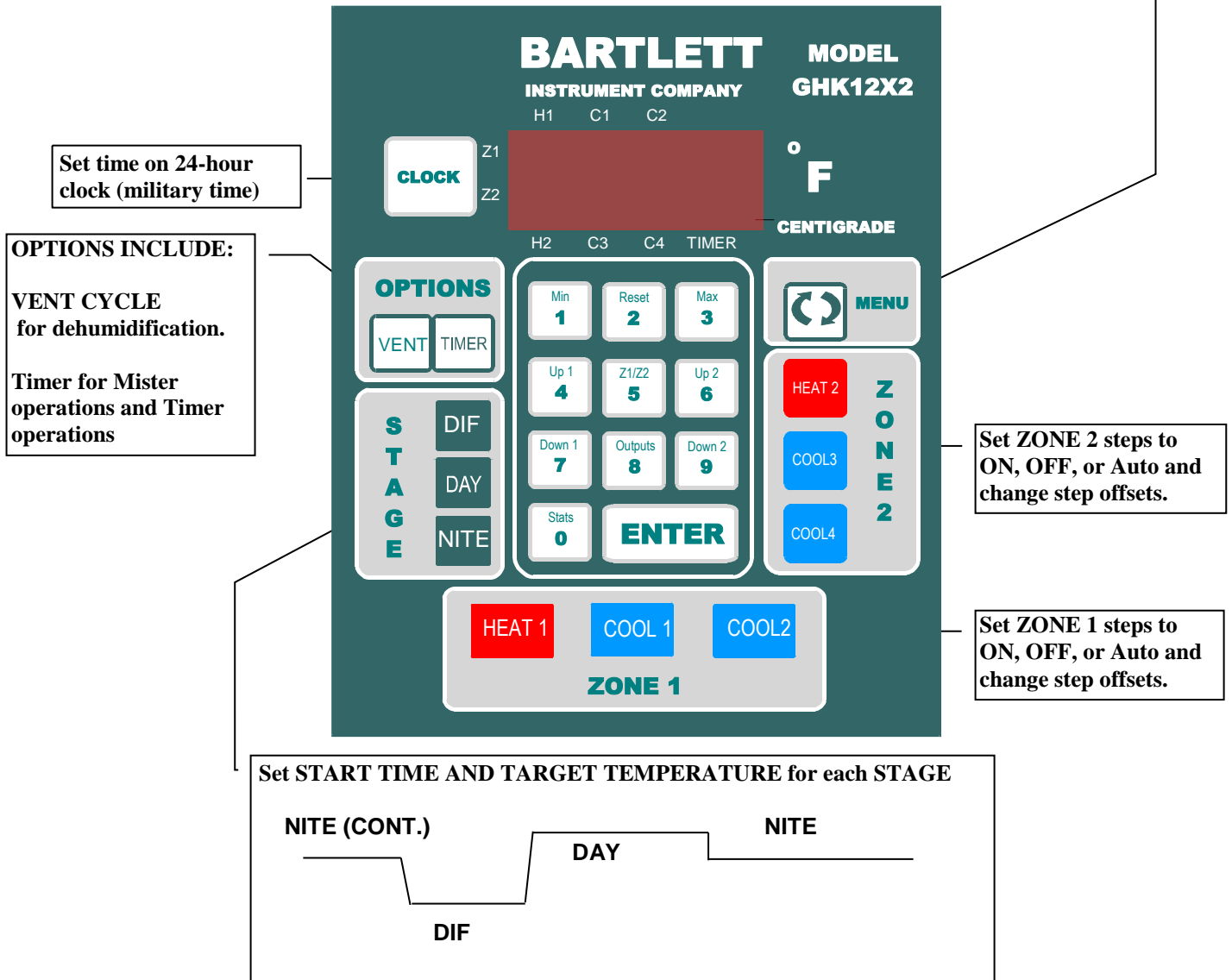


| | |
|--|-----------|
| Front Panel Description | 3 |
| Introductory Notes..... | 4 |
| Controller Operations..... | 5 |
| Overview/Features..... | 5 |
| Options | 5 |
| Stages – DIF, DAY, NITE..... | 5 |
| Target Temperature | 6 |
| Output Steps | 6 |
| Output Temperature..... | 7 |
| Output ON/OFF Transitions | 7 |
| Programming..... | 8 |
| Stage - DIF, DAY, NITE..... | 8 |
| Outputs (HEAT 1, COOL 1...) | 9 |
| Clock | 10 |
| TIMER/MISTER Function..... | 10 |
| Dehumidification Vent Cycle..... | 12 |
| Humidify Mode (requires humidity sensor) | 14 |
| Menu Options | 15 |
| Controller Status..... | 17 |
| Operating Display..... | 17 |
| Output Conditions (Hot Key 8) | 18 |
| Target Temperature Viewing and Override..... | 18 |
| Error Status Displays | 19 |
| Statistics..... | 19 |
| Overrides | 20 |
| Target Temperature Override | 20 |
| VENT or TIMER Manual Start | 20 |
| Outputs | 20 |
| Curtain/Vent Control (Models GHK12X2C AND GHK12X2CH) | 21 |
| Energy setting..... | 22 |
| Wind/Rain Alarm Input Option (Models GHK12X2C and GHK12X2CH)..... | 23 |
| Heat 3 Option (Models GHK12X2H AND GHK12X2CH)..... | 23 |
| Appendix A: Hot Keys | 24 |
| Appendix B: Default Settings..... | 25 |
| Appendix C: Celsius Settings Conversions | 26 |
| Appendix D: Quick Start..... | 27 |

Front Panel Description

- MENU INCLUDES:**
- rSEt** – Reset changes all “ON” outputs to “AUTO”
 - Ht3** – Set point heat option for models GHK12X2H, CH
 - CHFC** – Select °F or °C
 - Id** – Select ID# for CIS (COMPUTER INTERFACE SYSTEM)
 - OtOA** – Set time to reset “ON” outputs back to “AUTO”
 - dELA** – Delay sets time delay between the transition from heat to cool or from cool to heat
 - dEFt** – Defaults resets DIF, DAY, and NITE back to default settings
 - HYS** – Hysteresis settings for tightness of control
 - ALM1, 2** – Enter temperatures for High and Low alarm for each zone
 - 1Or2** – Select 1 or 2-zone mode
 - FAIL** – Selects if thermistor failure triggers heat cycling or outputs off.
 - tHrS** – Threshold time
 - Curt** – Curtain/vent settings for models GHK12X2C, CH
 - FuLL** – Full open time for curtain/vent option on models GHK12X2C, CH
 - ntLo** – Nite lock-out of cooling stages
 - RuNT** – Appliance run time



Introductory Notes

This section will aid you in understanding how the GHK12x2 operates. Also this section will introduce some terminology that will be used throughout this manual

Notes

- The controller uses a 24-hour clock format (military time).
- Programs are not stored until all information has been entered. If programming is started, and no key is pressed for 15 seconds the controller will go back to normal operation and any changes that had been made will be lost.
- The DIF stage must start before the DAY stage and DAY must start before NITE
- Allowable target temperatures range from 32°F to 131°F.
- Allowable offsets for each output ranges from 0°F to 31°F.
- In single-zone mode COOL 2, 3, 4 activate 30 seconds after COOL 1 to allow louvers to open.
- In two-zone mode COOL 2 and COOL 4 will not activate for 30 seconds after COOL 1 and COOL 3 (respectively).

Definitions

First we need to define and understand some terms.

| TERM | MANUAL DEFINITION AND DESCRIPTION |
|--------------------------------|--|
| Output | OUTPUT is a relay that corresponds to HEAT 1, COOL 1, and COOL 2 for ZONE 1; and HEAT 2, COOL 3, and COOL 4 for ZONE 2. |
| Target Temperature | The base temperature set for each stage (DIF, DAY and NITE). Usually the temperature for the first HEAT to come on. |
| Step Temperature or Step | The STEP TEMPERATURE is the amount added (cools) to or subtracted (heats) from the target temperature to determine the output temperature. |
| Output Temperature | This is the TARGET TEMPERATURE with the STEP applied. For heating APPLIANCES this is the TARGET TEMPERATURE minus the OFFSET. For cooling APPLIANCES this is the TARGET TEMPERATURE plus the OFFSET. |
| Hysteresis | This is the separation between output temperature and trip point. It is variable from 1° to 3°F |
| Trip Point | The temperature at which an output (relay) turns on or off. |
| Appliances | APPLIANCES are the heating and cooling connected to the controller. |

Controller Operations

Overview/Features

The GHK12X2 environmental controller for louver/fan houses is a growing tool with multiple set points, data collection and coordinated heating and cooling to save you time and money. Here are the GHK series main highlights -

- DIF, DAY, and NITE temperature setting for height control and energy savings.
- 2 temperature sensors allow 1 or 2 zone operation. (1 large area or 2 ground-to-ground houses)
- 2 heat and 4 cool outputs. (1 heat and 2 cools per zone in 2 zone mode)
- High and Low temperature setting for the alarm output. (independent setting for each zone)
- Statistics/average temperature for each stage and 24hr period. Helps with troubleshooting and graphical tracking.
- Timer/Mister output for lights or irrigation/fogging.
- Humidity probe input to trigger dehumidification vent cycle or humidify misting cycle.

