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Introduction

Temperature fluctuations from hot to cold during use are typically caused by a restriction in the hot water flow from the tankless heater. This slows the flow within the tankless heater, decreasing it below the activation flow rate, which shuts off the burners. The end result is nothing but cold water coming out of the outlet. Follow each step below before proceeding to the next. After each step, test the hot water flow to see if it remains constant without turning cold.

Tools needed:
- Various wrenches
- Container with known volume (like a quart container)

Clean faucet aerators and shower heads

1. Check for restrictions in plumbing outlets, which could limit hot water flow and may contribute to heater deactivation. For sinks, remove faucet aerator. Flush and clean screen and reinstall. For showers, remove showerhead and flush. If plugged with mineral deposits, clean according to manufacturer’s suggestions or replace showerhead. (If showerhead is wand style/hand held, corrugated tube connecting to head may be too restrictive. Use a larger tube or replace with a normal shower head.)

Clean heater’s inlet filter screen

1. Inlet filter screen is located just inside the cold water inlet (right) at the bottom of the unit.
2. Remove filter and clean. If filter is damaged, replace filter.

Check for plumbing crossover

NOTE: A plumbing crossover can be caused by a failed washer at a single lever faucet, incorrect plumbing or a faulty mixing valve in the plumbing. The crossover will create back pressure on the hot water flow and prevent an adequate flow of water through the heater.
1. Close the installer supplied cold water shut off valve (if none installed, install before proceeding).
2. Open all hot water taps supplied by the heater. Wait 5 minutes and check all taps. The water flow should come to a complete stop at every tap.

3. Any water running is a sign of a plumbing crossover. Consult a local plumber or service person for help. This condition must be corrected before the heater can operate properly.

Confirm water pressure

- Water pressure must stay above 30psi during heater operation. For installation on a private well system with the use of a pressure tank, the lowest pressure range setting recommended is 30-50 psi (2.07-3.45 bar). The use of a pressure reducing/regulating valve directly after the pressure tank is an effective way to maintain constant water pressure to the water heater. Watts brand 25AUB-¾” or N35B-¾” pressure reducing/regulating valves or equivalent is suggested.

Check temperature balancing valves

- Heater deactivated by temperature balancing valves. If the outlet water temperature is set too high, the heater can produce temperatures that are too hot. A temperature balance shower valve will automatically mix in cold water to reduce such hot water temperature. In the event of any temperature instability at a fixture using a temperature balancing valve, refer to the valve manufacturer for instructions on internal adjustment setting. An adjustment should be made to minimize the amount of cold water the valve is adding. Additionally, the temperature setting on the heater can be lowered to prevent the temperature balance valve from mixing in too much cold.

Confirm activation rate of the heater

1. Fully open one hot water tap.
2. Return to heater and shut cold water supply valve.
3. Slowly open cold water supply valve just until the burners ignite.
4. Return to hot water tap and measure flow rate by timing how long it takes to fill a quart container. A fill time of 19 seconds indicates a proper activation rate of 0.8 gallons per minute (GPM).
5. Repeat steps 4 and 5 a few times to check the accuracy of the test.

NOTE: A fill time less than 19 seconds indicates an activation rate above the required 0.8 GPM and a possible problem within the heater’s water valve.
Lower temperature

- Use the controls on the front on the heater to lower the output temperature. Most people use hot water in the range of 100-110°F.
Service bulletin
Measuring gas pressure

Introduction

- In order to meet design capacities of this unit, the gas supply must meet the design requirements.
- It is important to size the gas line to meet the requirements of all gas appliances. Please consult the National Fuel Gas Code NFPA 54, or a locally licensed gas technician if you are unsure of the gas line size.
- While testing for adequate gas pressure, all gas appliances must be operated at full capacity.

Tools needed:
- Manometer
- Philips head screw driver
- Small flat head screw driver

Connecting Manometer

1. Shut off gas supply with installer supplied shut off valve.
2. Remove front cover and locate inlet gas pressure measuring tap on gas valve.
3. Loosen screw inside the tap with a small flat head screw driver (do not remove) and connect manometer tube on test tap (if manometer fitting goes inside the tap, remove screw.)

Static Pressure Test

1. Turn gas supply back on.
2. Operate all other gas appliances on same gas piping system at maximum output.
3. Gas pressures lower than 5” W.C. for Natural Gas or 11” W.C. for Liquid Propane will result in insufficient degree rise to the hot water being used and must be corrected.

Operating Pressure Test

NOTE: Reset any error codes with reset button first.
1. Put ON/OFF switch in the OFF position.
2. Press and hold the “Program” (M) button and turn ON/OFF switch to ON position.
3. As soon as ‘188’ is displayed, release “Program” button and the display should read ‘P2’.

Program mode

4. Press the ‘+’ button, until P1 appears.
5. Turn on a high volume of hot water flow (at least 6 gpm) and the heater will ignite.
6. Gas pressures lower than 5” W.C. for Natural Gas or 11” W.C. for Liquid Propane will result in insufficient degree rise to the hot water being used and must be corrected.
7. Remove manometer from measuring tap and tighten screw.
Common causes of low gas pressure

- Appliance gas connector is not at least ¾".
- Gas line was not sized large enough. Most often found in retrofit applications.
- The gas filter on the bottom of the unit is clogged with pipe dope or other debris.
- Gas meter or regulator is not set to deliver enough gas or is defective. Have gas or propane supplier verify proper operation.
Introduction

The remote control initialization instructions vary based on the version of control board installed in your heater. Follow these instructions to determine the control board version in the water heater and the corresponding manual to use.

