



Kerosene-Fired and Oil-Fired Water Heater

Installation Manual

MODEL **BS-36UFF**

(Type B)



IMPORTANT

THIS APPLIANCE SHOULD BE INSTALLED BY A LICENSED, AUTHORIZED PERSON(S) DUE TO THE NECESSITY OF MAKING ELECTRICAL, WATER AND FUEL CONNECTIONS. RETAIN THIS MANUAL FOR FUTURE REFERENCE. CHECK LOCAL CODES AND ORDINANCES FOR PERMITTED USE.

CAUTION

THIS WATER HEATER SHALL NOT BE USED FOR COMMERCIAL USE OR FOR ANY PURPOSES OTHER THAN HOT WATER SUPPLY USES. OTHER USAGE MAY CAUSE A MALFUNCTION OR SHORTEN ITS SERVICE LIFE. DO NOT REMOVE THE RATING PLATE AND LABELS FROM THE WATER HEATER UNIT.

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SECTION A:

SAFETY TIPS FOR INSTALLATION

BE SURE TO FOLLOW THE FOLLOWING INSTRUCTIONS.

The instructions which are contained in this manual are classified into the following two types, which are "WARNING" and "CAUTION". These instructions are intended to provide important information for safe operation.

"WARNING" indicates the possibility of causing the user a fatal accident or serious injury if the water heater is incorrectly operated.

"CAUTION" indicates the possibility of causing the user injuries or material damages if the water heater is incorrectly operated.

WARNING

1. Never use any fuel other than water-clear kerosene (ASTM No. 1-K grade) or No.1 fuel oil. NEVER USE GASOLINE! Use of such fuels can result in an explosion and/or fire and cause injury.
2. Improper installation, adjustment, modification, or service and maintenance by an unauthorized person may cause **SERIOUS UNIT DAMAGE, BODILY INJURY, HAZARD OR PROPERTY DAMAGE.** This unit should be installed by a licensed, authorized person(s) due to the necessity of making electrical, water and fuel connections. Refer to the installation manual and the operation and maintenance instructions for assistance, or consult your dealer for further information.
3. **HAZARD OF ELECTRICAL SHOCK!** Before removing any access panels of water heater for service, make sure the electrical supply to the water heater is shut off. Failure to do this may result in **HAZARD, SERIOUS BODILY INJURY, OR PROPERTY DAMAGE.**
4. Check and comply with all state, local codes and ANSI Z21.22 that may apply to water heater(s) before beginning the installation.
5. This water heater is designed to be used no more than 6,890 FT. (2,100 m) above sea level. The water heater may have a failure of combustion at a high altitude.
Ask your local dealer for using at altitudes higher than 4,922 FT. (1,500 m) ~ 6,890 FT. (2,100 m) above sea level.
If the water heater is installed at an altitude of higher than 2,953 FT. (900 m) above sea level, the exhaust pipe or the air inlet hose shall not be elongated or connected with its extension pipe. The standard installation only is allowed for installing the water heater at such altitude.
6. **RISK OF INDOOR AIR POLLUTION AND FIRE.** Be sure the exhaust pipe is properly installed and connected. Aluminum tape provided may be used for sealing exhaust pipe connections.

CAUTION

1. Keep the area around the unit clean and free of flammable materials.
2. **RISK OF FIRE AND ELECTRIC SHOCK.** Do not apply any excessive force or pressure to the power supply cord. Make sure the plug is free of dust. Be sure plug fits the receptacle securely.
3. Install a temperature and pressure relief valve on the installation mouth in accordance with local codes and ANSI Z21.22. See the page 6 for more details.
4. If a check valve or one-way valve is required on the cold water supply line by local codes, it is recommended that an expansion tank be installed on the hot water line. See the page 7 for more details.

