

# CSC

## Temperature Selection Procedure Auto-Ignition Addendum

### Natural Gas, Propane & Butane Fired Storage Water Heaters

MODELS CSC39, CSC59, CSC78, CSC93, CSCL39, CSCL59, CSCL78, CSCL93  
Auto Ignition

Working towards  
a cleaner future



## TEMPERATURE ADJUSTMENT (24V CONTROL SYSTEM)

The water heater temperature setting is adjusted by using the control display mounted to the front of the control panel of the water heater. The water heater thermostat is set at the lowest setpoint of 70°F when shipped from the factory. The control display shows the temperature setpoint in degrees Fahrenheit (°F) or degrees Celsius (°C), and the status of the water heater ("Idle" or "Heating"). If the water heater is functioning normally, the display will also show "Operational".

For energy efficient operation of your water heater, the suggested initial temperature setting is 120°F (49°C). During the winter season, or any cold period, you may desire a higher temperature setting to adjust for the colder incoming water. This adjustment, however, may cause additional condensation to form on the cooler tank surface. This does not mean the tank is leaking. During summer months, the warmer incoming water temperatures will benefit the performance of your water heater and reduce the amount of condensation developed.

Condensation does not mean your tank is leaking. Over 40% of reported tank leaks on installation are proven to be condensation. To avoid unnecessary expense and inconvenience, make sure the tank is leaking before calling a service person.

### WARNING

If the water heater display does not show "Operational" in the "Status" indicator, there may be an operating malfunction with the water heater. If this is the case, a numeric code will be displayed. Refer to the label next to the display for the definition of the error code and call your plumbing professional or service agent to service the water heater. Do not try to reset the water heater without having a qualified service person to diagnose and correct the problem. If the display is blank or does not show an error code, make sure there is power to the water heater.

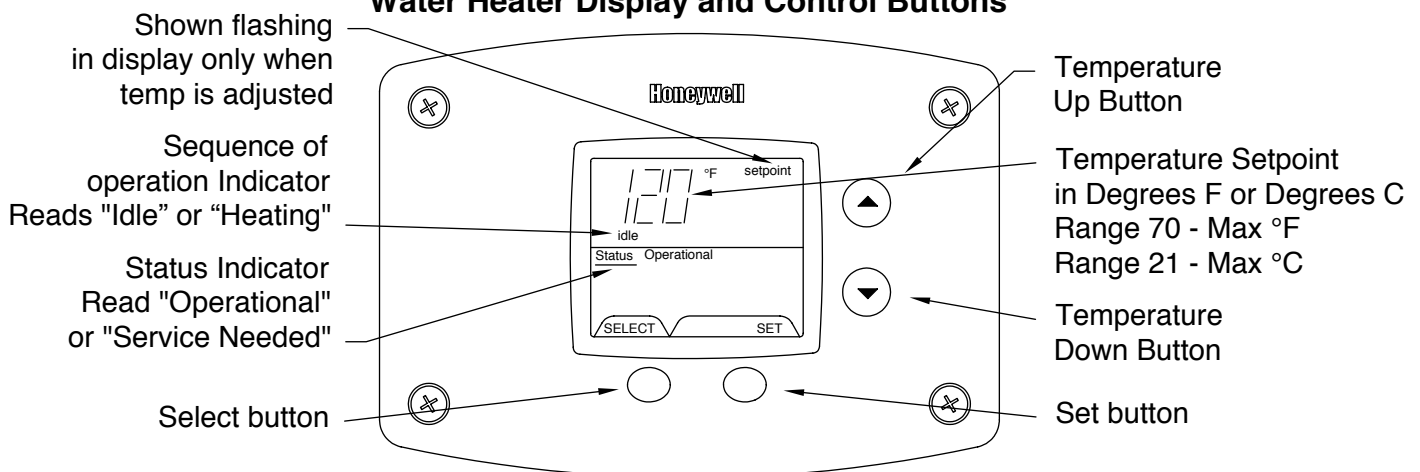
Setting the water temperature to the maximum set point can result in scalding hot water delivered to the faucets. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. See following section to change the maximum setpoint limit (max setpoint). Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted. See previous warning on scalds and an ASSE approved mixing valve.

### NOTICE

When the maximum setpoint is reached, the display will show "Max Setpoint" without the setpoint value. The maximum setting is equal to approximately 180°F (82°C).

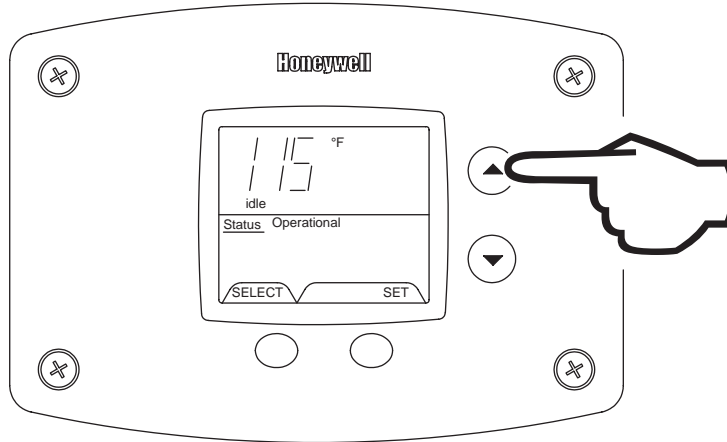
The default temperature setpoint from the factory is 70°F (21°C).

### Water Heater Display and Control Buttons



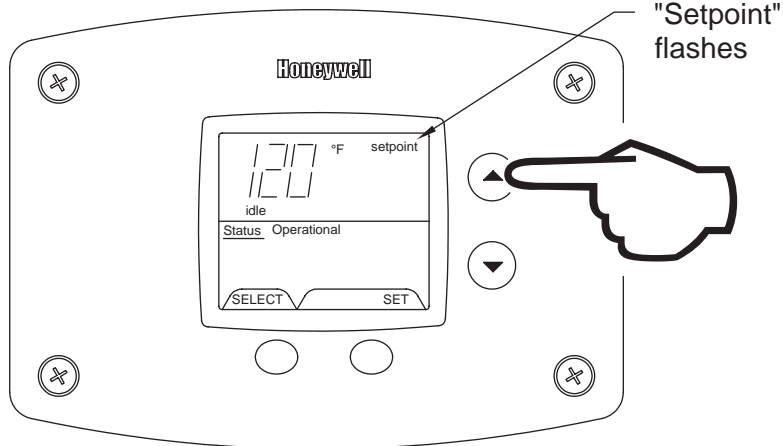
## To Increase Setpoint Temperature

Step 1: Depress and hold "Temperature Up" button until desired setpoint temperature appears in the display.



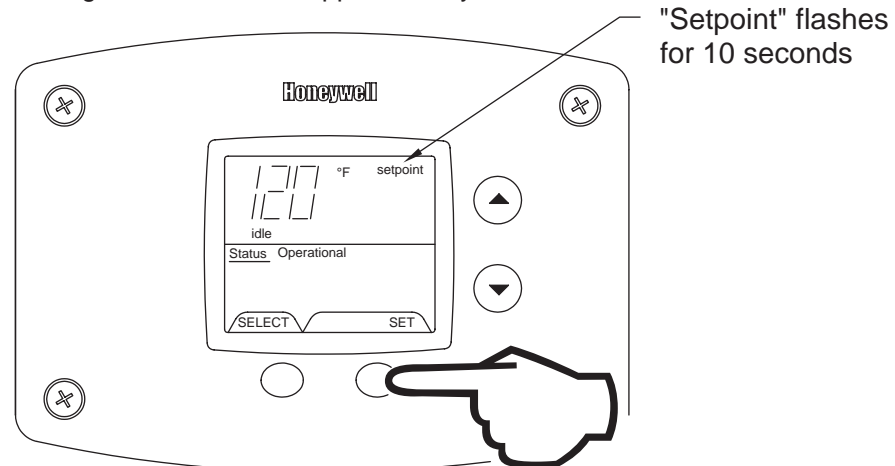
### Step 1

Step 2: "Setpoint" indicator begins flashing in the display after pressing "Temperature Up" button.



### Step 2

Step 3: Press "SET" button for new setting to take effect immediately. "Setpoint" will stop flashing. If the "SET" button is not pressed, the new temperature setting will take effect in approximately 10 seconds.

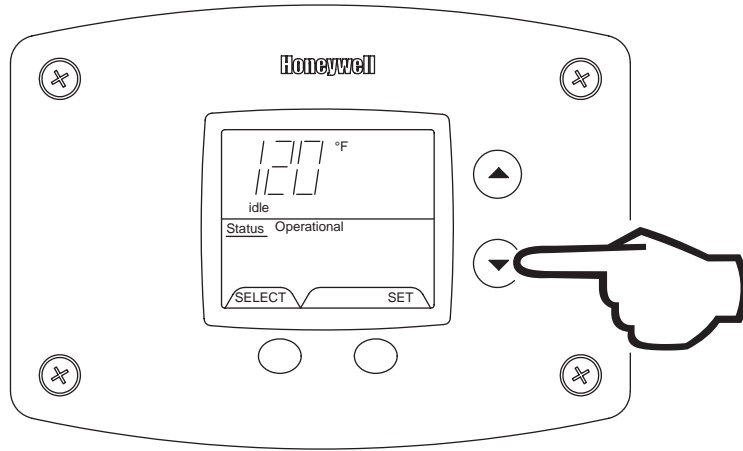


### Step 3

Press SET Button for setting to take effect immediately

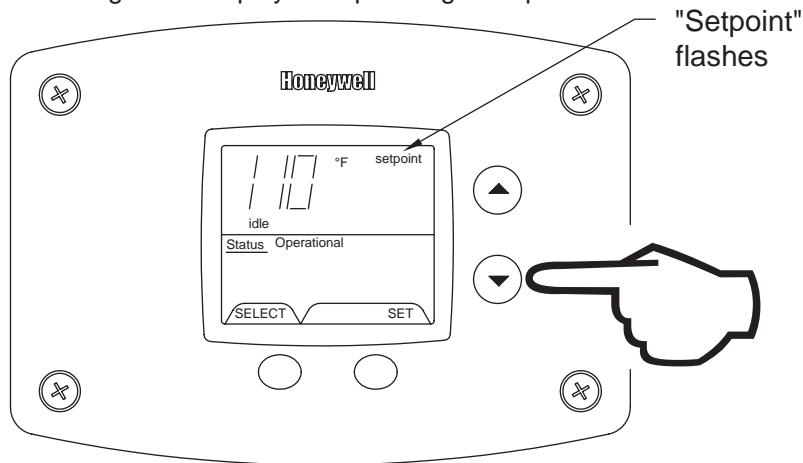
## To Decrease Setpoint Temperature

Step 1: Depress and hold "Temperature Down" button until desired setpoint temperature appears in the display.



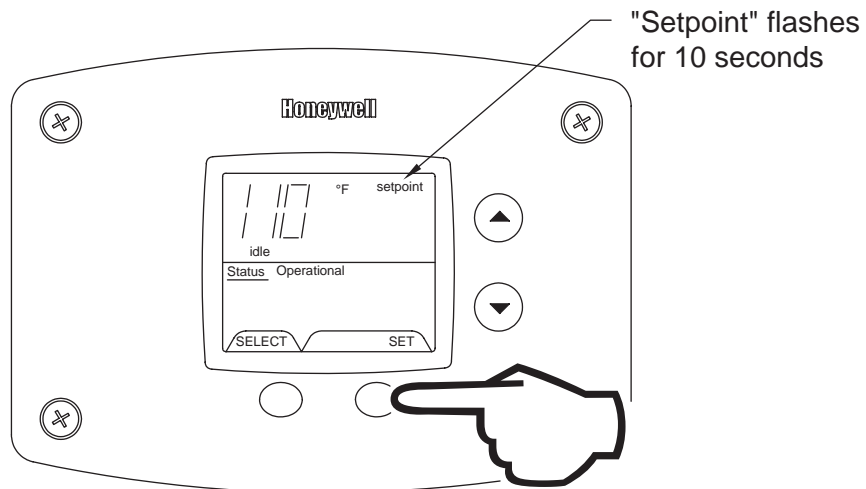
### Step 1

Step 2: "Setpoint" indicator begins flashing in the display after pressing "Temperature Down" button.



