config. To SD Card</td><td>Write current configuration to SD card</td></tr> <tr><td>F</td><td>Display AC Ext. Config.</td><td>Current settings of AC external relay</td></tr> <tr><td>M</td><td>Start Test Mode</td><td>Start test mode. Press “M” to step through</td></tr> <tr><td>L</td><td>Display Alarm Mapping</td><td>Shows which alarms are tracked</td></tr> <tr><td>I</td><td>Display DC Fan2 Config.</td><td>Current settings of DC Cond. Fan</td></tr> </tbody> </table>	Key	Sub Menu	Options / Description	S	System Status	Current status of system level operation	O	Override Mode	Override individual components in system	B	Display AC Comp. Config.	Current settings of AC Compressor	T	Display AC Fan 1 Config.	Current settings of AC Evap Fan	E	Display Heater Config.	Current settings of Heater	A	Display AC Fan 2 Config.	Current settings of AC Cond. Fan	R	Display DC Fan 1 Config.	Current settings of DC Evap Fan	W	Display DC Comp. Config.	Current settings of DC Compressor	Y	Display Controller Config.	Current settings of controller	C	Configure System	Change current settings for any item	D	Dump Config. To SD Card	Write current configuration to SD card	F	Display AC Ext. Config.	Current settings of AC external relay	M	Start Test Mode	Start test mode. Press “M” to step through	L	Display Alarm Mapping	Shows which alarms are tracked	I	Display DC Fan2 Config.	Current settings of DC Cond. Fan
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Menu	<p>The Display and the System Status Menus are for displaying information only. You cannot change anything from this menu.</p> <p>The Override Menu allows you to manually operate system components. To operate in this function, press the desired component number, followed by “;” and the operational parameter. For example, to turn on the heater, 5;1.</p>																																																

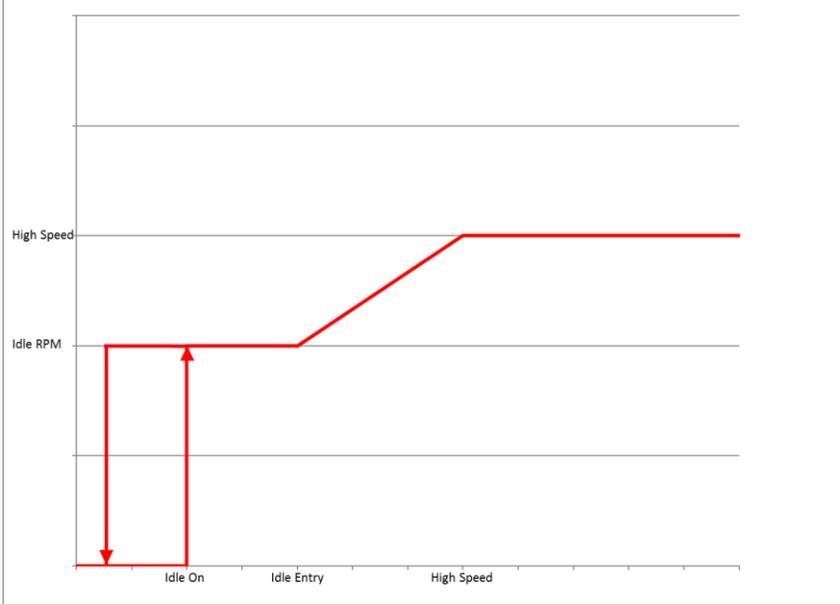
	<p>To change individual settings, go to the configuration menu and press the appropriate sub menu. Within the sub menu, select the desired setting, followed by “,” and new setting.</p>
Timers	<ul style="list-style-type: none"> • In Override mode, the controller will automatically exit after 1 minute if no changes are made • In Test Mode, the controller will automatically exit after 4 minutes if the unit is not manually stepped through • The compressor forced on / off time can be set through configuration settings. A cycle time of 6 minutes should be used to avoid short cycling. • The alarm delay can be set through the configuration settings. An alarm delay of at least 30 seconds should be used to avoid nuisance alarms.
Dead band	<ul style="list-style-type: none"> • There is a 3C dead band between the “ON” and “OFF” temperature of the heater. The maximum heater set point is 15C. • There is a 3C dead band between the “ON” and “OFF” temperature of the compressor. The minimum cooling set point is 20C. • The high & low temperature alarm threshold has a 1C dead band to avoid nuisance alarms.
	<ul style="list-style-type: none"> •

SD Card	<p>An SD card slot is provided to allow data logging. Configurations and program updates are not typically performed in the field and should be limited to factory provisioning as explained in the factory setting menu.</p> <p>A 32GB card or less is required. Larger than 32GB may not work or functions may be limited.</p>
LED Diagnostics Indicators	<p>Three LED diagnostic indicators are located just above the SD card.</p> <ul style="list-style-type: none"> • Green LED – illuminates when the unit is operational. Does not illuminate during programming through the SD card. • Amber LED – illuminates when power is supplied to the control board. • Red LED – illuminates when there is an alarm.
Ethernet Connection	Optional feature described in the Ethernet section of this document.

