

## 4 Installation

### 4.1 Safety Guidelines

The water heater requires careful and correct installation to ensure safety and efficient operation. This manual must be followed. Please read the "Safety Guidelines" and the "Safety Warnings and Operation Safety Guidelines" sections at the beginning of this manual.

Ensure the following warnings and instructions are read and understood before commencing installation.



#### WARNING

- Installation and service must be performed by a licensed professional (for example, a licensed plumber or gas fitter).
- The licensed professional is responsible for the correct installation of the water heater and for compliance with all relevant national, state and local regulations.
- The installation must conform with local codes or, in the absence of local codes, the National Fuel Gas Code, ANSI Z223.1/NFPA 54, and/or CSA B149.1, Natural Gas and Propane Installation Code.
- The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, and/or the CSA C22.1, Canadian Electrical Code, Part I.
- The water heater must be installed outdoors only. Do not install water heater indoors.
- Not to be used as a pool heater.



#### WARNING

- Water temperatures above 122 °F (50 °C) can cause severe burns or death from scalding.
- Children, the disabled and the elderly are at a high risk of being injured. Feel the water temperature before bathing or showering. Do not leave children, disabled persons, or the elderly unsupervised.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.



#### DANGER

- Do not store or use gasoline or other flammables, vapors, or liquids in the vicinity of this appliance. Vapors from flammable liquids will explode and catch fire causing death or severe burns.
- Do not reverse the water and/or gas connections as this will damage the gas valves and can cause severe injury or death. Follow the diagram when installing your water heater (Please refer to 3.1 Function Introduction and Explanation).
- Do not use this appliance if any part has been in contact with or been immersed in water.
- Immediately call a licensed professional to inspect and/or service the unit if necessary.
- Do not disconnect the electrical supply if the ambient temperature will drop below freezing.
- The Freeze Prevention System only works if the unit has electrical power. The warranty will not be covered if the heat exchanger is damaged due to freezing (Please refer to 6.6 Freeze Prevention).

### 4.2 General Guidelines

The water heater is intended to be installed. Please ensure that:

- The water heater has enough natural ventilation space.
- Location of water leaks that will not damage the surrounding area.
- Whether all transport protection/packaging has been removed.
- Check the nameplate and Gas type label to determine the correct gas type, gas pressure, water pressure and electrical characteristics; If the equipment does not meet the operating conditions, do not install it or consult your supplier.

### 4.3 water heater installation check List

- Unbox and check whether the water heater, installation manual and owner's guide, parts and accessories bag, wired digital controller (outdoor gas water heater models only) are coming in the box.
- Check to ensure there are no corrosive chemicals in the air intake.
- Water supply should be free of chemicals, and water hardness that higher than allowed level may damage the water heater.
- Ensure there is enough space required for installation.
- Ensure there is enough distance required between the exhaust vent and air inlet of houses.
- Ensure you are using the right exhaust vent products, and follow the installation manual from the suppliers.
- Turn off hot water switch, turn on cold water switch and the drain screw, flush the debris and air out of the water pipes. Debris inside the water may damage the water heater. Please use buckets or extra water pipes if needed.
- Ensure no water leakages.
- Turn off cold and hot water switches before cleaning up water inlet filter. Put a bucket under the water heater's filter to catch any water out of the water heater. Screw out the water inlet filter, wash off debris and dusts, and then hand screw the filter back in. When it's done, turn on the cold and hot water switches.
- Ensure the pressure relieve valve's relieving capacity exceeds that of the water heater BTU input rating. Please refer to the specifications on the side of machine for BTU input ratings. Install a manual gas shut-off valve between the water heater and your gas supply line.
- Check to confirm there is no gas leakage in piping and fittings.
- Confirm the gas inlet pressure in the min-max range as required.
- Confirm you are using the gas type as required by the water heater.
- Confirm the power supply is 120 V/60 Hz, and properly grounded.
- Confirm the thermostat works normally.
- Connect a gas manometer to the pressure port to verify the system is working normally. Turn on appliances that use high flow rate hot water and set the water heater to its maximum operation capacity, the inlet gas pressure must be higher than the minimum pressure on the specification label.
- Do not induct poisonous chemicals into drinking water, like the chemicals used to process broiler water.
- Drain the water out of the water heater if you are not using the water heater for a significant time period.
- For outdoor Tankless Water Heater models, confirm the wired digital controller is installed correctly.