Controller Operations: Options

Option C – add proportional output for CURTAIN/VENT CONTROL

The model GHK12X2C has the standard features listed above plus time proportional outputs (open/close) to control a curtain, roof vent, or vent window. It has a programmable step size and 5 steps of control.

Option H – add 3rd heat output, SET POINT HEAT OUTPUT

The model GHK12X2H also has the standard features and includes an extra heat output with independent set point and sensor for controlling boilers or bench heat.

Option CH - CURTAIN/VENT CONTROL plus SET POINT HEAT OUTPUT

The model GHK12X2CH combines the standard feature, curtain/vent control, and set point heat.

At power up, the display will read - - **E**, **C E**, **H E**, or **CH E** for a few seconds to tell you the firmware version. You can view which model of controller (standard, C, H, or CH) you have and the firmware version by pressing “CLOCK” then “MENU”.

Controller Operations: Stages – DIF, DAY, NITE

The GHK12X2 has three operating stages (DIF, DAY, and NITE).

- The DIF stage allows you to adjust the temperature a few hours before sunrise to help control crop height.
- The DAY stage allows you to take advantage of solar energy to increase the daytime temperature so you can maintain the correct average daily temperature to control crop maturity.
- The NITE stage allows you to lower the temperature at night to save on heating.

Controller Operations: Target Temperature

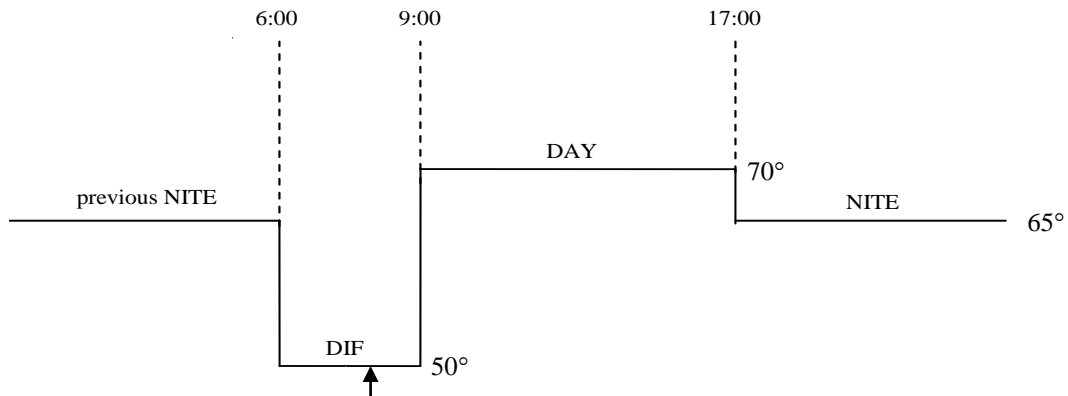


Figure 1 – Shows the controller programmed the DIF stage to start at 06:00 (6:00am), the DAY stage at 09:00 (9:00am) and the NITE stage for 17:00 (5:00pm). The target temperatures for the DIF stage: 50°F, the DAY stage: 70°F, and the NITE stage for 65°F. As indicated by the arrow, at 8:00am you are in the DIF stage and the target temperature is 50°F.

Controller Operations: Output Steps

The target temperature is the base line for determining when each output comes on. Each output has a step temperature to be added to (Cools) or subtracted from (Heats) the target temperature to determine that output’s activation temperature. Therefore, as the target temperature changes with the operating stage, the activation temperature for each output changes. **Figure 2** shows the sample settings for the step temperatures and the activation temperatures with respect to the target temperature for each output.

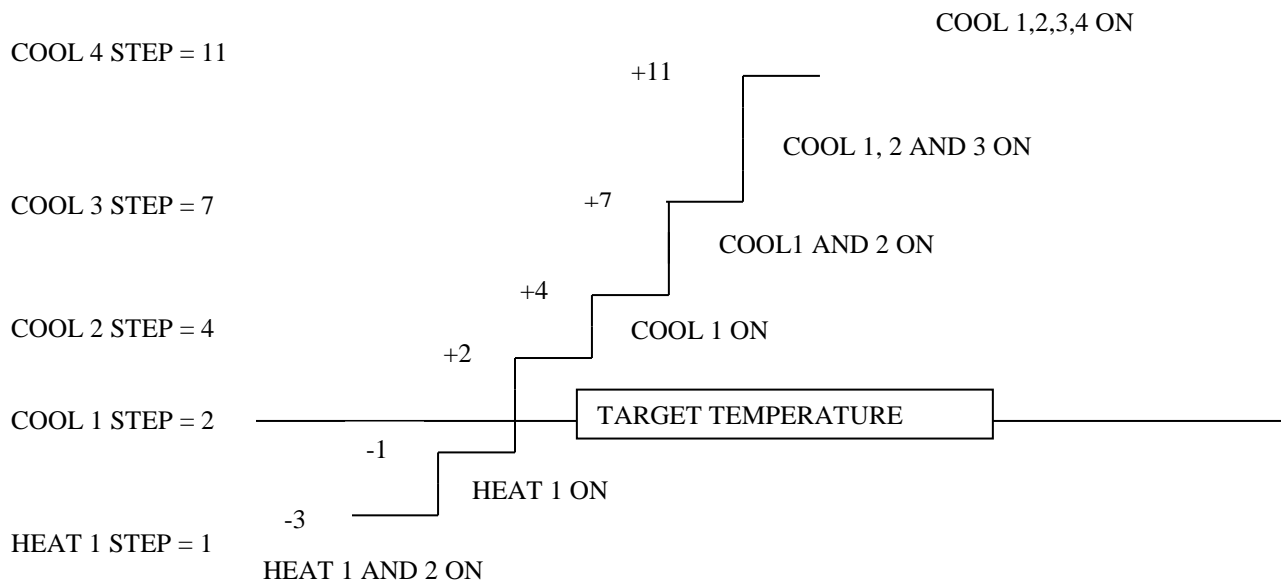


Figure 2

Controller Operations: Output Temperature

Using the information in **Figures 1** and **2**, if the time is 8:00 AM the operating stage is DIF and the target temperature is 50°F. The output temperatures for each output are as follows:

| | Target Temperature | Step | Output Temperature |
|--------|--------------------|--------|--------------------|
| COOL 4 | 50° F | + 11 = | 61° |
| COOL 3 | 50° F | + 7 = | 57° |
| COOL 2 | 50° F | + 4 = | 54° |
| COOL 1 | 50° F | + 2 = | 52° |
| HEAT 1 | 50° F | - 1 = | 49° |
| HEAT 2 | 50° F | - 3 = | 47° |

Table 1

Controller Operations: Output ON/OFF Transitions

The trip point for an output is the temperature at which the output actually turns on or off. The “ON” and “OFF” points for an output should be separated slightly to prevent rapid cycling of appliances. This separation above and below the output temperature is called hysteresis (**Figure 3**). A larger hysteresis will give more efficient cycling of appliances but will also give a wider swing in temperature. The hysteresis can be set to values of 1, 2, or 3 through the menu options.

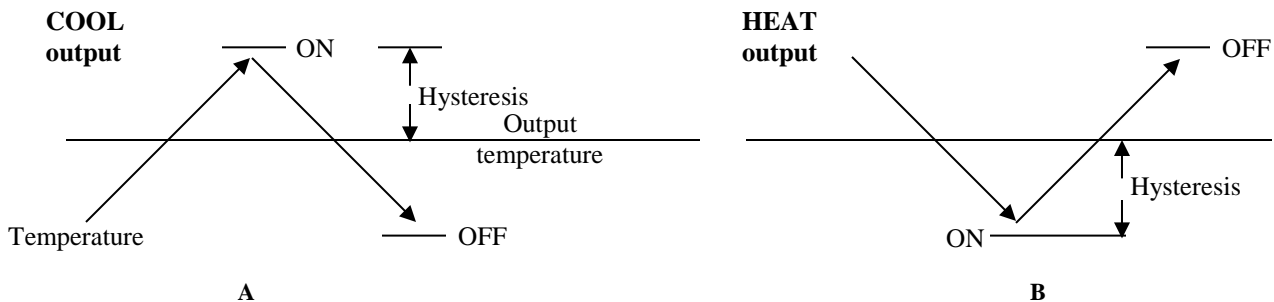


Figure 3

Using the output temperatures from **Table 1** and a hysteresis setting of 2, the trip points for each output will be as follows (all temperatures are in °F):

| | Output Temperature | Hysteresis | ON | OFF |
|--------|--------------------|------------|----|-----|
| COOL 4 | 61° | 2 | 63 | 59 |
| COOL 3 | 57° | 2 | 59 | 55 |
| COOL 2 | 54° | 2 | 56 | 52 |
| COOL 1 | 52° | 2 | 54 | 50 |
| HEAT 1 | 49° | 2 | 47 | 51 |
| HEAT 2 | 47° | 2 | 45 | 49 |

Table 2

Figure 4 shows the information of **Table 2** graphically.

