



OC Panel High Limit Aquastat Kit, Manual Reset p/n 233202

Instruction Sheet

APPLICATION

The OC (Option Control) Panel High Limit Aquastat Kit provides electronic temperature sensing in a UL limit-rated control with a single sensing probe. This Aquastat replaces auxiliary manual-reset high limit Aquastats such as L4006E and L4008E.

This product requires the use of one of the following OC (Option Control) Panel Kits:

- PN 233200 for AWR Gas Hot Water Boilers
- PN 233201 for FWZ Oil Hot Water Boilers

The OC Panel High Limit Aquastat Card may be simply “plugged in” to the OC Panel and only requires sensor and well installation to become operational.

GENERAL

This manual reset control requires user intervention to reset a temperature condition after the temperature returns to safe levels.

SPECIFICATIONS

Listings/Approvals

- UL353 Limit Controls for both US (UL) and Canada (CUL)—Component Recognized
- UL 1998 Software Safety Standards as a Class 2 device.
- Add the OC Panel and OC Panel High Limit Manual Reset Aquastat Kit to the temperature control mounted on the boiler from the factory to be fully compliant with **CSD-1 requirements** for temperature controls in the US and Canada



Dimensions: 4.5 in. x 1.5 in. (fits onto OC Panel)

Operating temperature: -4°F to 150°F

Shipping and Storage: -40°F to 175°F

Humidity 0 to 95% R.H. Non-condensing

Input ratings: 24 VAC 60 Hz

Reset: Manual reset mode

Sensor: Dual Sensor, Limit Rated, p/n 350080
(Honeywell p/n 50001464-005)
with sensor clip p/n 350077

Well: p/n 35-1005, (Honeywell p/n 123869A),
Spud Size: 1/2 inch NPT
Insertion: 3 inches
Insulation: 1-1/2 inches

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition. Save instructions for future use.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

Caution

Electrical Hazard

Disconnect power before beginning installation and wiring. Failure to do so may cause electrical shock or equipment damage. Wiring must comply with applicable codes, ordinances and regulations.

WARNING

- Installation must be performed in accordance with all national and local codes and ordinances.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.
- When installations are complete, check for correct operation of ALL limit and operating controls.
- Use only copper conductors. Wire insulation must be rated at 221° F (105° C) or greater. Use of other wire or insulation types could result in fire causing property damage, serious injury, and death.
- Hot or pressurized boiler systems can discharge steam and hot water. Cool boiler system to 80° F (27° C) and to 0 psi (0 bar) before servicing. Failure to do so could result in serious burns.

Caution

Limit settings are safety parameters and adjusting them incorrectly can have serious consequences.

WARNING

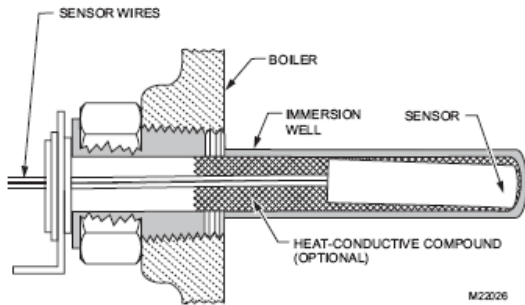
Incorrect adjustment can cause equipment damage or serious injury.

Adjustment of Limit Settings should be done by trained personnel only.

Important

Immersion well must fit sensing element and sensor bulb must rest against bottom of well.

INSTALLATION (continued)



Sensor clip



Sensor clip installed

Sensor Installation Diagrams

Well and Sensor Installation

1. Turn off all power and drain the boiler.
2. Install sensor with well that was provided with the OC Panel High Limit Aquastat Kit. When using an existing well ensure that the well specifications (Spud Size: 1/2 inch NPT, Insertion depth: 3 inches & Insulation: 1-1/2 inches) match the supplied well and will accommodate the supplied sensor clip.
3. Prepare a properly sized and threaded tapping near the boiler supply water outlet. Choose a location (or existing tappings) that allows the boiler water to circulate freely over the well.
4. Sparingly coat the well threads with pipe dope.
5. Install the well in the boiler tapping and tighten securely.
6. Refill boiler and check for water leakage.
7. Insert the sensor element into the well until it bottoms. See Sensor Installation diagram above for details
8. Insert sensor clip to hold the sensor against the bottom of the well.
9. Route sensor wire and connect to OC Panel High Limit Aquastat Card.
10. Turn power ON.
11. Set High Limit (see User Interface Section of this manual)

IMPORTANT

Best thermal response is obtained with a well that snugly fits the sensor. Insert the sensor until it rests against the bottom of the well. Use a well of correct length and install sensor clip. If the well is not a snug fit on the sensor, use the heat-conductive compound, (Honeywell p/n 120650)

OC Panel High Limit Aquastat Card Installation

1. Turn off power to the boiler before installing the option card
2. Select an unoccupied OC Panel slot and carefully insert pins on the OC Panel header into the connector on the bottom of the option card.

NOTE

Use caution not to bend the pins. Align all four card guides before gently pushing card into slot.