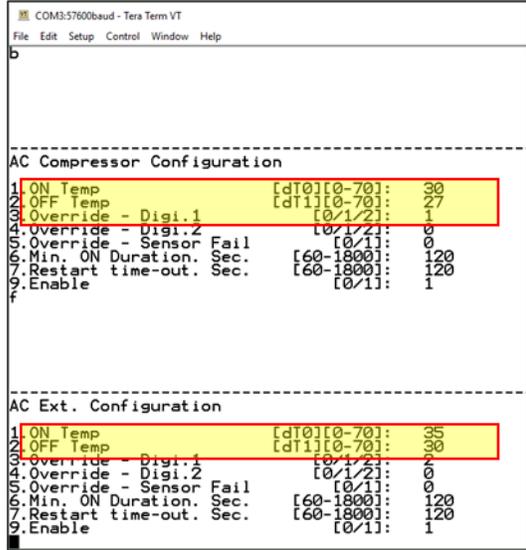
Internal Connections (Input & Output)	
<p>Terminals / connections</p> <p>Back Side of Controller</p>	<p>Commonly used connectors are grouped as shown in Appendix B. The connector is an OST, 3.81 Series Connector with various positions.</p> <ul style="list-style-type: none"> • From back of controller <ul style="list-style-type: none"> ○ J7 (Output Relays) – On Shore Tech, OSTOQ103251 <ul style="list-style-type: none"> ▪ Condenser fan GND ▪ Condenser fan 12V ▪ Evaporator fan GND ▪ Evaporator fan 12V ▪ Heater GND ▪ Heater 12V ▪ Compressor GND ▪ Compressor 12V ▪ Power Input – 12V ▪ Power Input – GND ○ J6 (Sensors) – On Shore Tech, OSTOQ083251 <ul style="list-style-type: none"> ▪ Return Sensor ▪ Return Sensor ▪ Condenser Sensor ▪ Condenser Sensor ▪ Board Sensor Connection ▪ Board Sensor Connection ▪ Digital Input GND ▪ Digital Input 4 RET ○ J9 (DC Controls) <ul style="list-style-type: none"> ▪ Serial communication for compressor controller ○ J8 (DC Controls) <ul style="list-style-type: none"> ▪ +12V ▪ Fan1 Drv ▪ GND ▪ Fan1 Tach ▪ Fan2 DRV ▪ Fan2 Tach ▪ +12V ▪ Heat Relay ▪ +12V In ▪ GND In

<p>Terminals / connections</p> <p>Front Side of Controller</p>	<ul style="list-style-type: none"> • From front of controller (User Accessible) – On Shore Tech, OSTOQ121251 <ul style="list-style-type: none"> ○ P6 (Inputs) - SD Card ○ P7 (Communication) - Ethernet Connection (RJ45) ○ P8 (Communication) - TTL Connection ○ P9 (User Inputs) <ul style="list-style-type: none"> ▪ GND ▪ Hotspot Sensor GND ▪ Hotspot Sensor RET ▪ Digital Input GND ▪ Digital Input 1 RET ▪ Digital Input 2 RET ▪ A/C relay Output ▪ A/C relay Output ▪ A/C relay Output ▪ Alarm relay common ▪ Alarm relay normally open ▪ Alarm relay normally closed

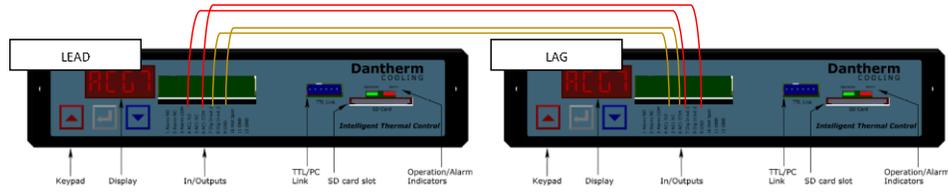
Control Signals	
Supply voltage	The input voltage is 12vdc. A separate power supply in the air conditioner will provide this power. In DC air conditioners, the DC18 Supply board will provide the power for the control board 12vdc and the power for the compressor 48vdc. Polarity protection is included.
Temperature Monitoring	<p>There are multiple input signals to guide the controller:</p> <ul style="list-style-type: none"> • All sensors are 2.7 kOhm NTC thermistor (see attached graph & Vishay Spec 23226403). • The condenser fan is based on the condenser sensor. Within the settings, the condenser fan can be turned on / off if there is a failure of the condenser sensor. • For control, the priority is as described; <ul style="list-style-type: none"> ○ If a hot spot sensor is installed, the controller will use this sensor to control the compressor, heater, and evaporator fan. ○ Lacking a hot spot sensor, if a return sensor is connected to the back of the control board on J6, this will be used to control the compressor, heater, and evaporator fan. ○ Lacking a hot spot sensor and return sensor, the unit will use the on-board sensor to control the compressor, heater, and evaporator fan.
Digital Input	Digital Input detecting closed or open signals to affect controls
Control Output	The unit will control based on the above parameters. Board will switch signal voltage to operate 12vdc relays for compressor, ACV fans, and heater. On the output of the controller, a dead short across one of the signals will damage the control board.
Alarm Output	Alarm signal will be available through a form "C" relay output. Normally Open and Normally Closed will be read through a relay capable of 60VAC / 0.3 amps or 100vdc / 0.3 amps.