### Step 2

Step 3: Press "SET" button for new setting to take effect immediately. The setpoint will stop flashing. If the "SET" button is not pressed, the new temperature setting will take effect in approximately 10 seconds.

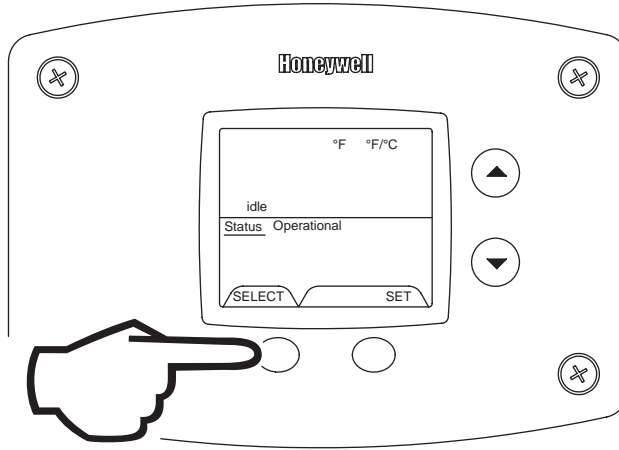


Press SET for setting to take effect immediately

### Step 3

# To Change Temperature Format in Display from °F to °C or °C to °F:

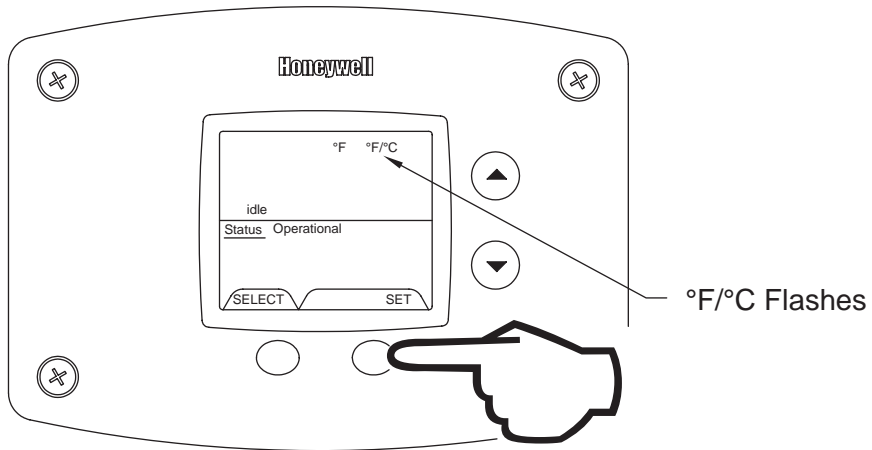
Step 1: Press "SELECT" button until °F/°C is displayed.



Press select

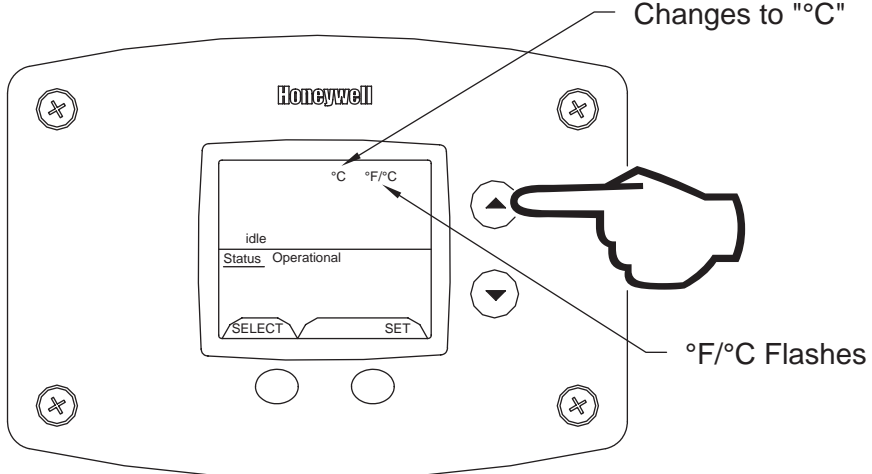
Step 1

Step 2: Press "SET" button to change temperature format. Symbol °F/°C will flash.



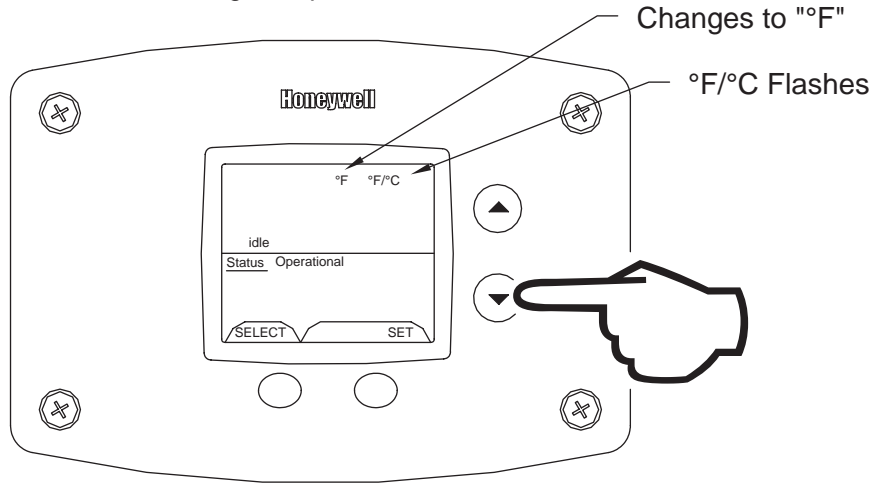
Step 2

Step 3a: Press "Temperature Up" button to change temperature format to °C.



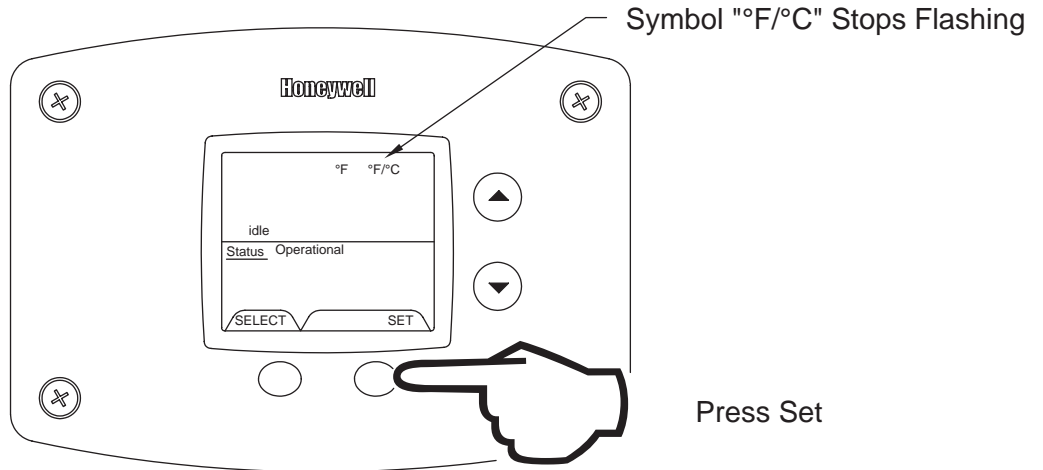
Step 3a

Step 3b: Press "Temperature Down" button to change temperature format to °F.



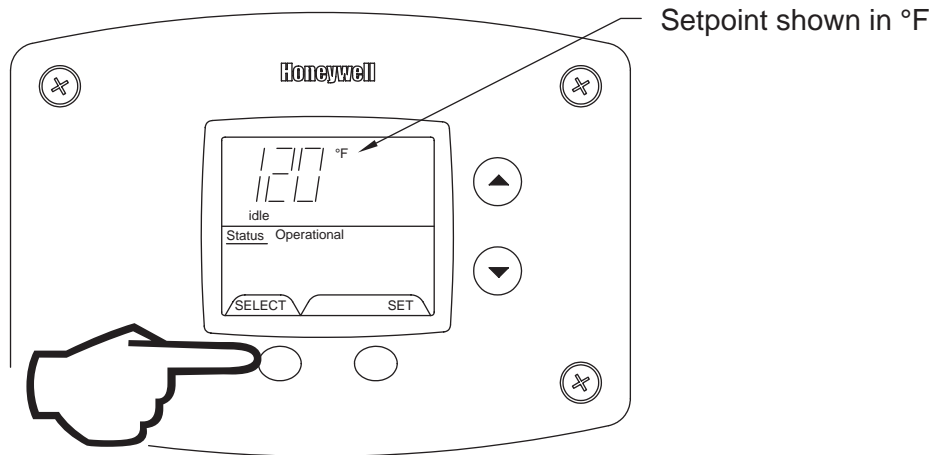
### Step 3b

Step 4: Press "SET" button to confirm °F or °C format. °F/°C will stop flashing. Setpoint display will appear in the format selected (°F or °C) in 10 seconds.



### Step 4

Step 5: Pressing "SELECT" button will return display to setpoint in format selected (°F or °C) immediately.



Press select

### Step 5

An automatic gas shut-off device (ECO) is incorporated in the sensor and control board which will shut off all gas supply to the burner and pilot if the water heater temperature exceeds 200°F (93°C). Should the ECO function (open), the water temperature should be reduced to approximately 120°F (49°C) and follow applicable Lighting Instructions to place the water heater in operation. The water heater must have the problem corrected by a qualified service person before putting the water heater back in operation. It is recommended that all service work be performed by a qualified service agency.

If the water heater is to remain idle for 30 days or more or is subjected to freezing temperatures while shut off, the water heater and piping should be fully drained (See "To Drain the Water Heater") and the drain valve should be left fully open.

## WARNING

Hydrogen gas can be produced in an operating water heater that has not had water drawn from the tank for a long period of time (generally two weeks or more). Hydrogen gas is extremely flammable. To prevent the possibility of injury under these conditions, we recommend the hot water faucet to be open for several minutes at the kitchen sink before you use any electrical appliance which is connected to the hot water system. If hydrogen is present, there will be an unusual sound such as air escaping through the pipes as hot water begins to flow. Do not smoke or have open flame near the faucet at the time it is open.

### Burner Flame Check

At the time of installation and at periodic intervals (about every 3 months), a visual check of the pilot and burner flames should be made to determine if they are burning properly. No adjustment to the air shutter should be required for this heater. The burner flames should be blue with yellow tips. A blue-orange flame is characteristic of operation on liquefied petroleum (LP) gas. If the burner flame does not appear as described, an air shutter adjustment may be required. The burner tube flames should light smoothly from the pilot.