Insert OC Panel High Limit Aquastat Card into selected slot

3. Gently push the option card into the OC Panel option slot until it locks into place. The OC Panel will automatically recognize the card and establish communication.

INSTALLATION (continued)

Checkout

Check to make certain that the OC Panel High Limit Aquastat Card has been installed and adjusted to the proper settings. Put the system into operation and observe the action of the device through several cycles to make certain that it provides proper control of the system as described in the Operations section. Further adjustments can be made to meet more exact comfort requirements.

Operation

1. When checking out the system, adjust the control point low enough so the temperature of the controlled medium reaches the high limit setting, the burner shuts off, and the OC Panel High Limit Controller “locks out”. When the temperature of the controlled medium drops to the high limit setting minus differential, activate the manual reset button (refer to “How To Reset The OC Panel High Limit Controller” below for reset procedure) and the system should be operative again.
2. Reset control to proper high limit setting.

USER INTERFACE

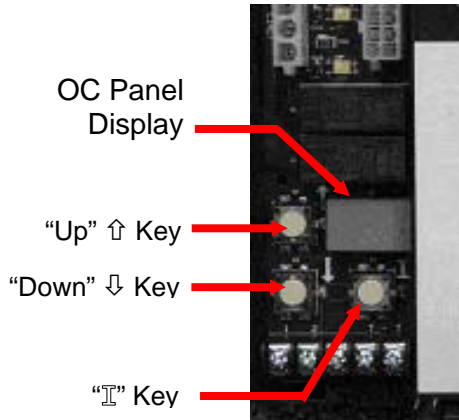
OC Panel High Limit Aquastat Card Features

LED	Description
Flashing Red	High Temperature, Lockout and manual reset required or fault indicator
Green TX	Enviracom® communication indicator

USER INTERFACE (continued)

Using OC Panel Display

The OC Panel display along with Up \uparrow , Down \downarrow , and “I” keys are used to view and adjust OC Panel High Limit Aquastat Card settings. **Please note that these keys look similar to the keys on the Boiler Control but are in a different orientation, and they perform different functions.**



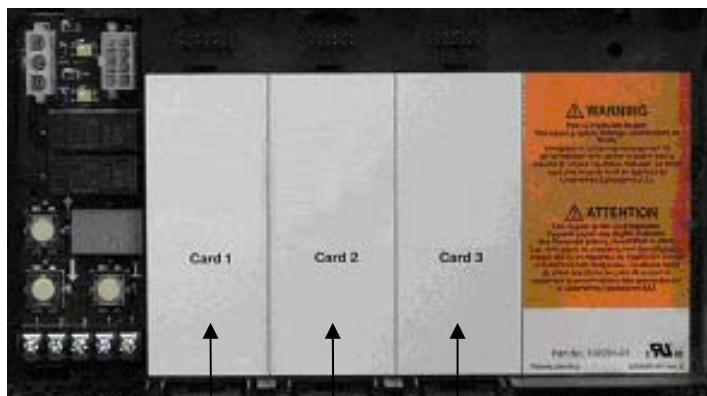
OC Panel User Interface

Selecting OC Panel High Limit Aquastat Card

To access an Option Card:

1. Press the “I” key. The display will go from “OC P” to [1, [2 and [3 (when cards are installed) to provide access to each of the card slots and the card plugged into that slot.
2. Press either the Up \uparrow or Down \downarrow keys when the display shows the card number where the OC Panel High Limit Aquastat Card is installed. For example, if the High Limit Card is installed in slot one, press the Up \uparrow or Down \downarrow keys when “[1” is displayed.

This will switch the display to show the OC Panel Card View Mode.



[1 [2 [3

OC Panel Option Card Slot Identification

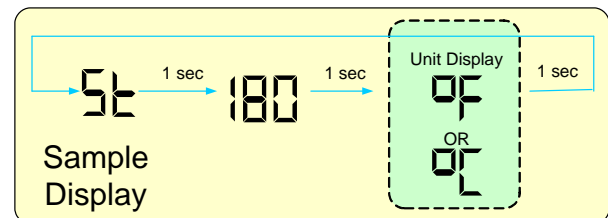
Showing View Mode Options

In view mode the user may look at (but not change) status and temperature readings. To view card information:

1. Press and release the “I” button. The following table shows the items that will be displayed in view mode:

View Mode Options	
HL	High limit setting of Aquastat
dF	High limit differential of Aquastat (fixed)
St	Sensor temperature of Aquastat
Err	Error (Followed By Error No.) 18 Internal Fault 19 Sensor Failure 25 Lockout, manual reset required (refer to Trouble Shooting Section for more information)
bAc	Return to OC Panel Card Select Menu

Each setting will alternately flash between the relevant display code, its corresponding value and units. For example, when the “I” key is pressed until “St” is displayed, it will then flash a display a number (such as “180”) and followed by either “F” (or “C”). This indicates that the sensed temperature is 180°F. Other view mode items display the information in a similar fashion.



Please note that in view mode to hold the display on the value the user can press and hold either the Up \uparrow or Down \downarrow keys and the value will be continuously shown. This may be helpful in watching a value “live”.

