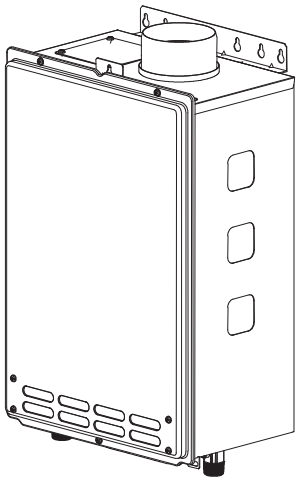
# *On-Demand Water Heater*
# *Installation Manual and Owner's Guide*

ANSI Z21. 10.3 and CSA 4.3

T-D2-IN / 510
model only

## Models

**T-KJr2-IN / 110**
**T-K4-IN / 310**
**T-D2-IN / 510**



### Gas Tankless Water Heater™

*Suitable for potable water heating and space-heating**
** Please refer to local codes for space-heating compliance.*

**WARNING**

If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
  - Do not try to light any appliance.
  - Do not touch any electric switch, do not use any phone in your building.
  - Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
- Installation and service must be performed by a qualified installer, service agency or the gas supplier.

FEATURING

- ENDLESS HOT WATER
- ON-DEMAND USAGE
- COMPACT, SPACE SAVING
- ENERGY CONSERVATION
- COMPUTERIZED SAFETY
- NO PILOT LIGHT
- EASY-LINK SYSTEM*
- COMMERCIAL GRADE COPPER*

*(T-D2-IN / 510 model only)

If you have any questions,
please call 1-888-479-8324

65Q012-6
REV. 06(04-15)

# Table of Contents

## *INSTALLATION MANUAL*



## *OWNER'S GUIDE*

# Installation Manual

## SPECIFICATIONS

| Model | | | T-KJr2-IN / 110 | T-K4-IN / 310 | T-D2-IN / 510 |
|---|---|---|---|---|---|
| Natural Gas Input (Operating Range) | | | Min.: 19,500 BTU/h<br>Max.: 140,000 BTU/h | Min.: 11,000 BTU/h<br>Max.: 190,000 BTU/h | Min.: 11,000 BTU/h<br>Max.: 199,000 BTU/h |
| Propane Input (Operating Range) | | | Min.: 19,500 BTU/h<br>Max.: 140,000 BTU/h | Min.: 11,000 BTU/h<br>Max.: 190,000 BTU/h | Min.: 11,000 BTU/h<br>Max.: 199,000 BTU/h |
| Gas Connection | | | 3/4” NPT | | |
| Water Connections | | | 3/4” NPT | | |
| Water Pressure | | | 15 - 150 psi* | | |
| Inlet Pressure | Natural Gas | | Min. 5.0” W.C. Max. 10.5” W.C. | | |
| | Propane | | Min. 8.0” W.C. Max. 14.0” W.C. | | |
| Manifold Pressure** | Natural Gas | | 2.0” W.C. | 2.0” W.C. | 2.0” W.C. |
| | Propane | | 2.5” W.C. | 3.7” W.C. | 3.7” W.C. |
| Weight | | | 13 kg (28.7 lbs.) | 18 kg (39.6 lbs.) | 18 kg (39.6 lbs.) |
| Dimensions | | | 520 mm (H) x 351 mm (W) x 170mm (D)<br>H 20 1/2" x W 13 3/4" x D 6 3/4" | 520 mm (H) x 351 mm (W) x 216mm (D)<br>H 20 1/2” x W 13 3/4” x D 8 1/2” | |
| Ignition | | | Electric Ignition | | |
| Electric | Supply | | 120 VAC, 60 Hz | | |
| | Consumption | Operation | 73.1 W / 0.61 A | 87.6 W / 0.73 A | 89.8 W / 0.75 A |
| | | Standby | 6.2 W / 0.05 A | 6.2 W / 0.05 A | 6.2 W / 0.05 A |
| | | Freeze-Protection | 111 W / 0.93 A | 111 W / 0.93 A | 111 W / 0.93 A |

* 40 psi or above is recommended for maximum flow.

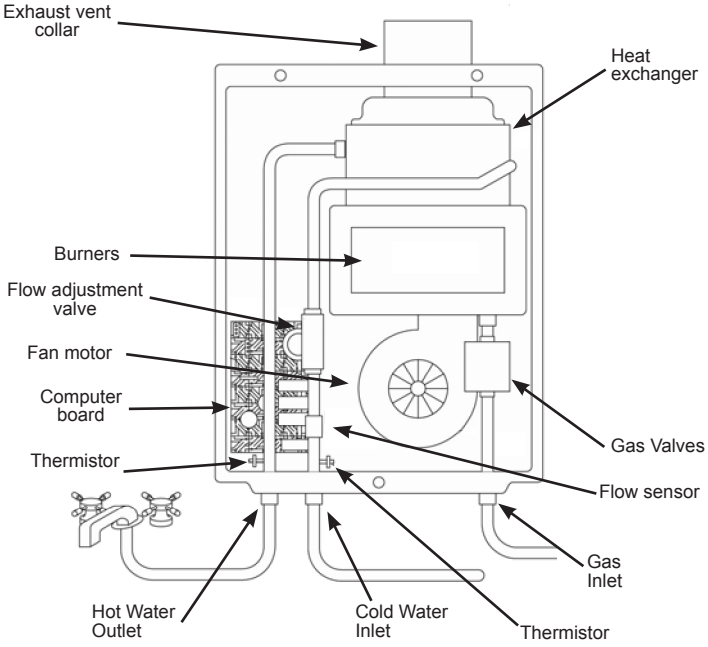
** The Manifold Pressure is the factory setting and generally should not need adjustment.

NOTE:

- Check the rating plate to ensure this product matches your specifications before installation.
- The manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

# INTRODUCTION

- This manual provides information necessary for the installation, operation, and maintenance of the water heater.
- The model description is listed on the rating plate which is attached to the side panel of the water heater.
- Please read all installation instructions completely before installing this product.
- If you have any problems or questions regarding this equipment, consult the manufacturer or its local representative or call an HVAC technician in your area.
- This equipment is an on-demand, tankless water heater designed to efficiently supply endless hot water for your needs.
- The T-KJr2-IN / 110, T-K4-IN / 310, & T-D2-IN / 510 models are to be installed indoors only (direct-vent convertible).
- The principle behind tankless water heaters is simple:




* This diagram illustrates tankless water heater design concepts only and does not accurately represent the water heater's physical description.

1. A hot water tap is turned on.
2. Water enters the heater.
3. The water flow sensor detects the water flow.
4. The computer initiates the fan motor and sends a signal to the igniter to create an ignition spark.
5. The igniter starts and the gas valve opens and flames appear within the burner chamber.
6. Water circulates through the heat exchanger and then gets hot.
7. Using thermistors to measure temperatures throughout the water heater, the computer modulates the gas and water valves to ensure proper output water temperature.
8. When the tap is turned off, the unit shuts down.

# SAFETY GUIDELINES

## Safety Definitions

**DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING**

Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

Indicates an imminently hazardous situation which, if not avoided, could result in minor or moderate injury.

## General

1. Follow all local codes, or in the absence of local codes, follow the most recent edition of **CSA B149.1 Natural Gas and propane Installation Code**.
2. Properly ground the unit in accordance with all local codes or in the absence of local codes, with **CSA C22.1 Canadian Electrical Code Part 1**.
3. Carefully plan where you intend to install the water heater. Please ensure:
   - Your water heater will have enough combustible air and proper ventilation.
   - Locate your heater where water leakage will not damage surrounding areas. (Please refer to pg. 6,7.)
4. Check the rating plate for the correct GAS TYPE, GAS PRESSURE, WATER PRESSURE and ELECTRIC RATING.
   * If this unit does not match your requirements, do not install. Consult with the manufacturer.
5. If any problem should occur, turn off all hot water taps and turn off the gas. Then call a trained technician or the Gas Company or the manufacturer.

**DANGER**

**WARNING**

- Water temperatures over 52 °C (125 °F) can cause severe burns instantly or death from scalding. The water temperature is set at 50 °C (122 °F) from the factory to minimize any scalding risk. Before bathing or showering always check the water temperature.
- Do not store or use gasoline or other flammables, vapors, or liquids in the vicinity of this appliance.
- 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 on pg. 16 when installing your water heater.
- Do not use this appliance if any part has been in contact with or been immersed in water. Immediately call a licensed plumber, a licensed gas fitter, or a professional service technician 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 Protection System only works if the unit has electrical power. The heat exchanger will not be covered under warranty if it is damaged due to freezing. Refer to the section on the Freeze Protection System on pg. 26 for more information.

# INSTALLATION

## General

1. Follow all local codes, or in the absence of local codes, follow the most recent edition of **CSA B149.1 Natural Gas and propane Installation Code**.
2. All gas water heaters require careful and correct installation to ensure safe and efficient operation. This manual must be followed exactly. Read the “Safety Guidelines” section.
3. The manifold gas pressure is preset at the factory. It is computer controlled and should not need adjustment.
4. Maintain proper space for servicing. Install the unit so that it can be connected or removed easily. Refer to the "Clearances" section on pg. 7 for proper clearances.
5. The water heater must be installed in a location where the proper amount of combustible air will be available to it at all times without obstructions.
6. The electrical connection requires a means of disconnection, to terminate power to the water heater for servicing and safety purposes.
7. Do not install the unit where the exhaust vent is pointing into any opening in a building or where the noise may disturb your neighbors. Make sure the vent termination meets the required distance by local code from any doorway or opening to prevent exhaust from entering a building. (Refer to pg. 13, CSA B149.1.)
8. Particles from flour, aerosols, clothes dryers and other airborne contaminants may clog the air vent, build up and reduce the functions of the rotating fan, cause improper burning of the gas, or cause damage to the water heater. Regularly ensure that the area around the unit is dust or debris-free. Regular maintenance is recommended for these types of environments. Sealed combustion is recommended too.
9. For the T-KJr2-IN / 110, T-K4-IN / 310, & T-D2-IN / 510 models:
   - These units may be converted to a direct-vent (sealed combustion) appliance by installing a direct-vent conversion kit (Part No. TK-TV10) which will bring in all required combustible air from outside the building. When installing the direct-vent conversion kit, please follow all instructions included with the kit.
   - If the water heater is used as a direct-vent appliance, the unit requires a 76mm (3 in.) combustible air supply pipe. The intake pipe must be sealed airtight. Air supply pipe can be made of PVC, CPVC, ABS, Polypropylene, corrugated stainless steel, Category III / IV stainless steel or aluminum flex tube.
   - Terminating the venting through a sidewall is recommended for the direct-vent system.
   - Running the exhaust vent and the intake pipe parallel is recommended.
   - Terminating the exhaust and intake on the same wall/surface is recommended. Terminating in the same pressure zone allows for pressure balancing, which prevents nuisance shutdowns.

**WARNING**

- **Installation and service must be performed by a qualified installer (for example, a licensed plumber or gas fitter), otherwise the warranty will be void.**
- **The installer (licensed professional) is responsible for the correct installation of the water heater and for compliance with all national, state / provincial, and local codes.**
- **The manufacturer does not recommend installing the water heater in a pit or location where gas and water can accumulate.**
- Do not have the vent terminal pointing toward any operating window, door, or opening into a building.
- Do not install next to any source of airborne debris, such as a clothes dryer, that can cause debris to be trapped inside the combustion chamber, unless the system is direct-vented.
- **The manufacturer does not recommend installing the water heater in an attic due to safety issues**. If you install the water heater in an attic:
  - Make sure the unit will have enough combustion air and proper ventilation.
  - Keep the area around the water heater clean. When dust collects on the flame sensor, the water heater will shut down on an error code.
  - If the above conditions cannot be met, use the direct-vent conversion kit TK-TV10.
  - Place the unit for easy access for service and maintenance.
  - A drain pan, or other means of protection against water damage, is required to be installed under the water heater in case of leaks.

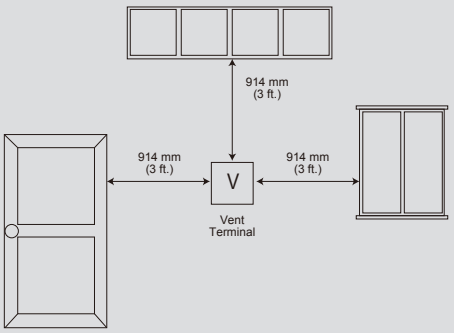
**CAUTION**

- **The warranty will not cover damage caused by water quality.**
  - Only potable water can be used with this water heater. Do not introduce pool or spa water, or any chemically treated water into the water heater.
  - Water hardness levels must not exceed 7 grains per gallon (120 ppm) for single family domestic applications or more than 4 grains per gallon (70 ppm) for all other types of applications. Water hardness leads to scale formation and may affect/ damage the water heater. Hard water scaling must be avoided or controlled by proper water treatment.
  - Water pH levels must be between 6.5 and 8.5
  - Well water must be treated.
- Do not install the unit where water, debris, or flammable vapors may get into the flue terminal.
- **The manufacturer recommends using the direct-vent conversion kit when the water heater is installed in a beauty salon or anywhere there are airborne contaminants**. Some chemicals used in a beauty salon may affect the flame sensor. Water heater may not work properly.
- Although the water heater is designed to operate with minimal sound, **the manufacturer does not recommend installing 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 water 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. The manufacturer will not be responsible for any water damage that may occur. If you install a drain pan under the unit, ensure that it will not restrict the combustion air flow.

# WARNING FOR INSTALLATION LOCATIONS

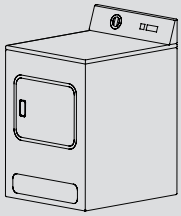
- Do not install the heater where water, debris or flammable vapors may get into the flue terminal. This may cause damage to the heater and void the warranty.
- Do not have the vent terminal pointing toward any opening into a building. Do not locate your heater in a pit or location where gas and water can accumulate.
- Do not install this water heater vent terminator within 914 mm (3 ft.) of any air intake or building opening. (Refer to p.13.)

Prohibited




- Do not install next to a dryer or any source of airborne debris that can be trapped inside the combustion chamber, unless the system is direct-vented.

