HOTPACK

AN EXTRA DEGREE OF CONTROL

Hotpack Series 65 & 93 Controller Operation and Setup Guide

This guide is intended for use as a guide only.
If you are not experienced with the controller you should NOT attempt adjustments to the controllers operating parameters.

It will likely result in loss of control of the unit.

Table of Contents

I. How to Use the Keys and Displays

Upper Display
Normally indicates chamber temperature or humidity condition. May also indicate the operating parameter value when working in PID menus or the presence of an open sensor.

Lower Display
Normally indicates the temperature or humidity setpoint. May also indicate the operating parameter being changed when working in PID menus or the applicable alarm code when in an alarm condition.

L1 Light
When lit, this LED indicates the temperature or humidity heater is being fired.

L2 Light
When lit, this LED indicates when the unit is in an alarm condition. (Except on humidity controllers for flooded bottom Model 434304, 435304 and 435314 units where it is used to control cooling water flow.)

MN Light (% ON 93)
Flashes for 5 seconds after A/M key is pressed to silence audible alarm.

A/M Key (∞ ON 93)
When pressed one time, it silences the audible alarm.

MODE Key (TEIL KEY)
Used to step the controller through the Operating and Setup menu.

UP Key
Increases the value of the displayed parameter. A light touch increases the value by one. Holding the key down increases the value at a rapid rate. New data is self-entering in 5 seconds.

DOWN Key
Decreases the value of the displayed parameter. A light touch decreases the value by one. Holding the key down decreases the value at a rapid rate. New data is self-entering in 5 seconds.

UP/DOWN Keys
When pressed simultaneously for 3 seconds, the Setup Menu appears displaying LOC in the Lower Display and the current LOC parameter in the Upper Display.
They are also used to select between options when choosing the settings for a given parameter in the PID menus.

II. Error Codes

Four Dashes
(- - - -)

When visible in the Upper Display this indicates a controller error. The error code is visible in the Lower Display.

Er 2
Sensor
Underrange
Error

The sensor input generated a lower value than the allowable signal range, or the A/D circuitry malfunctioned. Enter a valid input. Make sure the In parameter in the Setup Menu is correct.

Temperature	-	rt.d
Humidity	-	0 - 5

Er 4
Configuration
Error

The unit's microprocessor may be faulty.
Call the factory.

Er 5
Non-volatile
Checksum
Error

The non-volatile memory checksum discovered a checksum error. Unless a momentary power interruption occurred while the unit was storing data, the non-volatile memory is bad.
Call the factory.

Er 6
A/D Underflow
Error

The A/D circuit is Underrange. An open or reversed polarity sensor is the most likely cause. Check the sensor; if the connection is good and the sensor functions properly, call the factory. The A/D underrange voltage is too low to convert an A/D signal. Make sure the In parameter matches your sensor and DIP switches are set accordingly.

Temperature	-	rt.d
Humidity	-	0 - 5

Er 7
A/D Overflow
Error

The A/D circuit is overrange. An open or reversed polarity sensor is the most likely cause. Check the sensor; if the connection is good and the sensor functions properly, call the factory. The A/D overrange voltage is too high to convert an A/D signal. Make sure the In parameter matches your sensor and DIP switches are set accordingly.

Temperature	-	rt.d
Humidity	-	0 - 5

NOTE: An alarm display will be masked by an error condition or when the control is in the Calibration or Setup Menus.

CAUTION: Electrical noise or a noise event, vibration or excess environmental moisture or temperature may cause errors to occur. If the cause of the error is not otherwise apparent, check for these.

III. General Operation and Startup

General Operation

The L1 light on the controller is ON when the heater is energized. When the light is on steadily, the heater is energized continuously. When the light is pulsing ON , the heater is energized intermittently.
As you get close to the setpoint, this is normal.

Startup

Power ON

Place the power switch in the ON position. The controller displays will light, and the chamber fan will energize.

NOTE:

Under normal operating conditions, the actual chamber temperature or humidity condition is shown on the upper display; the chamber temperature or humidity setpoint is shown on the controller's lower display.

When you first start the unit, or after prolonged shutdown, you will more than likely experience an alarm condition until the chamber stabilizes. The Lower Display may flash the following:

- X LO and the Setpoint value. This is a Low Alarm condition
- X HI and the Setpoint value. This is a HI Alarm condition.
- X The L2 Light will stay ON as long as the unit is in the alarm condition.

Press the A/M key (or ∞) once to reset the alarm.

If you do not press the A/M key you should expect the following:

- X The audible alarm (if installed) will sound approximately 14 minutes from startup or door closing.
- X The heating systems will not be reactivated if the controller is in a Low Alarm condition.

IV. Changing the Setpoint Value

Using this step you may change the temperature or humidity setpoint.

To change either the temperature or humidity setpoint, press either the UP or the DOWN key until the desired setpoint value appears in the Lower Display. Take care to enter only values within the designed operating range of the unit the controller is installed in.

