Adapt™ Service Part Instructions

TABLE OF CONTENTS

Air Intake Water Trap Replacement Kit Instructions

Kit 100371209 Contains:
- Air Intake Water Trap
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Air Intake Water Trap

4 Locate the air intake water trap on upper left side of the water heater. See Figure 1.

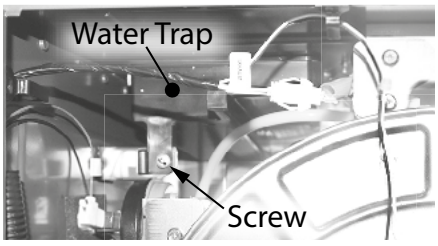

Figure 1 - Water trap location

5 Locate the screw securing the air intake water trap to the water heater. See Figure 1. Use a Phillips screwdriver to remove the screw. Place screw aside in a safe place for reinstallation.

6 Press the latch securing the air intake trap and carefully pull it from the water heater. See Figure 2.

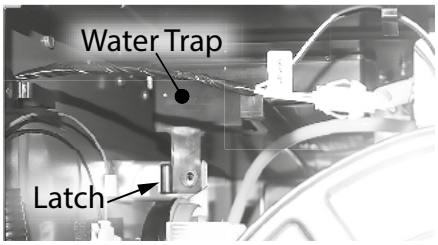

Figure 2 - Latch location

7 Dispose of the old air intake water trap properly.

Replacing the Air Intake Water Trap

8 Locate the new air intake water trap in the kit.

9 Install the air intake water trap in the water heater. Make sure the tab on the right side of the air intake water trap fully engages with the channel in the water heater. See Figure 3. Secure with the screw removed in **Step 5.**

NOTICE: The heat exchanger is not shown in Figure 3 for clarity.

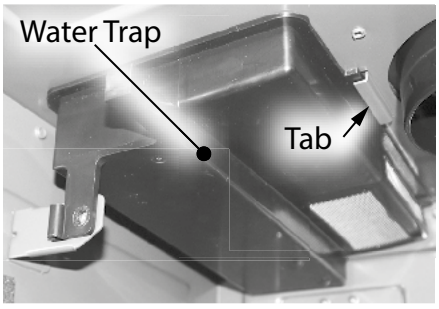

Figure 3 - Tab location

Returning Water Heater to Operation

10 Replace the cabinet cover and secure with the screws previously removed in **Step 3**.

11 Restore power to the water heater. The water heater is now ready for operation.

Burner Door Hi-Limit Replacement Kit Instructions

Kit 100371180 Contains:
- Burner Door Hi-Limit
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Burner Door Hi-Limit

4 Locate the burner door hi-limit on the burner assembly as shown in Figure 1. Disconnect the two (2) wire leads (labeled HIGH LIMIT 1) from the hi-limit assembly and route them inside the water heater cabinet for ease of access to hi-limit. See Figure 1.

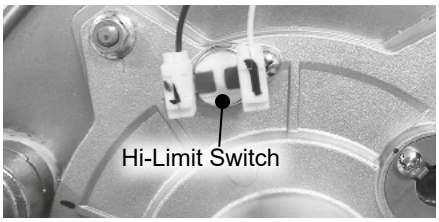

Figure 1 - Hi-Limit location

5 Use a Phillips screwdriver to remove the two (2) screws securing burner door hi-limit to the burner assembly. Place screws aside in a safe place for reinstallation. See Figure 2.

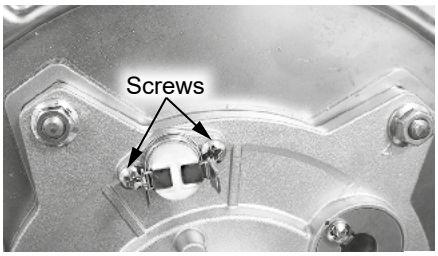

Figure 2 - Hi-Limit screw removal

6 Remove burner door hi-limit from burner assembly and dispose of properly.

Installing New Burner Door Hi-Limit

7 Locate the new burner door hi-limit assembly provided in the kit.

NOTICE: Confirm hi-limit is fully seated in bracket before installing to burner assembly.

8 Install the burner door hi-limit to the burner assembly. Secure with the two (2) screws previously removed in **Step 5**. Confirm hi-limit sits flush against burner assembly.

9 Connect the two (2) wire leads to the burner door hi-limit previously disconnected in **Step 4**. Confirm wire connections are secure.

Returning the Water Heater to Operation

10 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

11 Restore power to the water heater. The water heater is now ready for operation.

Hi-Limit Switch (Manual Reset) Replacement Kit Instructions

Kit 100371192 Contains:
- Hi-Limit Switch (Manual Reset)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Hi-Limit Switch

4 Locate the hi-limit switch on the outlet burner tube as shown in Figure 1. Disconnect the two (2) wire leads (labeled HIGH LIMIT 2) from the hi-limit switch and route them inside the water heater cabinet for ease of access to hi-limit.

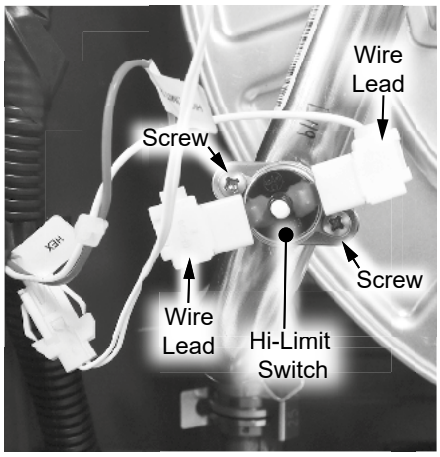

Figure 1 - Hi-Limit switch location

5 Use a Phillips screwdriver to remove the two (2) screws securing the hi-limit switch to the outlet burner tube. Place screws aside in a safe place for reinstallation. See Figure 1.

6 Remove hi-limit switch from outlet burner tube and dispose of properly.

Installing New Burner Door Hi-Limit

7 Locate the new hi-limit switch assembly provided in the kit.

NOTICE: Confirm hi-limit switch is fully seated in bracket before installing to outlet burner tube.

8 Install the hi-limit switch to the outlet burner tube. Secure with the two (2) screws previously removed in **Step 5**. Confirm hi-limit switch sits flush against outlet burner tube.

9 Connect the two (2) wire leads to the hi-limit switch previously disconnected in **Step 4**. Confirm wire connections are secure.

Returning the Water Heater to Operation

10 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

11 Restore power to the water heater. The water heater is now ready for operation.

Burner Replacement Kit Instructions

Kit 100371164 Contains:
- Burner
- (2x) Graphite Gasket, Flame & Ignitor Rods
- Graphite Gasket, Burner Door
- Burner Insulation Gasket, 125 mm OD
- Burner Insulation Gasket, 87 mm OD
- Burner Insulation, Inner Vermiculite Ring
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- 12" Phillips Screwdriver (magnetized)
- 10 mm Hex Socket
- Torque Wrench
- Mini Pick or Hook
- Plastic Scraper
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

5 Locate the fan wiring harness on the control board panel as shown in Figure 1. Disconnect and route the wiring out of the way for ease of removing the fan and venturi assembly.

Figure 1 - Locate fan wiring harness on control board

6 Locate the screw securing the control board panel as shown in Figure 2. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

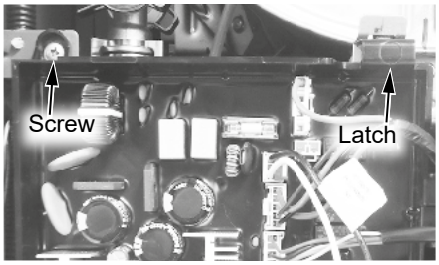

Figure 2 - Control board location

7 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Fan & Venturi Assembly

8 Locate the venturi wires (2x) and disconnect them as shown in Figure 3. Wires are labeled "Venturi" and "Micro Switch." These wires are connected at and run through the black cable conduit located on the left side of the water heater cabinet.

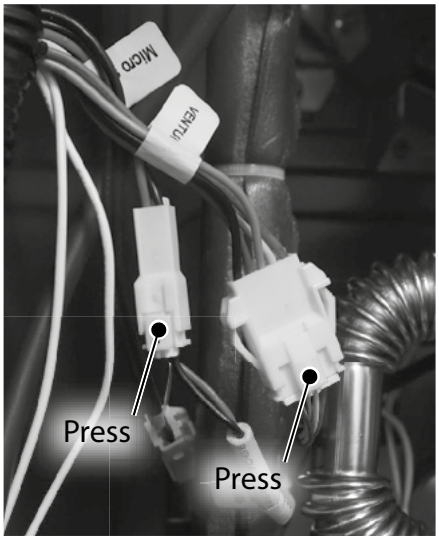

Figure 3 - Locate venturi wire harnesses

Burner Replacement Kit Instructions

9 Locate the gas tube connecting the venturi assembly to the gas valve as shown in Figure 4. Note the orientation of the spring clip securing the gas tube to the gas valve. Remove spring clip and place it aside in a safe place for reinstallation.

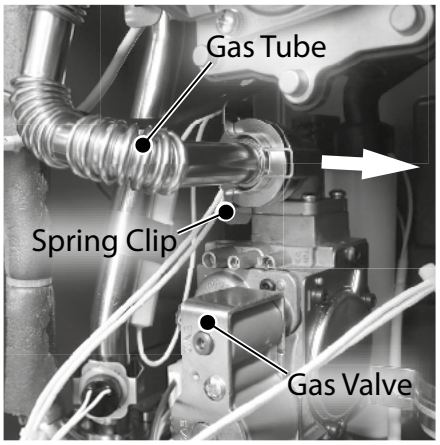

Figure 4 - Remove gas tube spring clip

10 Locate the four (4) screws securing the fan assembly to the burner door assembly as shown in Figure 5. Use a Phillips screwdriver to remove the screws. Place the screws aside in a safe place for reinstallation.

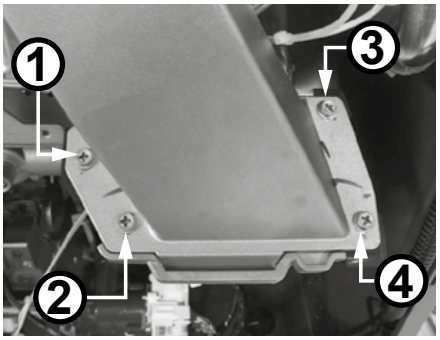

Figure 5 - Remove fan assembly screws

11 Disconnect the gas tube from the gas valve and carefully remove the fan and venturi assembly from the water heater.

Removing Flame Sensor & Ignitor Rod Assemblies

12 Locate the flame sensor and ignitor rod on the burner assembly as shown in Figure 6. Remove the caps from the flame sensor and ignitor rod. Disconnect the green ground wire from the ignitor rod.

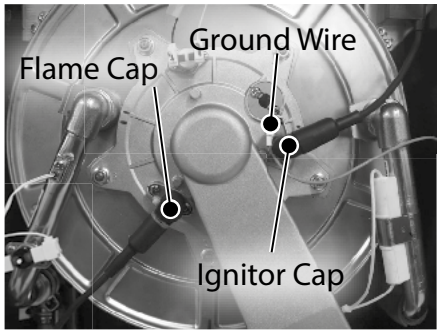

Figure 6 - Remove ignitor rod and flame sensor caps

13 Use a Phillips screwdriver to remove the four (4) screws securing flame sensor and ignitor rod to the burner assembly. Place screws aside in a safe place for reinstallation.

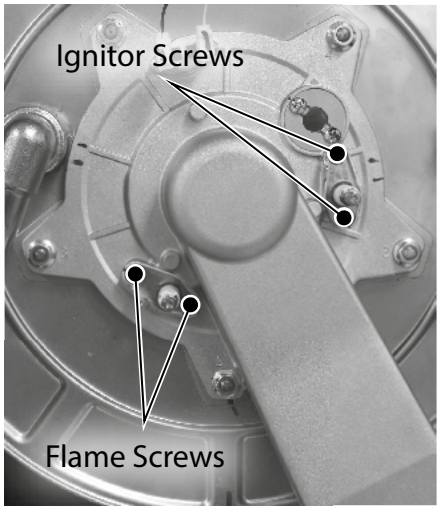

Figure 7 - Remove ignitor rod and flame sensor screws

14 Remove flame sensor, ignitor rod and the two (2) graphite gaskets from burner assembly and place them aside in a safe place for reinstallation.

Disconnect Burner Door Hi-Limit

15 Locate the burner door hi-limit on the burner assembly as shown in Figure 8. Disconnect the two (2) wire leads from the hi-limit assembly and route them inside the water heater cabinet for ease of access to burner door.

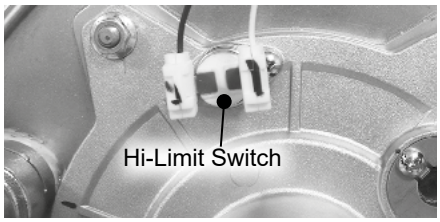

Figure 8 - Burner door hi-limit location

Removing Burner Door Assembly

16 Locate the five (5) hex nuts securing the burner door assembly to the heat exchanger as shown in Figure 9. Use a 10 mm hex socket to remove hex nuts. Place hex nuts aside in a safe location for reinstallation.

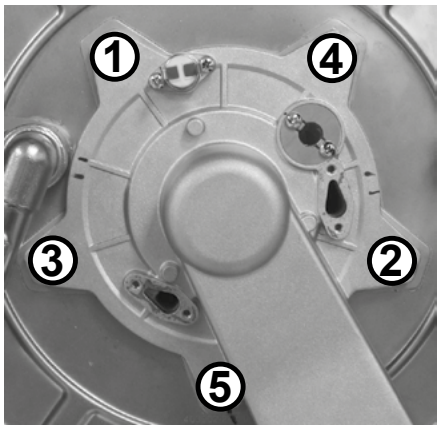

Figure 9 - Remove burner door hex nuts

NOTICE: Star pattern in Figure 9 above MUST be followed during reinstallation of screws to burner door assembly.

17 Remove the burner door assembly from the heat exchanger. Carefully pull the assembly out such that the burner and outer vermiculite ring are not damaged as shown in Figure 10.

Burner Replacement Kit Instructions

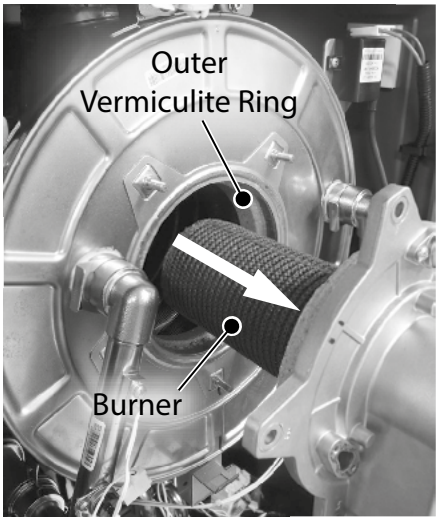

Figure 10 - Remove burner door assembly

Replacing Burner Door Gaskets and Insulation

18 Locate the three (3) screws securing the inner vermiculite insulation ring to the burner door as shown in Figure 11. Use a Phillips screwdriver to remove screws. Place screws aside in a safe place for reinstallation.

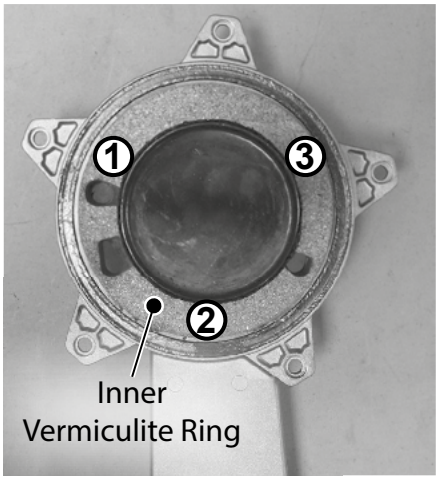

Figure 11 - Remove inner vermiculite ring

19 Slide vermiculite insulation ring over and off burner. Dispose of vermiculite insulation ring properly.

20 Locate the three (3) screws securing the burner to the burner door as shown in Figure 12. Use a Phillips screwdriver to remove screws. Place screws aside in a safe place for reinstallation.

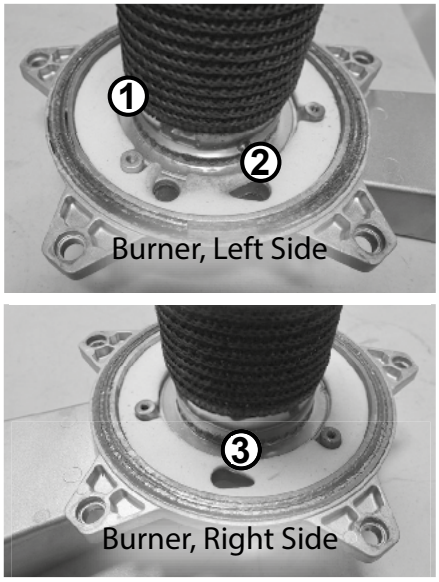

Figure 12 - Remove burner screws

21 Remove the burner from the burner door and dispose of properly.

22 Locate the small and large insulation gaskets on the burner door as shown in Figure 13. Use a plastic scraper to gently scrape insulation clean from burner door. Confirm burner door surfaces are free of any debris or leftover insulation.

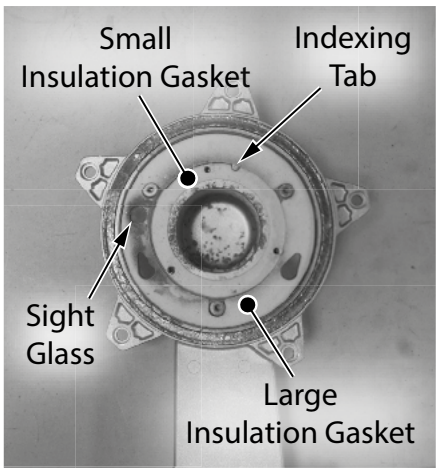

Figure 13 - Burner insulation gaskets

IMPORTANT! DO NOT gouge or damage burner door surfaces when removing insulation gaskets.

23 Locate the new, small insulation gasket provided in the kit. Install the small insulation gasket first. Flip gasket so the adhesive side is facing the burner door surface. Note the indexing tab on the burner door to properly orient the gasket (Figure 13). Confirm gasket sits evenly and flush with burner door.

24 Locate the new, large insulation gasket provided in the kit. Install the large insulation gasket second. Flip gasket so the adhesive side is facing the burner door surface. Note the location of the sight glass on burner door to properly orient the gasket (Figure 13). Confirm gasket sits evenly and flush with burner door.

25 Locate the graphite gasket on the burner door as show in Figure 14. Use a mini pick or hook to remove gasket from groove. Dispose of gasket properly.

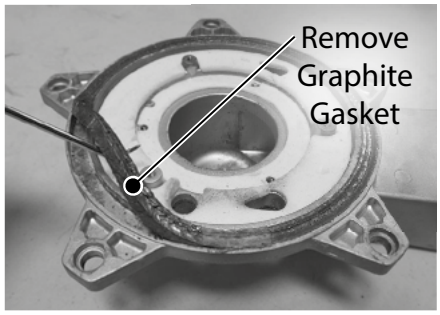

Figure 14 - Remove burner door graphite gasket

26 Locate new graphite gasket provided in kit. Orient gasket so side with slight chamfer is facing the groove in the burner door (Figure 15). Carefully install new graphite gasket to groove in burner door. Confirm gasket sits flush in groove.

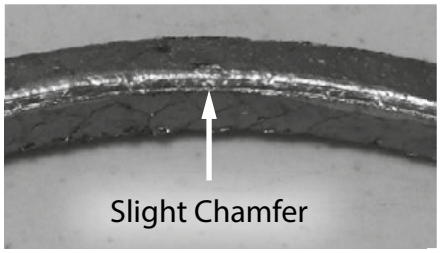

Figure 15 - Properly orient graphite gasket

Burner Replacement Kit Instructions

27 Locate the new burner provided in the kit. Install burner to burner door. Use the indexing tab to properly orient burner as shown in Figure 13. Secure with the three (3) screws previously removed in **Step 20.**

28 Locate the new inner vermiculite insulation ring provided in the kit. Orient the ring as shown in Figure 11. The flat side should be facing the groove in burner door.Carefully slide it over burner and secure vermiculite to assembly with the three (3) screws previously removed in **Step 18**.

Installing Burner Door Assembly

29 Install burner door assembly over bolts in heat exchanger. Locate the five (5) hex nuts previously removed in **Step 16.** Hand tighten the hex nuts, then use a 10 mm hex socket to tighten each nut in a star pattern as indicated by the numbers (1-5) adjacent to the bolt holes. Torque hex nuts to 7.4 ft-lbs. (10 Nm). See Figure 9 as reference.

Reconnect Burner Door Hi-Limit

30 Locate the burner door hi-limit and reconnect the two (2) wire leads previously disconnected in **Step 15.**

Installing Flame Sensor & Ignitor Rod Assemblies

31 Remove old graphite gaskets on flame sensor and ignitor rod assemblies and replace with new, small graphite gaskets provided in the kit.

32 Follow **Steps 12-14** in reverse order to install flame sensor and ignitor rod assemblies to burner assembly.

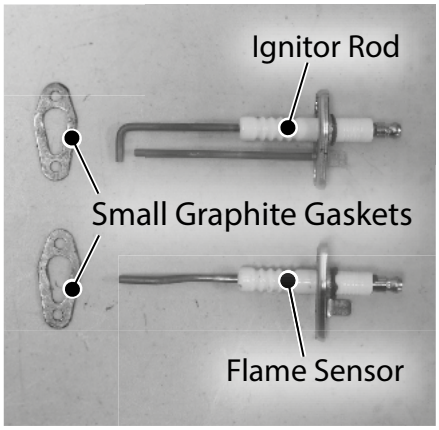

Figure 16 - Replace ignitor rod and flame sensor assemblies

Installing Fan & Venturi Assembly

33 Locate the fan and venturi assembly previously removed from the water heater in **Step 11**. Follow **Steps 8-11** in reverse order to install fan and venturi assembly to water heater.

NOTICE: Confirm the burner assembly tab engages the slot on the fan as shown in Figure 17.

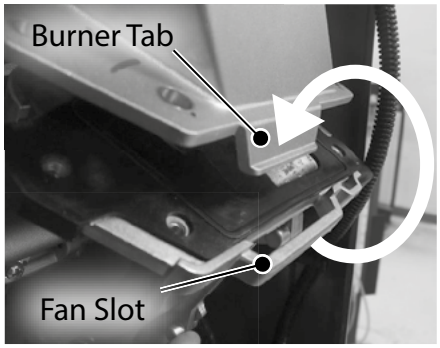

Figure 17 - Burner tab and fan slot

34 Lift the control board panel up and lock into place.

35 Reconnect the fan wiring harness to the control board panel previously disconnected in **Step 5**.

Checking for Gas Leaks

36 Turn **ON** the gas supply to the water heater at the manual gas shut off valve. Restore power to the water heater. Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

37 Check for leaks around all gas connection points and the burner door assembly. Use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture (1 part soap to 15 parts water) or children's soap bubbles around the burner assembly. If any leaks are detected (which will appear as small bubbles), resecure components and recheck for leaks.

Returning Water Heater to Operation

38 Install and tighten the screw to the control board panel previously removed in **Step 6**.

39 Replace the cabinet cover and secure with the screws previously removed in **Step 3**.

Bypass Valve & Tubing Replacement Kit Instructions

Kit 100371165 Contains:
- Bypass Valve
- (2x) O-ring (15.5 x 2.5)
- Kit Instructions

Kit 100371199 Contains:
- Bypass Water Tube
- (2x) O-ring (15.5 x 2.5)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Bucket or Pan
- Towel or Rag
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

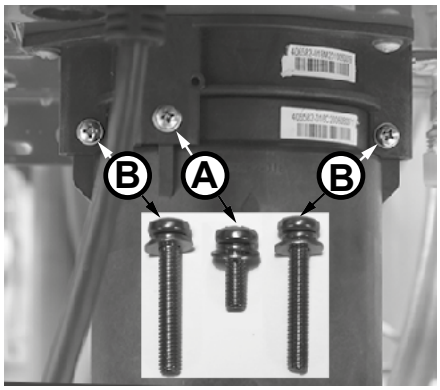

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

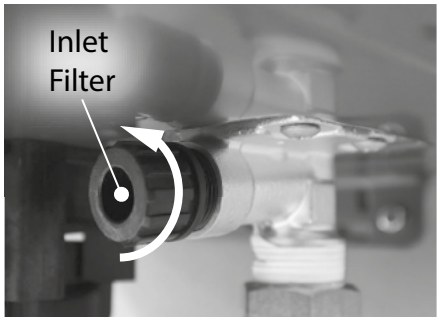

Figure 2 - Removing the inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

12 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

13 Lift cover up and away from cabinet to gain access to the water heater's internal components.

14 Locate the screw securing the control board panel as shown in Figure 3. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

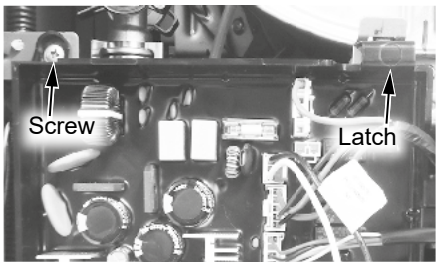

Figure 3 - Control board location

Bypass Valve & Tubing Replacement Kit Instructions

15 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Bypass Water Tube

Proceed to **Step 21** if not replacing bypass water tube.

16 Locate the bypass water tube connected to the bypass valve. Locate and remove the two (2) spring clips (size 25) securing the tube to the bypass valve and the mixing tee as shown in Figure 4.

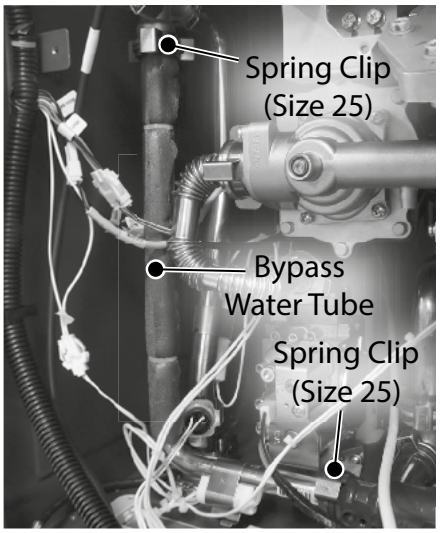

Figure 4 - Remove spring clips from bypass water tube

17 Locate the heater block attached to the tube as shown in Figure 5. Remove bracket (size 16) securing heater block to tube. Place bracket aside in a safe place for reinstallation. Route heater block and wiring inside water heater cabinet.

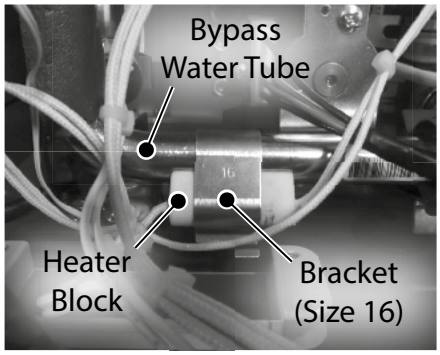

Figure 5 - Remove heater block and bracket from bypass water tube

18 Remove bypass water tube from bypass valve and mixing tee. Dispose of properly.

Installing New Bypass Water Tube

19 Locate the new bypass water tube and the two (2) O-rings provided in the kit. Install O-rings to the inlet and outlet of bypass water tube. Install bypass water tube to bypass valve and mixing tee. Secure tube with the two (2) spring clips (size 25) previously removed.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

20 Install heater block to bypass water tube and secure with bracket (size 16) previously removed. Proceed to **Step 30** if not replacing bypass valve.

Removing Bypass Valve

21 Locate the bypass valve at the bottom front side of the water heater as shown in Figure 6. Disconnect the wiring harness from the valve.

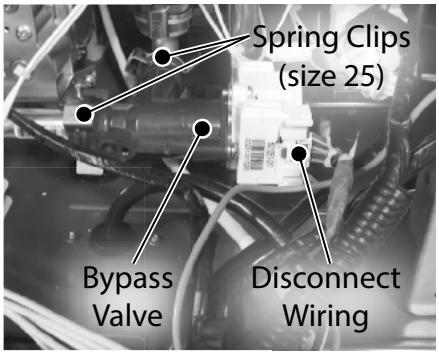

Figure 6 - Bypass valve

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

22 Remove the two (2) spring clips (size 25) securing the bypass valve to the piping system. Place the spring clips aside in a safe place for reinstallation.

23 Remove the bypass valve from the piping system and dispose of properly.

Installing New Bypass Valve

24 Locate the two (2) O-rings on the exposed water pipe connections as shown in Figure 7 and remove them. Dispose of O-rings properly.

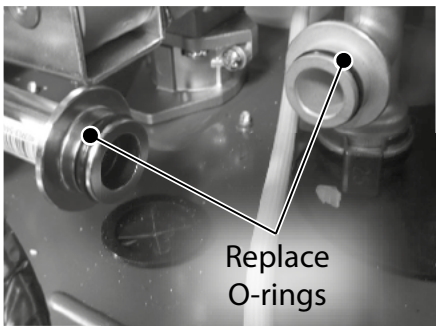

Figure 7 - Replace exposed O-rings

25 Locate the two (2) O-rings provided in the kit.

Bypass Valve & Tubing Replacement Kit Instructions

26 Install new O-rings to exposed water pipe connections.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

27 Locate the new bypass valve provided in the kit. Carefully install bypass valve to pipe connections.

28 Locate the two (2) spring clips previously removed in **Step 22**. Install spring clips to bypass valve, securing it to piping connections. Verify water connections are tight and will not leak.

