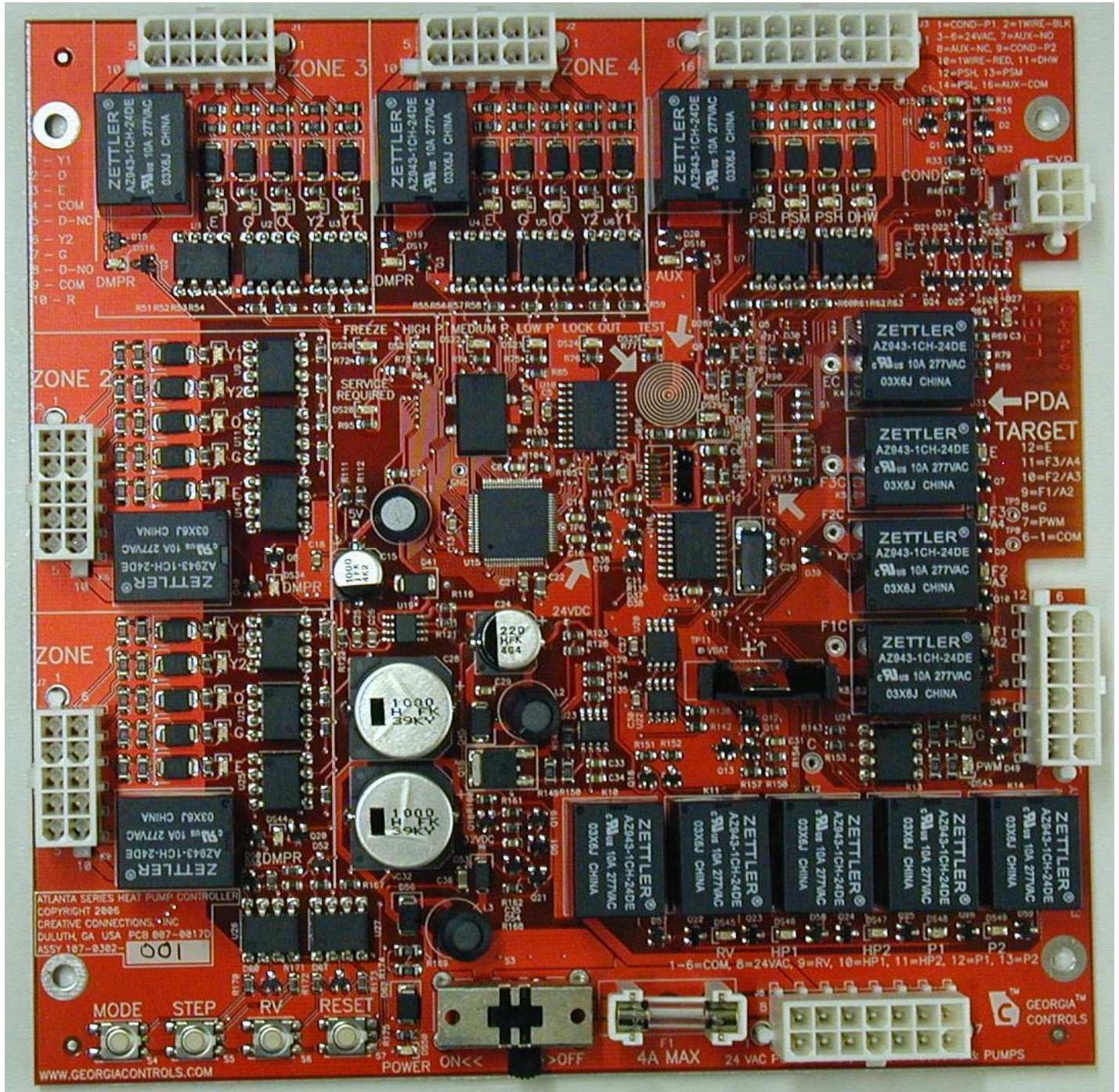


7.0 GEORGIA CONTROLS ATLANTA SERIES CONTROLLER



Get the latest updates online at: http://www.hydro-temp.com/Georgia_Controls/

7.1 Programming the Hydro-Temp / Georgia Controls control board.

The Hydro-Temp/Georgia Controls control board requires a PDA to adjust the system run parameters, zone parameters and basic system program. There are 4 programs to be installed on the PDA to program and monitor the GC control board. These 4 programs and updates should be installed using your palm software Quick Install function. Please follow the PDA instructions that came with your PDA on how to install the software.

The ability to transfer settings, logs, and toolbox data from PDA to PDA is available by clicking on the top menu area and selecting export to PDA. This is available in all four PDA programs.

The four PDA programs needed are: Firmware, Toolbox, Setup and Logs. Each has a separate function.

***** Programming note - Always power up the controller with the battery in place. Wait at least 20 seconds before trying to communicate with the controller. Any time the palm is communicating with the controller an amber light will illuminate on the controller. If for some reason the communication is interrupted or not started the palm will display an error. If no error messages are given during or after the communication you can believe your data was sent.***

7.1.1 Firmware Program is used to update the firmware in a controller. The most current firmware version will be installed in the controller before shipping from Hydro-Temp. If you are instructed to update the firmware you will need to download and install the firmware Program and the firmware from our website. (This is included with the basic download pack) The update will need to be installed on your PDA from the Palm Desktop software. When you open the firmware manager program after a hotsync/update from the computer it checks for new programs and checks the integrity of the firmware. It is recommended to open the firmware manager after hotsync to insure a good install from the computer to the PDA. Next Click on and highlight the update “Atlanta Type: ** Rev **.**” and press the green up arrow icon at the bottom of the screen and aim the palm towards the receiver on the controller you wish to update. This will start the update process which takes around three – five minutes to export depending on your palm transmit speed. When all the lights have flashed rapidly then shut off the update is done. If the transmission is interrupted in the middle you will need to turn the controller off and back on and try again. The firmware is not burned into the controller memory until a successful download and verify of download integrity has completed.

7.1.3 Toolbox Program is used to view the real time reading / status of the controller. All information downloaded can be stored in the palm for future retrieval or transfer to other PDA's. There are 3 security levels in the ATL Toolbox. User area – for general home owner, Technician area for installing dealer and Factory level for factory personal. Each level can be changed by clicking on the U, T, or F on the bottom right of the screen, then selecting the desired security level. For the password to change between levels call your Hydro Temp tech support representative. The Technician and Factory levels are the same for the ATL toolbox and listed below in blue print.

To start click on the Toolbox Icon. This will bring up a list of stored data saved by “Date, serial number”. To view an existing toolbox data log highlight the data and click the open folder at the bottom of the screen. To create a new download press the download icon at the bottom of the screen. This will start a download from the controller. (Aim the palm towards the receiver on the control board.) When finished you will be taken to the System info page.

