

**Thermal Controller User Guide**

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1.0 Thermal Stage Configurations

Based on your heating and cooling needs, there are a number of thermal stage configurations availbale form QFI

##### 1.1 Thermal Stage Models

4” 20C – 150C 600W

* Cooling Capacity = 250W
* High Voltage = 41V
* Low Voltage = 30V
* Heating Time = 120s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 4
* User ID settings = 000
* Fluid Flow = 2.2G/min
* Max DC Current = 13A
* Max AC Current = 4.5A
* Power Supply = 36V 18A 600W

4” 20C – 200C 1000W

* Cooling Capacity = 200W
* High Voltage = 48V
* Low Voltage = 30V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 4
* User ID settings = 001
* Fluid Flow = 2.2G/min
* Max DC Current = 18A
* Max AC Current = 6.5A
* Power Supply = 36V 18A

2” 20C-140C 75W

* Cooling Capacity = 200W
* High Voltage = 41V
* Low Voltage = 30V
* Heating Time = 120s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 4
* User ID settings = 010
* Fluid Flow = 2.2G/min
* Max DC Current = 13A
* Max AC Current = 4.5A
* Power Supply = 36V 18A

2.5C” 20C – 200C 150W - AirCooled

* Cooling Capacity = 150W
* High Voltage = 13V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 1
* User ID settings = 011
* Active Air Cooled
* Max DC Current = 18A
* Max AC Current = 6.5A
* Power Supply = 36V 18A

2.5C” 20C – 200C 150W – Water Cooled

* Cooling Capacity = 150W
* High Voltage = 13V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 1
* User ID settings = 011
* Active Air Cooled
* Max DC Current = 18A
* Max AC Current = 6.5A
* Power Supply = 36V 18A

8” 20C – 200C 1000W

* Cooling Capacity = 1000W
* High Voltage = 42V
* Low Voltage = 30V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 16
* User ID settings = 100
* 2.2 G/min
* Max DC Current = 29A
* Max AC Current = 6.5A
* Power Supply = 7.5V 10A

12” 20C – 150C 1000W

* Cooling Capacity = 1000W
* High Voltage = 42V
* Low Voltage = 30V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 16
* User ID settings = 101
* 2.2 G/min
* Max DC Current = 29A
* Max AC Current = 6.5A
* Power Supply = 7.5V 10A

4” -40C – 200C 1000W

* Cooling Capacity = 250W
* Intergrated Chiller
* High Voltage = 48V
* Low Voltage = 30V
* Heating Time = 180s
* Cooling Time = 120s
* Qtemp = 9.5V
* Number of Coolers 4
* User ID settings = 110
* Fluid Flow = 2.2G/min
* Max DC Current = 18A
* Max AC Current = 6.5A
* Power Supply = 36V 18A

User Commands

Theraml Description commands

|  |  |  |
| --- | --- | --- |
| Command | Description | Default |
| MODEL | Sets and read the type of thermal controller – Sets all parameters back to default and sets all applicable setting for the thermal controller  1 – 2” Air Cooled  2 – 2.5” Active Air Cooled  3 – 2.5” Water Cooled (Thin Model – Qualcomm)  4 – 2.5” Water Cooled  5 – 4” 20C-150C  6 – 4” 20C-200C  7 – 8” 20-200C  8- 8x8 20C -200C  9 – 12” 20C-150C  10 - 4” -40C-200C Neslab  11 - 8” -40C-200C Neslab  12 - 4” -40C-200C Julabo  13 - 8” -40C-200C Julabo  14 – Julabo Big Guy (Under Development) |  |
| SHIP | Sets and read the ship date |  |
| SERVICE | Sets and reads date of last service / clears service flag |  |
| VH | Sets and read the the high voltage |  |
| VL | Sets and reads the low voltage |  |
| STEMP | Sets and reads the temp where the unit will switch into high mode |  |
| SHYST | Sets and reads the switching hysteresis temperature |  |
| MAXT | Sets and reads the max temp of Athena |  |
| MINT | Sets and reads the min temp |  |
| START | Sets and reads the start temp |  |
| SN | Sets and reads the system SN |  |
| SSN | Sets and reads the stage SN |  |
| CSN | Sets and reads the Controllers SN |  |
| PIDWAIT | Sets and reads the power on time of the PID controller in seconds | 3s |
| CWAIT | Sets and reads the power on time of the Chiller in seconds | 20s |
| POLL | Sets and reads the interval that the system is polled in seconds | 3s |
| FANMIN | Sets and reads the minimum time the fan will be on | 180s |
| SERIAL | 1. Sets the system as USB communication 2. Sets serial port 2 to be used as RS232 3. Sets serial port 2 to be a debug port 4. Sets serial port 2 to be configured to communicate with a Neslab chiller 5. Sets serial port 2 to be configured with a Julabo 6. Sets serial port 2 to be configured with a Julabo(big guy) | 0 |
| FTR | “Fan Timer Reset” Set to 1 – Resets fan timer when switch is closed, set to 0 – Fan timer does not reset | 0 |
| FBOUNCE | Sets the amount of time the fan switch needs to be closed to turn the fan on (ms) | 5ms |
| STAGE | Returns stage temperature |  |
| SET | Returns/Sets Set Temperature (Athena) |  |
| Help | Lists all commands |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Command | Description |  |  |
| FANON | 1 sets the fan on, 0 turns the fan off |  |  |
| FHT | FHT 1 forces to high temp mode |  |  |
| IOSTAT | Status of FAN, Athena, Chiller, high temp bits, fan switch, fan timer |  |  |
| ERROR | Status of global error |  |  |
| STAT | 1 = All SNs  2 = All temperatures (chiller,PID, stage)  3 = System Timing/Service |  |  |
| RESET | Clear all flags and re-initialize system |  |  |
| USBSTAT | Status of USB |  |  |
|  |  |  |  |

User Commands –

Add hbridge to struct

Set\_read string set\_read ship combined using type parameter….

-Model struct serial must be in struct to set julabo etc enabled in code -

-Cooling type query - model

-Cooling (0 = air, 1 active air, 2 intergrated fluid, 3 = neslab, 4 = chiller) – have to be able to set neslab and julabo diff among same user id) – set with model

Model will also set serial to right setting i.e. set the chiller type – add code for this

-tune high and low parameters

Athena resolution

-retrun athena to default

* Set baud rate 9600
* Id 1
* Change Athena id
* Poll Athena id
* Athena settings stat 9
* Lock/unlock screen Athena screen

-**Look Up Table set and veiw**

-**LED off**

USB BLINK RATE

Possible Commands ( not sure if useful)

How long fan switch has been closed.

Last read stage temp stat 2.

-User ID Active or not – I think it will be

Get chiller temps later – during big guy development

Chiller MAX/MIN Temps – during big guy development

-Water temp – don’t have at this point

Echo char