CoolLogic
Installation, Operation & Maintenance

CoolLogic Digital Controller
By CLIMA•COOL®
The Ultimate Chiller Solution®
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General Description

The CoolLogic Control System provides leaving chilled and hot water liquid temperature control algorithms which maintain precise temperature control for cooling, heating, heat recovery and simultaneous heating and cooling applications. A compressor run time equalization sequence is given to ensure even distribution of compressor run time throughout the entire chiller bank. Chiller power consumption is minimized by indexing the most efficient stages of cooling, optimizing heat transfer surface.

The ClimaCool® Ultimate Chiller Solution, “UCW/H/R” and “UGW” series, modular water-cooled chillers utilize the CoolLogic Control System to incorporate one or more modules. The controls are divided into two separate sections - the Master Control Panel and the module controller. The Master Control Panel governs all significant events, timing and compressor staging, providing operator interface for all levels of setting and retrieving data. A single Master Control Panel has the ability to control a bank of modules with each unit having a unique address code by setting the two rotary switches of the master and each module controller. The Master Controller is address #01, module #1 is address #02, and so on (see figure 3 on page 3).

The module controller resides at each module location which senses and analyzes all pertinent data specific to that module’s compressor and water temperature operations.

Safety

Throughout this manual warning, danger, caution and attention notices appear. Read these items carefully before attempting any installation, service or troubleshooting of the equipment. All labels on unit access panels must be observed.

DANGER: Immediate hazardous situation which, if not avoided, will result in death or serious injury.

WARNING: Potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION: Potentially hazardous situation or an unsafe practice which, if not avoided, could result in minor or moderate injury or product or property damage.
CoolLogic Control System Wiring

A separate 115 volt power supply is required to power the CoolLogic Master Control Panel. Communication between the Master Control Panel and chiller modules requires a simple two-conductor 18 AWG shielded cable with drain rated at 60°C minimum, daisy chain connection. Control wiring cannot be installed in the same conduit as line voltage wiring or with wires that switch highly inductive loads such as contactor and relay coils. All wiring shall be in compliance with all local and national codes.

Field Connections between Master Control Panel and Module Controller

- Arcnet or equivalent, 18-22 gauge AWG, two conductor shielded cable with drain (under 50 feet)
- Over 50 feet, contact factory

Note: Use the same polarity throughout the network segment.

Field Connections to the Master Control Panel

Field integration with the stand-alone Master Control Panel is simplified by the use of the following minimum input devices:
- A remote start/stop in
put for scheduling
- Differential pressure flow sensors for heating, cooling and source (if applicable) water flows
- Voltage/phase monitor (phase loss/phase reversal, brown-out/black-out device) inputs
- Chilled water inlet and outlet temperature sensors and wells
- Heating water inlet and outlet temperature sensors and wells
- Source water inlet and outlet temperature sensors and wells if applicable

Field integration of the following output devices is standard:
- Alarm output closes when any active latching alarm condition occurs (parameter or compressor fault)
- Chiller status output is closed whenever there is a call for chiller operation and all flow, limit, phase, and interlock inputs deliver a closure signal indicating a present normal condition to allow for chiller operation

Configuring the Master Controller (I/O Pro 812u) for ARC156

1. Turn off the Master Controller’s (I/O Pro 812u) power
2. Using the rotary switches, set the Master Controller’s address. Set the Tens (10’s) switch to the tens digit of the address, and the Ones (1’s) switch to the ones digit.

Example (Figure 3): If the Master Controller’s address is 01, point the arrow on the Tens (10’s) switch to 0 and the arrow on the Ones (1’s) switch to 1.
3. Port 1 is the only port that speaks BACnet over ARC156. Connect the communications wiring to Port 1 in the screw terminals labeled Net+, Net-, and Shield (Gnd). The module controller references GND, and the master controller references SHIELD (see Figure 4 below).

4. Set Port 1 Mode jumper to ARC156 (Figure 5).

5. Turn on the Master Controller’s power.

6. Default for the Master Board address will be 516800. Any variance from this device number cannot be used without ClimaCool Custom Programming. Consult factory if Custom Programming is required.

**Dipswitch Settings**

1. Enhanced Port 2a- must be OFF to allow BMS communications through Port 2a. Do not turn ON.

2. IP Address- if IP communication is not used leave OFF (default). If Custom IP address is used, turn ON (assigned) This allows the use of a custom IP address configurable in the BACview under FNo> IP.

3. BMS Port- always set to ON when BMS is used. Allows BMS connection to Port 2.

4. Dip Switches 4 & 5 BAUD rate- this is the BAUD rate used by the BMS. See Figure 6 for various BAUD rate selections. ClimaCool currently supports the following Protocols: MS/TP m (see BMS for BAUD rate), N2 (always 9600), Modbus (see BMS for BAUD rate), Lon SLTA (see BMS for BAUD rate).

5. Dip Switches 6, 7 & 8 BMS Port Settings- see Figure 7 for various Protocol selections/switch configurations (for Bacnet MSTP, use MS/TP m).

**CoolLogic Control System Operator Interface**

The CoolLogic Control System offers an easy-to-use operator interface keypad (Figure 8) which includes a four-line by 40 character, back-lit LCD display panel, which is easy to navigate using logically grouped menus. This enables the user to access important information concerning set points, active temperatures, pressures, operating modes, alarm conditions, chiller scheduling, servicing, diagnostics and more.