## NOTICE

**IMPORTANT-** In the event of an emergency, turn off the gas and electric (if applicable) to the appliance.

**IMPORTANT-** The water heater should be inspected at a minimum annually by a qualified service technician for damaged components and/or joints not sealed. **DO NOT** operate this water heater if any part is found damaged or if any joint is found not sealed

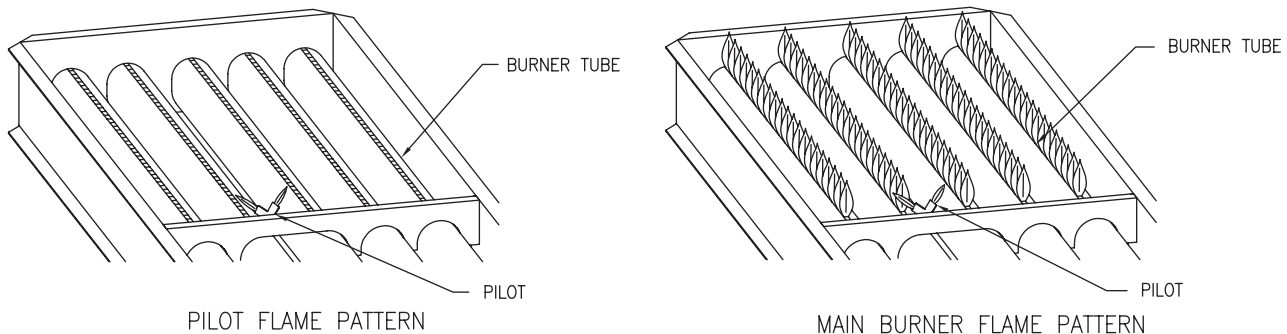


Figure 8

## WARNING

Water heaters are heat producing appliances. To avoid damage or injury there shall be no materials stored against the water heater or vent system, and proper care shall be taken to avoid unnecessary contact (especially by children) with the water heater and vent system. **UNDER NO CIRCUMSTANCES SHALL FLAMMABLE MATERIALS, SUCH AS GASOLINE OR PAINT THINNER BE USED OR STORED IN THE VICINITY OF THIS WATER HEATER, VENT SYSTEM OR IN ANY LOCATION FROM WHICH FUMES COULD REACH THE WATER HEATER OR VENT SYSTEM.**

## SECTION X: MAINTENANCE

The following maintenance should be performed by a qualified service technician at the minimum periodic intervals suggested below. In some installations, the maintenance interval may be more frequent depending on the amount of use and the operating conditions of the water heater. Regular inspection and maintenance of the water heater will help to insure safe and reliable operation.

1. Annual checks of the ignition systems (millivolt and electronic), temperature controls and any other water heater controls are necessary to ensure proper operation. Also, all safety shut-off valves must be checked to verify proper operation and tightness.
2. The flow of combustion and ventilation air **MUST NOT** be restricted. Clear the combustion air openings of any dirt, dust, or other restrictions. **WARNING!** The combustion ventilation system may be **HOT**.
3. At all times keep the water heater area clear and free from combustible materials, gasoline and other flammable vapors and liquids.
4. Bi-annually conduct a visual check of the pilot and burner flames to determine that they are burning properly. See "Burner Flame Check" section for example of proper burner flame pattern.
5. Annually remove the main burner rack assembly to clean orifices and related parts of any dirt or other foreign material. Inspect the burner ports for obstructions or debris and clean with a wire brush, vacuum, or use a mild detergent solution to clean as needed. **NOTE:** It is imperative for proper operation of the water heater that the main burner rack be replaced in the original location.

### **WARNING**

**When lifting lever of the combination temperature and pressure relief valve, hot water will be released under pressure. Be careful that any released water does not result in bodily injury or property damage.**

**Keep clear of the combination temperature and pressure relief valve discharge line outlet.** The discharge may be hot enough to cause scald injury. The water is under pressure and may splash.

6. At least once a year, check the combination temperature and pressure relief valve to insure that the valve has not become encrusted with lime. Lift the lever at the top of the valve several times until the valve seats properly without leaking and operates freely.

### **NOTICE**

**IMPORTANT-** If the combination temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation. Do not plug the combination temperature and pressure relief valve outlet.

7. Monthly drain off a gallon of water to remove silt and sediment. **WARNING!** This water may be **HOT**.
8. All models are equipped with a cleanout opening to aid in removal of hard water deposits from the tank bottom. If this water heater operates under hard water conditions, the following should be performed at least every 3 months: Drain the water heater. Remove the cleanout jacket cover and tank cover. When cleaning the tank, care must be taken to avoid trying to break deposits loose as this could damage the glass lining and shorten the life of the water heater. After cleaning, replace the cleanout tank cover and jacket cover, and refill with water.
9. A sacrificial anode rod has been installed to extend tank life. The anode rod should be inspected annually (every year) and replaced when necessary to prolong tank life. Water conditions in your area will influence the time interval for inspection and replacement of the anode rod. Contact the plumbing professional who installed the water heater or the manufacturer listed on the rating plate for anode replacement information. The use of a water softener may increase the speed of anode consumption. More frequent inspection of the anode is needed when using softened (or phosphate treated) water.
10. The venting system must be inspected at least once a year to ensure against leakage of exhaust products.

### **CAUTION**

**FOR YOUR SAFETY, DO NOT ATTEMPT REPAIR OF COMBINATION GAS CONTROL, BURNERS OR GAS PIPING. REFER REPAIRS TO A QUALIFIED SERVICE TECHNICIAN.**



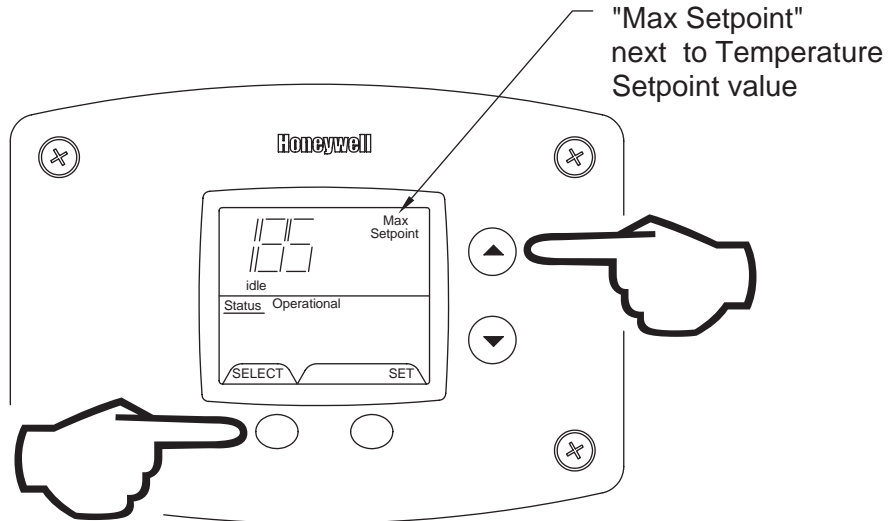
## ACCESSING SERVICE MODE ON THE WATER HEATER DISPLAY (FOR SERVICE PERSONNEL ONLY)

The display has a “service mode” for changing the maximum setpoint and accessing information in aiding servicing of the water heater. This procedure is for service and installation personnel only. To enter the Service Mode, follow the steps illustrated below:

### WARNING

The following procedure is for service and installation personnel only. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

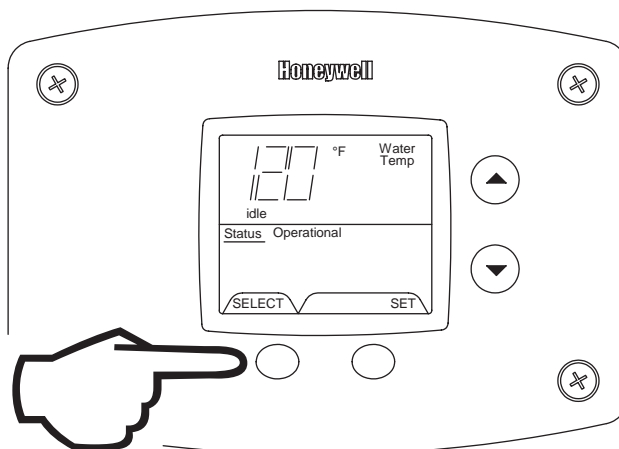
Step 1: Press “Select” and “Temperature Up” buttons together and hold for 3 seconds until “Max Setpoint” is shown in the display.



### NOTICE

30 Seconds after the last button press, the display will automatically return to the “User Mode”. Simultaneously pressing the “Select” and “Temperature Up” buttons will switch the display immediately to the “User Mode”.

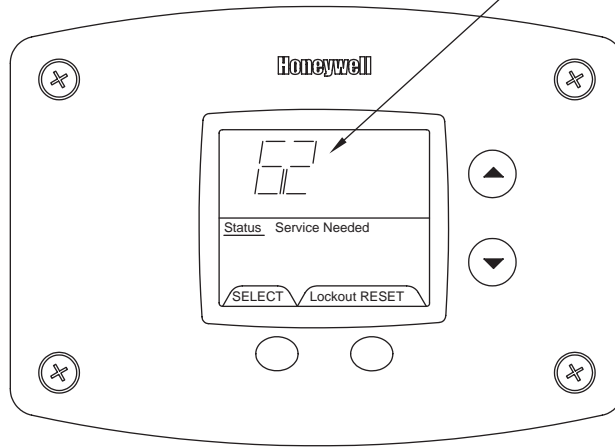
Step 2: Pressing “Select” button will change display to next mode



The following is the sequence of modes available in "Service Mode" by pressing the "Select" button:

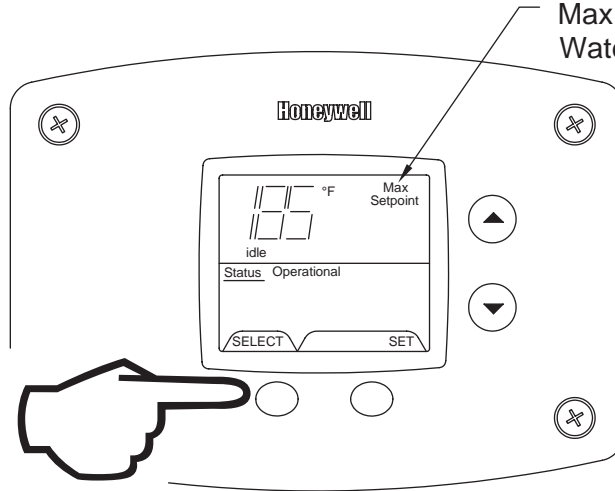
Error Code Number (Display/Reset). This is only shown if there is an operating error in the "User Mode".