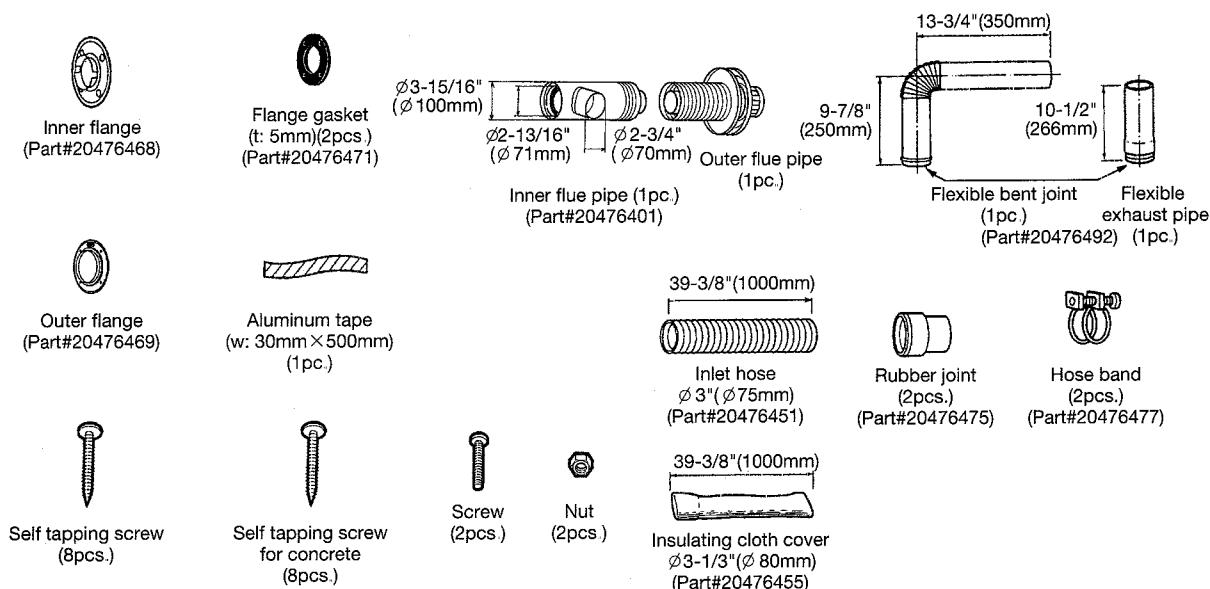
SECTION B: UNPACKING

UNPACKING

1. Unpack the unit carefully.
2. Check to see if there are any loose screws that may have occurred in transit.
3. Take accessories and the instruction manual out of the carton.

STANDARD INSTALLATION PARTS

The following standard installation parts are enclosed with unit. For alternate installation methods, you may need to purchase additional accessories which are available from your dealer.

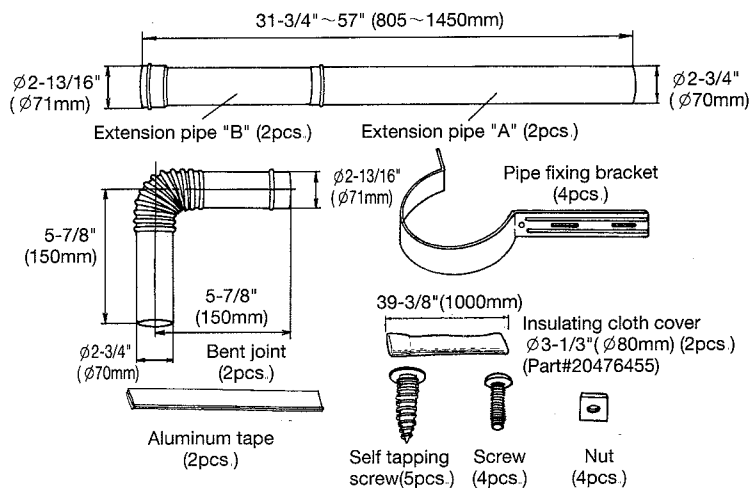


ACCESSORY PARTS (OPTION)