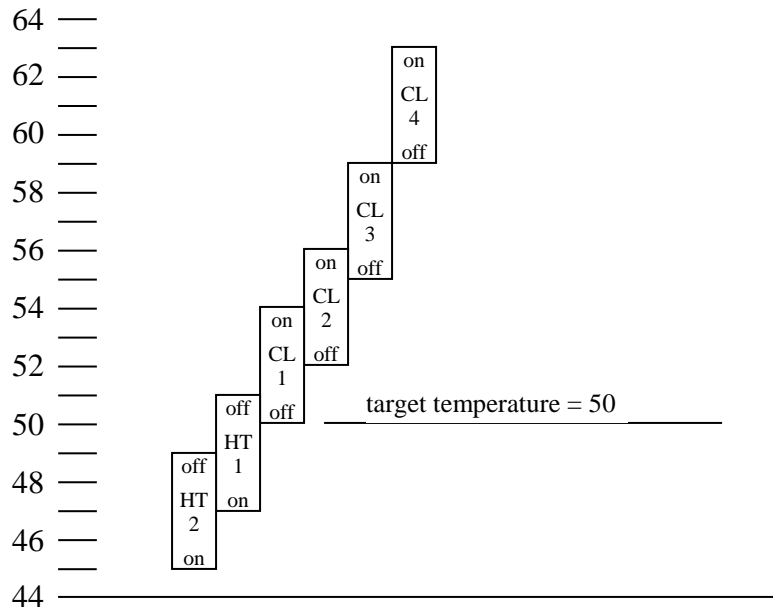


Figure 4

Programming

The basic programming only requires 3 operations - setting the start time and target temperature for each stage, setting the offset for each output and setting the clock. (Refer to **Appendix D** for basic programming)

Notes

- The GHK12x2 utilizes a 24-hour clock (military time).
- All information for a program sequence must be entered before the program is saved.
- Once data is entered it remains until modified, even after a power failure.
- The display flashes at a 1/2-second rate when in a programming mode.
- After 15 seconds without a key-press the GHK12x2 returns to normal operation without saving.
- Entering invalid data will cause a beep and display of the old information (DIF, DAY, NITE).

Stage - DIF, DAY, NITE

The GHK has 3 stages – DIF, DAY, and NITE. Each stage has a start time and target temperature as shown in **Figure 1**. (2-zone operation will have an additional target temperature for the second zone).

Here are the steps to enter the data in **Figure 1**.

1. Press the DIF key. DIF flashes with the current start time.
2. Press 6, 0, 0 for a start time of 6AM; Press the “**ENTER**” key and the display flashes the target temperature and °F 1.

3. Press 5, 5 for a target temperature of 55° F; Press the “**ENTER**” key and the display will go back to the operating display if in 1-zone mode or will ask for °F 2 if in 2-zone mode.
4. Press the DAY key. DAY flashes with the current start time.
5. Press 9, 0, 0 for a start time of 9AM; Press the “**ENTER**” key and the display flashes the target temperature and °F 1.
6. Press 7, 0 for a target temperature of 70° F; Press the “**ENTER**” key and the display will go back to the operating display if in 1-zone mode or will ask for °F 2 if in 2-zone mode.
7. Press the NITE key. NITE flashes with the current start time.
8. Press 1,7,0,0 for a start time of 1700 hour (5PM); Press the “**ENTER**” key and the display flashes the target temperature and °F 1.
9. Press 6, 5 for a target temperature of 65° F; Press the “**ENTER**” key and the display will go back to the operating display if in 1-zone mode or will ask for °F 2 if in 2-zone mode.

Outputs (HEAT 1, COOL 1...)

Each heating and cooling output has three different settings - Auto, On, and Off. In the “Auto” mode, the controller will regulate the temperature to correspond with the target temperature +/- the offset. In the “On” mode the output is active. In the “Off” mode the output is inactive until the setting is changed.

The GHK12X2 has a special feature in its menu options called “On-to-Auto”. This is used in conjunction with manually setting an output to “ON” to ensure the output is not left on indefinitely. The “On-to-Auto” time can be set from 1 minute to 23 hours and 59 minutes. Outputs can be set “On” indefinitely by setting On-to-Auto to 0.

To change the outputs setting (ON, OFF, or AUTO), press the appropriate output key. This will cause either ‘Auto’, ‘On’, or ‘OFF’ to appear in the display. Press the output key again until the desired setting is displayed. Then press “**ENTER**”. For the Auto mode you will additionally be asked to enter the step temperature for this output. Refer to **Controller Operations** for more on step temperatures.

Here are the steps to program the output offsets from **Figure 2** –

1. Press “**HEAT 1**” until the display flashes between HT 1 and AUTO. Press “**ENTER**”.
2. The display flashes HT 1, and the current offset. Press 1 to set the offset to 1 then press “**ENTER**”. The display goes back to normal operating display.
3. Press “**HEAT 2**” until the display flashes between HT 2 and AUTO. Press “**ENTER**”.
4. The display flashes HT 2, and the current offset. Press 3 to set the offset to 3 then press “**ENTER**”. The display goes back to normal operating display.
5. Press “**COOL 1**” until the display flashes between CL 1 and AUTO. Press “**ENTER**”.
6. The display flashes CL 1, and the current offset. Press 2 to set the offset to 2 then press “**ENTER**”. The display goes back to normal operating display.
7. Press “**COOL 2**” until the display flashes between CL 2 and AUTO. Press “**ENTER**”.
8. The display flashes CL 2, and the current offset. Press 4 to set the offset to 4 then press “**ENTER**”. The display goes back to normal operating display.
9. Press “**COOL 3**” until the display flashes between CL 3 and AUTO. Press “**ENTER**”.
10. The display flashes CL 3, and the current offset. Press 7 to set the offset to 7 then press “**ENTER**”. The display goes back to normal operating display.

11. Press “**COOL 4**” until the display flashes between CL 4 and AUTO. Press “**ENTER**” key.
12. The display flashes CL 4, and the current offset. Press 1, 1 to set the offset to 11, then press “**ENTER**”. The display goes back to normal operating display.

Special Note

COOL 1 and COOL 3 are designed to control louvers; COOL 2 and COOL 4 are designed to control fans. Therefore, fan outputs will not come on until COOL1 (COOL 3) is on. Setting COOL 1 to off will disable other outputs. A 30 second delay between louver outputs and fan outputs is guaranteed.

Clock

It is important to remember that the GHK12x2 uses a 24-hour clock (military time). The middle decimal point in the time settings designates the hours and minutes division. See **Figure 5** below for an example of the clock. For morning times the clock setting will be from 00.00 until 11.59 and the afternoon settings are from 12.00 until 23.59.

Press “**CLOCK**”, and the current time will appear. The middle decimal point will be illuminated indicating a time is being displayed. If the time is correct, press the “**CLOCK**” button again or wait 15 seconds. The display will return to the normal operating mode. If the time is incorrect, use the number keys to type the new time and press “**ENTER**” to store it.

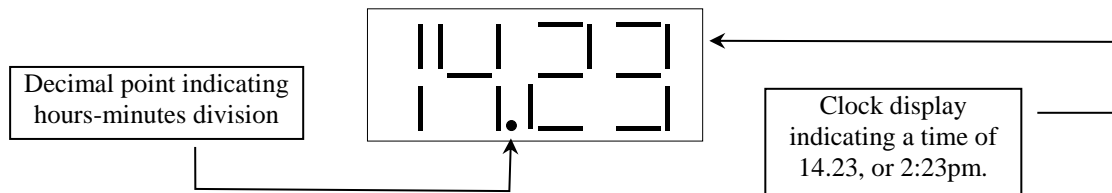


Figure 5

TIMER/MISTER Function

The GHK12X2 has a TIMER output that is not used for temperature control but can be used to turn on lights at a certain time or to run mist type irrigation. The TIMER option has three modes of operation; TIMER, MISTER, and OFF. In the Off position the timer relay will not turn on. In TIMER mode the timer relay will turn on at a designated time of day and run for a set length. The MISTER mode causes the timer appliance to enter an on-off cycle. In this on-off cycle the timer is on for a programmed number of seconds repeating after the set number of minutes has expired. The timer along with the alarm output can also be used to run a shade or energy curtain. See section on the next page for details.

TIMER Mode

Timer mode is designated by ‘**TIMR**’ in the display window when the TIMER option key is pressed. A timer cycle may be manually started at any time by pressing “**TIMER**” and then “**CLOCK**”.