Error Code Shown  
in Water Heater Display

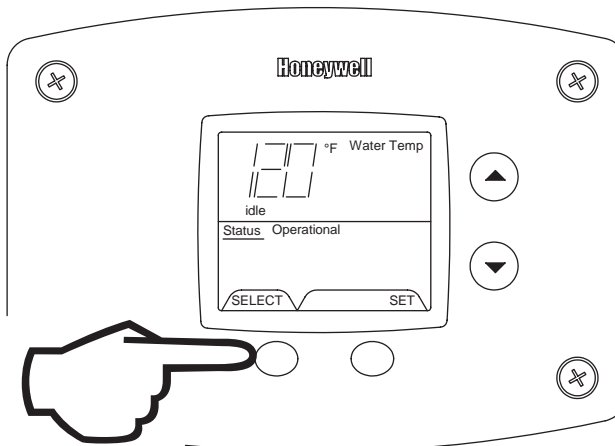


1. Max Setpoint (Display/Change)

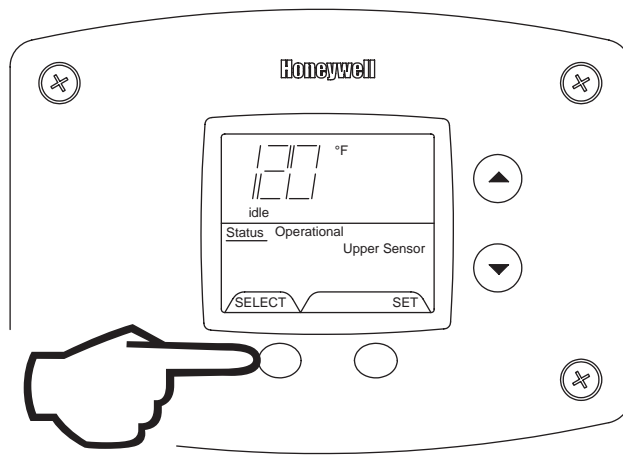
Max Setpoint value  
Water Heater Display



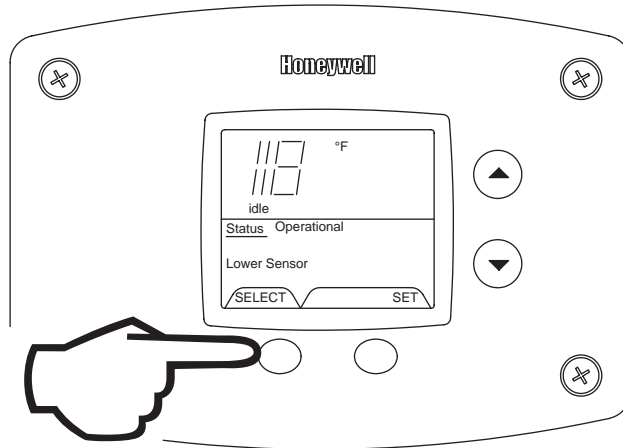
2a. Water Temperature Average (Displays average if there are two sensors – sensor temperature displayed if single sensor is used).



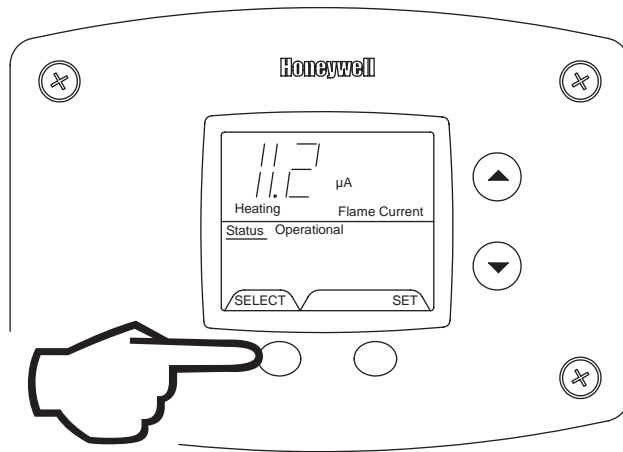
2b. Water Temperature - Upper Sensor (Displays if there is an upper sensor – some models)



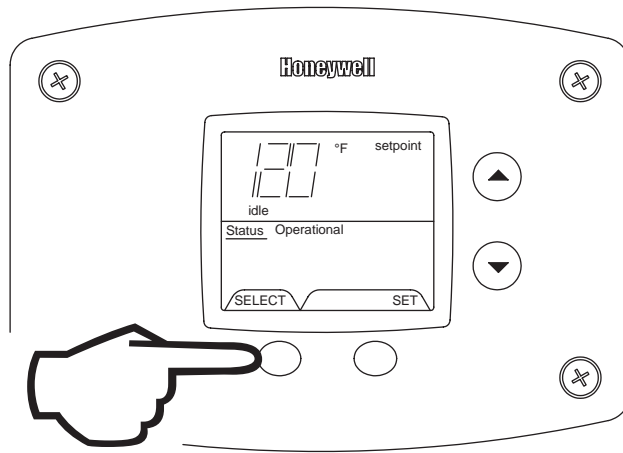
2c. Water Temperature - Lower Sensor (Displays if there are two sensors)



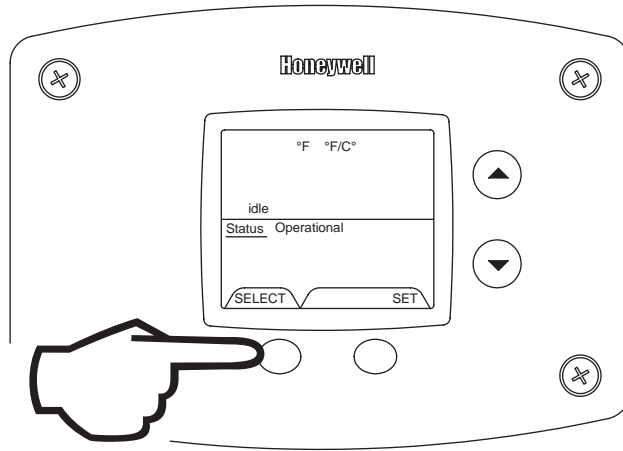
3. Flame Current of Pilot Flame Sensor (Displays only in the Heating Cycle)



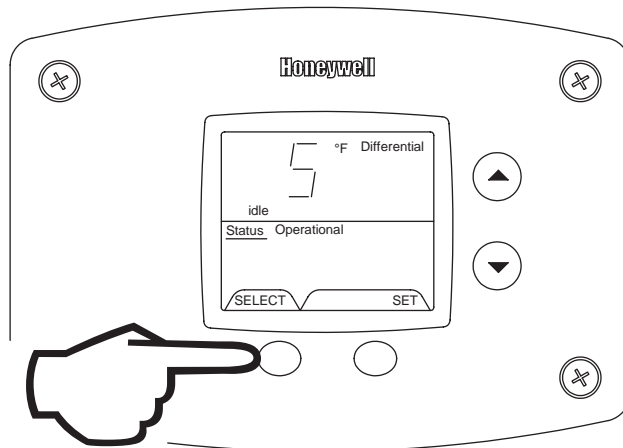
4. Setpoint (Display/Change)



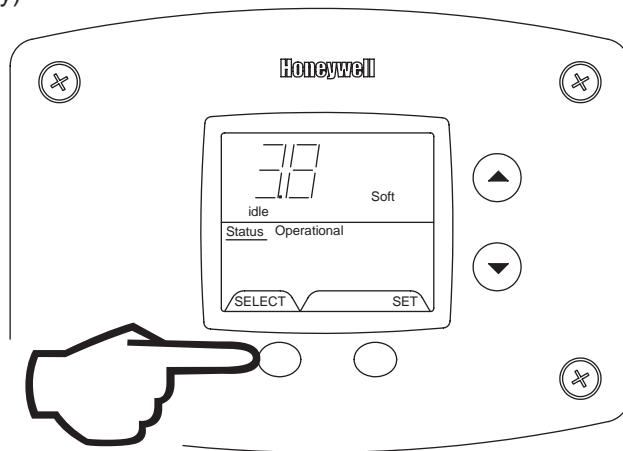
5. °F/°C (Display/Change)



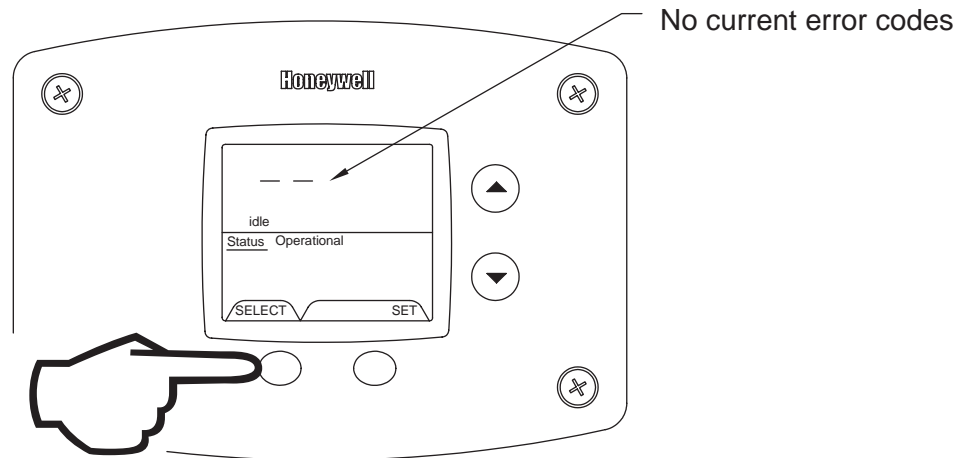
6. Differential (Display only – shows the differential of the thermostat)



7. Software Version (Display only)



8. Error Code History (Displays if there are present error codes or up to 10 previous error codes). Water Heater Display will show -- if there are no error codes.

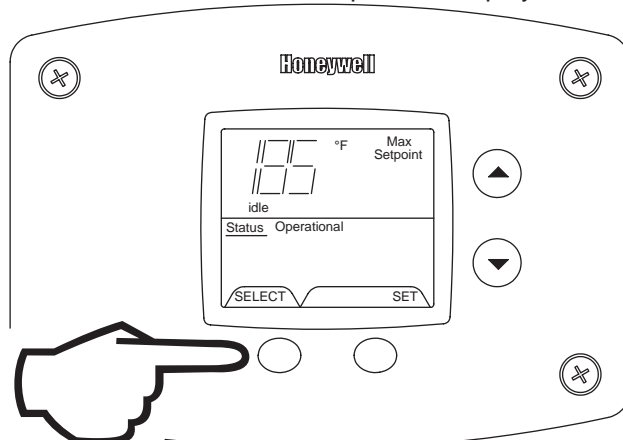


To change the Maximum Setpoint Limit (Max Setpoint) for the temperature setpoint:

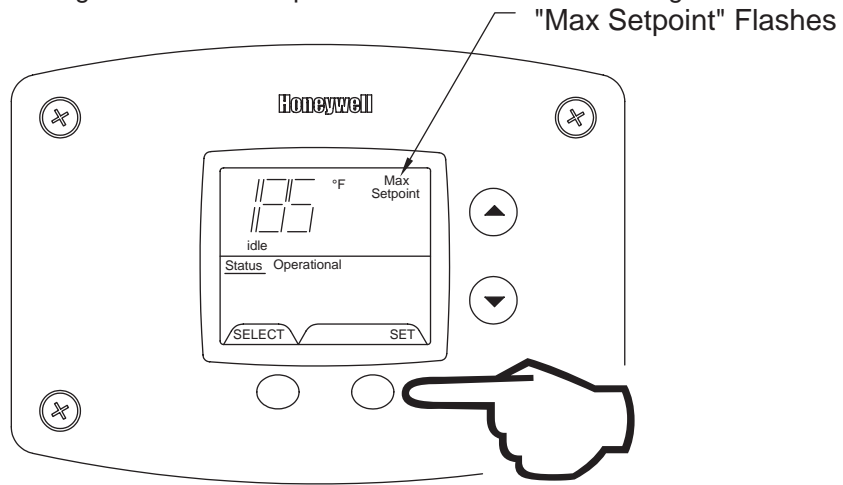
 **WARNING**

Setting the water temperature to the maximum set point can result in scalding hot water delivered to the taps. It is highly recommended that the maximum setpoint be adjusted to the lowest temperature possible for the needs of the installation. See following section to change the maximum setpoint limit (max setpoint). Make sure the water heater control display is not in a public area that can result in the temperature settings being improperly adjusted. See previous warning on scalds and an ASSE approved mixing valve.