If the keypad is left idle for 10 minutes, the default screen appears (Figure 9).
CoolLogic Control System

All new installs will display: NO SCREEN FILE DOWNLOAD MEMORY until a clipping file is downloaded to the control board.

Starting the Chiller

When power is first applied to the Master Control Panel, a 45 second initialization period will occur. The display will show the home screen (Figure 10). Once power has been applied to the Master Control Panel various display screens are accessible by several methods. From the “Home” screen, the operator is easily guided to the main menu listings for the following categories by pressing one of the bottom four menu buttons:

Figure 10: Home Screen

<table>
<thead>
<tr>
<th>CHILL WATER IN: 0000.0F</th>
<th>COOL SPT: 0000.0F</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHILL WATER OUT: 0000.0F</td>
<td>TOT STG WANT: 00</td>
</tr>
<tr>
<td>COND WATER IN: 0000.0F</td>
<td>TOT STG ON: 000</td>
</tr>
<tr>
<td>COND WATER OUT: 0000.0F</td>
<td>MODE: COOLING</td>
</tr>
<tr>
<td>CHIL WATER FLOW: YES</td>
<td>HEAT SPT: 0000.0F</td>
</tr>
<tr>
<td>COND WATER FLOW: YES</td>
<td>STATUS: UNLOADING</td>
</tr>
</tbody>
</table>

At the end of this delay, the first compressor will start and after a five minute timeout, the display will change to the default screen (see page 3 Figure 9).

Status Menu

Items in the status menu can be used to view operational status of various items as listed (Figure 11):

Figure 11: Status Menu

<table>
<thead>
<tr>
<th>COOLLOGIC CHILLER STATUS MENU</th>
</tr>
</thead>
<tbody>
<tr>
<td>--&gt; ALL MODULE COMPR UNLOAD STATUS FN5</td>
</tr>
<tr>
<td>--&gt; MODULE SIZE STATUS / --&gt; CHILLER OPER ST</td>
</tr>
<tr>
<td>--&gt; MOD1 COMP1 DATA / --&gt; MOD1 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; MOD2 COMP1 DATA / --&gt; MOD2 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; MOD3 COMP1 DATA / --&gt; MOD3 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; MOD4 COMP1 DATA / --&gt; MOD4 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; MOD5 COMP1 DATA / --&gt; MOD5 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; MOD6 COMP1 DATA / --&gt; MOD6 COMP2 DATA</td>
</tr>
<tr>
<td>--&gt; COMPR RUNTIMES / --&gt; COMPR CYCLES</td>
</tr>
<tr>
<td>--&gt; COMPR ON/OFF STATUS</td>
</tr>
<tr>
<td>--&gt; EVAP STATUS / --&gt; COND STATUS</td>
</tr>
</tbody>
</table>

[--> PREV] [--> CLOCKSET] [--> HOME] [--> ALARM]

Setup Menu

Chiller system operation is determined by the values assigned to the system variables, as predominantly found in the Setup menu (Figure 12). The Setup menu lists a series of sub-menus:

- General System Settings
- Heating and Cooling Set Point Menus
- Lead Compressor Rotation Setup
- Alarm Lockout Reset (or FN+3)
- Chiller Loading Status
- Schedules

These variables are initially assigned a default value. For most applications, these values will provide optimum results.

Figure 12: Setup Menu (FN+2)

COOLLOGIC SYSTEM SETUP FN2
[--> GENERAL SYSTEM SETTINGS] FN4
[--> HEAT & COOL SETPOINT MENUS]
[--> LEAD COMPR ROTATION SETUP]
[--> ALARM LOCKOUT RESET]
[--> CHILLER LOADING STATUS]
[--> SCHEDULES]


Service Menu

Items in the service menu can be used for diagnostic and calibration of various items (Figure 13).

Figure 13: Service Menu (FN+7)

COOLLOGIC SERVICE MENU SETUP FN7
[--> DIAGNOSTICS MANUAL MODE]
[--> ALL MODULE COMPR UNLOAD STATUS] FN5
[--> ALL MODULES SENSOR CALIBRATION MENU]
[--> RESET ALL MODULE SENSOR OOR ALARMS]
[--> RESET COMP ALARMS & ALM DELAYS]
[--> MODULE WATER TEMP LIMITS]
[--> WATER & AIR TEMP LIMITS]
[--> CALIBRATE WATER TEMPS]
[--> LOCK WATER & AIR TEMPS]
[--> RESET COMP RUNTIMES & CYCLES]


Alarm Menu

Up to 100 of the most recent occurrences stored with date and time. Access to this log is available through the keypad.

Figure 14: Alarm Menu (FN+3 resets the alarm)

MODULE EVENT HISTORY (100 MOST RECENT)

NONE IN BUFFER.

ACTIVE ALARMS

NONE IN BUFFER.

ACTIVE FAULTS

NONE IN BUFFER.

RETURNED-TO-NORMAL (RTN)

NONE IN BUFFER.

MANUALLY CLEARED (CLR)

NONE IN BUFFER.

[--> PREV]
LOCAL/OFF/REMOTE SWITCH

To Turn System On there are two options:

**LOCAL MODE**
- Set to “Digital Input”
- OR
- Set to “Keypad” and “Enable Chiller from Keypad”

Set to ON.