29 Reconnect wiring harness to bypass valve. Confirm wiring connection is secure.

Checking for Water Leaks

30 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

31 Lift the control board panel up and lock into place.

32 Install and tighten the screw to the control board panel previously removed in **Step 14**.

33 Replace the cabinet cover and secure with the screws previously removed in **Step 12**.

34 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

35 Restore power to the water heater. The water heater is now ready for operation.

Cartridge Manifold and Outlet Tee Replacement Kit Instructions

Kit 100374732 Contains:
- Cartridge Manifold
- Kit Instructions

Kit 100371194 Contains:
- X3®Outlet Tee
- (1x) O-ring (21.8 x 2.4)
- (1x) O-ring (15.5 x 2.5, NBR)
- (1x) O-ring (15.5 x 2.5, EPDM)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

3 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

4 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

5 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

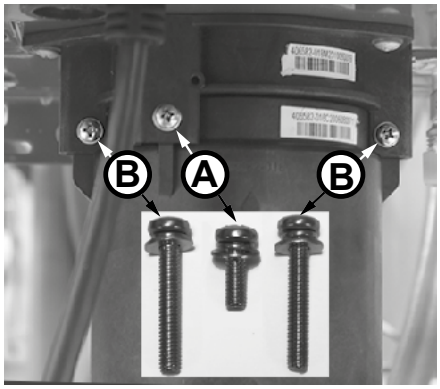

Figure 1 - Identify cartridge screws

6 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

7 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

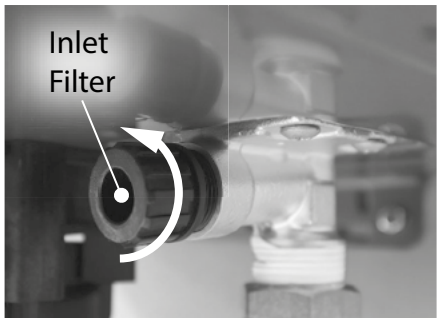

Figure 2 - Locate and remove inlet filter

8 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

DO NOT reinstall cartridge.

Accessing Water Heater Components

9 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

10 Lift cover up and away from cabinet to gain access to the water heater's internal components.

11 Locate the screw securing the control board panel as shown in Figure 3. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

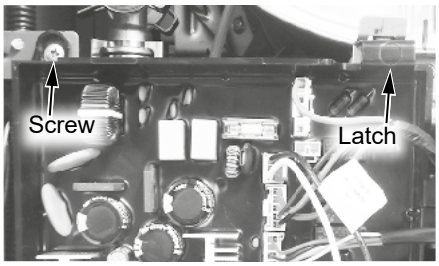

Figure 3 - Control board location

12 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Preparing Cartridge Manifold and Outlet Tee Assembly for Removal

13 Locate the outlet tee connected to the bypass valve and burner inlet tube as shown in Figure 4 on the following page. Remove the large spring clip (size 30) securing the outlet tee to the burner inlet tube. Remove the small spring clip (size 25) securing the outlet tee to the bypass valve. Place spring clips aside in a safe place for reinstallation. **DO NOT** remove spring clip securing outlet tee to cartridge manifold.

Cartridge Manifold and Outlet Tee Replacement Kit Instructions

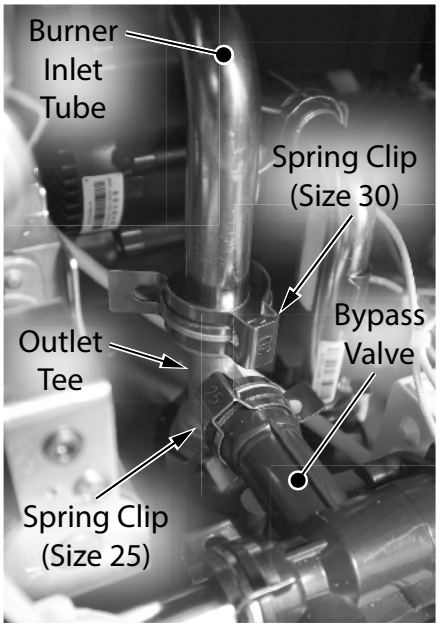

Figure 4 - Remove two spring clips from outlet tee

14 Disconnect bypass valve from outlet tee.

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

15 Locate and remove the small spring clip (size 25) securing the pump outlet tube to cartridge manifold as show in Figure 5. Place spring clip aside in a safe place for reinstallation. Disconnect pump outlet tube from manifold.

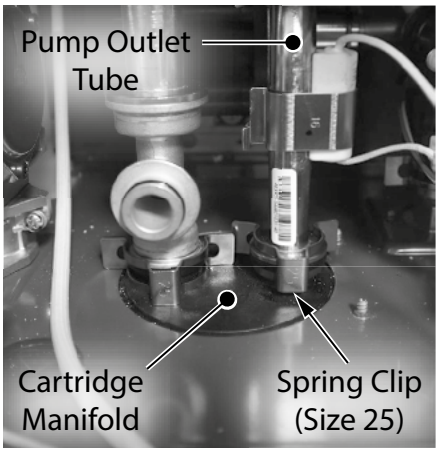

Figure 5 - Remove spring clip from pump outlet tube

The cartridge manifold and outlet tee are now prepared for removal.

Removing Cartridge Manifold and Outlet Tee Assembly

16 Locate the three (3) screws securing the cartridge manifold to the underside of the water heater cabinet as shown in Figure 6. Use a Phillips screwdriver to remove screws. Place screws aside in a safe place for reinstallation.

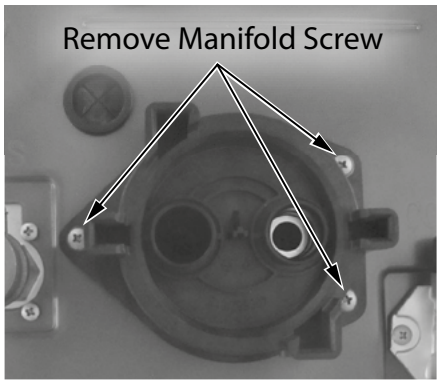

Figure 6 - Remove manifold screws

NOTICE: Rotate spring clip securing outlet tee to cartridge manifold such that the assembly can be easily removed from water heater.

Disconnect the outlet tee from the burner inlet tube and pull manifold down. The assembly will now come free and can be removed from under the water heater cabinet.

17 Remove the small spring clip (size 25) securing outlet tee to cartridge manifold as shown in Figure 7. Place spring clip aside in a safe place for reinstallation. Separate outlet tee from cartridge manifold.

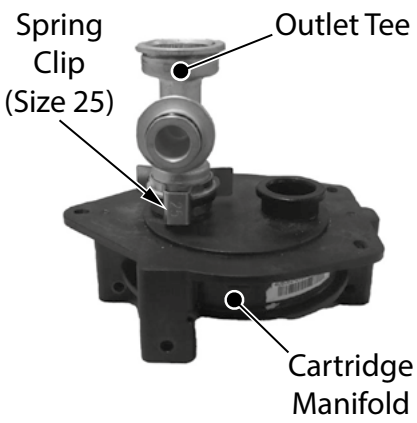

Figure 7 - Remove spring clip from outlet tee and cartridge manifold

(For Kit 100374732 Only)

18 If replacing cartridge manifold, discard old manifold and locate the new cartridge manifold provided in the kit. Attach outlet tee to cartridge manifold and secure with spring clip (size 25) previously removed. Proceed to **Step 21**.

(For Kit 100371194 Only)

19 If replacing outlet tee, discard old tee and locate the new outlet tee provided in the kit. Install one (1) 15.5 x 2.5, NBR O-ring to outlet tee. Replace one (1) 15.5 x 2.5, EPDM O-ring on the cartridge manifold. Replace one (1) 21.8 x 2.4 O-ring on the burner inlet tube. See Figure 8 on the following page for reference.

Cartridge Manifold and Outlet Tee Replacement Kit Instructions

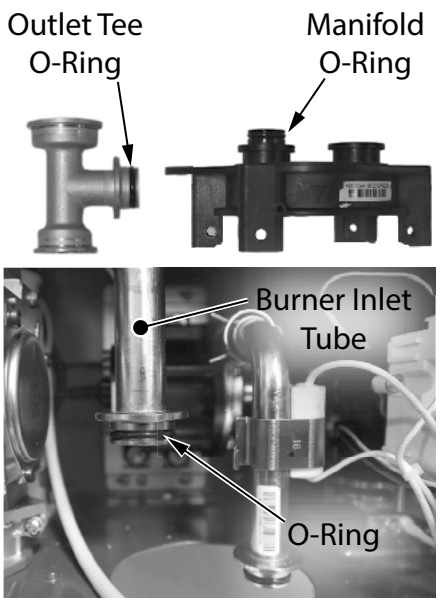

Figure 8 - Replace O-rings

20 Attach new outlet tee to cartridge manifold and secure with spring clip (size 25) previously removed. Proceed to the next step.

Installing Cartridge Manifold and Outlet Tee Assembly

21 Orient cartridge manifold and outlet tee assembly as shown in Figure 9. Install assembly from under the water heater cabinet. Connect the outlet tee to the burner inlet tube and secure with the spring clip (size 30) previously removed in **Step 13**. This will help keep the manifold in place when installing screws.

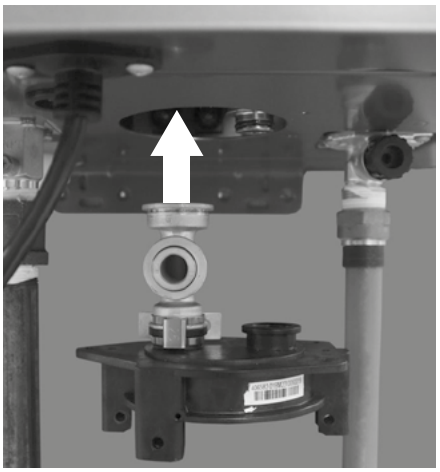

Figure 9 - Orient cartridge manifold and outlet tee

22 Locate the three (3) screws previously removed in **Step 16**. Use screws to secure cartridge manifold to water heater cabinet.

23 With cartridge manifold secured, connect pump outlet tube to manifold and secure with the spring clip (size 25) previously removed in **Step 15**.

24 Connect bypass valve to outlet tee and secure with spring clip (size 25) previously removed in **Step 13**.

Checking for Water Leaks

25 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 5**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

26 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

27 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Lower circuit board panel and correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

28 Lift the control board panel up and lock into place.

29 Install and tighten the screw to the control board panel previously removed in **Step 11**.

30 Replace the cabinet cover and secure with the screws previously removed in **Step 9**.

31 Restore power to the water heater. The water heater is now ready for operation.

Condensate Trap Replacement Kit Instructions

Kit 100371168 Contains:
- Condensate Trap
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Flat Head Screwdriver
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

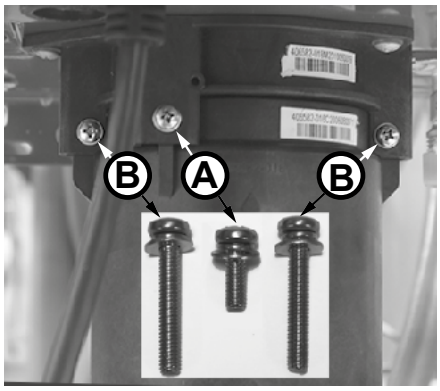

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

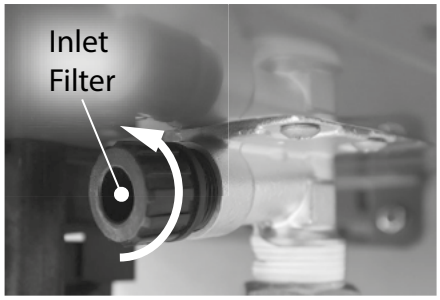

Figure 2 - Inlet filter location

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Condensate Trap

12 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

13 Lift cover up and away from cabinet to gain access to the water heater's internal components.

14 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 3.

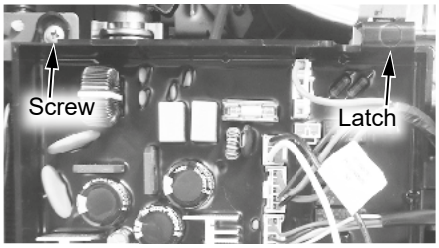

Figure 3 - Control board location

15 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

Removing Condensate Trap

16 Locate the condensate trap at the left rear side of the water heater.

17 Locate the plastic condensate drain on the bottom left of the water heater. Disconnect drain piping to the plastic condensate drain. Place a bucket or pan underneath to collect

Condensate Trap Replacement Kit Instructions

water during removal.

18 Trace the yellow wires from the condensate trap to the red wiring harness and disconnect them. See Figure 3.

NOTICE: The harness uses a black security clip. Use a small flat blade screw driver to remove and keep this clip for reinstallation. See Figure 3.

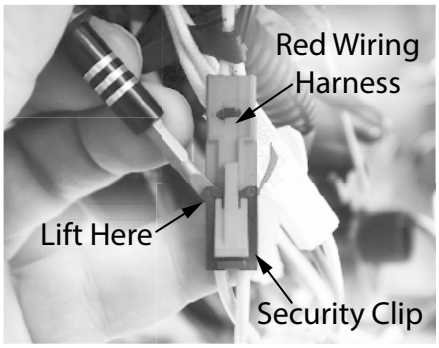

Figure 4 - Red wiring harness clip removal

19 Trace the black wires from the condensate trap to the wiring harness marked "LIQUID LEVEL" and disconnect them. See Figure 5.

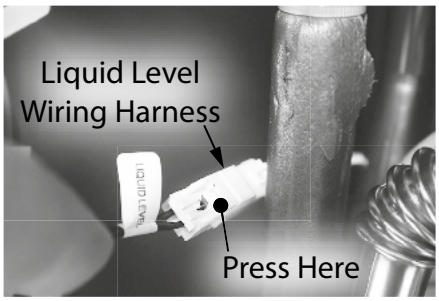

Figure 5 - Liquid level wiring harness location

20 Disconnect the black hose from the top of the condensate trap and then from the back of the heat exchanger (HEX). Compress the spring clamp and pull it down along with the black hose. Remove it and dispose of properly. See Figure 6.

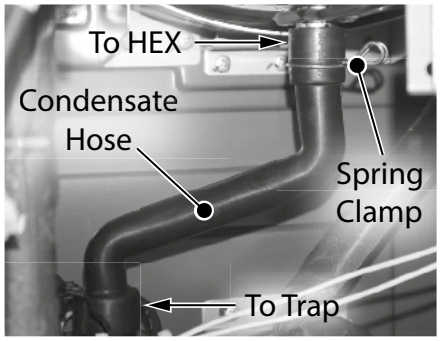

Figure 6 - Condensate hose removal

21 Locate the three (3) screws at the back left corner of the cabinet that secure the condensate trap. See Figure 7. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

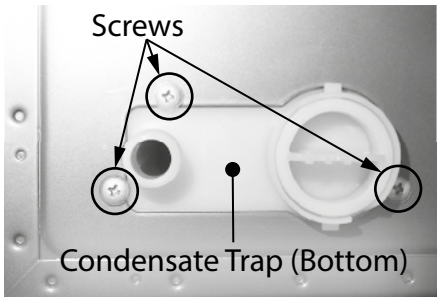

Figure 7 - Location of condensate trap screws.

22 Locate the hot outlet pipe and mixing tee connection shown in Figure 8. Remove the spring clip (size 30) and set aside in a safe place for reinstallation.

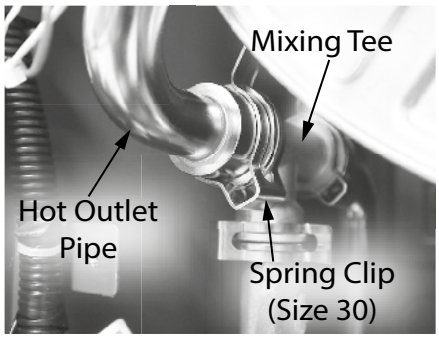

Figure 8 - Mixing tee location

23 Move the hot outlet pipe towards the side of the cabinet to allow sufficient room to remove the condensate trap.

24 Carefully remove the old condensate trap and dispose of it properly.

Installing New Condensate Trap

25 Locate the new condensate trap provided in the kit. Carefully install the new condensate trap.

26 Secure the condensate trap with the three (3) screws removed in **Step 21**.

27 Route the new red wiring harness to its mate disconnected in **Step 18.**

NOTICE: Carefully insert the black safety clip into the red wiring harness. See Figure 9.

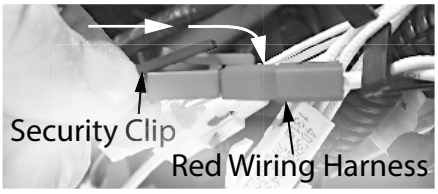

Figure 9 - Reconnecting the wiring harness

28 Route and reconnect the black wire marked "LIQUID LEVEL" to its mate removed in **Step 19.**

29 Reattach the black hose removed in **Step 20** to the heat exchanger. Make sure the hose is fully seated along with the spring clamp. Reattach the other end of the black hose to the top of the condensate trap. Check the connections to ensure there are fully seated to prevent leaks.

30 Reconnect the hot outlet piping to the mixing tee and secure with the spring clip (size 30) removed in **Step 22.**

31 Reconnect the condensate drain piping removed in **Step 17.**

32 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Condensate Trap Replacement Kit Instructions

Returning Water Heater to Operation

33 Lift the circuit board panel up and lock into place.

34 Install and tighten the screw to the circuit board panel previously removed in **Step 14**.

35 Replace the cabinet cover and secure with the screws previously removed in **Step 12**.

36 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

37 Restore power to the water heater. The water heater is now ready for operation.

Emission Port Cap Replacement Kit Instructions

Kit 100371166 Contains:
- Emission Port Cap
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Removing Emissions Port Cap

3 Locate the emission port cap at the outlet exhaust port on the water heater as shown in Figure 1.

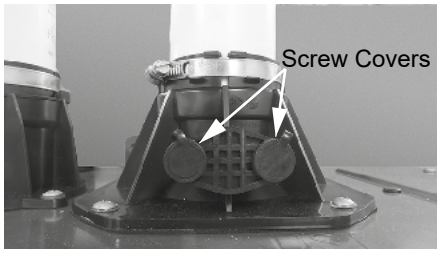

Figure 1 - Emission port location

4 Lift the screw covers to reveal the screws securing emission port cap to exhaust port.

5 Remove screws and set aside in a safe place for reinstallation. See Figure 2.

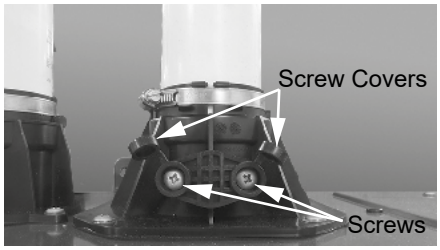

Figure 2 - Emissions port screw removal

6 Remove emission port cap and dispose of properly.

Installing New Emission Port Cap

7 Locate the new emission port cap provided in the kit.

8 Orient cap such that the plug can be inserted into the outlet exhaust port and push to insert it in starting collar.

9 Locate screws previously removed in **Step 5.** Use screws to secure cap to outlet exhaust port. Cover screws with screw covers.

Checking for Gas Leaks

10 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

11 Restore power to the water heater.

12 Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

13 Check for leaks around the emission port cap. Use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture (1 part soap to 15 parts water) or children's soap bubbles around the emissions port cap. If any leaks are detected (which will appear as small bubbles), resecure the emission port cap and recheck for leaks.

Returning the Water Heater to Operation

14 The water heater is ready for operation once there are no leaks detected at the emission port cap.

Fan Assembly Replacement Kit Instructions

Kit 100371169 Contains:
- Fan Assembly
- Fan Inlet O-ring
- Fan Outlet Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Marker
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

5 Locate the fan wiring harness on the control board panel as shown in Figure 1. Disconnect and route the wiring out of the way for ease of removing the fan assembly.

Figure 1 - Locate fan wiring harness on control board

6 Locate the screw securing the control board panel as shown in Figure 2. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

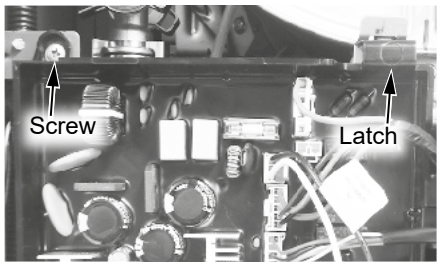

Figure 2 - Control board location

7 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Fan & Venturi Assembly

8 Locate the venturi wires (2x) and disconnect them as shown in Figure 3. Wires are labeled "Venturi" and "Micro Switch." These wires are connected at and run through the black cable conduit located on the left side of the water heater cabinet.

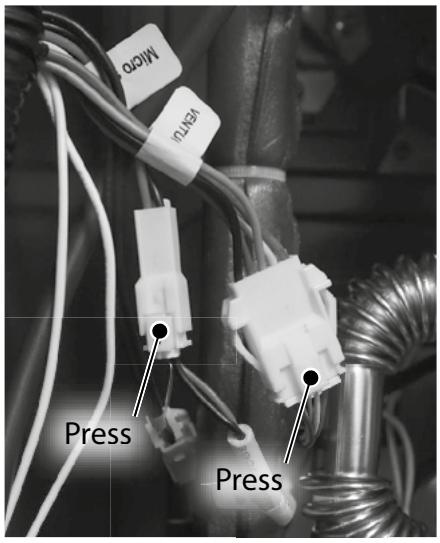

Figure 3 - Locate venturi wire harnesses

9 Locate the gas tube connecting the venturi assembly to the gas valve as shown in Figure 4. Note the orientation of the spring clip securing the gas tube to the gas valve. Remove spring clip and place it aside in a safe place for reinstallation.

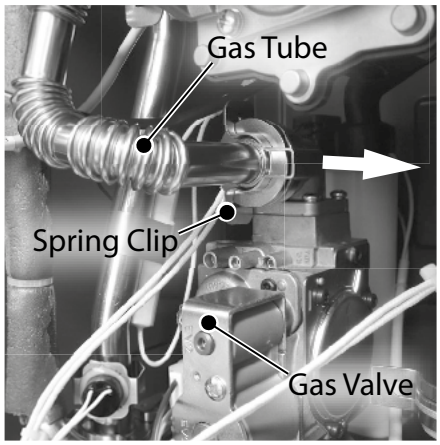

Figure 4 - Remove gas tube spring clip

10 Locate the four (4) screws securing the fan assembly to the burner assembly as shown in Figure 5 on the following page. Use a Phillips screwdriver to remove the screws. Place the screws aside in a safe place for reinstallation.

Fan Assembly Replacement Kit Instructions

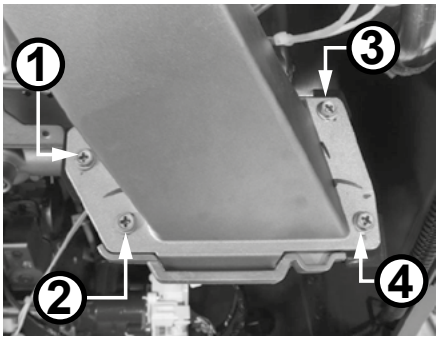

Figure 5 - Remove fan assembly screws

11 Disconnect the gas tube from the gas valve and carefully remove the fan and venturi assembly from the water heater.

Preparing New Fan Assembly

12 Locate the large four screws securing the fan to the venturi. Figure 6 shows venturi facing upright for ease of removing screws.

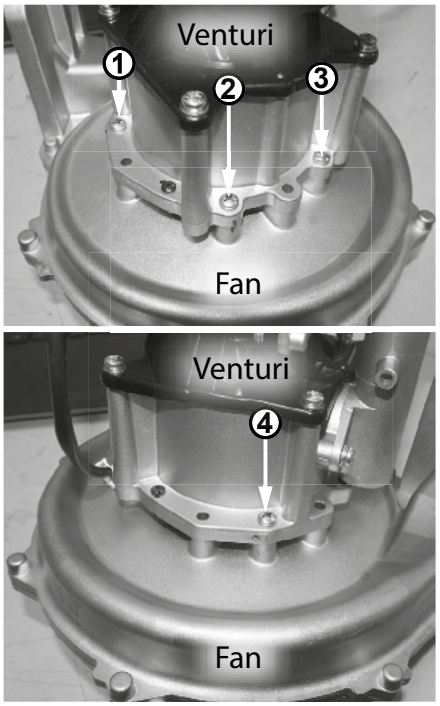

Figure 6 - Locate fan and venturi screws

13 Use a marker to identify the location of each screw hole (4x) on both the fan and venturi. Mark one screw hole location with an orientation mark on the fan and venturi. These marks will assist in proper orientation and installation of the new fan to the venturi.

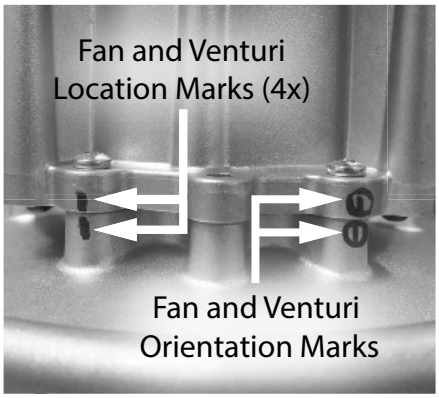

Figure 7 - Screw hole and orientation markings

14 Remove the four (4) screws and separate the venturi assembly from the old fan. Set the old fan aside as an orientation reference.

15 Locate the new fan, outlet gasket, and inlet O-ring provided in kit. Install outlet gasket and inlet O-ring to fan (see Figure 8). Once installed, make sure the outlet gasket and inlet O-ring are fully seated and not damaged.

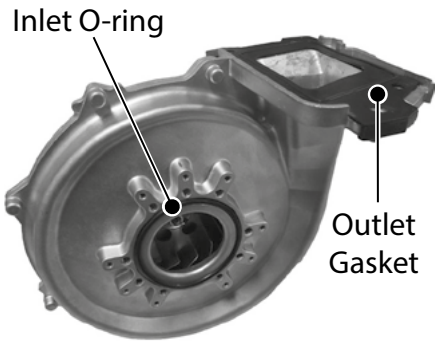

Figure 8 - Install inlet O-ring and outlet gasket to new fan assembly

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

16 Install the new fan to the venturi. Reference the orientation mark on the old fan to position the new fan properly as shown in Figure 9. Use the screw hole marks on the venturi to properly install the four (4) screws previously removed in **Step 14**.

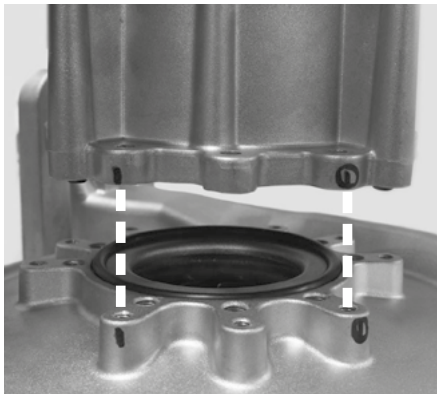

Figure 9 - Proper fan and venturi alignment

Installing Fan & Venturi Assembly

17 Fit the fan and venturi assembly to the burner assembly.

NOTICE: Confirm the burner tab engages the fan slot as shown in Figure 10.

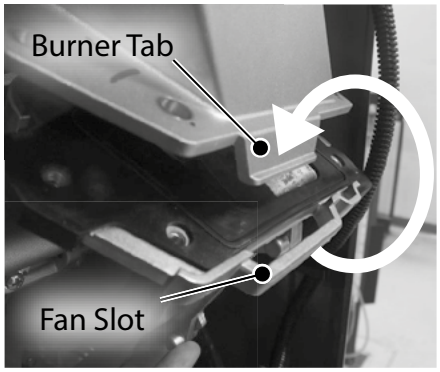

Figure 10 - Burner tab and fan slot

18 Locate the four (4) screws previously removed in **Step 10**. Use screws to secure fan and venturi assembly to burner assembly.

Fan Assembly Replacement Kit Instructions

19 Connect the gas tube to the gas valve. Locate the spring clip previously removed in **Step 9**. Orient spring clip properly as shown in Figure 11. Install spring clip to secure the gas tube to the gas valve. Confirm gas connection is tight and will not leak.

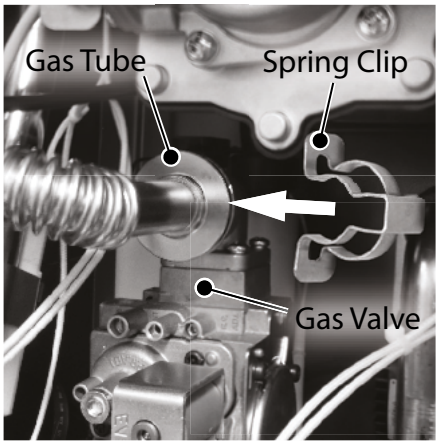

Figure 11 - Secure gas tube with spring clip

20 Reconnect the venturi wires (2x) previously disconnected in **Step 8**. Confirm connections are secure.

Returning Water Heater to Operation

21 Lift the control board panel up and lock into place.

22 Install and tighten the screw to the control board panel previously removed in **Step 6**.

23 Reconnect the fan wiring harness to the control board panel previously disconnected in **Step 5**.

24 Replace the cabinet cover and secure with the screws previously removed in **Step 3**.

25 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

26 Restore power to the water heater.

Flame Sensor Assembly Replacement Kit Instructions

Kit 100371170 Contains:
- Flame Sensor Assembly
- Graphite Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Flame Sensor Assembly

5 Locate the flame sensor on the burner assembly as shown in Figure 1. Remove the cap from the flame sensor. **DO NOT** pull on wires.