4.4 Prepare for installation

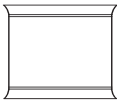
■ Parts included



Tankless  
Water Heater



User Manual



Assembly Kit



Wired Controller

■ Tools and Materials needed (Not included)



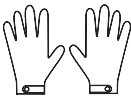
Screw Driver



Pipe Wrench



Wrench



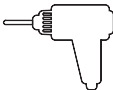
Gloves



Safety Glasses



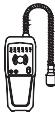
Levelling  
instrument



Hammer Drill  
with Concrete Bits



Soapy Water



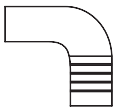
Gas Leak Detector



Ruler



Teflon Tape

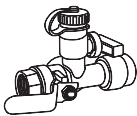


Approved Venting



Pressure Relief Valve

■ Materials that may be needed (Not included)



Cold Water  
Isolation Valve



Single gang  
electrical box



Electrical  
Adhesive Tape



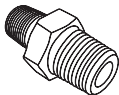
Pipe Wrap Insulation



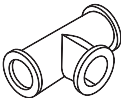
Thermostatic  
Mixing Valve



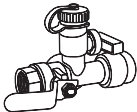
NPT3/4-in x 1/2-in dia  
Threaded Male Adapter



1/2"Hex Nipple



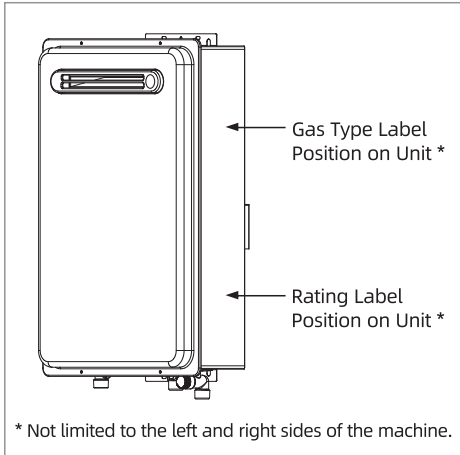
Threaded Tee Fitting  
(Middle 3/4")



Hot Water  
Isolation Valve

## 4.5 Confirm the Appliance Suitability

Check the gas type label and the name plate for the correct gas type, gas pressure, water pressure and electrical rating for your application. Do not install the unit if these requirements are not met.



### WARNING

- This equipment is not suitable for pool or spa heating.
- Water hardness may affect the water heater performance. It is important that the water heater is installed in water conditions that are suitable for long term operation.
- This is a water heating apparatus only and the delivered water quality is dependent upon the quality of water supplied to this system.
- The connection, attachment, integration or general association of other equipment or parts not specified by the water heater which either directly or indirectly affect the operation or performance of this equipment could void the warranty.
- The manifold pressure is preset at the factory. It is computer controlled and should not need adjustment.
- It should be as close as practical to the hot water outlets to minimise heat loss and cost.
- The water heater does not require a

fireproof back plate if installed on a timber wall.

- Special conditions which shall be avoided, e.g. marine environment, high humidity conditions (more than 95% RH), necessary to ensure optimum performance.

## 4.6 Installation Position

Carefully read this section before installation, and selecting the location for installing the water heater.

The following precautions should be considered.



### WARNING

- This is a water heating apparatus only and the delivered water quality is dependent upon the quality of water supplied to this system.
- Although the water heater is designed to operate with minimal noise level, you should not install the unit on a wall adjacent to a bedroom, or a room that is intended for quiet study or meditation, etc.
- Locate your heater close to a drain where leakage will not do damage to surrounding areas.
- As with any water heating appliance, the potential for leakage at some time in the life of the product does exist.