And if the chiller is a 4-pipe system,
- Cool Mode BAS set to ON
- Or, Heat Mode BAS set to ON (if available)
- Or, Heat Recovery Mode BAS set to ON (if available)
- Or, if the chiller is an SHC 6-pipe system, one, two or all three modes above, (if available) can be enabled for automatic mode control.

**REMOTE MODE**
- With jumper installed at terminals 42 and 43 of LVTB1 and Mode set to Digital IN.
- OR
- Mode set to BAS and the BAS is sending an ON command.

To use a remote relay (enable), insert the relay in place of the jumper. Set the switch to Remote Mode and the input mode to “Dig Input.”

**To Power Down Chiller Bank**

1. Locate CoolLogic Master Panel for the particular bank to be disabled.
2. Locate the bank of modules connected to this CoolLogic Master Panel.
3. Go to the Master Panel and turn the LOCAL-OFF REMOTE- switch to the off position.

If complete shut-down of main power to all equipment is desired, the additional steps can be taken (see Controller Battery section).

1. Inside the CoolLogic Master panel, locate the main transformer box in the top left corner. Slide the pivoting door to access the amber ON/OFF switch and switch to the OFF position.
2. Locate the main power disconnect or breaker panel that feeds each module and/or the entire bank of modules; place the line powered switch to the OFF position.
3. Lock out/Tag out Line voltage equipment as required.

**Note:** Do not leave the CoolLogic controller or the Module controllers without power for an extended period of time as the battery power of the controller will be drained and program can be corrupted.

**To Power Up Chiller Bank**

1. Remove the Lock out/Tag out devices from line powered disconnect switch.
2. Turn the main power disconnect(s) to the ON position.
3. Confirm the POWER ON indicator light is ON at each of the chiller modules. 4. Open the CoolLogic Master Panel and turn the main transformer ON/OFF switch back to the ON position.
5. Close the CoolLogic Master Panel door and set the LOCAL-OFF REMOTE-switch to the local or remote position.

**Recommended for Extended Bank Shutdown**

1. Remove the command for “Remote Chiller Enable” using the BAS System or hard wire connection.
2. Turn off the switch on the front of the Master Control Panel.
3. Leave main power ON to the CoolLogic Master Controller.

If this procedure is not followed for scheduled shutdowns, you may risk losing the software program and/or set points.

**Controller Battery**

**Warning:** Complete shutdown of the main power to the chiller modules and/or CoolLogic controller for an extended period of time will leave only the on board battery for data retention.

The CoolLogic Master Panel has a 10-year Lithium CR123A battery which provides a maximum of 720 hours data retention during power outages. To conserve battery life, battery backup turns off after a specified number of days defined in the driver which is factory set for three (3) days.

The CR123a is held in place with a plastic clip. Squeeze clip and pull to remove. Battery can then be pulled from receptacle and replaced. Observe correct polarity while removing and replacing.

Each chiller module has a 10-year Lithium CR2032 battery which provides a minimum of 10,000 hours of data retention during power outages. The CR2032 does not have a clip.

It can simply be pulled from the socket using thumb and forefinger. Observe correct polarity while removing and replacing.

**Note:** When replacing batteries, leave power applied to prevent potential loss of data.

**Note:** If the master battery fails, the controller can lose set points and the software program.
Standard Alarm Functions

**High Pressure Cutout**
This requires resetting both the module’s manual reset high pressure control switch and the Master Control Panel’s software reset to resume operation see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3. Default for R-410A is 560; for R-134a is 380.

**Low Pressure Cutout**
This requires resetting the Master Control Panel to resume operation see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3. Default for R-410A is 92; for R-134a is 25.

**Compressor Thermal Protector Fault**
This would occur if the motor protector sensed an overload trip in the compressor motor. The compressor thermal protector monitors a series of thermistor temperatures in the motor windings as an indication of overload. This requires resetting the Master Control Panel see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3.

**Low Suction Temperature**
During operation, should this temperature drop to 32°F, the compressor will shut down. This requires resetting the Master Control Panel after the temperature has risen above 33°F see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3.

**High Discharge Temperature (Standard with UCH and UGW)**
During operation, should this temperature rise above 225°F, the compressor will shut down. This requires resetting the Master Control Panel after the temperature has cooled to below 175°F see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3.

**Low Leaving Chilled Water Temperature - Below 38°F**
Evaporator freeze protection requires resetting the Master Control Panel after the temperature has risen to 40°F see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3.

**High Leaving Condenser Water Temperature - Above 138°F**
The Master Control Panel will auto reset after the temperature has fallen below 133°F. see Setup Menu, Figure 12 on page 4 for Alarm Menu display or press FN+3.

**Communications Error**
This signifies a loss of communication between any module controller and the Master Control Panel.

**No Run - No Status**
This alarm occurs when a compressor is commanded to run and the status is not sensed by the controller. The status circuit uses a contact closure by either an auxiliary contact mounted to the compressor contactor, or a current switch that senses a minimum compressor amperage to close its contact. This circuit closure includes resistors of specific values to provide an input to the controller confirming the ON status of either compressor.

**Motorized Valve Alarm**
This alarm is similar to the NO RUN alarm, in that the end switch contact closure of the motorized valves (used for the current mode of operation) will complete a circuit (or circuits) through the resistor board and is then input to the controller to provide an OPEN VALVE status.