Control Parameters	
General	<ul style="list-style-type: none"> All features are available through the SD card, TTL, and the Ethernet connection. The LED and three buttons allow access only to the Cooling Set Point, Heater Setpoint, Fault codes, Testing, and C/F Units.
Set Points	<p>Separate Heating and cooling control points are used. There is a dead band of 5C between the maximum heating and the minimum cooling set point to prevent the system from heating and cooling at the same time.</p> <ul style="list-style-type: none"> Cooling set point range is from 20 to 40C Heat set point range is from 0 to 15C
Display / Units	<ul style="list-style-type: none"> Celsius is the default for the display Fahrenheit as an option for the display only All settings in the TTL and SD card are in Celsius
Control of DC fans	<ul style="list-style-type: none"> PWM control of the DC fans will have: <ul style="list-style-type: none"> Off setting On setting (idle speed) Ramp Entry setting (fan begins to ramp) Maximum Speed setting (fan is at maximum speed)
Control of DC Compressor	<ul style="list-style-type: none"> PWM control of the DC compressor will have: <ul style="list-style-type: none"> Off setting On setting (idle speed) Ramp Entry setting (compressor begins to ramp) Maximum Speed setting (compressor is at maximum speed)
Control of DC Fan and Compressor	

Factory Provisioning (not for general field use!)	
General	<p>To initialize the controller at the factory, the TTL and the SD card must be used.</p> <p>A SD card is inserted with the following files: Cfgtmp.txt Units.txt xxxxxxxx.txt (cannot be more than 8 characters)</p> <p>The xxxxxxxx.txt file can be labeled in any manner as long as the file name is included in the units.txt file.</p> <p>Upon power start up (or cycle) the cfgtmp.txt will load, which takes about 1 minute.</p> <p>Press “del” to initialize the menu for selecting the configuration.</p> <p>Select the number corresponding to the xxxxxxxx.txt. The standard / default setting will be loaded on the controller, which takes about 2 minutes.</p>
Firmware updates	<p>While extremely rare, if a firmware update is required, insert in SD card with the dtout.hex file. The controller will validate the dtout.hex file for updating and then begin the process, which takes about 5 minutes.</p>
Firmware	<p>The version of firmware used is shown on the main page of the TTL port.</p>

Lead / Lag	
	<p>The LEAD-LAG feature of the PrecisionAir Air Conditioners (using the ACG7 Intelligent Thermal Controller) is available when two units are connected and each unit is configured accordingly. With LEAD-LAG in use, one unit will operate as a master/primary and the second unit will operate as a slave/secondary. This is only available with two units and operates only when in the cooling mode. In heating mode, the units will operate independently of each other.</p> <p>The LEAD and the LAG units are configured the same and will come from the factory with default settings. Further adjustment can be done through the TTL connection. The LEAD will be whichever unit is reading the warmest temperature. The LAG unit will operate based on input from the LEAD and its own temperature readings.</p>
	<div style="display: flex;"> <div style="flex: 1; padding-right: 10px;"> <p>Setup: The ACG7 ITC is configured for VAC solutions as shown to the right. The “Override – Digi. 1” is set to “1” with the AC Ext. enabled. Both the LEAD and the LAG are given the same settings from the factory.</p> <p>In this example, the LEAD unit will turn on at 30°C and turn off at 27°C. The LAG unit will be called to turn on at 35°C and turn off at 30°C.</p> <p>The LAG unit will be called to turn on at 35°C and turn off at 30°C, based on the temperature reading on the LEAD unit. The LAG unit also has the same AC compressor settings, so the LAG unit will read its own temperature. If its temperature is above 30°C, the unit will be on and below 27°C it will be off.</p> <p>This provides dual stage cooling in situations where one unit is reading a warmer temperature than the other. Additionally, the LAG unit can have its set point raised through the display and effectively turn this unit to a second stage air conditioner all the time.</p> </div> <div style="flex: 1; border: 1px solid black; padding: 5px;">  <pre> COM3:57600baud - Tera Term VT File Edit Setup Control Window Help ----- AC Compressor Configuration 1.ON Temp [dTO][0-70]: 30 2.OFF Temp [dT][0-70]: 27 3.Override - Digi.1 [0/1/2]: 1 4.Override - Digi.2 [0/1/2]: 0 5.Override - Sensor Fail [0/1]: 0 6.Min. ON Duration. Sec. [60-1800]: 120 7.Restart time-out. Sec. [60-1800]: 120 9.Enable [0/1]: 1 f ----- AC Ext. Configuration 1.ON Temp [dTO][0-70]: 35 2.OFF Temp [dT][0-70]: 30 3.Override - Digi.1 [0/1/2]: 1 4.Override - Digi.2 [0/1/2]: 0 5.Override - Sensor Fail [0/1]: 0 6.Min. ON Duration. Sec. [60-1800]: 120 7.Restart time-out. Sec. [60-1800]: 120 9.Enable [0/1]: 1 f </pre> </div> </div>
	<div style="display: flex;"> <div style="flex: 1; padding-right: 10px;"> <p>The VDC solution will also operate in LEAD-LAG configuration. In the second example to the right, the LEAD VDC unit will turn on at 30°C, off at 27°C and run variable speed to 42°C. The LAG VDC unit will also turn on at 35°C and off at 30°C. With the override-Digi.1 set to 3, the LAG VDC unit will operate at 50% speed until its own temperature rises.</p> <p>The override-Digi.1 setting tells the VDC compressor how to operate. Settings and speed of compressor operation are 0-0%, 2-Ignore, 3-50%, and 4-100%.</p> </div> <div style="flex: 1; border: 1px solid black; padding: 5px;">  <pre> COM3:57600baud - Tera Term VT File Edit Setup Control Window Help ----- DC-Compressor Configurations 1.OFF Temp [xTO][0-70]: 27 2.IDLE ON Temp [xTI][0-70]: 30 3.IDLE entry Temp [xTI][0-70]: 35 5.HIGH SPEED Temp [xH][0-70]: 42 10.IDLE RPM [xR][0-9999]: 2200 11.HIGH SPEED RPM [xR][0-9999]: 2600 18.Min. ON Duration. Sec. [60-1800]: 120 19.Restart time-out. Sec. [60-1800]: 120 20.Override - Digi.1 [0/2/3/4]: 3 21.Override - Digi.2 [0/2/3/4]: 0 f ----- AC Ext. Configuration 1.ON Temp [dTO][0-70]: 35 2.OFF Temp [dT][0-70]: 30 3.Override - Digi.1 [0/1/2]: 3 4.Override - Digi.2 [0/1/2]: 0 5.Override - Sensor Fail [0/1]: 0 6.Min. ON Duration. Sec. [60-1800]: 120 7.Restart time-out. Sec. [60-1800]: 120 9.Enable [0/1]: 1 f </pre> </div> </div>
	<p>Wiring / Interconnection Cable: A cable must be used to connect the ACG7 Intelligent Thermal Controllers together. This is done from the front of the controller. The AC1 pinouts from the LEAD controller are</p>