Tools needed:
- None

Control board version

1. Turn power switch on the water heater to the off position.
2. When turning power switch to the on position, note the first two letters that appear on the display (either AF or SU).
3. Make note of the two letters that appeared.

Manual version

1. In the lower left hand corner of the remote control manual, there are a series of numbers. Both manuals have the numbers: 6 720 606 990 followed by numbers in parantheses.

2. The numbers in parantheses indicate the version of the manual. Use the following table to determine which instruction manual to use.

<table>
<thead>
<tr>
<th>Software code</th>
<th>Manual version</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF</td>
<td>(05.11)</td>
</tr>
<tr>
<td>SU</td>
<td>(04.03)</td>
</tr>
</tbody>
</table>
Introduction

- The inlet and outlet temperature sensors work together to ensure that the set-point temperature on the control board can be reached accurately. Incorrectly placed sensors, corroded sensor connections or defective sensors may result in temperature overshooting/undershooting, fluctuating temperatures and in some cases a lock-out error code on the control board that requires resetting. These error codes are typically A7, A9, E1, E2, and in some cases E9.

Tools needed:
- Multi-meter
- Thermometer
- Philips head screw driver
- Emery cloth

Preparation

1. Remove the front cover of the water heater. For instructions on removing the front cover, refer to the installation/owner’s manual of the water heater.
2. Locate the temperature sensors clipped onto their respective hot and cold ½” copper pipes inside the water heater. The hot water temperature sensor should have two red wires connected from the control board and should be located on the horizontal pipe. The cold water temperature sensor is connected with two blue wires and should be clipped to the diagonal pipe. See below.

Temperature sensor location

3. If the either sensor is not in it’s respective location, move to the proper location immediately. Ensure that the sensor is firmly clipped and making good contact with the copper pipe.

Removing, cleaning and/or replacing temperature sensor

1. Remove the wire spade connections on the temperature sensor in question.
2. Unclip temperature sensor from the copper pipe. Wipe the inside of the sensor clean with a pencil eraser where it makes contact with copper pipe. Wipe down the ½” copper pipes where sensors are placed with a clean rag.
3. Clip the cleaned or new temperature sensors firmly onto the pipe. (see Temperature sensor location figure) Make sure sensor is making good contact with copper pipe.
4. Clean and polish spade connections on temperature sensors with emery cloth. Reconnect wire connections to their respective sensor ensuring that the spade connectors are fully seated.
5. Repeat these steps for both sensors as needed.
Testing temperature sensors

1. Turn the on/off switch on the water heater to off. Display should be blank.
2. Remove the wire spade connections on both temperature sensors.
3. Remove the hot water temperature sensor from the outlet pipe and place this directly adjacent to the cold water sensor on the inlet pipe inside the water heater. Make sure that both sensors are seated firmly on the copper pipe.
4. Turn on a hot water fixture such as a sink and allow water to run steadily through the water heater for 5 minutes. Using a thermometer, measure the temperature of the water flowing out of this tap. Continue running water and go back to the water heater.
5. Using a multi-meter set on kilo-ohms (kΩ), measure the resistance between the two connections of each sensor and record readings.
6. Refer to the table below for resistance readings in accordance with water temperature readings. **NOTE:** Readings are approximate. If readings are inconsistent between sensors and/or do not match approximate readings, replace the sensor with improper readings. If sensor readings are accurate according to the table but still give inconsistent temps or an error code, contact Bosch Water Heating Technical Support at 800-642-3111.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Approximate resistance reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 °F</td>
<td>40 kΩ</td>
</tr>
<tr>
<td>55 °F</td>
<td>22.5 kΩ</td>
</tr>
<tr>
<td>65 °F</td>
<td>13.5 kΩ</td>
</tr>
<tr>
<td>100 °F</td>
<td>7.5 kΩ</td>
</tr>
<tr>
<td>120 °F</td>
<td>4.5 kΩ</td>
</tr>
<tr>
<td>140 °F</td>
<td>3.5 kΩ</td>
</tr>
</tbody>
</table>
Service bulletin
Winterizing and freeze prevention

Introduction

► Please note that installation instructions state that the water heater must not be installed in a location where it may be exposed to freezing temperatures. If the heater must be left in a space which is likely to experience freezing temperatures (less than 36° F), all water must be drained from the heater. If precautions are not taken, resulting damage will not be covered under the warranty.

► NOTE: Use of agents like anti-freeze is not recommended as they may cause damage to the water heater’s internal components.