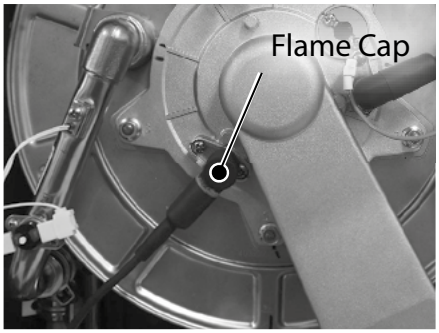

Figure 1 - Remove flame sensor cap

6 Use a Phillips screwdriver to remove the two (2) screws securing flame sensor to the burner assembly as shown in Figure 2. Place screws aside in a safe place for reinstallation.

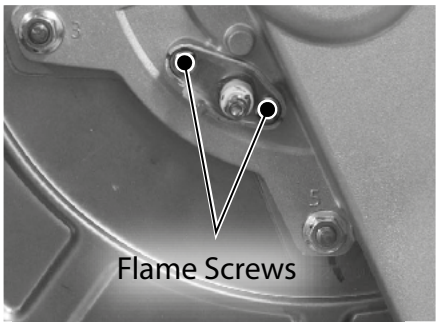

Figure 2 - Remove flame sensor screws

7 Remove flame sensor and graphite gasket from burner assembly and dispose of properly.

Installing New Flame Sensor Assembly

8 Locate the new flame sensor assembly and graphite gasket provided in the kit. Orient the graphite gasket as shown in Figure 3 and install to flame sensor assembly.

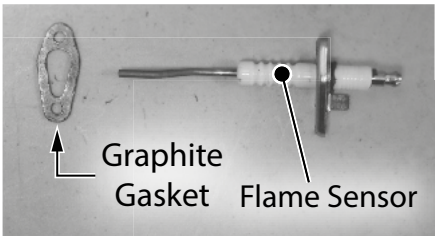

Figure 3 - Install flame sensor and graphite gasket

9 Install the flame sensor and graphite gasket to the burner assembly. Secure the flame sensor assembly with the two (2) screws previously removed in **Step 6**. Confirm bracket and graphite gasket sit flush against burner assembly.

10 Locate the cap previously removed in **Step 5**. Push the cap back on to the flame sensor assembly. The cap will snap into place when firmly secured to the flame sensor assembly.

Checking for Gas Leaks

11 Turn **ON** the gas supply to the water heater at the manual gas shut off valve. Restore power to the water heater. Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

12 Use code approved methods to check for leaks around all gas connection points and the burner door assembly. To protect graphite gaskets from water damage, **DO NOT** perform a bubble test. If any leaks are detected, resecure components and recheck for leaks.

Returning Water Heater to Operation

13 Replace the cabinet cover and secure with the screws previously removed in **Step 3**. The water heater is now ready for operation.

Ignitor Rod Assembly Replacement Kit Instructions

Kit 100371182 Contains:
- Ignitor Rod Assembly
- Graphite Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Ignitor Rod Assembly

5 Locate the ignitor rod on the burner assembly as shown in Figure 1. Remove the cap from the ignitor rod. **DO NOT** pull on wires.

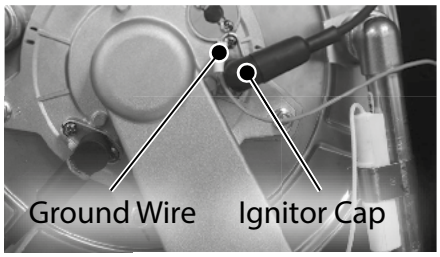

Figure 1 - Remove ignitor rod cap

6 Disconnect the green ground wire at the ignitor rod as shown in Figure 1. Route the wire inside the water heater cabinet for ease of access to ignitor rod.

7 Use a Phillips screwdriver to remove the two (2) screws securing ignitor rod to the burner assembly. Place screws aside in a safe place for reinstallation.

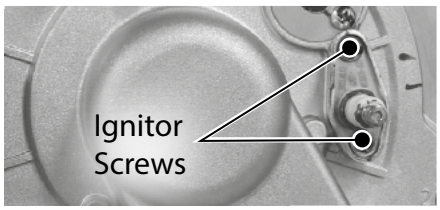

Figure 2 - Remove ignitor rod screws

8 Remove ignitor rod and graphite gasket from burner assembly and dispose of properly.

Installing New Ignitor Rod Assembly

9 Locate the new ignitor rod assembly and graphite gasket provided in the kit. Orient the graphite gasket as shown in Figure 3 and install to ignitor rod assembly.

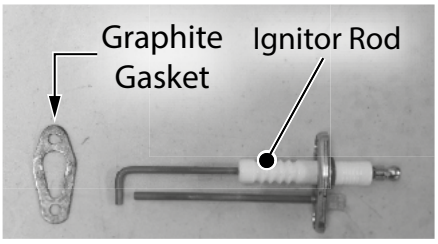

Figure 3 - Install ignitor rod and graphite gasket

10 Install the ignitor rod and graphite gasket to the burner assembly. Secure the ignitor rod assembly with the two (2) screws previously removed in **Step 7**. Confirm bracket and graphite gasket sit flush against burner assembly.

11 Reconnect the green ground wire previously disconnected in **Step 6.**

NOTICE: Verify rubber casing is fully covering the ground terminal connection at the ignitor rod.

12 Locate the cap previously removed in **Step 5**. Push the cap back on to the ignitor rod assembly. The cap will snap into place when firmly secured to the ignitor rod assembly.

Checking for Gas Leaks

13 Turn **ON** the gas supply to the water heater at the manual gas shut off valve. Restore power to the water heater. Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

14 Use code approved methods to check for leaks around all gas connection points and the burner door assembly. To protect graphite gaskets from water damage, **DO NOT** perform a bubble test. If any leaks are detected, resecure components and recheck for leaks.

Returning Water Heater to Operation

15 Replace the cabinet cover and secure with the screws previously removed in **Step 3**. The water heater is now ready for operation.

Flame Sensor Wire Replacement Kit Instructions

Kit 100371178 Contains:
- Flame Sensor Wire
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Flame Sensor Wire

4 Disconnect the flame sensor wire (blade style connector) from control board panel as shown in Figure 1. Notice the wire notch in the control board panel for proper routing of the flame sensor wire during reinstallation.

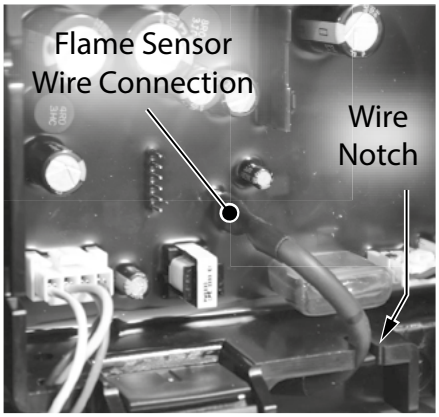

Figure 1 - Disconnect flame sensor wire

5 Locate the screw securing the control board panel as shown in Figure 2. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

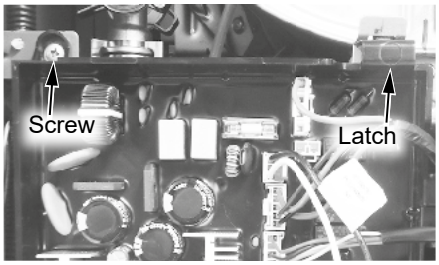

Figure 2 - Control board location

6 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board panel will hold itself in place.

7 Locate the cap on flame sensor wire as shown in Figure 3. Pull cap from flame sensor in burner door and remove flame sensor wire from water heater. Dispose of flame sensor wire properly.

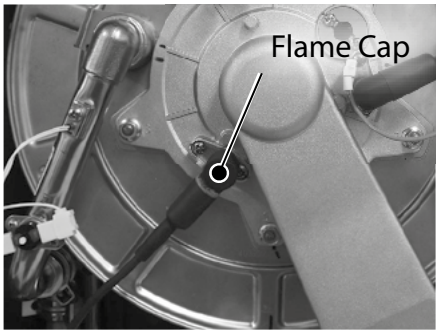

Figure 3 - Remove flame sensor cap

Installing New Flame Sensor Wire

8 Locate the new flame sensor wire provided in the kit.

9 Install cap on flame sensor wire to the flame sensor in burner door. The cap will click into place when secured.

10 Route the flame sensor wire under the control board panel and through the notch as shown in Figure 1. This will help keep wire in place.

11 Lift the control board panel up and lock into place.

12 Connect the flame sensor wire to control board panel as shown in Figure 1.

Returning Water Heater to Operation

13 Install and tighten the screw to the control board panel previously removed in **Step 5**.

14 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

15 Restore power to the water heater. The water heater is now ready for operation.

Freeze Protection Thermostat Replacement Kit Instructions

Kit 100371197 Contains:
- Freeze Protection Thermostat
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

4 Locate the screw securing the control board panel as shown in Figure 1. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

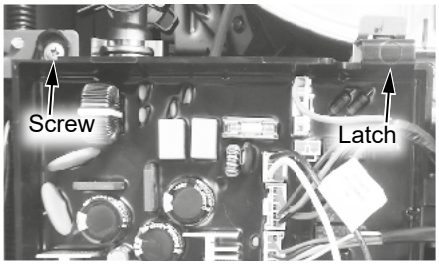

Figure 1 - Control board location

5 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board panel will hold itself in place.

Removing Freeze Protection Thermostat

6 With control board panel lowered, locate the freeze protection thermostat wire connection (white) as shown in Figure 2. Press tab on connector and disconnect wires. Wires leading to control board are white and brown. Wires leading to thermostat are both white.

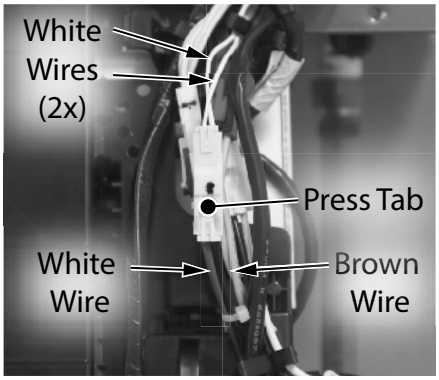

Figure 2 - Disconnect thermostat wiring

7 Locate freeze protection thermostat installed to the outlet water tube as shown in Figure 3. The thermostat is secured to tubing by a metal clamp. To remove thermostat from piping, gently pull on metal clamp and the assemlby will come free. Dispose of properly.

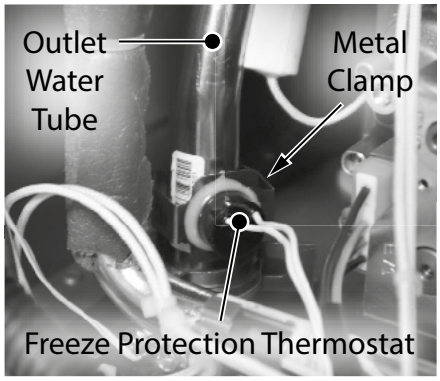

Figure 3 - Remove freeze protection thermostat

Installing New Free Protection Thermostat

8 Locate the new freeze protection thermostat provided in the kit.

9 To install freeze protection thermostat to outlet water tube, gently push metal clamp onto tubing. The metal clamp will snap into place. Confirm thermostat sits flush against piping.

10 Connect freeze protection thermostat to wiring cluster located at the control board panel as shown in Figure 2. Confirm wiring is snug inside plastic organizer.

Returning Water Heater to Operation

11 Lift the control board panel up and lock into place.

12 Install and tighten the screw to the control board panel previously removed in **Step 4**.

13 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

14 Restore power to the water heater. The water heater is now ready for operation.

Flow Control Valve Replacement Kit Instructions

Kit 100371171 Contains:
- Flow Control Valve
- (2x) O-ring (15.5 x 2.5)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

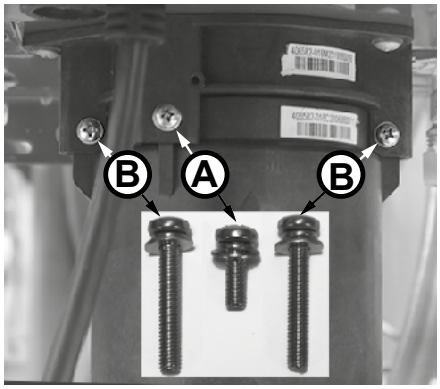

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

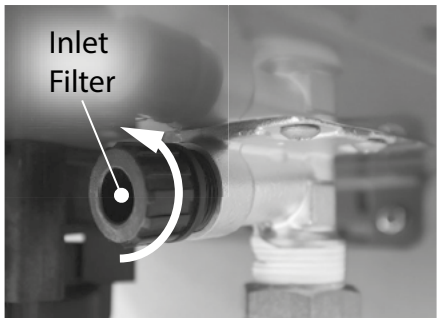

Figure 2 - Removing the inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

12 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

13 Lift cover up and away from cabinet to gain access to the water heater's internal components.

14 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

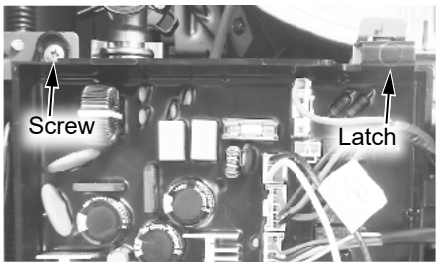

Figure 3 - Control board location

15 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place. See Figure 3.

Flow Control Valve Replacement Kit Instructions

Removing Flow Control Valve

16 Locate the flow control valve at the bottom right side of the water heater as shown in Figure 4. Disconnect the three (3) wiring harnesses from the valve marked:

- "Water Valve 1"
- "Inlet"
- "Flow"

To disconnect the "Inlet" and "Flow" connections, use a pair of needle nose pliers to gently press down on the connector tab while pulling connections apart. See Figure 4.

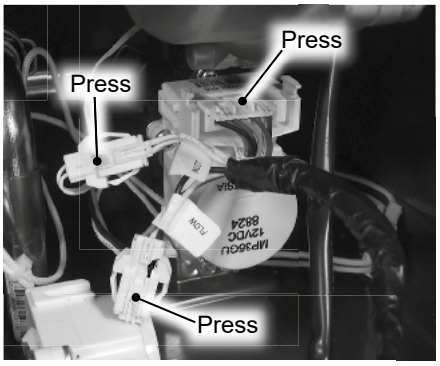

Figure 4 - Locating wiring harnesses

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

17 Remove the two (2) spring clips (size 25) securing the flow control valve to the piping system. Place the spring clips aside in a safe place for reinstallation. See Figure 5.

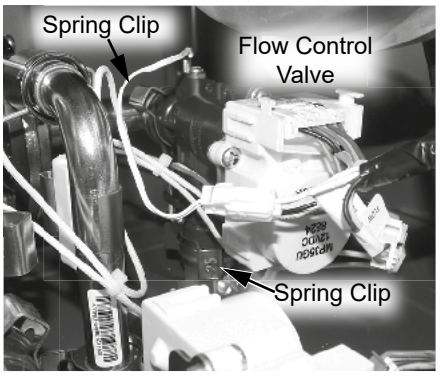

Figure 5 - Locating Flow Control Valve

18 Remove the flow control valve from the piping system and dispose of properly.

19 Locate the two (2) O-rings on the exposed water pipe connections as shown in Figure 6 and remove them and install the new O-rings. Dispose of the old O-rings properly. See Figure 6.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

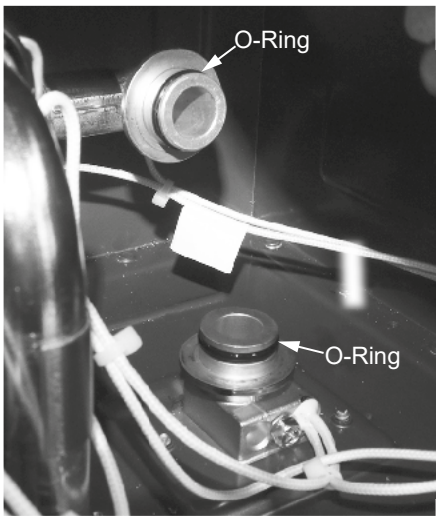

Figure 6 - Locating the O-rings

Installing New Flow Control Valve

20 Locate the new flow control valve provided in the kit. Carefully install flow control valve to pipe connections.

21 Locate the two (2) spring clips previously removed in **Step 17**. Install spring clips to flow control valve, securing it to piping connections. See Figure 5. Verify water connections are tight and will not leak.

22 Reconnect the three (3) wiring harnesses to the flow control valve previously disconnected in **Step 16**. Confirm wiring connections are secure. See Figure 4.

Checking for Water Leaks

23 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

24 Lift the control board panel up and lock into place.

25 Install and tighten the screw to the circuit board panel previously removed in **Step 14**.

26 Replace the cabinet cover and secure with the screws previously removed in **Step 12**.

27 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

28 Restore power to the water heater. The water heater is now ready for operation.

Flue/Air Intake Clamp Replacement Kit Instructions

Kit 100371167 Contains:
- Clamps
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Flathead Screwdriver
- Phillips head Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the flue exhaust port and intake air port. See Figure 1.

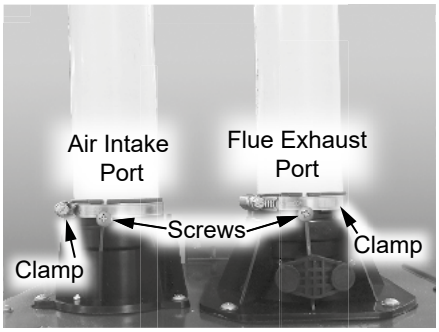

Figure 1 - Flue exhaust port and intake air port location

3 Remove the two (2) screws securing the intake air and exhaust piping to the ports. Place the screws aside in a safe place for reinstallation. See Figure 1.

Removing the Flue/Air Intake Clamps

4 Using a flathead screwdriver loosen the exhaust port and air intake clamps.

5 Disconnect the flue exhaust pipe from the exhaust port and air intake pipe from the air intake port.

6 Remove the clamps and dispose of them properly.

Replacing the Flue/Air Intake Clamps

7 Locate the new clamps provided in the kit. Place a new clamp over the intake air port and the exhaust port. Note the orientation of the clamps. See Figure 1

8 Reinstall the flue exhaust pipe to the exhaust port and air intake pipe to the air intake port removed in **Step 5**.

NOTICE: Before placing the pipes into the ports make sure they are clean and free from any debris.

9 Reinstall the two (2) screws removed in **Step 3.** See Figure 1.

10 Tighten the clamps at the exhaust and intake air ports to secure the piping.

Returning Water Heater to Operation

11 Restore power to the water heater. The water heater is now ready for operation.

Gas Connector Replacement Kit Instructions

Kit 100371172 Contains:
- Gas Connector
- Gas Valve O-ring
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Pipe Wrench
- Thread Sealant Tape or Pipe Dope
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Locate the gas connector on the bottom of the water heater. See Figure 1. Disconnect the gas line to the water heater.

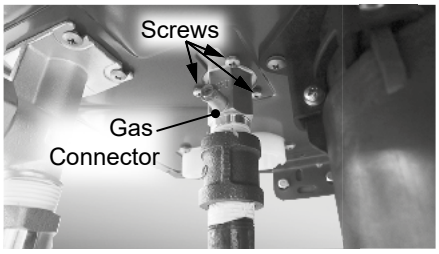

Figure 1 - Gas connector location

4 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

5 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Gas Connector

6 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 2.

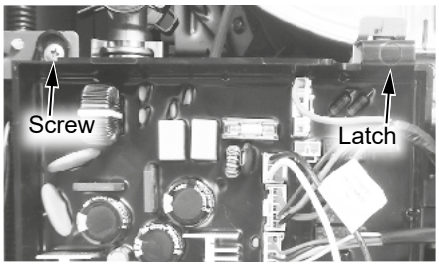

Figure 2 - Control board loaction

7 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

8 Locate the gas valve at the bottom left side of the water heater. See Figure 3.

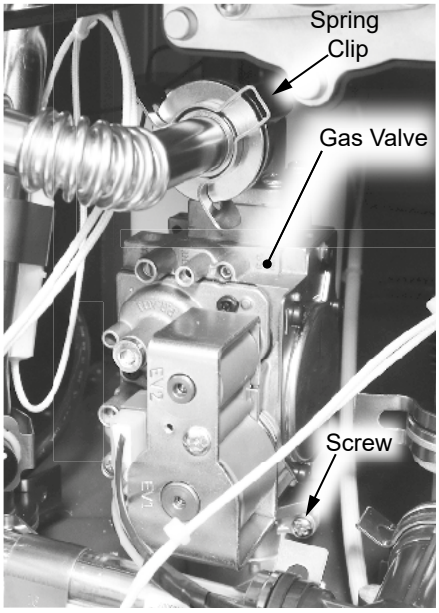

Figure 3 - Gas valve location

9 Locate and remove the spring clip securing the gas valve to the gas piping system. Note its orientation and place it aside for reinstallation. See Figure 3.

10 Remove and keep the screw at base of the gas valve. See Figure 3.

11 Remove the gas valve and set aside for reinstallation.

NOTE: It is not necessary to remove the gas valve from the water heater, it can be set aside in the case.

12 Locate the three (3) screws securing the gas connector to the base of the base of the cabinet. Use a Phillips screwdriver to remove the screws and place them aside in a safe place for reinstallation. See Figure 1.

13 Remove the old gas connector and dispose of properly.

Replacing the Gas Connector

14 Locate the new O-ring included in the kit, install it as shown in Figure 4.

Gas Connector Replacement Kit Instructions

NOTICE: Handle with care and verify lubricant has been applied to O-ring and O-ring is not dirty or damaged.

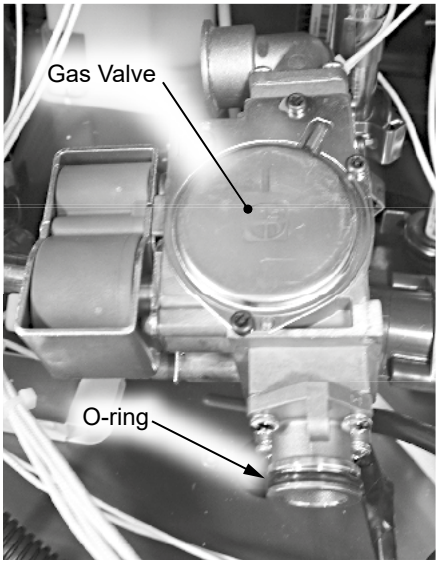

Figure 4 - Gas valve o-ring

15 Install the new gas connector in the base of the cabinet and secure with the three (3) screws removed in **Step 12**.

16 Carefully install the gas valve to the gas connector. Secure with the screw removed in **Step 10.**

NOTICE: Check the fittings for any dirt or debris before making the connection.

17 Locate the spring clip previously removed in **Step 9**. Install spring clip to gas valve securing it to gas connector.

18 Reconnect the gas line to the gas connector. Use an approved thread sealant tape or pipe dope when making the connection.

Checking for Gas Leaks

19 Turn **ON** the gas supply to the water heater at the manual gas shut off valve and check for leaks. Use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture (1 part soap to 15 parts water) or children's soap bubbles around the gas valve connector. If any leaks are detected (which will appear as small bubbles), resecure the connection and recheck for leaks.

Returning Water Heater to Operation

20 Lift the circuit board panel up and lock into place. Install and tighten the screw previously removed in **Step 6**.

21 Replace the cabinet cover and secure with the screws previously removed in **Step 4**.

22 Restore power to the water heater. The water heater is now ready for operation.

Gas Valve Replacement Kit Instructions

Kit 100371174 Contains:
- Gas Valve
- 3 Gas Valve O-rings (20 x 2.65 NBR)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- 12" Phillips Screwdriver (Magnetized)
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Gas Valve

5 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 1.

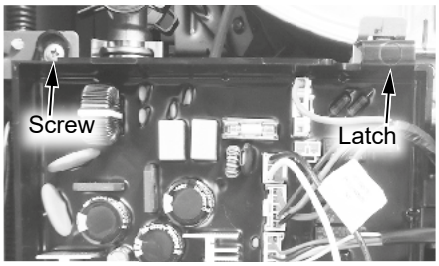

Figure 1 - Control board location

6 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

7 Locate the gas valve at the bottom left side of the water heater. See Figure 2.

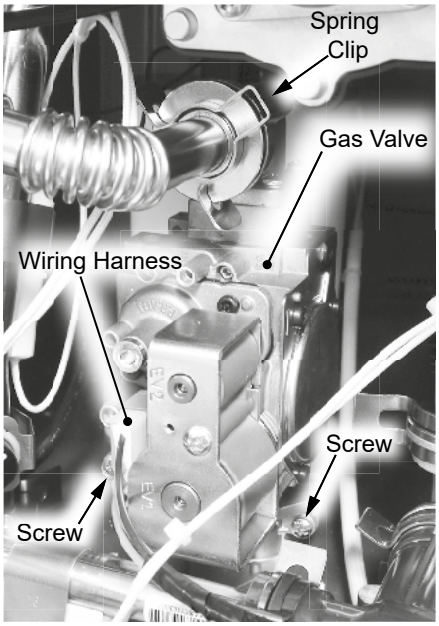

Figure 2 - Gas valve location and connections

8 Remove and keep the screw securing the wiring harness to the gas valve. See Figure 2.

9 Locate and remove the spring clip securing the gas valve to the gas piping system. Note its orientation and place it aside for reinstallation. See Figure 2.

10 Remove and keep the screw at base of the gas valve. See Figure 2.

11 Remove the old gas valve and dispose of properly.

Replacing the Gas Valve

12 Locate the new gas valve o-ring, install it as shown in Figure 3.

NOTICE: Handle with care and verify lubricant has been applied to o-ring and o-ring is not dirty or damaged.

13 Carefully install the new gas valve to the gas connector. Secure with the screw removed in **Step 10.**

NOTICE: Check the fittings for any dirt or debris before making the connection.

Gas Valve Replacement Kit Instructions

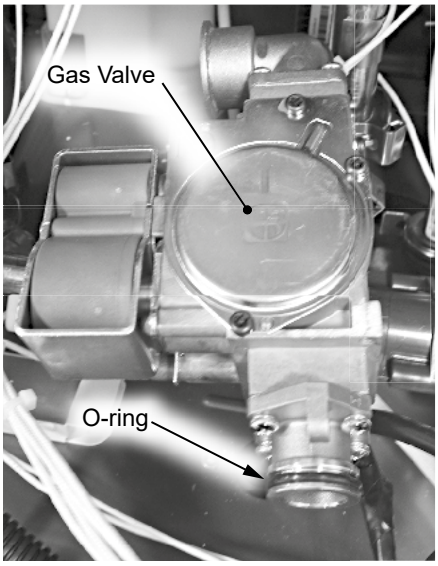

Figure 3 - O-ring replacement (one o-ring)

14 Install the two new O-rings on the gas tube as shown in Figure 4.

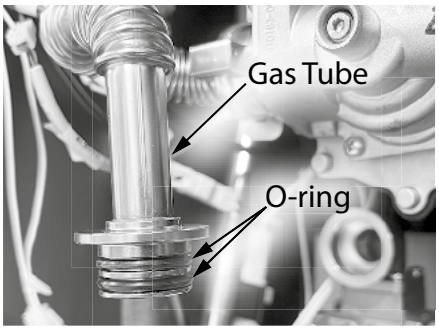

Figure 4 - O-ring replacement (two o-rings)

15 Locate the spring clip previously removed in **Step 9**. Install spring clip to gas valve securing it to gas piping system.

16 Reinstall the wiring harness and secure with screw removed in **Step 8**.

17 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

18 Restore power to the water heater.

19 Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

20 Check for leaks around the bottom gas valve connection only. Use a small, soft-bristled brush to apply a hand dishwashing soap and water mixture (1 part soap to 15 parts water) or children's soap bubbles around the bottom gas valve connection. If any leaks are detected (which will appear as small bubbles), resecure the connection and recheck for leaks.

NOTICE: DO NOT apply liquids to the top connection of the gas valve.

21 Close all hot water fixtures in the house once the check is complete.

Returning Water Heater to Operation

22 Lift the circuit board panel up and lock into place. Install and tighten the screw previously removed in **Step 5**.

23 Replace the cabinet cover and secure with the screws previously removed in **Step 3**.

24 The water heater is now ready for operation.

Gas Wiring Harness Replacement Kit Instructions

Kit 100371211 Contains:
- Gas Wiring Harness
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Pliers
- O-Ring Pick
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Gas Wiring Harness

4 Locate the ignitor wiring harness and ignitor ground connection. See Figure 1. Disconnect them and move the wires aside.

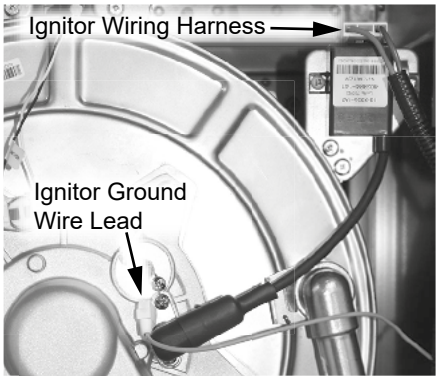

Figure 1 - Ignitor wiring harness location

5 The wiring is held in place along the right side of the cabinet by three (3) plastic organizers. Remove the wiring from these keepers.

6 Locate and remove the two (2) screws securing the grounding wires to the grounding plate. See Figure 2. Do not remove the third ground connection that is not part of the wiring assembly. Place screws aside in a safe place for reinstallation.