**Miscellaneous Alarm Functions of the CoolLogic Control System**
- Loss of flow through the evaporator
- Loss of flow through the condenser
- Electrical voltage/phase failure
- Temperature Sensor “Out-of-Range” error detects when an open or shorted sensor condition exists
Chilled Water Flow Sensor
The Master Control Panel has an input for a differential pressure sensor, which measures and displays pressure drops across the chilled water main headers. If the differential pressure drops below a predetermined setting for a fixed period of time after the chiller receives a “RUN” input signal, the chiller will not be allowed to run and a chilled water flow alarm condition is displayed. The alarm condition must be resolved, flow re-established and a minimum pressure differential acknowledged by the differential pressure sensor. The alarm clears automatically which constitutes an “OK to RUN” status. The alarm condition is logged for retention in the most recent 100 alarms.

Condenser Water Flow Sensor
The Master Control Panel has an input for a differential pressure sensor, which measures and displays pressure drops across the condenser water main headers. If the differential pressure drops below a predetermined setting for a fixed period of time after the chiller receives a “RUN” input signal, the chiller will not be allowed to run and a condenser water flow alarm condition is displayed. This alarm condition must be resolved and flow re-established and a minimum pressure differential acknowledged by the differential pressure sensor. The alarm clears automatically and the alarm condition is logged for permanent retention of the most recent 100 alarms. This will constitute an “OK to RUN” status.

Voltage/Phase Monitor
Voltage/phase monitors are factory supplied for field installation with the CoolLogic Master Control Panel. The voltage/phase monitor helps guard the chiller bank against voltage fluctuations, phase failure or phase reversal conditions. The voltage phase monitor will be field installed and connected to the main three phase power panel that feeds all the installed modules. Two low voltage control wires are connected to the CoolLogic Master Control Panel, terminals 40 and 41 of LVTB1, and must be field installed as well along with the power wiring. Do not install control wiring in the same conduit as line voltage wiring or with wires that switch highly inductive loads such as contactor and relay coils.

Install one (1) monitor per bank at main power distribution panel to monitor voltage and phasing of power to the modules. See Wiring Diagram on page 23.

Chilled/Heating Water Reset
The Master Control Panel can be programmed to reset the leaving water temperature set point using a hard wired input voltage or current signal, or the voltage input can be modified via a BAS command. The reset functions are optional and must be activated through the appropriate setup menus. If the chiller is operating and it receives a chilled water reset command, the leaving chilled water temperature setting will be allowed to ramp toward the new setting at a rate of 2°F every seven minutes. When the chiller is not operating and it receives a chilled water reset command, the leaving chilled water temperature setting will be fully reset immediately.

External Chilled Water Set Point Option
The Master Control Panel provides an input that accepts either 2-10 VDC or 4-20 mA signals to set the leaving chilled water set point. This input defines the setpoint and is not a reset (or offset) function. This input is used with generic Building Automation System (BAS) installations. The 2-10 VDC and 4-20 mA ranges each correspond to a preset range from the minimum chilled water set point to the maximum chilled water set point.

External Condenser Water Set Point Option
Associated with heat recovery chillers, the Master Control Panel provides an input that accepts either 2-10 VDC and 4-20 mA signals to set the leaving condenser water set point. This input defines the setpoint and is not a reset (or offset) function. This input is used with generic BAS installations. The 2-10 VDC and 4-20 mA ranges each correspond to a preset range from the minimum condenser water set point to the maximum condenser water set point.

Demand (or Load) Limiting
To limit the number of compressors that can be simultaneously energized, a demand limit control is available. The Master Control Panel provides an input channel that accepts either 2-10 VDC and 4-20 mA signals to set the maximum number of compressor stages allowable at any one time. This input is typically used with generic BAS installations. The 2-10 VDC and 4-20 mA ranges each correspond to a range from 0% to 100% of the total available compressor stages.

Alarm Output
The relay output contact is closed whenever there is an active latching or non-latching alarm condition present relative to a fault parameter.

Chiller Status Output
The relay output contact is closed whenever all input signals to the chiller are present and normal, indicating the requirement for the chiller to operate when able.
Chilled Water Temperature Sensor Connections
Chilled water temperature monitoring (entering and leaving) is a standard feature of the CoolLogic Control System. It is accomplished by using a factory supplied pair of sensors and sensor wells which are field installed into ½” weld-o-lets (field supplied and installed onto the main water headers) within 60” of the entering and leaving chilled water locations. **Note:** Sensors must be fully inserted into the well to obtain proper readings and must be 2 ½ pipe diameter minimum before or after an elbow.

Condenser Water Temperature Sensor Connections
Condenser water temperature monitoring (entering and leaving) is a standard feature of the CoolLogic Control System. It is accomplished by using a factory supplied pair of sensors and sensor wells which are field installed into ½” weld-o-lets (field supplied and installed onto the main water headers) within 60” of the entering and leaving chilled water locations. **Note:** Sensors must be fully inserted into the well to obtain proper readings and must be 2 ½ pipe diameter minimum before or after an elbow.

Building Automation System (BAS) Interface
Internal operational information is available where the chiller is to be integrated into a building system and monitored by the equipment of a controls manufacturer. Available protocols built into the CoolLogic Control System as standard are:
- BACnet
- MODBUS
- N2*
- LonWorks*

*N2 and LonWorks require special programming/points list. Limit point polling to a max of 50 points at not more than 20 second intervals.