Tools needed:
► Bucket
► Adjustable wrench
► Air compressor/compressed air

Preparation

1. Turn on/off switch on the water heater to the off (O) position and unplug power supply cord. The display should be blank.
2. Shut off gas supply to heater.
3. Shut off the water supply to the water heater using installer supplied shutoff valve.
4. Open hot water taps to drain and relieve pressure from the plumbing system. If water continues to flow after 5 minutes, a plumbing crossover is present and must be corrected before proceeding.
5. Disconnect inlet and outlet water pipes from the water heater. Place a small bucket underneath the water heater to catch residual water remaining inside the water heater. Save washers for future use.
6. Using an air compressor, blow short bursts of air through the inlet water connection until there is no water present coming through the outlet water connection of the heater.
7. Reconnect water fittings and return heater to service when danger of freezing has past.
Introduction

Control boards having software versions 3003 and newer are equipped with full diagnostic features. Older model control boards are not capable of running software version 3003 and newer. Contact Bosch Water Heating at 1-800-642-3111 with questions.

Tools needed:
- None

Determining diagnostic mode availability

1. Turn on/off switch on water heater to off (O) position then back to the on (I) position. Quickly observe the first set of letters on the LCD display of control unit. If the heater displays the letters "SU", then diagnostics are not available with this software version. If the heater displays the letters "AF", then diagnostics are available and you may proceed to the next step.

Accessing diagnostic mode

1. Turn on/off switch on water heater back to off (O) position.
2. Press and hold the program (P) button (M on older models) while turning the on/off switch to the on (I) position. The display will cycle through a start-up procedure including software version.
3. Release the 'P' button when '188' appears on the display. The display should read 'P2' when the program button is released. If not, repeat process.
4. Press the '+' button on the control panel until the display reads 'P4'. You are now in the diagnostic mode of the control board.
5. When the display reads 'P4', press the 'P' button once again and the display should read 'E'.
6. Use the '+' and '-' button on the control board to cycle through different diagnostic modes available.

NOTE: Each diagnostic mode that appears on the LCD display will have a number on the left and a letter on the right. If the letter on the right is an upper case P, then refer to Software Version 3003 of the diagnostics table on the back page. If the letter on the right is a lower case "d", then refer to Software Version 3005 of the diagnostics table on the back page.

7. Once in the selected diagnostic mode of your choice, press the 'P' button to display the diagnostic information.

EXAMPLE (using software version 3005): To read the flow rate in gallons/minute while the unit is flowing water, cycle to the '3d' mode and press the 'M' button. A reading of 25 on the display would indicate the heater is reading a flow rate of 2.5 gallons/minute.
8. Once the information is obtained, press the 'P' button again to return to the diagnostic mode menu and scroll to additional diagnostic information.
9. To exit the diagnostic mode of the heater, use the '+' or '-' button until the display reads 'E'.
10. Press the 'P' button once again and the display should read P4.
11. Turn the on/off switch off (O) and back on (I) again to return heater to normal function.
### Software version 3003 diagnostic codes

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Entry/Exit into sub-modes</td>
</tr>
<tr>
<td>0P</td>
<td>Set-point temperature</td>
</tr>
<tr>
<td>1P</td>
<td>Inlet water temperature</td>
</tr>
<tr>
<td>2P</td>
<td>Outlet water temperature</td>
</tr>
<tr>
<td>3P</td>
<td>Water flow (liters/min)</td>
</tr>
<tr>
<td>4P</td>
<td>Water flow (gallons/min)</td>
</tr>
<tr>
<td>5P</td>
<td>Fan speed (Hz)</td>
</tr>
<tr>
<td>6P</td>
<td>Burner power (%)</td>
</tr>
<tr>
<td>7P</td>
<td>Maximum power (kW)</td>
</tr>
<tr>
<td>8P</td>
<td>PWM cycle (signal to fan)</td>
</tr>
<tr>
<td>9P</td>
<td>Appliance selection</td>
</tr>
<tr>
<td>1F</td>
<td>Most recent error/failure</td>
</tr>
<tr>
<td>2F</td>
<td>2nd most recent error</td>
</tr>
<tr>
<td>3F</td>
<td>3rd most recent error</td>
</tr>
<tr>
<td>4F</td>
<td>4th most recent error</td>
</tr>
<tr>
<td>5F</td>
<td>5th most recent error</td>
</tr>
<tr>
<td>6F</td>
<td>6th most recent error</td>
</tr>
<tr>
<td>7F</td>
<td>7th most recent error</td>
</tr>
<tr>
<td>8F</td>
<td>8th most recent error</td>
</tr>
<tr>
<td>9F</td>
<td>9th most recent error</td>
</tr>
<tr>
<td>10F</td>
<td>10th most recent error</td>
</tr>
</tbody>
</table>

### Software version 3005 diagnostic codes

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Entry/Exit into sub-modes</td>
</tr>
<tr>
<td>0d</td>
<td>Set-point temperature</td>
</tr>
<tr>
<td>1d</td>
<td>Inlet water temperature</td>
</tr>
<tr>
<td>2d</td>
<td>Outlet water temperature</td>
</tr>
<tr>
<td>3d</td>
<td>Water flow (gallons/min)</td>
</tr>
<tr>
<td>4d</td>
<td>Gas type (LP or NA)</td>
</tr>
<tr>
<td>5d</td>
<td>Fan speed (Hz)</td>
</tr>
<tr>
<td>6d</td>
<td>Burner power (%)</td>
</tr>
<tr>
<td>7d</td>
<td>Maximum power (kW)</td>
</tr>
<tr>
<td>8d</td>
<td>PWM cycle (signal to fan)</td>
</tr>
<tr>
<td>9d</td>
<td>Appliance selection</td>
</tr>
<tr>
<td>1F</td>
<td>Most recent error/failure</td>
</tr>
<tr>
<td>2F</td>
<td>2nd most recent error</td>
</tr>
<tr>
<td>3F</td>
<td>3rd most recent error</td>
</tr>
<tr>
<td>4F</td>
<td>4th most recent error</td>
</tr>
<tr>
<td>5F</td>
<td>5th most recent error</td>
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<td>6F</td>
<td>6th most recent error</td>
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<tr>
<td>7F</td>
<td>7th most recent error</td>
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<tr>
<td>8F</td>
<td>8th most recent error</td>
</tr>
<tr>
<td>9F</td>
<td>9th most recent error</td>
</tr>
<tr>
<td>10F</td>
<td>10th most recent error</td>
</tr>
</tbody>
</table>
Introduction