TIMER Example

To program a Timer cycle, to occur daily, with the following settings follow the programming example below.

| START TIME | HOLD LENGTH | REPEAT |
|------------|-------------|--------|
| 1:15pm | 15 minutes | ON |

TIMER Programming

| KEY PRESS | DISPLAY | COMMENTS |
|----------------|---------------------|---|
| TIMER | MIS or OFF or TIMR | Press until 'TIMR' is displayed. |
| ENTER | TIMR/XX.XX | 'TIMR' and previous start time. Will flash at 1/2-second interval. |
| 1,3,1,5 | 13.15 | New start time of 1:15 PM. |
| ENTER | HOLd/00.00 | New hold time in hours.minutes. Maximum hours setting is 23 and maximum minutes setting is 59. |
| 1,5 | 00.15 | Hold time of 15 minutes. |
| ENTER | REPT/OFF REPT/On | Repeat timer cycle on or off. Toggle with TIMER key. 'REPT' off is performed once. 'REPT' on is repeated daily |
| ENTER | Operating display | All information saved. |

MISTER Mode

The Timer output can also be used in a misting mode, where it comes on for a number of seconds (on time) and repeats in a number of minutes (cycle time). The MISTER option is enabled by pressing the "TIMER" key until 'MIST' appears in the display window and then pressing "ENTER" to accept.

Each stage (DIF, DAY, and NITE) has unique on times and cycle times. To program the on time and cycle time, press the appropriate stage key (DIF, DAY, or NITE) and enter the start time and target temperature as before. Now 'on-T' and number of seconds will be displayed. Type the number of seconds on for each cycle and press "ENTER". 'CYCL' will be displayed. Type the number of minutes for a cycle and press "ENTER". Repeat this for each stage. Valid entries are 0-99 for minutes and seconds.

The cycle time will start counting when the output comes on. For instance, an on time of 30 seconds and cycle time of 1 minute, will have 30 seconds of on time and 30 seconds of off time.

TIMER/ALARM For Shade Curtain Control

The Timer and Alarm Outputs can be used to run a shade or energy curtain. The timer is used as the extend signal and the alarm is used as the retract signal. This can only be done if the Alarm output is NOT being used. The alarm will still be displayed and sent to CIS as normal. The Timer/Alarm feature coordinates the outputs to give a 10 second delay between extend and retract signals to allow the motor to come to a complete stop before changing directions. To program the TIMER/ALARM for curtain control follow these steps:

| KEY PRESS | DISPLAY | COMMENTS |
|--------------|-------------------|---|
| MENU | RSET | |
| 4,4,6 | T-A/NO | The Timer/Alarm for the shade curtain is off. |
| 1 | T-A/YES | The Timer/Alarm for the shade curtain is now on. |
| ENTER | Operating Display | Automatically reverts back to normal operating display. |

Once you have activated the TIMER/ALARM for curtain control, you need to set the timer. The timer is set the same way as explained before.

Dehumidification Vent Cycle

The vent cycle is a flexible dehumidification cycle. It consists of three programmable length stages – a first exhaust stage, a heating stage, and a second exhaust stage. One, two, or all three stages can be used. The display will show FAN1 during the first exhaust stage, PRHT during the heating stage, and FAN2 during the second exhaust stage. The vent cycle can be started by a programmed start time, or can be run manually, or by high humidity if the optional sensor is installed. The vent cycle can be stopped by pressing VENT then CLOCK.

Pressing the “**VENT**” key, cycles thru the 5 vent menu options – OFF, LMT, VENT, HuM, and SETU (set up).

LMT – sets the low and high temperature limits before aborting a vent cycle. (New Feb, 2013)

VENT – allows setting a time of day to start a vent cycle.

HuM – displays the current humidity level and is for programming a humidity set point.

SETU – is for which outputs will be active during a dehumidification cycle.

OFF – the cycle will not run automatically but can be run manually.

Adjusting the low and high temperature limits (LMT) is the first step in programming a vent cycle. Then selecting the active outputs (SETU) is the second step. The last step is picking the activation method – HUM, VENT, or OFF for manual operation.

LMT (temperature limits for VENT cycle)

The limit setting gives control over when the vent cycle can run. If the temperature is above the HI H or below the LO H setting the vent cycle will be aborted or will not start. The LO H can be set as low as 32 and HI H as high as 99. Zero is special code for the LO H and HI H settings. Programming LO H to 0 indicates that the HEAT 1 temperature (target temperature – Heat 1 offset) will be the low temperature to abort the vent cycle. Setting HI H to 0 indicates that COOL 2 temperature will be used for the high limit.

SETU (setup configuration)

SETU is used to configure which appliances will be used during a vent cycle, the length of each vent stage and whether the heats will be used to maintain the temperature during an exhaust stage. The setup is necessary for all three types of activation. The following table diagrams the information to be programmed.

| | | | | | | | | | | |
|--------|--------|--------|--------|--------|--------|--------------------------|-------------------|-------------------|-------------------|---------------------------|
| Cool 1 | Cool 2 | Cool 3 | Cool 4 | Heat 1 | Heat 2 | Curt Curtain/ vent | Fan1 exhaust | PrHt Heat | Fan2 exhaust | Heat During exhaust |
| On/off | On/off | On/off | On/off | On/off | On/off | On/off | 0 – 30 minutes | 0 – 30 minutes | 0 – 30 minutes | On/off |

To program the setup information:

Only shows up for models
GHK12X2 C or CH

1. Press the **“Vent”** key until the display shows **“SetU”**.
2. Press **“ENTER”**, the display will alternate between **“CL 1”** and on or off. **“On”** indicates the appliance connected to the Cool 1 output will function during the exhaust stages.
3. Press a number key to switch the current setting.
4. Press **“ENTER”** when the desired setting is displayed.
5. Repeat steps 2, 3, and 4 until **“On or Off”** has been entered for all outputs and **“Fan1”** is displayed.
6. **“Fan1”** will alternate with the number of minutes in the first exhaust stage.
7. Type in the desired number of minutes in this stage and press **“ENTER”**.
8. **“PrHt”** will alternate with the number of minutes in the heating stage.
9. Type in the desired number of minutes in this stage and press **“ENTER”**.
10. **“Fan2”** will alternate with the number of minutes in the second exhaust stage.
11. Type in the desired number of minutes in this stage and press **“ENTER”**.
12. **“HEAT”** will alternate with **“On or Off”**.
 - **“On”** indicates that the heaters will work to maintain the programmed temperature in an exhaust stage.
 - **“Off”** will keep the heats off during an exhaust stage but if the temperature drops below 55 F, the exhaust stage will be ended and the vent cycle will move to the next stage.
13. When the desired option is displayed, press **“ENTER”** to complete setup programming.

Using the humidity probe

When a humidity probe is used, you can program the maximum allowable humidity. Anytime the humidity exceeds the set point a vent cycle will be started. The controller compares the current humidity reading to the humidity set point on the half-hour to allow time between consecutive cycles. Also, when using the humidity probe, you can turn the VENT cycle on or off during each of the stages (DIF, DAY, NITE). The following table illustrates the information that needs to be programmed:

| | | | |
|--------------------------|--------|--------|--------|
| Hu Humidity set point | DIF | DAY | NitE |
| 0 – 100% | On/off | On/off | On/off |

To program the humidity set point:

1. Press **“Vent”** until **“HuM”** is displayed. It will flash at a 1 second rate and show the current humidity reading.
2. Press **“ENTER”** the display will show **“Hu”** and the current humidity set point. It will flash at ½ second rate.
3. Type in the new set point and press **“ENTER”**. **“DIF”** will flash with on or off.

4. Press a number key to change the on/off setting.
5. Press **“ENTER”** when the correct setting is selected. **“DAY”** will flash with on or off.
6. Press a number key to change the on/off setting.
7. Press **“ENTER”** when the correct setting is selected. **“NITE”** will flash with on or off.
8. Press a number key to change the on/off setting.
9. Press **“ENTER”** when the correct setting is selected and programming is complete.

Once-a-day VENT cycle

After setup is completed, the VENT cycle can be programmed to start at a certain time of day. You can also select to have the VENT cycle repeat everyday or run just one time. The required information to program is start time and whether to repeat each day.

The programming steps are as follows:

1. Press **“Vent”** until **“Vent”** is displayed.
2. Press **“ENTER”**. **“Vent”** will flash with the current start time. Note the controller uses a 24 hour clock (military time).
3. Type in the new start time.
4. Press **“ENTER”**. **“rEPt”** will flash with on or off. If it is set to **“On”**, the VENT cycle will run every day.
5. Press a number key to change the current setting.
6. Press **“ENTER”** and programming is complete.

DISABLE VENT CYCLE

The VENT cycle can be disabled by pressing **“Vent”** until **“Off”** is displayed and then pressing **“ENTER”**.