WARNING



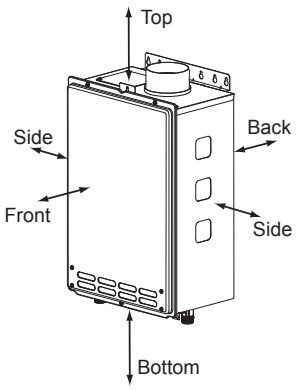
## Clearances

| Model | Top | Bottom | Front | Back | Sides |
|---|---|---|---|---|---|
| T-KJr2-IN / 110 | 305mm (12 in.) | 305mm (12 in.) | 102mm* (4 in.) | 25mm (1 in.) | 76mm (3 in.) |
| T-K4-IN / 310 | 305mm (12 in.) | 305mm (12 in.) | 102mm* (4 in.) | 25mm (1 in.) | 76mm (3 in.) |
| T-D2-IN / 510 | 305mm (12 in.) | 305mm (12 in.) | 102mm* (4 in.) | 25mm (1 in.) | 76mm (3 in.) |

*610 mm (24 inches) recommended for maintenance.

Maintain all clearances around the water heater.

## The diagram of clearance




## Included Accessories

Check that these items below are included with the water heater.

| Items | | | |
|---|---|---|---|
| Installation Manual & Owner's Guide | |  | Qty: 1 |
| Communication Cable (T-D2-IN / 510 models only) | |  | Qty: 1 |
| Temperature remote controller | T-KJr2-IN /110 &T-K4-IN /310 | TK-RE02 | Qty: 1 |
| | T-D2-IN /510 | TM-RE30 | Qty: 1 |

## Optional Items

| Model | T-KJr2-IN / 110 | T-K4-IN / 310 | T-D2-IN / 510 |
|---|---|---|---|
| Universal Appliance Adapter (9008146005) (2SVBFDPA04) | x | x | x |
| TK-TV10 | x | x | x |
| TK-PC01 | | x | x |
| TK-PCJr2 | x | | |
| Sidewall vent terminator(Hood) / Termination Box & Wall thimble | x | x | x |
| Direct-vent concentric termination kit (2SVSHTCKIT43S or 2SVSHTCKIT43) | x | x | x |
| TK-IV01-AB (Isolation valve kit) | x | x | x |

1. Temperature remote controller: TK-RE02 Please refer to the remote controller manual supplied with the remote.

The temperature remote controller has two functions. It allows the output temperature from the water heater to be adjusted within the range of 37.5 °C to 75 °C (99 °F to 167 °F)*, and it also works as a diagnostic tool that will give a concise error code whenever there is a problem with the unit. The temperature options are 37.5 °C (99 °F), 38 °C (100 °F), 39 °C (102 °F), 40 °C (104 °F), 41 °C (106 °F), 42 °C (108 °F), 43 °C (110 °F), 44 °C (111 °F), 45 °C (113 °F), 46 °C (115 °F), 47 °C (117 °F), 50 °C (122 °F), 55 °C (131 °F), 60 °C (140 °F), 70 °C (158 °F), and 75 °C (167 °F). See the troubleshooting section for information on possible error codes.

*The remote only provides the temperature display in Fahrenheit.

2. Temperature remote controller: TM-RE30 Please refer to the remote controller manual supplied with the remote.

The temperature remote controller has two functions. It allows the output temperature from the water heater to be adjusted within the range of 37 °C to 85 °C (100 °F to 185 °F), and it also works as a diagnostic tool that will give a concise error code whenever there is a problem with the unit. The temperature options are 37 °C (100 °F), 38 °C (100 °F), 39 °C (102 °F), 40 °C (104 °F), 41 °C (106 °F), 42 °C (108 °F), 43 °C (110 °F), 44 °C (111 °F), 45 °C (113 °F), 46 °C (115 °F), 47 °C (117 °F), 50 °C (122 °F), 55 °C (131 °F), 60 °C (140 °F), 65 °C (149 °F), 70 °C (158 °F), 75 °C (167 °F), 80 °C (176 °F). See the troubleshooting section for information on possible error codes.

3. 4 inches universal appliance adapter with back flow preventer and condensation drain: 9008146005 / 2SVBFDPA04

There are three functions available for this adaptor, which can be connected with the water heater and Flex master venting line and prevents the backflow of air through the exhaust vent. This helps prevent harmful exhaust gases from entering the home, as well as helping to prevent the unit from freezing in areas where cold air can be blown or drawn into the exhaust system. Furthermore condensation drain from the combustion is discharged. Install this adaptor in accordance with the installation instructions that are packaged with the adaptor and any applicable codes.

4. Direct-vent conversion kit: TK-TV10

This kit can be used to convert the water heater from a standard vent system to a direct-vent (or sealed combustion) system. Install this conversion kit in accordance with the installation instructions and any applicable codes.

5 . Pipe Covers: TK-PC01 and TK-PCJr2

The pipe cover protects the plumbing pipes to the water heater from unexpected adjustments. This pipe cover is fixed to the bottom of the water heater, which hides the plumbing and improves the visual aspects of the whole installation for the water heater.

6. Wall thimble and Sidewall vent terminations

Wall thimble

Termination Hood

Termination Box

They are used when venting out through the wall. These terminations are special stainless steel vents for gas appliances and are UL listed as Category II, III and IV. For different wall thicknesses, there are two ranges of lengths available. (Refer to the Flexmaster brochure for details.) Install these vent terminations in accordance with their installation instructions and any applicable local code.

| Covering wall thicknesses | Part# |
|---|---|
| Wall Thimble 4 - 7 in. | 2SVSWTF04 |
| Wall Thimble 5 - 10 in. | 2SVSWTEF04 |
| Termination Hood | 2SVSHTX04 |
| Termination Box | 2SVSRTF04 |

7. Direct-vent concentric termination kit

Used when terminating direct-vent (sealed combustion) systems, with indoor models that require a 3 in. (76 mm) intake and a 4 in. (102 mm) exhaust. This concentric termination provides the convenience of only having to make one penetration through a sidewall instead of two separate penetrations for the intake and exhaust piping. The termination includes a bird screen, restricting small animals, pests, and foreign objects from entering into the vent system. This sidewall termination is available in two different sizes, to cover a wide range of wall thicknesses. For different wall thicknesses, there are two ranges of lengths available. (Refer to the Flexmaster brochure for details.)

| Covering wall thicknesses | Part# |
|---|---|
| 6.75 – 13.0 in. | 2SVSHTCKIT43S |
| 12.25 – 19.25 in. | 2SVSHTCKIT43 |

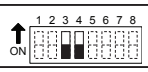
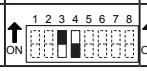
8. Isolation valve kit: TK-IV01-AB

The kit uses Isolation Valves to isolate a unit for service. The Pressure Relief Valve is to help protect the unit and release if the pressure in the tankless water heater or hot water system exceeds 150 psi.

## High-altitude Installations

Check the elevation where your water heater is installed. Set DIP switches shown in the table below depending on the altitude.

T-KJr2-IN / 110 & T-K4-IN / 310 Models

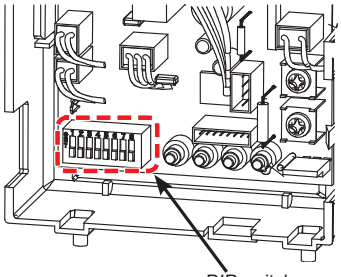
| Altitude | 0 to 2,000 ft (DEFAULT) | 2,001 to 4,000 ft | 4,001 to 6,000 ft |
|---|---|---|---|
| Switch No. 3 | OFF | ON | OFF |
| Switch No. 4 | OFF | OFF | ON |
| |  |  |  |

T-D2-IN / 510 Model **(Left bank of DIP switches)**

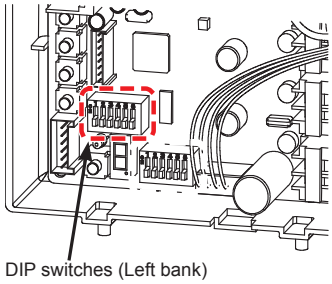
| Altitude | 0 to 2,000 ft (DEFAULT) | 2,001 to 4,000 ft | 4,001 to 6,000 ft |
|---|---|---|---|
| Switch No. 4 | OFF | ON | OFF |
| Switch No. 5 | OFF | OFF | ON |
| |  |  |  |

- The dark squares indicate the direction the DIP switches should be set to.
- **The maximum certified or allowable installed altitude is 6,000 ft.**

T-KJr2-IN / 110 & T-K4-IN / 310 Computer board




T-D2-IN / 510 Computer board




**WARNING**

DO NOT adjust any DIP switches on the right bank for the T-D2-IN / 510 model.

## Venting Instructions

### General

**DANGER**

- Improper venting of this appliance can result in excessive levels of carbon monoxide which can result in severe personal injury or death.
- Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gases poisoning. Improper installation will void product warranty.

**CAUTION**

When installing the vent system, all applicable national and local codes must be followed. If you install thimbles, fire stops or other protective devices and they penetrate any combustible or noncombustible construction, be sure to follow all applicable national and local codes.

The water heater must be vented in accordance with the section “Venting of Equipment" of the latest edition of **CSA B149.1 Natural Gas and propane Installation Code** as well as applicable local building codes.

**The manufacturer recommends the Flexmaster line.** However, the following are also UL listed manufacturers: ProTech Systems Inc. (FasNSeal), Metal-Fab Inc., and Heat-Fab Inc. (Saf-T Vent).

General rules for venting water heaters are:

- Place the water heater as close as possible to the vent termination.
- The vent collar of the water heater must be fastened directly to an unobstructed vent pipe.
- Do not weld the vent pipe to the water heater’s vent collar.
- Do not cut the vent collar of the water heater.
- The vent must be easily removable from the top of the water heater for normal service and inspection of the unit.
- Avoid using an oversized vent pipe or using extremely long runs of the pipe.
- For rooftop venting, a rain cap or other form of termination that prevents rain water from entering into the water heater must be installed.
- Do not common vent or connect any vent from other appliances to the water heater vent.

General rules for vent terminations:

- Avoid locating the water heater vent termination near any air intake devices. These fans can pick up the exhaust flue products from the water heater and return them to the building. This can create a health hazard.
- Locate the vent termination so that it cannot be blocked by any debris, at any time. Most codes require that the termination be at least 305 mm (12 in.) above grade, we recommend that it be at least 305 mm (12 in.) above the anticipated snow line, but the installer may determine that it should be higher, depending on the job site condition and applicable local codes.
- A proper sidewall termination is recommended when the water heater is vented through a sidewall.
- Regarding the clearances from the exhaust termination to the air inlet or opening, refer to the next few pages.

## Exhaust venting

This is a Category III appliance and must be vented accordingly. The vent system must be sealed airtight. All seams and joints without gaskets must be sealed with high heat resistant silicone sealant or UL listed aluminum adhesive tape having a minimum temperature rating of 177 °C (350 °F). For best results, a vent system should be as short and straight as possible.

- This water heater is a Category III appliance and must be vented accordingly with any 102 mm (4 in.) vent approved for use with Category III or Special BH type gas vent.
- Follow the vent pipe manufacturer's instructions when installing the vent pipe.
- Do not common vent this appliance with any other vented appliance. (Do not terminate vent into a chimney. If the vent must go through the chimney, the vent must run all the way through the chimney with Category III approved or Special BH vent pipe.)
- When the horizontal vent run exceeds 1.5 m (5 ft.), support the vent run at 0.9 m (3 ft.) intervals with overhead hangers.
- The maximum length of exhaust vent piping must not exceed 15.24 m (50 ft.) (deducting 1.5 m (5 ft.) for each elbow used in the venting system). Do not use more than 5 elbows.

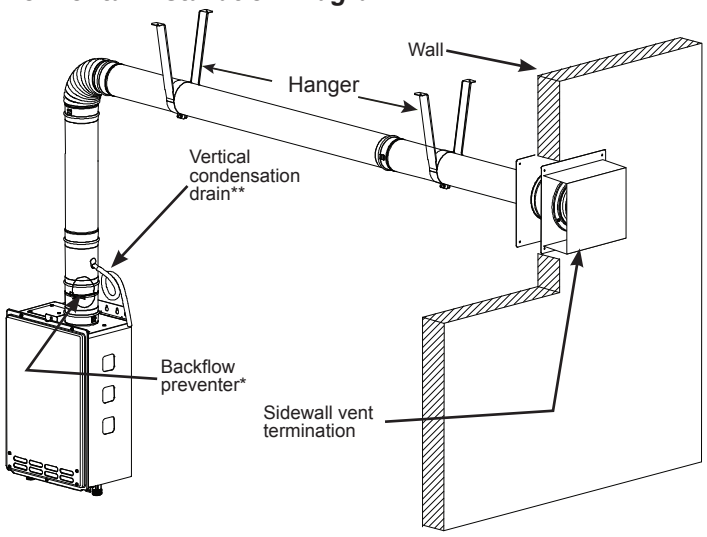
| Diameter | Max. No. of Elbows | Max. Vertical & Horizontal (Total) Vent Length |
|---|---|---|
| 102 mm (4 in.) | 5 | 15.24 m (50 ft.) |
| * For each elbow added, deduct 1.5 m (5 ft.) from max. vent length. | | |

| No. of Elbows | Max. Vertical or Horizontal Length |
|---|---|
| 0 | 15.24 m (50 ft.) |
| 1 | 13.7 m (45 ft.) |
| 2 | 12.2 m (40 ft.) |
| 3 | 10.7 m (35 ft.) |
| 4 | 9.1 m (30 ft.) |
| 5 | 7.6 m (25 ft.) |
| Excludes elbow termination, rain caps, or the 102 mm (4 in.) Concentric Termination, Termination Hood and Termination Box. | |

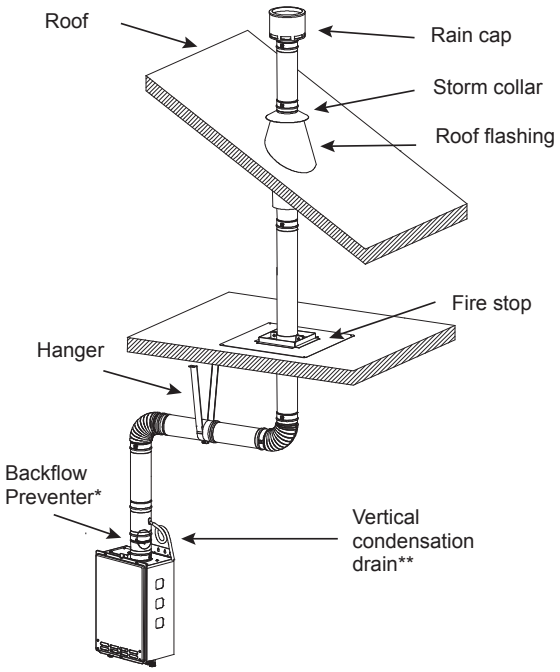
## Venting Illustrations

For details of the optional items, refer to the Installation manual for each Optional item.