LonWorks® LonTalk Communications Interface Option
The Master Control Panel provides an optional LonTalk communication interface between the chiller and the BAS. Additional hardware is required (Echelon SLTA-10 communications card) to provide “gateway” functionality between a LonTalk compatible device and the CoolLogic Control System.

Compressor Unloading
Compressor unloading routines are programmed into each module controller. When any one of the module or compressor control parameters approaches a pre-limit condition, the CoolLogic Control System executes appropriate compressor unloading commands to avoid compressor lockout, thus maximizing the chiller system on time. The FN5 menu can be accessed to view UNLOAD conditions when they are active.

Compressor Minimum Off Delay
When a compressor is turned off, the compressor will remain off for this period of time. The default minimum off delay is 200 seconds.

Compressor Minimum On Delay
When a compressor is turned on, the compressor will remain on for this period of time. This time can be cut short if an alarm condition is predicted. The default minimum on is 90 seconds.
CoolLogic Master Controller

Page 1 of 2

Project Name: ___________________________

Start-Up Date:
Chiller # _______ Bank # _______

[FN+2] then "CoolLogic General System Settings FN4"
Chiller Control Type [Cool Ctrl]
Chiller Control Source [Big Input]
Enable Chiller from Keypad? [Off]
Mod Ref Type [407C]
Chiller Model Type: [UCW]
Cool Design Delta Temp [000.0]
Heat Design Delta Temp [000.0]
Use High Amb Temp Limit? [Yes]
Use PID Slope Calc? [Yes]
Software Version: UCW-H.E.01a.10

[FCr] [SETUP] [HOME] [ALARM]

Start-Up Form

[FN+2] then "Module Size Selector"

Module Size Selector Screen: Legend
Mod1 Size: [0]/[1] Not Used/4-70Ton Mod
Mod2 Size: [0]/[1] NOTE: DO NOT SELECT 2 OR 3
Mod3 Size: [0]
Mod4 Size: [0]
Mod5 Size: [0]
Mod6 Size: [0]/[1] [SETUP] [ALARM] [CLOCKSET]

Module1 Size
Module 2 Size
Module 3 Size
Module 4 Size
Module 5 Size
Module 6 Size

[FN+2] then "Module Water Out Temp Limits"

Module Water Out Temp Limits
Mod1 Evap Wat Out Lo Limit: [0000.0]°F
Mod1 Evap Wat Out Hi Limit: [0000.0]°F
Mod1 Cond Wat Out Lo Limit: [0000.0]°F
Mod1 Cond Wat Out Hi Limit: [0000.0]°F

[FCr] [SETUP] [HOME]

Module Evap Water Out Low Limit
Module Evap Water Out Hi Limit
Module Cond Water Out Low Limit
Module Cond Water Out Hi Limit

[FN+2] then "Cool PID Stage #1 Setup"

CoolLogic Cool PID Stage #1 Setup
Stage One Cool PID Output: 000.0 %
Stage One Cool PID Error Intervals: [000]
Stage One Cool PID P-Gain: [000]
Stage One Cool PID I-Gain #1: [00.00]
Max Cool Ramp Rate: [-000.0]°F/min
Cool PID Rise: [000.0] °F/min
Cool PID Fall: [000.0] °F/min
Cool Max PID Limit with Mot Ylv: [000.0]%
Cool Max PID Limit w/out Mot Ylv: [000.0]%
Cool Max PID Limit w/out Mot Ylv: [000.0]%
Cool Max PID Limit w/out Mot Ylv: [000.0]%
Cool Deadband: [00.0]°F/Cool Deadband: [00.0]°F
Stage One Cool PID P-Gain: [000.0]
PID Switching Differential: [0000.0] °F
Cool Ctrl Setpt Offset: [0000.0]°F

[FCr] [SETUP] [ALARM] [CLOCKSET]

Stage 1 Cool PID P-Gain
Stage 1 Cool PID I-Gain
Cooling PID Rise
Cooling PID Fall
Cool Central Setpoint Offset
Stage 1 Heat PID P-Gain
Stage 1 Heat PID I-Gain
Heating PID Rise
Heating PID Fall
Heat Central Setpoint Offset

[FN+2] then "Freeze Target Setpt Menu"

Freeze Target Setpt Menu
Freeze Target Setpt [0000.0]°F

[FCr] [SETUP] [HOME]

Freeze Target Setpt

Note: For Reference Only. Each model will contain various menu items.

www.climacoolcorp.com
[FN+8] then "Master Input Chnls 8 & 11 Setup"

- Master Controller Chnls 8 & 11 Setup
- Use Chn# 8 as Diff Pres Sensors? [Yes]
- Use Hi Range Diff Pres Sensors? [Yes]
- Hi Range=0-43 psid/Lo Range=0-14.5 psid
- Cond Wat Min Diff Pr Flo Setpt:[000.0]PSI
- Chil Wat Min Diff Flo Pr Setpt:[000.0]PSI
- Differential Pressure Snsre Reading:
- Cond Water Diff Press Sensor: 0.00 PSI
- Chil Water Diff Press Sensor: 0.00 PSI

[+Rev] [→SETUP] [+HOME]

Use Chn# 8 as Diff Pres Sensors? ..............
Use Hi Range Diff Pres Sensors? ..............
Cond Water Min Diff Pr Flow Setpoint......
Chil Water Min Diff Pr Flow Setpoint........