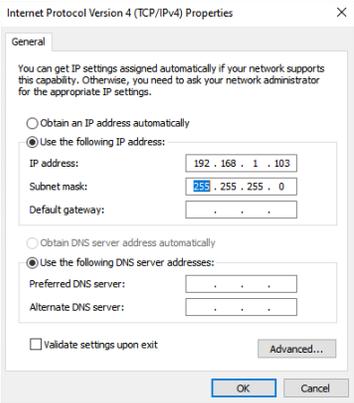
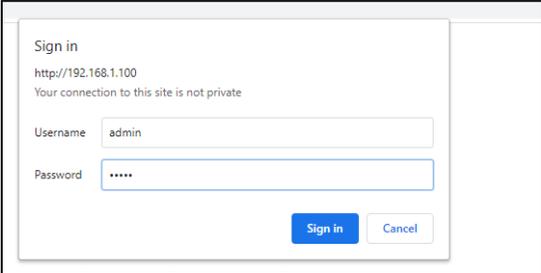
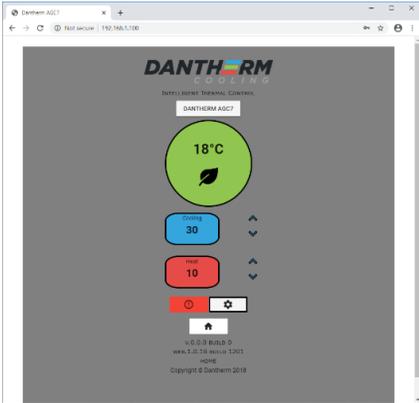
connected to the Dig1 Input and Dig1GND inputs on the LAG controller. To allow the system to work both ways, a second set of wires is used from the AC1 of the LAG to the Dig1 of the LEAD. This allows either unit to become the "LEAD" based on the warmest temperature. The wiring is not polarity sensitive.