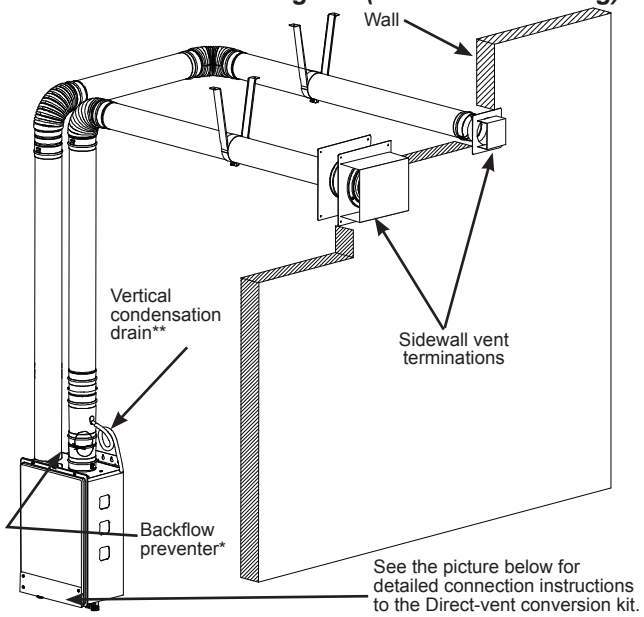
***Horizontal Installation Diagram:***



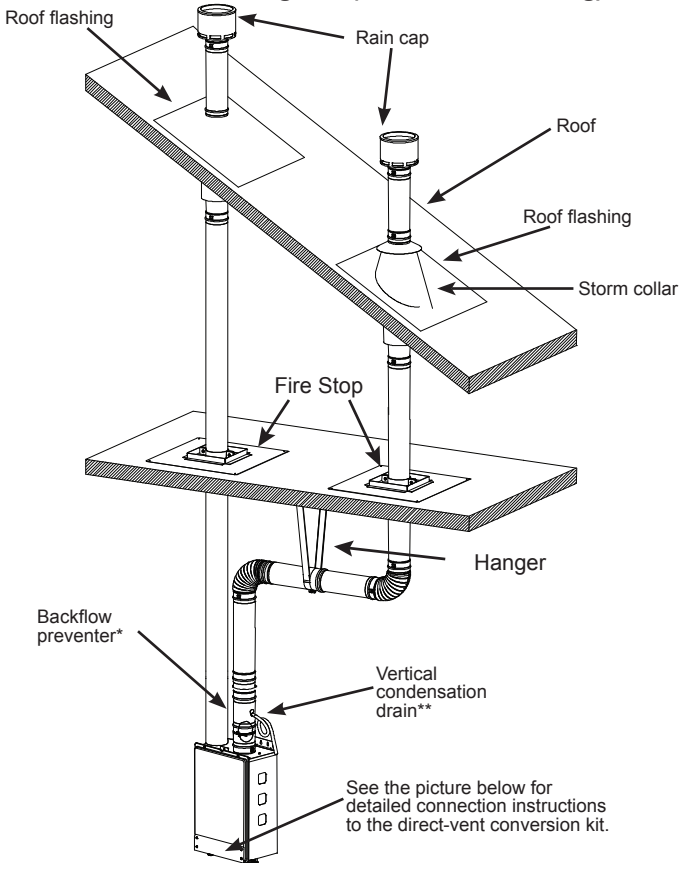

***Vertical Installation Diagram:***



### *Horizontal Installation Diagram (with direct-venting)*



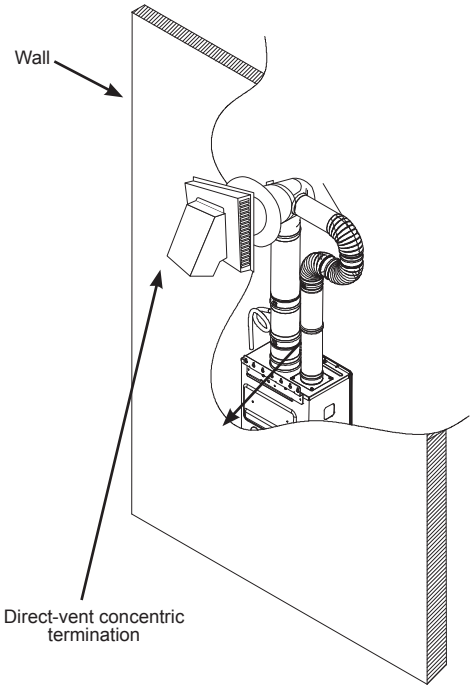

### *Vertical Installation Diagram (with direct-venting)*



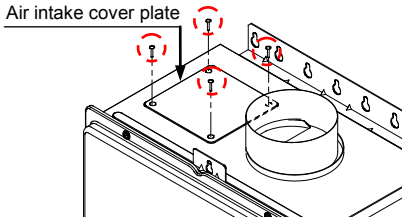

* Backflow preventer (Recommended for freezing weather conditions: 2 °C (36 °F) and below).

** Vertical condensation drain must be installed in accordance with local codes.

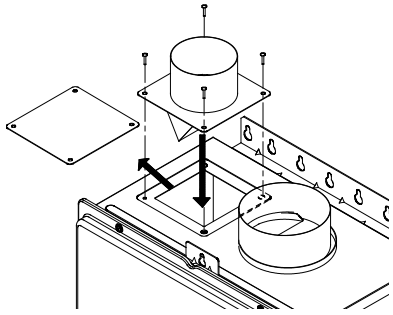
### *Horizontal Installation Diagram with Direct-Vent Concentric Termination*

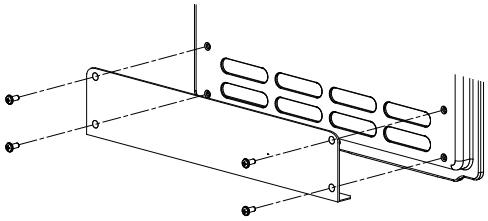



### *Installation Diagram of Direct-Vent Conversion Kit (TK-TV10) with a water heater*



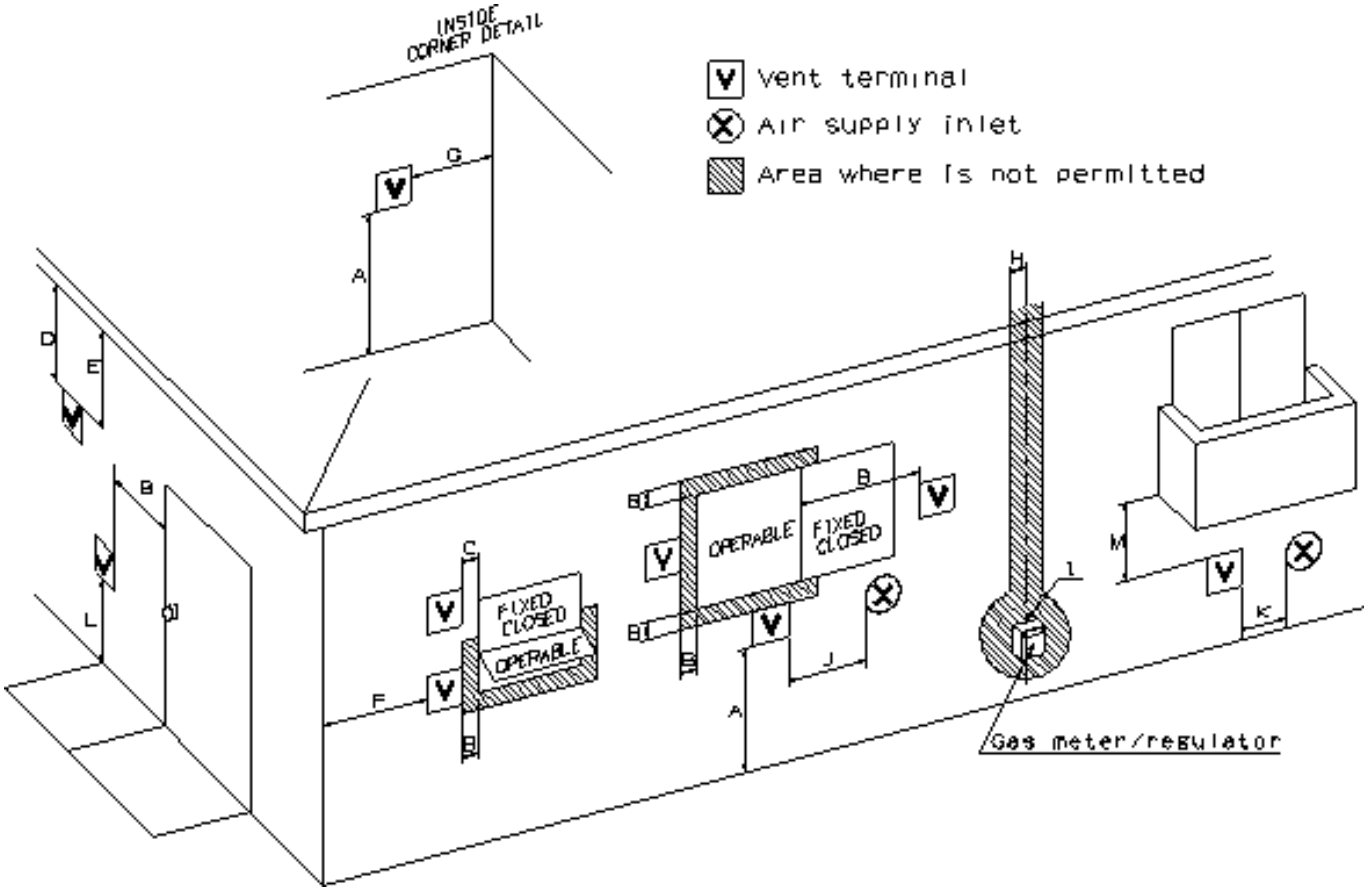

Remove the air intake cover plate to attach the air intake port from the Direct-vent conversion kit. (TK-TV10)





Cover the louver of the water heater with the plate provided in the Direct-vent conversion kit to complete the conversion to sealed combustion.

## Vent Termination Clearances



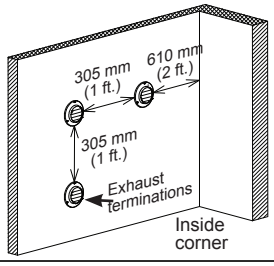

| | | Canada | U.S.A | |
|---|---|---|---|---|
| | | Direct-vent and other than Direct-vent | Direct-vent | Other than Direct-vent |
| A | Clearance above grade, veranda, porch, deck, or balcony | 1 foot | 1 foot | 1 foot |
| B | Clearance to window or door that may be opened | 3 feet | 1 foot | 4 feet from below or side opening. 1 foot from above opening. |
| C | Clearance to permanently closed window | * | * | * |
| D | Vertical clearance to ventilated soffit located above the vent terminator within a horizontal distance of 2 feet (61cm) from the center line of the terminator | * | * | * |
| E | Clearance to unventilated soffit | * | * | * |
| F | Clearance to outside corner | * | * | * |
| G | Clearance to inside corner | * | * | * |
| H | Clearance to each side of center line extended above meter/regulator assembly | 3 feet | * | * |
| I | Clearance to service regulator vent outlet | 3 feet | * | * |
| J | Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other application | 3 feet | 1 foot | 4 feet from below or side opening. 1 foot from above opening. |
| K | Clearance to mechanical air supply inlet. | 6 feet | 3 feet | 3 feet |
| L | Clearance above paved sidewalk or paved driveway located on public property | 7 feet | * | 7 feet |
| M | Clearance under veranda, porch deck, or balcony | 1 foot | * | * |

* For clearances not specified in **CSA B149.1 Natural Gas and propane Installation Code**, please use clearances in accordance with local installation codes and the requirement of the gas supplier.

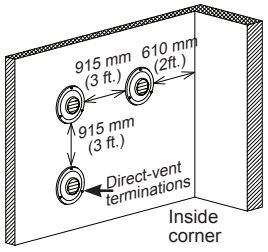
**CAUTION**

Please follow all local and national codes in regards to proper termination clearances. In the absence of such codes, the following clearances can be used as guidelines. Local codes supersede these guidelines.

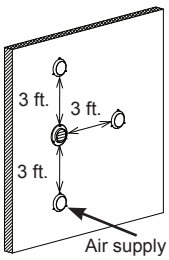
For sidewall terminations



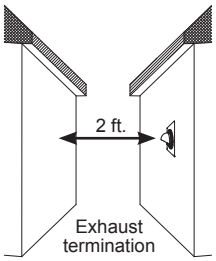

For multiple sidewall exhaust terminations (e.g. Multi-Unit systems), an exhaust termination must be at least 305 mm (1 ft.) away from another exhaust termination. An exhaust termination must also be at least 610 mm (2 ft.) away from an inside corner. (If the adjacent wall is less than 610 mm (2 ft.) of length, the minimum required distance away from the inside corner will be equal to the length of that adjacent wall.)