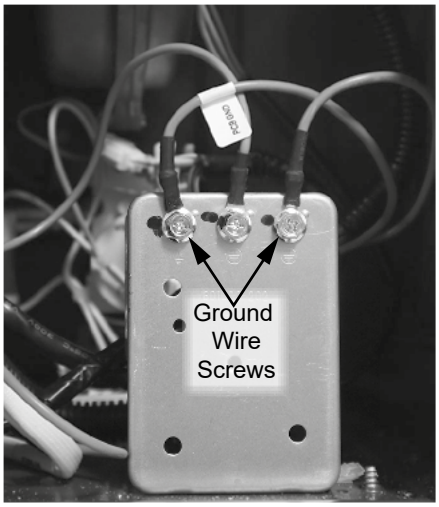

Figure 2 - Location of ground wires

NOTICE: Remove the push mount cable tie securing the wiring assembly to the ground plate.

7 Using Figures 3 & 4 as reference, disconnect wiring harness A and B from the control board.

NOTICE: To remove wiring harness Ⓐ, depress the spot shown in Figure 3 while pull the harness away from the control board.

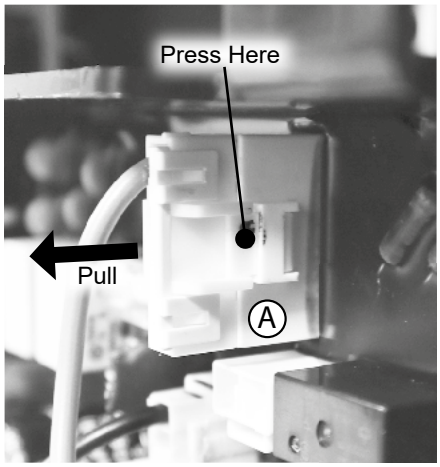

Figure 3 - Wiring harness A removal.

8 Disconnect wiring harness Ⓑ shown in Figure 4.

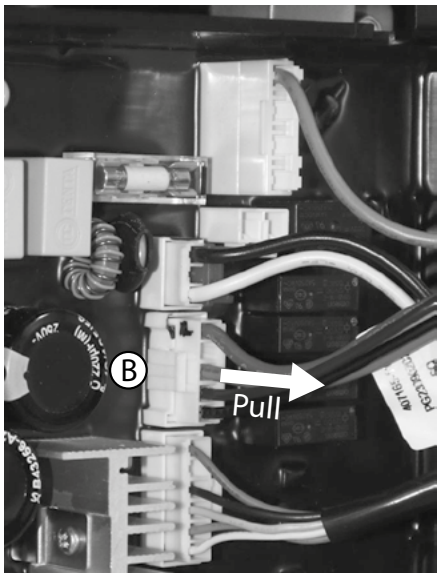

Figure 4 - Wiring harness location

9 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

Gas Wiring Harness Replacement Kit Instructions

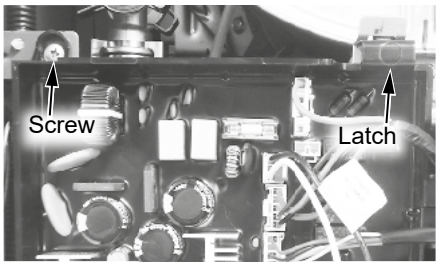

Figure 5 - Control board screw location

10 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

11 Remove the wiring assembly from the plastic organizers on the back of the control board.

12 Locate the screw securing the wiring harness to the gas valve. See Figure 6. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

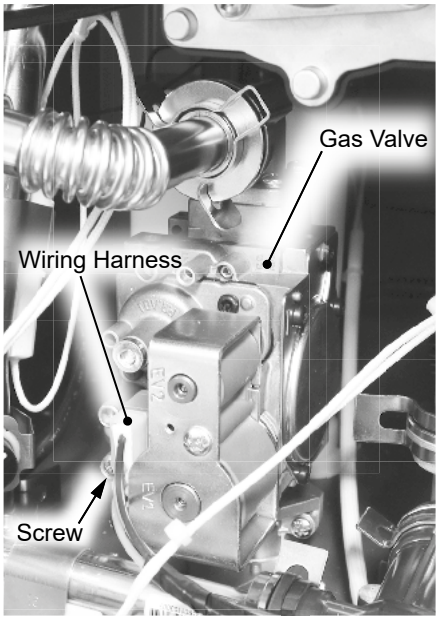

Figure 6 - Gas valve wiring harness location.

13 Remove the old gas wiring harness and dispose of it properly.

Replacing the Gas Wiring Harness

14 Locate the new gas wiring harness provided in the kit.

15 Reconnect the gas valve wiring harness and secure with screw removed in **Step 12**.

16 Route the wiring through the cable organizer removed in **Step 11**.

17 Lift the circuit board panel up and lock into place. Install and tighten the screw previously removed in **Step 9**.

18 Reconnect wiring harnesses A and B removed in **Step 7 & 8**.

19 Using the screws removed in **Step 6**, reconnect the ground wires to the grounding plate.

20 Reroute the wiring assembly through the plastic organizers on the right side of the cabinet removed in **Step 5**.

21 Reconnect the ignitor ground connection and ignitor wiring harness removed in **Step 4**.

Returning Water Heater to Operation

22 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

23 Restore power to the water heater. The water heater is now ready for operation.

Heat Exchanger Replacement Kit Instructions

Kit 100371179 Contains:
- Heat Exchanger (HEX) Assembly (includes flame sensor, ignitor rod, sight glass, exhaust thermistor and burner door hi-limit)
- (2x) O-ring (21.8 x 2.4)
- Exhaust Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- 12" Phillips Screwdriver (magnetized)
- Flathead Screwdriver
- 8 mm Hex Socket with 8" & 16" extensions
- Towel or Rag
- Bucket
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

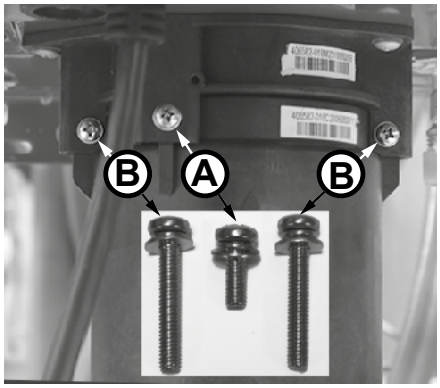

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

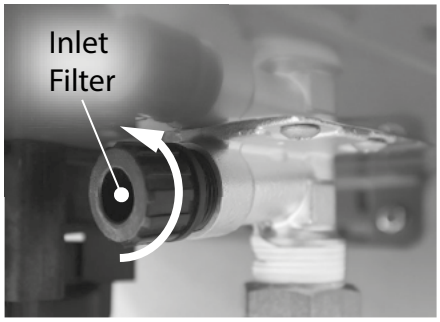

Figure 2 - Removing the inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

12 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

13 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Heat Exchanger Replacement Kit Instructions

14 Locate the fan wiring harness on the control board panel as shown in Figure 3. Disconnect and route the wiring out of the way for ease of removing the fan and venturi assembly.

Figure 3 - Locate fan wiring harness on control board

15 Locate the screw securing the control board panel as shown in Figure 4. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

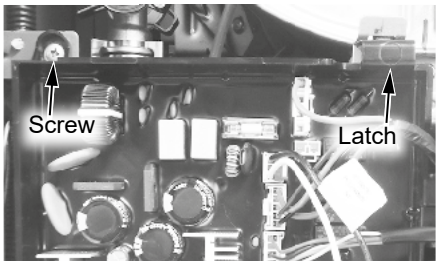

Figure 4 - Control board location

16 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Fan & Venturi Assembly

17 Locate the wire connectors labeled "Venturi" and "Micro Switch" and disconnect them as shown in Figure 5. These wires are connected at and run through the black cable conduit located on the left side of the water heater cabinet.

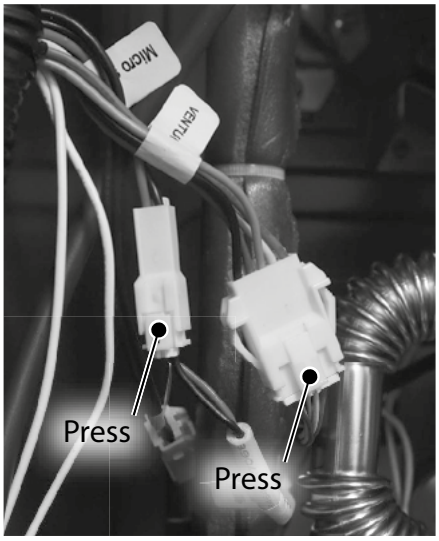

Figure 5 - Locate venturi and micro switch wires

18 Locate the gas tube connecting the venturi assembly to the gas valve as shown in Figure 6. Note the orientation of the spring clip securing the gas tube to the gas valve. Remove spring clip and place it aside in a safe place for reinstallation. Leave the gas tube connected to gas valve. This will provide support when removing the fan assembly screws.

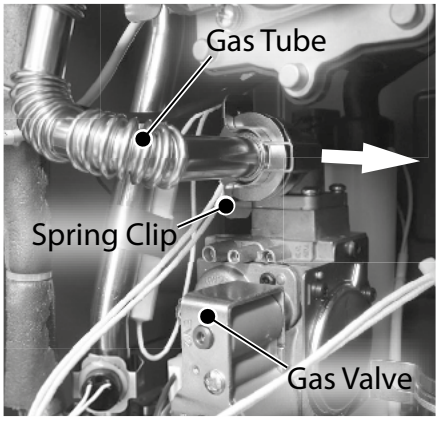

Figure 6 - Remove gas tube spring clip

19 Locate the four (4) screws securing the fan assembly to the burner door assembly as shown in Figure 7. Use a Phillips screwdriver to remove the screws. Place the screws aside in a safe place for reinstallation.

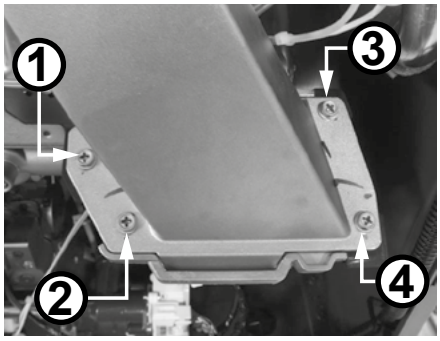

Figure 7 - Remove fan assembly screws

20 Disconnect the gas tube from the gas valve and carefully remove the fan and venturi assembly from the water heater.

Disconnecting Condensate Hose

21 Disconnect the black hose from the top of the condensate trap and then from the back of the heat exchanger as shown in Figure 8. Compress the spring clamp and pull it down along with the black hose. Place hose aside in a safe place for reinstallation.

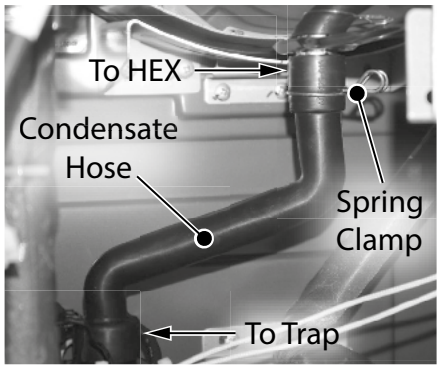

Figure 8 - Disconnect condensate hose

Removing Heater Blocks

22 Locate the two heater blocks attached to the top and bottom of HEX inlet tube as shown in Figure 9. Remove brackets (size 20) securing

heater blocks to tube. Place brackets aside in a safe place for reinstallation. Route heater blocks and wiring inside water heater cabinet for ease of access to heat exchanger.

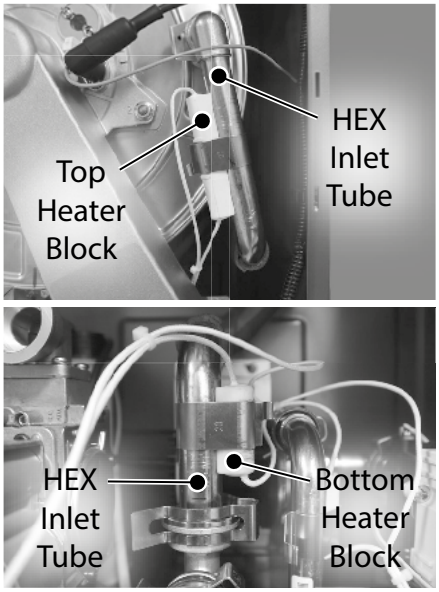

Figure 9 - Remove heater blocks from HEX inlet tube

Removing HEX Inlet Tube

23 Locate the HEX inlet tube as shown in Figure 10. Remove the spring clip (size 30) securing the HEX inlet tube to the outlet tee. Place bracket aside in a safe place for reinstallation.

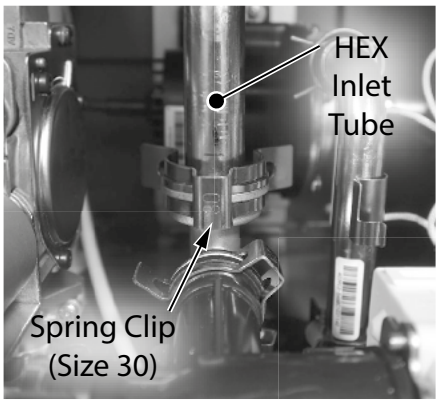

Figure 10 - Remove spring clip securing HEX inlet tube

24 Locate the fastener securing the HEX inlet tube to the heat exchanger as shown in Figure 11. Use a flathead screwdriver to gently pry the fastener free. Remove fastener and place it aside in a safe place for reinstallation.

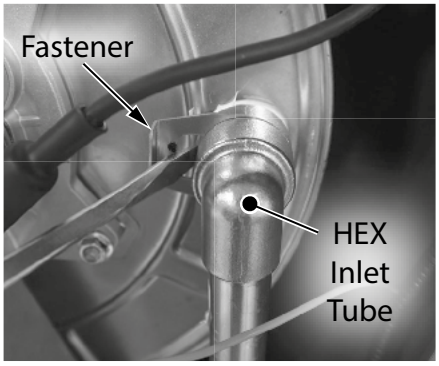

Figure 11 - Remove fastener securing HEX inlet tube

25 Disconnect HEX inlet tube from heat exchanger and outlet tee. Remove HEX inlet tube from water heater and place it aside in a safe place for reinstallation.

Removing HEX Outlet Tube

26 Locate the HEX outlet tube as shown in Figure 12. Remove the spring clip (size 30) securing the HEX outlet tube to the mixing tee. Place bracket aside in a safe place for reinstallation.

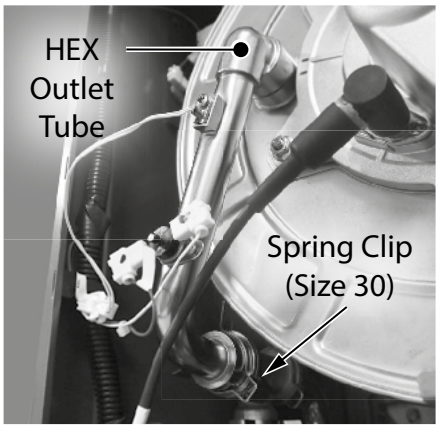

Figure 12 - Remove spring clip securing HEX outlet tube

27 Locate the fastener securing the HEX outlet tube to the heat exchanger as shown in Figure 13. Use a flathead screwdriver to gently pry the fastener free. Remove fastener and place it aside in a safe place for reinstallation.

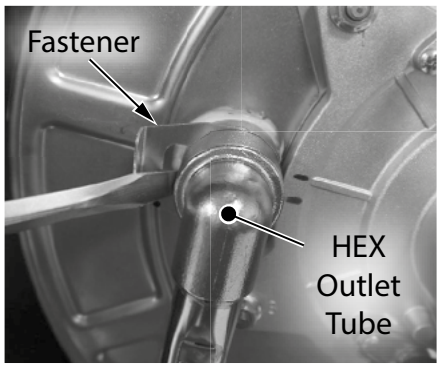

Figure 13 - Remove fastener securing HEX outlet tube

28 Locate the hi-limit switch and thermostat wiring connected to the HEX outlet tube as shown in Figure 14. Disconnect the hi-limit wires (labeled "HI LIMIT 2") from the switch. Disconnect the thermostat wiring (labeled "HEX") by pressing on the small tab while separating the wires.

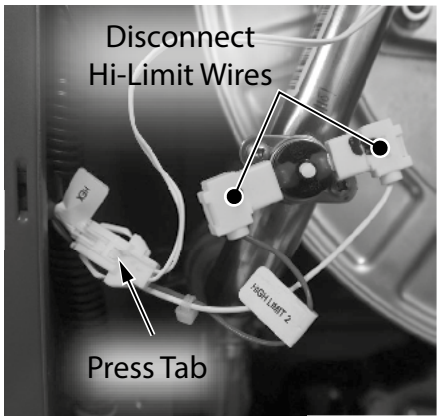

Figure 14 - Disconnect HEX outlet tube wiring

29 Disconnect HEX outlet tube from heat exchanger and mixing tee and place it aside in a safe place for reinstallation.

Disconnecting Flame Sensor & Ignitor Rod Caps

30 Locate the flame sensor and ignitor rod on the burner assembly as shown in Figure 15 (following page). Remove the caps from flame sensor and ignitor rod. **DO NOT** pull wires. Disconnect the green ground

Heat Exchanger Replacement Kit Instructions

wire from the ignitor rod assembly.

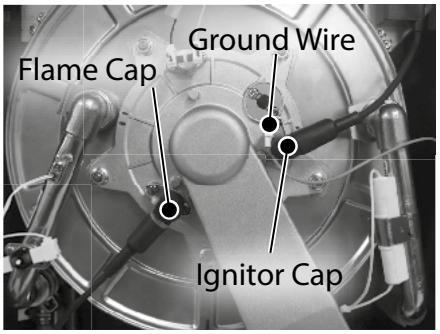

Figure 15 - Remove ignitor rod and flame sensor caps

Removing Ignitor Assembly

31 Locate the ignitor assembly on upper right side of the heat exchanger as shown in Figure 16.

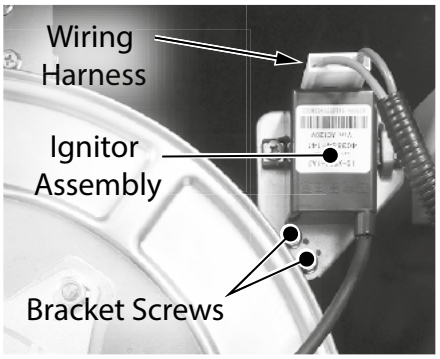

Figure 16 - Ignitor assembly location

32 Disconnect the wiring harness from the ignitor assembly.

33 Locate the two (2) screws securing ignitor assembly bracket to heat exchanger. Remove screws, bracket and ignitor assembly from heat exchanger. Place components aside in a safe place for reinstallation.

Disconnecting Burner Door Hi-Limit & Exhaust Thermistor

34 Locate the burner door hi-limit and exhaust thermistor wiring connected to the heat exchanger as shown in Figure 17. Disconnect the hi-limit wires (labeled "HI LIMIT 1") from terminals. Disconnect the thermistor wiring (labeled "EXHAUST") by pressing on the small tab while separating the wires.

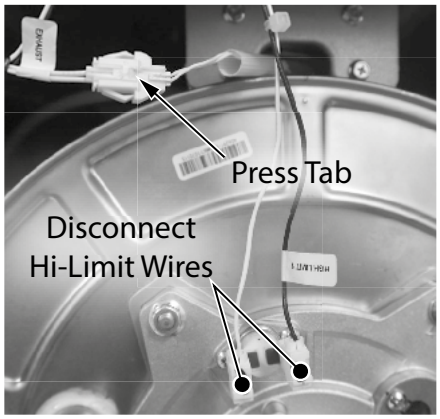

Figure 17 - Disconnect hi-limit and exhaust thermistor wiring

35 Route exhaust thermistor wiring through the heat exchanger install bracket for ease of removing heat exchanger.

Removing Pressure Switch Assembly

36 Locate the pressure switch assembly on upper left side of the heat exchanger as shown in Figure 18.

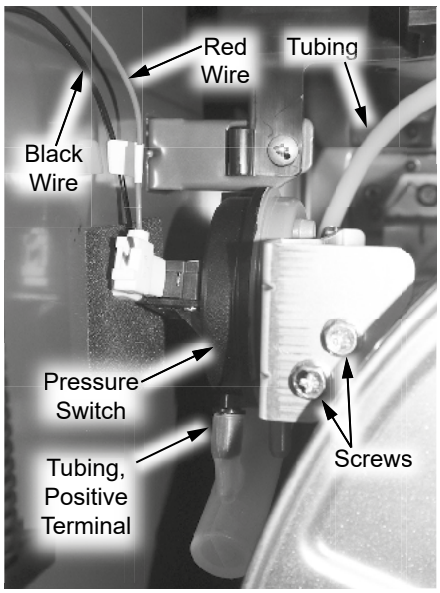

Figure 18 - Pressure switch assembly location

37 Disconnect the tubing from heat exchanger.

38 Locate the two (2) screws securing pressure switch assembly bracket to heat exchanger. Remove screws, bracket and pressure switch assembly from heat exchanger.

39 Disconnect the black wire harness from the common (C) connector and the red wire harness from the normally closed (NC) connector. Place components aside in a safe place for reinstallation.

Removing Heat Exchanger

Lifting Risk

⚠ WARNING! The heat exchanger is heavy. Follow these precautions to reduce the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

40 Locate the two vertical (2) brackets and four (4) screws securing the heat exchanger to the backside of the water heater cabinet as shown in Figure 19.

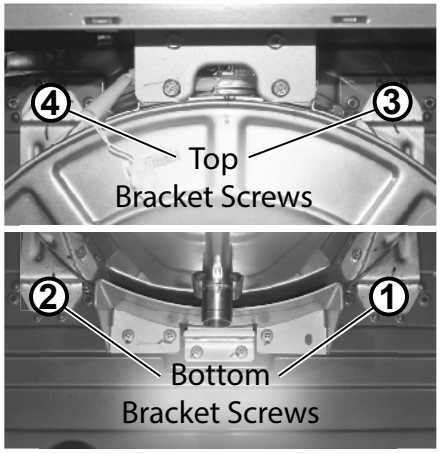

Figure 19 - Locate and remove heat exchanger bracket screws

41 Use an 8 mm hex socket with an 8" extension to remove the bottom screw on the right bracket.

Heat Exchanger Replacement Kit Instructions

42 Use an 8 mm hex socket with a 16" extension to remove the bottom screw on the left bracket.

43 Use an 8 mm hex socket with a 16" extension to remove the two (2) top screws on each bracket.

Place all four (4) screws aside in a safe place for reinstallation.

44 Disconnect exhaust piping from exhaust port. Locate and remove the four (4) screws securing exhaust port to water heater cabinet as shown in Figure 20. Place screws aside in a safe place for reinstallation.

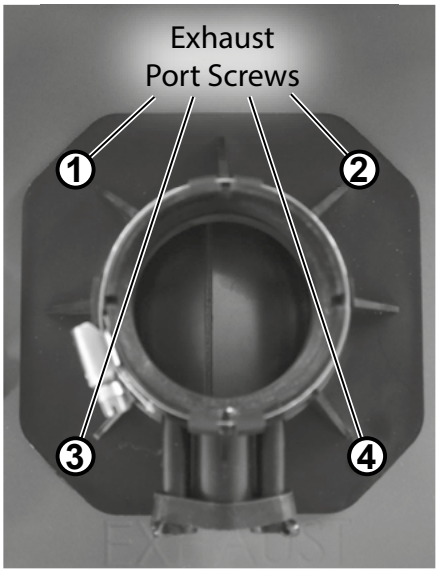

Figure 20 - Remove exhaust port screws

45 Disconnect exhaust port from water heater and set aside in a safe place for reinstallation.

46 Locate the heat exchanger install bracket and top two (2) screws as shown in Figure 21.

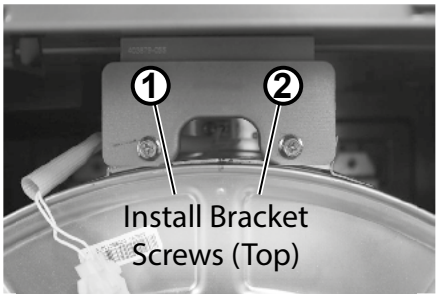

Figure 21 - Heat exchanger install bracket

⚠ WARNING! Once top screws are removed from bracket the heat exchanger will come free. Properly support the weight of the heat exchanger when removing screws. Failure to properly support the weight of the heat exchanger could cause property damage or personal injury.

47 Remove the top two (2) screws from install bracket. Allow heat exchanger to lean slightly forward. Lift up to remove heat exchanger tab from hanger assembly and remove heat exchanger from water heater. See Figures 22 & 23 for reference.

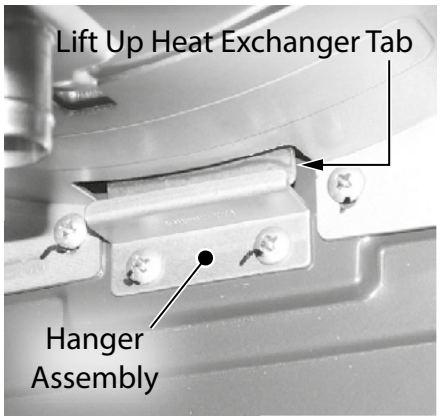

Figure 22 - Heat exchanger tab and hanger (bottom side of heat exchanger)

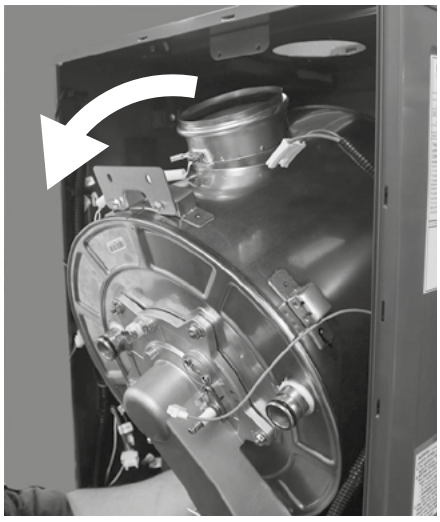

Figure 23 - Remove heat exchanger

Preparing New Heat Exchanger for Installation

48 Locate the two (2) bottom screws securing install bracket to old heat exchanger as shown in Figure 24. Remove screws and install bracket from old heat exchanger. Secure install bracket to the new heat exchanger with the two (2) bottom screws.

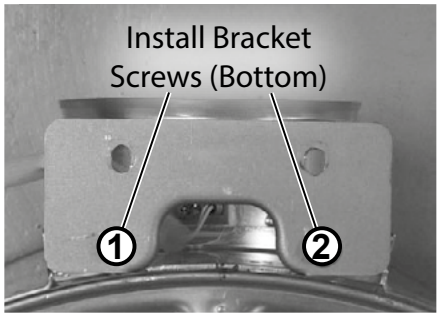

Figure 24 - Heat exchanger install bracket

49 Dispose of old heat exchanger properly.

50 Locate the exhaust gasket provided in the kit. Orient gasket so side with small flat surface is facing downward. The side facing upward will have a slight bevel. See Figure 25 as reference.

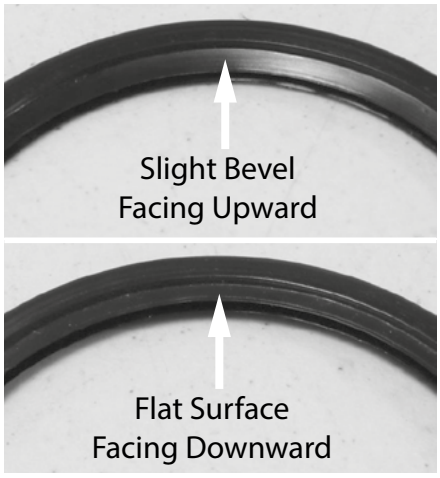

Figure 25 - Orient exhaust gasket

NOTICE: Handle with care and verify lubricant has been applied to gasket. Confirm gasket is not dirty or damaged.

Heat Exchanger Replacement Kit Instructions

51 Install exhaust gasket to groove in heat exchanger exhaust as shown in Figure 26.

Figure 26 - Install exhaust gasket

52 Locate the two (2) O-rings provided in the kit. Install O-rings to the inlet and outlet HEX tube connections as shown in Figure 27.

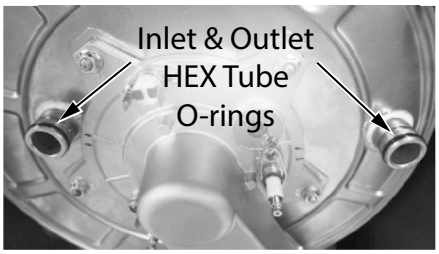

Figure 27 - Install new O-rings

NOTICE: Handle with care and verify lubricant has been applied to O-rings. Confirm O-rings are not dirty or damaged.

Installing New Heat Exchanger

Lifting Risk

⚠ WARNING! The heat exchanger is heavy. Follow these precautions to reduce the risk of property damage, injuries from lifting or impact injuries from dropping the water heater.

53 Locate the top two (2) install bracket screws previously removed in **Step 47.** Place both screws and a Phillips screwdriver on top of water heater cabinet for ease of access when installing heat exchanger.

54 Lift heat exchanger into water heater cabinet. Lean the top side of heat exchanger slightly toward you so the tab at the bottom inserts into the hanger assembly as shown in Figure 28. Once the tab is inserted, push heat exchanger upright so the screw holes in the install bracket align with bracket in cabinet as shown in Figure 29.