- If there is little or no flow coming out of the heater, the inlet screen is clean and the unit is plumbed correctly, then the water valve may be stuck closed. To cycle the water valve to the open position, follow the steps below.

Tools needed:
- Very small flat head screwdriver

Unlocking water valve

1. Turn the on/off button on the front of the heater to the off position (to the left).
2. Locate the water valve inside the lower half of the heater where the cold inlet water comes in. Locate the plug connection that comes from the control board and plugs into a connection coming from the water valve. This plug has 8 multi colored wires coming into each connection.
3. Disconnect the multi colored wire connections coming from the water valve.
4. On the connector coming from the control board and starting at one side you will see a black wire, then a red wire, and then a green wire (on older models, this wire was brown). Using a very small screwdriver, push down on the silver tab to release and disconnect the green wire (or brown for older models) from the connector.
5. Leaving the green wire (or brown wire for older models) disconnected, plug the 2 connectors back together.
6. Turn the heater on (to the right). You should hear the water valve opening up. Leave the heater on for 5-10 seconds and then shut the heater off (to the left).
7. Unplug the wire connections and replace the green wire (brown for older models) from where it was pulled out.
8. Plug the 2 connections back together and turn the heater on (to the right) and the heater should be back in operation and the water valve to its full open position.
9. Make sure inlet water is on, gas is on, and power is on and run a hot water tap and the heater should be operating fine now.
10. If the problem persists, please contact Bosch technical support at 800-642-3111 for further assistance.
Introduction

NOTE: The CO₂ levels can only be adjusted by a certified gas technician with a calibrated combustion gas analyzer.

Tools needed:
- Combustion gas analyzer
- Flat head screw driver
- Philips head screw driver

Measure gas pressure

One factor that may affect CO₂ levels is improper gas pressure. Please see bulletin TWH-G2-03 for the procedure to measure gas pressure. Correct any deficiencies in gas pressure before proceeding.

Preparation

1. Turn ON/OFF switch to the OFF (O) position.
2. Remove brass flat head screw on the exhaust collar as seen below.

3. Insert CO₂ analyzer probe into the measuring port. The tip of the probe should be in the center of the flue pipe (approx 1.5” inserted).
4. While holding the Program (M) button, move the ON/OFF switch to ON (I) position. As soon as ‘188’ flashes on the display, release the program button. The display should now read P2.

Measuring CO₂

1. Open hot water taps to achieve a flow rate of at least 4 gallons per minute. (1 tub and 2 sinks should be sufficient)
2. Record the P2 CO₂ reading below. (Analyzer reading may take several minutes to stabilize)
   P2 CO₂ reading: % CO₂
3. Press the ‘+’ button until P1 appears. Unit will ramp up to high fire and the water flow should increase.
4. Record the P1 CO₂ reading below.
   P1 CO₂ reading: % CO₂
5. Compare your readings to those found in the following table. If CO₂ readings are off make adjustments as outlined in the next section.

<table>
<thead>
<tr>
<th>Proper CO₂ readings</th>
<th>Natural Gas</th>
<th>LP Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max input P1</td>
<td>9.7 ± 0.3 %</td>
<td>10.7 ± 0.3 %</td>
</tr>
<tr>
<td>Max input P2</td>
<td>9.5 ± 0.5 %</td>
<td>10.5 ± 0.5 %</td>
</tr>
</tbody>
</table>
Adjusting CO₂

**NOTE:** When making adjustments with the front cover off, CO₂ levels will be 0.3 - 0.5 % lower than with the front cover on. Make final readings with the front cover installed.

**NOTE:** Adjusting P1 CO₂ levels will change the P2 CO₂ levels. Confirm the P1 value BEFORE adjusting the P2 level.

**Adjusting P1 CO₂ level**

1. Loosen yellow painted Philips screw and cover should rotate down revealing a brass slotted screw.

2. Adjusting the brass slotted screw counter-clockwise will raise P1 CO₂ levels and clockwise will lower P1 CO₂ levels.

**Adjusting P2 CO₂ level**

1. Remove yellow painted #40 Torx cover from the front of the gas valve. A plastic #40 Torx screw will be revealed.

2. Adjusting the plastic #40 Torx screw counter-clockwise will lower P2 CO₂ levels and clockwise will raise P2 CO₂ levels.

**Final readings**

1. Verify both P1 and P2 are within the ranges specified in the table below. Continue adjusting the P1 and P2 levels as necessary until CO₂ values are within the specified ranges.