For multiple-unit, direct-vent sidewall terminations that combine the intake and exhaust into a single penetration, space each direct-vent termination at least 915 mm (3 ft.) away from each other, no matter the orientation. A direct-vent termination must also be at least 610 mm (2 ft.) away from an inside corner. (If the adjacent wall is less than 610 mm (2 ft.) of length, the minimum required distance away from the inside corner will be equal to the length of that adjacent wall.)

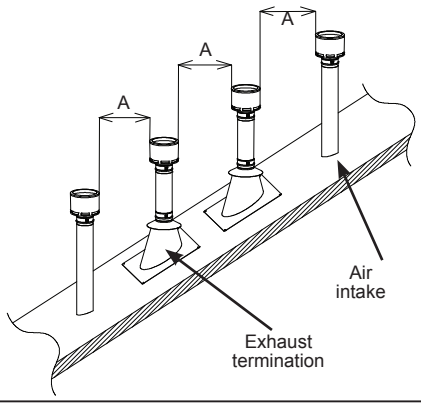


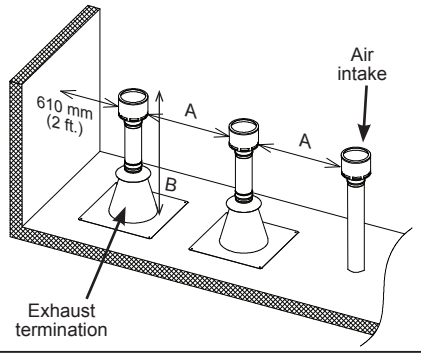

For direct-vent sidewall terminations that use two separate penetrations for the intake and exhaust, distance the intake and exhaust terminations at least 915 mm (3 ft.) away from each other, no matter the orientation.




Exhaust and/or direct-vent sidewall terminations should be at least 610 mm (2 ft.) away from an opposite surface/wall. Do not place the termination directly in front of an opening into a building.

For rooftop terminations




A: In accordance with local codes

For multiple-unit rooftop terminations (whether for standard or direct-vent installations) space all exhaust and intake terminations in accordance with local codes. An exhaust termination must be spaced from a wall or surface in accordance with local codes as well.

B:

An exhaust termination shall extend not less than 915 mm (3 ft.) above the highest point where it passes through the roof of a building AND NOT less than 610 mm (2 ft.) higher than any portion of a building within a horizontal distance of 3048 mm (10 ft.). (CSA B149.1 §8.14.4)

## Gas supply and gas pipe sizing

### General

**WARNING**

- **Check that the type of gas matches the rating plate first.**
- **Ensure that any and all gas regulators used are operating properly and providing gas pressures within the specified range shown below. Excess gas inlet pressure may cause serious accidents.**
- Conversion of this unit from natural gas to propane or vice versa will void all warranty. Contact your local distributor to get the correct unit for your gas type. **The manufacturer is not liable for any property and/or personal damage resulting from gas conversions**.

- The minimum and maximum inlet gas pressures are:

| Gas type | Inlet gas pressure |
|---|---|
| Natural Gas | Min. 5.0” W.C. – Max. 10.5” W.C. |
| Propane Gas | Min. 8.0” W.C. – Max. 14.0” W.C. |

- Inlet gas pressures that fall outside the range of values listed above may adversely affect the performance of the water heater. These pressures are measured when the water heater is in full operation.
- Inlet gas pressure must not exceed the above 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.

### Gas Connections

1. Install a manual gas shutoff valve between the water heater and the gas supply line.
2. When the gas connections are completed, it is necessary to perform a gas leak test (see below) either by applying soapy water to all gas fittings and observing for bubbles or by using a gas leak detection device.
   - The water heater 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).
   - The water heater must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than 1/2 psi (3.5kPa).
3. Always purge the gas line of any debris, inert gas* and/or water before connecting to the gas inlet.

* Inert gas may be left in the line from pressure testing.

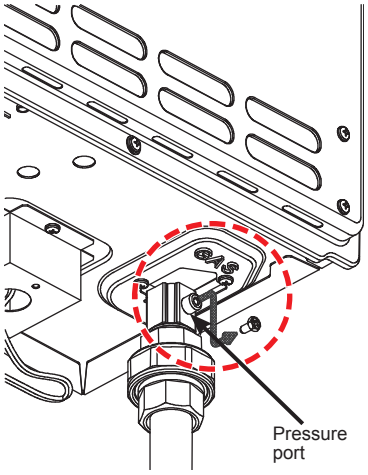
**Note**: Size the gas pipe appropriately to supply the necessary volume of gas required for the water heater using **CSA B149.1 Natural Gas and propane Installation Code** or local codes. Otherwise, flow capabilities and output temperatures may be limited. The installation shall comply with **CSA B149.1 Natural Gas and propane Installation Code.**

### Measuring Inlet Gas Pressure

1. Turn off all electric power to the water heater if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit clockwise to the off position.

The water heater cannot perform properly without sufficient inlet gas pressure. Below are instructions on how to check the inlet gas pressure. **THIS IS ONLY TO BE DONE BY A LICENSED PROFESSIONAL**.

1. Shut off the manual gas valve on the supply gas line.
2. Remove the screw for the pressure port located on the gas inlet of the water heater shown in the diagram below.
3. Connect the manometer to the pressure port.
4. Re-open the manual gas valve. Check to see that there are no gas leaks. Take a reading of the gas pressure. Open some of the fixtures that use the highest flow rate to turn on the water heater.
5. Check the inlet gas pressure. Take another reading. When the water heater is on maximum burn, the manometer should read from 5.0” to 10.5” W.C. for Natural gas or from 8.0” to 14.0” W.C. for Propane. Verify drop meets code.




## Water Connections

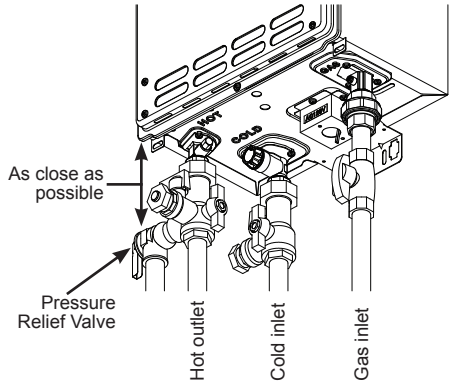
**CAUTION**

- Do not use this water heater if any part has been submersed under water. Immediately call a licensed professional to inspect the water heater to replace any damaged parts.
- Do not reverse the hot outlet and cold inlet connections to the water heater. This will not properly activate the water heater.

All pipes, pipe fittings, valves and other components, including soldering materials, must be suitable for potable water systems.

1. A manual shutoff valve must be installed on the cold water inlet to the water heater between the main water supply line and the water heater.

2. In addition, a manual shutoff valve is also recommended on the hot water outlet of the unit. If the water heater is installed within, or subjected to, a closed loop water system, a thermal expansion tank must be installed on the return side. We recommend isolation valve sets with hose bibs for serviceability such as flushing. See maintenance section.
3. Before installing the water heater, flush the water line to remove all debris, and after installation is complete, purge the air from the line. Failure to do so may cause damage to the heater.
4. There is a wire mesh filter within the cold inlet to trap debris from entering your heater. This will need to be cleaned periodically to maintain optimum flow.




### Pressure Relief Valve

The water heater has a high-temperature shutoff switch built in as a standard safety feature (called a Hi-Limit switch) therefore a “pressure only” relief valve is required.

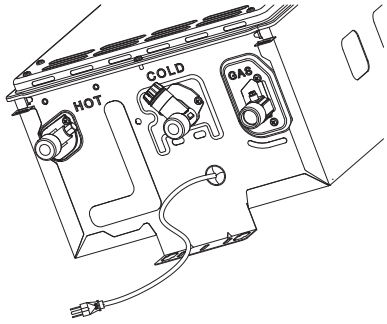
- This unit does not come with an approved pressure relief valve.
- An approved pressure relief valve must be installed on the hot water outlet.
- The pressure relief valve must conform to **CAN 1-4.4** and installation must follow local codes.
- The discharge capacity must be at least 140,000 BTU/h for the T-KJr2-IN / 110, 190,000 BTU/h for the T-K4-IN / 310, and 199,000 BTU/h for the T-D2-IN / 510.
- The pressure relief valve needs to be rated for a maximum of 150 psi.
- The discharge piping for the pressure relief valve must be directed so that the hot water cannot splash on anyone or on nearby equipment. Follow local codes.
- Attach the discharge tube to the pressure relief valve and run the end of the tube to within 152 mm (6 in.) from the floor. This discharge tube must allow free and complete drainage without any restrictions.
- If the pressure relief valve installed on the water heater discharges periodically, this may be due to a defective thermal expansion tank or defective pressure relief valve or it could be signs of internal scale build up.
- The pressure relief valve must be manually operated periodically to check for correct operation.
- No valve may be placed between the relief valve and the water heater.

## Electrical Connections

**WARNING** Follow the electrical code requirements of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of **CSA C22.1 Canadian Electrical Code, Part 1**.

**CAUTION** When servicing or replacing parts within the water heater, label all wires prior to disconnection to facilitate an easy and error-free re-connection. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

1. The water heater requires **120 VAC, 60 Hz electrical power supply that is properly grounded**.
2. The use of a surge protector is recommended in order to protect the unit from power surges.



## Remote Controller Connections

To connect the remote controller to the water heater:

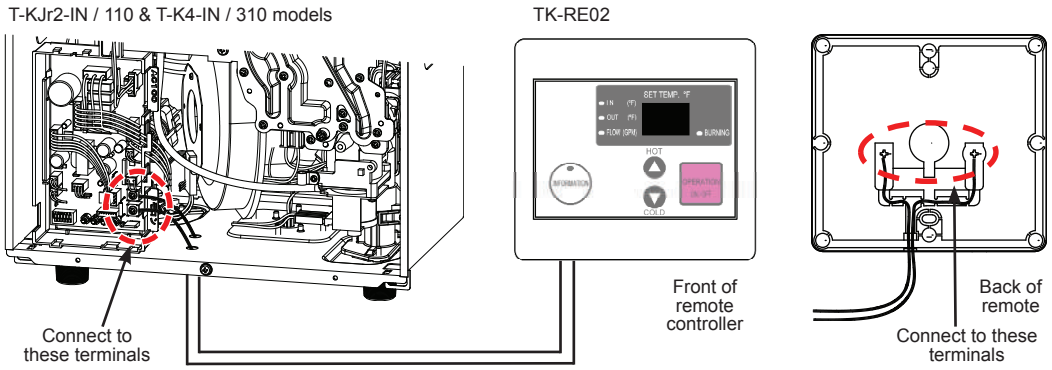
1. Disconnect power supply from the water heater.
2. Take off the water heater's front cover.
3. Wires used for the remote controller connection must be:
   - Minimum 20 gauge wire (No polarity)
   - T-KJr2-IN / 110 & T-K4-IN / 310 models (TK-RE02)
     Maximum 45 m (150 ft.) long
     T-D2-IN / 510 model (TM-RE30)
     Maximum 122 m (400 ft.) long

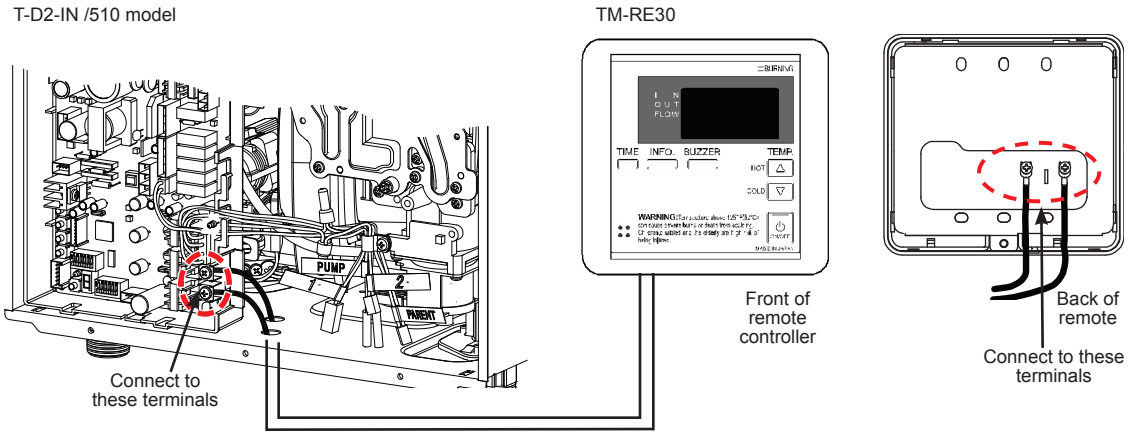
   * For detailed connection to the remote controller, refer to the instructions that are packaged with the remote controller.
4. Pick location of install for the remote controller.
5. Cut enough two pair wire.
6. Crimp on supplied fork connectors.
7. Locate the remote controller terminals, pictured below (located around the lower right-hand side of the computer board).
8. Open the plastic cover of the remote controller, and then attach the two fork terminals to connector base of the backside of the remote controller with two screws. Make sure the terminals are firmly fixed.
9. Pull the remote's wires through the hole at the bottom of the water heater's casing.
10. Properly attach the remote's wires to the remote controller terminals on the computer board. (No polarity)

*** Do NOT jump or short-circuit the wires, or the computer board will be damaged.**

11. Replace the plastic computer board cover and then replace the front cover securely.

NOTE*: If the T-D2-IN / 510 model is used in an Easy-Link System, the remote MUST be connected to the Parent unit. Only one remote controller is needed in an Easy-Link System.



## Pump Control Mode

(Available on the T-D2-IN / 510 model only)

The T-D2-IN / 510 water heaters can be used to control a recirculation pump. Proper pump control helps to preserve the life of the system and saves energy as well.