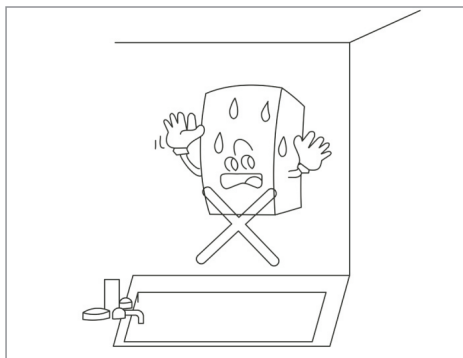
### WARNING

- Every care is taken to warn occupants of the building and the public of any injury that may occur from falling tools, open trenches, water connections or any other general hazard.
- Make sure the water heater will have sufficient room to expel combustion air and operate with natural ventilation.
- Keep the area around the water heater clean. Particles may clog the air vent, reduce fan function, or cause improper combustion.
- Locate the unit for easy access and maintain clearance for service and maintenance. Install the unit so that it can be connected or removed easily.

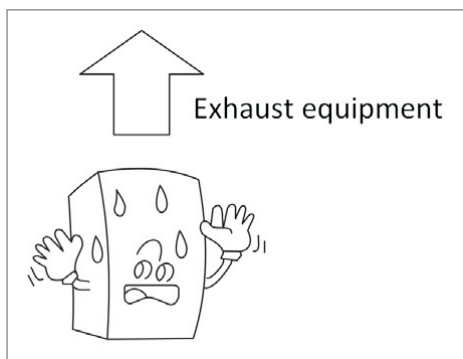


- The water heater must be installed outdoors only. Do not install the water heater indoors.
- Not to be used as a swimming pool heater.
- Do not locate your water heater in a pit or any location where gas and water can accumulate.
- Please check the proximity of gas & electrical connections so as not to create a hazard and avoid access problems for other services.
- It must be located in accordance with the requirements clearances from eaves, windows, vents etc. And see the diagram on the "4.6 Installation Position". For more surrounding construction material requirement.
- Do not place flammable or explosive materials within one meter of the water heater to avoid fires.
- This relates to the physical separation distance specification where multiple appliances are employed. That equates to a minimum 150 mm horizontal flue separation distance allowing appliances to be placed side by side in the same vertical plane
- Most load bearing walls such as brick, brick/veneer, weatherboard and stud-frames are suitable locations.
- Securely fasten the unit to the wall with screws or bolts in the top and bottom brackets.

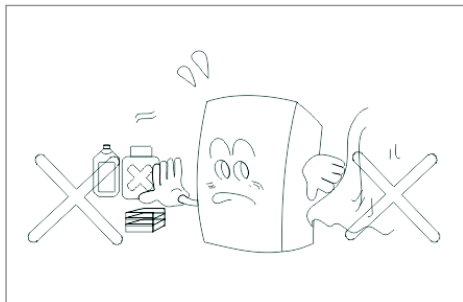
- This water heater is strictly forbidden to be installed indoors and in the bathroom.



- The water heater shall not be installed under the exhaust fan of the exhaust fan or the range hood.



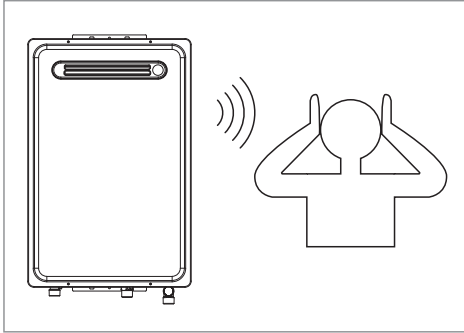
- There shall be no other gas appliances near the installation of the water heater, and there shall be no flammable gases, liquids, etc. around it.



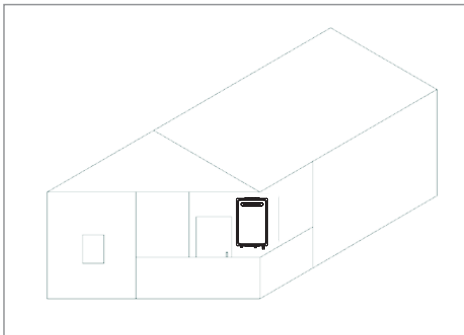
#### 4.6.1 Clearances for Outdoor Heater Locations

- Clearance in accordance with local installation codes and the requirements of the gas supplier.
- A vent shall not terminate directly above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.
- Permitted only if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