<table>
<thead>
<tr>
<th>Proper CO₂ readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
</tr>
<tr>
<td>Max input P1</td>
</tr>
<tr>
<td>Min input P2</td>
</tr>
</tbody>
</table>

2. As a safety precaution, verify the Carbon Monoxide (CO) readings on P1. CO levels should not exceed 300ppm (follow local codes if more restrictive). If values exceed this limit, inspect vent system and fincoils on the heat exchanger for blockage. To access heat exchanger fincoil, refer to service bulletin TWH-G2-22.

<table>
<thead>
<tr>
<th>Proper CO readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas</td>
</tr>
<tr>
<td>Max input P1</td>
</tr>
</tbody>
</table>

**Returning to Service**

1. Return slotted cover to original position.
2. Reinstall Torx cover.
3. Remove CO₂ analyzer probe and reinstall brass flathead screw in exhaust collar.
4. Turn ON/OFF switch to the OFF (O) position and then back to the ON (I) position.
5. Heater is ready for normal operation.

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Service bulletin

Descaling

Introduction

Periodic descaling may be necessary in areas with high mineral content in the water. Scale buildup in the heat exchanger may result in lower flow rates, error codes of A7 and E9 and boiling sounds in the heat exchanger.

Tools needed:
- Various plumbing wrenches
- Bucket for descaling solution
- Small circulator or pump

Descaling using a pump

1. Disconnect electrical supply from the water heater.
2. Shut off the water supply to the water heater using (installer supplied) isolation or shutoff valves.
3. Open hot water taps to drain and relieve pressure from the plumbing system.
4. Drain water from the unit’s heat exchanger by disconnecting inlet and outlet water connections from the heater.
5. Connect a line (A) from the outlet of the circulating pump (installer supplied) to the inlet water fitting on the water heater.
6. Connect another line (B) to the water outlet fitting on the water heater. Route the other end of this line into a descaling reservoir.
7. Using a 3rd line (C) from the descaling reservoir, connect to the inlet side of circulating pump. Verify that there is a filter on the end of the line in the descaling reservoir.
8. Make sure all connections are “hand tight.”
9. Fill tank with descaling solution so both lines inside are submerged. We recommend straight white vinegar. If using a commercial descalant, refer to manufacturer’s instructions on dilution with water.
10. Operate the circulating pump.
11. Make sure there are no leaks and the solution is flowing from the descaling reservoir through the heater and returning to the reservoir.
12. Run solution through the heater until the solution returning to the descaling reservoir comes out clear. (Changing to a fresh solution may be necessary during this process)
13. Disconnect all lines and drain all solution from heat exchanger. Properly discard of solution.
14. Position a container below the hot water outlet and reconnect cold water supply. Open cold water supply isolation valve and flush heat exchanger with clean water.
15. Shut cold water isolation valve and reconnect hot water line to the water heater.
16. Reconnect electrical supply to unit, open water isolation valves, and return the unit to service.
Service bulletin
Replacing heat exchanger

Introduction

- When removing heat exchanger, the older style overheat cutoff fuse wrapped around the heat exchanger (if installed) should be replaced with a flue gas limiter (part # 8700400032). Consult bulletin TWH-G2-29 for the installation instructions.
- If the heat exchanger developed a leak at one of the side elbows and the leaking point looks like a split, please contact Bosch Water Heating if you have not already done so for instructions on how to prevent this from happening in the future.

Tools needed:
- Philips head screw driver

Removing heat exchanger

1. Turn off gas to heater using installer supplied manual shut off valve.
2. Turn power switch to the off (O) position and unplug heater.
3. Close installer supplied inlet isolation valve or shut-off valve and open a hot water tap to release pressure from hot water side of heater. If water flow does not stop a crossover is present and must be corrected. Disconnect inlet and outlet pipes to facilitate draining the heater (be prepared to catch water).
4. Remove cover (see installation manual).
5. Remove brass phillips-head screws to release holding bracket.
6. Disconnect overheat sensor fuse: Follow two red wires from the top half of the heater down the left side to a connector and disconnect. Newer models may have the flue gas limiter which is mounted in the top right corner of the heater and does not need to be disconnected.
7. Disconnect two white wires from the ECO on top right of heat exchanger by pulling gently on the connectors.
8. Remove clips on heat exchanger pipe connections.
10. Turn flue adaptor to the left and it will now lift up and separate from flue gas collector. If this is difficult, disconnect the white exhaust adapter from the top of the unit.
11. Remove flue gas collector, leaving black gasket on top of heat exchanger.
12. While holding cold and hot water pipes, gently lift up on left hand side of heat exchanger to separate. Carefully lift heat exchanger up 1" and bring forward slowly making sure not to hit flame sensor and igniter rods while removing.

Preparing new heat exchanger

1. Inspect heat exchanger for signs of ship damage. Please call supplier of heat exchanger with questions.
2. Remove white silicon spacer from inlet and outlet pipes of old heat exchanger and install in the same location on the new heat exchanger.
3. Remove ECO from top right of heat exchanger by removing screw and install in same location on the new heat exchanger.
4. Install new viewing window and gasket on new heat exchanger.
Replacing heat exchanger

1. Place heat exchanger in place, being careful not to hit the flame sensor and igniter rods with the back of the heat exchanger.
2. Press hot and cold pipes from heat exchanger down until the top lip of the heat exchanger pipe is even with the top lip of the lower pipe.
3. Reinstall clips. The top (smaller) part of clip should hug copper pipe and be completely above heat exchanger pipe lip. **NOTE:** Heater WILL leak if clips are not properly secured see Figure 5 for proper position.
4. Ensure that lower heat exchanger gasket is in place and makes a good seal.
5. Push silicone spacer in place. The top of the spacer should be level and make a good seal.