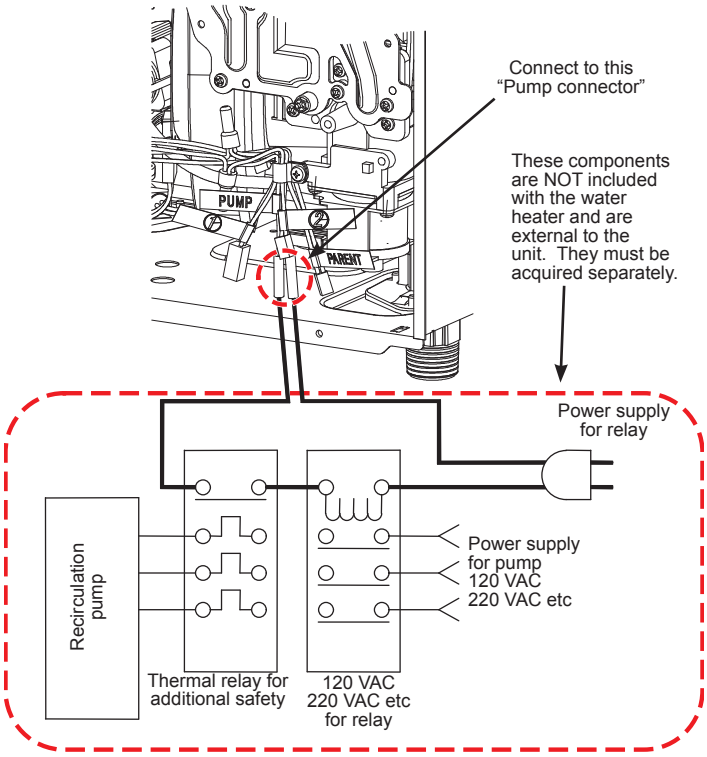
The water heater pump control port is a “normally-open dry contact”, and therefore needs additional components to properly control a recirculation pump. To control a recirculation pump, connect the pump to the “Pump connector” in the water heater as shown in the diagram below. (In an Easy-Link System, connect the pump ONLY to the “PARENT” unit.) The pump is to be connected using suitable relays shown in the diagram below.

Please make sure the relays are properly rated for the recirculation pump.

Using the water heater’s internal thermistors as a temperature control, the recirculation pump will only turn on when recirculation is needed.

**CAUTION**

**In an Easy-Link System, the pump must be connected to the “Pump connector” in the “PARENT” unit only**. If the pump is connected to any of the **“CHILD” units**, the pump will not work.




## Easy-Link System

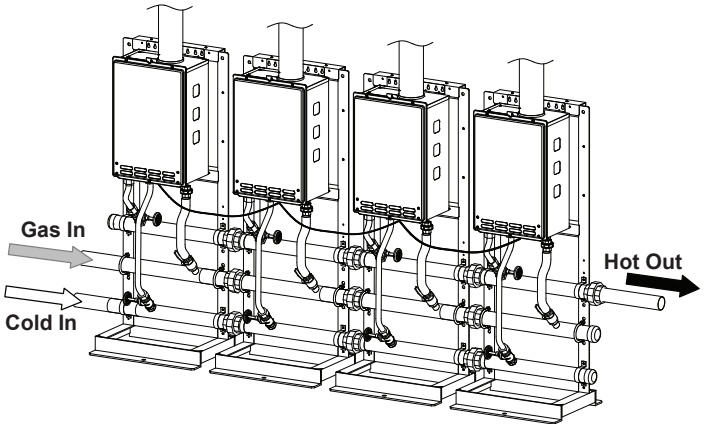
(Available on the T-D2-IN / 510 model only)

### General

The T-D2-IN / 510 water heaters can be connected with other heaters of the same model with communication cables to work as a multiple-unit manifold system.

- The Easy-Link System allows up to 4 units to manifold together.
- A communication cable (gray color) comes with each T-D2-IN / 510 model.

You can manifold from 2 to 4 units without the need for a Multi-Unit Controller. A 4-unit system has full automatic modulation between 11,000 BTU/h and 796,000 BTU/h.




**CAUTION**

- The Easy-Link System is limited up to **4 units**. If you connect more than 4 units, only the first 4 units will work as a part of the Easy-Link System. The other additional units will not work correctly and fluctuating water temperatures or no hot water may be a result.
- **All units within an Easy-Link System must be of the same exact model. Easy -Link System is backward compatible with the T-K3 and T-K3 Pro, no other models cannot be combined together to form an Easy-Link System.**
- **Only change DIP switch settings with power off.**

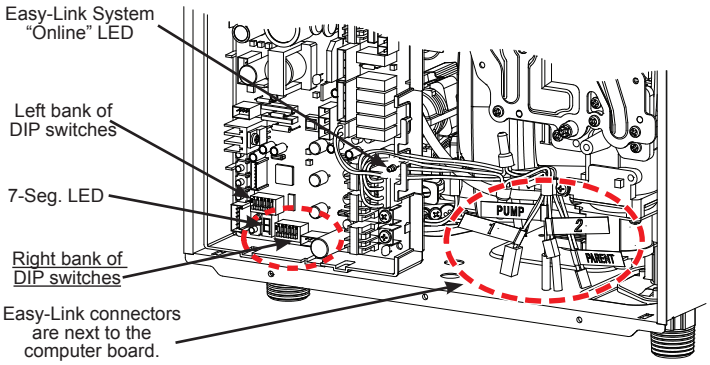
### Easy-Link Connection Procedures

1. Make sure the power to the water heaters are off.
2. Verify the set temperatures of all units within the system. Every single water heater must be set to the same set temperature. See *Note on the next page.
3. Select one unit to be the **“PARENT”** unit with power off.
4. **“PARENT”** unit:
   Locate the two banks of DIP switches at the right of the 7-Seg LED on the computer board of the unit that you select to be the **“PARENT”** unit. Change DIP switch No. 1 on the **right bank of DIP switches to the ON position**. See the computer board diagram as shown in the next page. Do not change any DIP switches on any of the **“CHILD”** units.
5. Between the **“PARENT”** and the **“CHILD-1”** units:
   Connect the **“PARENT”** connector of the **“PARENT”** unit to the **“1”** connector of the **“CHILD-1”** unit.
6. Between the **“CHILD-1”** and the **“CHILD-2”** units:
   Connect the **“2”** connector of the **“CHILD-1”** unit to the **“1”** connector of the **“CHILD-2”** unit.
7. Between the **“CHILD-2”** and the **“CHILD-3”** units:
   Connect the **“2”** connector of the **“CHILD-2”** unit to the **“1”** connector of the **“CHILD-3”** unit.

8. Make sure the 7-Seg LED of all the units' computer boards display the unit #. The numbering system automatically allocates the unit # to each water heater in the Easy-Link System, in accordance with the table below.

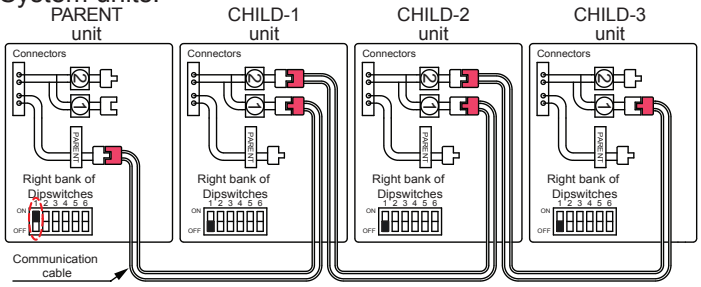
| | |
|---|---|
| Parent unit | Unit #: 1 |
| Child units | Unit #: 2, 3 or 4 |

(A) T-D2-IN / 510 Computer board




To change the DIP switch settings for the Easy-Link System, locate the bank of DIP switches at the right of the 7-Seg LED. **Do not adjust the left bank of DIP switches**.

(B) Basic diagram of connections between the Easy-Link System units.




**CAUTION**

The dark squares indicate the direction the DIP switches should be set to.

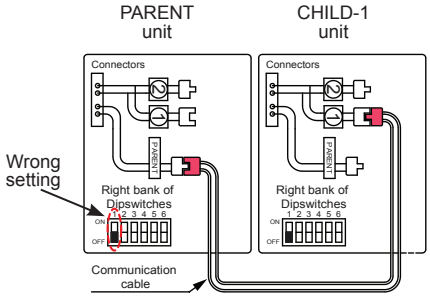
*Note:

- A remote controller is not required for the Easy-Link System.
- If running the Easy-Link System without a remote controller, please make sure the temperature settings on ALL the units are set to the same settings. Otherwise, the units will not operate properly.
- If a remote controller is used, the temperature on all the units in the system will automatically be set to the same temperature that is set on the remote.

(C) Examples of incorrect settings and/or connections

CASE 1:

- Unless you change DIP switch No. 1 of the "PARENT" unit to the "ON" position, the system will not work as an Easy-Link System. The units will operate as individual units.

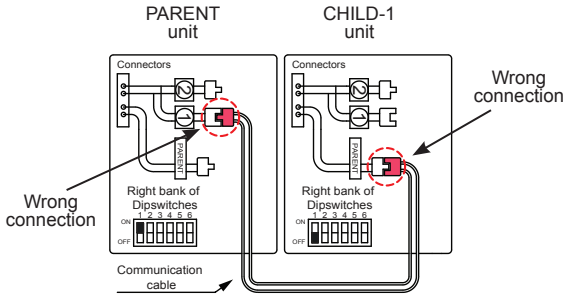



**Prohibited**

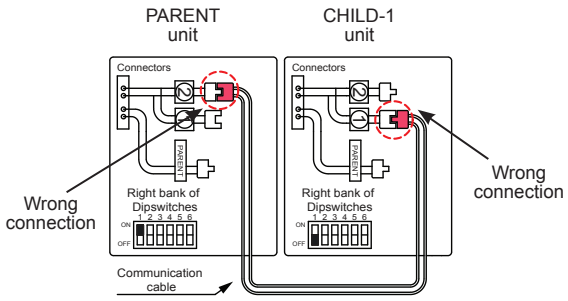
Wrong DIP switch setting on the **"PARENT"** unit

CASE 2:

- If you connect the "1" (or "2") connector of the "PARENT" unit to the "PARENT" (or "1") connector of the "CHILD-1" unit, the system will not work as an Easy-Link System. The units will operate as individual units.




**OR**

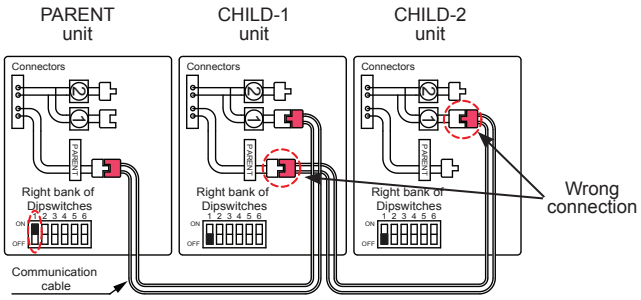



**Prohibited**

Wrong connections between the **"PARENT"** unit and the **"CHILD-1"** unit

CASE 3:

- If you connect the “PARENT” connector of the “CHILD-1” unit to the “1” connector of the “CHILD-2” unit, the “CHILD-2” unit will operate as an individual unit, and will not be part of the Easy-Link System.




**Prohibited**

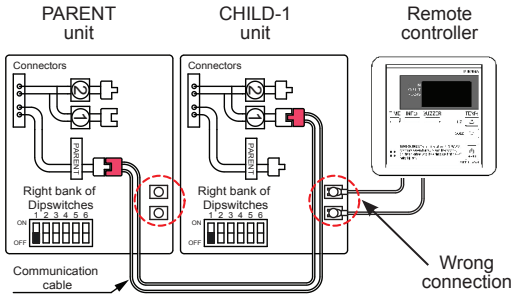
Wrong connections between the **“CHILD-1”** unit and the **“CHILD-2”** unit

**WARNING**

Connecting two **“PARENT”** connectors together from two separate units **may damage the computer board**. The communication cable has a female end and a male end so it’s impossible to have a PARENT-to-PARENT connection with the communication cable. Do not splice or modify connectors.

CASE 4:

- If a remote controller is used, it has to be connected to the “PARENT” unit. If the remote controller is connected to a “CHILD” unit, it will only control that particular individual “CHILD” unit and will not control the Easy-Link System as a whole.




**Prohibited**

Remote controller connected to incorrect unit

# APPLICATIONS

## Space-Heating Applications

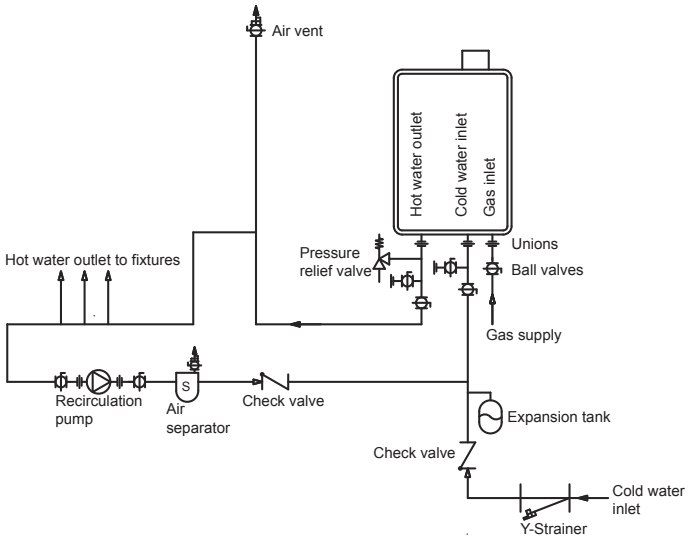
**WARNING**

- **In order to purge air in water pipes within a closed-loop system, an air vent and air separator should be installed in the system. Required circulation flow rates are labeled next to each application diagram. These flow rate requirements must be followed**.
- Toxic chemicals used in boiler treatments such as alcohol, glycerol and glycol groups must not be introduced into the system if the system incorporates an open-loop potable water system.
- The water heater can be used to supply potable water and space heating and shall not be connected to any heating system or component(s) previously used with non-potable water where any chemicals were added to the water heating appliances.
- Water heaters for combination water/space heating cannot be used in space heating applications only.
- When the system requires water for space heating at temperatures higher than required for other uses, a means such as a mixing valve shall be installed to temper the water for those other uses in order to reduce scald hazard potential.
- Water temperature over 52 °C (125 °F) can cause severe burns instantly or death from scalding.