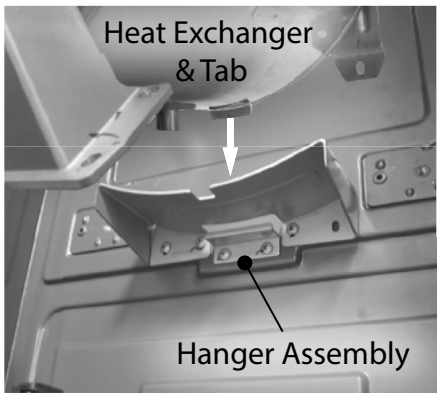

Figure 28 - Insert tab into hanger

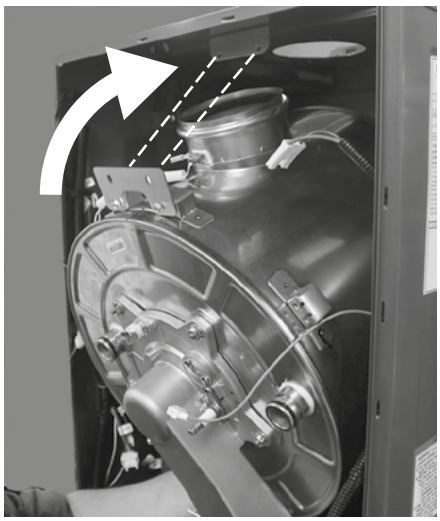

Figure 29 - Install heat exchanger to water heater

55 Hold heat exchanger in place and secure with the top two (2) screws placed on the water heater cabinet in **Step 53.**

56 Verify the four (4) screw holes in vertical brackets properly align with screw holes in water heater cabinet. To realign heat exchanger screw holes, lift heat exchanger from underneath and shift left or right to center tab in hanger assembly.

57 Locate the four (4) screws previously removed in **Steps 40-43.** Use screws to secure the vertical brackets using the appropriate hex socket and extension (or use a 12" Phillips screwdriver).

IMPORTANT! The heat exchanger is now secured to the water heater and fully supported.

58 Locate exhaust port and the four (4) screws previously removed in **Step 44**. Install exhaust port to water heater cabinet and secure with screws. Confirm emissions port is facing the front of the water heater. Reconnect exhaust piping and confirm connection is tight.

Connecting Condensate Hose

59 Locate the black hose previously removed from the condensate trap and heat exchanger in **Step 21**. Connect hose to condensate trap. Connect the other end of hose to the back of heat exchanger. Secure connection at heat exchanger with spring clamp as shown in Figure 8. Confirm connections are tight and will not leak.

Installing HEX Inlet Tube

60 Locate the HEX inlet tube previously removed in **Step 25**. Follow **Steps 23-25** in reverse order to secure HEX inlet tube to outlet tee and heat exchanger. Confirm connections are tight and will not leak.

NOTICE: To secure HEX inlet tube to heat exchanger, align fastener previously removed in **Step 24** with slots in HEX inlet tube and push fastener inward until it is secure.

Installing Heater Blocks

61 Locate the two (2) heater blocks and two (2) brackets (size 20) previously removed in **Step 22**. Install heater blocks to HEX inlet tube and secure with brackets as shown in Figure 9.

Heat Exchanger Replacement Kit Instructions

Installing HEX Outlet Tube

62 Locate the HEX outlet tube previously disconnected in **Step 29**. Follow **Steps 26-29** in reverse order to secure HEX outlet tube to mixing tee and heat exchanger. Confirm connections are tight and will not leak.

NOTICE: To secure HEX outlet tube to heat exchanger, align fastener previously removed in **Step 27** with slots in HEX outlet tube and push fastener inward until it is secure.

Connecting Burner Door Hi-Limit & Exhaust Thermistor

63 Follow **Steps 34-35** in reverse order to connect burner door hi-limit and exhaust thermistor wiring. Confirm connections are tight and routed properly as shown in Figure 17.

Installing Pressure Switch Assembly

64 Connect tubing from pressure switch assembly to the port located on the heat exchanger exhaust as shown in Figure 30. Confirm tubing is fully secured to heat exchanger. Confirm tubing is connected to the positive terminal (black side) of the pressure switch assembly as shown in Figure 18.

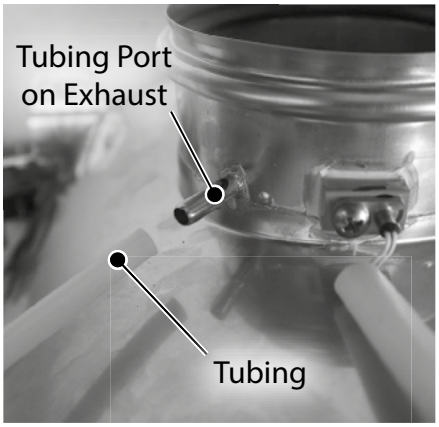

Figure 30 - Install tubing to heat exchanger

65 Connect pressure switch wires previously removed in **Step 39**. Red connection is on the right and black connection is on the left. Confirm connections are tight and routed properly as shown in Figure 18.

66 Install pressure switch assembly to heat exchanger. Secure with the two (2) screws previously removed in **Step 38**.

Installing Ignitor Assembly

67 Locate the ignitor assembly and two (2) screws previously removed in **Step 33**. Follow **Steps 31-33** in reverse order to secure ignitor assembly to water heater.

Connecting Flame Sensor & Ignitor Rod Caps

68 Connect the green ground wire to the ignitor rod assembly previously removed in **Step 30.** Locate the flame sensor and ignitor rod caps and install them. Caps will click into place when secured.

Installing Fan & Venturi Assembly

69 Locate the fan and venturi assembly previously removed in **Step 20**. Follow **Steps 17-20** in reverse order to secure fan and venturi assembly to water heater. Confirm connections are tight and will not leak.

NOTICE: Confirm the burner tab engages the fan slot as shown in Figure 31.

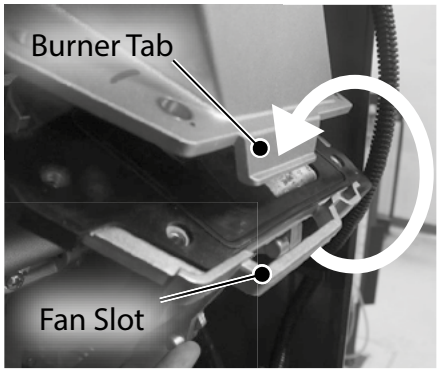

Figure 31 - Burner tab and fan slot

Checking for Water Leaks

70 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Checking for Gas Leaks

71 Lift the control board panel up and reconnect the fan wiring harness previously disconnected in **Step 14**. Lower control board panel.

72 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

73 Restore power to the water heater.

74 Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

75 Use code approved methods to check for leaks around all gas connection points and the heat exchanger. To protect graphite gaskets from water damage, **DO NOT** perform a bubble test. If any leaks are detected, resecure components and recheck for leaks.

76 The water heater is ready for operation once there are no leaks detected.

Returning Water Heater to Operation

77 Lift the control board panel up and lock into place. Install and tighten the screw to the control board panel previously removed in **Step 15**.

78 Replace the cabinet cover and secure with the screws previously removed in **Step 12**.

Heater Block Wiring Assemblies Replacement Kit Instructions

Kit 100371176 Contains:
- Long Heater Block Assembly
- Short Heater Block Assembly
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- 12" Phillips Screwdriver (magnetized)
- Mini Pick
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

4 Locate the screw securing the control board panel as shown in Figure 1. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

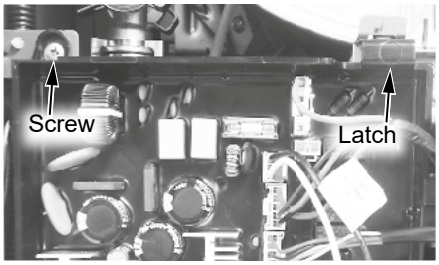

Figure 1 - Control board location

5 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

(For Outdoor Units Only)

6 Locate the air inlet plate as shown in Figure 2. The air inlet plate can be removed to allow easy access to heater block inside hot outlet connection.

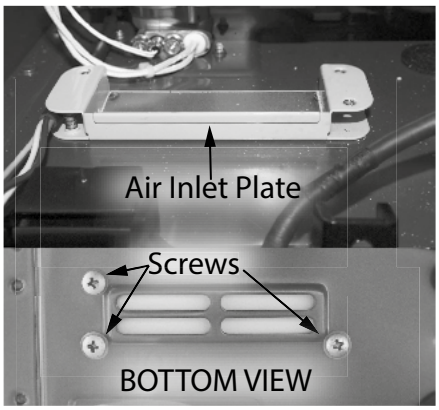

Figure 2 - Air inlet plate

7 Locate the three (3) screws securing the air inlet plate. Use a Phillips screwdriver to remove the screws from under water heater cabinet. Place the screws and air inlet plate aside in a safe place for reinstallation.

NOTICE: When installed outdoors, the air inlet plate will be installed with the yellow side facing upward.

Removing Short Heater Block Assembly

8 Locate the heater block attached to the pump inlet elbow behind the flow control valve as shown in Figure 3.

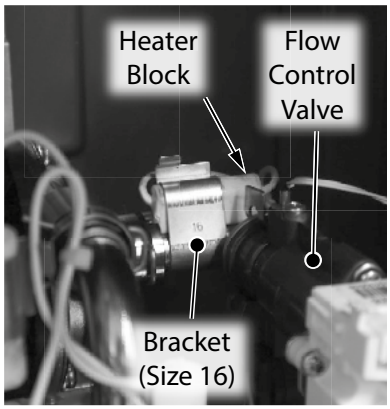

Figure 3 - Remove heater block

9 Remove bracket (size 16) securing heater block to pump inlet elbow. Place bracket aside in a safe place for reinstallation.

10 Locate the wire connection between the short heater block assembly and the long heater block assembly. Push tab to disconnect wires at connection point as shown in Figure 4.

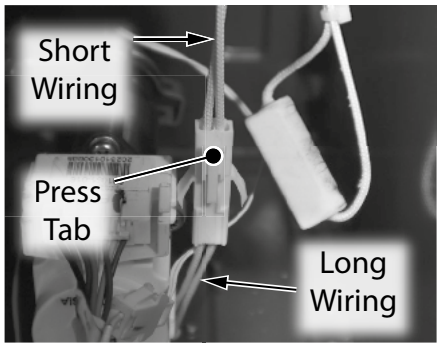

Figure 4 - Disconnect short heater block wiring from long heater block wiring

11 Remove short heater block assembly from water heater and dispose of properly.

Heater Block Wiring Assemblies Replacement Kit Instructions

Removing Long Heater Block Assembly

12 Locate the wire connection between the long heater block assembly and the reverse side of control board. To disconnect, gently remove the security clip with a mini pick or fingernail. Push tab as shown in Figure 5. Separate the harnesses. Place security clip aside in a safe place for reinstallation.

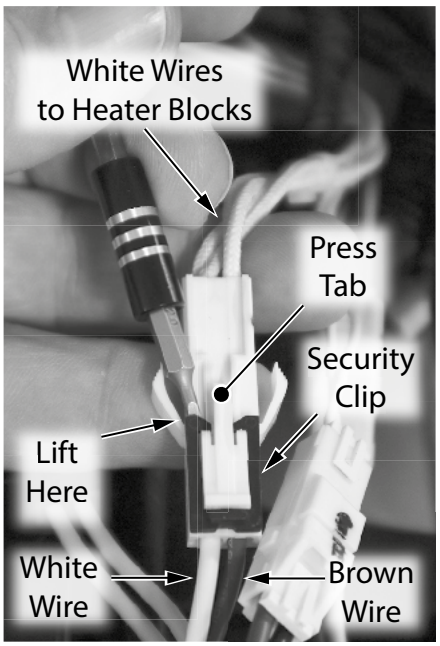

Figure 5 - Disconnect long heater block wiring from control board

13 Locate the screw securing the heater block inside the flow control valve as shown in Figure 6. Use a 12" Phillips screwdriver (magnetized) to remove screw. Place screw aside in a safe place for reinstallation. Remove heater block from flow control valve.

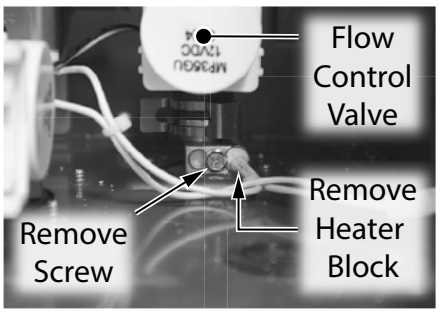

Figure 6 - Remove flow control heater block

14 Locate the screw securing the heater block inside the hot outlet connection as shown in Figure7. Use a 12" Phillips screwdriver (magnetized) to remove screw. Place screw aside in a safe place for reinstallation. Remove heater block from hot outlet connection.

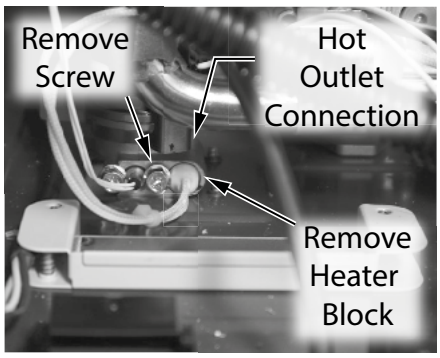

Figure 7 - Remove hot outlet connection heater block

15 Locate the five (5) remaining heater blocks attached to pipe connections as shown in Figure 8. Note the path of wires for ease of installation of new assembly. Remove brackets securing heater blocks to pipe connections. Place brackets aside in a safe place for reinstallation.

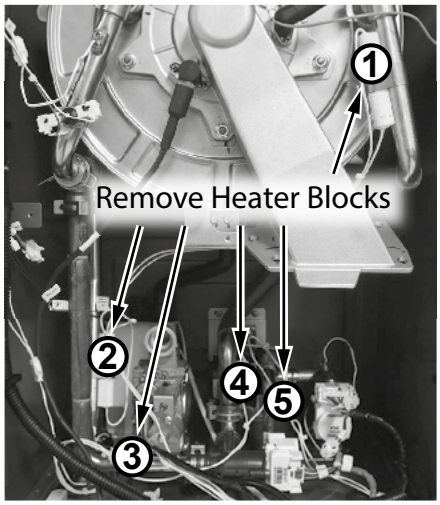

Figure 8 - Remove remaining heater blocks

16 Remove long heater block assembly from water heater and dispose of properly.

Installing New Long Heater Block Assembly

17 Locate the new, long heater block assembly provided in the kit. Install the five (5) heater blocks to pipe connections and secure with brackets previously removed in **Step 15**.

NOTICE: First secure heater block to pump outlet tube to ensure proper length of wire to connect long and short heater block assemblies later in **Step 20**. See Figure 9.

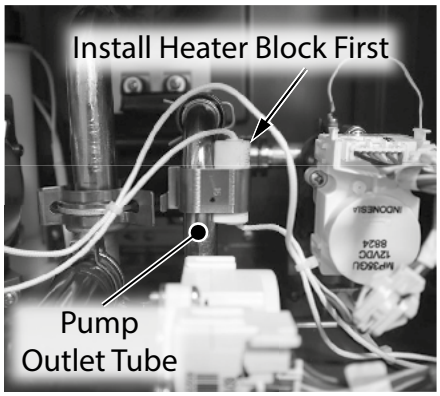

Figure 9 - Install pump outlet tube heater block

18 Locate the screw previously removed in **Step 14**. Insert heater block into hot outlet connection and secure with screw.

19 Locate the screw previously removed in **Step 13**. Insert heater block into flow control valve and secure with screw.

20 Connect new, long heater block assembly wires previously disconnected in **Step 12** to reverse side of control board. Secure wire harnesses with security clip. See Figure 10.

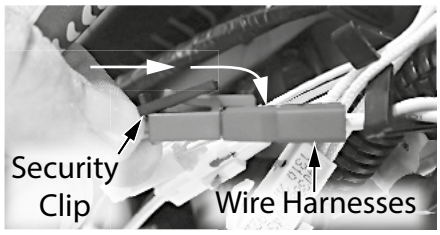

Figure 10 - Secure wiring with security clip

Heater Block Wiring Assemblies Replacement Kit Instructions

Installing New Short Heater Block Assembly

21 Locate the new, short heater block assembly provided in the kit. Install heater block to pump inlet elbow and secure with bracket previously removed in **Step 9.**

22 Connect long and short heater block assemblies previously disconnected in **Step 10**.

For indoor units, proceed to **Step 24**.

(For Outdoor Units Only)

23 Locate the air inlet plate and three (3) screws previously removed in **Step 7.** Orient air inlet plate so yellow side is facing up and the three (3) screw holes align. Install plate to water heater and secure with the three (3) screws.

Returning Water Heater to Operation

24 Lift the control board panel up and lock into place.

25 Install and tighten the screw to the control board panel previously removed in **Step 4**.

26 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

27 Restore power to the water heater. The water heater is now ready for operation.

Burner Door Hi-Limit Replacement Kit Instructions

Kit 100371180 Contains:
- Burner Door Hi-Limit
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Burner Door Hi-Limit

4 Locate the burner door hi-limit on the burner assembly as shown in Figure 1. Disconnect the two (2) wire leads (labeled HIGH LIMIT 1) from the hi-limit assembly and route them inside the water heater cabinet for ease of access to hi-limit. See Figure 1.

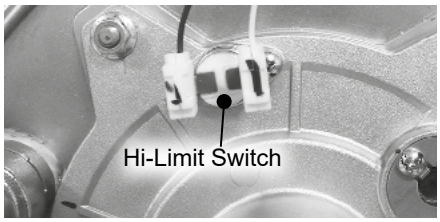

Figure 1 - Hi-Limit location

5 Use a Phillips screwdriver to remove the two (2) screws securing burner door hi-limit to the burner assembly. Place screws aside in a safe place for reinstallation. See Figure 2.

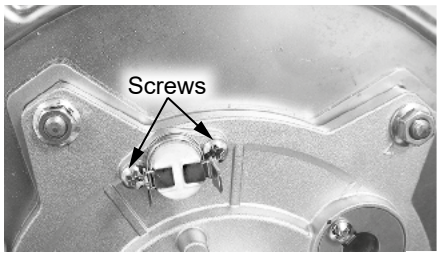

Figure 2 - Hi-Limit screw removal

6 Remove burner door hi-limit from burner assembly and dispose of properly.

Installing New Burner Door Hi-Limit

7 Locate the new burner door hi-limit assembly provided in the kit.

NOTICE: Confirm hi-limit is fully seated in bracket before installing to burner assembly.

8 Install the burner door hi-limit to the burner assembly. Secure with the two (2) screws previously removed in **Step 5**. Confirm hi-limit sits flush against burner assembly.

9 Connect the two (2) wire leads to the burner door hi-limit previously disconnected in **Step 4**. Confirm wire connections are secure.

Returning the Water Heater to Operation

10 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

11 Restore power to the water heater. The water heater is now ready for operation.

Hi-Limit Switch (Manual Reset) Replacement Kit Instructions

Kit 100371192 Contains:
- Hi-Limit Switch (Manual Reset)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

Accessing Water Heater Components

2 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Hi-Limit Switch

4 Locate the hi-limit switch on the outlet burner tube as shown in Figure 1. Disconnect the two (2) wire leads (labeled HIGH LIMIT 2) from the hi-limit switch and route them inside the water heater cabinet for ease of access to hi-limit.

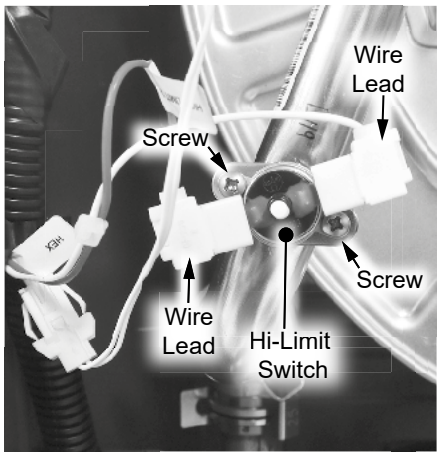

Figure 1 - Hi-Limit switch location

5 Use a Phillips screwdriver to remove the two (2) screws securing the hi-limit switch to the outlet burner tube. Place screws aside in a safe place for reinstallation. See Figure 1.

6 Remove hi-limit switch from outlet burner tube and dispose of properly.

Installing New Burner Door Hi-Limit

7 Locate the new hi-limit switch assembly provided in the kit.

NOTICE: Confirm hi-limit switch is fully seated in bracket before installing to outlet burner tube.

8 Install the hi-limit switch to the outlet burner tube. Secure with the two (2) screws previously removed in **Step 5**. Confirm hi-limit switch sits flush against outlet burner tube.

9 Connect the two (2) wire leads to the hi-limit switch previously disconnected in **Step 4**. Confirm wire connections are secure.

Returning the Water Heater to Operation

10 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

11 Restore power to the water heater. The water heater is now ready for operation.

HEX Inlet & Outlet Tube Replacement Kit Instructions

Kit 100371200 Contains:
- HEX (Heat Exchanger) Inlet Tube
- (2x) O-ring (21.8 x 2.4)
- Kit Instructions

Kit 100371201 Contains:
- HEX (Heat Exchanger) Outlet Tube
- (2x) O-ring (21.8 x 2.4)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver (magnetized)
- Flathead Screwdriver
- Mini Pick or Hook
- Towel or Rag
- Bucket
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

3 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

4 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

5 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

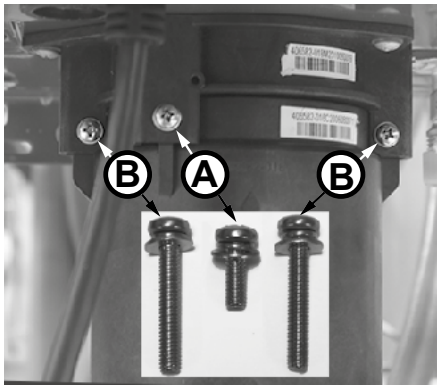

Figure 1 - Identify cartridge screws

6 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

7 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

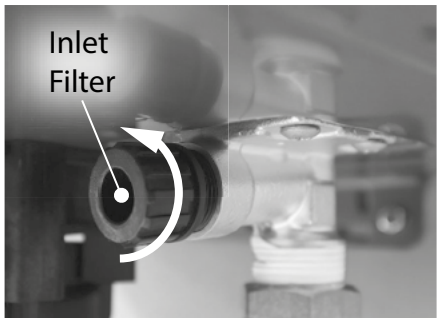

Figure 2 - Removing the inlet filter

8 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

9 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 5**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

10 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

11 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

12 Lift cover up and away from cabinet to gain access to the water heater's internal components.

13 Locate the screw securing the control board panel as shown in Figure 3. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

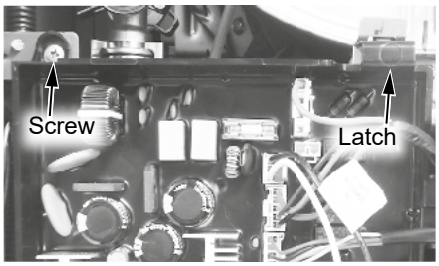

Figure 3 - Control board location

14 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

HEX Inlet & Outlet Tube Replacement Kit Instructions

(For Kit 100371200 Only)

15 Locate the two heater blocks attached to HEX inlet tube as shown in Figure 4. Remove brackets (size 20) securing heater blocks to tube. Place brackets aside in a safe place for reinstallation. Route heater blocks and wiring inside water heater cabinet for ease of HEX inlet tube removal.

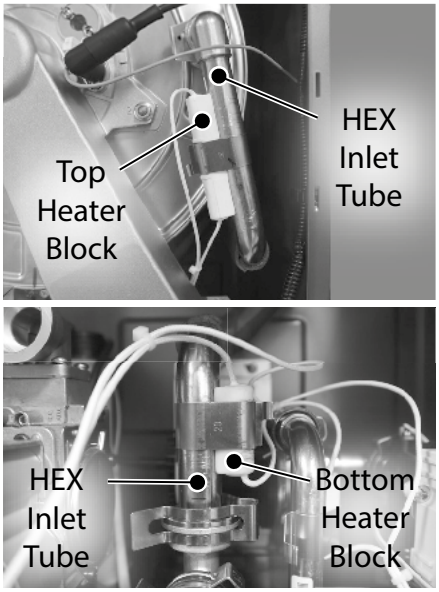

Figure 4 - Remove heater blocks from HEX inlet tube

16 Disconnect the spring clip (size 30) securing HEX inlet tube to outlet tee as shown in Figure 5.

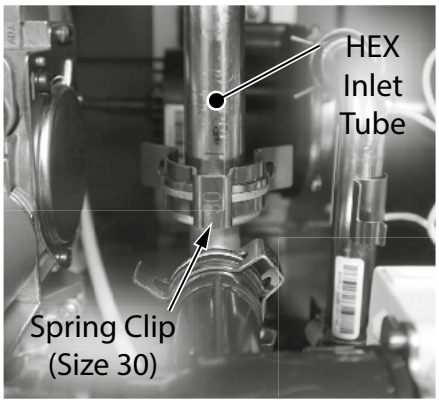

Figure 5 - Remove spring clip securing HEX inlet tube

17 Locate the fastener securing the HEX inlet tube to the heat exchanger. Use a flathead screwdriver to gently pry the fastener free. Remove fastener and place it aside in a safe place for reinstallation.

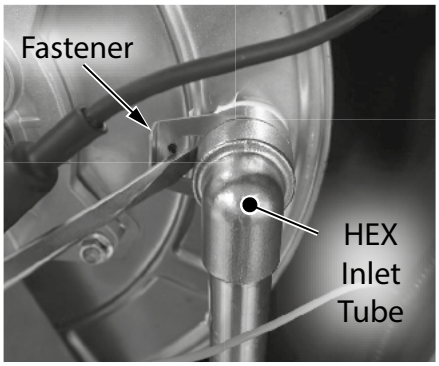

Figure 6 - Remove fastener securing HEX inlet tube

18 Disconnect HEX inlet tube from heat exchanger and outlet tee. To remove HEX inlet tube from water heater, lift upward and pull top of tube toward you as shown in Figure 7. Guide HEX inlet tube around the right side of heat exchanger and above fan assembly as shown in Figure 8. Dispose of HEX inlet tube properly.

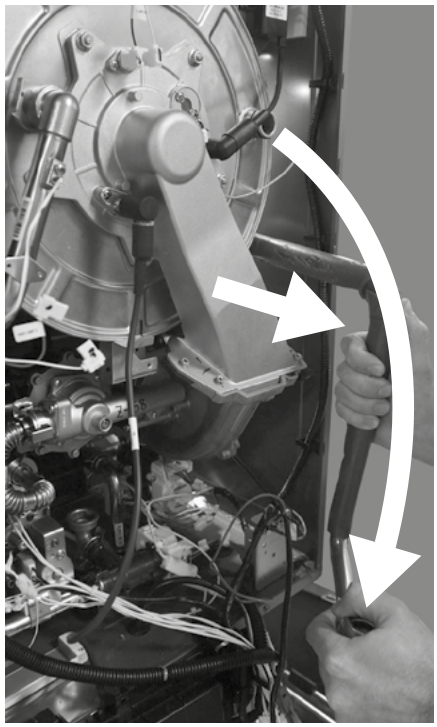

Figure 7 - Lift & pull HEX inlet tube toward you

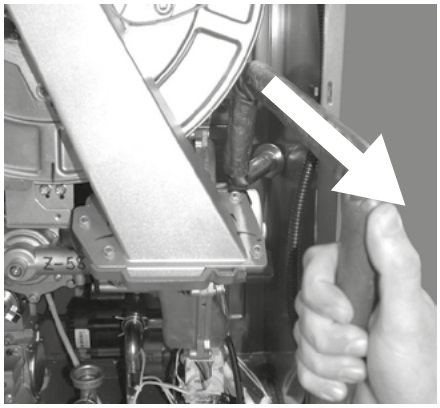

Figure 8 - Remove HEX inlet tube

19 Locate new HEX inlet tube and two (2) O-rings provided in the kit. Install the first O-ring to the male connection on the HEX inlet tube. Install the second O-ring to male connection on the heat exchanger.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

20 Install new HEX inlet tube to heat exchanger and outlet tee. Secure to outlet tee with the spring clip (size 30) previously removed in **Step 16**.

NOTICE: To secure HEX inlet tube to heat exchanger, align fastener previously removed in **Step 17** with slots in HEX inlet tube and push fastener inward until it is secure.

21 Locate the two (2) heater blocks and two (2) brackets (size 20) previously removed in **Step 15**. Install heater blocks to tube and secure with brackets. Proceed to **Step 32.**

(For Kit 100371201 Only)

22 Locate the HEX outlet tube connected to the heat exchanger as shown in Figure 9 on the following page. Remove the spring clip (size 30) securing HEX outlet tube to mixing tee. Remove spring clip and place aside in a safe place for reinstallation.

HEX Inlet & Outlet Tube Replacement Kit Instructions

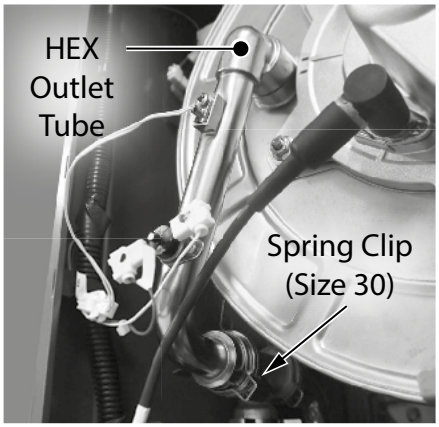

Figure 9 - Remove spring clip securing HEX outlet tube

23 Locate the hi-limit switch installed to the HEX outlet tube as shown in Figure 10. Disconnect the two (2) wire leads from the hi-limit switch (labeled "HI LIMIT 2"). Remove the two (2) screws securing hi-limit switch to HEX outlet tube. Remove hi-limit switch and place aside with the two (2) screws in a safe place for reinstallation.