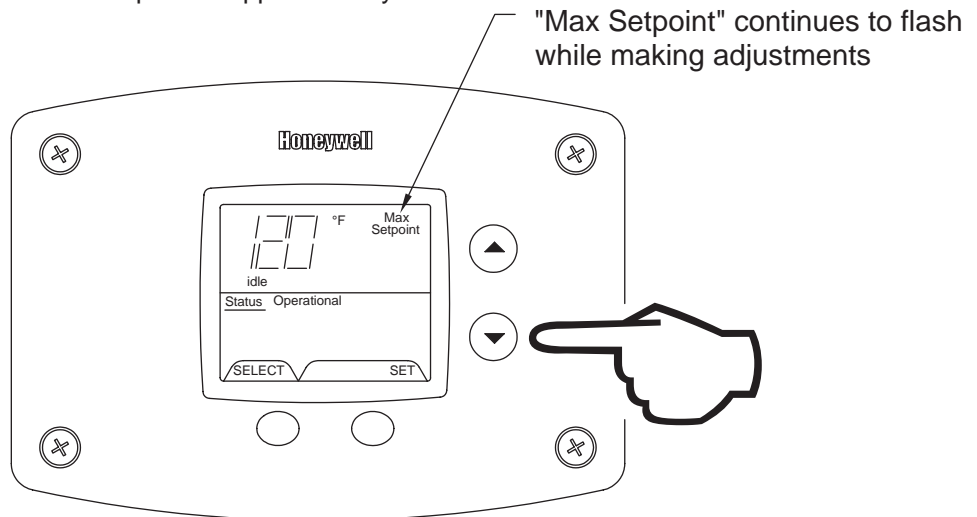
Step 1: In service mode press the "Select" button until "Max Setpoint" is displayed.



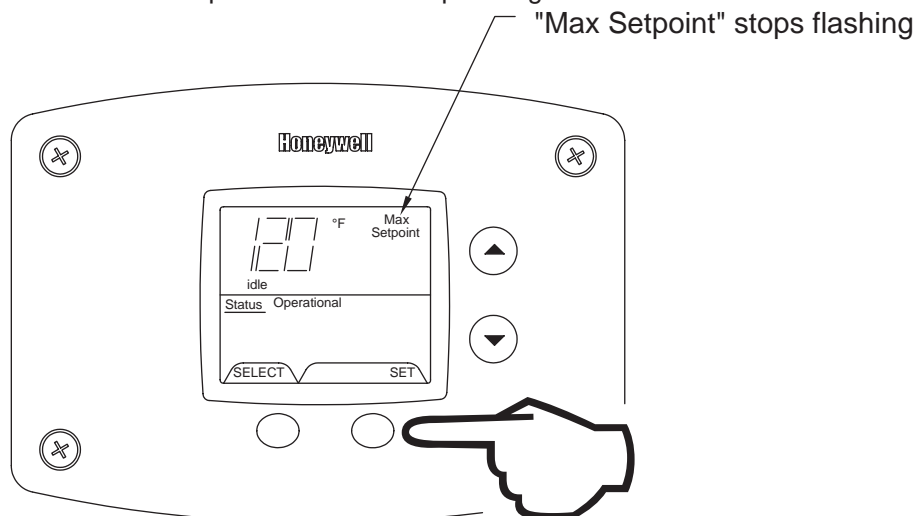
Step 2: Press "Set" button to enter setting mode. "Max Setpoint" will flash to indicate setting mode.



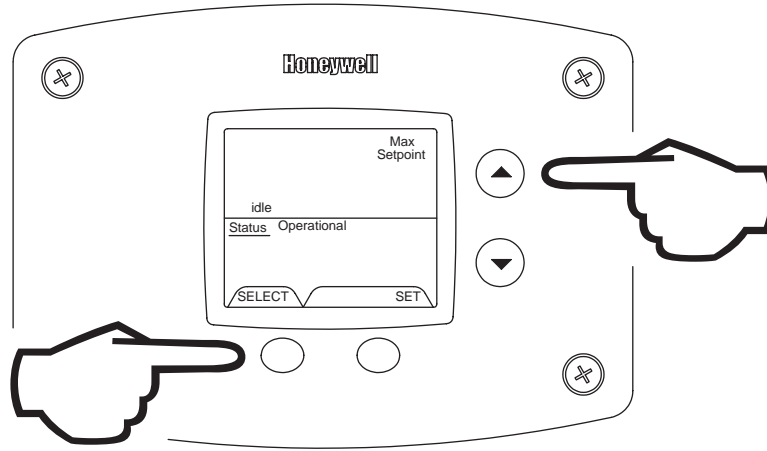
Step 3: Press the "UP" or "DOWN" buttons to change the maximum setpoint value. This will limit the maximum setpoint the user can select. Note: The maximum setpoint is approximately 180°F.



Step 4: Press "Set" button to confirm new "Max Setpoint" value and stop setting mode.



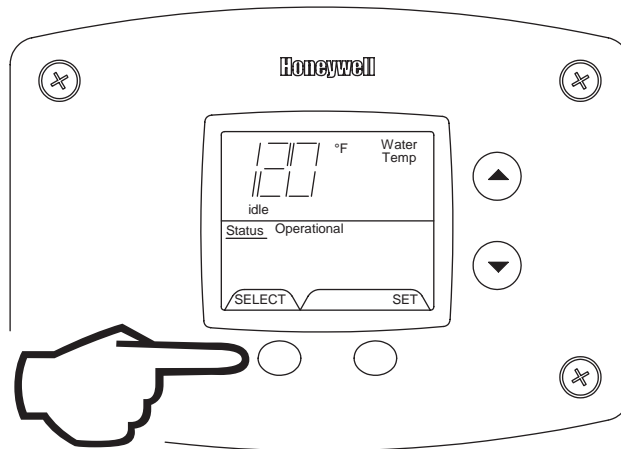
Step 5: 30 Seconds after the last button press, the Water Heater Display will go back to "User Mode". It will read "Max Setpoint" without showing a temperature value if the temperature setpoint is at the maximum setting. The Water Heater Display can be set back to the "User Mode" immediately by pressing both the "Temperature Up" and "Select" buttons together for 3 seconds.



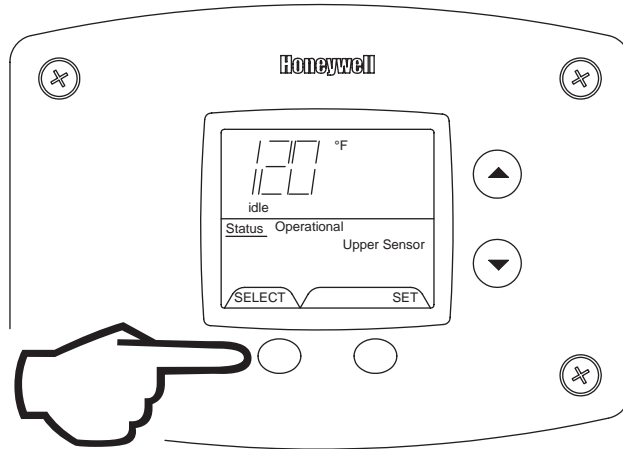
### Exiting Service Mode

#### Display of Water Temperature:

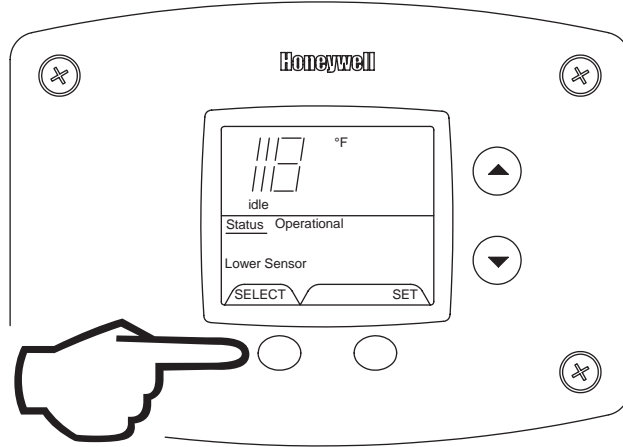
Step 1: In Service Mode, Press the "Select" button until "Water Temp" is displayed in the upper right section of the water heater display. For water heaters using two temperature sensors in the tank, this will be the average reading between the two sensors. For water heaters using a single sensor, this is the reading for the sensor.



Step 2: For water heaters using two temperature sensors, pressing the “Select” button again displays the Upper Sensor temperature reading. “Upper Sensor” will be displayed in the lower right side of the status window of the water heater display.

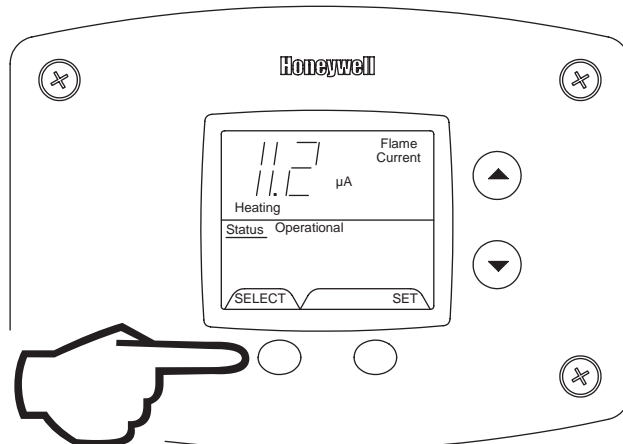


Step 3: For water heaters using two temperature sensors, pressing the “Select” button again displays the Lower Sensor temperature reading. “Lower Sensor” will be displayed in the lower left side of the status window of the water heater display.



### To Display Flame Sense Current of the Pilot Flame Sensor:

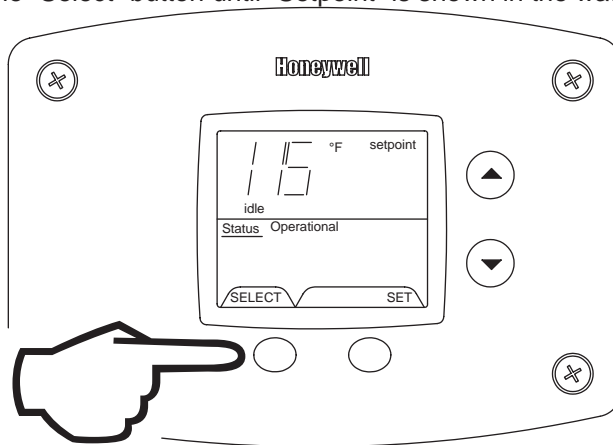
The pilot flame sense current is available only when the burners are in operation. Step 1: Make sure the status displays “Heating” or draw enough hot water to start the burners. Step 2: Enter the “Service Mode” described previously. Step 3: Press the “Select” button until a number value is displayed with “Flame Current” to the right of the number. The value displayed is in microamps ( $\mu\text{A}$ ).



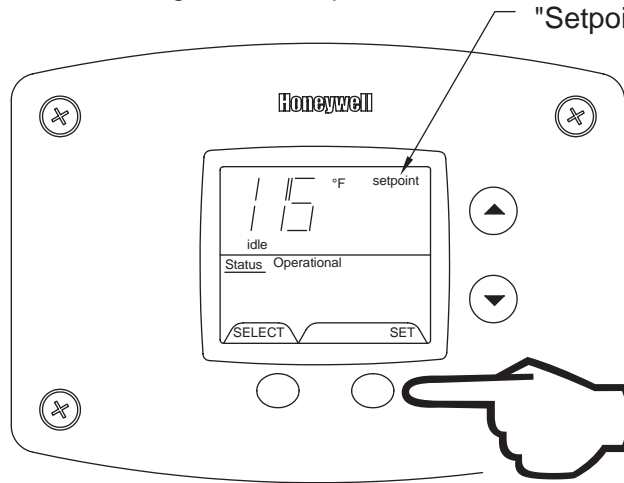


**To Display and Change Temperature Setpoint:**

Step 1: In "Service Mode" press the "Select" button until "Setpoint" is shown in the water heater display.