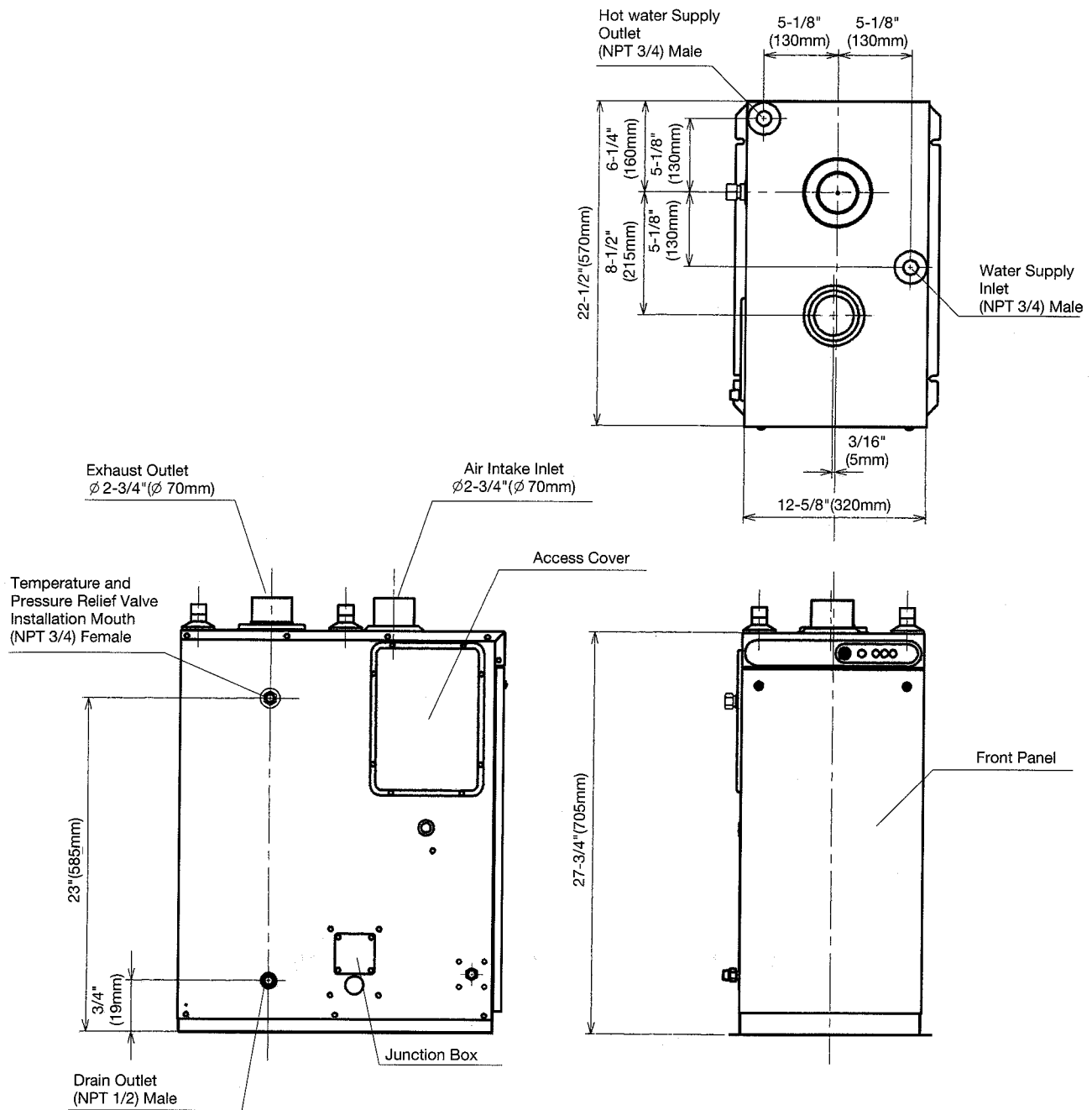
EXTENSION PIPE KIT (Part#20476496)

CAUTION: Total length of the extension pipe between the water heater and the flue pipe must be no greater than 10ft. with a total of three bends.

NOTE: When using extension pipes always cover the exhaust pipe with the insulating cloth cover.



DIMENSIONAL OUTLINE



SECTION C: INSTALLATION

WARNING: This unit must be installed in accordance with these instructions, local codes, ordinances and/or in the absence of local codes, the latest edition of the national fire protection association (NFPA31) code.

Check and comply with all state, local codes and ANSI Z21.22 that may apply to water heater(s) before beginning the installation.

This unit should be installed by a licensed, authorized person(s) due to the necessity of making electrical, water and fuel connections.

SELECTING A LOCATION

Select a place to install the water heater where water pipes, electric supply, and surrounding surfaces will be at safe and noise prevention distances.

1. Select a place which is free of moisture, water spills, pools or snow.
2. Select a place which draining can be done easily.
3. Select a place which the fuel tank can be installed safely.
4. Select a place which is free of combustible substances.
5. The surrounding walls should be finished with noncombustible materials (concrete block, mortar, or plaster are allowable).
6. The floor on which the water heater is installed must prevent intensive vibrations or shock and must be strong enough to bear the weight of the water heater.
7. Select a place where proper maintenance and control can be provided for the unit after installation.
8. Select a place sheltered from weather.
9. Install the unit on a noncombustible surface in a stable position. If installing on combustible floor, the unit should be raised off the floor to prevent contact with combustible materials.
10. It is important to keep enough clearance for the purpose of maintenance, repair and possible servicing.
11. The flue pipe is free of snow, icing, leaves, bird's nest or strong drafts.
12. Before making a hole in your wall for the flue pipe, make sure the area is free of electrical wires, gas pipes and other obstacles.

TOOLS NEEDED FOR INSTALLATION

Tool	Use
Phillips Head Screwdriver	Installation of flue pipe, etc.
Electric Drill	Drilling hole in wall for flue pipe
Hole Saw, 4-3/4" diameter	Making hole in wall for flue pipe
Pipe Wrench	Connecting fuel pipe

FUEL TANK INSTALLATION

The fuel tank must be purchased separately and installed by a qualified fuel supply technician.

NOTE: Fuel tank installation must comply with National Fire Protection Association Code NFPA 31 or locally applicable codes. Check with local building officials.

The following instructions should be followed for installation of a large capacity, gravity-fed fuel tank.

- Installation height of tank's fuel outlet should be at least 16 in. above floor surface upon which the water heater rests.
- To avoid excess fuel pressure to water heater, the top of fuel tank should be no more than 8-1/2 ft. above the bottom of the unit.
- The inlet fuel pressure must not exceed 2.5 PSI. If the inlet pressure exceeds 2.5 PSI, a pressure reducer must be used.
- Fuel tank should be located at least 6 ft. away from all heat sources.
- 3/8" OD copper tubing should be used for the fuel line.
- To prevent air locks in the fuel line, the fuel line should be smooth with no U-shaped or sharp bends.
- Use of a fuel filter, adjacent to the tank is recommended. Shut-off valves should also be installed on the fuel line and connected to the tank as shown below.