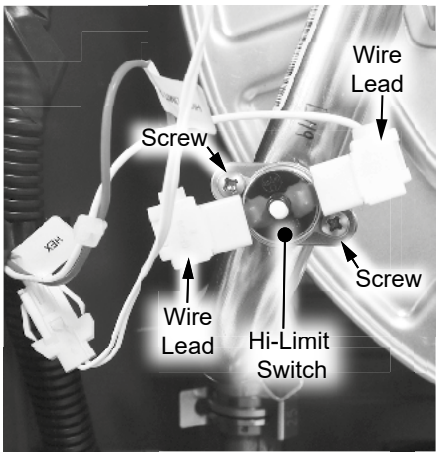

Figure 10 - Disconnect and remove hi-limit switch from HEX outlet tube

24 Locate the screw securing the outlet thermistor and clip to HEX outlet tube as shown in Figure 11. Remove screw and clip and place aside in a safe place for reinstallation. Disconnect thermistor and route wire to the side.

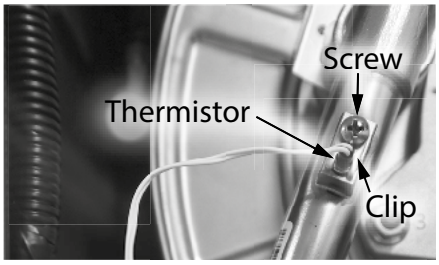

Figure 11 - Disconnect thermistor from HEX outlet tube

25 Use a mini pick or hook to remove the thermistor O-ring seated in the thermistor block. Place aside in a safe place for reinstallation.

26 Locate the fastener securing the HEX outlet tube to the heat exchanger. Use a flathead screwdriver to gently pry the fastener free. Remove fastener and place it aside in a safe place for reinstallation.

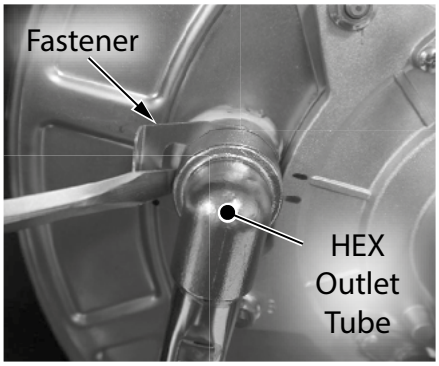

Figure 12 - Remove fastener securing HEX outlet tube

27 Disconnect HEX outlet tube from heat exchanger and mixing tee. Dispose of HEX outlet tube properly.

28 Locate new HEX outlet tube and two (2) O-rings provided in the kit. Install the first O-ring to the male connection on the mixing tee. Install the second O-ring to male connection on the heat exchanger.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

29 Install new HEX outlet tube to heat exchanger and mixing tee. Secure to mixing tee with the spring clip (size 30) previously removed in **Step 22**.

NOTICE: To secure HEX outlet tube to heat exchanger, align fastener previously removed in **Step 26** with slots in HEX outlet tube and push fastener inward until it is secure.

30 Locate the hi-limit switch and two (2) screws previously removed in **Step 23.** Install hi-limit switch to HEX outlet tube and secure with the two (2) screws. Connect the two (2) wire leads to hi-limit switch.

31 Locate the screw, clip, and thermistor O-ring previously removed in Steps **24 & 25**. Install O-ring to thermistor and insert into thermistor block. Secure thermistor and O-ring with clip and screw.

Checking for Water Leaks

32 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

33 Lift the control board panel up and lock into place.

34 Install and tighten the screw to the control board panel previously removed in **Step 13**.

35 Replace the cabinet cover and secure with the screws previously removed in **Step 11**.

36 Restore power to the water heater. The water heater is now ready for operation.

Ignitor Assembly Replacement Kit Instructions

Kit 100371181 Contains:
- Ignitor Assembly
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Ignitor Assembly

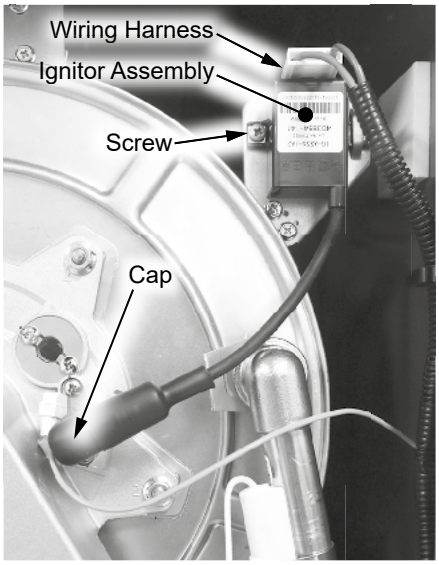

Figure 1 - Ignitor assembly location

4 Locate the ignitor assembly on upper right side of the water heater. See Figure 1.

5 Disconnect the cap by holding cap close to base as to not damage the high voltage wire from the ignitor rod. See Figure 1.

6 Disconnect the wiring harness from the ignitor assembly. See Figure 1.

7 Remove and keep the screw securing the ignitor assembly to the water heater. See Figure 1.

8 Carefully pull the old ignitor assembly from the water heater and dispose of it properly.

Replacing the Ignitor Assembly

9 Locate the ignitor assembly provided in the kit.

10 Mount the ignitor assembly using the screw removed in **Step 7** by placing one end under the tab then screw in the other side.

11 Reconnect the wiring harness removed in **Step 6.**

12 Reconnect the cap removed in **Step 5** by pushing it down hard until it clicks into place.

Returning Water Heater to Operation

13 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

14 Restore power to the water heater. The water heater is now ready for operation.

Flame Sensor Assembly Replacement Kit Instructions

Kit 100371170 Contains:
- Flame Sensor Assembly
- Graphite Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Flame Sensor Assembly

5 Locate the flame sensor on the burner assembly as shown in Figure 1. Remove the cap from the flame sensor. **DO NOT** pull on wires.

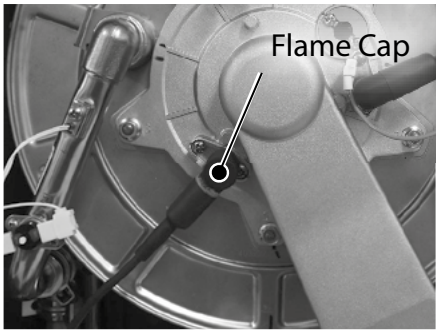

Figure 1 - Remove flame sensor cap

6 Use a Phillips screwdriver to remove the two (2) screws securing flame sensor to the burner assembly as shown in Figure 2. Place screws aside in a safe place for reinstallation.

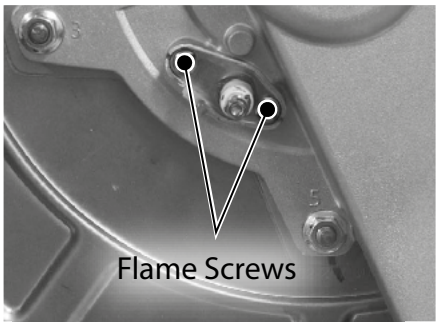

Figure 2 - Remove flame sensor screws

7 Remove flame sensor and graphite gasket from burner assembly and dispose of properly.

Installing New Flame Sensor Assembly

8 Locate the new flame sensor assembly and graphite gasket provided in the kit. Orient the graphite gasket as shown in Figure 3 and install to flame sensor assembly.

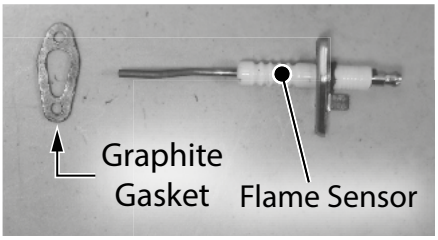

Figure 3 - Install flame sensor and graphite gasket

9 Install the flame sensor and graphite gasket to the burner assembly. Secure the flame sensor assembly with the two (2) screws previously removed in **Step 6**. Confirm bracket and graphite gasket sit flush against burner assembly.

10 Locate the cap previously removed in **Step 5**. Push the cap back on to the flame sensor assembly. The cap will snap into place when firmly secured to the flame sensor assembly.

Checking for Gas Leaks

11 Turn **ON** the gas supply to the water heater at the manual gas shut off valve. Restore power to the water heater. Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

12 Use code approved methods to check for leaks around all gas connection points and the burner door assembly. To protect graphite gaskets from water damage, **DO NOT** perform a bubble test. If any leaks are detected, resecure components and recheck for leaks.

Returning Water Heater to Operation

13 Replace the cabinet cover and secure with the screws previously removed in **Step 3**. The water heater is now ready for operation.

Ignitor Rod Assembly Replacement Kit Instructions

Kit 100371182 Contains:
- Ignitor Rod Assembly
- Graphite Gasket
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

WARNING!
This kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize the risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit.

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing Ignitor Rod Assembly

5 Locate the ignitor rod on the burner assembly as shown in Figure 1. Remove the cap from the ignitor rod. **DO NOT** pull on wires.

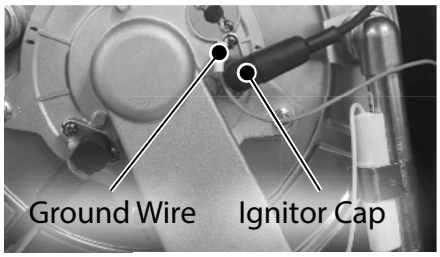

Figure 1 - Remove ignitor rod cap

6 Disconnect the green ground wire at the ignitor rod as shown in Figure 1. Route the wire inside the water heater cabinet for ease of access to ignitor rod.

7 Use a Phillips screwdriver to remove the two (2) screws securing ignitor rod to the burner assembly. Place screws aside in a safe place for reinstallation.

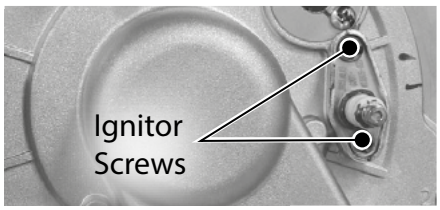

Figure 2 - Remove ignitor rod screws

8 Remove ignitor rod and graphite gasket from burner assembly and dispose of properly.

Installing New Ignitor Rod Assembly

9 Locate the new ignitor rod assembly and graphite gasket provided in the kit. Orient the graphite gasket as shown in Figure 3 and install to ignitor rod assembly.

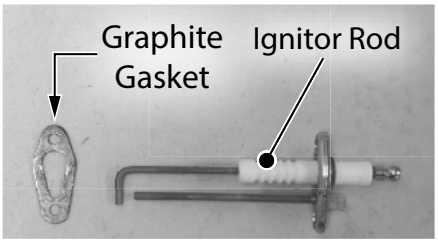

Figure 3 - Install ignitor rod and graphite gasket

10 Install the ignitor rod and graphite gasket to the burner assembly. Secure the ignitor rod assembly with the two (2) screws previously removed in **Step 7**. Confirm bracket and graphite gasket sit flush against burner assembly.

11 Reconnect the green ground wire previously disconnected in **Step 6.**

NOTICE: Verify rubber casing is fully covering the ground terminal connection at the ignitor rod.

12 Locate the cap previously removed in **Step 5**. Push the cap back on to the ignitor rod assembly. The cap will snap into place when firmly secured to the ignitor rod assembly.

Checking for Gas Leaks

13 Turn **ON** the gas supply to the water heater at the manual gas shut off valve. Restore power to the water heater. Open all hot water fixtures in the house. This will initiate the call for heat at the water heater.

14 Use code approved methods to check for leaks around all gas connection points and the burner door assembly. To protect graphite gaskets from water damage, **DO NOT** perform a bubble test. If any leaks are detected, resecure components and recheck for leaks.

Returning Water Heater to Operation

15 Replace the cabinet cover and secure with the screws previously removed in **Step 3**. The water heater is now ready for operation.

Inlet Assembly Replacement Kit Instructions

Kit 100371207 Contains:
- Inlet Assembly
- O-ring (15.5 x 2.5)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Thread Sealant/Pipe Dope
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

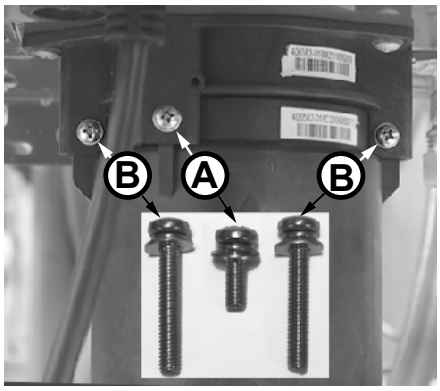

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

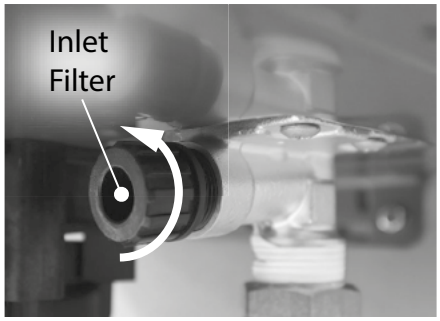

Figure 2 - Locate and remove inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

12 Disconnect the cold water line to the cold inlet assembly.

Accessing Flow Control Valve

13 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

14 Lift cover up and away from cabinet to gain access to the water heater's internal components.

15 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 3.

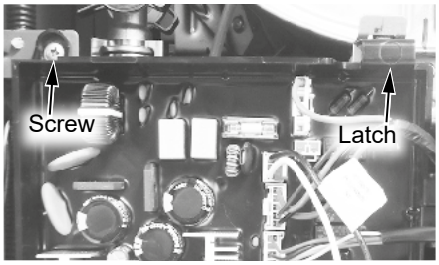

Figure 3 - Control Board screw location

16 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

Inlet Assembly Replacement Kit Instructions

Removing the Flow Control Valve

17 Locate the flow control valve at the bottom right side of the water heater as shown in Figure 4.

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

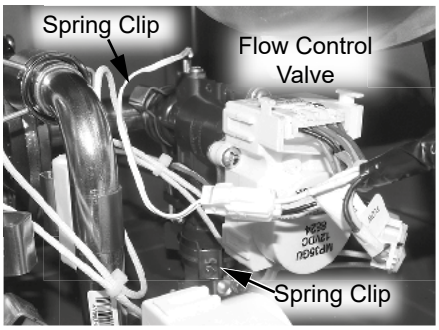

Figure 4 - Flow control valve location

18 Remove the two (2) spring clips (size 25) securing the flow control valve to the inlet assembly. Place the spring clips aside in a safe place for reinstallation.

19 Disconnect the flow control valve from the piping system and set it aside in the water heater cabinet.

Removing the Inlet Assembly

20 Locate the inlet assembly at the bottom right side of the water heater as shown in Figure 5.

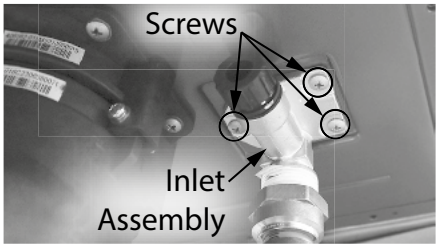

Figure 5 - Inlet assembly location

21 Locate the screw securing the heater block in the base of the inlet assembly. See Figure 6. Use a Phillips screwdriver to remove the screw. Place the screw aside in a safe place for reinstallation.

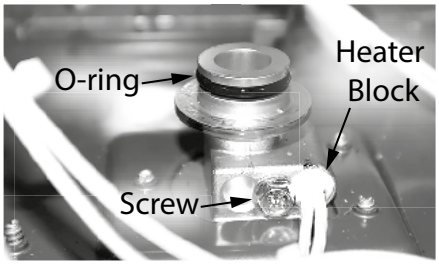

Figure 6 - Heater block location

22 Remove the heater block from the base and set aside for reinstallation.

23 Locate the three (3) screws securing the inlet assembly to the base of the water heater. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation. See Figure 5.

24 Remove the old inlet assembly from the piping system and dispose of properly.

Installing Inlet Assembly

25 Locate the new inlet assembly and O-ring provided in the kit.

26 Place the new O-ring on the new inlet assembly. See Figure 6.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

27 Place the new inlet assembly in the water heater and secure with the screws removed in **Step 23**.

28 Reinstall the heater block to the base of the inlet assembly and secure with the screw removed in **Step 21**.

Installing Flow Control Valve

29 Locate the flow control valve set aside earlier in **Step 19**. Carefully install flow control valve to pipe connections.

30 Locate the two (2) spring clips previously removed in **Step 18**. Install spring clips to flow control valve, securing it to piping connections. Verify water connections are tight and will not leak.

31 Reconnect the cold water line disconnected in **Step 12**. Use thread sealant tape or pipe dope when making the connection.

32 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

33 Lift the circuit board panel up and lock into place.

34 Install and tighten the screw to the circuit board panel previously removed in **Step 15**.

35 Replace the cabinet cover and secure with the screws previously removed in **Step 13**.

36 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

37 Restore power to the water heater. The water heater is now ready for operation.

Outlet Assembly Replacement Kit Instructions

Kit 100371208 Contains:
- Outlet Assembly
- O-ring (21.8 x 2.4)
- O-ring (3.8 x 1.9)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Thread Sealant/Pipe Dope
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

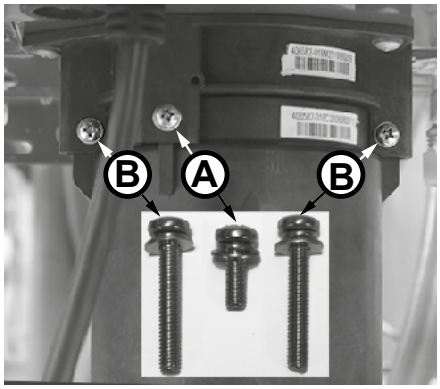

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

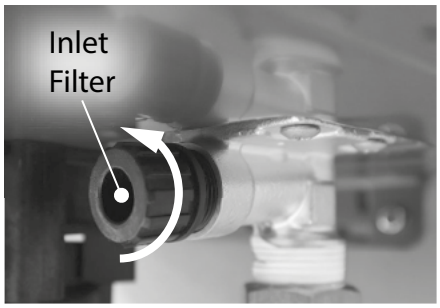

Figure 2 - Locate and remove inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

12 Disconnect the hot water line to the hot outlet assembly.

Accessing Outlet Assembly

13 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

14 Lift cover up and away from cabinet to gain access to the water heater's internal components.

15 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 3.

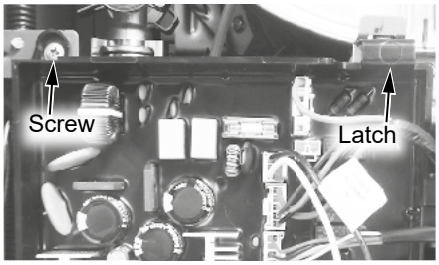

Figure 3 - Control Board screw location

16 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

Outlet Assembly Replacement Kit Instructions

Removing the Outlet Assembly

17 Locate the spring clip (size 30) at the base of the outlet tube. See Figure 4. Remove and set this clip aside in a safe place for reinstallation.

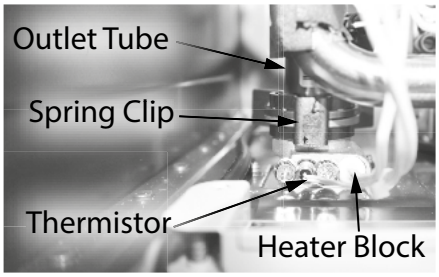

Figure 4 - Outlet tube location

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

18 Locate the three (3) screws securing the air inlet plate to the water heater cabinet. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation. See Figure 5. Note the orientation of the plate when removed and returning to that orientation when reinstalling it.

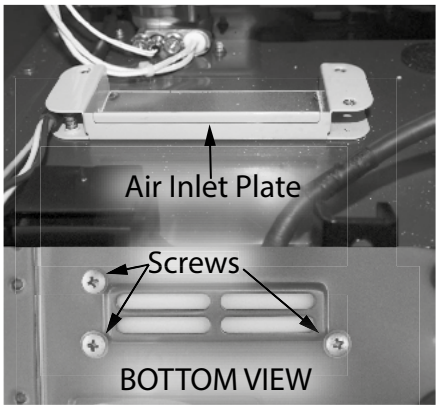

Figure 5 - Air inlet plate location

19 Locate the two (2) screws securing the thermistor and heating block to the outlet assembly. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation. See Figure 4.

20 Pull the heater block and thermistor from the outlet base and set aside for reinstallation.

21 Locate the three (3) screws securing the outlet assembly to the base of the water heater. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation. See Figure 6.

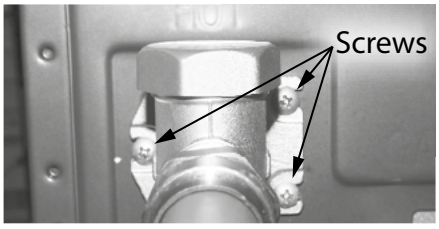

Figure 6 - Outlet assembly screw location

22 Pull down to remove the old outlet assembly from the piping system and dispose of properly.

Installing Outlet assembly

23 Locate the new outlet assembly and (21.8 x 2.4) O-ring provided in the kit.

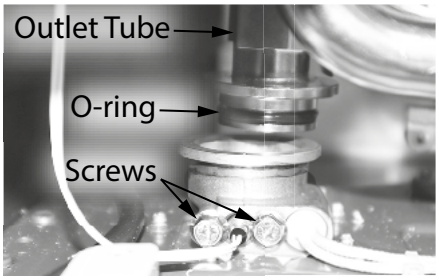

Figure 7 - O-ring location

24 Install the new (21.8 x 2.4) O-ring as shown in Figure 7.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

25 Place the new outlet assembly in the water heater and secure with the screws removed in **Step 21**.

26 Locate the (3.8 x 1.9) O-ring provided in the kit. Place the O-ring over the thermistor and install it in the outlet assembly base.
See Figure 8.

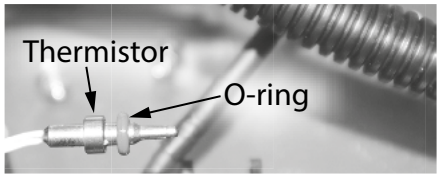

Figure 8 - Thermistor O-ring location

27 Reinstall the heater block to the base of the outlet assembly and secure with the screws removed in **Step 19**.

28 Locate the size (30) spring clip set aside earlier in **Step 17**. Reinstall the spring clip to secure the outlet pipe to the outlet assembly. Verify water connections are tight and will not leak.

29 Reinstall the air inlet plate and secure with the screws removed in **Step 18**.

30 Reconnect the hot water line disconnected in **Step 12**. Use thread sealant tape or pipe dope when making the connection.

31 Turn **ON** the water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

32 Lift the circuit board panel up and lock into place.

33 Install and tighten the screw to the circuit board panel previously removed in **Step 15**.

34 Replace the cabinet cover and secure with the screws previously removed in **Step 13**.

35 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

36 Restore power to the water heater. The water heater is now ready for operation.

Inlet Filter Replacement Kit Instructions

TABLE OF CONTENTS

Kit 100371184 Contains:
- Inlet Filter
- O-ring (2.4 x 12)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Pliers
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

5 Place a bucket or pan underneath the water heater to collect water during removal.

6 Remove the old inlet filter and dispose of it properly.

Installing New Inlet Filter

7 Locate the new inlet filter and O-ring provided in the kit. Install the O-ring to the inlet filter. See Figure 1.

NOTICE: Handle with care and verify lubricant has been applied to O-ring and O-ring is not dirty or damaged.

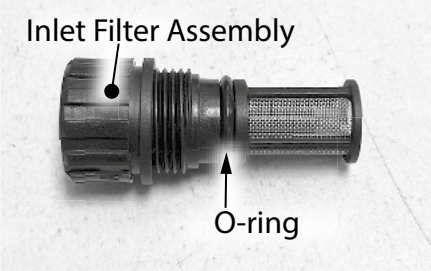

Figure 1 - O-ring location

8 Install the new inlet filter to water heater hand tight. Use caution and **DO NOT** damage the inlet filter.

Returning Water Heater to Operation

9 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately.

10 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

11 Restore power to the water heater. The water heater is now ready for operation.

Main Wiring Harness Replacement Kit Instructions

Kit 100371210 Contains:
- Main Wiring Harness
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Pliers
- O-Ring Pick
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Main Wiring Harness

4 Locate the outlet thermistor wiring harness labeled "EXHAUST" and disconnect it. See Figure 1.

5 Locate the burner hi-limit switch wire leads labeled "HI LIMIT 1" and disconnect them. See Figure 1.

6 Locate the pressure switch wire leads labeled "WIND" and disconnect them. See Figure 1.

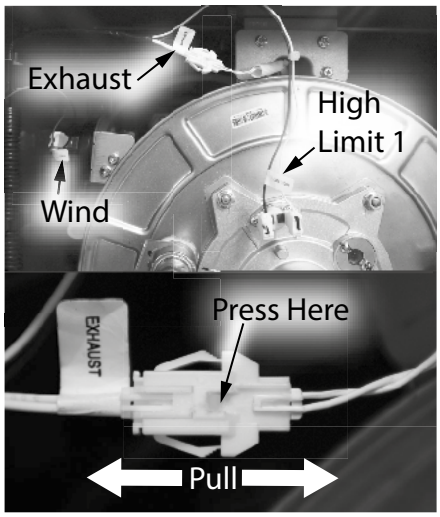

Figure 1 - First wiring harness bundle location

7 Remove the harness from the plastic organizers on the left side of the water heater cabinet.

8 Locate and disconnect the "HI LIMIT 2" wire leads and "HEX" thermistor wiring harness shown in Figure 2.

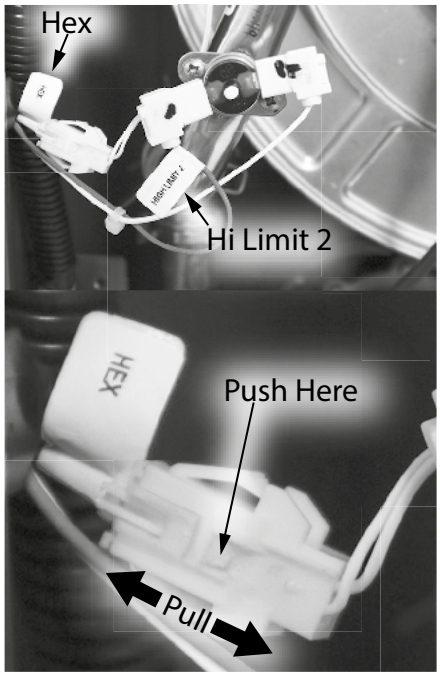

Figure 2 - Second wiring harness bundle location

9 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 3.

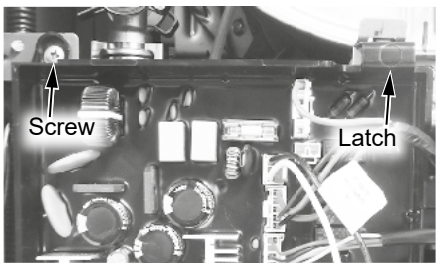

Figure 3 - Control board location

10 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

11 Locate the third bundle of wiring harnesses shown in Figure 4. Disconnect the following harnesses: MICRO SWITCH, VENTURI, LIQUID LEVEL, and OUTLET.

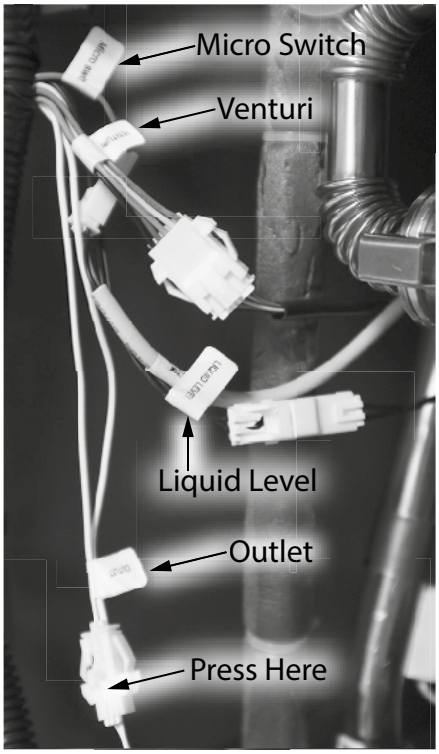

Figure 4 - Third bundle of wiring harnesses

Main Wiring Harness Replacement Kit Instructions

12 Use pliers to release the push mount cable tie securing the wiring harness to the water heater cabinet.

13 Locate the push mount securing the wiring harness to the back of the control panel.

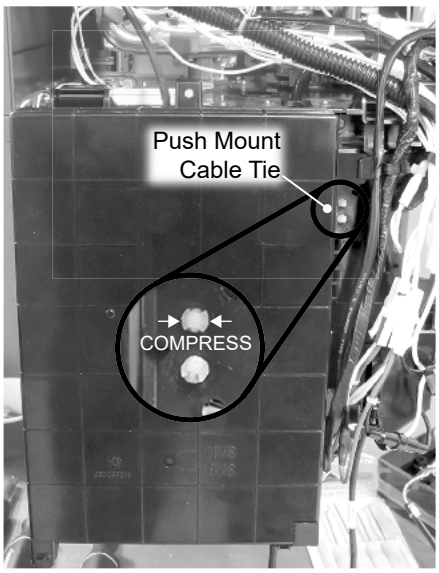

Figure 5 - Locating the push mount connector

14 Lift the control board panel up and lock into place.

15 Locate the latch on the top of the user interface module. See Figure 6. Depress this latch and pull forward to remove the user interface module from the mounting bracket.

Figure 6 - User Interface latch

16 Locate the four (4) screw securing the metal mounting plate. See Figure 7. Use a Phillips screwdriver to remove the screws. Place screws and mounting plate aside in a safe place for reinstallation.