You can now press the left arrow key to return to the main menu, which shows the:

- System Info (serial number, software version & board time. Board time can be set by pressing the clock next to the Device time.)
- Statistics (Hours of run time and cycles per comp, pump, Fan & Strips)
- If the service required light is on, why and what to do to repair the issue.
- Temperature Sensors (Real time readout of each sensor attached)
At the bottom of the screen you can press the Play button to update the temperatures every 5 seconds.
- System Test (Allows you to bypass the thermostats and run the system from the Palm, including opening and closing each damper and turning on and off pumps.)
 - Run mode: **Normal** = system operation given to thermostats. **Test** = Test mode
 - Make allows for switching from heat to cool. Stage: sets the compressor stage to test. Fan speed will adjust automatically as the compressor speeds are incremented. If compressors are left off the fan speeds can be set manually to test air flow. Dampers, pumps and strips can be turned on / off by placing a check mark next to the item you want on.
 - PSL Ignore – If this is checked the Low pressure switch **will be ignored** while in test mode.
 - Timer – This is an exit test mode timer. Defaults to 30 Minutes, so after 30 minutes of test the system will revert back to normal run. If set to OFF the system will run in test mode continuously.
- Find Sensors (Use this command to find all sensors attached)

7.1.4 Logs Program List of system critical events, system setting changes and event date / time. Logs can be downloaded by pressing the down arrow key. Click on the plus sign next to the date and time to see details concerning each event. Each log file can be saved for future viewing. Logs will be saved on the PDA formatted “system name” @ date&time. Logs can not be deleted from the controller and are permanently burnt into the controller memory.

7.1.5 Setup Program is the main palm program used to setup the control board and tell the board what accessories you have hooked to the board. Open program Setup. Just like the toolbox program the setup program has three levels of security. Please call for the passwords to change between levels. The settings accessible to the general user are shown below in black, settings to technicians are shown in blue.

- **Open Program to be edited:**
 - **Import / download the Control Program into your palm for editing:** You should always start out by importing the control program into the memory of your palm. This insures you have the latest setup from that unit. Do this by clicking on the down arrow icon at the bottom of the screen. Next aim the palm towards the receiver of the controller. If the unit had been downloaded before by this palm a small window will pop up asking you if you wish to overwrite or rename the one you just downloaded. When completed you will see the program listed in the window for editing. The program is normally named the same as the unit's serial number. Next open the program as described below for an existing program.
 - **Open an existing program for editing.** Point to the program you wish to open and highlight the program. Next click on the open folder icon at the bottom of the screen. This will open the program for editing.
 - **Edit the program and Export back into the controller.** Once you have finished with the next several pages the changes must then be exported back into the controller. Do this by aiming the palm towards the receiver of the controller and press the green up arrow icon on the bottom of the screen.

Navigation between screens can be done by pressing the up or down arrow at the bottom right of the screen or by pressing the screen name in the bottom of the screen and selecting the one you want.

The next few screens will describe the settings on each screen.

General Screen:

Notes: This will be the Unit serial number or common Program name.

Notes can only be changed in technician level or factory level.

System Priority: This sets which zone has system priority if a heat and a cool call is made from two different zones at the same time.

Options include: *Heat, Cool, Zone*

(If Zone is selected then zone1 has top priority, zone2 second and so on.)

[Default = Heat]

Stage Capacity: This sets the max stage each zone can call for. They are settable from 1–3

The system will add two or more zones together if more than one calls at a time.

For example if Zone 4 is set to one and it is the only zone calling then the system will stay in stage one no matter what the thermostat stages up to. If zone 3 is set to 2 and it is the only zone calling then it can stage up to stage 2 but no higher. If both call at the same time then the system can stage all the way up to stage 3. This is important when sizing the duct to smaller zones. These can be set in increments of one tenth. So if you have a zone you never want to be able to bring on the system by itself you could set it to .5 then it would have to add in with another zone only, or two zones set at .5 could add up to 1 which if they both called at the same time could turn on the system in stage one.

[Defaults are Zone 1 = 3, Zone 2 = 3, Zone 3 = 2, Zone 4 = 1]

Stage Capacity can only be changed in technician level or factory level.

T-stat Type: *HP or Reg.* HP = heat pump thermostat. Reg = Non heat pump thermostat.

[Default = HP] *T-stat Type can only be changed in technician level or factory level.*

Heat pump thermostats refer to thermostats that have the following:

G terminal for blower

Y or Y1 terminal for stage one compressor

Y2 terminal for stage two compressor

O terminal for reversing valve (heat / cool switching)

Reg or Non heat pump thermostats refer to thermostats that have the following:

G terminal for blower

Y terminal for cooling call

W terminal for heating call

The difference between the two:

Short of the wiring differences the Reg thermostat stages up on an adjustable time delay in the controller between stage one and two then another time delay between stage two and stage three. The Heat pump thermostat stages up between stage one and two from a call from the thermostat then an adjustable time delay in the controller between stage two and stage three.

Cooling Screen:

Fan Blower Speeds for each compressor stage. Displayed in CFM. If dual blowers this setting should be half of desired CFM. [Set by Factory @ approx 350-375 CFM/Ton]
A lower blower speed in cooling is always recommended for dehumidification.
Blower speeds can only be changed in technician level or factory level.

Desuperheat into DHW: Set to allow desuperheating of the hotwater tank during cooling mode. (Yes or No) [Default = Yes]

Desuperheat into AHW: Set to allow desuperheating of the auxiliary water tank during cooling mode. (Yes or No) *Only available if Aux water heating is enabled.* [Default = No]

Dehumidification:(If humidity sensor is present)

Target Percent: + or – to increase or turn off. This target setting will slow down the fan as much as 25% to increase the dehumidification in cooling if the space humidity is higher than set point. If humidity is lower than set point the fan will speed up to increase the sensible cooling, and prevent over dehumidification. The target fan speed is determined by the differential between target percent and actual humidity, taking into account the effects on the suction temp and return air temp [Default = Off]

Heating Screen:

Fan Blower Speeds for each compressor stage. Displayed in CFM. If dual blowers this setting should be half of desired CFM. [Set by Factory @ approx 400 CFM/Ton]
Blower speeds can only be changed in technician level or factory level.

Desuperheat into DHW: Set to allow desuperheating of the hotwater tank during heating mode. (Yes or No) [Default = Yes]

Desuperheat into AHW: Set to allow desuperheating of the auxiliary water tank during heating mode. (Yes or No) *Only available if Aux water heating is enabled.* [Default = No]

Humidification: (If humidity sensor is present)

Target Percent: + or – to adjust or turn off. Used to turn on or off and external humidifier via aux relay. Only operates when system is on in heating mode. Will not start fan or energize the aux relay if not running in heat.

Strip Assist: *Enabled or Disabled* [Default = Enabled]

Enabled – Strips will come on as needed via E call if thermostat is set to Hp or time delay if Reg. Will also come on immediately if a limit it tripped.

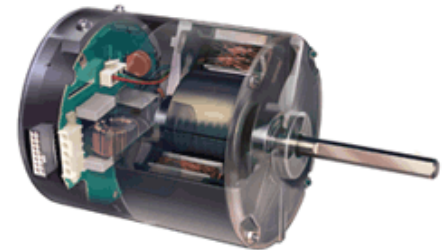
Disabled – Disables strip heat from being able to come on unless there is an Emergency heat call. Will also come on immediately if a limit it tripped.