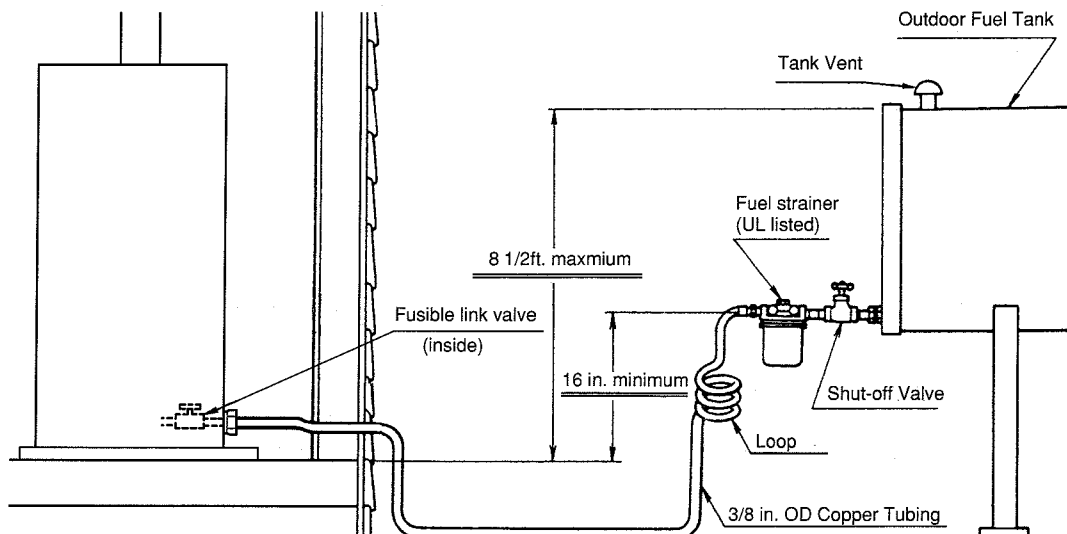
NOTE: An additional shut-off valve installed next to the exterior wall will minimize the amount of fuel to be drained should the water heater need to be disconnected. If the valve is inside the building, a fusible link type is recommended.

1. Be sure all external tanks have an operating vent.
2. Install a UL listed fuel filter at the fuel tank outlet.
Specifications required of this fuel filter are as follows:
Type of Fuel: Type 1-K Kerosene or No.1 Fuel Oil
Rated Filtering Capacity: 2 GPH (Minimum)
3. Be sure to observe the maximum and minimum tank heights as specified.

NOTE: If the maximum height is exceeded, a fuel pressure limiting valve is required. A suitable unit is available through NAPA stores. Part No. 7302368 comes with 3/8 in. fittings. The rubber connectors may be discarded and replaced with flare connections.

NOTE: Fusible Link Valve (#10005597)

- It is most important that the valve, depending on its use, be fully opened or fully closed.
- The top nut on the valve (below the turn handle) is sealed and should never be tightened or removed.
- When installing fuel lines to the valve, be sure to check for fuel leakage.
- A LEAKING VALVE SHOULD ALWAYS BE REPLACED.

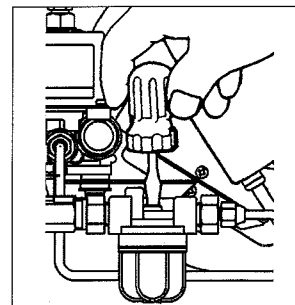


REMOVING AIR TRAP

When operating for the first time or when refueling an empty tank, air may be trapped in the fuel line, making ignition difficult. In this situation, follow the procedures below:

1. Press "POWER SWITCH" to "OFF" position. Disconnect the power supply cord.
2. To catch the fuel which will drain out, put a small container under the strainer.
3. Loosen the screw on top of the strainer. Immediately wipe off any spilled fuel.
4. Remove the trapped air thoroughly. Failure to remove all the air will cause improper ignition and may extinguish the unit.
5. Tighten the screw after removing trapped air.
6. Plug into the receptacle. Press "POWER SWITCH" to "ON" position.

NOTE: In the event of an ignition failure, press "POWER SWITCH" to "OFF" position and after 10 seconds press "POWER SWITCH" to "ON" position once again.



TEMPERATURE AND PRESSURE RELIEF VALVE INSTALLATION

At the time of installation, a temperature and pressure relief valve complying with the standard for Relief valve for Hot Water Supply System, ANSI, shall be installed in the threaded opening provided on the water heater for the temperature and pressure relief valve. Local codes should govern the installation of the relief devices.