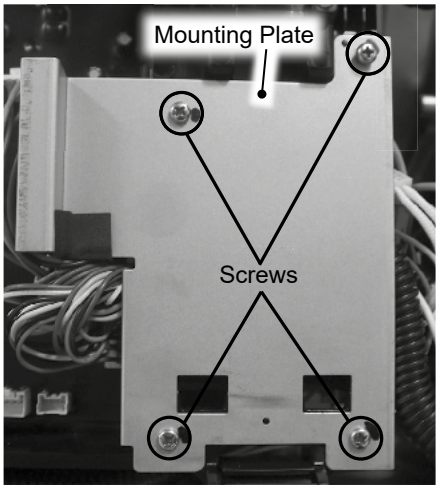

Figure 7 - Mounting plate screw removal.

17 Using Figure 8, remove harnesses E - I and K.

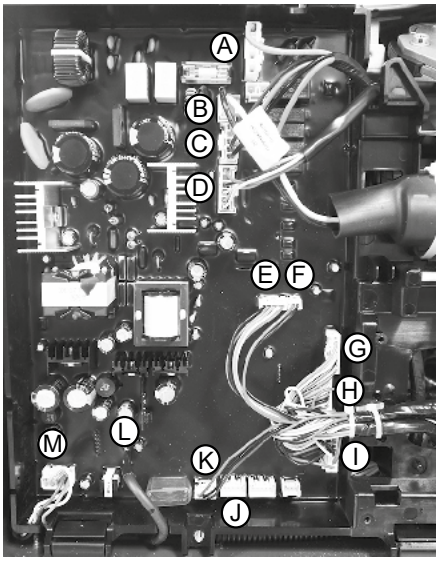

Figure 8 - Wiring harness connection points.

18 On connection point I, use an O-ring pick to apply pressure to the point shown in Figure 9 while pulling the harness from the board. Remove "keeper" and place aside in a safe place for reinstallation.

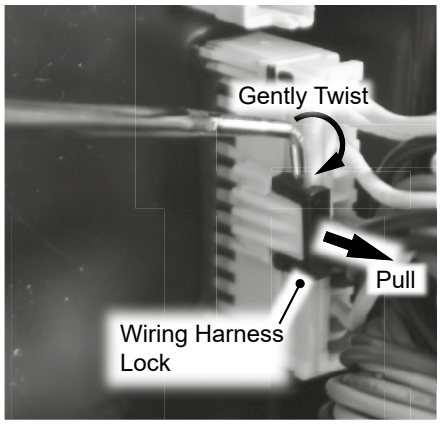

Figure 9 - Black harness lock removal

19 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

20 Locate the blue wiring harness labeled "WATER VALVE" at the bypass module and disconnect it. See Figure 10.

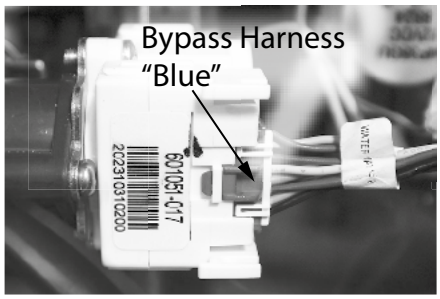

Figure 10 - Bypass valve harness location

21 Locate the three (3) wiring harness at the inlet flow module and disconnect them. See Figure 11.

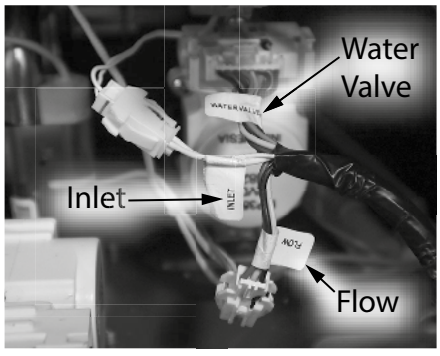

Figure 11 - Location of inlet flow module harnesses

Main Wiring Harness Replacement Kit Instructions

22 To disconnect the "INLET" harness, reference Figure 12.

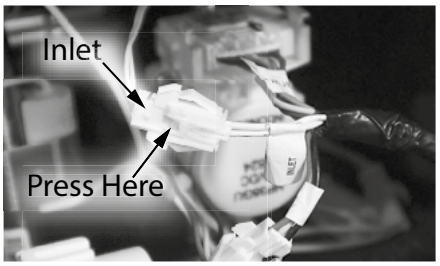

Figure 12 - Inlet harness disconnect instructions

23 Remove the old main wiring harness and dispose of it properly.

Replacing the Gas Wiring Harness

24 Locate the new gas wiring harness in the provided in the kit.

25 Reconnect the end of the new main wiring harness to the three (3) wiring harnesses removed in **Step 21**. See Figure 11.

26 Reconnect the blue wiring harness removed in **Step 20**, to the bypass cartidge See Figure 10.

27 Lift the circuit board panel up and lock into place.

28 Reconnect wiring harnesses E - I, and K removed in **Step 17**.

29 Reconnect the wiring harness lock removed in **Step 18**.

30 Reconnect wiring through the plastic organizers.

31 Reinstall the metal mounting plate using the four (4) screws removed in **Step 16**.

NOTICE: Route the wiring harnesses behind the metal mounting plate.

32 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

33 Reconnect the group of wiring harnesses removed in Step 11.

34 Lift the circuit board panel up and lock into place. Install and tighten the screw previously removed in **Step 9**.

35 Reconnect the group of wiring harnesses removed in **Step 8**.

36 Route the wiring through the palstic organizers removed in **Step 7**.

37 Reconnect the pressure switch wire leads removed in **Step 6**.

NOTICE: The red connection is on the right and black connection is on the left.

38 Reconnect the hi-limit switch wire leads removed in **Step 5.**

39 Reconnect the hot outlet thermistor switch wiring harness removed in **Step 4**.

40 Check to ensure all cables are stowed and will not interfere with operation.

Returning Water Heater to Operation

41 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

42 Restore power to the water heater. The water heater is now ready for operation.

Pressure Switch Replacement Kit Instructions

Kit 100371190 Contains:
- Pressure Switch
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the Pressure Switch

4 Locate the pressure switch on upper left side of the water heater. See Figure 1.

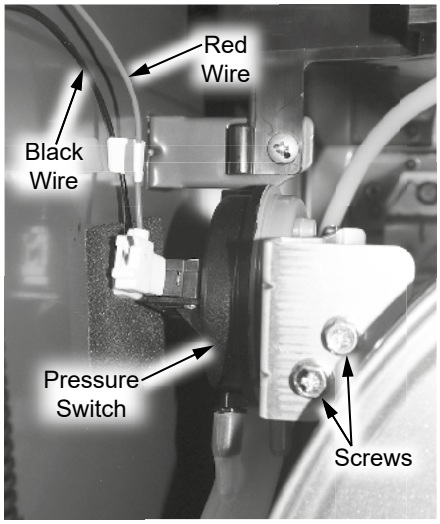

Figure 1 - Pressure switch location

5 Disconnect the black wire harness from the common (C) connector and the red wire harness from the normally closed (NC) connector. See Figure 1.

6 Remove and keep the two screws securing the pressure switch to the water heater. See Figure 1.

7 Carefully pull the pressure switch from the water heater and disconnect the pressure tubing from the pressure switch.

NOTICE: Be careful not to damage the pressure tubing. See Figure 2.

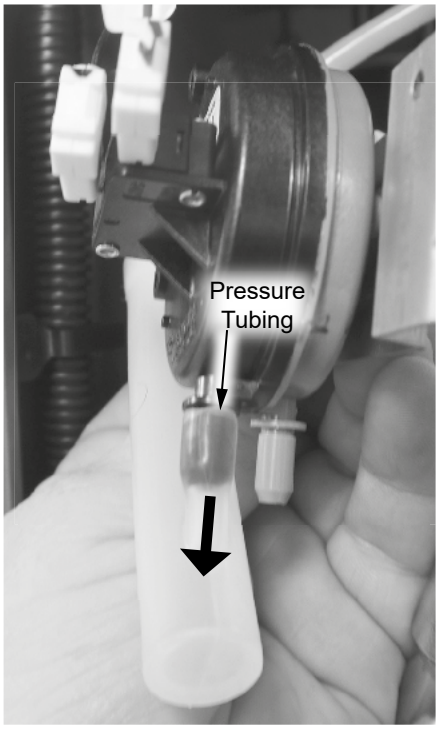

Figure 2 - Removing the pressure tube

8 Remove and keep the two screws securing the pressure switch to the mounting bracket.

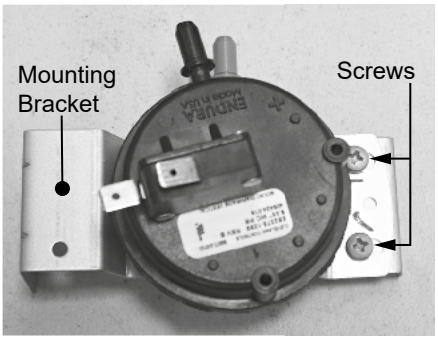

Figure 3 - Pressure switch mounting backet

9 Dispose of the old pressure switch properly.

Pressure Switch Replacement Kit Instructions

Replacing the Pressure Switch

10 Locate the pressure switch provided in the kit.

11 Mount the new pressure switch to the mounting bracket. Secure with the two screw removed in **Step 8.**

12 Reconnect the pressure tubing as shown in Figure 3.

13 Reconnect the pressure switch to the water heater and secure with the two screws removed in **Step 6.**

14 Reconnect the black wire harness to the common (C) connector. Reconnect red wire harness to the normally closed (NC) connector. See Figure 2.

Returning the Water Heater to Operation

15 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

16 Restore power to the water heater. The water heater is now ready for operation.

User Interface Module/Control Board Replacement Kit Instructions

Kit 100371204 Contains:
- User Interface Module
- Kit Instructions

Kit 100371187 Contains:
- Printed Circuit Board (THR-160)
- Kit Instructions

Kit 100371188 Contains:
- Printed Circuit Board (THR-180)
- Kit Instructions

Kit 100371189 Contains:
- Printed Circuit Board (THR-199)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Pliers
- Cable Tie (8 inch or greater)
- O-Ring Pick
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Locate the two screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

3 Lift cover up and away from cabinet to gain access to the water heater's internal components.

Removing the User Interface Module

4 Locate and disconnect the wiring harness connection point J shown in Figure 5.

5 Locate the user interface module on the bottom front of the water heater. See Figure 1.

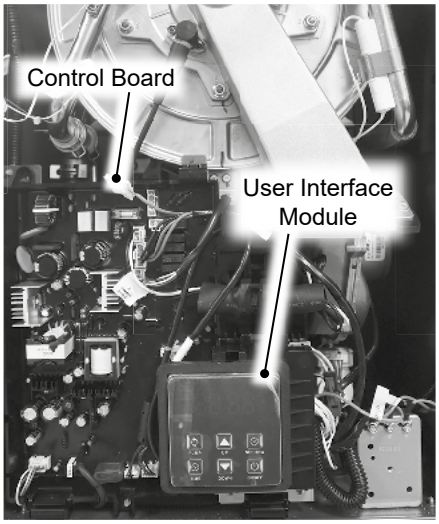

Figure 1 - User Interface Module

6 Locate the latch on the top of the user interface module. See Figure 2. Depress this latch and pull forward to remove the old user interface module from the mounting bracket.

Figure 2 - User Interface latch

7 Locate the four (4) screws securing the metal mounting plate. See Figure 3. Use a Phillips screwdriver to remove the screws. Place screws and mounting plate aside in a safe place for reinstallation.

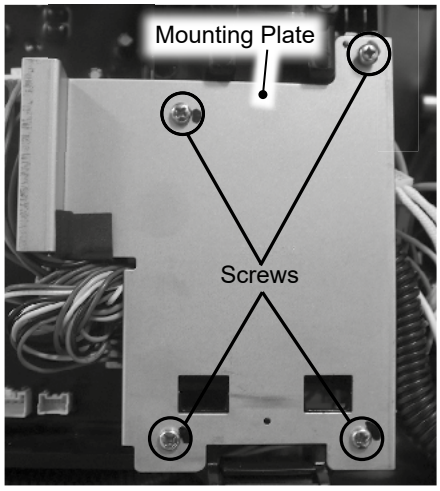

Figure 3 - Mounting plate screw removal.

8 Locate the screw securing the control board panel. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 4.

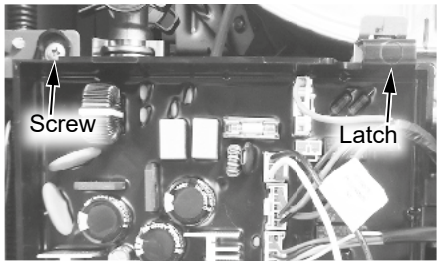

Figure 4 - Control board location

9 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

10 Locate the push mount cable tie as shown in Figure 9. Use pliers to compress the wings and pull the user interface module wire to free it from the assembly.

User Interface Module/Control Board Replacement Kit Instructions

11 Lift the circuit board panel up and lock into place.

12 The old user interface module is free from the assembly.

NOTICE: If only replacing the user interface module, dispose of it properly and proceed to **Step 35**. Proceed to the next section to remove the control board.

Removing the Control Board

13 Locate the control board on the botton front of the water heater. See Figure 1.

14 Using Figure 5 as reference disconnect the wiring harnesses A through M from the control board.

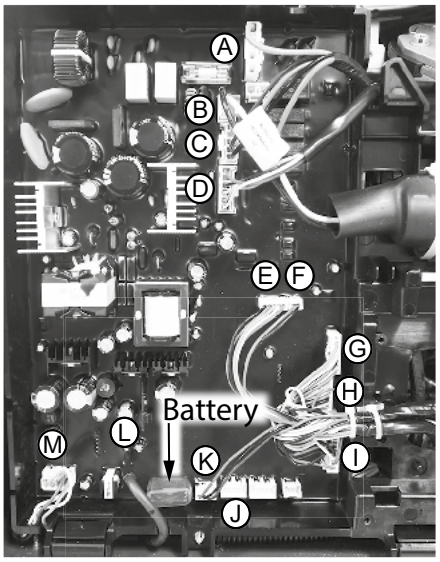

Figure 5 - Wiring harness connection points.

15 Connection points A, C - H, K, and M use a compression type harness. Grasp each harness in the middle and squeeze with a gentle pull to disconnect them.

16 Wiring harnesses B and I have plastic "keepers" to ensure the harnesses do not disconnect from the board. Use the following steps to assist in disconnecting those connections.

17 On connection point B, use an O-ring pick to apply pressure to the point shown in Figure 6 while pulling the harness from the board. Remove "keeper" and place aside in a safe place for reinstallation.

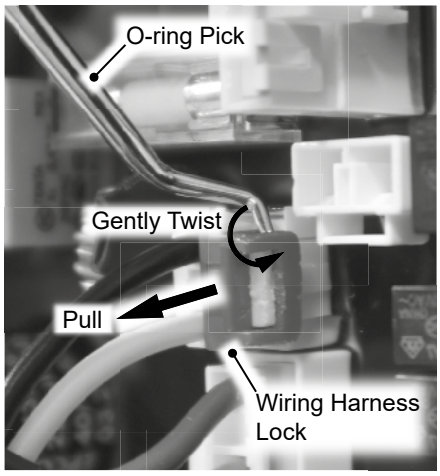

Figure 6 - Red harness lock removal

18 On connection point I, use an O-ring pick to apply pressure to the point shown in Figure 7 while pulling the harness from the board. Remove "keeper" and place aside in a safe place for reinstallation.

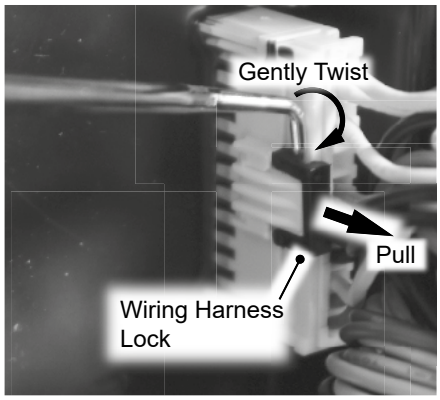

Figure 7 - Black harness lock removal

19 Connection point L, uses a standard blade style connector. Gently pull to remove.

20 At connection point M, free the wiring from the notch they are nested in.

21 Remove the cable tie shown in Figure 8. Route the now loose wiring away from the control board.

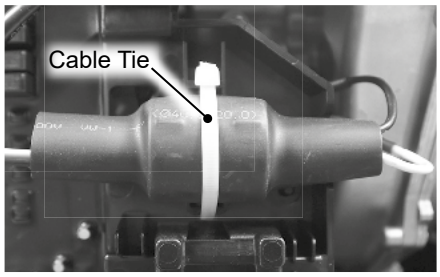

Figure 8 - Cable tie removal.

22 Press the latch at the top of the circuit board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The circuit board assembly will hold itself in place.

23 Locate the wiring organizers on the back of the control board. Carefully remove the wiring from the organizers and route them aside.

24 Locate the two (2) push mount cable ties on the back of the control board. See Figure 9. Use a pair of pliers to compress tabs and push them out of the keeper holes.

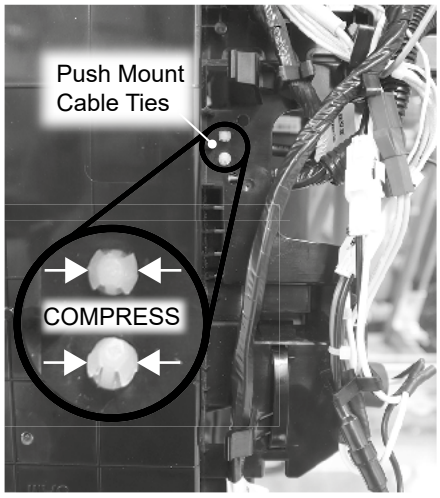

Figure 9 - Push mount cable tie removal.

25 Disconnect the push mount cable tie as shown in Figure 9.

26 With all wiring disconnected from the control board, lift control board until its hinges appear as shown in Figure 10.

User Interface Module/Control Board Replacement Kit Instructions

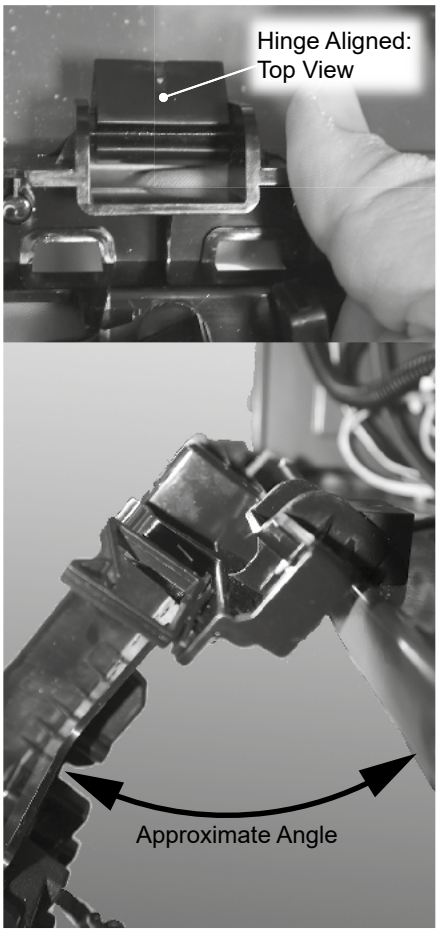

Figure 10 - Removing the control board.

27 Remove the old control board from the water heater and dispose of properly.

Replacing the Control Board

28 Locate the new control board provided in the kit.

29 Align the hinge tabs on the control board with hinge mounts on the water heater. The control board hinge tabs are oriented that it will connect when rotated to a specific angle. See Figure 10.

30 Re-route the wiring through the wiring organizers removed in **Step 23**.

31 Lift the circuit board panel up and lock into place.

32 Use a cable tie to secure the wiring removed in **Step 21**.

33 Reconnect the wiring harnesses removed in **Step 14**. Reference Figure 5 for placement of each wiring harness.

34 Reconnect the "keepers" on wiring harnesses B and I removed in **Steps 17 & 18**. Reference Figure 5 for placement of each wiring harness.

Replacing the User Interface Module

35 Reconnect the user interface module wiring harness removed in **Step 4**. Reference Figure 5 for connection point M.

36 Reinstall the metal mounting plate using the four (4) screws removed in **Step 7**. See Figure 3.

NOTICE: The user inteface module wiring and other wiring is routed behind this plate.

37 Reintall the original or replacment user interface module removed in **Step 6**.

Returning Water Heater to Operation

38 Lift the circuit board panel up and lock into place. Install and tighten the screw previously removed in **Step 8**.

39 If the new control board does not have a battery installed, remove the battery from the old control and place it in the new one. See Figure 5 for battery location.

40 Replace the cabinet cover and secure with the screws previously removed in **Step 2**.

41 Restore power to the water heater. The water heater is now ready for operation.

Venturi & Gas Tube Replacement Kit Instructions

Kit 100371205 Contains:
- Venturi Assembly
- (2x) O-ring (20 x 2.65)
- Fan Inlet O-ring
- Fan Outlet Gasket
- Kit Instructions

Kit 100371206 Contains:
- Venturi Assembly
- (2x) O-ring (20 x 2.65)
- Fan Inlet O-ring
- Fan Outlet Gasket
- LP Conversion Kit
- Kit Instructions

Kit 100371173 Contains:
- Gas Tube
- (4x) O-ring (20 x 2.65)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver
- Safety Gloves
- Marker

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

Accessing Water Heater Components

3 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

4 Lift cover up and away from cabinet to gain access to the water heater's internal components.

5 Locate the fan wiring harness on the control board panel as shown in Figure 1. Disconnect and route the wiring out of the way for ease of removing the fan assembly.

Figure 1 - Locate fan wiring harness on control board

6 Locate the screw securing the control board panel as shown in Figure 2. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

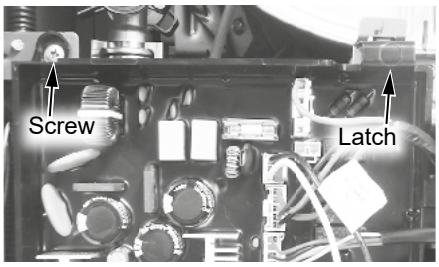

Figure 2 - Control board location

7 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Venturi & Fan Assembly

8 Locate the gas tube connecting the venturi assembly to the gas valve as shown in Figure 3. Note the orientation of the lower spring clip securing the gas tube to the gas valve. Remove spring clip and place it aside in a safe place for reinstallation.

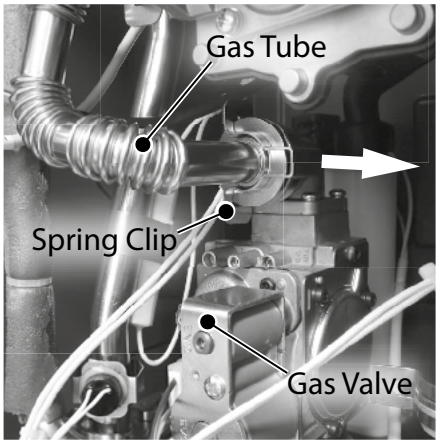

Figure 3 - Remove lower spring clip

9 Locate the upper spring clip securing the gas tube to the venturi as shown in Figure 4. Note the orientation of the upper spring clip securing the gas tube to the venturi. Remove spring clip and place it aside in a safe place for reinstallation.

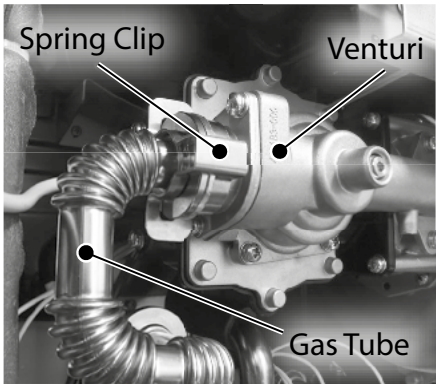

Figure 4 - Remove upper spring clip

Proceed to **Step 10** if not replacing gas tube.

Venturi & Gas Tube Replacement Kit Instructions

(For Kit 100371173 Only)

- Remove gas tube from venturi and gas valve. Dispose of gas tube properly.
- Locate the new gas tube and four (4) O-rings provided in the kit. Install O-rings to grooves located on each end of gas tube as shown in Figure 5. Install gas tube to venturi and gas valve.

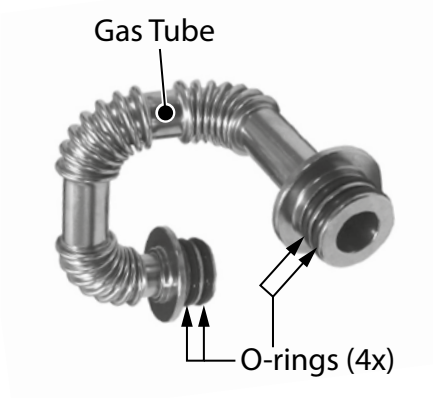

Figure 5 - Install O-rings to gas tube

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

- Locate the two spring clips previously removed. Orient spring clips properly as shown in Figures 6 & 7. Install spring clips to secure the gas tube to the venturi and gas valve. Confirm gas connections are tight and will not leak.

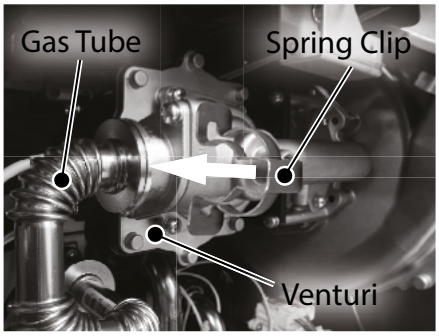

Figure 6 - Secure upper spring clip

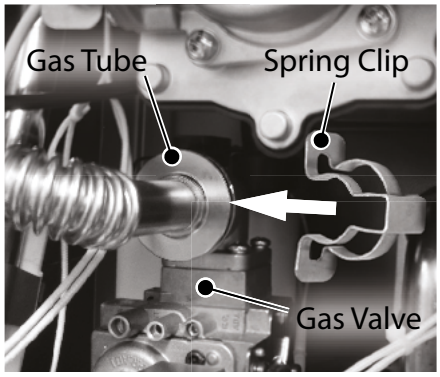

Figure 7 - Secure lower spring clip

- Proceed to **Step 25** if not replacing venturi assembly.

10 Locate the venturi wires (2x) and disconnect them as shown in Figure 8. Wires are labeled "Venturi" and "Micro Switch." These wires are connected at and run through the black cable conduit located on the left side of the water heater cabinet.

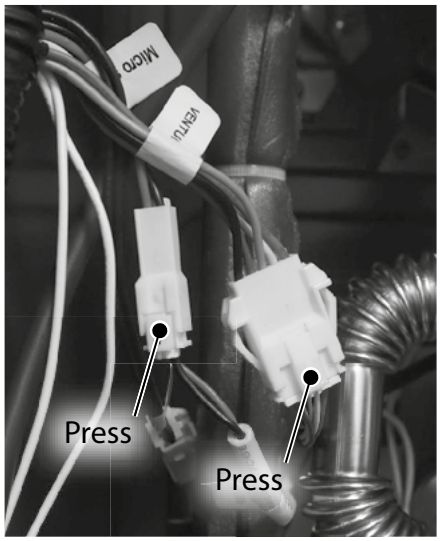

Figure 8 - Locate venturi wire harnesses

11 Locate the four (4) screws securing the fan assembly to the burner assembly as shown in Figure 9. Use a Phillips screwdriver to remove the screws. Place the screws aside in a safe place for reinstallation.

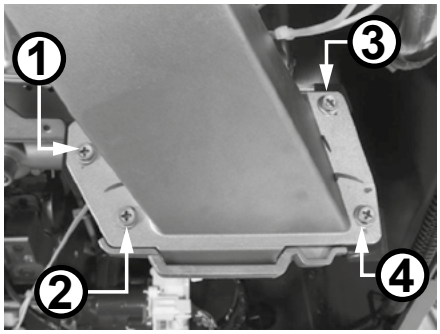

Figure 9 - Remove fan assembly screws

12 Disconnect the gas tube from the gas valve and carefully remove the venturi and fan assembly from the water heater.

Replacing Venturi Assembly

13 Locate the large four screws securing the venturi to the fan. Figure 10 shows venturi facing upright for ease of removing screws.

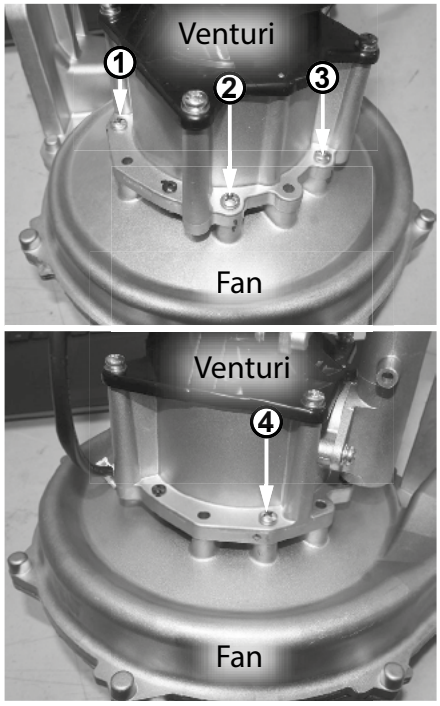

Figure 10 - Locate venturi and fan screws

Venturi & Gas Tube Replacement Kit Instructions

14 Use a marker to identify the location of each screw hole (4x) on both the venturi and fan. Mark one screw hole location with an orientation mark on the venturi and fan. These marks will assist in proper orientation and installation of the new venturi to the fan.