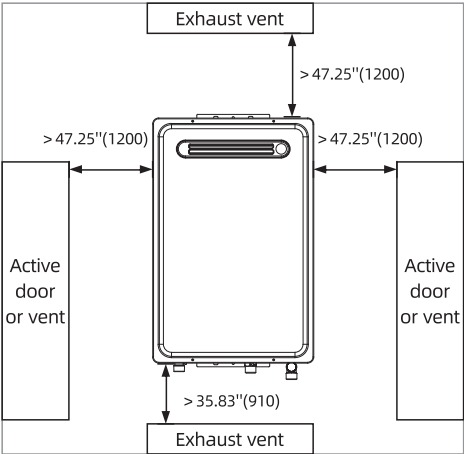
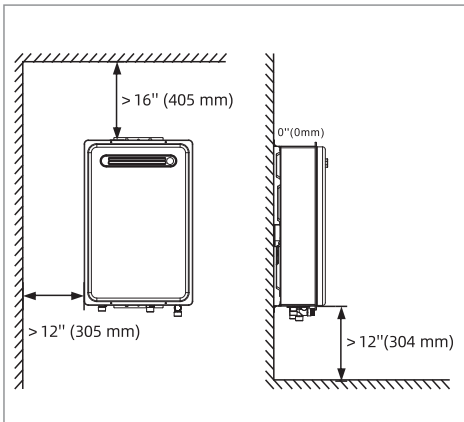
- Installation of outdoor water heaters should avoid the impact of other people's lives due to exhaust and noise.



- The water heater must be installed in a well ventilated area (eg open balcony, patio)



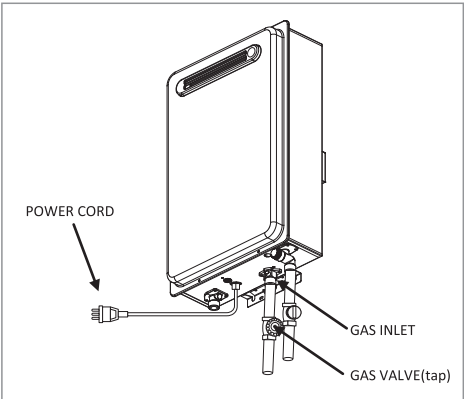
- The distance between the water heater and the surrounding wall, unit: inch (mm)



4.7 Water Heater Installation

1. According to the requirements of the figure and the size of the water heater, mark the wall with a dash mark, then drill three holes with a diameter of  $\Phi 8\text{mm}$  and a depth of 60mm, respectively insert three M6×50 mm expansion screws into the hole and tight the expansion screws with a wrench.
2. Hang up the water heater, screw on the M6nut, and fix the water heater to the wall.
3. The installation of the water heater must be correct, otherwise it will affect the normal use of the water heater.

4.8 Gas Connection



**WARNING**

- Turn off the electric power to the water heater and manual gas valve located on the outside of the unit before beginning gas connection.
- Confirm the position of the gas inlet. Do not connect water line to gas inlet.

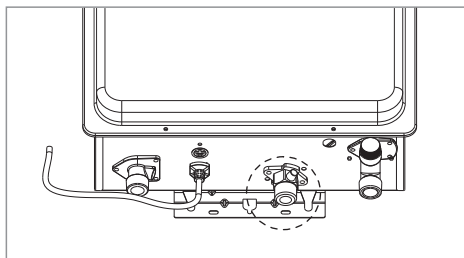
**WARNING**

Conversion of this unit from natural gas to propane (LPG) or propane (LPG) to natural gas cannot be done in the field. Contact your supplier to get the correct unit for your gas type.