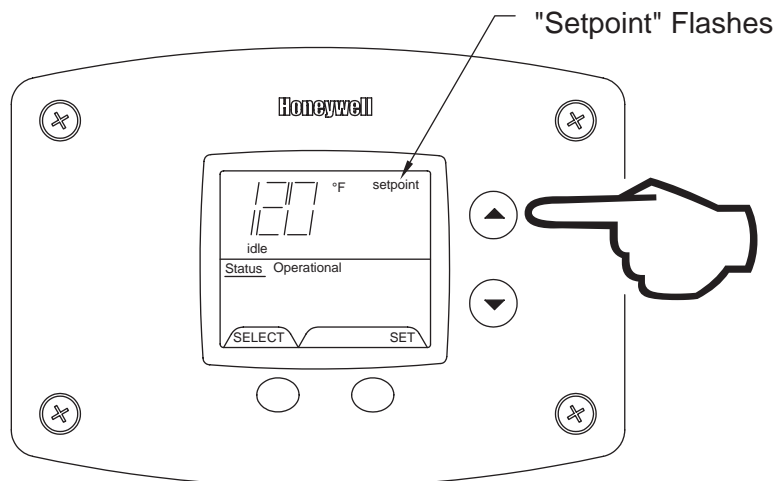
Step 2: Press the "Set" button to enter the setting mode. "Setpoint" will flash in the water heater display.



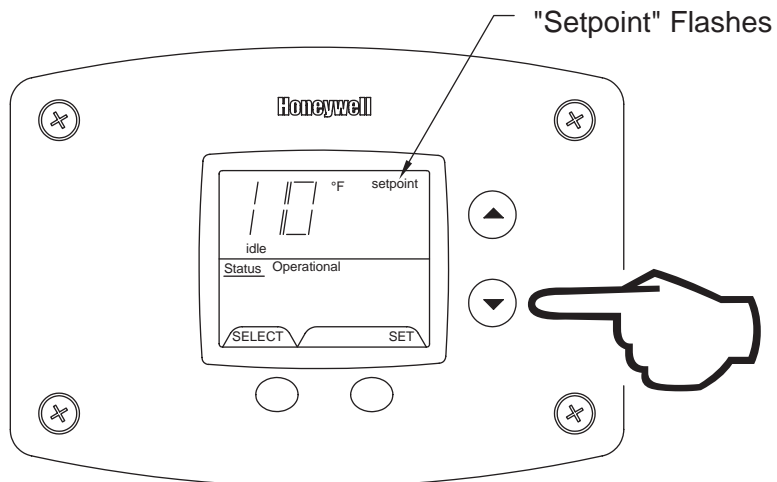
Step 3: To raise the temperature setpoint, press the "Temperature Up" button until the desired temperature is shown on the water heater display.

**NOTICE**

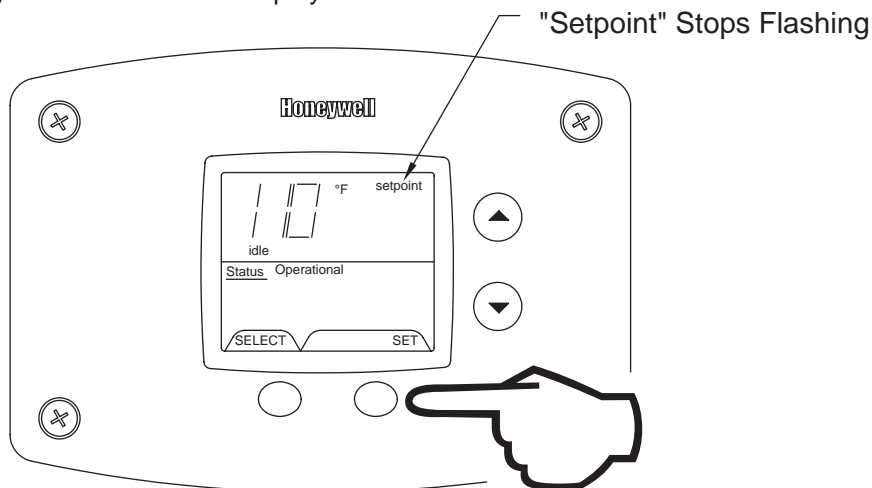
Note: The maximum temperature that can be set in the Water Heater Display is limited to the "Max Setpoint" described previously. To change the "Max Setpoint", refer to the procedure "To Change the Maximum Setpoint Limit..." described previously under "Accessing the Service Mode on the Water Heater Display".



Step 4: To lower the temperature setpoint, press the "Temperature Down" button until the desired temperature is shown on the water heater display.



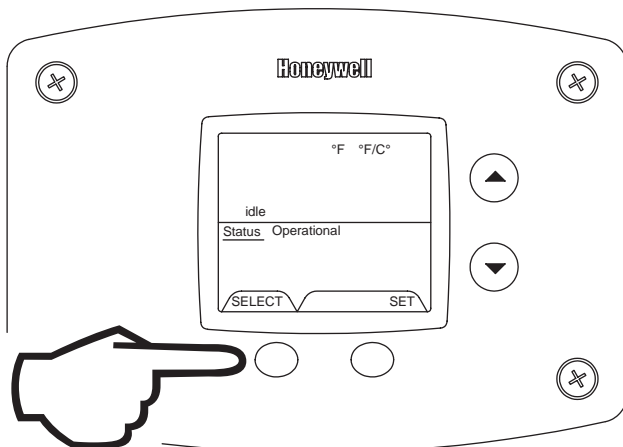
Step 5: When the desired setpoint is reached on the water heater display, press the "Set" button to confirm the new setpoint. "Setpoint" stops flashing in the water heater display.



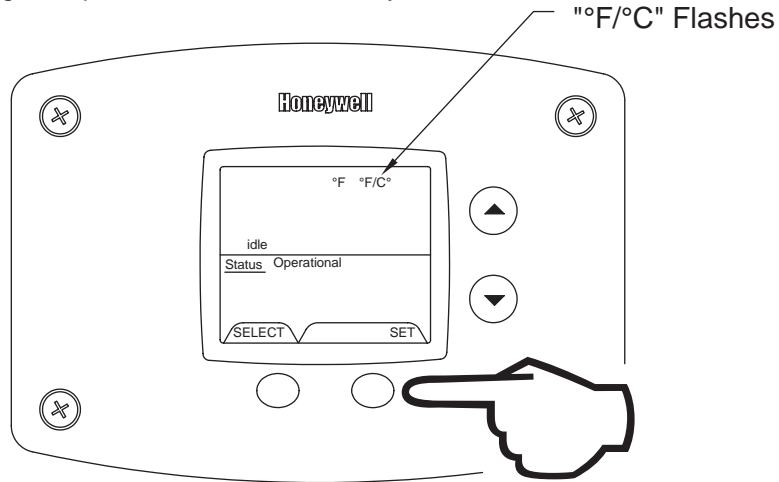
#### To Display and Change Temperature Format (°F/°C):

#### To Change Temperature Format in Display from °F to °C or °C to °F:

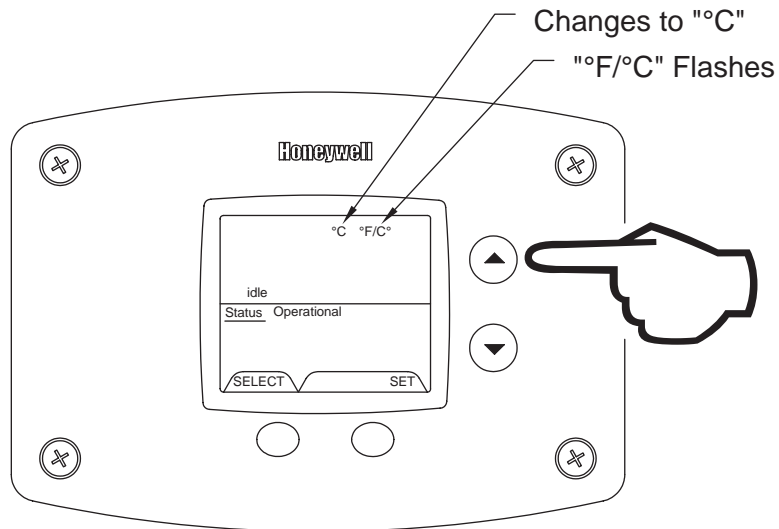
Step 1: While in "Service Mode", press "Select" button until "°F/°C" is shown in the upper right portion of the water heater display.



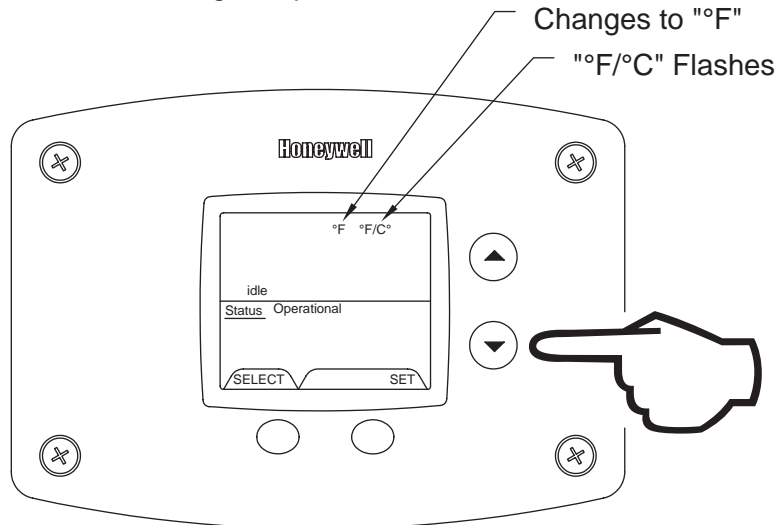
Step 2: Press "Set" button to change temperature format. "°F/°C" symbol will flash in the water heater display.



Step 3a: Press "Temperature Up" button to change temperature format to °C.

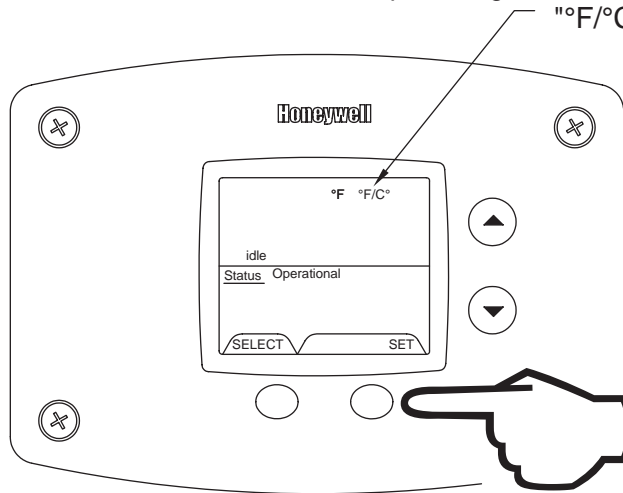


Step 3b: Press "Temperature Down" button to change temperature format to °F.