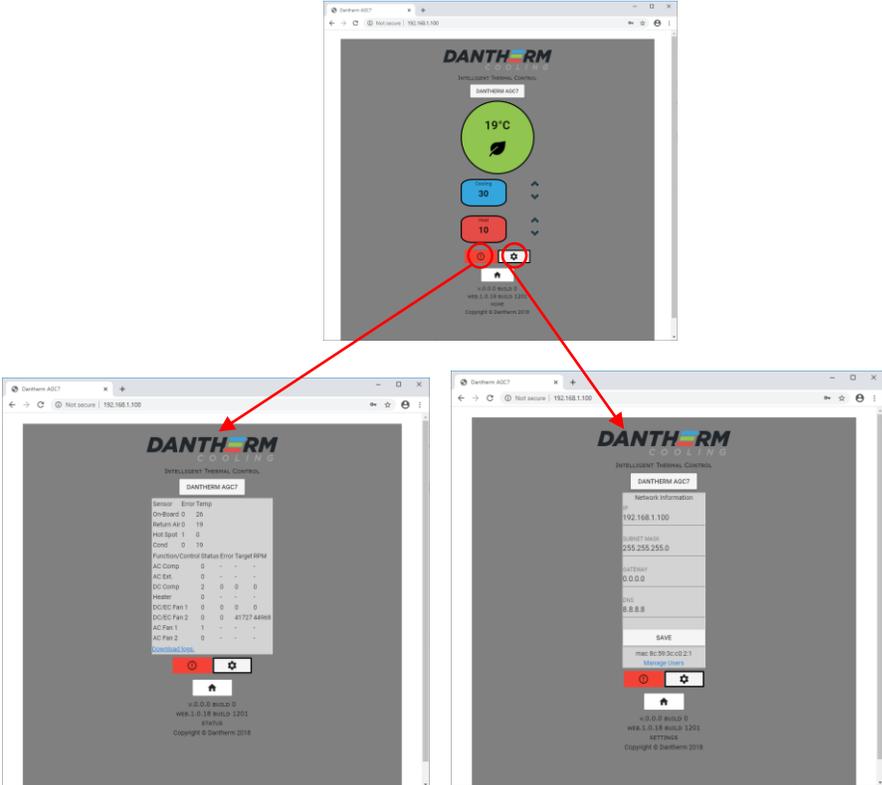


Connecting Door Switch to Lead / Lag Units:

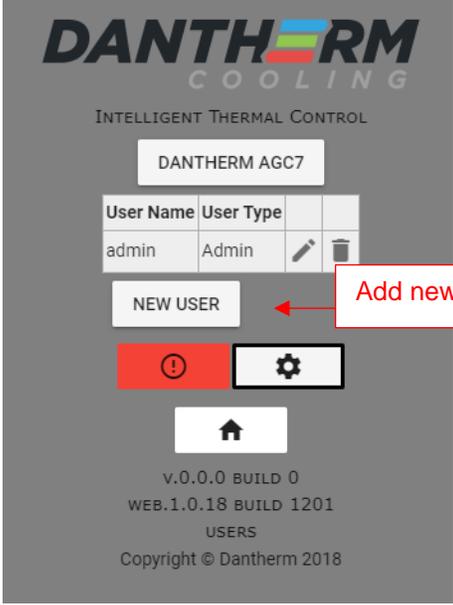
Care must be taken to not connect the GND between the two controllers when used in the VDC application. If the VDC are not on the same ground or a both (+) and (-) are not disconnected at the same time, a path through the GND will occur and try to operate the controller. Damage to the controller can occur.

Troubleshooting																																									
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Err 8 in Menu	DC Compressor Fan alarm. Check for operation / wiring to compressor Check Red LED on compressor controller (inside unit); <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr style="background-color: #cccccc;"> <th style="width: 50%; padding: 5px;">Compressor LED</th> <th style="padding: 5px;">Condition</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Solid</td> <td style="padding: 5px;">Standby Normal</td> </tr> <tr> <td style="padding: 5px;">Flash one time</td> <td style="padding: 5px;">Running Normal</td> </tr> <tr> <td style="padding: 5px;">Flash two times</td> <td style="padding: 5px;">Motor Drive Error</td> </tr> <tr> <td style="padding: 5px;">Flash four times</td> <td style="padding: 5px;">Over / Under Voltage</td> </tr> <tr> <td style="padding: 5px;">Flash six times</td> <td style="padding: 5px;">Overload switch error</td> </tr> <tr> <td style="padding: 5px;">Flash eight times</td> <td style="padding: 5px;">Communication error</td> </tr> </tbody> </table> Faulty Compressor Faulty Compressor Controller	Compressor LED	Condition	Solid	Standby Normal	Flash one time	Running Normal	Flash two times	Motor Drive Error	Flash four times	Over / Under Voltage	Flash six times	Overload switch error	Flash eight times	Communication error																										
Compressor LED	Condition																																								
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Flash six times	Overload switch error																																								
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Err 9 in Menu	Return / Evaporator Sensor not connected Return / Evaporator Sensor faulty																																								
Err 10 in Menu	Hot Spot Sensor not connected Alarm Mapping to Hot Spot sensor, but sensor not used Hot Spot Sensor faulty																																								
Err 13 in Menu	Condenser Sensor not connected Condenser Sensor faulty																																								
Err 16 in Menu	High Pressure Alarm																																								

	Ethernet Communications General Overview (optional).
	This section covers the optional ethernet functionality in the ACG-7 Intelligent Thermal Controller.
	Google Chrome is supported. Other web browsers such as Windows IE and Edge are not supported.
	Default IP Address: 192.168.1.100 Default username: admin Default password: admin
Configure your computer	<p>The default IP address is 192.168.1.100. The computer or laptop initially connected to controller must be configured to accept this address. For details, contact your IT administrator. This is typically done from the IPv4 properties for your computer, with one example shown below.</p> 
	<p>Using Google Chrome, type in the address 192.168.1.100. A “Sign In” window will appear. The default username is ‘admin’ and the default password is ‘admin’. Press <enter></p> 
User Interface	<p>The user interface for the controller will be displayed.</p> 