## Recirculation

- The recirculation pump is to be controlled by:
  - Dual-set aquastat (recommended w/timer)

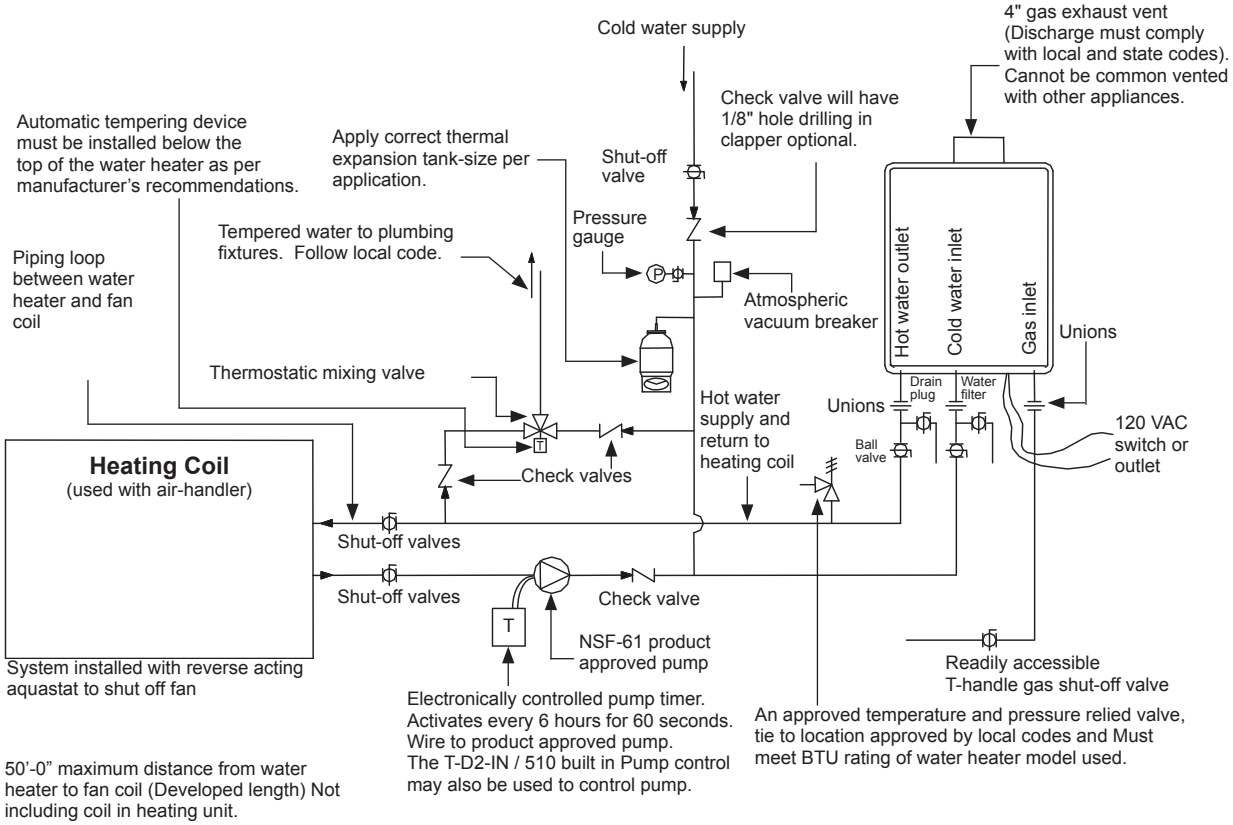
    **OR**
  - "Pump Control Mode" (T-D2-IN / 510 Models only). Refer to pg. 18.
- The recirculation pump is to provide no less than 7.5 L/min (2 GPM (US)) and no more than 15 L/min (4 GPM (US)) through each activated unit in the system.




## Dual-purpose Hot Water Heating with T-D2-IN / 510 Model Only

(Domestic and Space Heating):
Diagramatic layout of Radiant Heating and Domestic Water Heater.

The recirculation pump is to provide no less than 7.5 L/min (2 GPM (US)) and no more than 15 L/min (4 GPM (US)) through each activated unit in the system.




**Note**:

- **Priority Control Devices** such as a flow switch, an Aquastat or other electronic controller can be used to prioritize the domestic water system over the heating system.
- Follow all local codes.
- This illustration is a concept design only. There are a wide variety of variations to the application of controls and equipment presented. Designers must add all necessary safety and auxiliary equipment to conform to code requirements and design practice. For more details, contact the manufacturer.

## INITIAL OPERATION

# FOR YOUR SAFETY, READ BEFORE OPERATING

- Check the GAS and WATER CONNECTIONS for leaks before firing unit for the first time.
- Open the main gas supply valve to the unit using only your hand to avoid any spark. Never use tools. If the knob will not turn by hand, do not try to force it; call a qualified service technician. Forced repair may result in a fire or explosion due to gas leaks.
- Be sure to check for the presence of leaking gas toward the bottom of the unit because some gases are heavier than air and may settle towards the floor.
- Check the GAS PRESSURE. Refer to pg. 15.
- Do not try to light the burner manually. It is equipped with an electronic ignition device which automatically lights the burner.
- Check for PROPER VENTING and COMBUSTIBLE AIR to the water heater.
- Purge the GAS and WATER LINES to remove any air pockets or debris.
- Do not use this water heater if any part has been submersed under water. Immediately call a qualified service technician to inspect the water heater and to replace any damaged parts.

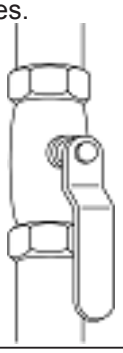
**WARNING**

**IF YOU SMELL GAS:**

- Do not try to start the water heater.
- Do not touch any electric switches; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

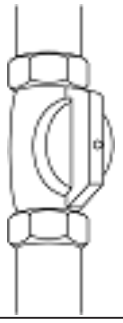
1. Once the above checks have been completed, please clean filter of any debris. Refer to pg. 27 for instructions.

2. Fully open the manual water control valve or valves on the water supply lines.

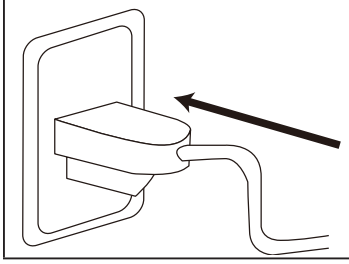


3. Open a hot water tap to verify that water is flowing to that tap. Then close the hot water tap.

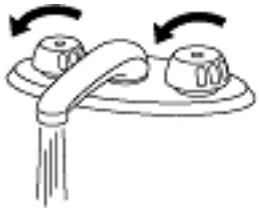
4. Fully open the manual gas control valve installed.



5. Turn on the 120 VAC, 60 Hz power supply to the water heater.



6. Now you are ready to enjoy hours of endless hot water.



# Owner's Guide

## OPERATING SAFETY

### FOR YOUR SAFETY READ BEFORE OPERATING

**WARNING:** If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This water heater does not have a pilot. It is equipped with an ignition device that automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the water heater area for evidence of leaking gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
WHAT TO DO IF YOU SMELL GAS.
- Do not try to light any appliance.
- Do not touch any electric switch, do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas valve knob. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. Forced or attempted repair may result in a fire or explosion.

D. Do not use this water heater if any part has been under water. Immediately call a qualified service technician to inspect the water heater and to replace any damaged parts.

### OPERATING INSTRUCTIONS

1. **STOP!** Read the safety information above or in the Owner's Manual.
2. Turn off all electric power to the water heater.
3. Do not attempt to light the burner by hand.
4. Turn the manual gas valve located on the outside of the unit clockwise to the OFF position.
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to next step.
6. Turn the manual gas valve located on the outside of the unit counterclockwise to the ON position.
7. Turn on all electrical power to the water heater.
8. If the water heater will not operate, follow the instructions “to Turn Off Gas to Appliance" and call your service technician or gas supplier.

### TO TURN OFF GAS TO APPLIANCE

1. Turn off all electric power to the water heater if service is to be performed.
2. Turn the manual gas valve located on the outside of the unit clockwise to the OFF position.

## DANGER


Vapors from flammable liquids will explode and catch fire causing death or severe burns.

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

| Keep flammable products: | Vapors: |
|---|---|
| 1. Far away from heater | 1. Cannot be seen |
| 2. In approved containers | 2. Vapors are heavier than air |
| 3. Tightly closed | 3. Go a long way on the floor |
| 4. Out of children's reach | 4. Can be carried from other rooms to the main burner by air currents |

**WARNING:** Do not install water heater where flammable products will be stored.
Read and follow water heater warnings and instructions. If owner's manual is missing, contact the manufacturer.

## WARNING

The outlet hot water temperature of the water heater is factory set at 50 °C (122 °F).
Use this heater at your own risk. The set outlet water temperature can cause severe burns instantly or death from scalds.
Test the water before bathing or showering.
Do not leave children or an infirm person in the bath unsupervised.

## DANGER

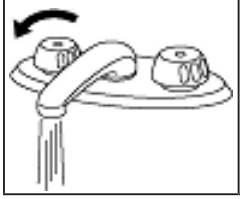
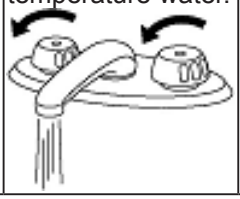

Hot Water Heater temperature over 52 °C (125 °F) can cause severe burns instantly or death from scalding. Children, disabled and the elderly are at the highest risk of being scalded. Feel water temperatures before bathing or showering. Temperature limiting valves are available. Ask a professional person.

# NORMAL OPERATION

## General

**Note**:

- Flow rate to activate the water heater: 1.9 L/min (0.5 gallons (US) per minute).
- Flow rate to keep the water heater running: 1.5 L/min (0.4 gallons (US) per minute).

| 1. Open a hot water tap.* | 2. Mix cold water with the hot to get the correct temperature water. | 3. Close the water taps. |
|---|---|---|
|  |  |  |

* If a remote controller is installed, turn the remote controller ON by pressing the power ON/OFF button on the remote controller and then set the temperature by pressing the HOT/COLD buttons before opening a hot water tap. The temperature is displayed when the remote controller is turned ON.

**For more detail on the remote controller, refer to the manual attached with the remote controller.**

## Temperature Settings

### Without Remote Controller

Depending on the model, there are 4 temperatures that you can select from by changing the DIP switch settings on the computer board without the remote controller. See the table below.

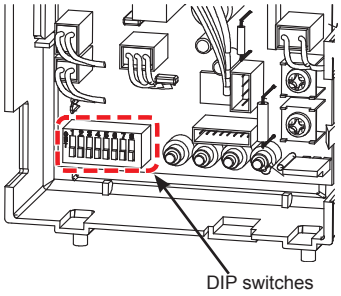
| Model | Temperatures available | | | |
|---|---|---|---|---|
| T-KJr2-IN /110<br>T-K4-IN /310 | 45 °C (113 °F) | 50 °C (122 °F) | 55 °C (131 °F) | 60 °C (140 °F) |
| T-D2-IN / 510 | 40 °C (104°F) | 45 °C (113 °F) | 50 °C (122 °F) | 60 °C (140°F) |

For detailed DIP switch settings for each temperature, refer to the charts on the right.

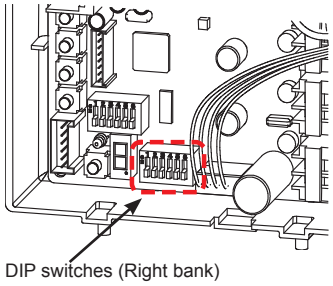
- The temperature has been preset at the factory to 50 °C (122 °F).
- If temperatures other than the ones listed above are required, the remote controller can provide several more temperature options. Refer to pg. 8 for a list of available temperatures on the remote controller.
- This water heater is an on-demand, tankless water heater designed to efficiently supply endless hot water.

### DIP switch Settings for Temperature

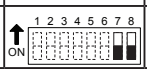
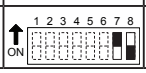
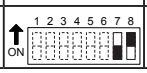
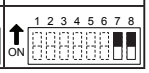
T-KJr2-IN / 110 & T-K4-IN / 310 Computer board



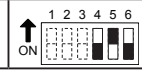
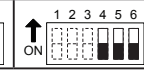
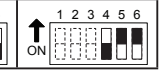

T-D2-IN / 510 Computer board




T-KJr2-IN / 110 & T-K4-IN / 310 Models

| Temperature Settings | | | | |
|---|---|---|---|---|
| | 45 °C (113 °F) | 50 °C (122 °F) DEFAULT | 55 °C (131 °F) | 60 °C (140 °F) |
| Switch No. 7 | OFF | ON | OFF | ON |
| Switch No. 8 | OFF | OFF | ON | ON |
| |  |  |  |  |

T-D2-IN / 510 Model

| Temperature Settings (Right bank) | | | | |
|---|---|---|---|---|
| | 40 °C (104 °F) | 45 °C (113 °F) | 50 °C (122 °F) DEFAULT | 60 °C (140 °F) |
| Switch No. 4 | OFF | OFF | OFF | OFF |
| Switch No. 5 | OFF | ON | OFF | ON |
| Switch No. 6 | ON | OFF | OFF | ON |
| |  |  |  |  |

**Note**:

- Black part shows the position of the switch.

**WARNING**

- DO NOT adjust the left bank of DIP switches for the T-D2-IN / 510 model for temperature.
- Turn off the power supply to the water heater before changing the DIP switch settings.
- Only change the switches with the dark squares. The dark squares indicate which direction the DIP switch should be set to.