6. Place flue gas collector on top of the heat exchanger and make sure the upper heat exchanger gasket is in place and makes a good seal.
7. Rotate flue gas collector collar to the right. A distinctive “thunk” will be heard when installed correctly.
8. Tighten phillips-head screw on flue adapter.
9. Reconnect two white wires to the ECO on the top right of heat exchanger.
10. Reinstall metal holding bracket with Philips head screws.
11. Reconnect inlet and outlet water pipes to the bottom of heater.
12. Slowly open inlet isolation valve while checking for leaks. If any leaks are detected, shut off water and correct the source of the leak before continuing.
13. Plug unit in and turn power switch to on (I) position. Reset any error that is displayed with reset button.
14. Replace cover and reconnect white flue exhaust adapter (indoor unit, if removed) or the vent cap (outdoor unit).
15. Open gas shut-off valve.
16. Return water heater to service.

**Silicon spacer**

BBT North America Corporation
Bosch Group

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Service bulletin
Replacing and cleaning electrodes

Introduction

- The electrode set may need to be cleaned or replaced if the heater has frequent EC error codes or does not spark.

Tools needed:
- Philip head screw driver
- 8mm open end wrench or small adjustable wrench
- Steel wool for cleaning electrodes

Removing electrode set

1. Turn off gas to heater using installer supplied manual shut off valve.
2. Turn power switch to the off (O) position and unplug heater.
3. Remove cover per chapter 4 in installation manual.
4. Remove brass phillips-head screws to release holding bracket.
5. Remove air intake duct: remove two philips-head screws on the bottom of the air intake duct and then pull forward.

   NOTE: There is a thin black oring between the air intake duct and the gas/air mixer that may fall out.

6. Disconnect three yellow wires connected to the bottom of the electrode set.
7. Remove two 8mm retaining nuts.
8. Lower the electrode set slowly and rotate inward to remove.
Cleaning electrode set

1. If electrode set gasket is discolored or torn, replace with a new gasket.
2. Using steel wool, gently polish all surfaces of the flame sensor rod and electrodes.

Replacing electrode set

1. Gently place new gasket on studs. The studs will hold the gasket in place.
2. Carefully feed tips of electrode set into bottom of burner bed and rotate out while inserting.
3. Ensure proper seal between bottom of burner bed and the electrode set.
4. Replace the two 8mm retaining nuts.
5. Connect the two similar yellow wires to the left and center terminals (ignitor rods). Connect the thinner yellow wire to the right terminal (Flame sensor). Ensure the connectors fit snugly on the terminals.
6. Place thin black o-ring around the outside lip of the gas/air mixer.
7. Push air intake duct in place with two hands and hold. Ensure the top of the air intake duct is level and the back rubber gasket is tucked under the bed.
8. Replace two phillips-head screws on the bottom of the air intake duct.
9. Replace holding bracket and cover.
10. Plug unit in and turn power switch to on (I) position. Reset any error that is displayed.
12. Return to service.
Service bulletin
Replacing the control unit

Introduction

Before removing the control unit the original fan speed settings must be recorded so they can be programmed into the new control unit.

Tools needed:
- Philips head screw driver

Recording fan speeds

1. Turn the unit’s on/off switch to the off (O) position.
2. While depressing and holding the “P” program button (M on some models) turn the power switch to the on (I) position.
3. Release the “P” button when you see 188 on the display.
4. P2 will then be shown on the display. (If not, repeat steps 1-3)

5. Press the “P” button to view the fan speed setting for P2, record the number (normally between 10 and 15).
   P2 = 

6. Press the “P” button again, P2 will appear on display.
7. Press the “+” button until P1 appears.
8. Press the “P” button to view the P1 fan speed setting, record the number (normally between 46 and 53).
   P1 = 

9. Turn power switch to the off (O) position.

Removing control unit

1. Disconnect power supply to heater.
2. Remove plastic decals on front panel.
3. Loosen two Philips head screws located behind plastic decals.
4. Lift front cover up/outward and remove.
5. Loosen two philips head screws to remove control unit auxiliary cover.
6. Remove the 3-5 screws on the front retaining bar being careful not to damage the foam gasket material on it.
7. Remove the two electrical strip connectors inside the auxiliary cover by pulling them outward. Remove the two rubber seals from the control unit as well.

8. Loosen the 110V power supply cord retaining nut located underneath the heater. Once loosened, the power cord can be pulled up through the heater to provide sufficient slack.

9. At the ignition electrodes, pull off the 2 thick yellow igniter wires that come from the top of the control unit. Then pull the complete control unit forward and out of the heater, pull up the power supply cord further if more slack is needed.

10. While holding the control unit in one hand or resting it on a flat surface, remove the front cover of control unit by removing its 4 screws.

11. Locate electrical connections and ground inside control unit, disconnect, taking notice of black and white wire location. Remove cord connector from control unit.