- Available Sensor Menu Temp. & Pressure
- Dis Free Air Temp[On]/Succ Free Air[OFF]
- Dis Temp Avail[On]/Succ Temp Avail[OFF]
- Avail Sensor Menu Temp.
- Leaving Cond Water Temp CWR Avail [OFF]
- Enable CWR Lo Alm[Off]/EnabCHS Hi Alm[OFF]

[+Rev] [→SETUP] [+HOME]

Discharge Pressure Available...................
Suction Pressure Available...................
Discharge Temp Available......................
Suction Temp Available.......................
Leaving Cond Water Temp CWR Available........
Enable CWR Lo Alarm................................
Enable CHS Hi Alarm............................


- Refriger Temp. & Press. Alarm Settings
- DisPreAlm10UGCW[000]/DisPreAlm41UCH[000]
- DisPreAlm41UCH[000]/DisPreAlm41UCH[000]
- Mod Active Status DisFr Alm SP: 000
- Succ Fr Alm 410a[000]/Succ Fr Alm 407C[000]
- Mod Active Status SuccFr Alm SP: 000
- Low Dis Fr Alm SP R410a[000]
- Low Dis Fr Alm SP R407C[000]
- Mod Active Status Low DisFr Alm SP: 000
- M Succfr Alm SP[000]/M SuccFr Alm SP[000]

[+Rev] [→SETUP] [+HOME]

Suction Pressure Alarm 410a........................
M SuctFr Alm SP...................................

[FN+2] then "Cool Mode Setpoint Menu"

- CoolLogic Cool Mode Setpoint Menu
- Local Evap Wat Out Setpts[0000.0]F
- No-Load Cool Setpoint Reset:[0000.0]F
- Min Evap Wat Out Setpt:[0000.0]F
- Max Evap Wat Out Setpt:[0000.0]F

Local Evap Water Out Setpoint.............
Min Evap Water Out Setpoint.............
Max Evap Water Out Setpoint.............

[FN+4] then "Heat Mode Setpoint Menu"

- CoolLogic Heat Mode Setpoint Menu
- Local Cond Wat Out Setpts[0000.0]F
- No-Load Heat Setpoint Reset:[0000.0]F
- Min Cond Wat Out Setpts[0000.0]F
- Max Cond Wat Out Setpt:[0000.0]F

Local Cond Water Out Setpoint.............
Min Cond Water Out Setpoint.............
Max Cond Water Out Setpoint.............

[FN+4] for Bacnet Network #:

- Backnet Network #........................
- MAC Address
- MS/TP Network #....................
- Ethernet Network #..............
- Ethernet MAC Add........................

[FN+4] then « IP » Submenu:

- IP Network #........................
- Current IP Addr: 192.168.168.4
- Current Subnet Mask: 255.255.0.0
- Current Gateway Addr: 192.168.168.254
- Current UDP Port: 47808
- Custom IP Addr: 172.0.19.233.004
- Custom Subnet: 255.255.0.0
- Custom Gateway: 192.0.19.233.001
- Custom UDP Port: 00000 (0-47808)

- Current IP Address...................
- Current Subnet Mask................
- Current Gateway Add.............

Contractor Name: _____________________
Address: _____________________________
____________________________________
____________________________________
Phone: ______________________________
(Authorized Signature):____________________

Note: For Reference Only. Each model will contain various menu items.
CoolLogic Screen Menu Hierarchy

User Access - Home Screen (Example Only)

HOME

STATUS

SETUP (FN2)

SERVICE (FN7)

ALARM

BACview Menu

FN1 – PREV – Move back to last screen
FN2 – General System Settings
  • Heat and Cool Set Points
  • Module/Compressor Status
FN3 – Alarm Menu - Module and Master Alarm Resets
FN4 – BAS Configuration Screen
  Used for BAS system integrations
FN5 – Module Unload Status
FN6 – Module Level Configuration
  • Module Temperature and Pressure Set Points
  • Module Valve and Fan Configurations
FN6 – Module Level Configuration
  • Module Temperature and Pressure Set Points
  • Module Valve and Fan Configurations
FN7 – Diagnostic Screen
  • Manual Mode
  • Sensor Calibration
  • Module Water Temperature Limit
FN8 – Master Level Configurations
  • Module Size Selector
  • PID – Cooling & Heating
  • Water Temperature Limits
  • External Input Configurations – Temp Resets, DPT
FN9 – User Level Password Configuration
FNo - IP address or the Mac address
Used for BAS system integrations
CoolLogic Control System Network Setup

Connection Type
The default CONNECTION TYPE for the BACnet over ETHERNET to the WEB PORTAL is a CAT5 Cable via an RJ-45 connector. The connector plugs into the Ethernet 10BaseT port.

Ethernet Network
The Master Controller is equipped with an interface which may be connected directly to the Ethernet network using the 10BaseT port. To prevent circular routes, the Master Panel will be configured only for BACnet/IP. The BACnet/IP Network Number will be defaulted to 516800. The BACnet/Ethernet router configuration will be disabled and the Ethernet Network number set to 0. Note: if these settings need to be changed, please contact a ClimaCool Representative.

IP Address
The following is the default settings for the IP Address for a typical Master Controller:

- IP: 192.168.17.100
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.17.1

Note: If these settings need to be changed, please contact a ClimaCool Representative.

Device Instance of Master Controller
The device instance number for the Master Controller is 516800. The “address” number of the Master is “01,” as identified by the two rotary switches on the Master PCB (one rotary switch is for 10’s digit and the other is for the 1’s digit), (see Figure 3 – page 3). Note: If these settings need to be changed, please contact a ClimaCool Representative.