## Flow

- The flow rate through the water heater is limited to a maximum of 25 L/min (6.6 GPM (US)) for the T-KJr2-IN / 110, 30.3 L/min (8.0 GPM (US)) for the T-K4-IN / 310, and 37.8 L/min (10.0 GPM (US)) for the T-D2-IN / 510.
- The temperature setting, along with the supply temperature of the water will determine the maximum flow rate output of the unit.
- Please refer to the temperature vs. gallons per minute charts on pg. 42 to determine the likely flow rates based on your local ground water temperature and your desired outlet water temperature.
- Refer to the table below for typical household plumbing fixture flow rates to determine what the water heater can do in a household application.

| Household Flow Rates | | |
|---|---|---|
| Appliance/Use | Flow Rate | |
| | L/min | GPM (US) |
| Lavatory Faucet | 3.8 | 1.0 |
| Bath Tub | 15.2 - 37.8 | 4.0 – 10.0 |
| Shower | 7.5 | 2.0 |
| Kitchen Sink | 5.6 | 1.5 |
| Dishwasher | 5.6 | 1.5 |
| Washing machine | 15.2 | 4.0 |
| Taken from UPC 2006 | | |

- Based on the **CAN/CSA P.7** test method for measuring energy loss of gas-fired instantaneous water heaters, the water heater is rated for litres per hour (l/hr) ((US) gallons per hour (GPH)) or litres per minute (L/min) ((US) gallons per minute (GPM)) for Natural Gas and Propane, when raising the water temperature by 43 C° (77 F°) (from 14 °C to 57 °C (58 °F to 135 °F)). See the chart to the upper right.

| Model | Unit of Measure | Natural Gas | Propane |
|---|---|---|---|
| T-KJr2-IN / 110 | L/hr | 681 | 681 |
| | L/min | 11.4 | 11.4 |
| | GPH (US) | 180 | 180 |
| | GPM (US) | 3 | 3 |
| T-K4-IN / 310 | L/hr | 931 | 931 |
| | L/min | 15.5 | 15.5 |
| | GPH (US) | 246 | 246 |
| | GPM (US) | 4.1 | 4.1 |
| T-D2-IN / 510 | L/hr | 954 | 954 |
| | L/min | 15.9 | 15.9 |
| | GPH (US) | 252 | 252 |
| | GPM (US) | 4.2 | 4.2 |

## Freeze protection system

- This unit comes equipped with heating blocks to protect it against damages associated with freezing.
- For this freeze protection system to operate, there has to be electrical power to the unit. Damage to the heat exchanger caused by freezing temperatures due to power loss is not covered under the warranty. In cases where power losses can occur, consider the use of a backup power supply.
- The freeze protection system will activate when the freeze protection thermostat senses temperature at 2.5 °C (36.5 °F) or lower.
- In any areas subject to freezing temperatures, freezing issues can only occur if cold air enters through the venting into the heat exchanger, whether by negative pressures within the installation location or by strong outside winds.
- The manufacturer also highly recommends the use of a backflow preventer (sold separately) to minimize the amount of cold air entering through the exhaust venting when the water heater is off.
- It is the installer's responsibility to be aware of freezing issues and take all preventative measures. The manufacturer will not be responsible for any damage to the heat exchanger as a result of freezing.
- If you will not be using your heater for a long period of time:
  1. Completely drain the water out of the unit. Refer to pg. 27.
  2. Disconnect power to your heater.

  This will keep your unit from freezing and being damaged.

**CAUTION**

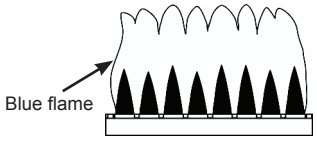
Only pipes within the water heater are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will not be protected. Properly protect and insulate these pipes from freezing.

## Maintenance and Service

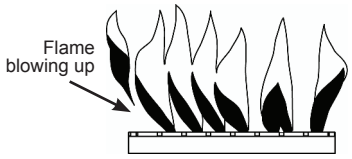
**WARNING**

Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.

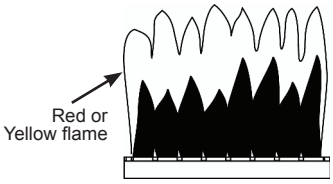
- Clean the cold-water inlet filter. (Refer to Unit draining and filter cleaning section in this page.)
- Be sure that all openings for combustion and ventilation air are not blocked.
- The venting system should be checked annually for any leaks, corrosion, blockages or damage.
- The burner should be checked annually for dust, lint, grease or dirt.
- Keep the area around the water heater clear. Remove any combustible materials, gasoline or any flammable vapors and liquids.
- In accordance with all local codes and common safety practices, water discharged from the pressure relief valve can cause severe burns instantly from scalding. DO NOT touch the pressure relief valve.
- If the relief valve discharges periodically, it may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct this situation.
- Visual check of burner flames (see below) through the burner window in the burner assembly located at the middle of the water heater.




Satisfactory



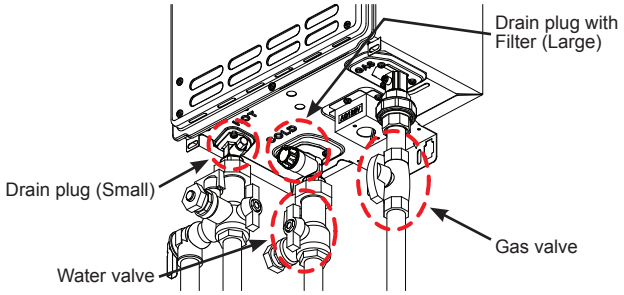

Unsatisfactory




Unsatisfactory

The manufacturer recommends having the unit checked once a year or as necessary by a licensed technician. If repairs are needed, any repairs should be done by a licensed technician.

### Unit Draining and Filter Cleaning




1. Close the manual gas shutoff valve.
2. Turn off power to the unit and wait a couple of seconds. Turn on again.
3. Wait 30 seconds, and then turn off power to the unit, yet again.
4. Close the water shutoff valve.
5. Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
6. Have a bucket or pan to catch the water from the unit's drain plugs. Unscrew the two drain plugs (large and small) to drain all the water out of the unit.
7. Wait a few minutes to ensure all water has completely drained from the unit.
8. Clean the filter: Check the water filter located within the cold inlet. With a tiny brush, clean the water filter of any debris which may have accumulated and reinsert the filter back into the cold water inlet.

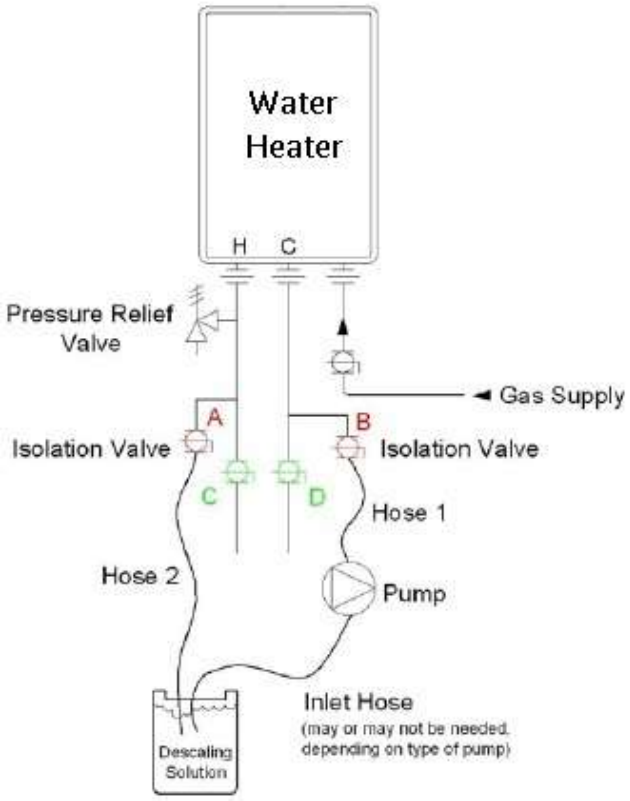
9. Securely screw the drain plugs back into place. Hand-tighten only.

**WARNING**

Locate your heater close to a drain where water 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. The manufacturer will not be responsible for any water damage that may occur. If you install a drain pan under the unit, ensure that it will not restrict the combustion air flow.Turn off the electrical power supply and close the manual gas shutoff valve and the manual water control valve before servicing.

## Descaling the Unit

Hard water is a severe problem for the copper coils inside heat exchangers. Heat exchanger failure due to scale buildup from hard water conditions is NOT covered by warranty. It is highly suggested that a scale inhibitor be installed before the cold water inlet after this procedure is done.

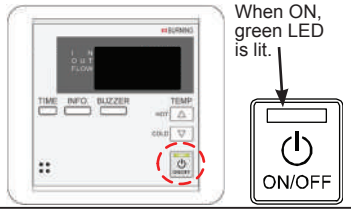
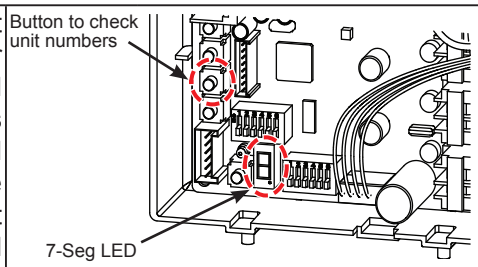



1) TOOLS Gather the following materials:
   a. Pump: The pump should provide a minimum of 1 gpm through the heater.
   b. Descaling Solution
   c. Water hoses
   d. Bucket
2) SETUP
   a. Set the unit to its highest temperature setting.
   b. Open multiple hot water fixtures to run a large volume of water through the water heater. Allow the unit to run at its full firing rate for at least 2 minutes.
   c. While the water heater is still firing, disconnect power to the water heater.
   d. Shut off all the open hot water fixtures.
3) WATERLINES – Assumes isolation valves with drain ports are installed.
   a. Isolate the water heater by closing the incoming/ outgoing water isolation valves C and D.
   b. Relieve pressure within the water heater by temporarily opening up the pressure relief valve.
   c. Drain the water heater and connect hoses/pump to the drain ports of the isolation valves: Outlet of the pump to valve B (cold side), and another hose from valve A (hot side) to the bucket.
4) PUMP and DESCALE –
   a. Fill the bucket with 5 gallons of diluted solution. Dilution ratio depends on the cleaning/descaling solution used.
   b. Place the pump into the bucket if it is submersible, or use an inlet hose into the bucket if it is not submersible.
   c. Open valves A and B.
   d. Circulate descaling solution through the water heater for 45 minutes.
5) CLEANSE THE SYSTEM – Flush the chemicals out of the heat exchanger with fresh water.
   a. Close valve B.
   b. Open valve D and run fresh water through the water heater and drain out of Hose 2 for 15 minutes.
   c. Close all valves, relieve pressure from the water heater with the pressure relief valve, and clean the inlet water filter with fresh water.
   d. Once the water heater is flushed and cleansed, replace the water filter, open C and D, and reconnect power to the water heater.
   e. Change the temperature setting back to the desired temperature.

# TROUBLESHOOTING

## General

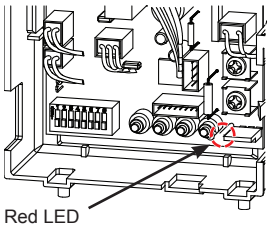
| | PROBLEM | SOLUTIONS |
|---|---|---|
| TEMPERATURE and AMOUNT OF HOT WATER | It takes a long time to get hot water at the fixtures. | • The time it takes to deliver hot water from the water heater to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the pipes, the longer it will take to get hot water.<br>• If you would like to receive hot water to your fixtures quicker, you may want to consider a hot water recirculation system. (pg. 21) |
| | The water is not hot enough. | • Compare the flow and temperature. See the charts on pg. 41.<br>• Check cross plumbing between cold water lines and hot water lines.<br>• Is the gas supply valve fully open? (pg. 22)<br>• Is the gas line sized properly? (pg. 15)<br>• Is the gas supply pressure enough? (pg. 15)<br>• Is the set temperature set too low? (pg. 25)<br>• Is Easy-Link set up correctly in a Multi-Unit System? (pg 18 to 20)<br>• If a mixing valve is used in your system, is it blending? |
| | The water is too hot. | • Is the set temperature set too high? (pg. 25) |
| | The hot water is not available when a fixture is opened. | • Make sure the unit has 120 VAC, 60 Hz power supply.<br>• If you are using the remote controller, is the power button turned on?<br>• Is the gas supply valve fully open? (pg. 22)<br>• Is the water supply valve fully open? (pg. 22)<br>• Is the filter on cold water inlet clean? (pg. 27)<br>• Is the hot water fixture sufficiently open to draw at least 1.9 L/min (0.5 GPM (US)) through the water heater? (pg. 25)<br>• Is the unit frozen?<br>• Is there enough gas in the tank/cylinder? (For Propane models)<br>• Is it plumbed back with reverse plumbing?<br>• If your water heater is used in a dual purpose installation with a check valve,is the check valve defective? Check for cross plumbing.<br>• If your installation is Multi-Unit, is Easy-Link set up correctly?(pg,18 to 20) |
| | The hot water turns cold and stays cold. | • Is the flow rate enough to keep the water heater running? (pg. 25)<br>• If there is a recirculation system installed, does the recirculation line have enough check valves? (pg. 21)<br>• Is the gas supply valve fully open? (pg. 22)<br>• Is the filter on cold water inlet clean? (pg. 27)<br>• Are the fixtures clean of debris and obstructions?<br>• Check if the flow rate is too low. (pg. 25) |
| | Fluctuation in hot water temperature. | • Is the filter on cold water inlet clean? (pg. 27)<br>• Is the gas line sized properly? (pg. 15)<br>• Is the supply gas pressure sufficient? (pg. 15)<br>• Check for cross connection between cold water lines and hot water lines.<br>• Is Easy-Link set up correctly?(pg. 18 to 20) |
| WATER HEATER | Unit does not ignite when water goes through the unit. | • Is the power on to the water heater?<br>• Is the gas on?<br>• Is the flow rate over 1.9 L/min (0.5 GPM (US))? (pg. 25)<br>• Check for the filter on cold water inlet. (pg. 27)<br>• Check for reverse connection and cross connection.<br>• If a remote controller is connected, is it powered on?<br>• Check if the inlet temperature is too high. |
| | The fan motor is still spinning after operation has stopped. | • This is normal. After operation has stopped, the fan motor keeps running from 15 to 70 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue. |

| | PROBLEM | SOLUTIONS |
|---|---|---|
| WATER HEATER | Abnormal sounds from tankless unit | • Is the correct gas type of the water heater installed?<br>• Are the DIP switch settings for your altitude set correctly?(pg. 10)<br>• Check the flame quality.<br>• Is the intake or exhaust vent blocked?<br>• Is the vent length and diameter correct?(pg. 11)<br>• Is the manifold pressure set correctly(pg. 3)?<br>• Is there enough clearance between the air intake and exhaust when separate penetrations are used?<br>• If multiple units are installed, are the clearance between the exhaust and intakes met? (pg. 13 and 14) |
| Remote controller: TM-RE30 / TK-RE02 | Remote controller does not display anything when the power button is turned on. | • Make sure the unit is supplied with power.<br>• Make sure the connections to the unit are correct. (pg. 17) |
| | | TM-RE30 only:<br>If the green LED lights up, the remote controller has been turned ON. When the unit has not operated for five minutes or more, the display turns off to conserve energy.<br>  |
| | An ERROR code is displayed. | • Please see pg. 30 to 33. |
| EASY-LINK SYSTEM (T-D2-IN / 510 model only) | How are the unit numbers assigned? | • For an Easy-Link System, the Parent unit is always labeled #1 and all other subsequent Child units are numbered randomly. Renumbering of water heaters can be done so that they are numbered any way you like. Press and hold the INC button on all Child units for at least 5 seconds. Zero will be displayed on all Child units. Then press INC button in the order you want them numbered.<br>• To check which numbers are assigned to which Child units, push the increase button on the computer board of any Child unit as shown on the right. The unit number will be displayed on the 7-Seg LED. (Refer to pg. 18 to 20.)<br>  |

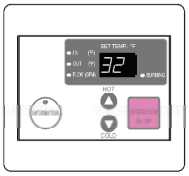
## Error Codes

- The water heaters have built in self-diagnostics for safety and convenience when troubleshooting.
- If there is a problem with the installation or the unit, the T-D2-IN /510 model will display a numerical error code on the 7-Seg LED on the computer board, and the T-KJr2-IN / 110 & T-K4-IN / 310 models will display a blinking red LED on the computer board. If a remote controller is installed, the error codes will be displayed on the remote controller.
- Consult with the table on the following page for the description of each error code.