Comfort Mode Target: + or – to adjust or turn off. Sets the discharge air temp you wish to achieve by lowering the CFM. Adjustable from 70°F – 111°F or off [Default = Off] 98 – 100 works best if used. This will also take into account the return air temperature and hot gas temperature so as not to slow the fan down too slow causing the system to kick the high pressure switch.

Blower Screen:

Fan blower speeds for each zone, if dual blowers this setting should be half of desired CFM. [Default = 200 per zone]

Each zone can be adjusted to the CFM the blower will blow if the fan is set to on, or better known as fan circulation mode. **These will add together if more than one zone is calling for fan circulation.**



The controller uses the most common blower output, a two wire PW signal to the ECM blower motor. Hydro-Temp redefines comfort and efficiency by incorporating GE ECM™ Blower Motor Technology in our equipment. These systems feature: more even temperatures, better indoor air quality, precise humidity control, quieter operation and lower utility bills.

The blower motor hub monitors the output of the control board to regulate the blower speed.

If a different kind of blower motor is to be used this setting can be changed in the Hardware screen to accommodate multi-speed PSC blower motors or variable speed VFD controllers.

Staging Screen:

Stage Type:

Timers – *Stage Time:* Compressors and blowers will stage on by t-stat. If using heat pump t-stat it will stage up to stage two from t-stat call. Staging from stage two to stage 3 is done by this time delay. [Default = 30 Minutes]

Strip heat: Strip heat will come on as auxiliary heat only after high speed of compressor has ran for this time delay and a strip heat call is made by the t-stat. Emergency heat is not effected by this time delay [Default = 30 Minutes]

Advanced – Staging of the system will be done by calculating the temperature change of the return air. When this option is selected two adjustable bars will show up below, one for the temperature change per hour for cool and one for heat. These bars allow you to adjust the minimum degrees per hour allowed before the system will stage up. For example if the system is on in cooling and the Cool/Hr is set to 1°F and the controller calculates that the return air is not dropping at a rate of 1°F per hour the system will stage up after 25 minutes of run time. (25 minutes run time needed to make calculation) *This setting requires that the return air to the system is a good representation of the actual space temperature. The return temperature can not be affected by any unconditioned areas.*

Stage type can only be changed in technician level or factory level.

Hotwater Screen:

In the hotwater screen you will be able to toggle between two different screens by clicking the drop down box that will appear between the Hot water and up arrow at the bottom of the screen. This is where you will setup your DHW (domestic hot water) and AHW (Aux hot water) or also referred to as second priority. To use the AHW you must have sensor 29 on the buffer tank or pool line and it also requires the Aux Relay Mode in the [Special screen] to be set to “Aux Water”. The settings in both screens will react the same, but will not always be set the same. In this manual we will describe the settings once.

Max Temp: This sets the max temp the HW pump will run while desuperheating. This is strictly a safety setting. It should always be set higher then all other settings on this page. [Default = 130°F] *Max Temp can only be changed in technician level or factory level.*

Auto DHW (AD) in Cooling: This check box is used if HW sensor is present on the tank and the system is running in cooling this will allow the ground loop pump to shut down when the sensor temp is 1 deg below the AD/AP stop temp to keep the tank topped off. This should be unchecked if not priority. [Default = Checked]

Auto DHW can only be changed in technician level or factory level.

Auto Priority (AP): This check box will run priority from the sensor mounted on the tank. Uncheck if using aqua stat or if system in not a priority system. If using AP with the sensor the Aqua stat light will not come on when running in priority [Default = Checked if priority unit is ordered]

Auto Priority can only be changed in technician level or factory level.

AP Max Stage: Selects the max stage the system will run in while making hot water on demand. If the system is running in priority and heating the house the controller will override this setting and run in high speed heat. If a single speed unit this must be changed to 1. If a twin single this must be set to 2. [Default = 3]

AP Max Stage can only be changed in technician level or factory level.

Stage Degree: + or – next to AP Max Stage: This is used for staging the priority hot water heating. This is the temp the water tank has to drop below the AP start temp before stage two compressor will come on in priority. Other wise stage one compressor only will heat the water tank. [Default = 4°F]

Stage Degree can only be changed in technician level or factory level.

AP Start: Adjustable from 50- 132°F. Low setting for hot water tank temp. The temperature the system will come on and start making hot water. [Default = 112°F]

AD / AP Stop: Adjustable from 50 – 132°F. High setting for hot water tank temp. The temperature the system will shut off in priority. The system can desuperheat beyond this setting. If the system runs long enough it could reach the Max Temp and then stop desuperheating. [Default = 116°F]

Pump Cycle Every: + or – to adjust or never. This setting is normally left on never. It always best to mount the sensor on the tank to get real time temperature readings. Used to turn on the DHW pump on a timed cycle to read an external aqua-stat. [Default = Never] If a setting is set for 5 minutes or above the **Pump Run Time** adjustment will appear. This allows you to tell the system for how long to run the pump before the controller samples the sensor temperature. *If the pump cycle every routine is used the sensor will only show the temperature after the last pump cycle when probed in the ATL setup program.*

Freeze Cop Screen:

FreezeCop: The freeze cop incorporates a refrigerant sensor reading the temperature of the refrigerant line exiting the water coil. If lack of water flow and this reading drops below set freeze cop temperature the system will defrost. On systems that chill water two sensors may be present. The controller will defrost on the temperature of the reading off the lowest read sensor. *If the system is running in heat and a defrost is needed the system will switch to cooling. If the system is running in cool and a defrost is needed the system will switch to heating.* **(This is a safety and should never be disabled unless the system is confirmed to have a minimum of 20% anti-freeze in all water lines)** [Default = 36°F]

This setting is not adjustable unless in Factory screen by qualified dealer.

Hardware Screen:

Compressors: Options of one or two compressors. [Set by Factory]

Compressor setting can only be changed in technician level or factory level.

Max Stage: Options of one, two or three stages, depending on comp. selection.

Max Stage setting can only be changed in technician level or factory level.

If one compressor the max stage would be: [Set by Factory]

One – Single compressor setup

Two – Twin single compressor *(One comp. that runs at two speeds)*

If two compressors the max stage would be: [Set by Factory]

Two – Used for a two speed system *(both compressors the same size)*

Three – Three speed unit. *Staging small comp, then big comp. then both.*

Fan Type: Variable / Multi-speed [Default = Variable]

Fan Type setting can only be changed in technician level or factory level.

If Fan type is Variable then [Set by Factory]

Blower CFM: Select blower motor HP. / Max CFM of Blower motor.

Frequency: 60 / 50 [Default = 60]

Both settings can only be changed in technician level or factory level.

If Fan Type is Multispeed then

Blower Speeds: Selectable from 1 – 3

Multispeed Type: Cumulative (F1 + F2 + F3)

Exclusive (F1 only) (F2 only) (F3 only)

Special Screen:

Aux Relay Mode: This allows use of the Aux relay. The Aux relay is a floating dry contact. Common on the relay must be hooked to the power supply. (Selections include: None, Aux water, Humidifier, Stage 1, Stage2, Stage3, Freeze LED, Service LED, Low Pressure, High Pressure, High/Low pressure, Lockout LED, RV Opposite, Attention Required, blower on, Heating on and Cooling on.) If system is a double priority system Aux water should be selected then the aux relay can be used to turn on and off the second priority pump.