Device Instance of Module Controller
The device instance number for the FIRST Module Controller is 243002. The “address” number of the FIRST module controller is “02.” Similarly, the device instance number of the SECOND Module Controller is 243003. The “address” number of the SECOND Module Controller is “03.” Note: If these settings need to be changed, please contact a ClimaCool Representative.

Note: Contact factory for network points list.

Note: The installation of two banks, with separate Master Control Panels, utilizing the same BAS network must have different device instance numbers to negate any conflicts. Contact factory for special programming requirements.
Appendix A

Physical Hardwire Inputs and Outputs

The CoolLogic Master Control Panel with I/O Pro 8/12U - Quick Reference Guide

Input Points

<table>
<thead>
<tr>
<th>Input #</th>
<th>Description</th>
<th>Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bank Chilled Water Outlet Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>2</td>
<td>Bank Chilled Water Entering Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>3</td>
<td>Bank Condenser Water Outlet Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>4</td>
<td>Bank Condenser Water Entering Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>5</td>
<td>Outside Air Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>6</td>
<td>Remote Cool Target Set Point</td>
<td>AI - (2-10VDC/4-20Ma)</td>
</tr>
<tr>
<td>7</td>
<td>Demand Limiting</td>
<td>AI - (2-10VDC/4-20Ma)</td>
</tr>
<tr>
<td>8</td>
<td>Chilled Water Pressure Differential Flow Sensor</td>
<td>AI - (0-5 VDC)</td>
</tr>
<tr>
<td>8a</td>
<td>Optional Chilled Water Flow Switch (When Using a Switch for a Flow Safety Device)</td>
<td>DI - (10 kohm = Chilled Water Flow Switch)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Open = Both Flow Switches Open)</td>
</tr>
<tr>
<td>8b</td>
<td>Optional Condenser Water Flow Switch (When Using a Switch for a Flow Safety Device)</td>
<td>DI - (6.6 kohm = Both Flow Switches Closed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(20 kohm = Condenser Water Flow Switch Closed)</td>
</tr>
<tr>
<td>9</td>
<td>Local-Off-Remote Selector Switch</td>
<td>DI - (Local and Remote Open – Chiller Off)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10 kohm = Local circuit closed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(20 kohm = remote circuit closed)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE: (for remote circuit closure, jumper must be installed between terminals 42 and 43 of LVTB1)</td>
</tr>
<tr>
<td>10</td>
<td>Remote Heat Target Set Point</td>
<td>AI - (2-10VDC/4-20Ma)</td>
</tr>
<tr>
<td>11</td>
<td>Condenser Water Pressure Differential Flow Sensor</td>
<td>AI - (0-5 VDC)</td>
</tr>
<tr>
<td>12</td>
<td>Phase Loss Monitor</td>
<td>DI - (Common to Normally Open Contact)</td>
</tr>
<tr>
<td></td>
<td>(Open is Failed Condition)</td>
<td></td>
</tr>
</tbody>
</table>

Legend:  
AI = Analog Input  
DI = Digital Input  
DO = Digital Output

Output Points

<table>
<thead>
<tr>
<th>Output #</th>
<th>Description</th>
<th>Output Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cool Header Bypass Valve (Spare)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>2</td>
<td>Heat Header Bypass Valve (Spare)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>3</td>
<td>Control Relay 3 (Spare)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>4</td>
<td>Control Relay 4 (Spare)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>5</td>
<td>Chiller Status Output</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>6</td>
<td>Common Alarm Output Contacts</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>7</td>
<td>Source Header Bypass Valve</td>
<td>DO - Form C Contact</td>
</tr>
</tbody>
</table>

Legend:  
AI = Analog Input  
DI = Digital Input  
DO = Digital Output
## Input Points

<table>
<thead>
<tr>
<th>Input #</th>
<th>Description</th>
<th>Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Compressor 1 Suction Refrigerant Pressure</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>2.</td>
<td>Compressor 2 Suction Refrigerant Pressure</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>3.</td>
<td>Compressor 1 Discharge Refrigerant Pressure (If Used)</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>4.</td>
<td>Compressor 2 Discharge Refrigerant Pressure (If Used)</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>5.</td>
<td>Compressor 1 Suction Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>6.</td>
<td>Compressor 2 Suction Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>7.</td>
<td>Compressor 1 Discharge Temp (If Used)</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>8.</td>
<td>Compressor 2 Discharge Temp (If Used)</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>9.</td>
<td>Chilled Water Outlet Temp</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>10.</td>
<td>Condenser Water Outlet Temp (If Used)</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>11a.</td>
<td>Evaporator Motorized Valve Status (If Used)</td>
<td>DI - (10 kohm=EV MV OPEN - or - 3.3 VDC- J4- 18 &amp; 20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(OPEN=BOTH MV's CLOSED -or- 5.0 VDC- J4- 18 &amp; 20)</td>
</tr>
<tr>
<td>11b.</td>
<td>Condenser Motorized Valve Status (If Used)</td>
<td>DI - (20 kohm=CD MV OPEN or - 4.0 VDC- J4- 18 &amp; 20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6.6 kohm=BOTH MV's OPEN -or- 2.8 VDC- J4- 18 &amp; 20)</td>
</tr>
<tr>
<td>12a.</td>
<td>Compressor 1 Status</td>
<td>DI - (10 kohm=C1 ON - or - 3.3 VDC- J4- 19 &amp; 20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(OPEN=BOTH OFF - or - 5.0 VDC- J4- 19 &amp; 20)</td>
</tr>
<tr>
<td>12b.</td>
<td>Compressor 2 Status</td>
<td>DI - (20 kohm=C2 ON - or - 4.0 VDC- J4- 19 &amp; 20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(6.6 kohm=BOTH ON - or - 2.8 VDC- J4- 19 &amp; 20)</td>
</tr>
</tbody>
</table>