MANUALLY START VENT CYCLE

After setup is complete, the VENT cycle can be manually started if VENT is set to **“Off”** or to **“Once-A-Day”**. Press **“Vent”** then **“Clock”** to start the cycle. To stop a manually started cycle, press **“Vent”** then **“Clock”** again.

USING THE VENT CYCLE IN THE 2- ZONE MODE

If you have the controller programmed for 2 zones but only want to use the VENT cycle on one of the zones, go into the humidity setup and turn all the outputs for the zone not being vented to **“Off”**. The zone with its settings at "Off" will function normally.

Humidify Mode (requires humidity sensor)

The humidify mode combines the mist cycle and the humidity set point of the vent cycle to keep the humidity from getting too low. The mist output is enabled when the humidity is below the humidity set point. The mist cycle is disabled when the humidity is above the set point.

Programming steps for humidify mode –

1. Enable the mist mode using the timer key. (See timer/mister function section)
2. Set the on time and cycle time for DIF, DAY, and NITE.
3. Adjust the humidity set point and set DIF, DAY, and NITE to “On”. (see **Using the humidity probe** above)
4. Press the “**TIMER**” key to display TIMR and press “**ENTER**”.
5. The display will flash TIMR and the start time.
6. Press 7, 7, 7, 7, then “**ENTER**”.
7. The display will show “**t hu**” when humidifying otherwise it will show the temperature and stage.

Menu Options

The menu key allows access to the menu functions of the GHK12x2. The different menu functions of the controller are: ‘rSEt’, ‘CHFC’, ‘Id’, ‘OtOA’, ‘dELA’, ‘dEft’, ‘HYSt’, ‘ALAr’, ‘1Or2’, ‘FAIL’, ‘ntLo’, and ‘RuNT’. Also included under the menu are the following status conditions of the controller: ‘ALAr’, ‘FL 1’, or ‘FL 2’. When the conditions for a status are indicated the status condition replaces the reset function of the controller. More will be explained on these conditions later in this section.

To navigate through the menu options press “**MENU**” to advance to the next option. Once in the menu, press “**CLOCK**” to navigate backwards. When the desired option is displayed, press “**ENTER**”.


| MENU OPTION | DISPLAY | COMMENTS |
|---|---------|---|
| Reset | rSEt | Returns all heat and cool outputs to auto. The offsets return to the previously stored values. Under the special status conditions the reset option is replaced by the status indication message. To reset press “ ENTER ” when ‘rSEt’ is displayed. (*See Status Conditions after table) |
| Heat 3 set point entry ONLY SHOWS UP IN MODELS H and CH | Ht 3 | Heat 3 is independent from the stepped heat outputs Heat 1 and 2. It has a separate temperature sensor and its own set point. From the temperature/stage display to enter the Heat 3 set point press “ MENU ” until ‘Ht 3’ is displayed. Press “ ENTER ”. Type in the new set point and press “ ENTER ” to accept the value. If ‘Ht 3’ does not show up in the menu then you don’t have a controller with the H option. |
| Fahrenheit to Celsius | CHFC | Allows change of the temperature scale (°F or °C). Appendix C contains information about any changes to the settings that occur under the Celsius setting. To indicate the controller is reading in the centigrade scale a decimal appears in the ones reading of the display.  <p style="text-align: center;">CENTIGRADE</p> <p style="text-align: right;">Celsius temperature readings indicator</p> |
| Identification | Id | Controller Software Identity. Identification indicates the software identity of the controller for CIS (Computer Interface System). Default = 1 |

Figure 6

To change temperature scale press “**ENTER**” when ‘**CHFC**’ is displayed. Press “**MENU**” to toggle between temperature scales. Press “**ENTER**” when the desired scale is displayed. Default = °F.

| | | |
|---|--------------------|--|
| On to Auto | OtOA | Sets duration time in minutes for when all manually on outputs return to auto. For more comfortable working conditions or if an emergency situation develops, any output may be turned on manually. On to Auto will return any output that is set in the on position after a certain length of time has expired. Default = 15 |
| Delay | DELA | Sets the delay duration time in minutes between transitions from cooling to heating. Default = 15 |
| Defaults | dEFt | Returns the controller to default settings. Also will clear all statistics. For default settings see Appendix B . |
| Hysteresis | HYS | Sets the hysteresis value used for temperature regulation. 1, 2, or 3 are valid for the hysteresis. Default = 2 |
| ALARM | ALM1 or ALM2 | Sets temperatures for high and low alarm values. Dry contact output to trigger auto dialer or buzzer. Default low = 32, high = 131. |
| 1 or 2 zones | 1Or2 | Sets the number of zones being monitored. Under one zone operation both thermistor connections are averaged to determine the temperature. Default = 2 |
| Thermistor Fail Mode | FAIL | Sets the operation if thermistor fail is detected. The off condition causes all outputs to terminate during a fail condition for the failed zone. The heat condition causes the controller to enter 50 percent on 50 percent off heating duty cycle. The 50/50 heating duty cycle is designed for use during colder weather or in colder climates to help prevent loss of greenhouse crops. Default = heat |
| Threshold time ONLY SHOWS UP IN MODELS C and CH | tHrS | This is the number of minutes the temperature must be in the next step before the curtain/vent will open or close to the next setting. |
| Curtain/vent settings ONLY SHOWS UP IN MODELS C and CH | curt | Sets curtain/vent to On/Off/Auto. In Auto, it also sets the temperature step size and the percentage for each of the 5 steps. |
| Curtain/vent full open time. ONLY SHOWS UP IN MODELS C and CH | FULL | Sets the number of seconds for the curtain or vent to transition from closed to full open. |
| Nite Lock-out of cooling stages | ntLo | Prevents the ALL cool outputs from running during the “Nite” stage. This is an energy saving feature. Nite Lock-out prevents the dehumidification cycle from working. |
| Appliance Run Time | RuNT | This will display the number of hours of run time for all outputs: Heat 1, Heat 2, Cool 1, Cool 2, Cool 3, Cool 4, and Heat 3(H and CH versions) since the last reset. Options to view or reset are given when this is selected. |

**Status Conditions

Under normal operation when the menu key is pressed 'rSEt' appears in the display. However when certain status conditions are present this display changes for notification of this status. The status condition displays are 'HI 1', 'Lo 1', 'HI 2', 'Lo 2' 'FL 1', and 'FL 2'.

'HI' and 'Lo' indicate alarm conditions. 'HI 1'(Zone 1) and 'HI 2'(Zone 2) indicate the temperature has gone above the high temperature setting in their respective zone. 'Lo 1'(Zone 1) and 'Lo 2'(Zone 2) indicates the temperature has gone below the low temperature setting in their respective zone. 'FL 1' and 'FL 2' indicate thermistor fail conditions. 'FL 1' indicates a fail on thermistor one and 'FL 2' indicates a fail on thermistor two.

An alarm or error condition will latch the alarm relay. Pressing "MENU" will display the cause of the alarm. Once the cause has been remedied, press "MENU", then "ENTER" to clear the display and reset the alarm relay.

Controller Status

Operating Display

The main operating display will tell you the current stage and temperature, one or two zone operation, the temperature scale (°F/°C), and if the target temperature has been overridden. During normal operation, the current stage (DIF, DAY, or NITE) and the current temperature will be alternately shown at a 1-second rate. Around the outside edge of the display are the output identifiers.

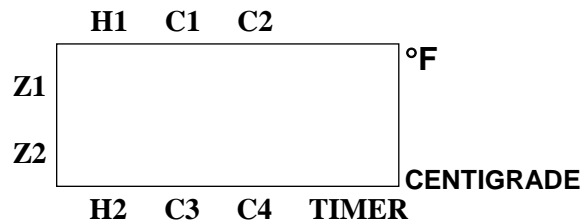


Figure D.1 – Controller Display
Output Identifiers

The following table explains what each describes.

| Output Identifier | Explanation |
|-------------------|---|
| Z1 | Bar to the right of Z1 identifies Zone 1 is being viewed. |
| Z2 | Bar to the right of Z2 identifies Zone 2 is being viewed. |
| H1 | Bar below H1 identifies Heat 1 is on. |
| C1 | Bar below C1 identifies Cool 1 is on. |
| C2 | Bar below C2 identifies Cool 2 is on. |
| H2 | Bar above H2 identifies Heat 2 is on. |
| C3 | Bar above C3 identifies Cool 3 is on. |
| C4 | Bar above C4 identifies Cool 4 is on. |
| TIMER | Bar above TIMER identifies Timer is on. |
| °F | Default temperature of Fahrenheit. Reminder to user temperature readings. |
| CENTIGRADE | Decimal in lower right corner identifies in Centigrade temperatures. |

If there is no bar to the right of Z1 or Z2 then the controller is set for single-zone use.
Press the 5 key to toggle the zone being displayed when in two zone mode. (See **Figure 7** below)