[Default = Service LED]

Aux. Relay Mode can only be changed in technician level or factory level.

If Fan Type is set to Variable then the next settings normally used for PSC motors can be used for the various options: (Selections include: None, Humidifier, Stage 1, Stage2, Stage3, Freeze LED, Service LED, Low Pressure, High Pressure, High/Low pressure, Lockout LED, RV Opposite, Attention Required, blower on, Heating on and Cooling on.)

Relay Mode setting can only be changed in technician level or factory level.

F1 Relay Mode: [Default = Stage 1]

F2 Relay Mode: [Default = Stage 2]

F3 Relay Mode: [Default = Stage 3]

External DHW Input Makes: This is set only if a third party aqua-stat is used. You may also use this input when using a third party infloor heat control to tell the Hydro-Temp system when to start and stop making hot water. Use this feature to tell the board which priority is using the aqua-stat/controls. Options include DHW or AHW.

[Default = DHW]

External DHW Input makes can only be changed in technician level or factory level.

Factory Screen:

Damper Close Delay: Time before damper output will de-energize after zone is satisfied. [Default 4 Seconds]

Loop Pre-flow: Loop pumps will run for this amount of time before compressors will be allowed to come on. [Default = 5 seconds] Should be set to 45 seconds if belimo or any slow open or close water valve is used.

Hi & Low Pressure Lock out settings:

Max Faults: Number of faults allowed with in fault window before lockout.

[Default 5]

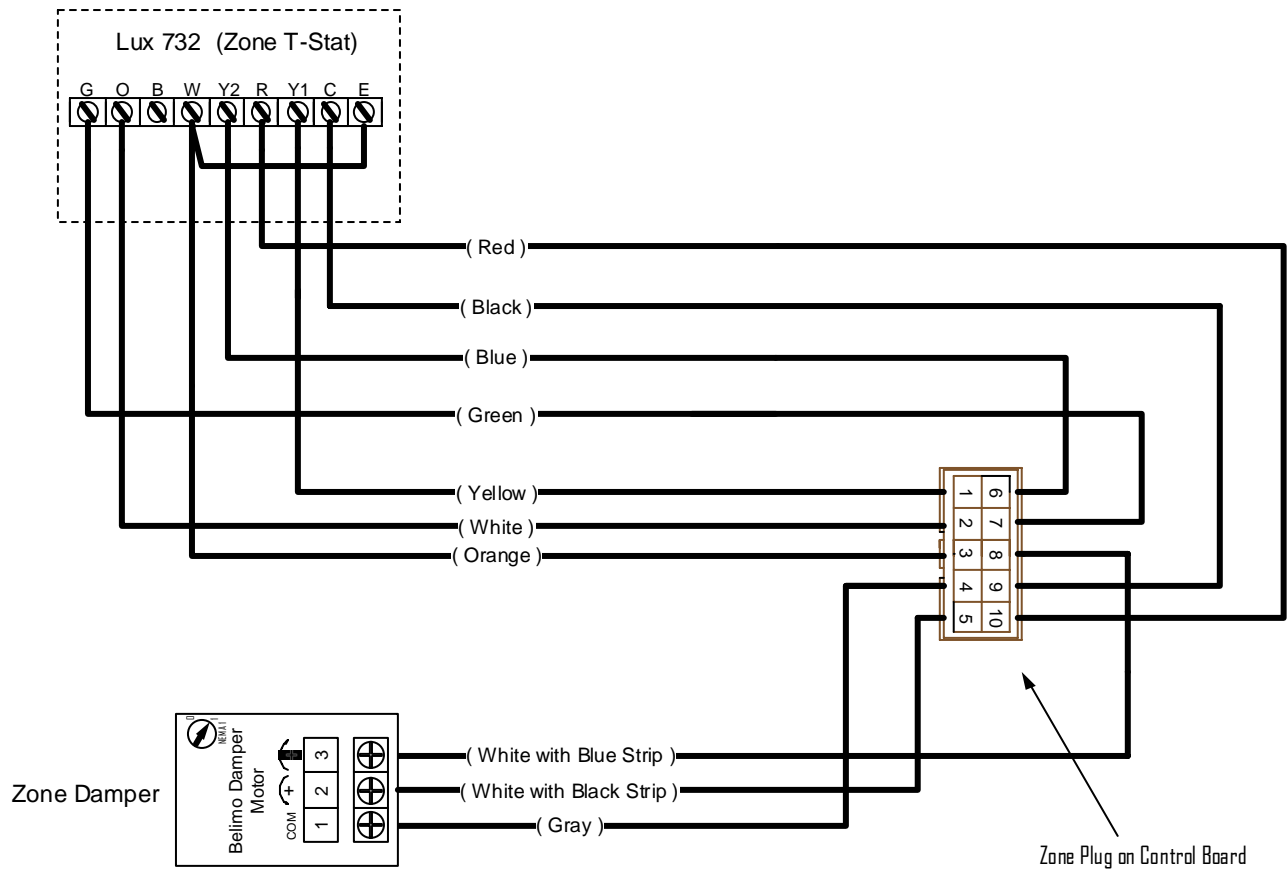
Fault Lockout: Time the system will lockout if Max Faults are reached during fault window. [Default 5 Hours]

Fault Window: Time to remember faults. [Default 60 Seconds]

Lock out settings can only be changed in factory level.

7.2 Lux 732 Thermostat connected to Controller with damper

Zone Thermostat diagram showing Lux732 thermostat hooking up to zone plug that plugs into control board.



Damper will turn counterclockwise to close & clockwise to open

Up to 4 zone Thermostats and dampers can be plugged in to the control board.