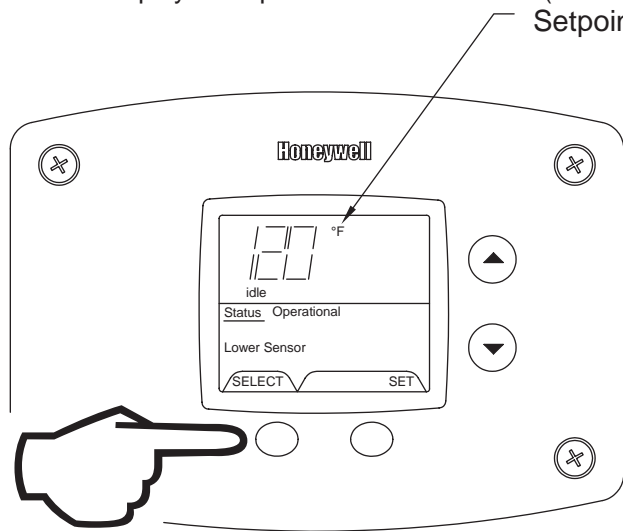
Step 4: Press "Set" button to confirm °F or °C format. °F/°C will stop flashing.

"°F/°C" Symbol Stops Flashing



Step 5: Pressing "Select" button will return display to setpoint in format selected (°F or °C) immediately.

Setpoint shown in °F



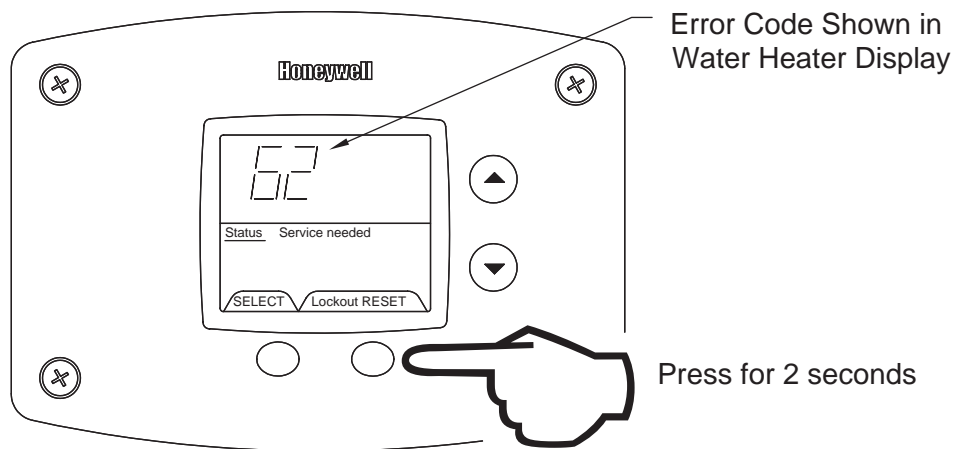
## How to reset the control from Lockout Conditions:



The following procedure is for service and installation personnel only. Resetting lockout conditions without correcting the malfunction can result in a hazardous condition.

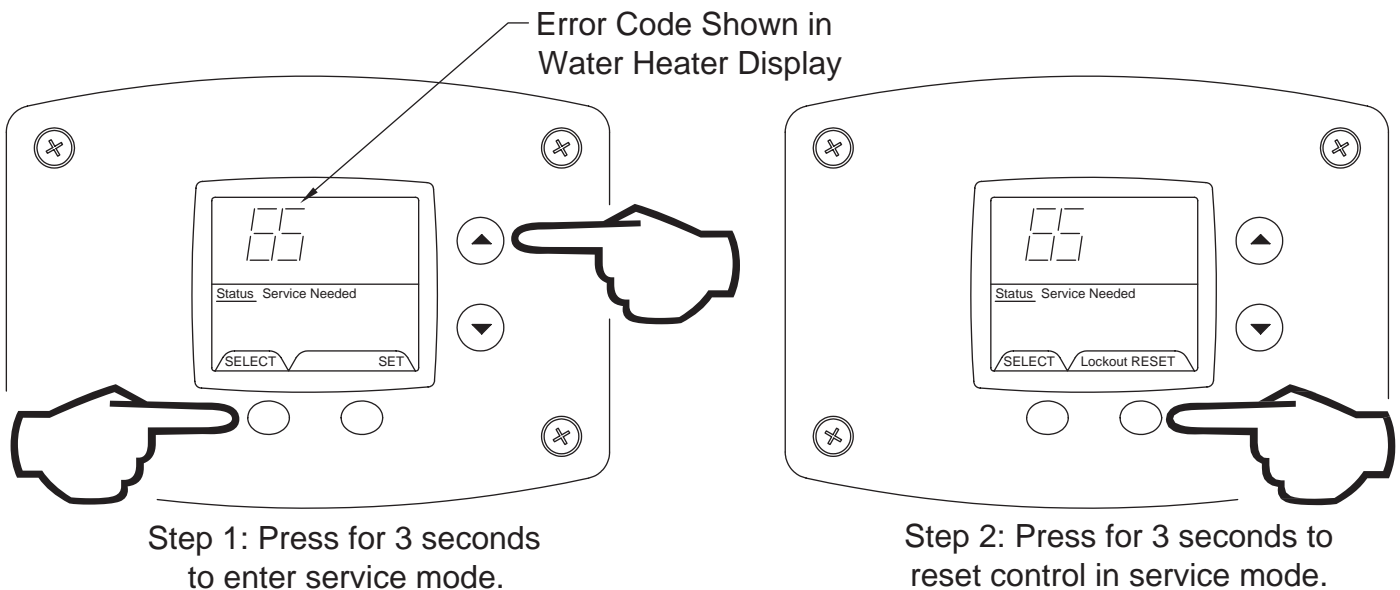
If an error code is displayed (except for #4, low flame sense current), the water heater will be in a “lockout condition” with the water heater display showing the error code number and “Service Needed” in the status section of the display window. Error codes 62 (maximum number of retries detected) and 63 (maximum number if ignition recycles detected) are “Soft Lockouts” in which the control can be reset in the “User Mode” by pressing the lower right button under “Lockout Reset” shown in the lower right portion of the display. The control will also go through 3 attempts to relight the burners every hour in the soft lockout condition.

### Resetting Error Codes in Soft Lockout Condition



All other error codes will put the water heater into a “Hard Lockout” condition, in which the water heater will not operate and cannot be reset in the “User Mode”. To reset a hard lockout, first enter the “Service Mode” described earlier by pressing both the “Temperature Up” and “Select Buttons” at the same time for 3 seconds. Then press the lower right button under “Lockout Reset” in the water heater display and hold for 3 seconds.

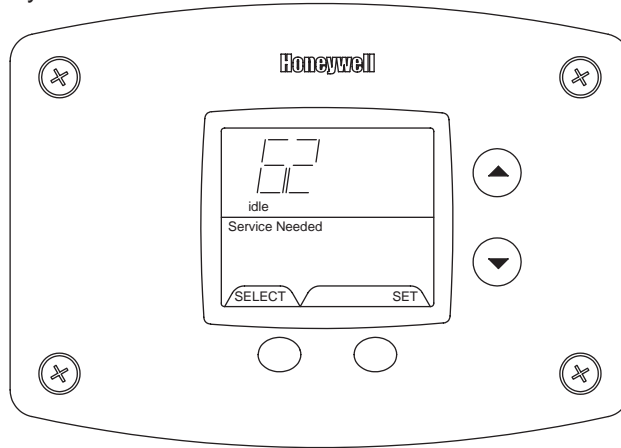
### Resetting Error Codes in Hard Lockout Condition



### Error Codes and Error History Display:

If there is an operating problem with the water heater, an error code number will appear on the water heater display with “Service Needed” to the right of the “Status” indicator. The error code label is located below the water heater display and the following section in this Installation and Operating Instruction Manual explains the error codes with corrective actions to repair the water heater.

Example of Error Code in the Display:



### Error Code History:

In “Service Mode” pressing the “Select” button after the “Software Version” (item 8 in the previously described sequence of service modes) will show an error code history, if there have been any previous operating problems with the water heater. If the display shows --, there is not a current error code.

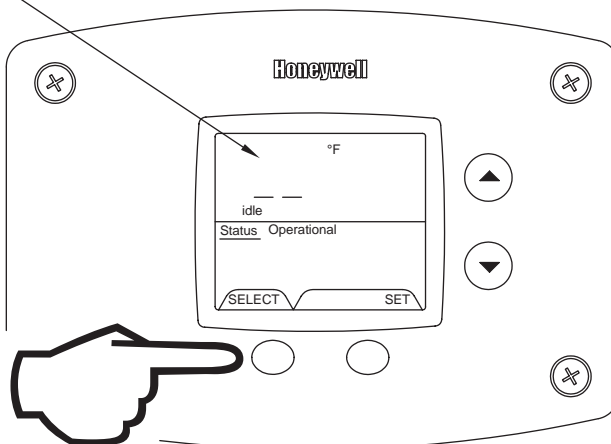
The Water Heater Display will provide up to 10 previous error codes. The oldest error code will be stored in code index #1 and the most recent in code index #10 (if there are 10 error codes).

### To view previous error codes:

Step 1:

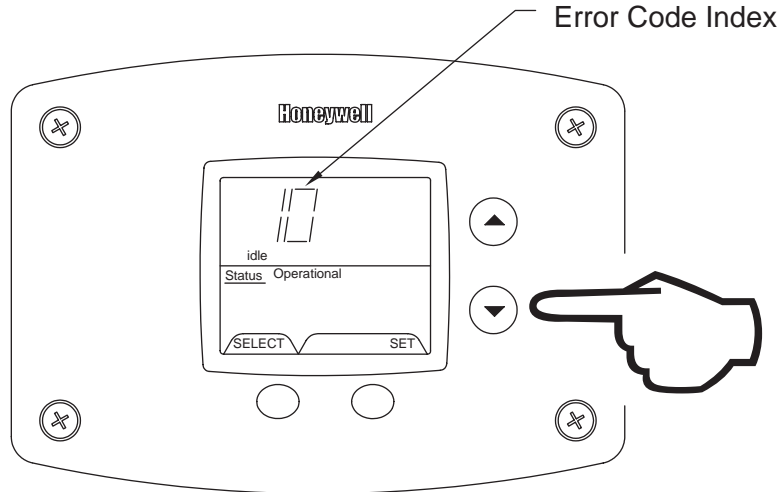
In “Service Mode” press the “Select” button until the next display after the “Software Version”. If there are no current error codes, the display will show -- .

No Current Error Code



Step 2:

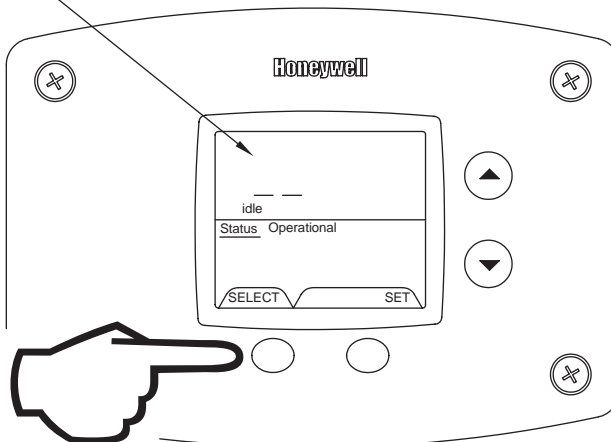
Press the "Temperature Down" button to select the error code index, starting with the most recent error code "10".