Specifications required of this temperature and pressure relief valve are as follows:

Inlet (male): 3/4 in.
Temperature relief: 210°F
Pressure relief setting: 150PSI
Rated capacity: Min. 148,000 BTU/H

- (a) No other valve is placed between the relief valve and the water heater.
- (b) Discharge from the relief device is routed to a suitable place for disposal when relief occurs.
- (c) No reducing coupling or other restrictions are installed in discharge line.
- (d) Discharge line is installed to allow complete drainage for the device and line.

Note: Manual operation of pressure relief valves should be done at least once a year.

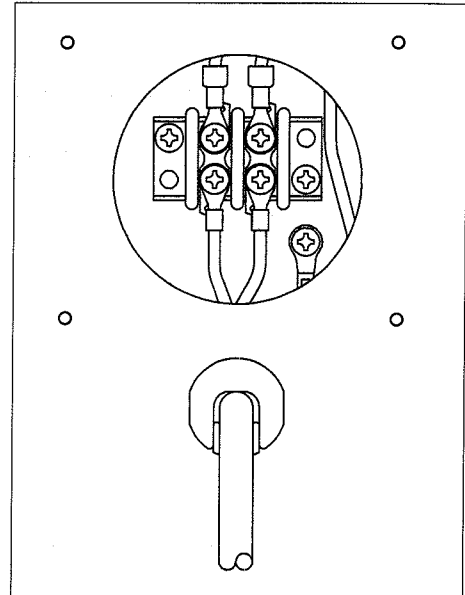
PERMANENT WIRING INSTALLATION

WARNING: RISK OF FIRE AND ELECTRIC SHOCK. Make sure the power supply cord is disconnected to avoid any electric shock before servicing. Electric shock may cause serious injury. It is recommended that installation should be conducted by a licensed electrician.

BE SURE TO FOLLOW THE FOLLOWING PROCEDURE

POWER SOURCE: 120V AC, 60Hz single phase

1. Disconnect power supply cord from power source.
2. Remove four (4) screws and junction box cover on the left side of unit.
3. Disconnect ground wire (green) from the power supply cord bracket.
4. Disconnect two power supply wires from upper side of the terminal.
5. Squeeze strain relief with the adjustable pliers to remove plastic bushing from the unit. Remove the power supply cord.
6. Replace the strain relief bushing to the power supply cable and insert the cable into the hole of the left side of unit. Connect the ground wire to the power supply cord bracket and power wires to the terminal.
7. Affix the junction box cover to the unit and insert screws.



PLUMBING

COLD AND HOT WATER PLUMBING

WARNING: Plumbing should conform to proper plumbing methods, and in conformance with local codes or regulations.

A licensed plumber familiar with local codes and ordinances should install the BS36UFF.

CAUTION: An ANSI listed temperature and pressure relief valve should be installed at the hot water outlet connection of the heater at the time of installation. Local codes should govern the installation of the relief devices.

If a check valve or one-way valve is required on the cold water supply line, it is recommended that an expansion tank (100 psi, 8 gal Min.) should be installed on the hot water supply line.

When the unit is to be installed as a replacement water heater, it is important to determine whether a check valve has been installed or not.

Remove the check valve before installation of the unit unless a check valve is required by local code.

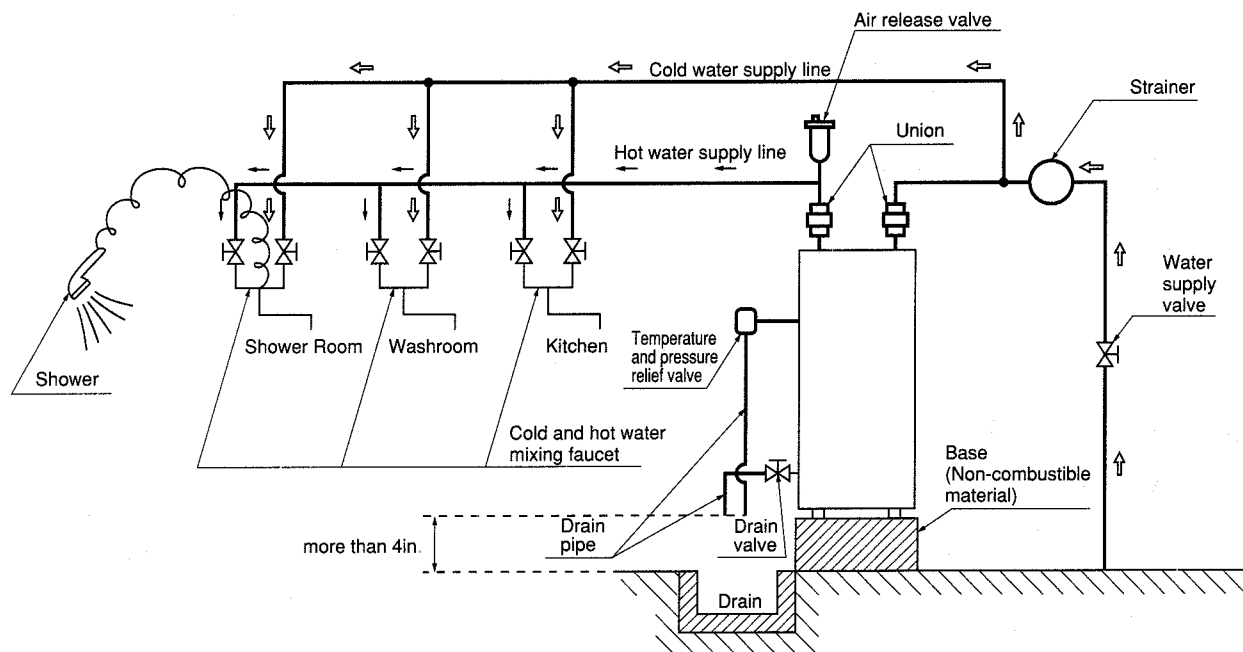
In order to prevent the water heater from being damaged or develop a leak, regardless of being used in a cold region or in a warm or hot region, the cold water supply piping, hot water supply piping, drain pipe, check valve, valves, expansion tank, and temperature and pressure relief valve should be protected with sufficient insulation materials (by wrapping with heat insulation or by equipping with a freeze prevention heater).