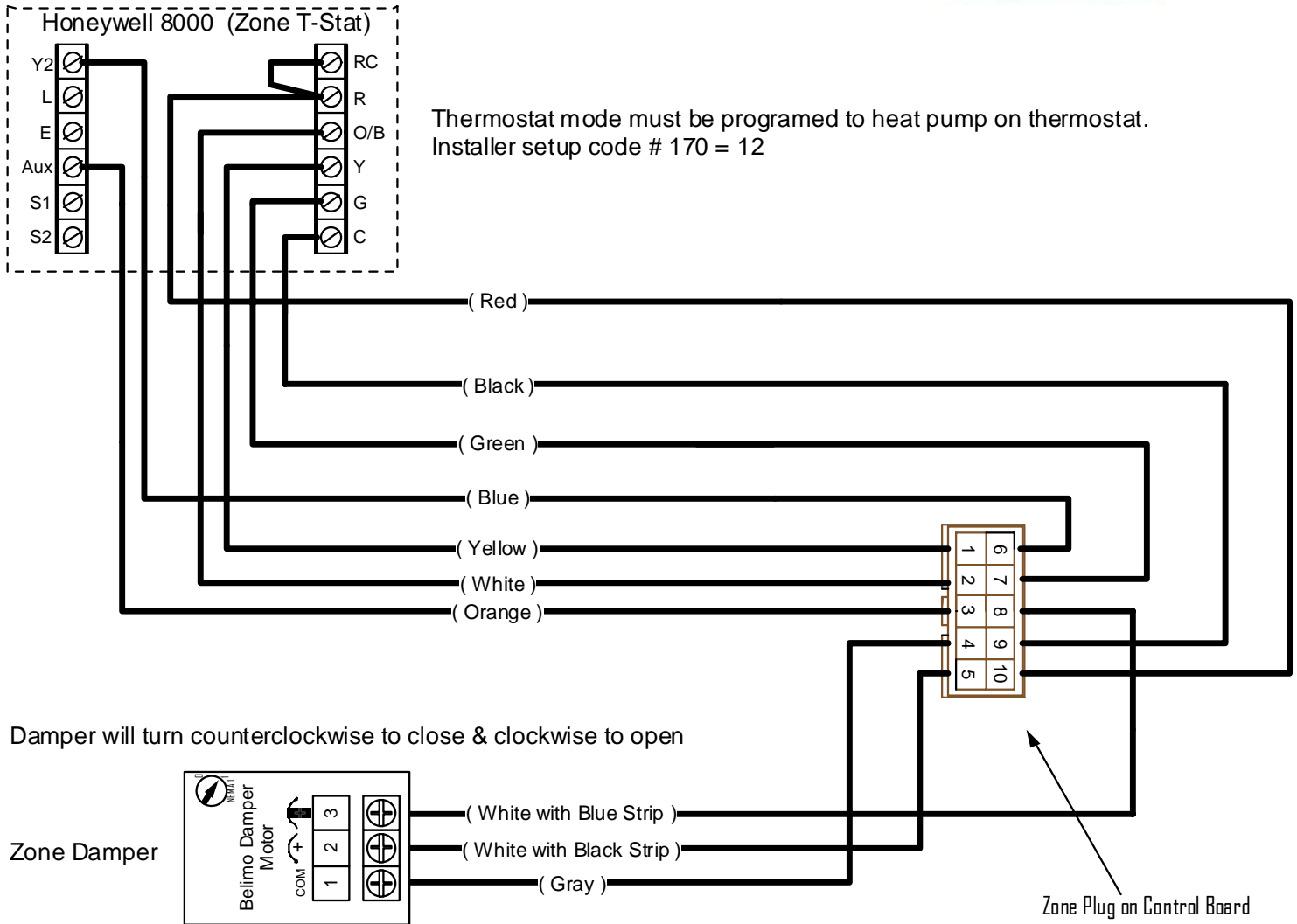
Each zone will have a plug that will hook to the zone thermostat and zone damper.

7.2.1 Honeywell 8000 Thermostat connected to Controller

Zone Thermostat Showing a Honeywell 8000 thermostat hooking up to the zone plug that plugs into the control board.



Drawing # H004465

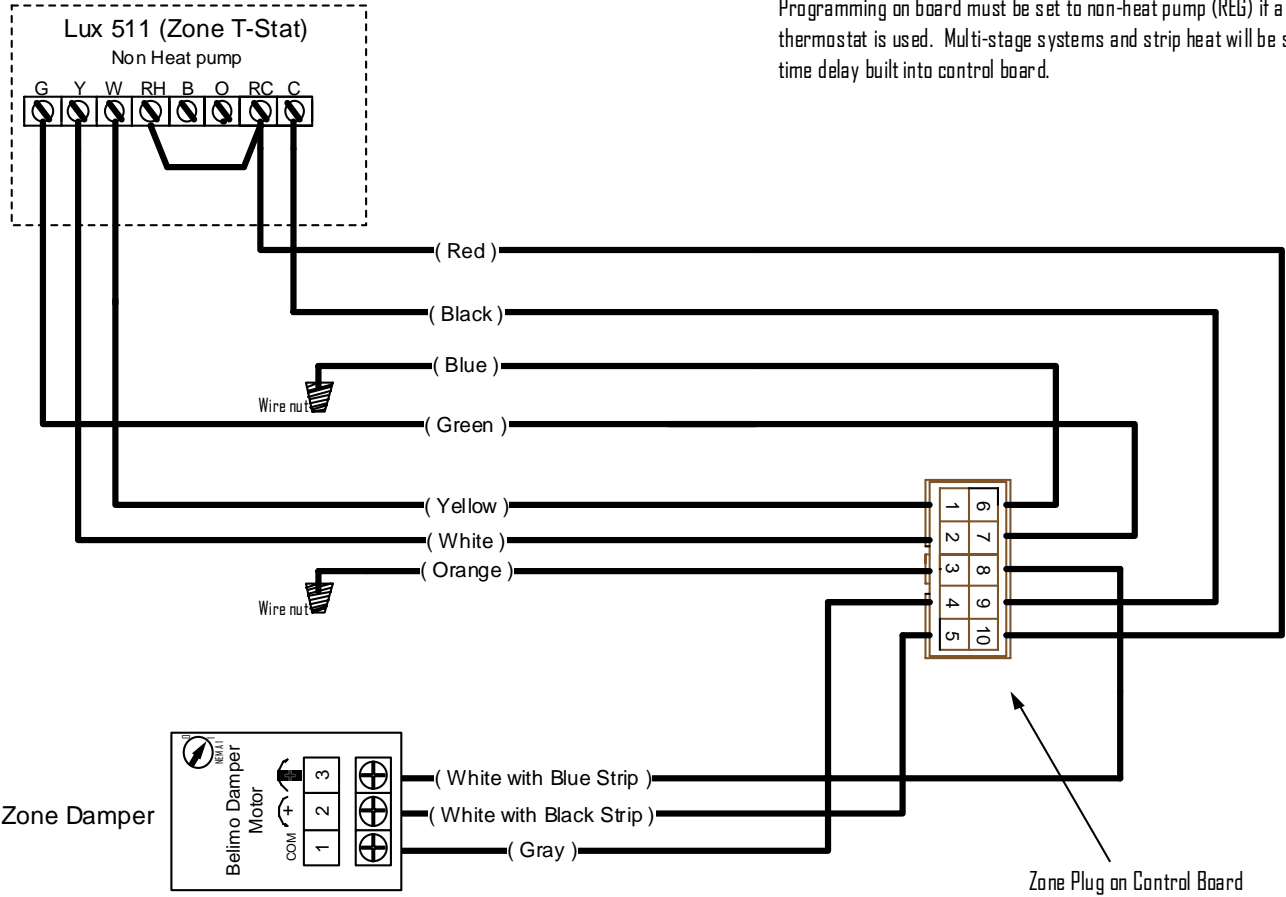


Up to 4 zone Thermostats and dampers can be plugged in to the control board.

Each zone will have a plug that will hook to the zone thermostat and zone damper.

7.2.2 Lux 511 Non Heat Pump Thermostat connected to Controller

Zone Thermostat diagram showing Lux511 thermostat hooking up to zone plug that plugs into control board.



Programming on board must be set to non-heat pump (REG) if a non-heat pump thermostat is used. Multi-stage systems and strip heat will be staged on by time delay built into control board.