12. Remove the two yellow ignitor wires from the control unit for installation in the new control unit.

Replacing control unit

1. Reconnect the two yellow ignitor wired into the new control unit.
2. For natural gas applications install a jumper on JP6 (see below). Liquid propane applications do not need a jumper.

3. Replace cord connector and reinstall black, white and ground wires to appropriate locations.
4. Replace the front cover to the control unit and reinsert into heater and proceed with previous steps in reverse order. When reconnecting the electrical strip connectors to the new control unit, be sure to connect the larger (2") connector to the lower position on the circuit board and the smaller (1 1/2") connector to the upper position. Be sure that the rubber seals of the electrical strip connectors are in place and the 2 yellow igniter wires get reconnected to the electrodes.

3. Replace retaining bar.
4. Replace front cover panel and plastic decals.
5. Plug power cord into outlet

Programming fan speeds

1. Turn the on/off switch to the off (O) position.
2. While depressing and holding the “P” program button turn the power switch to the on (I) position.
3. Release the “P” button when you see 188 on the display.
4. P2 should show on the display.
5. Press the “P” button to view the fan speed setting for P2, then press + or – to change display to the fan speed previously recorded. (normally between 10 and 15).
6. Press the “P” button until the number flashes for 3 seconds then release.
7. Press the “+” button until P1 appears.
8. Press the “P” button to view the P1 fan speed setting, then press “+” or “−” to change display to the number previously recorded (normally between 46 and 53).
9. Press the “P” button until the number flashes for 3 seconds then release.
10. Repeat the programming steps to ensure the proper values are locked in for P1 and P2.
11. Turn power switch to the off (O) position and back to the on (I) position to return heater to service.
**Introduction**

- This procedure must be performed by a licensed gas technician
- Failure to properly calibrate heater’s CO₂ level may result in a hazardous condition.

**Tools needed:**
- Philips head screw driver
- #40 Torx driver
- Digital combustion gas analyzer (Not CO detector)

**Preparation**

1. Turn power switch to off (O) position and unplug power cord.
2. Remove front cover (see installation manual).
3. Remove control board access cover.
4. Remove lower wire harness from control board.
5. Loosen yellow painted Philips screw and cover should rotate down revealing a brass slotted screw.
6. Remove yellow painted #40 Torx cover from the front of the gas valve revealing a plastic #40 Torx screw.
Converting from propane (LPG) to natural gas (NG)

1. Add jumper to location JP6 on the control board.

2. Reinstall lower wire harness onto control board.
3. Reinstall control board auxiliary cover.
4. Turn slotted brass screw 3.5 turns counter clockwise.
5. Turn #40 plastic torx screw 1 tooth clockwise.

Converting from natural gas (NG) to propane (LPG)

1. Remove jumper from location JP6 on the control board.

2. Reinstall lower wire harness onto control board.
3. Reinstall control board auxiliary cover.
4. Turn slotted brass screw 3.5 turns clockwise.
5. Turn #40 plastic torx screw 1 tooth counter clockwise.

Clean up

1. Reinstall yellow painted #40 Torx cover on the front of the gas valve.
2. Rotate brass slotted screw cover up and tighten yellow painted Philips screw.
3. Apply conversion sticker to right side panel above rating plate. Ensure that the information is filled out and accurate.
4. Reinstall cover and return to service.

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Introduction

- When replacing the water valve, it is very important to drain all water from the heater to prevent getting the internal electronics wet.

Tools needed:
- Philips head screw driver
- Bucket to catch draining water
- Plumber’s grease

Removing water valve

1. Turn power switch to the OFF (O) position and unplug power cord from electrical outlet.
2. Remove plastic decal and shield from front panel.
3. Loosen two philips head screws located behind plastic decals.
4. Lift front cover upward and remove.
5. Close installer supplied inlet and outlet shut off valves.
6. Drain all water from unit by opening pressure relief valve on hot outlet side of unit. Have a bucket ready to collect water.
7. Unplug small and large wire connectors (A) from watervalve.
8. Remove pipe clips (B) located at the base and front of watervalve.
9. With a rag ready to absorb any residual water, pull copper pipe (C) connected to front of watervalve free from valve body.
10. Lift water valve upwards to separate it from the brass inlet connection (D).
11. Remove watervalve from heater.
Replacing water valve

1. Lubricate o-rings (E) with plumbers grease to prevent o-ring damage and leaks.
2. Insert replacement water valve by seating the base connection first. Be sure to pull water valve body down past o-ring on brass inlet (D).
3. Reconnect clip (B) for base connection only.
4. Reinsert copper pipe (C) into the front of the water valve. Be sure o-ring (E) on end of copper pipe is completely inside water valve body.
5. Reconnect remaining clip on front pipe connection (B).
6. Check that both clips (B) are seated correctly in the flanges. Improper seating will result in water leaks.
7. Reconnect small and large wire connectors for water valve wires (A).
8. Open installer supplied inlet and outlet shutoff valves and inspect for water leaks.
9. If no water leaks, plug power cord into wall outlet and move power switch back to ON position (I). If error code occurs on display reset the unit with the reset button. If error reappears, turn off power switch and check all wire connections. If error still occurs once power is turned back on and the previous error has been reset, call Bosch Water Heating at 1-800-642-3111.
10. If no errors, heater should be ready for normal operation. Replace cover and return to service.
Service bulletin

Installing attenuator

Introduction

This procedure must be performed by a certified gas technician with a calibrated combustion gas analyzer.