Step 3:

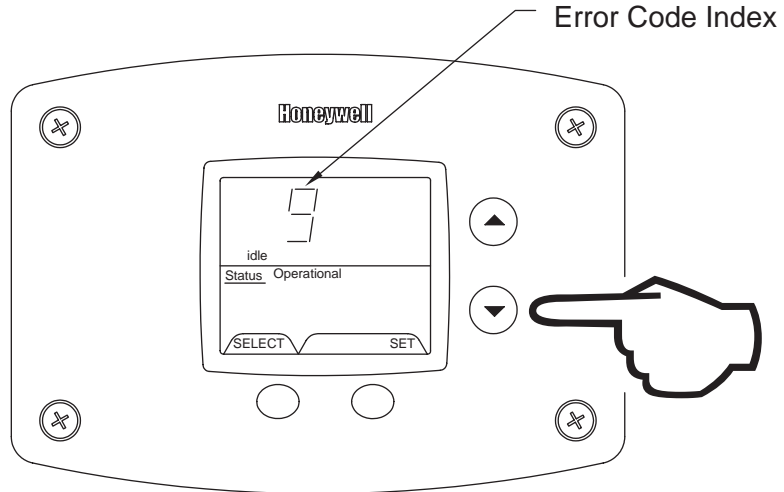
Press the "Select" button to view the error code for "code 10". If there is a number displayed, note what the number is. The label next to the water heater display will identify the code number. If no number is displayed with only a "--" in the water heater display, then there has not been an error code for error code index 10.

No Error Code Shown  
for Code Index 10



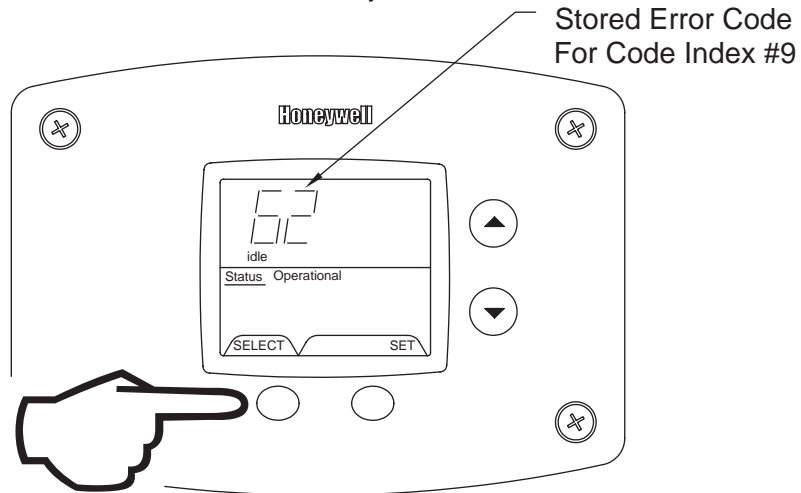
Step 4:

Press the "Temperature Down" button to change to the previous code index, code #9.



Step 5:

Press the "Select" button for code index #9 to view if there are any code numbers.

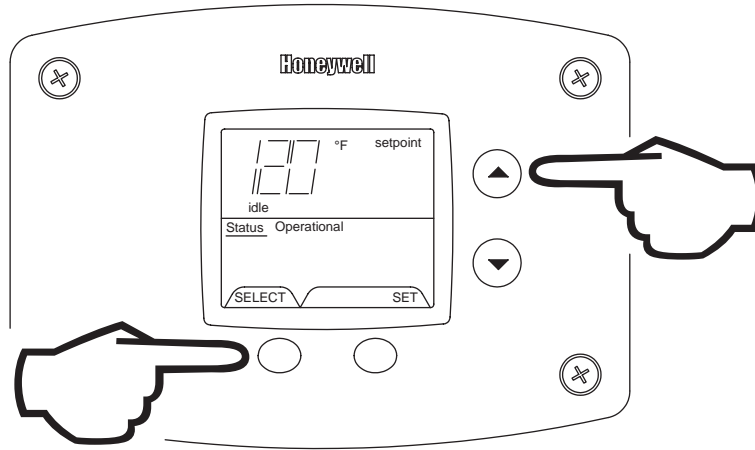




**Step 6:**

Continue pressing the “Temperature Down” button to change to the next error code index and press “Select” to view the error code number, if any, for that index number. Continue on to index #1, the oldest error code index. The water heater display will store up to 10 error codes with the oldest code starting in code index #1 with the most recent code in code index #10.

**Step 7:** 10 seconds after the last button press, the Water Heater Display will revert back to the current error code display. To exit Service Mode, either wait 30 seconds or press Temperature Up button and Select Button for 3 seconds.



**Exiting Service Mode**

**DIAGNOSTIC ERROR CODES AND TROUBLESHOOTING PROCEDURES FOR HONEYWELL INTEGRATED CONTROLS (24 VOLT FLUE DAMPER MODEL SERIES)**

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
4	Low Flame Sense Current	Determine flame sense current in the Service Mode with the water heater operating. If less than 1.0 microamps, check pilot flame sense rod and wire. Clean flame sense rod with emery cloth. If problem is not solved, replace pilot.
55	Damper End Switch Failed to Close (Stuck Open)	Check to see if flue damper has fully opened. If not, disconnect damper harness at damper plug connection and check for 24 volts between pins on red and white wires. If no voltage, check wire harness or measure output on control board (pins 1&4). If there is no voltage at the control board, replace control. Replace wire harness if voltage does not pass to the pin terminals from the control. If there is 24 volts at flue damper connection, replace flue damper. If damper is open, disconnect harness and check continuity between pins from black and yellow wires on flue damper. If no continuity, replace flue damper.
56	Damper End Switch Failed to Open (Stuck Closed)	Check to see if flue damper has fully closed. If not, disconnect damper harness at damper plug connection and check for 24 volts between pins on red and white wires. If no voltage, check wire harness or measure voltage output on control board (pins 1&4). If there is no voltage at the control board, replace control. Replace wire harness if voltage does not pass to the pin terminals from the control. If there is 24 volts at flue damper connection, replace flue damper. If damper is closed, disconnect harness and check continuity between pins from black and yellow wires on flue damper. If there is continuity, the end switch is stuck closed. Replace flue damper.

Error Code	Definition of Code	Cause of Problem and Actions Taken to Correct
6	Flame Sensed Out of Normal Sequence (Before Opening Gas Valve or After Closing Gas Valve)	Check to make sure gas valve has closed. No voltage should be present at the gas valve before or after ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.
23	Flame Detected Before Ignition	Check to make sure gas valve has closed. No voltage should be present at the gas valve before the ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.
24	Flame Detected After Heating Cycle Completes	Check to make sure gas valve has closed. No voltage should be present at the gas valve before the ignition cycle. Make sure wire positions on the wire harness are correct. If gas valve is stuck open, replace.
31	Upper Sensor Readings Faulty	Resistance of upper sensor out of operating range. Check continuity of wire harness to upper sensor, and if O.K., replace upper sensor.
32	Lower Sensor Readings Faulty	Resistance of lower sensor out of operating range. Check continuity of wire harness to lower sensor, and if O.K., replace lower sensor.
57	Flame Rod Shorted to Ground	Pilot flame sensor rod is shorted to ground. Check to see if flame sensor wire has bare spots touching metal parts or if flame sensor rod is touching the pilot shield or other metal parts. Replace pilot if flame sense wire is damaged or flame rod is bent.
58	AC Line Frequency Error – Signal Too Noisy or Frequency Incorrect	Check line voltage frequency to the water heater. Determine if there are wide fluctuations. Call an electrician if the problem persists. The water heater should be on a separate line.
59	Line Voltage Too Low or High	Check line voltage to the water heater. Determine cause of low or high voltage. Call an electrician or your utility. The water heater should be on a separate line.
61	DC Output Voltage Unstable	Check line voltage to the water heater for erratic readings. Also check wiring to make sure there are no shorts. If power supply and wiring is O.K., replace control board.
62	Maximum Number of Retries Detected	Pilot is either not lighting or not staying lit during the ignition cycle. Check inlet gas pressure for minimum pressure on rating label. Is pilot electrode sparking? Check gas valve wire harness for broken wires or shorts. If 24 volts is present between PV and PV/MV terminals at the gas valve, replace gas valve. Check for voltage output to the yellow and red gas valve wires on the control board pins. If during the ignition trial period, there is no voltage present at the control board pin terminal for the red and yellow wires leading to the gas valve, then replace the control board. Replace pilot if wires are damaged or electrode is damaged.
63	Maximum Number of Ignition Recycles Detected	Pilot flame is lost during run cycle, then reestablished on ignition cycle. Check inlet gas pressure. Is gas pressure dropping below the minimum operating pressure on the rating label after the main gas valve opens? Is the gas pipe size to the water heater adequate? Check the pilot shield position and condition of the burners. Clean or replace as needed. Check the pilot flame and observe the microamp output on the run cycle. Check the pilot tubing to the pilot and replace if crimped or damaged. Replace pilot if wires, flame sensor, or electrode is damaged.
64	Electronics Failure	Replace control board.
65	High Water Temperature (Over 200°F)	Water temperature in tank has exceeded 200°F. Check lower sensor. Make sure sensor is fully inserted into the well (clip on sensor wire secures sensor in place). Check lower and upper (where used) sensor readings. If not within specifications, replace sensor. If sensor and wire harnesses check O.K., replace control board.

## Procedure for Checking Thermostat Sensors

Set the thermostat above water temperature (See temperature adjustment section) and observe system through one (1) complete cycle. Make sure system operates as desired.

To check the upper sensor or lower sensor assembly, compare the resistance of the sensor terminals (blue leads for upper sensor, yellow and black lead for lower sensor) as measured by an ohmmeter to the water temperature as measured by an accurate thermometer. Thermistor resistance increases as the temperature decreases. The tables below show the correct sensor resistance at various temperatures. Replace the sensor if the ohm reading in the chart does not approximate the reading from the sensor at the temperature measured in the tank.

In Degrees F										
°F	0	1	2	3	4	5	6	7	8	9
40	26109	25400	24712	24045	23399	22771	22163	21573	21000	20445
50	19906	19383	18876	18383	17905	17440	16990	16553	16128	15715
60	15314	14925	14548	14180	13823	13477	13140	12812	12494	12185
70	11884	11592	11308	11032	10763	10502	10248	10000	9760	9526
80	9299	9078	8862	8653	8449	8250	8057	7869	7685	7507
90	7333	7165	7000	6839	6683	6531	6383	6238	6098	5961
100	5827	5697	5570	5446	5326	5208	5094	4982	4873	4767
110	4663	4562	4464	4368	4274	4183	4094	4006	3922	3839
120	3758	3679	3602	3527	3453	3382	3312	3244	3177	3112
130	3048	2986	2925	2866	2808	2752	3697	3643	2590	2538
140	2488	2439	2391	2344	2298	2253	2209	2166	2124	2083
150	2043	2004	1966	1928	1891	1856	1820	1786	1753	1720
160	1688	1656	1625	1595	1566	1567	1509	1481	1454	1427
170	1402	1376	1351	1327	1303	1280	1257	1235	1213	1191
180	1170	1150	1129	1110	1090	1071	1053	1035	1017	999
190	982	965	949	933	917	901	886	871	857	842
200	828	814	801	788	775	762	749	737	725	713

In Degrees C										
°C	0	1	2	3	4	5	6	7	8	9
0	32648	31026	29495	28049	26682	25389	24166	23010	21915	20879
10	19898	18968	18088	17253	16461	15710	14998	14322	13680	13071
20	12492	11942	11419	10922	10450	10000	9572	9165	8778	8409
30	8057	7722	7403	7099	6808	6532	6268	6016	5775	5546
40	5327	5117	4917	4726	4543	4368	4201	4042	3889	3742
50	3602	3468	3340	3217	3099	2986	2878	2774	2675	2579
60	2488	2400	2316	2235	2157	2083	2011	1942	1876	1813
70	1752	1693	1637	1582	1530	1480	1432	1385	1340	1297
80	1256	1216	1177	1140	1105	1070	1037	1005	974	944
90	916	888	861	835	810	786	763	741	719	698

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