NOTE:

Changing the Setpoint to a value outside the alarm band will activate the audible alarm and L2 Alarm Pilot Light. The output contacts for the heating circuits will also open, de-energizing the heaters. Pressing the A/M Key (or ∞) once will close the output contacts and silence the audible alarm. The L2 Alarm Pilot Light will stay ON until actual conditions return to within the factory set alarm band.

V. Locking and Unlocking the Controller

In order to change most of the controllers factory pre-set values, you must first unlock it's security protection.

WARNING: Changing factory pre-sets is not recommended and may result in operational failure. Chamber mal-function due to user misconfiguring of the controller is not covered under the warranty.

Unlocking

To unlock, proceed as follows:

1. Press and hold the UP and DOWN Keys until LOC appears in the Lower Display and the numerical LOC value (it should be 3 if the controller was locked as it should be) appears in the Upper Display.

2. Release the UP and DOWN Key.

3. Press the DOWN Key until the numerical value in the Upper Display is 0. This will allow you to access the Operation Menu. This menu contains user or technician programmable parameters (Calibration Offset, Deviation Alarms) as well as factory pre-set parameters (proportional band, reset/integral, etc.).
   Only those parameters outlined in the attached tables should be altered by the user or a person not thoroughly familiar with the unit.
   Operational malfunctions may result from changes in factory set parameters.

Locking

To return to normal operation, proceed as follows:

1. If the Setpoint is not displayed in the Lower Display and the chamber condition is not displayed in the Upper Display, press the MODE Key (or teal key) until they do.

2. Press and hold the UP and DOWN Keys until LOC appears in the Lower Display and the numerical LOC value (0 if the controller is in the unlocked condition) appears in the Upper Display.

3. Release the UP and DOWN Keys.

4. Press the UP Key until the LOC value 3 appears in the Upper Display.

5. Press the MODE Key (or the teal key) until the Setpoint appears in the Lower Display and the chamber condition appears in the Upper Display.

WARNING: If you do not go back to LOC value 3, the security of the controller will be compromised. Factory set parameters can be inadvertently changed and operation mal-function can occur. If this happens, repairs are not covered by the warranty.

VI. Changing Deviation Alarm Values

NOTE: For users attempting to change the pre-set alarm band, it is not recommended however if you must, the value entered is in the form of a deviation from setpoint such as +1 and -5 degrees. Do not attempt to enter a low and high alarm value using the actual low and high numerical values.
The controller permits the use of both Low and High Deviation Alarms. These are programmed via the Operation Menu.

CAUTION: Pressing the UP and DOWN Keys simultaneously provides access to the Setup Menu. The values contained in this menu are also factory set and should not be changed or operational failure may result.

Change the LOW Alarm

1. Unlock the controller using the instructions in the previous section.
2. Press the MODE Key until ALO appears in the Lower Display and the ALO value appears in the Upper Display.
3. Press the UP or DOWN Key to program the number of degrees or percent humidity below the setpoint value that chamber conditions must fall to activate a deviation alarm.

NOTE: This value should be the number or percent below setpoint, not the actual alarm value. For instance, if the setpoint is 60 degrees C and you desire the low alarm to sound at 55 degrees, the deviation alarm value should be set at -5 degrees not 55 degrees.

4. Press the MODE Key until the Setpoint appears in the Lower Display and the chamber condition appears in the Upper Display.
5. Relock the controller using the instructions in the previous section.

WARNING: If you do not go back to LOC value 3, the security of the controller will be compromised. Factory set parameters can be inadvertently changed and operation mal-function can occur. If this happens, repairs are not covered by the warranty.

Change the HIGH Alarm

1. Unlock the controller using the instructions in the previous section.
2. Press the MODE Key until AHI appears in the Lower Display and the AHI value appears in the Upper Display.
3. Press the UP or DOWN Key to program the number of degrees or percent humidity above the setpoint value that chamber conditions must rise to activate a deviation alarm.

NOTE: This value should be the number or percent above setpoint, not the actual alarm value. For instance, if the setpoint is 60 degrees C and you desire the low alarm to sound at 65 degrees, the deviation alarm value should be set at +5 degrees not 65 degrees.

4. Press the MODE Key until the Setpoint appears in the Lower Display and the chamber condition appears in the Upper Display.
5. Relock the controller using the instructions in the previous section.

WARNING: If you do not go back to LOC value 3, the security of the controller will be compromised. Factory set parameters can be inadvertently changed and operation mal-function can occur. If this happens, repairs are not covered by the warranty.

VII. Calibrating the Controller

It may sometimes be necessary to change the Calibration Offset Value.

To calibrate the controller, place an accurate standard in the geometric center of the chamber and allow the chamber to stabilize at the setpoint value for a minimum of 30 minutes.

1. Unlock the controller using the instructions in the previous section.

2. Once the chamber has stabilized at the Setpoint (temperature or humidity, depending on the controller) press the MODE Key until CAL appears in the Lower Display and the AHI value appears in the Upper Display.

.

3. Press the UP or DOWN Key to enter the difference between the controller readout and the actual chamber temperature or humidity according to the standard.