1. A water softener is recommended in regions where hard water may be a concern.
2. Do not apply any heat to the unit nipples.
3. Use standard copper alloy unions and nipples for the connections to the unit.
4. Copper piping is recommended for the hot water supply line.

Note: Refer to local codes when considering piping materials. Steel piping is not recommended as it may cause rust in the piping. Use NPT for piping of hot and cold water.

5. Connecting plumbing to the unit, hold unit fittings securely with a wrench to prevent damage to the unit.
6. Installation of a water strainer and the air release valve is recommended.
7. The distance between the water heater and places where hot water is used should be as short and direct as possible, and a uniform pipe size of sufficient diameter to carry the full capacity of hot water should be used.
8. Be sure to connect the water inlet and the hot water outlet as shown on the water heater. Reversing the two connections will damage the unit.
9. When hot water flows through the supply line there is an inevitable heat loss, regardless of type of water heater. Thus, insulation or protection of hot water piping is encouraged.
10. Flush the piping before connecting to the unit.

Plumbing Example



- CAUTION:**
- Do not allow pipes or valve to freeze.
 - Refer to PREVENTING FREEZE UP on Page 10 of the instruction manual.
 - Do not use the unit as an auxiliary heat source for a solar hot water heater, nor hydronic heating.

INSTALLATION OF UNIT AND FLUE PIPE

SAFETY TIPS FOR UNIT AND FLUE PIPE INSTALLATION

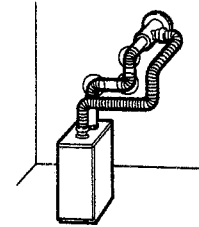
WARNING:

1. The flue pipe opening must be fully exposed to outside air. Do not vent into a garage, basement under the floor, or into any enclosed area.
2. Do not install the flue pipe in close proximity to other objects or materials.
3. Before making a hole in your wall for the flue pipe, make sure the area is free of electrical wires, gas pipes and other obstacles.
4. Do not install the flue pipe where it will be exposed to heavy snow, collected leaves, or strong drafts.
IMPORTANT: In areas of heavy snow fall, ground surface clearance must be increased according to average snow falls.
 In open areas with strong wind, a wind break may be necessary.
5. Do not install the flue pipe below the water heater nor into a chimney.
6. The exhaust pipe should be properly installed and connected. Aluminum tape may be used for sealing exhaust pipe connections.
7. Always cover the exhaust pipe with the insulating cloth cover.

CAUTION:

Total length of the extension pipe between the water heater and the flue pipe must be no greater than 10 ft. with a total of three bends.

NOTE: When using extension pipes always cover the exhaust pipe with the insulating cloth cover.



INSTALLATION OF UNIT

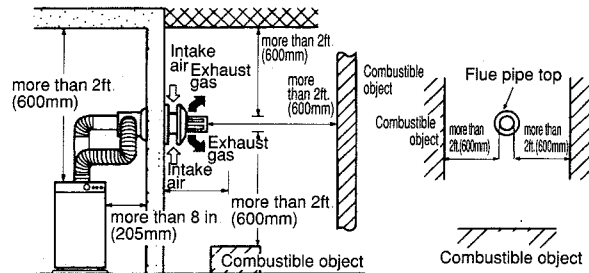
1. Install the unit on a noncombustible surface in a stable position. If installing on a combustible floor, the unit should be raised off floor to prevent contact with combustible materials by using brick, concrete block or similar non-combustible material.