Damper will turn counterclockwise to close & clockwise to open

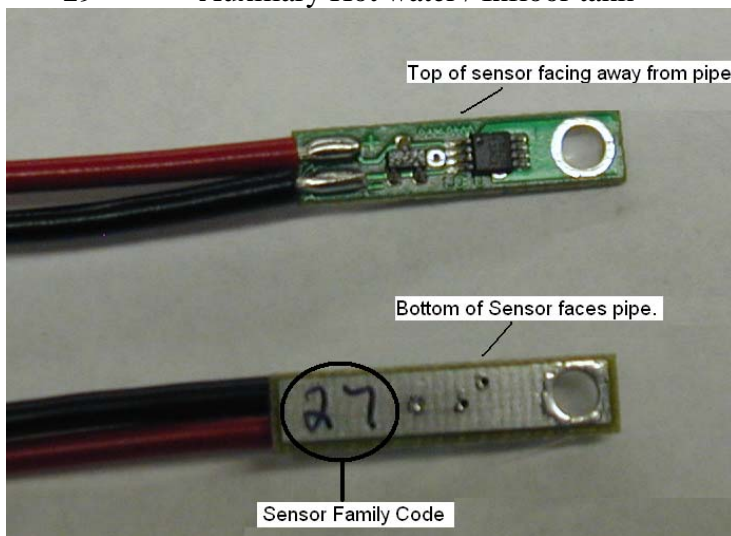
Up to 4 zone Thermostats and dampers can be plugged in to the control board.

Each zone will have a plug that will hook to the zone thermostat and zone damper.

7.2.4 Control board Sensor Identification

Family Code Description / Location

20	Air Input (Return Air)
21	Air Output (Supply Air)
22	Compressor Suction Line Temp
23	Compressor Hot Gas Line Temp
24	Loop in to system temp
25	Loop out of system temp
26	Freeze Protection Sensor
27	Domestic Hot water Tank
28	Not Used / Free
29	Auxiliary Hot water / Infloor tank



All sensors communicate through a one wire bus to the control board. Sensors are hooked to the small board pictured above on the right. This board is then hooked to the control board. This allows for easy sensor replacement or servicing. On/Off toggle switches are also hooked to the small board to turn on and off the priority options as needed. **The polarity of all sensors must be matched Black to black and red to red.** The spare input can be used for the humidity sensor is used.

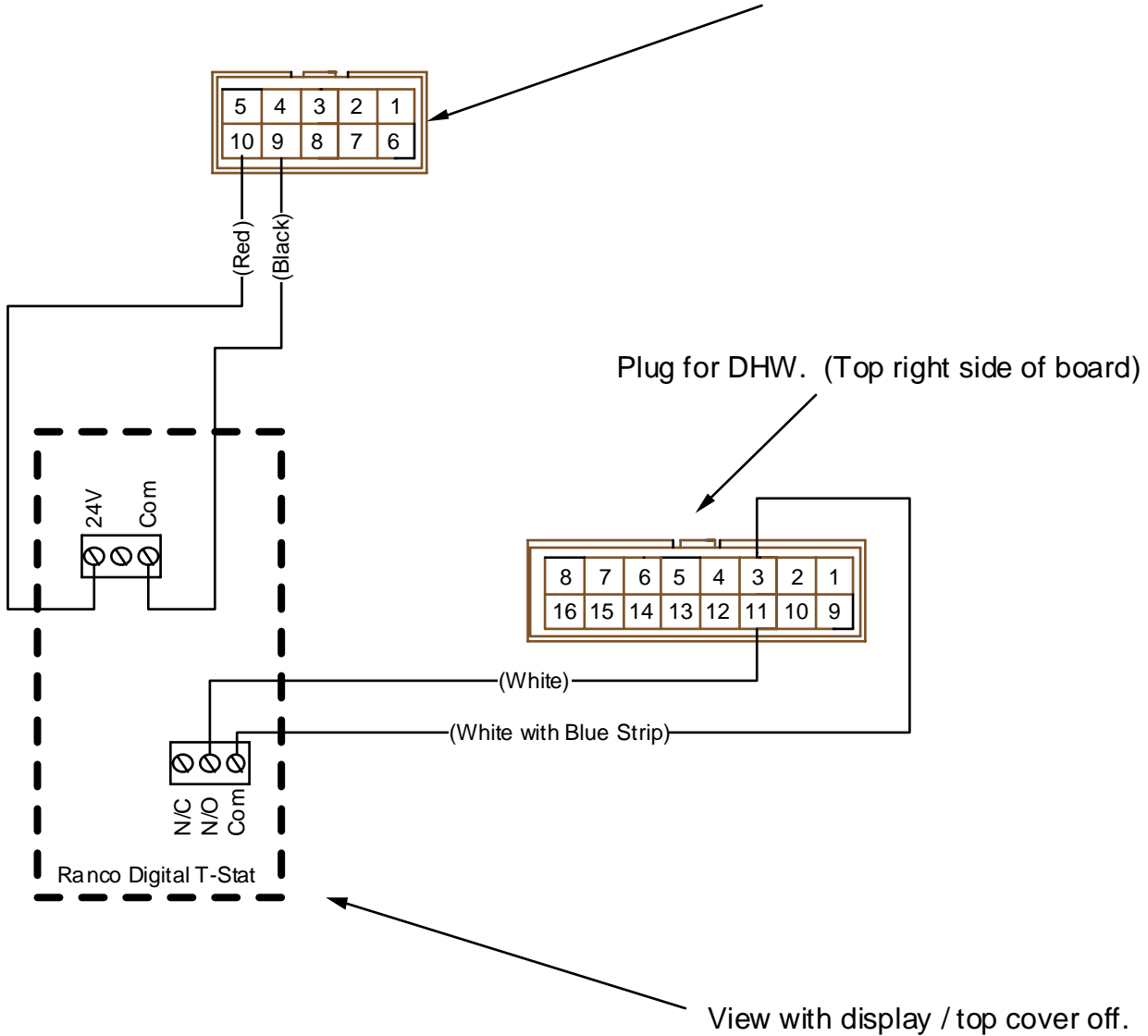
A terminal strip located in the electrical box will be provided for the field installation of the DHW and AHW tank sensors.

Find Sensor: If a sensor is replaced it will not be recognized until a find sensor command is done. This can be done by holding down the RV button on the board. You will see 4 red lights come on indicating you are in find sensor mode. Then the center two red lights will come on and flash one time for each sensor found. After the flashing is complete you can release the RV button.

On a new unit all the system sensors will be wired and found during test run at Hydro-Temp. The DHW sensor needs to be properly placed on the water heater and hooked up to the terminal strip on the front of the unit. Insure the sensor is near the bottom element between the tank and insulation and secured.

7.2.5 Optional Ranco Aqua-Stat Hookup.

Plug for zone 4. (Top Middle of board)
 If zone 4 is to be used wirenut on with wires to thermostat.
 (Using this plug to get 24 volts to power Ranco)



You may use either the Ranco Aqua-stat or the Georgia Controls Sensor.
 For a standard priority you would never use both.
 Sensor #27 for DHW
 Sensor #29 for AHW

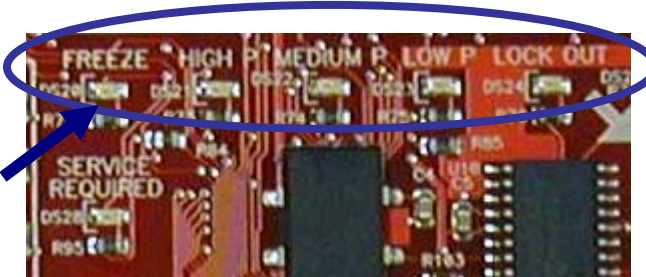
7.2.6 Control Board Status Light Identification

Monitoring the status of the system can be done with the status lights. You will notice two different color lights Green lights indicate normal inputs and outputs on or off status. Red lights indicate system problem or attention needed.