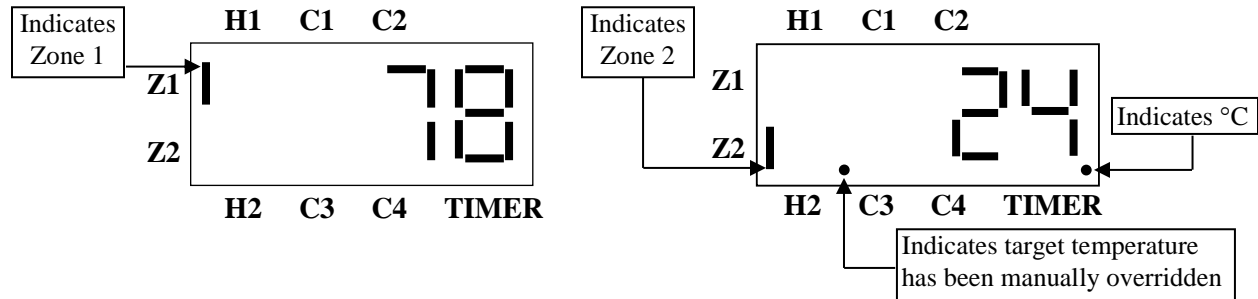


Figure 7

Two decimal points are used to give status information also. °C operation is indicated if the decimal point to the right of the ones digit is illuminated (See **Menu Options** for setting). Override of the target temperature is indicated if the decimal point to the right of the 1000s digit is illuminated. (See **Appendix A: Hot Keys** for this function)

Output Conditions (Hot Key 8)

Many times, especially for troubleshooting, you will want to know which outputs the GHK12X2 has on. Pressing the “8” key changes from the normal operating display to the output status display. For each output that is on, a horizontal bar will appear under/above the output heading. The display will go back to the main display after 15 second or when a key is pressed. See **Figure 8** below.

For curtain/vent models the current percentage open will precede the status bars.

For Heat 3 models a bar appears between H1 and H2.

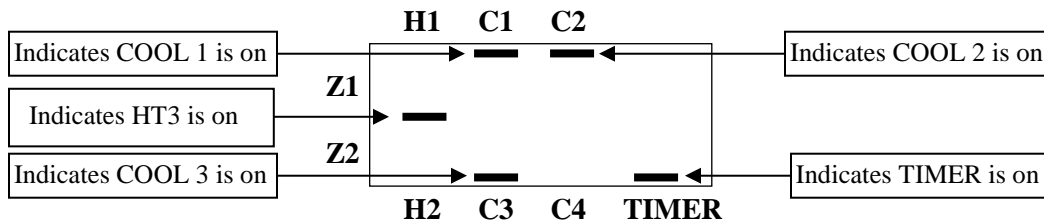


Figure 8

Target Temperature Viewing and Override

The hot keys for overriding the target temperature can be used to view the current setting. The target temperature for Zone 1 can be viewed by pressing, from the main operating display, the “4” or “7” key once and for Zone 2 by pressing “6” or “9” key once. To leave the temperature unchanged, simply wait 15 seconds to return to the main operation display or press “ENTER”. Continue pressing the up (4, 6) or down (7, 9) keys for that zone to temporarily override the current target temperature. The next stage transition will reset the target temperature to the programmed value.

Error Status Displays

Various error conditions will open the contacts of the alarm relay. The error signal will persist until manually cleared even if the fault corrects itself. Press “MENU” to see the fault (FL 1, FL 2, Hi, Lo) then press “ENTER” to clear the error. If the fault has not been corrected it will latch again and must be cleared again after correcting the offending condition.

Failed Thermistor

A vertical zone indicator on the left side of the display with the letters ‘FL’ indicates the thermistor for that zone is faulty or disconnected. A controller set for single zone operation will continue to control if one thermistor fails. If both thermistors in single zone mode or one thermistor in two-zone mode fail, the controller will either shut all outputs off or go into a heat cycle of 15 minutes on and 15 minutes off as specified under Menu Options “FAIL”.

ALARM Condition (High, Low Temperature)

‘ALAr’ will flash alternately with the current temperature if the high or low alarm conditions were exceeded. Use the Min and Max hot keys to see the temperature extremes. The ALARM relay will open indicating an alarm condition. Press “MENU”, then “ENTER” to reset the alarm status.

Memory Failure

‘ErrE’ will be displayed alternately with the temperature if the backup memory has had an error. The controller restores the factory default table and continues to function. The controller can be programmed but will restore defaults if power is lost and then restored. If the fault continues the controller should be returned to the factory for repair.

Clock Failure

If the real-time clock fails, the stage will remain in DAY and ‘CLOC’ will be displayed. When “MENU” is pressed, ‘CLOC’ will be displayed. Press “ENTER” to clear the error. The clock failure can be caused by excessive moisture in the case, a bad integrated circuit, or bad battery.

Faulty Keypad

‘StUC’ will be displayed if the keypad has a stuck key. Factory service will most likely be required.

Statistics

The GHK12X2 was designed to be a growing tool as well as a temperature control device. The GHK12X2 not only has a DIF feature to help control plant height through temperature control but also collects and stores averages for 7 days. Each day it stores the average temperature for each operating stage (DIF, DAY, and NITE) and the average for the 24 hours from the start of DIF until the end of NITE.

Note: When in the two-zone mode, set the zone indicator with the “5” key to the zone of interest before viewing averages or minimum and maximum temperatures.

The hot key “0” (stats) is used to view the averages. Press “0” once and day 1 will be displayed. ‘dAY 1’ is the current 24-hour period, ‘dAY 2’ is yesterday, ‘dAY 3’ the day before that, through ‘dAY 7’. Continue to press “0” until the day to be reviewed is displayed and press “ENTER”. The average temperature for that day’s

DIF period will be displayed. Continue to press “ENTER” to see the average temperature for DAY, NITE, and 24-hour periods.

Besides averages, the GHK12X2 tracks minimum and maximum temperatures. You can see the minimum and maximum temperature since the last hot key reset (“2”) by pressing “1” or “3”. Press the “2” key to reset the minimum and maximum.

The GHK12X2 also tracks the run time of each of the outputs: Heat 1, Heat 2, Cool 1, Cool 2, Cool 3, Cool 4, and Heat 3 (H and CH versions). The GHK12X2 will store the information until it is reset and will display the number of days since the last reset. To view run times, press MENU until ‘RuNT’ appears on the screen. Press ‘ENTER’ and ‘RuNT/View’ will alternate. Press ‘ENTER’ to view the run times. To reset the run times, press ‘1’ and ‘RuNT/CLR’ will alternate. Press ‘ENTER’ to reset the run times.

Overrides

Not only is the GHK12X2 easily programmed for automatic operation but it can also give the grower temporary overrides of the target temperature, manual start of the TIMER and VENT option, and on/off control of each output.

Target Temperature Override

The target temperature can be temporarily moved UP (4, 6) or DOWN (7, 9) with hot keys without altering the program. This is for times when you want to change the growing temperature because it is too uncomfortable to work in but want to revert back to the program after you have completed your task.

Use the appropriate hot key (“4” or “7” for Single Zone or Zone 1, “6” or “9” for Zone 2) to move the target temperature up or down. The first time you press one of these keys you will see the current target temperature. Continue to press the “UP” or “DOWN” key until the desired temperature is displayed and then press “ENTER”. The 1000’s decimal point will be illuminated indicating an override. The next stage transition will reset the target temperature to the programmed value.

Remember if you were in a cooling situation and the new target temperature moves you into a heating situation the delay between HEAT to COOL or COOL to HEAT must time out before the output will activate. Delay is a menu option and can be varied from 1 to 30 minutes.

VENT or TIMER Manual Start

The dehumidification VENT cycle or a TIMER cycle can be manually started by pressing either “TIMER” or “VENT” and then “CLOCK”. Repeating the key press sequence will end the manual start. VENT or TIMER can be manually started even if they are set to off. This allows you to program a cycle, set it to off and run it only on a manual cycle.

Outputs

Each HEAT or COOL output can be set to on or off. This will override the safety checks and you may have instances where the HEATS and COOLS run at the same time. The menu function ‘rSEt’ will set all outputs to Auto. The menu function On-to-Auto will set any output, from ‘ON’ back to ‘AutO’ after the programmed time. On-to-Auto does not affect an output set to off.

The GHK12X2 has a special feature in its menu options called “On-to-Auto”. This is used in conjunction with manually setting an output to “On” to ensure the output is not left on indefinitely. The “On-to-Auto” time can be set from 1 minute to 23 hours and 59 minutes. Setting the “On-to-Auto” time to 0 disables the function and the output will remain in the ON mode. The “On” mode or manual open setting will be maintained until changed by the operator.

Curtain/Vent Control (Models GHK12X2C AND GHK12X2CH)

The Curtain/Vent control option adds the ability to open a curtain, roof vent, or vent window in 5 proportional steps. The Curtain/Vent output has a step size that is a programmable number of degrees above the target temperature. As the temperature rises above the target temperature the output will open to the percentage that is proportional to the number of steps the temperature is above the target temperature. For example, if the temperature rises to more than 1 step above the target temperature, the output will open to percentage 1. As the temperature continues to rise above the next step, the output will open to percentage 2. If the temperature decreases to just one step above the target temperature the output will close to percentage 1.