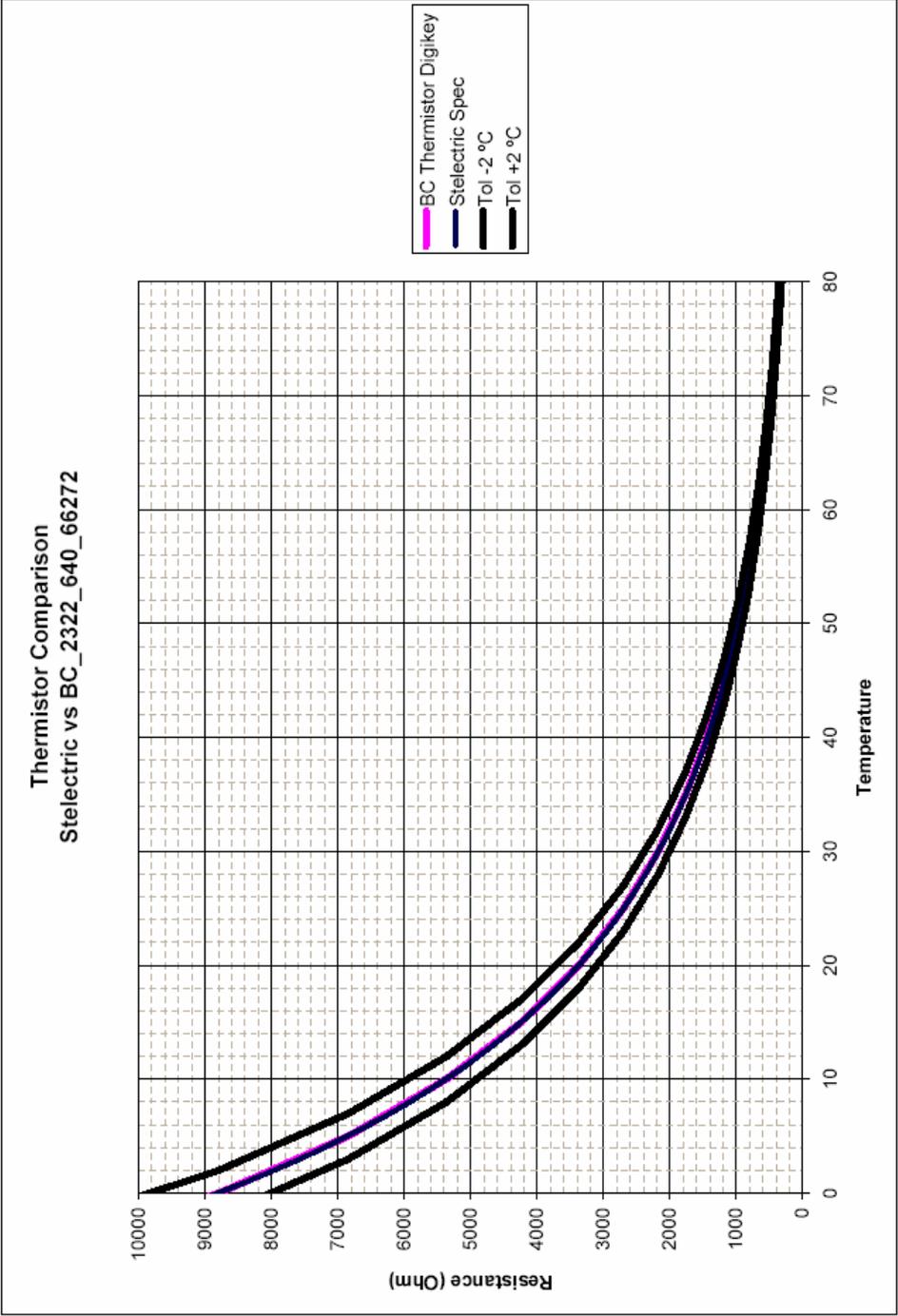
<p>Terminals / connections</p> <p>Back Side of Controller</p>	<p>Three pages are available from the user interface.</p> <p>Pressing the information icon, will display the unit status page</p> <p>Pressing the settings icon, will display the controller settings page</p> <p>Pressing the home icon, will display the main page</p> 
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<p>Home Page</p>	<p>Change the unit name</p> <p>Current temperature</p> <p>Adjust cooling set point</p> <p>Adjust heating set point</p>
<p>Unit Status Page</p>	<p>Change the unit name</p> <p>Current settings / status</p> <p>Download log file – can take up to 5 minutes</p>
<p>Controller Settings Page</p>	<p>User / unit specified settings</p> <p>Unique MAC address</p> <p>Save current settings</p> <p>Change / add users</p>
<p>Manage user</p>	

	
<p>SNMP Overview</p>	<p>The ACG7 with ethernet supports SNMP over TCP/IP. Simple Network Management Protocol is used in some applications to communicate detailed information. Changing certain settings / values is also supported.</p>
<p>SNMP version support</p>	<p>The ACG7 controller is designed to work with SNMPv1 and SNMPv2. The community string is not used in our SNMP (“public” may be used in some applications). Security is the responsibly of the network owner. In some applications, this is handled through a IPsec tunnel.</p>
<p>MIB File</p>	<p>A MIB file, unique to the ACG7 controller is available directly from Dantherm Cooling. The Management Information Base file defines the data that can be communicated to the user application. Please contact technical support (tech.support@danthermcooling.com) for this file.</p>
	<p>The IP settings can be reset to the factory defaults by holding the up button the controller during a power cycle. The default IP address (192.168.1.100) will now be active.</p>

General		
	Problem	Check / Possible Cause
	No access to the controller through the webpage. No login window displayed.	<ul style="list-style-type: none"> • Verify Google Chrome • Reset IP settings to factory defaults
	No access to controller webpage. Login window is shown and does accept username.	<ul style="list-style-type: none"> • Verify Google Chrome • Verify internet access • Webpage has been corrupted - contact factory for update or replace
	Webpage displays garbled characters.	<ul style="list-style-type: none"> • Initial setup will require computer to have internet access while accessing the controller. This is to access the font from public libraries.