EXAMPLE: If the controller readout is 37 degrees C and the actual chamber condition is 36.5 degrees C, lower the CAL value by 0.5 degrees C.

4. Press the MODE Key until the Setpoint appears in the Lower Display and the chamber condition appears in the Upper Display.

5. Relock the controller using the instructions in the previous section.

WARNING: If you do not go back to LOC value 3, the security of the controller will be compromised. Factory set parameters can be inadvertently changed and operation mal-function can occur. If this happens, repairs are not covered by the warranty.

VIII. How to Set Up a Controller From Scratch

The occasion may arise when a user must set up a new controller or one which has lost it's memory for some reason.

Using controller PID setup sheets from the factory or your manual, perform the steps as follows:

Unlock the controller using the instructions in the previous section.

Setup Menu

1. The Setup Menu parameter values should be entered first, failure to enter Setup Menu parameters before Operation Menu parameters will result in controller malfunction.

2. Press the UP and DOWN Keys simultaneously until LOC appears in the lower display. The Numerical value in the Upper Display should be 0 if the controller is properly unlocked.

3. Use the MODE Key to step through the controller menus and enter the various values per the data sheets until the Setpoint appears in the Lower Display and the actual chamber condition appears in the Upper Display.

   Expect to see the following PID parameters in the Lower Display. (Depending on controller configuration, some of these parameters may not be visible.)

LOC	Enter nothing but 0 here until you are ready to relock the controller.
In	Sensor type
dEC	Decimal point (Only visible in Humidity Controller)
C_F	Celsius or Fahrenheit (Only visible in Temperature Controller)
rL	Range low
rH	Range high
Ot 1	Output 1
HSC	Control hysteresis
Ot2	Output 2 alarm hysteresis
Lat	Latching for alarm
SiL	Silence alarm
rtd	RTD calibration curve (Temperature controller only)
rP	Ramp function
rt	Ramp rate (Humidity controller only)
PL	% Power limiting
dSP	Display

Operation Menu

1. The Setup Menu parameter values should be entered first, failure to enter Setup Menu parameters before Operation Menu parameters will result in controller malfunction.

2. Use the MODE Key to step through the controller menus and enter the various values per the data sheets until the Setpoint appears in the Lower Display and the actual chamber condition appears in the Upper Display.

.

Expect to see the following PID parameters in the Lower Display. (Depending on controller configuration, some of these parameters may not be visible.)

Pb1	Proportional band for Output 1
rE1	Reset for Output 1
It1	Integral for Output 1 (Not used)
rA1	Rate for Output 1
dE1	Derivative for Output 1
Ct1	Cycle time for Output 1
Pb2	Proportional band for Output 2
rE2	Reset for Output 2
It2	Integral for Output 2 (Not used)
rA2	Rate for Output 2
dE2	Derivative for Output 2
Ct2	Cycle time for Output 2
ALO	Alarm low
AHI	Alarm high
CAL	Calibration offset
Aut	Auto-tune

5. Relock the controller using the instructions in the previous section.

WARNING: If you do not go back to LOC value 3, the security of the controller will be compromised. Factory set parameters can be inadvertently changed and operation mal-function can occur. If this happens, repairs are not covered by the warranty.

Sample Controller PID Setup Sheets

Model: 417532	Setup Menu		
Setup Parameter	**Temperature**	**Humidity**	
LOC	3	3	
In	Rt.d	0 - 5	
DEC		0.0	
C_F	C		
RL	00.0	00.0	
RH	72.0	100.0	
Ot1	ht	Ht	
HSC	0.2	0.3	
Ot2	dEA	DEA	
HAS	0.1	0.3	
Lat	nLA	NLA	
SIL	On	On	
Rtd	JIS		
RP	OFF	ON	
Rt		100	
PL	100	100	
DSP	nor	Nor	
Operation Parameter	**Temperature**	**Humidity**	
Pb1	3.0	6.0	
rE1	0.42	0.20	
rA1	0.11	0.01	
Ct1	1.0	1.0	
ALO	-5.0	-10.0	
AHI	1.0	10.0	
CAL	00.0	00.0	
Aut	0	0	

Model: 435314 – 435304 - 434304 Setup Menu			
Setup Parameter	**Temperature**	**Humidity**	
LOC	3	3	
In	Rt.d	0 - 5	
DEC	0.0	0.0	
C_F	C		
RL	0.0	0.0	
RH	95.0	100.0	
Ot1	ht	ht	
HSC	0.2	0.3	
Ot2	dEA	Con	
HAS	0.1		
Lat	nLA		
SIL	On		
Rtd	JIS		
RP	OFF	OFF	
Rt			
PL	100	100	
DSP	nor	nor	
Operation Parameter	**Temperature**	**Humidity**	
Pb1	5.4	6.0	
rE1	0.42	0.11	
rA1	0.01	0.01	
Ct1	1.0	1.0	
Pb2		2.5	
rE2		0.11	
rA2		0.01	
Ct2		5.0	
ALO	-5.0		
AHI	2.0		

CAL	**00.0**	**00.0**	
Aut	**0**	**0**	