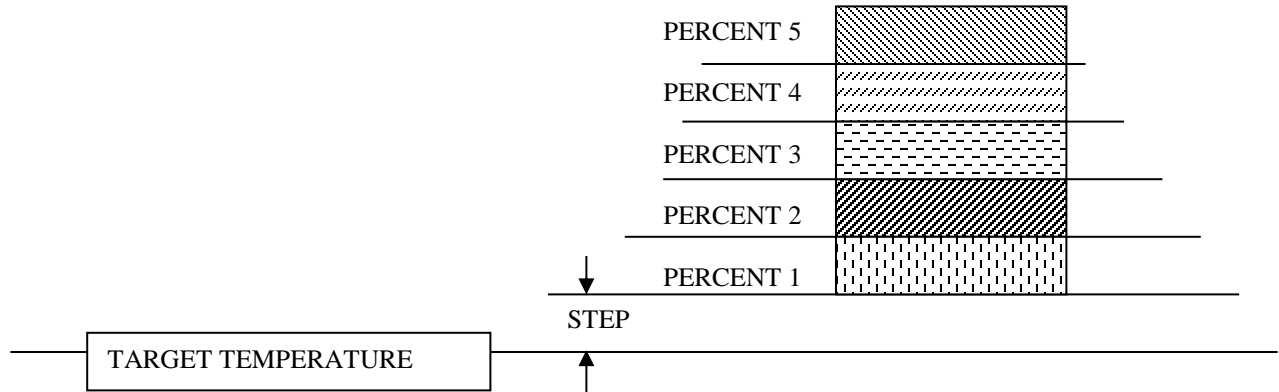


Figure 9

PROGRAMMING THE CURTAIN/VENT

The first of two steps in programming the Curtain/Vent is entering the time in seconds that is required for the curtain or vent to transition from closed to full open. Press “MENU” until ‘Full’ is displayed, press “ENTER”. ‘Sec’ will flash with the current full open time (default setting is 0). Type in the new time in seconds, press “ENTER”, and the full open time is saved.

NOTE: To navigate through the menu backwards to ‘FuLL’ press “MENU” once and then “CLOCK” (menu backward).

FULL OPEN TIME Programming

| KEY PRESS | DISPLAY | COMMENTS |
|-------------|-------------------|--|
| MENU | | Press “MENU” until ‘FuLL’ is displayed. |
| ENTER | SEc/XX.XX | ‘SEc’ and previous number of seconds programmed will flash at 1/2-second interval. |
| Number keys | xxxx | Type the number of seconds for full open |
| ENTER | Operating display | All information saved. |

The second step in programming the Curtain/Vent is setting the step size and entering the percentages. Press “MENU” until ‘Curt’ is displayed, then press “ENTER”. ‘Auto’, ‘Man’, ‘Enrg’ or ‘off’ is displayed. Press “MENU” to toggle to the desired setting, then press “ENTER”. If ‘Auto’ was selected, “step”/xxxx will be displayed. Type in the new step size (0 –15), then press “ENTER”. ‘Pct1’/xx will be displayed. Type in the new percent 1 setting, then press “ENTER”. Continue this through all 5 percentages.

Valid percentages are 0 – 99. 99% is full open. Percentages do **not** have to increase with increasing steps.

To synchronize the controller and appliance, set the curtain/vent to ‘off’ and wait for the curtain or vent to close completely and then set the controller to the ‘Auto’ mode.

NOTE: To navigate through the menu backwards to ‘Curt’ press “MENU” once and then “CLOCK” twice (menu backward).

Curtain/vent percentages Programming

| KEY PRESS | DISPLAY | COMMENTS |
|-----------|-------------------|--|
| MENU | | Press “MENU” until ‘Curt’ is displayed. |
| ENTER | curt/Auto | Displays “Curt” and the previous Auto/On/Off setting |
| MENU | Auto/On/Off | Toggles between On/Off/Auto ‘On’ will power the ‘open’ output ‘Off’ will power the ‘close’ output |
| ENTER | STEP/xx | If in Auto, shows step and current setting If ‘On’ or ‘Off’, “ENTER” takes you back to normal operation |
| # keys | xx | Enter the new step size – 1-15 degrees |
| ENTER | Pct1/xx | Shows the current percentage for step 1 |
| # keys | xx | Enter the new percentage |
| ENTER | Pct2/xx | Shows the current percentage for step 2 |
| # keys | xx | Enter the new percentage |
| ENTER | Pct3/xx | Shows the current percentage for step 3 |
| # keys | xx | Enter the new percentage |
| ENTER | Pct4/xx | Shows the current percentage for step 4 |
| # keys | xx | Enter the new percentage |
| ENTER | Pct5/xx | Shows the current percentage for step 5 |
| # keys | xx | Enter the new percentage |
| ENTER | Operating display | All information saved. |

Energy setting

The energy curtain (Enrg) setting for the C option controller will extend the curtain during the NITE stage and retract the curtain during DIF and DAY.

Wind/Rain Alarm Input Option (o-r display) (Models GHK12X2C and GHK12X2CH)

If the vent is open past **PCT1** setting, a contact closure across the wind alarm inputs will cause the vent to close to the **PCT1** setting. In this condition the display will alternate between the current temperature and o-r. In the 2 zone mode, both proportional output will respond to the wind/rain input. In the single zone mode only proportional output 1 will respond to the wind/rain alarm. The setting described below will cause both outputs to respond to the wind/rain alarm input in the single zone mode.

Heat 3 Option (Models GHK12X2H AND GHK12X2CH)

Heat 3 output is a set point heat with its own temperature sensor. It can be used for turning on a boiler based on outdoor temperature or controlling a bench heater. The settings for Heat 3 are not connected to the target temperature and do not change with the stage (DIF, DAY, NITE) as the target temperature does.

VIEW TEMPERATURE READING

The Heat 3 thermistor (temperature sensor) connects to the terminals labeled **TH3**. To view the temperature of the Heat 3 sensor press the “**5**” key. The display will flash ‘**Ht 3**’ and the temperature. To switch to the other zone in the two zone mode press the “**5**” key twice.

OUTPUT STATUS

If the Heat 3 output is on, pressing the “**8**” key for output status will produce a bar in the center of the 1000’s digit. See **Figure 8** in **Output Conditions**.

HEAT 3 PROGRAMMING

The set point for the Heat 3 is programmed through the menu. Press “**MENU**” until ‘**Ht 3**’ displayed. Press “**ENTER**”. ‘**Ht 3**’ will flash with the current set point. Use the number keys to type in a new set point (32 – 131 degrees F). Press “**ENTER**” to complete programming and the display will return to normal operation.

| KEY PRESS | DISPLAY | COMMENTS |
|-----------|-------------------|--|
| MENU | Ht 3 | Press “ MENU ” until ‘ Ht 3 ’ is displayed. |
| ENTER | Ht 3/xxx | The current set point and Ht 3 will alternate on the display. |
| Numbers | Xxxx | Type the number of the new set point |
| ENTER | Operating display | All information saved. |

HEAT 3 Programming

Appendix A: Hot Keys

The number keys function as hot keys in the normal operating mode to give instant access to special functions.

| KEYPAD NUMBER | HOT KEY | COMMENTS |
|---------------|---------|---|
| 1 | Min | Displays the Lowest temperature since the last reset of Min and Max. To clear the display press "ENTER" or wait 15 seconds. |
| 2 | Reset | Resets the Minimum and Maximum temperatures. |
| 3 | Max | Displays the Highest temperature since the last reset of Min and Max. To clear the display press "ENTER" or wait 15 seconds. |
| 4 | Up 1 | Temporarily increases the Zone 1 target temperature. This increase will be canceled at the next stage transition. A decimal will appear in the display to indicate a temporary change. See Figure A.1 below for an example. |
| 5 | Z1/Z2 | Toggle between which zone temperature is displayed. The zone indicator will change to indicate this. (See Operating Display on page 17) |
| 6 | Up 2 | Temporarily increases the Zone 2 target temperature. This increase will be cancelled at the next stage transition. A decimal will appear in the display to indicate a temporary change. See Figure A.1 below for an example. |
| 7 | Down 1 | Temporarily decreases the Zone 1 target temperature. This increase will be cancelled at the next stage transition. A decimal will appear in the display to indicate a temporary change. See Figure A.1 below for an example. |
| 8 | Outputs | Changes the display to the output indication. Figure A.2 is an example read-out of the display as output indication. (See Outputs on page 9) |
| 9 | Down 2 | Temporarily decreases the Zone 2 target temperature. This increase will be canceled at the next stage transition. A decimal will appear in the display to indicate a temporary change. See Figure A.1 for an example. |
| 0 | Stats | Displays the average temperatures for the selected day. The averages maintained are for DIF, DAY, NITE, and 24-hour period. (See Statistics on page 19) |

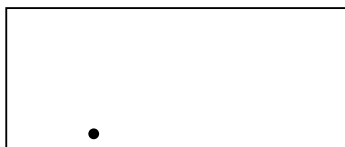


Figure A.1

Decimal indicator in the 1000s location shows a target temperature has been modified using the hot keys.