The small picture on the right shows the bottom right of the control board where some of the system outputs are.



Notice the 5 small lights, each indicate if the board is outputting for that device to be on. For example the first light shown is for the Reversing Valve, then HP1 or stage one compressor, and so on. Every input and every output has an indicator light.



The next picture on the left shows some of the system problem lights. These include: Freeze (Freeze condition detected in water coil) High pressure switch, medium pressure switch, low pressure switch, and system lock out. Knowing the location and purpose of the system lights makes service easier in the field. When the light is flashing that condition exist at that time. If the light is steady on then that condition was there at one time but is now reset. Trouble lights can be cleared by cycling the power or pressing the reset button.

7.2.7 Control Board Test Buttons

Test buttons can be used to bypass the thermostats and run the system from the unit. This should only be done for test run purposes and only by a qualified service technician.

To enter the test mode press the MODE button. (Located at the bottom left of the control board) This will switch the system into the test mode.



You may now press the RV button to switch from heat to cool.

The STEP button will step up the compressors. From stage one, up to stage three.

If a limit is tripped or a power up timer has the compressors locked out you can reset the timer by pressing the RESET button.

When finished press the MODE button to return control back to the thermostats. The time in test mode is limited to two hours. This is to protect the system from being left in test mode by accident. After two hours the system will automatically switch back to normal operation. You may also reset the power to the unit to remove the system from test mode.

7.2.8 Control Board Plug Identification



Notice on the picture above which is the top of the control board, the small numbers on the sides of the plug for zone 4 Thermostat and damper. These numbers indicate the pin number. The numbering on this plug starts on the top right and goes across then starts back on the bottom right with the number 6 all the way to ten on the bottom left. This is important in recognizing the proper wire on a plug. As you can see on the next plug the same numbering system is used with more pins.

Notice that located next to each plug will be a pin identification showing what pin goes where in abbreviated form. You can see on the picture below for the thermostat and damper plug the pin layout would be as follows:



- 1 = Y1 from the thermostat
- 2 = O from the thermostat
- 3 = E heat or strip heaters from thermostat.
- 4 = Thermostat common
- 5 = Damper Normally closed.
- 6 = Y2 From the thermostat.
- 7 = G from the thermostat.
- 8 = Damper normally open
- 9 = Damper common.
- 10 = R or 24 volts to the thermostat.

The next section describes each plug, number of pin connectors and general location on the board.

7.2.9 Control Board Pin Identification.

	<u>Wire Color</u>	<u>Termination</u>
(ZONES 1, 2, 3, 4) J7, J5, J1, J2 10-pin connectors: <Left side and top>		
1 = Y1	Yellow	T-Stat Y1 (Stage one comp.)
2 = O	White	T-Stat O (RV)
3 = E	Orange	T-Stat E&W2 (Strips)
4 = 24VAC COM	Gray	Damper Common
5 = Damper NC (Powers to close damper)	White with Blue Stripe	Belimo Damper Terminal #3
6 = Y2	Blue	T-Stat Y2 (Stage two Comp.)
7 = G	Green	T-Stat G (Fan)
8 = Damper NO (Powers to open damper)	White with Black Strip	Belimo Damper Terminal #2
9 = 24VAC COM	Black	T-Stat Common
10 = 24VAC (Hot)	Red	T-Stat R (24volt)

(LIMITS & DHW INPUTS) J3 – 16 pin connector: <Top right>		
1 = Condensate Pin 1	White with Purple Stripe	Condensate Sensor
2 = 1 Wire Sensors	Black	1Wire Sensor Black
3 = 24VAC (Hot)	White with Blue Stripe	To <i>Optional</i> DHW <i>Ranco</i> stat
4 = 24VAC (Hot)	White with Brown Stripe	To High Limit
5 = 24VAC (Hot)	White with Black Stripe	To Medium Limit
6 = 24VAC (Hot)	White with Yellow Stripe	To Low Limit
7 = AUX NO	Pink	Aux Relay N/O
8 = AUX NC	White with Red Stripe	Aux Relay N/C
9 = Condensate Pin 2	Purple	Condensate Sensor
10 = 1 Wire Sensors	Red	1Wire Sensor Red
11 = DHW	White	From <i>Optional</i> DHW <i>Ranco</i> stat
12 = PSH	Brown	From High Limit
13 = PSM	Tan	From Medium Limit
14 = PSL	Yellow	From Low Limit
15 = Not Used		
16 = AUX Relay Common (normally goes to 24V. Hot)	Red	Aux Relay Common (to 24v. Hot)

(BLOWER & STRIPS OUTPUTS) J6 – 12 pin connector: <Lower Right Side>		
1 = 24VAC COM	Gray	Pin 3 ECM 16 Pin Connector
2 – 6 = 24VAC COM	Gray	
7 = FAN PWM	White with Purple Stripe (0-12 vdc)	Pin 10 ECM 16 Pin Connector
8 = FAN G	Green (12 vdc)	Pin 15 ECM 16 Pin Connector
9 = F1	White with Blue Stripe	
10 = F2	White	
11 = F3	Black	
12 = E	Orange	To strip heat Contactor

(COMPRESSOR, RV, & PUMPS OUTPUTS) J8 – 14 pin connector: <Bottom Right>		
1 = 24VAC COM	Gray	From 24 VAC Common
2 = 24VAC COM	Gray	From Reversing Valve
3 = 24VAC COM	Gray	From Comp. Contactor 1
4 = 24VAC COM	Gray	From Comp. Contactor 2
5 = 24VAC COM	Gray	From Loop Pump Relay
6 = 24VAC COM	Gray	From DHW Pump Relay
7 = Not Used		
8 = 24VAC (Main Power Input to Controller)	Red	From 24 VAC Hot
9 = RV	Black	To Reversing Valve
10 = HP1	Orange	To Comp. Contactor 1
11 = HP2	Blue	To Comp. Contactor 2
12 = P1	Pink	To Loop Pump Relay
13 = P2	Purple	To DHW Pump Relay
14 = Not Used		

7.3 Hydro-Temp/Georgia Controls Microprocessor Sequence of Operation

Using Heat Pump Thermostats (For example the LUX732).

Heat pump refers to a thermostat that has a G call for blower, Y call for stage one compressor, Y2 for stage two compressor and O call for reversing valve.

A priority call is determined by placing a temperature sensor on the hot water tank. This temperature is read into the control board and priority is turned on and off internally in board.