If minimum clearances between the unit and combustible construction are maintained, no ventilation openings are needed in the closet door when installed in a closet.

• UNIT (INDOOR CLEARANCE)

Left side	8 in. (205 mm)
Right side	8 in. (205 mm)
Rear side	8 in. (205 mm)
From front door to closet	8 in. (205 mm)
Top	2 ft. (600 mm)

Note: It is important to keep enough clearance for the purpose of maintenance, repair and possible servicing.



• FLUE PIPE (OUTSIDE CLEARANCE)

From flue pipe top to combustible surface: Vertical	24 in. (600 mm)
From flue pipe top to combustible surface: Horizontal	24 in. (600 mm)

• EXTENSION EXHAUST PIPE

From extension exhaust pipe to combustible surface: Vertical	3 in. (76 mm)
From extension exhaust pipe to combustible surface: Horizontal	3 in. (76 mm)

2. Check local codes regarding installation of the water heater, water piping and fuel tank.

INSTALLATION OF FLUE PIPE

IMPORTANT: Check and comply with all state and local codes that may apply to water heater before beginning installation.

1. Select unit location. Allow clearances as indicated above between the unit and all other materials
2. Make sure that the outside area to where the flue pipe will reach is clear of any objects.

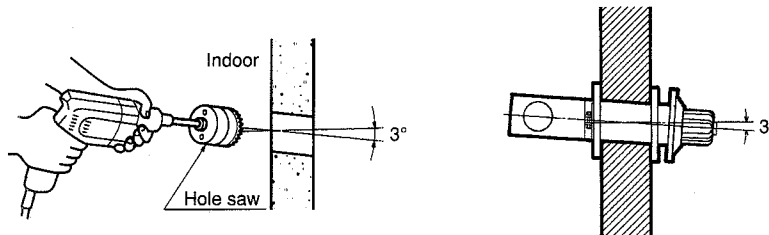
NOTE: Make sure wall thickness is not greater than 10-1/2 inches.

Flue pipe can be installed through any standard building materials. Please ask your local dealer or distributor for more details.

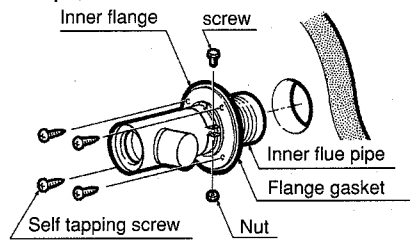
3. For standard installation, position the hole for the flue pipe.

NOTE: The water heater should be installed on a sturdy floor that is level and flat.

4. Cut the hole for the flue pipe from inside the room. Use a 4-3/4" diameter hole saw attached to an electric drill. The opening on the inside wall should be slightly higher than the outside opening (approximately 1/4") so that the flue pipe will slope slightly downward (approximately 3 degrees) after it is installed. This will enable condensed moisture to drain from the flue pipe to the outside and prevent rain or snow from entering from outside after installation.

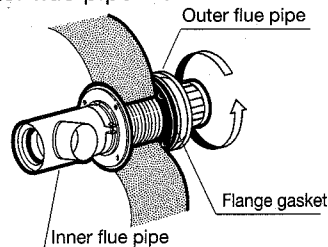


5. Install the inner flange and the flange gasket to the inner flue pipe and insert the inner flue pipe through the wall hole from inside the room. Make sure the arrow on the inner flange is pointing up and secure the securing band with a screw and a nut through two holes of the fixing band. Secure the inner flue pipe to the wall with the four screws provided with the unit.

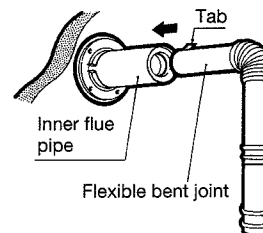
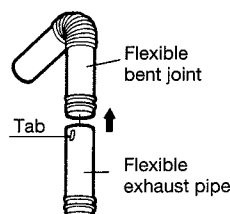


6. Install the flange gasket to the outer flue pipe. Secure the outer flue pipe to the wall by turning it clockwise. This locks the two halves together.

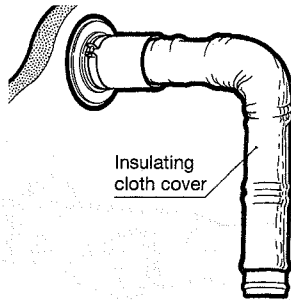
NOTE: Make sure to secure the outer flue pipe well.



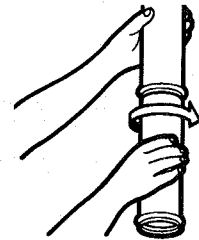
7. Insert the flexible exhaust pipe to the flexible bent joint until it locks. Insert the flexible bent joint to the exhaust mouth of the inner flue pipe until it locks.