### Output Points

<table>
<thead>
<tr>
<th>Output #</th>
<th>Description</th>
<th>Output Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Compressor 1 (Start/Stop)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>2.</td>
<td>Compressor 2 (Start/Stop)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>3.</td>
<td>Heat Pump Reversing Valve (Start/Stop) (If Used)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>4.</td>
<td>Evaporator Motorized Valve (Start/Stop) (If Used)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>5.</td>
<td>Module Alarm Light</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>6.</td>
<td>Spare</td>
<td>DO - Form C Contact</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Output Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Condenser Motorized Proportional Valve (If Used)</td>
<td>AO - (2-10VDC)</td>
</tr>
</tbody>
</table>

**Legend:**

- AI = Analog Input
- AO = Analog Output
- DI = Digital Input
- DO = Digital Output
## Appendix C

The CoolLogic Module Controller with I/O Flex 6126 - Quick Reference Sheet

### Model UGW

#### Input Points

<table>
<thead>
<tr>
<th>Input #</th>
<th>Description</th>
<th>Input Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compressor Current Sensor</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>2</td>
<td>Economizer Port Suction Pressure</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>3</td>
<td>Compressor Suction Refrigerant Pressure</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>4</td>
<td>Compressor Discharge Refrigerant Pressure</td>
<td>AI - Pressure Transducer (0-5VDC)</td>
</tr>
<tr>
<td>5</td>
<td>Spare</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Compressor Suction Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>7</td>
<td>Liquid Subcooling Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>8</td>
<td>Economizer Port Suction Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>9</td>
<td>Chilled Water Outlet Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>10</td>
<td>Condenser Water Outlet Temperature</td>
<td>AI - Thermistor/RTD</td>
</tr>
<tr>
<td>11a</td>
<td>Evaporator Motorized Valve Status</td>
<td>DI - (10 kohm=EV MV Open) (OPEN=Both MV’s Closed)</td>
</tr>
<tr>
<td>11b</td>
<td>Condenser Motorized Valve Status</td>
<td>DI - (20 kohm=CD MV Open) (6.6 kohm=Both MV’s Open)</td>
</tr>
<tr>
<td>12</td>
<td>VFD Alarm Status (If Used)</td>
<td>DI - Open - Normal Status; Closed - Alarm Status</td>
</tr>
<tr>
<td>12a</td>
<td>Compressor Contactor 1 Status (If Used)</td>
<td>DI - (10 kohm=CC1 On) (Open=Both Off)</td>
</tr>
<tr>
<td>12b</td>
<td>Compressor Contactor 2 Status (If Used)</td>
<td>DI - (20 kohm=CC2 On) (6.6 kohm=Both On)</td>
</tr>
</tbody>
</table>

#### Output Points

<table>
<thead>
<tr>
<th>Output #</th>
<th>Description</th>
<th>Output Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compressor Start/Stop</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>2</td>
<td>Compressor (CR 2) Unload Solonoid Valve (50% Lim)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>3</td>
<td>Compressor (CR 3) Unload Solonoid Valve (25% Min. Lim)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>4</td>
<td>Evaporator Motorized Valve (Start/Stop) (If Used)</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>5</td>
<td>Module Alarm Light</td>
<td>DO - Form C Contact</td>
</tr>
<tr>
<td>6</td>
<td>Compressor (CR 4) Load Solonoid Valve (100%)</td>
<td>DO - Form C Contact</td>
</tr>
</tbody>
</table>

### Description

1. Condenser Motorized Proportional Valve (If Used)
2. Economizer Electronic TXV Control
3. Main Electronic TXV
4. VFD Speed Reference

### Output Type

- AO - (2-10VDC)
- AO - (0-10VDC)

### Legend

- AI = Analog Input
- AO = Analog Output
- DI = Digital Input
- DO = Digital Output
- VFD = Variable Frequency Drive
Wiring Diagram - Master Control Panel

[Diagram of Master Control Panel Wiring]
### Control Board Input Jumper Configuration

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Electrical Panel Component Layout

- **Control Board Input Jumper Configuration**
- **Diagram**

---

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---

**Sheet 2 of 2**

REV G

**DATE: 09/13/2011**

**SCALE: **

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ClimaCool Corporation

GRANT OF LIMITED EXPRESS WARRANTY

This warranty is hereby granted for (1) all gas fired stainless steel heat exchangers supplied by CC with CC's warehouse; (c) (a) all roof top units built or sold by CC for twelve (12) months from the date of unit start-up or eighteen (18) months from date of shipment (from CC's warehouse), whichever comes first; (b) All compressors supplied by CC for twelve (12) months from the date of shipment (from CC's warehouse); (d) Any replacement parts, which are not supplied under warranty, for ninety (90) days from date of shipment (from CC's warehouse), whichever comes first; and (b) Any repair and replacement of parts under warranty for certain periods of time as set forth below.

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