HEATING MODE ALONE

a. Stage 1 heating call from zone 1 house T-stat

- i. Reversing valve de-energized.
- ii. Fan on low speed. *(Field adjustable)*
- iii. Loop pump on.
- iv. DHW pump on if hot gas temperature is hotter then DHW tank.
- v. Stage one compressor on
- vi. Stage two compressor off

b. Stage 1 and Stage 2 heating call from zone 1 house T-stat

- i. Reversing valve de-energized
- ii. Fan on medium speed. *(Field adjustable)*
- iii. Loop pump on
- iv. DHW pump on if hot gas temperature is hotter then DHW tank.
- v. Stage one compressor off
- vi. Stage two compressor on

c. Stage 1 and Stage 2 heating call from zone 1 house T-stat after a 30 minute stage time delay. *(Stage time delay Field adjustable)*

- i. Reversing valve de-energized
- ii. Fan on high speed. *(Field adjustable)*
- iii. Loop pump on
- iv. DHW pump on if hot gas temperature is hotter then DHW tank.
- v. Stage one and Stage two compressors on.

d. Stage 1, Stage 2, and Aux heat Call from zone 1 house T-stat.

- i. Auxiliary heat will only run after both compressors have ran for field selected time delay. This gives the compressor the opportunity to heat efficiently. Aux heat will run with both compressors.
- ii. Auxiliary heat will begin immediately if the high or low limit trips or only the aux and fan are called for from the t-stat. This would be referred to as emergency heat.
- iii. **Any time there is an Aux heat call the DHW pump will shut off to put 100% of the heat generated into the forced air. The only exception is if there is a priority call and an Aux heat call.**

HEATING MODE WITH PRIORITY HOT WATER CALL

- e. Stage 1 heat call from zone 1 house T-stat and DHW tank temp below AP start setting.** (default AP start setting = 112)
 - i. Reversing valve de-energized
 - ii. Fan on low speed. (*Field adjustable*)
 - iii. Loop pump on
 - iv. DHW pump on
 - v. Stage one and Stage two compressors on.

- f. Stage 1 and Stage 2 heat call from zone 1 house T-stat and DHW tank temp below AP start setting.** (default AP start setting = 112)
 - i. Reversing valve de-energized
 - ii. Fan on medium speed. (*Field adjustable*)
 - iii. Loop pump on
 - iv. DHW pump on
 - v. Stage one and Stage two compressors on.

- g. Stage 1 and Stage 2 heating call from zone 1 house T-stat after a 30 minute stage time delay and DHW tank temp below AP start setting.** (*Stage time delay Field adjustable*)
 - i. Reversing valve de-energized
 - ii. Fan on high speed. (*Field adjustable*)
 - iii. Loop pump on
 - iv. DHW pump on
 - v. Stage one and Stage two compressors on.

PRIORITY HOT WATER CALL ONLY

- h. Hot water drops below field selectable AP Start temperature.**
 - i. Reversing valve de-energized
 - ii. Loop pump on
 - iii. DHW pump on
 - iv. Stage one compressor on.
 - v. Stage two compressor off.

- i. If Hot water Continues to drop another 4.5° below AP Start Temperature** (*The 4.5° is field adjustable with the palm*)
 - i. Reversing valve de-energized
 - ii. Loop Pump on
 - iii. DHW pump on
 - iv. If AP max stage = 1 then Stage one on and Stage two compressor off.
 - v. If AP max stage = 2 then Stage one off and Stage two compressor on.
 - vi. If AP max stage = 3 then Stage one and Stage two compressor on.
(*The AP max Stage is a field adjustable setting with the palm*)

COOLING MODE ALONE

a. Stage 1 cooling call from zone 1 house T-stat

- i. Reversing valve energized
- ii. Fan on low speed. (Field adjustable)
- iii. Loop pump on unless DHW temperature is less than AP Stop temp.
- iv. DHW pump on if hot gas temperature is hotter than DHW tank.
- v. Stage one compressor on
- vi. Stage two compressor off

b. Stage 1 and Stage 2 cooling call from zone 1 house T-stat

- i. Reversing valve energized
- ii. Fan on medium speed. (Field adjustable)
- iii. Loop pump on unless DHW temperature is less than AP Stop temp.
- iv. DHW pump on if hot gas temperature is hotter than DHW tank.
- v. Stage one compressor off.
- vi. Stage two compressor on.

c. Stage 1 and Stage 2 cooling call from zone 1 house T-stat after a 30 minute stage time delay. *(Stage time delay Field adjustable)*

- i. Reversing valve energized
- ii. Fan on High speed. (Field adjustable)
- iii. Loop pump on unless DHW temperature is less than AP Stop temp.
- iv. DHW pump on if hot gas temperature is hotter than DHW tank.
- v. Stage one and Stage two compressors on.

COOLING MODE WITH PRIORITY HOT WATER CALL**d. Stage 1 cooling call from zone 1 house T-stat and DHW tank temp below AP Start setting.** (default AP start setting = 112)

- i. Reversing valve energized
- i. Fan on low speed. (Field adjustable)
- ii. Loop pump off until med limit trip or Priority satisfied.
- iii. DHW pump on
- iv. Stage one compressor on.
- v. Stage two compressor off.

e. Stage 1 and Stage 2 cooling call from zone 1 house T-stat and DHW tank temp below AP Start setting. (default AP start setting = 112)

- i. Reversing valve energized
- i. Fan on medium speed. (Field adjustable)
- ii. Loop pump off until med limit trip or Priority satisfied.
- iii. DHW pump on
- iv. Stage one compressor off.
- v. Stage two compressor on.

f. Stage 1 and Stage 2 cooling call from zone 1 house T-stat after a 30 minute stage time delay and DHW tank temp below AP Start setting.

- i. Reversing valve energized
- vi. Fan on High speed. (Field adjustable)
- vii. Loop pump off until med limit trip or Priority satisfied.
- viii. DHW pump on.
- ix. Stage one and Stage two compressors on.

ZONING CONTROL

- a. Zone one T-stat calling for stage one cool and Zone two t-stat calling for stage one cool.**
 - i. System will start in stage one cool and blower in low speed.
 - ii. Zone one and Zone two damper will open
 - iii. Zone three and Zone four damper will close
- b. Zone one T-stat calling for stage two cool and Zone two t-stat calling for stage one cool.**
 - i. System will stage up to stage two cool and blower in medium speed.
 - ii. Zone one and Zone two damper will open.
 - iii. Zone three and Zone four damper will close.
- c. Zone one T-stat calling for cool & zone two T-stat calling for heat**
 - i. **Hydro-Temp** system starts in field selected system priority mode.
 - ii. If heat mode is system priority then zone one, zone three and zone four dampers will close and zone two damper will open
System priority selectable from Heat, Cool, or Zone #

ZONE STAGE CAPACITY / LIMITING

- a.** The above sequence of operation assumed that all zones were set to a stage capacity of 3.
- b.** Each zone can be set to a stage capacity which is the limit of what stage the compressor can run at for that zone. For example if Zone 1 is set to a stage capacity of 1 and it is the only zone calling the system could never stage up out of stage 1.
- c.** If Zone 1 and Zone 2 are both set to a stage capacity of 1 and are both calling for heat the stage capacity will add together and the system would be allowed to stage up into a max stage of 2.
- d.** Each zone is adjustable from 0 – 3 for its max stage capacity. A setting of .5 would not allow a zone to turn on a compressor if it was the only zone calling but would allow it to add with another zone if they both called for the same mode.

Zone Stage Capacity / Limiting is very useful for those small zones that do not have large enough duct to run the system in higher speeds.