Tools needed:

- Manometer
- Combustion gas analyzer
- Philips head screw driver

Preparation

1. Verify adequate gas pressures using bulletin TWH-G2-03.
2. Turn off gas to heater using installer supplied manual gas shut off valve.
3. Turn power switch to the off (O) position and unplug heater.
4. Remove front cover (see installation manual).
5. Remove brass phillips-head screws to release holding bracket.
6. Remove the metal air inlet screen from the top of the black air inlet duct and discard. (retrofit installations only)

Installing attenuator

1. Insert the attenuator (side with clip facing outwards) into the opening on top of the air inlet duct by slightly pulling the air inlet duct outwards.
2. Push down on the attenuator until the metal clip on the attenuator seats over the lip on the air inlet duct.
3. Reinstall the holding bracket.
4. Open manual gas shut off valve.
5. Plug in heater and turn power switch to the on (I) position.
6. Calibrate the CO₂ using bulletin TWH-G2-12.
7. Return heater to service.
Introduction

- This procedure must be performed by a licensed gas technician.
- Failure to properly calibrate the heater’s CO₂ level may result in a hazardous condition.
- The gas valve is not gas type specific, but requires different values when calibrating.
- Bulletin TWH-G2-12 is required for this procedure.

Tools needed:
- Philips head screw driver
- Small flat head screw driver
- #40 Torx driver
- Combustion gas analyzer
- 30mm open end wrench or large adjustable wrench

Removing gas valve

1. Turn off gas to heater using installer supplied manual shut off valve.
2. Turn power switch to the off (O) position and unplug heater.
3. Remove front cover (see installation manual).
4. Remove brass phillips-head screws to release holding bracket.
5. Remove air intake duct: disconnect air balance tube from gas valve, remove two phillips-head screws on the bottom of the air intake duct and then pull forward(Fig. 1). NOTE: There is a thin black o-ring between the air intake duct and the gas/air mixer that may fall out. Do not lose as it will be reinstalled.
6. Unplug wire harness from gas valve
7. Loosen large 30mm hex nut on the left side of gas valve.
8. Using an offset screwdriver, unscrew the three phillips-head screws on the top of the gas valve.
9. Remove gas valve from heater.

Replacing gas valve

1. Replace both the grey fiber washer on the left of gas valve and the rubber gasket on top of the gas valve.
2. Hold replacement gas valve in place and reinstall the three phillips-head screws on the top of the gas valve (Fig. 2).
3. Reinstall 30mm hex nut on the left of the gas valve.
4. Open gas isolation valve and check for leaks at all connections.
5. Replace air inlet duct ensuring thin black o-ring is in place and reconnect air balance tube.
6. Replace retaining bar.
Calibrating gas valve

1. Plug in heater and turn power switch to the on (I) position.
2. Open hot water tap. If heater fires, adjust CO₂ using bulletin TWH-G2-12 Measuring and adjusting CO₂.
3. If the heater does not fire, allow the unit to display the EA error and shut off water. The fan will continue to run to purge unit of gases.
4. Perform rough adjustment as follows:
   Note: Do not forcefully tighten either screws past bottom out point. This will damage the gas valve. For screw locations, see bulletin TWH-G2-12.
   Using a #40 torx screw driver turn torx screw clockwise until bottomed out.
   Turn slotted adjustment screw clockwise until bottomed out.
   NG: Turn torx screw 1.5 turns counter clockwise.
   Turn slotted screw 6 turns counter clockwise
   LP: Turn torx screw .75 turns counter clockwise.
   Turn slotted screw 3 turns counter clockwise.
5. Reset any error codes and repeat step 2. If heater still does not fire, contact Bosch Water Heating at 1-800-642-3111.
Introduction

Tools needed:
- Philips head screw driver
- Wire snips

Disconnect and remove original overheat fuse

1. Turn power switch to the OFF (O) position and unplug the heater.
2. Remove the front cover using the instructions found in installation manual.
3. Disconnect overheat fuse wire connections (black wires and black clip from red wires and white clip, pos. 1).
4. Cut the red wires above the left hand silicone grommet. Remove cut wires below grommet from heater and return to BBTNA if requested by Tech Support. (pos. 2).
5. The remainder of the original overheat fuse should be left in place once cut/disconnected.
Installing new flue gas limiter

1. Remove the rear screw from the right air inlet opening (pos. 1).
2. Place the flue gas limiter at the top right of the unit (pos. 1).
3. Thread supplied machine screw through the air inlet cover or combustion air inlet accessory, and into flue gas sensor. Tighten snugly (pos. 1).
4. Feed white wires with connector from new flue gas sensor through red silicone grommet. (pos. 2). Grommet will need to be removed to pass the connector and wires from sensor through slit in grommet. Reseat grommet when completed.
5. Connect the flue gas limiter cable connector (white) to original wire connector from control unit (black) (Fig. 2, pos. 3).
6. Re-assemble the front cover and plug heater into outlet.
7. Turn power switch to the ON position (I) and return heater to service.

Final Installation Location