APPENDIX A – Thermistor Curve



APPENDIX B – Configuration File

AC_ON_Temp : 30	Point at which VAC compressor turns on
AC1_ON_Temp : 33	Point at which AC1 signal turns on
AC_OFF_Temp : 27	Point at which VAC compressor turns off
AC1_OFF_Temp : 30	Point at which AC1 signal turns off
Shelt_Temp : 0	Not used
Rtn_Temp : 0	Not used
Amb_Temp : 0	Not used
Cond_Temp : 0	Not used
HSpot_Temp : 0	Not used
EvapOut_Temp : 0	Not used
AC_Override_Digi1 : 2	VAC comp based on Digi1, 0 (off), 1 (on), 2 (ignore)
AC_Override_Digi2 : 2	VAC comp based on Digi2, 0 (off), 1 (on), 2 (ignore)
AC_Override_Sen_Fail : 0	VAC comp based on sens fail, 0 (off), 1 (on), 2 (ignore)
AC_Sense_Sel : 0	Not used
AC_SYS_Enable : 1	VAC comp active 0 (no), 1 (yes)
AC1_Override_Digi1 : 2	AC1 signal based on Digi1, 0 (off), 1 (on), 2 (ignore)
AC1_Override_Digi2 : 2	AC1 signal based on Digi2, 0 (off), 1 (on), 2 (ignore)
AC1_Override_Sen_Fail : 0	AC1 signal based on sens fail, 0 (off), 1 (on), 2 (ignore)
AC1_Sense_Sel : 0	Not used
AC1_SYS_Enable : 1	AC1 signal active 0 (no), 1 (yes)
DC_Off_Temp : 27	DC comp off
DC_Idle_On_Temp : 30	DC comp on (set point)
DC_Idle_Entry_Temp : 31	DC comp begin ramp
DC_Set_Pt_Temp : 0	Not used
DC_Hi_Speed_Temp : 40	DC comp end ramp
DC_Extd_Hi_Speed_Duty_Cycle : 0	Not used
DC_Override_Digi1 : 2	DC comp based on Digi1, 0-0%,2-ignore, 3-50%, 4-100%
DC_Override_Digi2 : 0	DC comp based on Digi2, 0-0%,2-ignore, 3-50%, 4-100%
DC_Tach_Pulse_Rev : 0	Not used
Heater_On_Temp : 10	Heater On point (set point)
Heater_Off_Temp : 13	Heater Off point
Heat_Override_Digi1 : 2	Heater based on Digi1, 0 (off), 1 (on), 2 (ignore)
Heat_Override_Digi2 : 2	Heater based on Digi2, 0 (off), 1 (on), 2 (ignore)
Heat_Sensor_Select : 2	Heater based on Sens fail, 0 (off), 1 (on), 2 (ignore)
DC_Fan1_Off_Temp : 0	DC fan 1 turns off set to 0 for continuous operation
DC_Fan1_Idle_On_Temp : 0	DC fan 1 turns on set to 0 for continuous operation
DC_Fan1_Idle_Entry_Temp : 20	DC fan 1 begins ramp
DC_Fan1_SP_Temp : 0	Not used
DC_Fan1_HSpd_Temp : 35	DC fan 1 ends ramp (maximum speed)
DC_Fan_IDLE_Duty : 0	Not used
DC_Fan1_HiSpd_Duty : 0	Not used
DC_Fan1_ExtHiSpd_Duty : 0	Not used
DC_Fan1_Override_Digi1 : 2	DC fan 1 based on Digi 1, 0-0%,2-ignore, 3-50%, 4-100%
DC_Fan1_Override_Digi2 : 0	DC fan 1 based on Digi 2, 0-0%,2-ignore, 3-50%, 4-100%
DC_Fan1_Pulse_Rev : 3	DC fan 1, # pulses per revolution
DC_Fan2_Off_Temp : 20	DC fan 2 turns off
DC_Fan2_Idle_On_Temp : 30	DC fan 2 turns on
DC_Fan2_Idle_Entry_Temp : 40	DC fan 2 begins ramp
DC_Fan2_SP_Temp : 0	Not used
DC_Fan2_HSpd_Temp : 50	DC fan 2 ends ramp (maximum speed)
DC_Fan2_Override_Digi1 : 2	DC fan 2 based on Digi 1, 0-0%,2-ignore, 3-50%, 4-100%
DC_Fan2_Override_Digi2 : 2	DC fan 2 based on Digi 2, 0-0%,2-ignore, 3-50%, 4-100%
DC_Fan2_Pulse_Rev : 3	DC fan 2, # pulses per revolution
AC_Fan1_On_Temp : 0	VAC fan 1/evap turns on 0 for continuous operation
AC_Fan1_Off_Temp : 0	VAC fan 1/evap turns on 0 for continuous operation