## 4.8.1 Sizing and Connection Suitability

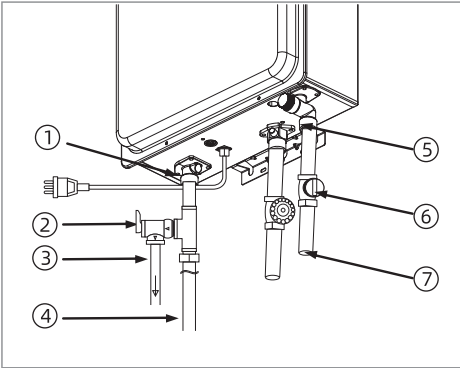
- Check the gas type label to make sure that the unit was built for the type of gas you will be using, and that the gas inlet pressure is within the appropriate range. (Please refer to 4.5 Confirm the Appliance Suitability)
- The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).
- Gas pressure below this specified range for the water heater and/or insufficient gas volume will adversely affect performance.
- Inlet gas pressure must not exceed the maximum values, gas pressure above the specified range will cause dangerous operating conditions and damage to the unit.
- Until testing of the main gas line supply pressure is completed, ensure the gas line to the water heater is disconnected to avoid any damage to the water heater.
- Always use approved connectors to connect the unit to the gas line. Always purge the gas line of any debris before connecting to the water heater.
- Install a manual gas shut-off valve between the water heater and the gas supply line.
- The regulator is preset at the factory. It is computer controlled and is not to be adjusted by any person other than a licensed professional.
- When the gas connections are completed, perform a gas leak test either by applying soapy water to all gas fittings and observing for bubbles or by using a gas leak detection device.

## 4.8.2 Measuring Inlet Gas Pressure and Testing Gas Leakage



1. Shut off the manual gas valve on the supply gas line.
2. Open a tap/outlet. The unit should turn on and the gas in the gas pipeline should be purged.
3. Leave the tap/outlet running until the unit shuts down due to lack of gas supply. Then turn off the tap/outlet.
4. Remove the screw on the pressure port located on the gas inlet of the water heater shown in the diagram to the above.
5. Connect the manometer to the pressure port.
6. Re-open the manual gas valve. Check to see that there are no gas leaks.
7. Open some of the fixtures that use a high flow rate to turn on the water heater.
8. Check the inlet gas pressure in the position showed in the red circle above when the water heater is at a maximum operation capacity, the inlet gas pressure point must be within the appropriate range. (Please refer to p.15).

## 4.9 Water Connections

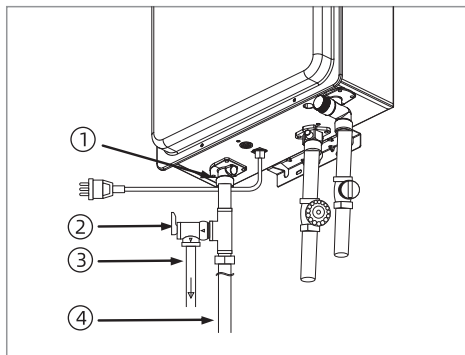


- |                         |                               |
|-------------------------|-------------------------------|
| ① Water outlet          | ⑤ Filter and drain plug       |
| ② Pressure relief valve | ⑥ Gate or ball valve on inlet |
| ③ Drain pipe            | ⑦ Cold water inlet            |
| ④ Hot water outlet      |                               |

- All pipes, pipe fittings, valves and other components, including soldering materials, must be suitable for potable water systems.
- A manual shut off valve must be installed on the cold water inlet to the water heater between the main water supply line and the water heater.
- Only a gate valve or a ball valve is to be used on the cold water supply.
- Check the cold water pressure. If above 1000 kPa an approved limiting valve must be fitted. Before installing the water heater, flush the water line to remove all debris, and after installation complete, purge the air from the line. Failure to do so may cause damage to the heater.
- To prevent water heater water system damage caused by excessive pressure. At the water outlet of the water heater, it is necessary to install an appropriate pressure relief valve to protect the water system and user safety. The pressure relief valve complies with ANSI Z21.22 • CSA 4.4.
- In the hot water system, the temperature rises continuously, and the volume of water expands.
- If the system is equipped with an expansion tank or a flexible connection bellows can absorb a part of the expansion amount, the expansion tank or the soft connection bellows cannot absorb the pressure relief valve needed to protect the pressure relief valve to protect the entire system prevents breakage of pipes and other components, so the relief valve pressure setting is generally selected to be slightly less than the maximum pressure (Pmax) that the entire system can withstand.
- In addition, the pressure can not be the same as the normal operating pressure, too close to the normal operation of the pressure relief valve will frequently pressure relief, lower temperature and pressure relief valve service life.
- In order to prevent the damage of the temperature probe or control system and cause the continuous heating of hot water to reach 212 °F (100 °C) vaporization, it is necessary to install a temperature and pressure safety valve, and the temperature and pressure valve temperature reaches 210 °F (99 °C) to relieve the pressure, thereby protecting the entire system. So the safety valve temperature is generally set to 210 °F (99 °C).
- There is a wire mesh filter to discourage debris from entering your heater. Clean filter after initial installation to ensure no debris from the pipe work has clogged it.