8. Slide the insulating cloth cover over the flexible exhaust pipe and the flexible bent joint.

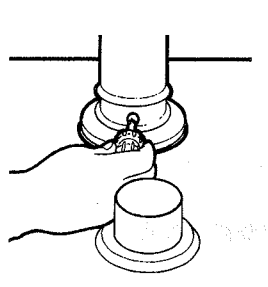


NOTE: When disconnecting the extension pipe (such as flexible pipe and flexible bent joint), pull the pipe by turning it clockwise.

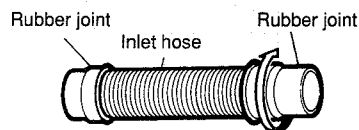


9. Remove the screw from the exhaust mouth of the unit. Insert the flexible exhaust pipe to the exhaust mouth and secure them with the screw.

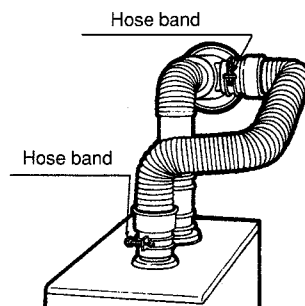
NOTE: Seal all connections of the pipes with the aluminum tape.

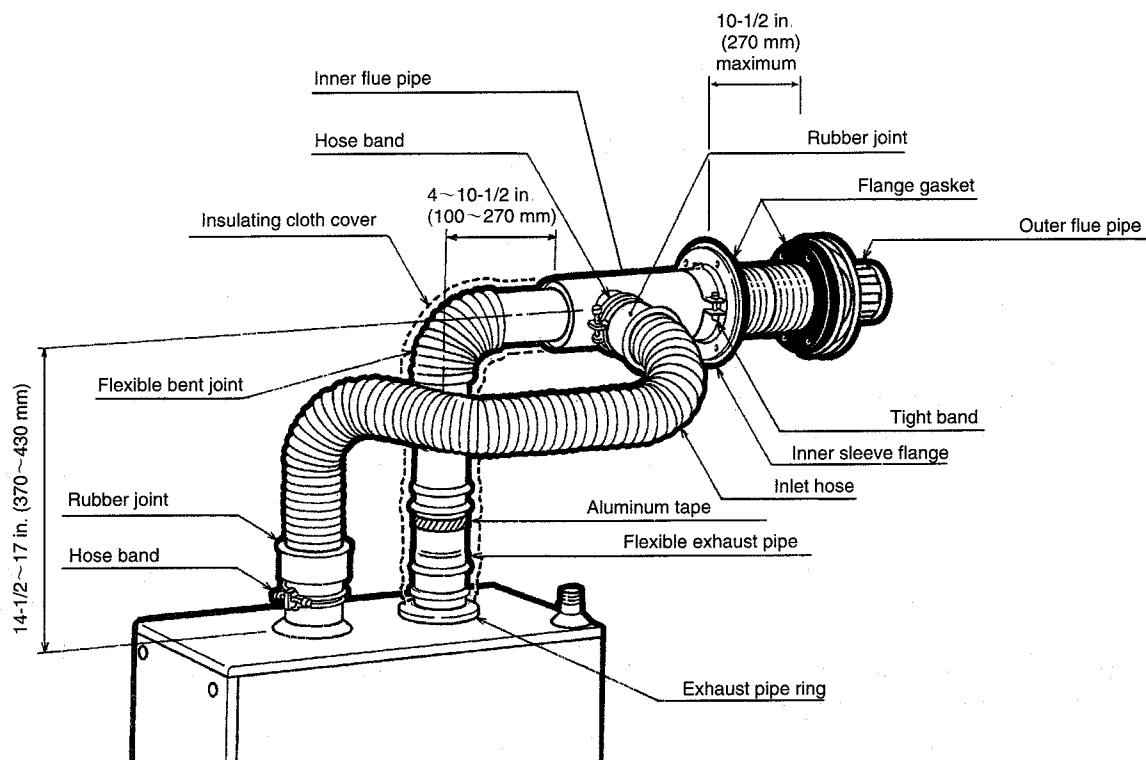


10. Connect rubber joints to the both ends of the inlet hose.



11. Place the hose bands on the rubber joints and attach the hose as shown below. Tighten the bands.





SECTION D: TEST RUN

PREPARATION

1. Make sure the flue pipe is installed properly.
2. Make sure the fuel tank is installed properly. Make sure there is no fuel leakage.
3. Make sure there is no water leaking from piping. (Plumbing)
4. Make sure electrical connections and grounding are wired properly.
5. Make sure the floor is stable and can withstand strong vibration and the weight of a full water heater.
6. Make sure the area is free of flammable materials.
7. Check for air trapped in fuel lines.

OPERATION

1. Open the fuel supply valve.
2. Set the hot water temperature on the control panel.
3. Press the power switch on the control panel to turn on. "Power" lamp goes on.
4. Open hot water faucet and unit will ignite in a few seconds.

TOYOTOMI U.S.A., INC.

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This manual supersedes earlier editions. PART No.20476493