AC_Fan1_Override_Digi1 : 2	VAC fan 1/evap based on digi1	0 (off), 1 (on), 2 (ignore)
AC_Fan1_Override_Digi2 : 2	VAC fan 1/evap based on digi2	0 (off), 1 (on), 2 (ignore)
AC_Fan1_Sensor_Select : 2	Not used	
AC_Fan2_On_Temp : 35	VAC fan 2/cond turns on	
AC_Fan2_Off_Temp : 30	VAC fan 2/cond turns off	
AC_Fan2_Override_Digi1 : 2	VAC fan 2/cond based on digi1	0 (off), 1 (on), 2 (ignore)
AC_Fan2_Override_Digi2 : 2	VAC fan 2.cond based on digi2	0 (off), 1 (on), 2 (ignore)
AC_Fan2_Sensor_Select : 3	Not used	
AC_1_Stat : 0	Not used	
DC_Comp_Error : 0	Not used	
DC_EC_Fan1_Stat : 0	Not used	
DC_EC_Fan1_Error : 0	Not used	
DC_EC_Fan2_Stat : 0	Not used	
DC_EC_Fan2_Error : 0	Not used	
Comp_Status : 0	Not used	
Fan1_Spd_OR : 0	Not used	
Fan2_Spd_OR : 0	Not used	
DCComp_Spd_OR : 0	Not used	
ExpValve_OR : 0	Not used	
Rtn_Temp_OR : 0	Not used	
HSpot_Temp_OR : 0	Not used	
EvapOut_Temp_OR : 0	Not used	
Cond_Temp_OR : 0	Not used	
Shelt_Temp_OR : 0	Not used	
ACond_Type : 0	Select VAC or VDC	0-VAC, 1-VDC
Temp_Low_Limit : 5	Low temperature alarm	
Temp_Hi_Limit : 50	High temperature alarm	
Lead_Lag_Enable : 0	Not used	
AC1_Relay_NO_NC : 0	Not used	
Hi_Press_Enable : 0	For high pressure sensing	
Hi_Press_Temp : 80	Temperature for high pressure sensing	
Alarm_NO_NC : 2	Not used	
Alarm_Delay_Sec : 120	Delay for alarm signal	
Dig1_NO_NC : 0	Whether Dig1 reads open or closed signal	
Dig2_NO_NC : 1	Whether Dig2 reads open or closed signal	
Status_Log_En : 0	Not used	
Log_Interval_Mins : 1	Log interval time in minutes	
DC_Sys_Enable : 1	Not used	
Heat_Enable : 1	Select for heater operation	0-inactive, 1-active
DC_Fan1_Control_Enable : 1	Not used	
DC_Fan1_Enable : 0	Not used	
DC_Fan2_Control_Enable : 1	Not used	
DC_Fan2_Enable : 0	Not used	
AC_Fan1_Enable : 1	Not used	
AC_Fan2_Enable : 1	Not used	
Temps_In_F : 0	Whether display is in F or C	0-F, 1-C
Map_Room_Temp_HL : 1	Alarm setting High temp	0-inactive, 1-active
Map_Fan1 : 0	Alarm setting DC Fan 1	0-inactive, 1-active
Map_Fan2 : 0	Alarm setting DC Fan 2	0-inactive, 1-active
Map_DC_Comp : 0	Alarm setting DC Comp	0-inactive, 1-active
Map_Rtn_Air_Sensor : 1	Alarm setting Return Sensor	0-inactive, 1-active
Map_Hot_Spot_Sensor : 0	Alarm setting Hot spot sensor	0-inactive, 1-active
Map_Evap_In_Sensor : 0	Alarm setting High temp	0-inactive, 1-active
Map_Evap_Out_Sensor : 0	Alarm setting High temp	0-inactive, 1-active
Map_Cond_Sensor : 1	Alarm setting High temp	0-inactive, 1-active
Map_Dig1_IP : 0	Not used	
Map_Dig2_IP : 0	Not used	

Map_HP_Press : 0	Alarm setting High pressure	0-inactive, 1-active
Map_DC_Heatsink : 0	Not used	
Map_DC_Dig1 : 0	Not used	
Map_DC_Dig2 : 0	Not used	
AC_Min_On_Secs : 120	VAC comp forced on	
AC_ReStart_TO_Secs : 120	VAC comp forced off	
AC1_Min_On_Secs : 120	Not used	
AC1_ReStart_TO_Secs : 120	Not used	
DC_Idle_RPM : 1800	VDC comp minimum speed	
DC_Hi_Speed_RPM : 3600	VDC comp maximum speed	
DC_Fan1_Idle_RPM : 1500	VDC Fan 1 minimum speed	
DC_Fan1_HiSpd_RPM : 3200	VDC Fan 1 maximum speed	
DC_Fan1_Ext_HiSpd_RPM : 0	Not used	
DC_Fan2_Idle_RPM : 1500	VDC Fan 2 minimum speed	
DC_Fan2_HiSpd_RPM : 3200	VDC Fan 2 maximum speed	
DC_Comp_RPM : 0	Not used	