To exit view mode and return to the OC Panel menu:

1. Press the “I” button to select the “bAc” menu item.
2. Press either the Up \uparrow or Down \downarrow keys to exit the card menu.

USER INTERFACE (continued)

Entering Adjustment Mode

In Adjustment Mode, the user can adjust the High Limit, change measurement units or reset a high temperature condition. To enter adjustment mode:

1. Press and hold the Up ↑, Down ↓, and “I” keys simultaneously for three (3) seconds while the display is in the Aquastat Card View Mode. While holding the buttons the display will change to an Adjustment mode label signifying to the user that installer mode has been entered. This procedure is intended to discourage unauthorized or accidental changes to parameter settings.
2. After entering Adjustment Mode, Press the “I” key to view the item to be adjusted.
3. Press the Up ↑ or Down ↓ keys to adjust the displayed setpoint to the desired value.
4. Exit adjustment mode by one of the following means:
 - a. Press the “I” key until “bRc” option is displayed and press either Up ↑ or Down ↓ keys
 - b. Press and Hold the Up ↑, Down ↓, and “I” keys until the first item of view mode is shown.
 - c. If no keys are pressed, after five (5) minutes the display will automatically return to the view mode.
5. Once in view mode press the “I” key until “bRc” option is displayed and press either Up ↑ or Down ↓ keys to return to the OC Panel Display.

How To Reset The Aquastat

To Reset the *Manual Reset* OC Panel High Limit Aquastat Card:

1. Make sure that the temperature has returned to normal.
2. Press “I” key until the Aquastat card slot number is displayed (C 1, C2 or C3).
3. Press the Up ↑ or Down ↓ keys to enter the card's view mode
4. Press and Hold the Up ↑, Down ↓, and “I” keys simultaneously for three (3) seconds, Adjustment Mode items will be shown
5. Press “I” until the Reset (r5t) Pushbutton is shown.
6. Press the Up ↑ or Down ↓ keys to turn Reset “on”

The following table shows adjustable items.

Adjustment Mode Options			
Display	Factory Default	Range	Definition
HL_	200	130-220	Adjust high limit setting of Aquastat
dF_	5	-	Manual Reset OC Panel High Limit Aquastat Card, fixed High Limit differential
	F	F-C	Unit Selection (°F or °C)
r5t	-	-	Reset from lockout
			on Ready to restore from lockout oFF Not Ready to restore from lockout
bRc	-	-	Return to Option Card View Mode Menu

TROUBLESHOOTING

OCP High Limit Aquastat Card Error Codes

The following errors are reportable via both EnviraCOM and the OC Panel Display. Errors will be displayed in view mode.

Display		Status	Boiler / Control Action(s)
Err	18	Internal Failure	<ul style="list-style-type: none"> ▪ Replace Control
Err	19	Sensor Failure	<ul style="list-style-type: none"> ▪ Temperature sensor or interface failure (open or short connection or increased connection resistance, dual sensor mismatch) or control hardware failure
Err	25	Lockout, manual reset required	<ul style="list-style-type: none"> ▪ When a lockout occurs the boiler will shut down. The boiler will not automatically restart once the temperature has decreased below the High Limit. To Reset the control follow "Aquastat Reset pushbutton procedure described on the previous page.

Checking Sensor Resistance

When checking sensor resistance values it is extremely important to follow the guidelines below or erroneous readings may occur.

1. Use a low volt ohm meter.
2. Check the resistance of the ohm meter leads by connecting them together. Excessive resistance in the test leads will cause inaccurate results. Resistance in test leads should be less than 1 ohm.
3. The sensor should be at a stable temperature for at least 3 minutes before checking the resistance.
4. Assure the water temperature gauge has a reasonable accuracy before depending on it for the reference temperature.
5. Remove the sensor connection at the OC Panel Hi Limit Card and, using the tips of the test leads, check the resistance between pin 1 and pin 2 on the connector. Note that the wire going to pin 2 is marked with a yellow tape band. Using the same procedure check the resistance between pin 2 and pin 3 on the connector. **Important: Holding the wires with your hands can cause significant errors.**
 - a. The reading between 1 and 2 and the reading between 2 and 3 should be approximately the same.
6. Take the reading as soon as possible as the current flow from the meter through the sensor will cause the sensor to heat and you will get erroneous results.
7. Use the Sensor Resistance Temperature Table on the next page to determine the corresponding temperature.

Sensor Resistance Temperature Table

Temperature Deg C	Temperature Deg F	Nominal Resistance, Ohms
0	32	32640
5	41	25390
10	50	19902
15	59	15714
20	68	12493
25	77	10000
30	86	8056
35	95	6530
40	104	5325
45	113	4366
50	122	3600
55	131	2985
60	140	2486
65	149	2082
70	158	1751
75	167	1480
80	176	1256
85	185	1070
90	194	916
95	203	786
100	212	678
105	221	587
110	230	509
115	239	444
120	248	388
125	257	340
130	266	299



Crown Boiler Company
 Manufacturer of Hydronic Heating Products
 P.O. Box 14818, 3633 I Street
 Philadelphia, PA 19134
www.crownboiler.com