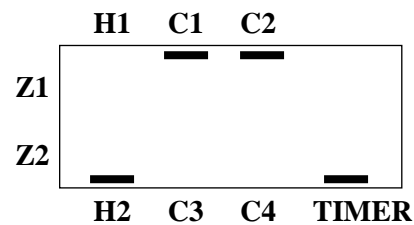


Figure A.2

Figure A.2 indicates that in Zone 1 both Cool 1 and Cool 2 are active (C1 and C2) and in Zone 2 that the heat is on (H2). Also, we can see by the indicator that we are running the current timer program.

Appendix B: Default Settings

Stage Temperature Settings

| STAGE | START TIME | °F1 | °F2 |
|-------|------------|-----|-----|
| DIF | 6:00 | 65 | 65 |
| DAY | 8:00 | 65 | 65 |
| NITE | 17:00 | 65 | 65 |

Options Settings

| OPTIONS KEY | DEFAULT SETTING |
|-------------|-----------------|
| VENT | OFF |
| TIMER | TMr |

Vent Programming Defaults

| OPTION | SETTING |
|------------|---------|
| START TIME | 19.00 |
| FAn1 | 00 |
| PrHt | 00 |
| FAn2 | 00 |

Timer Programming Defaults

| OPTION | SETTING |
|------------|---------|
| START TIME | 12.00 |
| HOLd | 00.00 |
| rEPt | OFF |

Output Settings

| OUTPUT | MODE | OFFSET |
|-------------------|------|--------|
| HEAT 1 and HEAT 2 | AUtO | 0 |
| COOL 1 and COOL 3 | AUtO | 1 |
| COOL 2 and COOL 4 | AUtO | 4 |
| TIMER | tMr | N/A |

Menu Settings

| MENU FUNCTION | SETTING |
|---------------|---------------------------|
| CHFC | °F |
| Id | 01 |
| OtOA | 10 |
| DELA | 15 |
| HYSst | 2 |
| ALAr | Lo – 32 °F HI – 131 °F |
| lOr2 | 2 |
| FAIL | HEAT |

Appendix C: Celsius Settings Conversions

When operating in Celsius mode the controller settings are different from in the Fahrenheit. The following table will illustrate the differences between the temperature settings. Remember that the default setting for the controller is Fahrenheit.


| SETTING | CONTROLLER DEFAULT | COMMENTS |
|--------------------------|-------------------------------|---|
| DIF target temperature | 18 | Maximum setting of 55. Minimum setting of 1. |
| DAY target temperature | 18 | Maximum setting of 55. Minimum setting of 1. |
| NITE target temperature | 18 | Maximum setting of 55. Minimum setting of 1. |
| HYS _t setting | 2 | Only values of 1, 2, or 3 accepted. |
| ALAr setting | | Values of 1 through 55 accepted. |
| Lo | 0 | |
| HI | 55 | |

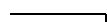
Converting the Fahrenheit settings to Celsius temperatures generates the values in this table. Although the default setting for ALAr Lo is 0 only values of 1 or higher are acceptable for entry. This is due to the internal conversion that the controller performs.


Appendix D: Quick Start

Getting Started


Adjust menu items (skip steps where default values are ok)

- 1) Select °F or °C *default= °F* 


Press “MENU” 2 times until CHFC’ appears.
 Press “ENTER”.
 Press “MENU” to switch between °F and °C.
 When desired scale is displayed press
- 2) Select 1 or 2 zones *default=2* 

Press “MENU” 9 times until ‘1Or2’ appears.
 Press “ENTER”.
 Press “1” for 1 zone.
 Press “2” for 2 zone.
 Press “ENTER”.
- 3) Select Thermistor fail mode *default=off* 

Press “MENU” 10 times until ‘FAIL’ appears.
 Press “ENTER”.
 Press “1” to switch between ‘OFF’ and ‘HEAT’.*
 When desired operation is displayed press “ENTER”.

*When ‘HEAt’ is selected the heater will cycle on 15 min. and off 15 min. if a thermistor fails. ‘OFF’ will keep all outputs off if a thermistor fails.
- 4) Adjust clock 

Press “CLOCK”. Adjust time with # keys.
Note: 24-hr. clock format (military time)
 Press “ENTER”.

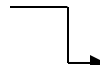
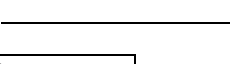
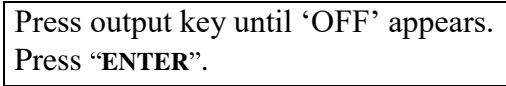
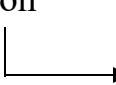
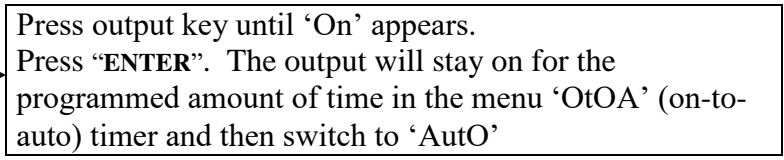
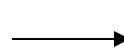
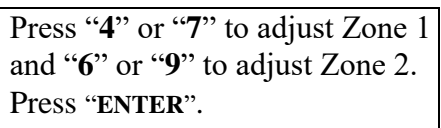
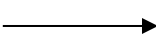

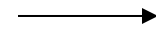
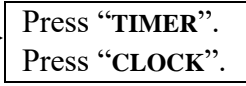
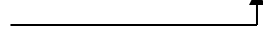
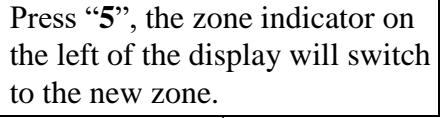
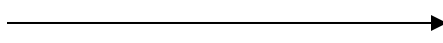
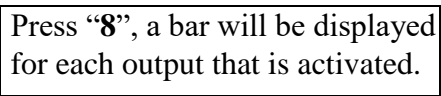
- 5) Set start times and target temperatures for DIF, DAY, and NITE stages. 

default settings:

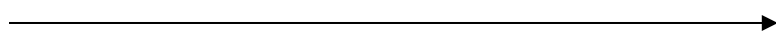
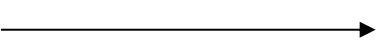
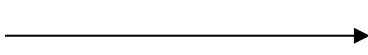
| Stage | Start Time | Zone 1 °F | Zone 2 °F |
|-------------|------------|-----------|-----------|
| DIF | 6:00 | 65 | 65 |
| DAY | 8:00 | 65 | 65 |
| NITE | 17:00 | 65 | 65 |

Press the “DIF”, “DAY”, or “NITE” key, the start time for that stage appears (24-hr. clock format - "military time"). Adjust the start time – DIF must start earlier than DAY, and DAY must start earlier than NITE.
 Press “ENTER” - °F 1 appears.
 Adjust Zone 1 target temperature (32 – 131°F).
 Press “ENTER” - °F 2 appears if set to 2 zones, else adjustment complete.
 Adjust Zone 2 target temperature (32 – 131°F).
 Press “ENTER”.

Adjustments, Options and Overrides

- A) Adjust step offset from target temperature. 
- B) Output manually "OFF" 
 Press output key until 'OFF' appears.
 Press "ENTER".
- C) Output manually "on" 
 Press output key until 'On' appears.
 Press "ENTER". The output will stay on for the programmed amount of time in the menu 'OtOA' (on-to-auto) timer and then switch to 'AutoO'
- D) Temporarily override target temperature 
 Press "4" or "7" to adjust Zone 1 and "6" or "9" to adjust Zone 2.
 Press "ENTER".
- E) Manually run programmed vent cycle 
 Press "VENT".
 Press "CLOCK".
- F) Manually run programmed timer cycle 
 Press "TIMER".
 Press "CLOCK".
- G) View temperature in other zone (2- zone only) 
 Press "5", the zone indicator on the left of the display will switch to the new zone.
- H) View output status 
 Press "8", a bar will be displayed for each output that is activated.

Statistics

- Reset Min and Max  Press "2"
- Display minimum temperature since last reset  Press "1"
- Display maximum temperature since last reset  Press "3"

Display average temperatures

Press **0** (stats) until the desired day appears – Day 1 is today, Day 2 is yesterday, ...
 Press "ENTER", the average temperature for the DIF stage appears.
 Press "ENTER", the average temperature for the DAY stage appears.
 Press "ENTER", the average temperature for the NITE stage appears.
 Press "ENTER", the average temperature for the 24hr period, DIF-NITE, appears.
 Press "ENTER".

Notes