## 4.10 Pressure Relief Valve Installation and Attentions

Model	Recommended pressure relief value temperature
FDG-CS120S	150psi / 210 °F (99 °C)



- ① Water outlet                      ③ Drain pipe  
② Pressure relief valve      ④ Hot water outlet

- Please use Teflon tape or sealant to seal the thread of pressure relief valve, then install it into Tee valve NPT 3/4 outlet (as shown above).
- Please use Teflon tape or sealant to seal the thread of water outlet, then install pressure relief valve, tee valve and water outlet together. Please select a suitable position to install (as shown above).
- Please note that the outlet of pressure relief valve can not face upward, otherwise it will always leave some water inside.
- Anti-fouling and anti-scaling, dirt will directly affect the normal function of the safety valve function. The drain pipe must match the drain port to ensure that the valve does not interfere with the normal operation of the valve.
- The pressure relief valve outlet can be installed horizontally or vertically, but it cannot make pressure outlet facing upwards, otherwise it can not work normally. It is forbidden to block its outlet.
- The dirt will directly affect the normal function of the safety valve function. It requires hot water

system maintenance of anti-fouling and anti-scaling cleaning.

- The user must check the relief valve at least once a year. When checking, turn off the water heater's power supply and gas. Turn on the water inlet switch to create pressure in the water system. Then gently open relief valve handle until there is water out and then gently close, if there is no water out, indicating that the valve is invalid, this time should immediately turn off the water heater water switch and ask the service personnel to deal with.
- Before operating the handle, check the discharge line connecting the valve to ensure that the water drained from the valve can be drained to a suitable place.



### WARNING

- Do not check the safety valve when the water heater is in normal operation to avoid hot water burns.
- When the set temperature exceeds 122 °F (50 °C), the flick mixer must be installed to mix the cold water and hot water before the temperature does not exceed 122 °F (50 °C), otherwise it will burn the skin. Please refer to the method of using the flick mixer (Please refer to 5.4 How to Set the Temperature).

## 4.11 Electrical Connection

- The water heater must be electrically grounded. Do not attach the ground wire to either the gas or water piping.
- The water heater requires an AC 120 V 60 Hz.
- The weather-proof power point should be no more than 1 meter from the base of the water heater for easy access.
- Install a power switch so that the electrical power can be switched off if necessary.
- If the cord supplied with this appliance must be replaced, it must be replaced with the correct appliance wiring material supplied by the Manufacturer.

- When servicing or replacing parts within the water heater, label all wires prior to disconnection to facilitate an easy and error free reconnection. Verify proper operation after servicing.

## 4.12 Wired Controller

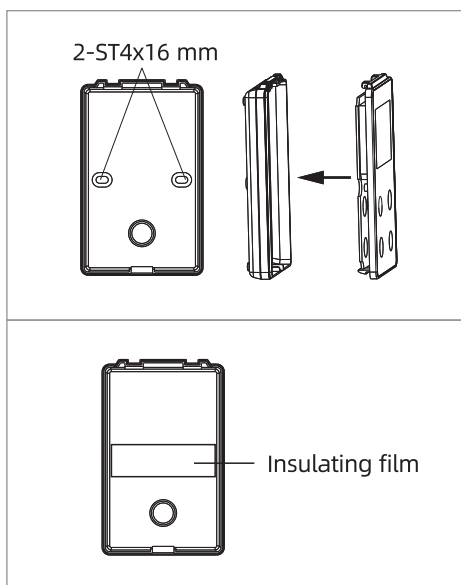
- The water heater can be installed with up to three wired controllers. Each wired controller has two functions which can adjust the set temperature and indicate the error code.
- **PRIORITY function:** The controller that is activated first (i.e. button is pressed) is given PRIORITY function, and can freely adjust the temperature. Remaining controllers will display the set temperature however will not be able to make any adjustments. After a 15 minute period of inactivity the priority on the first remote will cease and priority can then be assigned to another remote by activating it (i.e. a button is pressed). Then the new controller has priority and the cycle repeats.
- **Default setting temperature:** At the initial power on, the setting temperature will be the same as the value set on DIP switch. After the initial use, it will remember the former setting temperature.
- All water heater models have self diagnostic function for safety and convenience when troubleshooting. If there is a problem with the installation or the unit, it will display a numerical error code on the wired controller (or the LED of the computer board will be blink.)