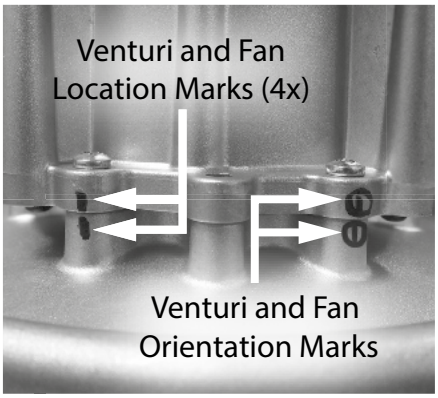

Figure 11 - Screw hole and orientation markings

15 Remove the four (4) screws and separate the venturi assembly from the fan. Set aside the old venturi as an orientation reference.

16 Remove gas tube from venturi. Place gas tube aside in a safe place for reinstallation.

(For Kit 100371206 Only)

- Locate the new venturi provided in the kit. Follow the instructions provided in the kit to convert venturi from natural gas to LP (liquid propane gas). Proceed to the next step.

17 Install the new venturi to the fan. Reference the orientation mark on the old venturi to position the new venturi properly as shown in Figure 12. Use the screw hole marks on the fan to properly install the four (4) screws previously removed in **Step 13**.

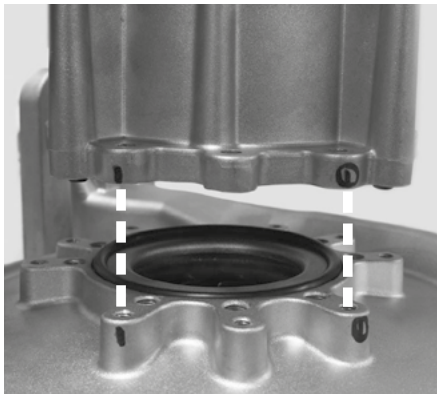

Figure 12 - Proper venturi and fan alignment

18 Dispose of old venturi assembly properly.

19 Locate the two (2) O-rings provided in the kit. Remove the two (2) old O-rings from gas tube (venturi mating side) and install the two (2) new O-rings as shown in Figure 13.

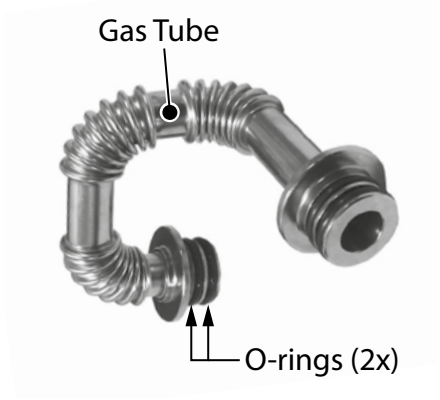

Figure 13 - Install venturi O-rings to gas tube

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

20 Install gas tube to venturi and locate spring clip previously removed in **Step 9**. Orient spring clip properly as shown in Figure 6. Install spring clip to secure the gas tube to the venturi. Confirm gas connection is tight and will not leak.

Installing Venturi & Fan Assembly

21 Locate the new fan outlet gasket, and inlet O-ring provided in kit. Install outlet gasket and inlet O-ring to fan (see Figure 14). Once installed, make sure the outlet gasket and inlet O-ring are fully seated and not damaged.

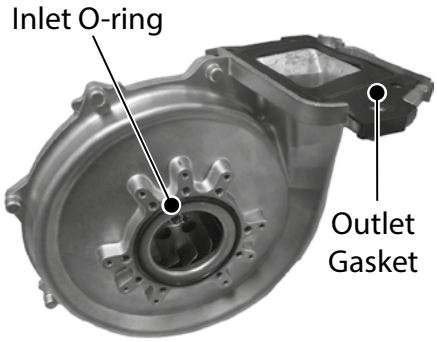

Figure 14 - Install inlet O-ring and outlet gasket to new fan assembly

22 Fit the venturi and fan assembly to the burner assembly.

NOTICE: Confirm the burner tab engages the fan slot as shown in Figure 15.

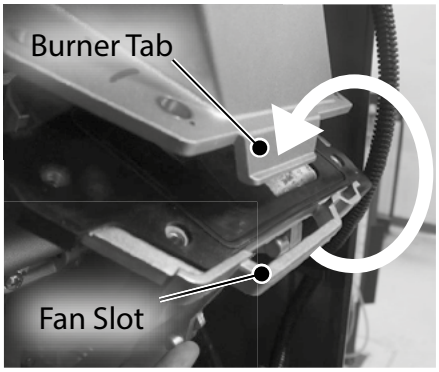

Figure 15 - Burner tab and fan slot

23 Locate the four (4) screws previously removed in **Step 11**. Use screws to secure fan and venturi assembly to burner assembly.

Venturi & Gas Tube Replacement Kit Instructions

24 Connect the gas tube to the gas valve. Locate the spring clip previously removed in **Step 8**. Orient spring clip properly as shown in Figure 7. Install spring clip to secure the gas tube to the gas valve. Confirm gas connection is tight and will not leak.

25 Reconnect the venturi wires (2x) previously disconnected in **Step 10**. Confirm wire connections are secure.

Returning Water Heater to Operation

26 Lift the control board panel up and lock into place.

27 Install and tighten the screw to the control board panel previously removed in **Step 6**.

28 Reconnect the fan wiring harness to the control board panel previously disconnected in **Step 5**.

29 Replace the cabinet cover and secure with the screws previously removed in **Step 3**.

30 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

31 Restore power to the water heater.

Water Piping Replacement Kit Instructions

Kit 100371193 Contains:
- Mixing Tee
- (1x) O-ring (15.5 x 2.5)
- (2x) O-ring (21.8 x 2.4)
- Kit Instructions

Kit 100371202 Contains:
- Outlet Water Tube
- (2x) O-ring (21.8 x 2.4)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- Phillips Screwdriver (magnetized)
- Towel or Rag
- Bucket
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

3 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

4 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

5 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

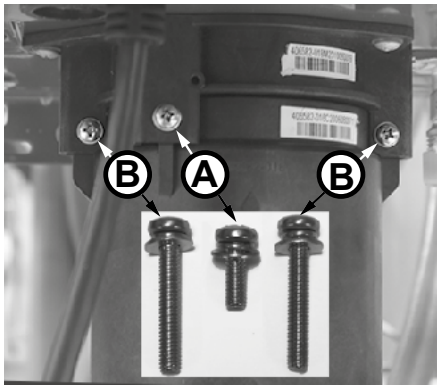

Figure 1 - Identify cartridge screws

6 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

7 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

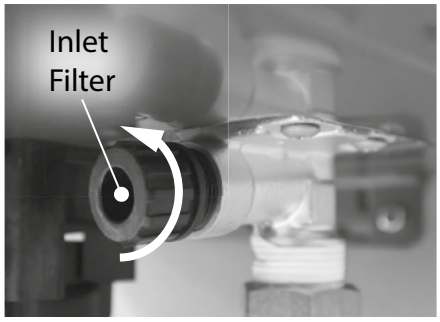

Figure 2 - Locate and remove inlet filter

8 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

9 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 5**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

10 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

11 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

12 Lift cover up and away from cabinet to gain access to the water heater's internal components.

13 Locate the screw securing the control board panel as shown in Figure 3. Use a Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation.

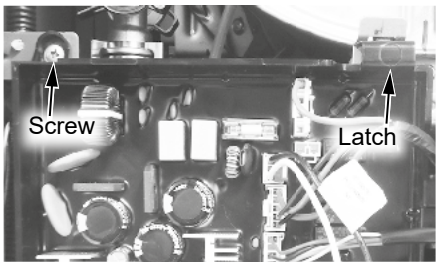

Figure 3 - Control board location

14 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Water Piping Replacement Kit Instructions

Removing Mixing Tee

15 Locate the mixing tee and bypass water tube as shown in Figure 4. Remove the spring clip (size 25) securing bypass water tube to bypass valve and mixing tee. Place spring clip aside in a safe place for reinstallation.

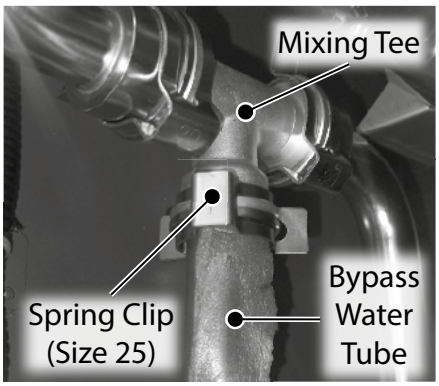

Figure 4 - Remove spring clip from bypass water tube

16 Remove the two (2) spring clips (size 30) securing mixing tee to HEX outlet tube and outlet water tube as shown in Figure 5. Place spring clips aside in a safe place for reinstallation.

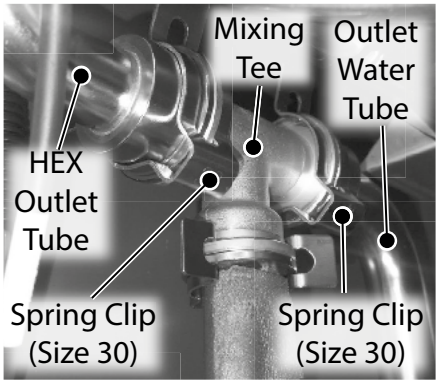

Figure 5 - Remove spring clips from HEX outlet tube and outlet water tube

17 Disconnect mixing tee from HEX outlet tube and outlet water tube. If not replacing mixing tee, place aside in a safe place for reinstalltion and proceed to **Step 18**.

(For Kit 100371193 Only)

- Discard old mixing tee properly.
- Locate the new mixing tee and three (3) O-rings provided in the kit. Install the two (2) large O-rings (21.8 x 2.4) to mixing tee. Remove and replace the one (1) small O-ring (15.5 x 2.5) on the bypass water tube (mixing tee side). See Figure 4 for location of bypass water tube.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

- Proceed to **Step 25.**

Removing Outlet Water Tube

18 Locate the outlet water tube as shown in Figure 6. Remove the freeze protection thermostat from tube and set it aside in water heater cabinet for ease of outlet water tube removal.

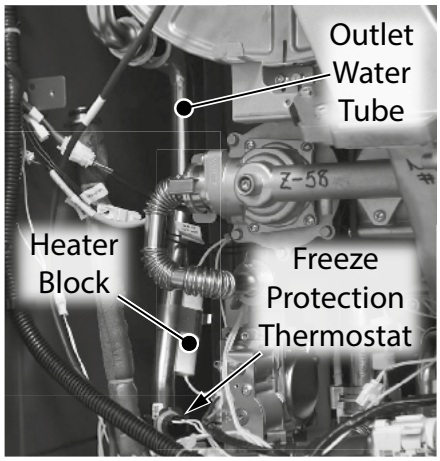

Figure 6 - Remove freeze protection thermostat and heater block from outlet water tube

19 Locate the heater block and bracket (size 20) attached to outlet water tube. Remove heater block and bracket as shown in Figure 6 above. Place bracket aside in a safe place for reinstallation. Route heater block and wiring inside water heater cabinet for ease of outlet water tube removal.

20 Locate and remove the spring clip (size 30) securing outlet water tube to hot outlet connection as shown in Figure 7. Place spring clip aside in a safe place for reinstallation.

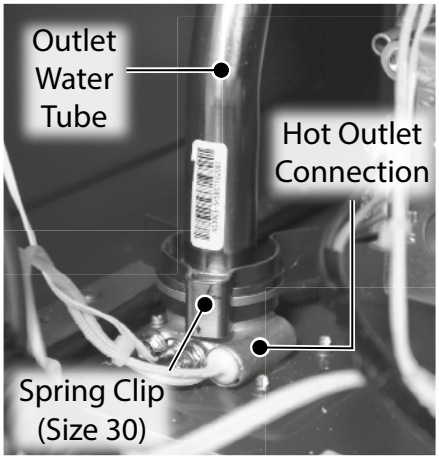

Figure 7 - Remove spring clip from outlet water tube

21 Disconnect outlet water tube from hot hot outlet connection.

(For Kit 100371202 Only)

- Discard old outlet water tube properly.
- Locate the new outlet water tube and two (2) O-rings (21.8 x 2.4) provided in the kit. Install one (1) O-ring to the new outlet water tube. Remove and replace the one (1) O-ring on the mixing tee (outlet water tube side) previously removed in **Step 17**.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

- Proceed to the next step on the following page.

Installing Outlet Water Tube

22 Connect outlet water tube to hot outlet connection. Secure outlet water tube with spring clip (size 30) previously removed in **Step 20**.

23 Install heater block and bracket (size 20) previously removed in **Step 19**.

24 Install the freeze protection thermostat previously removed in **Step 18.**

Installing Mixing Tee

25 Connect mixing tee to outlet water tube and HEX outlet tube. Secure mixing tee with the two (2) spring clips (size 30) previously removed in **Step 16.**

26 Connect bypass water tube to mixing tee and bypass valve. Secure bypass water tube with the spring clip (size 25) previously removed in **Step 15**.

Checking for Water Leaks

27 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

28 Lift the control board panel up and lock into place.

29 Install and tighten the screw to the control board panel previously removed in **Step 13**.

30 Replace the cabinet cover and secure with the screws previously removed in **Step 11**.

31 Restore power to the water heater. The water heater is now ready for operation.

Water Pump & Tubing Replacement Kit Instructions

Kit 100371191 Contains:
- Water Pump
- O-ring (15.5 x 2.5)
- O-ring (14 x 2.5)
- Double-Seal O-ring (16 x 7)
- Double-Seal O-ring (14 x 7)
- Kit Instructions

Kit 100371183 Contains:
- Pump Inlet Elbow
- (2x) O-ring (15.5 x 2.5)
- Double-Seal O-ring (16 x 7)
- Kit Instructions

Kit 100371203 Contains:
- Pump Outlet Tube
- O-ring (15.5 x 2.5)
- O-ring (14 x 2.5)
- Double-Seal O-ring (14 x 7)
- Kit Instructions

IMPORTANT: Use only factory authorized replacement parts. **DO NOT USE ELECTRIC SCREWDRIVERS OR DRILLS, HAND TIGHTEN ALL SCREWS TO PREVENT OVER TIGHTENING**. If you lack the necessary skills to properly perform the installation, you should not proceed, but get help from a qualified service technician.

Tools and Materials Required:
- 12" Phillips Screwdriver (magnetized)
- Towel or Rag
- Bucket or Pan
- Safety Gloves

Preparing Water Heater for Service

1 Disconnect power to the water heater by unplugging it or by turning off the circuit at the breaker box, as appropriate. The power button on the water heater and remote **DOES NOT** disconnect power to the water heater. You must physically disconnect power to the water heater.

2 Shut **OFF** the gas supply to the water heater at the manual gas shut off valve.

3 Shut **OFF** the cold water supply to the water heater at the cold inlet valve.

4 Open all hot water fixtures in the house. When the residual water flow has ceased, close all hot water fixtures. This will depressurize the water heater.

Draining the Water Heater

5 Drain the X3®/Bypass Cartridge. Place a bucket or pan underneath cartridge to collect water during removal.

6 Locate the three (3) screws securing the X3®/Bypass cartridge as shown in Figure 1. Remove the Ⓐ M4-12mm screw and the two Ⓑ M4-25mm screws from cartridge. Place screws aside in a safe place for reinstallation.

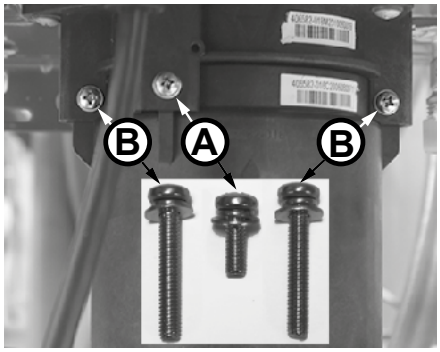

Figure 1 - Identify cartridge screws

7 Pull down to remove the cartridge from the water heater. Wait a few minutes to ensure all water has completely drained.

8 Locate and remove the inlet filter as shown in Figure 2 to drain any residual water left in the system. Place a bucket or pan underneath inlet filter to collect water during removal.

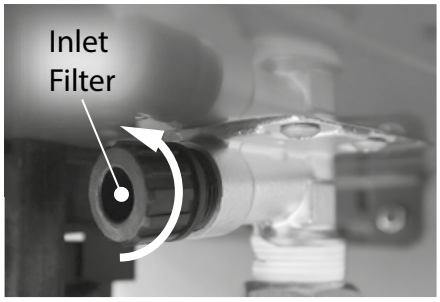

Figure 2 - Locate and remove inlet filter

9 Once the water heater has been adequately drained, reinstall inlet filter to water heater and tighten by hand. Confirm inlet filter is secured to water heater.

10 Reinstall the cartridge to the water heater. Locate the screws previously removed in **Step 6**. Insert and snug all three (3) screws by hand.

NOTICE: The X3® cartridge is keyed to only install in one direction. Align the ▲ on the cartridge with the ▼ on the manifold. When inserting the cartridge, push up until the screw holes align. Some resistance is normal. The bypass cartridge is not keyed and will install in either direction.

11 Use a screwdriver to tighten the two Ⓑ screws first and lastly tighten screw Ⓐ. **DO NOT** use a drill or impact driver to tighten the screws.

Accessing Water Heater Components

12 Locate the two (2) screws at the bottom of the cabinet cover. Use a Phillips screwdriver to remove the screws. Place screws aside in a safe place for reinstallation.

13 Lift cover up and away from cabinet to gain access to the water heater's internal components.

14 Locate the water pump wiring harness on the control board panel as shown in Figure 3. Disconnect and route the wiring out of the away for ease of removing the water pump.

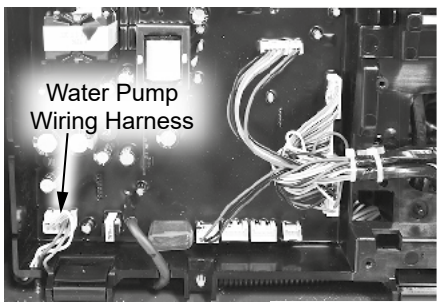

Figure 3 - Water pump wiring harness location

15 Locate the screw securing the control board panel. Use a

Water Pump & Tubing Replacement Kit Instructions

Phillips screwdriver to remove the screw and place it aside in a safe place for reinstallation. See Figure 4.

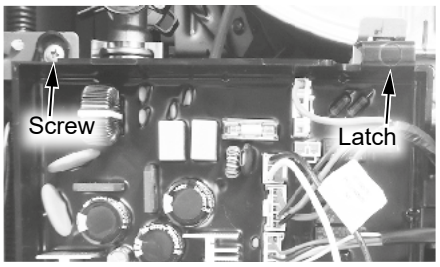

Figure 4 - Control board panel location

16 Press the latch at the top of the control board panel and pull the assembly forward from the top. It is hinged at the bottom and can be lowered. The control board assembly will hold itself in place.

Removing Bypass Valve

17 Locate the bypass valve at the bottom front side of the water heater as shown in Figure 5. Disconnect the wiring harness from the valve.

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

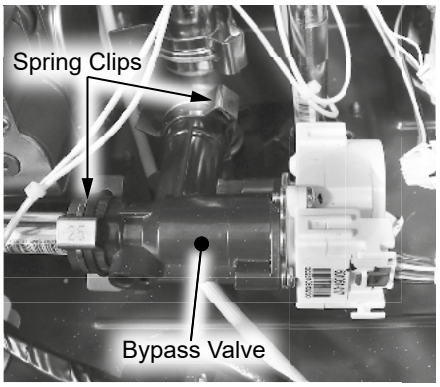

Figure 5 - Bypass valve location

18 Remove the two (2) spring clips (size 25) securing the bypass valve to the piping system. Remove the bypass valve from pipe connections. Place components aside in a safe place for reinstallation. See Figure 5.

Removing Flow Control Valve

19 Locate the flow control valve at the bottom right side of the water heater. See Figure 6.

⚠ CAUTION! Water may still be present in the valve assembly. Place a rag under the valve connection points to prevent water from escaping into the water heater cabinet.

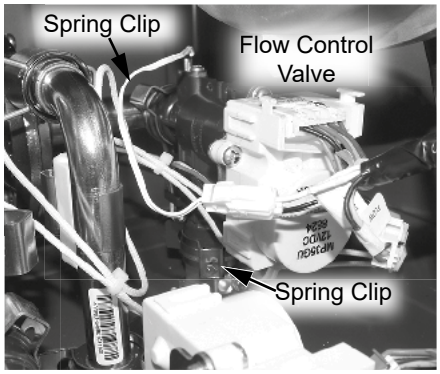

Figure 6 - Flow control valve location

20 Remove the two (2) spring clips (size 25) securing the flow control valve to the piping system. Place spring clips aside in a safe place for reinstallation. Remove the flow control valve from pipe connections and set aside in the water heater cabinet. See Figure 6.

Removing Heater Blocks

21 Locate the two heater blocks attached to the pump inlet elbow and the pump outlet tube as shown in Figure 7. Remove brackets (size 16) securing heater blocks to pipe connections. Place brackets aside in a safe place for reinstallation. Route heater blocks and wiring inside water heater cabinet for ease of access to water pump.

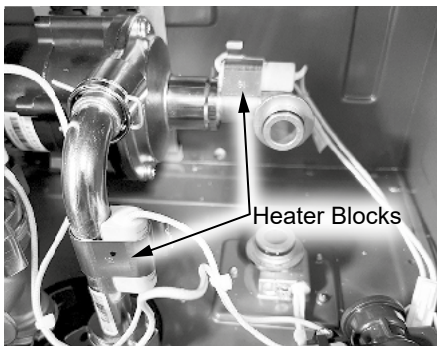

Figure 7 - Heater block locations

(For Kit 100371183 Only)

- Locate the pump inlet elbow. Remove the retaining clip securing elbow to water pump. Remove pump inlet elbow and dispose of properly. See Figure 8.

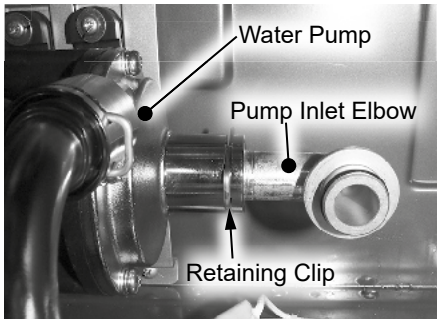

Figure 8 - Pump inlet elbow location

- Locate new pump inlet elbow and three (3) O-rings provided in the kit. The pump inlet elbow uses one (1) 15 x 2.5 O-ring on the inlet side, one (1) 16 x 7 double seal O-ring on the inlet side, and one (1) 15 x 2.5 O-ring on the outlet side. Install O-rings to elbow. Install elbow to water pump and secure with retaining clip. Proceed to **Step 33** if not replacing water pump. See Figure 9.

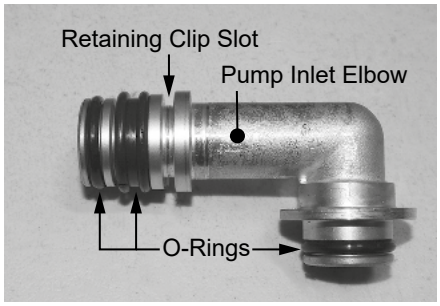

Figure 9 - Pump inlet elbow O-rings

Water Pump & Tubing Replacement Kit Instructions

(For Kit 100371203 Only)

- Locate the pump outlet tube. Remove the retaining clip securing tube to water pump. Locate and remove the spring clip (size 25) at the bottom of the pump outlet tube and disconnect tube from water connection and water pump. See Figure 10.

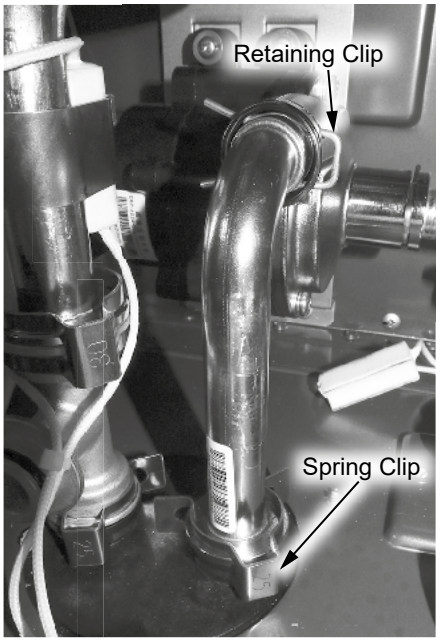

Figure 10 - Pump outlet tube location

- Locate new pump outlet tube and three (3) O-rings provided in the kit. The pump outlet tube uses one (1) 14 x 2.5 O-ring on the inlet side, one (1) 14 x 7 double seal O-ring on the inlet side, and one (1) 15 x 2.5 O-ring on the outlet side. Install O-rings to tube. Install tube to water pump and secure with retaining clip. Install tube to water connection and secure with spring clip (size 25). Proceed to **Step 33** if not replacing water pump. See Figure 11.

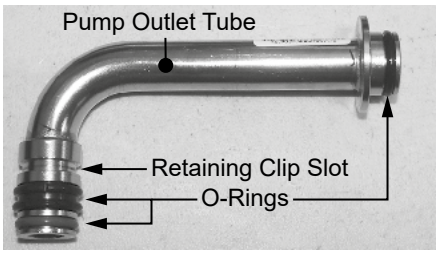

Figure 11 - Pump outlet tube O-rings

Removing Water Pump

22 Locate the four (4) screws securing the water pump assembly to the bracket at the back side of the water heater cabinet. Use a 12" Phillips screwdriver to loosen screws so they no longer engage bracket threads. Do not remove screws from gasket boots. See Figure 12.

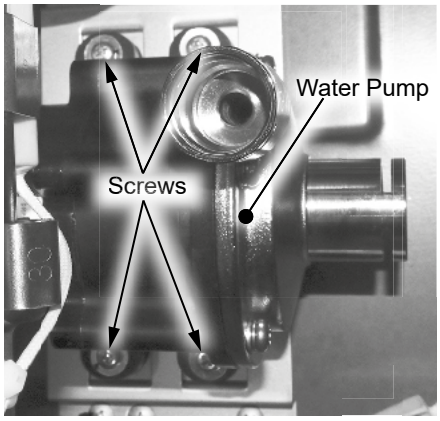

Figure 12 - Water pump screw locations

23 Locate and remove the spring clip (size 25) at the bottom of the pump outlet tube and disconnect tube from water connection.

24 With screws loosened and pump outlet tube disconnected, carefully remove water pump, tube, elbow, screws and wiring from water heater.

Preparing New Water Pump and Pipe Connections

25 Remove the four (4) gasket boots with screws from the old water pump by sliding them out of the brackets. Note orientation of gasket boots for proper installation to new water pump. See Figure 13.

Figure 13 - Water pump gasket boot orientation

26 Remove the retaining clips securing the pump inlet elbow and pump outlet tube to water pump. Remove the pipe connections from the water pump.

27 Replace the O-rings on both water pipes with the new O-rings provided in the kit.

The pump inlet elbow uses one (1) 15 x 2.5 O-ring on the inlet side, one (1) 16 x 7 double seal O-ring on the inlet side, and one (1) 15 x 2.5 O-ring on the outlet side. See Figure 9.

The pump outlet tube uses one (1) 14 x 2.5 O-ring on the inlet side, one (1) 14 x 7 double seal O-ring on the inlet side, and one (1) 15 x 2.5 O-ring on the outlet side. See Figure 11.

NOTICE: Handle with care and verify lubricant has been applied to O-rings and O-rings are not dirty or damaged.

28 Install pump inlet elbow and pump outlet tube to the new water pump provided in the kit. Secure pipe connections with retaining clips previously removed in **Step 26.** Confirm water connections are tight and will not leak.

29 Dip the ends of the four (4) gasket boots in water and slide them into the brackets on the new water pump. The water will help gaskets slide smoothly into brackets. Directional arrows on gasket boots must be pointing inward toward one another. See Figure 13.

The new water pump is now ready for installation.

Installing New Water Pump

30 Place the water pump into the water heater cabinet, routing the wiring harness cable behind the condensate collector and under the control board panel as shown in Figure 3. Use caution not to dislodge screws in gasket boots.

Water Pump & Tubing Replacement Kit Instructions

31 Install the pump outlet tube to water connection and secure with the spring clip (size 25) previously removed in **Step 23**. This will keep the water pump rigid while securing to bracket with screws.

32 Align gasket boots and screws with screw holes in bracket. Use a 12" Phillips screwdriver to secure the bottom two screws first. Gently push upward on the water pump to help guide bottom screws through bracket holes. Once the bottom screws are tight, finish securing water pump by tightening the top two screws.

33 Locate the two (2) heater blocks and brackets (size 16) previously removed in **Step 21**. Secure heater blocks to pump inlet elbow and pump outlet tube as shown in Figure 7.

34 Install the flow control valve and the bypass valve to the water heater by following **Steps 17-20** in reverse order. Confirm all wiring connections are secure. Confirm all water connections are tight and will not leak.

35 Lift the control board panel up and reconnect the water pump wiring harness previously disconnected in **Step 14**. Slide the wiring through the slot in the circuit board panel as shown in Figure 3. Lower control board panel.

Checking for Water Leaks

36 Turn **ON** the cold water supply to the water heater at the cold inlet valve. The system will fully pressurize and any leaks at water connections will be apparent. Correct any leaks immediately and dry water heater cabinet with a rag.

Returning Water Heater to Operation

37 Lift the control board panel up and lock into place. Install and tighten the screw to the control board panel previously removed in **Step 15**.

38 Replace the cabinet cover and secure with the screws previously removed in **Step 12**.

39 Turn **ON** the gas supply to the water heater at the manual gas shut off valve.

40 Restore power to the water heater. The water heater is now ready for operation.