### Wired controller installation requirements

- The wired controllers are splash resistant, however should not be positioned where it can be splashed directly & should be appropriately sealed between the surface of the wall & controller.
- The wired controller can be installed in the bathroom provided it is correctly installed.

## 4.12.1 Wired Controller Installation

- The wired controller comes with a 315.7" (8 m) cable. If a longer cable is needed, please purchase a shielding line. Cut the original line and rewire according to the polarity to avoid short circuit whilst adhering to the requirements below: Minimum 18 AWG wire.
- Attach the wired control to the wall with screws supplied. After fixing the screws, please use the insulation film inside the installation kit to wrap the screw head in case of damaging the wire controller which can cause a short circuit.

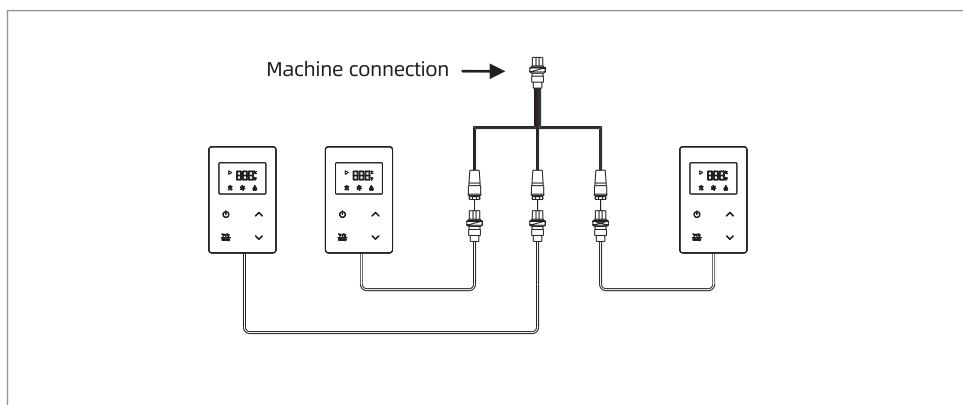


### WARNING

- DO NOT locate the remote controls where they may come into contact with water.
- DO NOT position the remote controls in the vicinity of chemicals.
- DO NOT position the remote controls over a heat generating appliance (i.e. cooker, toaster).
- DO NOT position the remote controls where materials may spill onto them.
- Please note if the controls are to be fitted to a metal surface an insulation plate should be provided behind the mounting position.

## 4.12.2 Connection of Wired Controller Wiring to the Water Heater

1. Turn off the power supply to the water heater.
  2. Connect the first controller only and turn on the power supply to the water heater.
  3. Turn off the first controller by pressing the " ⏻ " button (LED light will turn off).
  4. Continue to connect any additional wired control wires to the remote terminals directly.
  5. DO NOT jump or short-circuit wires otherwise the PCB may become damaged.
  6. Return the front cover.
- DO NOT turn on the remote until instructed.
7. Activate the first remote by pressing & holding the " ⏴ " button for 5 seconds until a single beep sounds. Then press & hold the " ⏵ " button for 5 seconds until the LED screen lights up.
  8. Adjust the on screen value to set the ID (available ID's include -0, -1, -2). Press the " ⏻ " button to confirm (The ID of the wired control cannot be repeated).
  9. Repeat for all additional controllers.
  10. Controllers can now be turned on and will operate as per the PRIORITY function (refer to 5.4 How to Set the Temperature).



## 4.13 Check the Water Heater

After the installation of the water heater is completed, it is necessary to check that the water heater has no air leakage and water leakage, and the ignition operation is normal, and there is no fault alarm.