T-KJr2-IN / 110 & T-K4-IN / 310

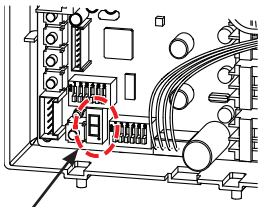



Error code on the computer board




Error code on the TK-RE02

T-D2-IN / 510




Error code on the computer board


Error Code the TM-RE30

### Single Unit Installations

Example: If your water heater displays the “321” error code (which signifies an inlet thermistor failure)

- T-KJr2-IN / 110 & T-K4-IN / 310 models: The red LED on the computer board will be blinking two times.
- If the TK-RE02 is installed: “32” will display on the screen in its entirety.
- T-D2-IN / 510 model: The 7-Seg LED on the computer board will display “3”…”2”…”1” in that order one digit at a time and continually repeat.
- If the TM-RE30 is installed: “321” will display on the screen in its entirety.

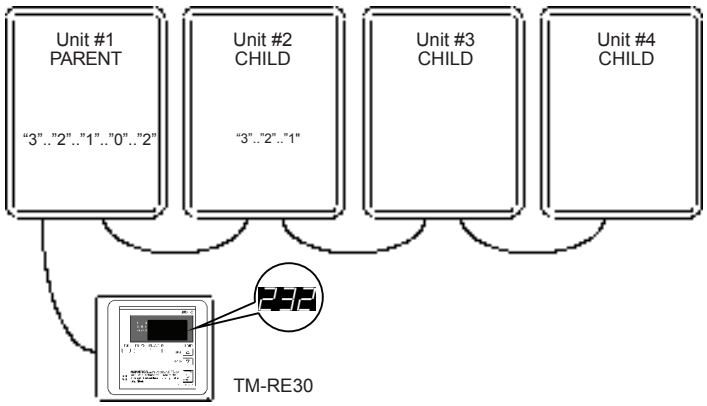
### Easy-Link System

(For the T-D2-IN / 510 model only)

Error codes will be displayed differently with units installed within an Easy-Link System, not only to show what the error code is, but to also indicate which unit within the system has the error code. Below is a sample of how the same error code is displayed in an Easy-Link System.

Example: If Unit #2 has the “321” error code (inlet thermistor failure)

- Parent unit: It will display “3”…”2”…”1”…”0”…”2” one digit at a time on the 7-Seg LED. The first 3 numbers indicate the error code. The last two numbers indicate that Unit #2 has the error code.
- Unit #2: It will display “3”…”2”…”1 on the 7-Seg LED, just like in the Single Unit example.
- Unit #3 & #4: These units will not display anything, as the error code does not pertain to them.
- TM-RE30: It will display “232” on its screen. The first “2” indicates that Unit #2 has the error. The “32” indicates the first two digits of the “321” error code.



## Fault Analysis of Error Codes

If the error code is displayed on the computer board of the water heater or remote controller, please check the following. After checking, **consult with the manufacturer**.

| T-KJr2-IN / 110 & T-K4-IN / 310 | | T-D2-IN / 510 | Malfunction description | Diagnosis |
|---|---|---|---|---|
| Red LED | TK-RE02 | TM-RE30 | | |
| One Time | 03 | 031 | Incorrect DIP switch setting | • Check the DIP switch settings on the PCB (Part #701). |
| Five Times | 10 | 101 | Warning for the “991” error code | • Check the gas type of the water heater matches the gas supplied to it.<br>• Check if there is any blockage in the intake air and/or exhaust.<br>• If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal.<br>• Check the altitude/elevation of area of where the water heater is installed and match DIP switches.<br>• Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.<br>• Check the DIP switches match gas type of unit.<br>• Check the manifold pressure at Max. and Min.<br>• Check the proportional gas valve hose. |
| Three Times | 11 | 111 | Ignition failure | • Check if the Hi-limit switch (Part #412) is properly functioning.<br>• Check for connection/breakage of wires (Part #413, 708, 709, 710, 712), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108).<br>• Check if there is a buzzing spark ignition sound coming from the burner (Part #101) when the water heater prepares for combustion.<br>• Listen for the double “clunk” sound coming from gas valve assembly (Part #102) when the water heater goes into combustion.<br>• Check if there is leaking from heat exchanger (Part #401).<br>• Check that the gas is turned on.<br>• Check gas supply. |
| Three Times | 12 | 121 | Loss of flame | • Check if the Hi-limit switch (Part #412) is properly functioning.<br>• Check for connection/breakage of wires (Part #413, 708, 709, 710, 712), burn marks on the computer board (Part #701), and/or soot on the flame rod (Part #108).<br>• Check if there is leaking from heat exchanger (Part #401).<br>• Check gas supply. |

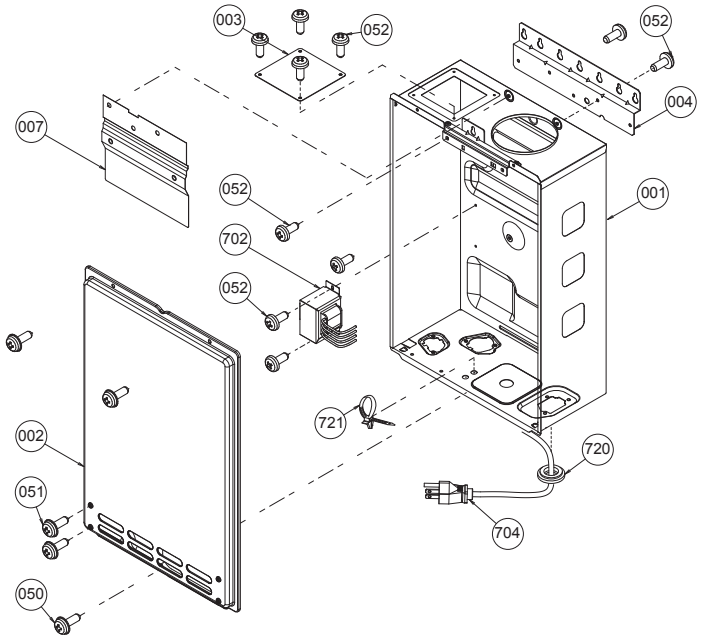
| T-KJr2-IN / 110 & T-K4-IN / 310 | | T-D2-IN / 510 | Malfunction description | Diagnosis |
|---|---|---|---|---|
| Red LED | TK-RE02 | TM-RE30 | | |
| Two Times | 31 | 311 | Output thermistor failure | • Check for connection/breakage of wires and/or debris on thermistor (Part #407, 408, 411, 716).<br>• Check the resistance. |
| | 32 | 321 | Inlet thermistor failure | |
| N/A | N/A | 331 | Mixing thermistor failure | |
| Two Times | 39 | 391 | Air–fuel ratio rod failure | • Check for connection/breakage of wires (Part #709) and/or soot on the AFR rod (Part #108).<br>• Check that the unit connected to a properly grounded outlet. |
| N/A | N/A | 441 | Flow sensor failure (Easy-Link System only) | • Check for connection/breakage of wires and/or debris on the flow sensor impeller (Part #402, 717).<br>• Check that the water isolation valves are open.<br>• Check inlet water filter for debris. |
| Six Times | 51 | 510 | Abnormal gas solenoid valve | • Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).<br>• Check gas valve contacts and gas valve wire harness connections for signs of rust or corrosion. |
| | 55 | N/A | Abnormal main gas valve | • Check for connection/breakage of wires (Part #708) and/or burn marks on the computer board (Part #701).<br>• Check for signs of vent corrosion.<br>• Check gas valve contacts and gas valve wire harness connections for signs of rust or corrosion. |
| Four Times | 61 | 611 | Fan motor fault | • Check for connection/breakage of wires, dust buildup in the fan motor (Part #103) and/or burn marks on the computer board (Part #701).<br>• Check for frozen/corrosion of connectors (Part #103). |
| N/A | N/A | 651 | Flow adjustment valve fault | • Inspect the flow adjustment valve (Part #402), for connection/breakage of wires (Part #718), locked motor drive due to scale buildup, and/or water leakage. |
| One Time | 70 | 701 | Computer board fault | • Check for connection/breakage of wires (Part #714) and/or burn marks on the computer board (Part #701).<br>• Check the power supply of the water heater. |
| Six Times | 72 | 721 | False flame detection | • For indoor models, check if condensate drain is installed on the vent collar of the water heater.<br>• Check if there is leaking from the heat exchanger (Part #401). |
| N/A | 74 | 741 | Miscommunication between the water heater and remote controller | • Check the model type of the remote controller.<br>• Inspect the connections between the water heater and remote controller.<br>• Check the power supply of the water heater. |
| N/A | N/A | 761 | Miscommunication in Easy-Link System | • Check if the connections between the parent unit and the Child units are correct. Refer to pg. 18 to 20.<br>• Check that the power is on to all Child units. |

| T-KJr2-IN / 110 & T-K4-IN / 310 | | T-D2-IN / 510 | Malfunction description | Diagnosis |
|---|---|---|---|---|
| Red LED | TK-RE02 | TM-RE30 | | |
| Five Times | 99 | 991 | Imperfect combustion | • Check the gas type of the water heater matches the gas supplied to it.<br>• Inspect the environment around the water heater. Determine how long the unit has been installed.<br>• Check the altitude/elevation of the area of where the water heater is installed and match DIP switches.<br>• Check if there is any blockage in the intake air and/or exhaust.<br>• If the water heater is installed as a direct-vent system, check whether there is enough distance between the intake air terminal and the exhaust terminal.<br>• Check if there is grease and/or dirt in the burner (Part #101) and the fan motor (Part #103), especially if the water heater has been installed in a contaminated area.<br>• Check the DIP Switches match gas type of unit.<br>• Check the manifold pressure at Max. and Min.<br>• Check proportional gas valve hose. |

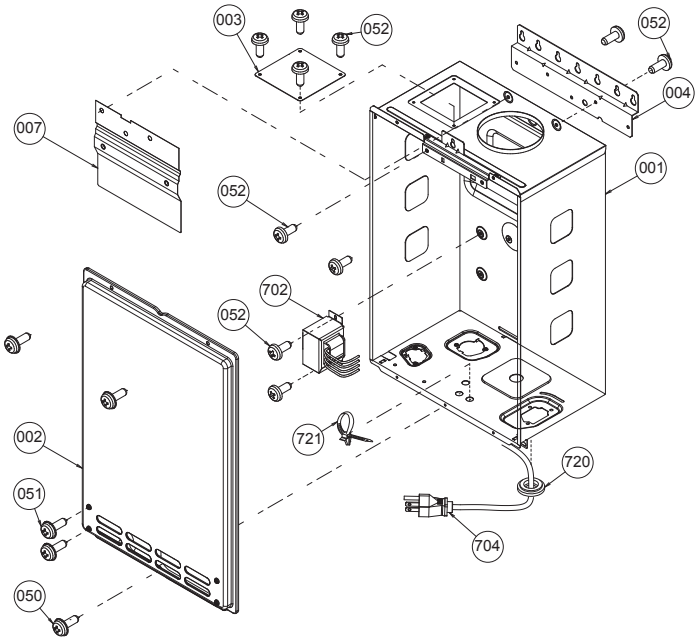
# COMPONENTS DIAGRAM

## Case assembly

### T-KJr2-IN / 110



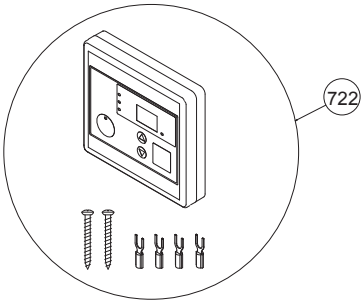

### T-K4-IN / 310 & T-D2-IN / 510




## Temperature remote controller

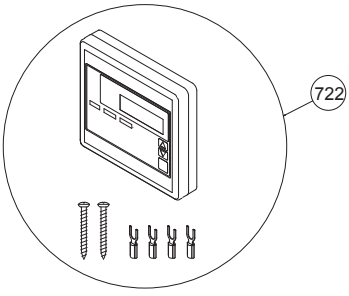
### T-KJr2-IN / 110 & T-K4-IN / 310

**TK-RE02**



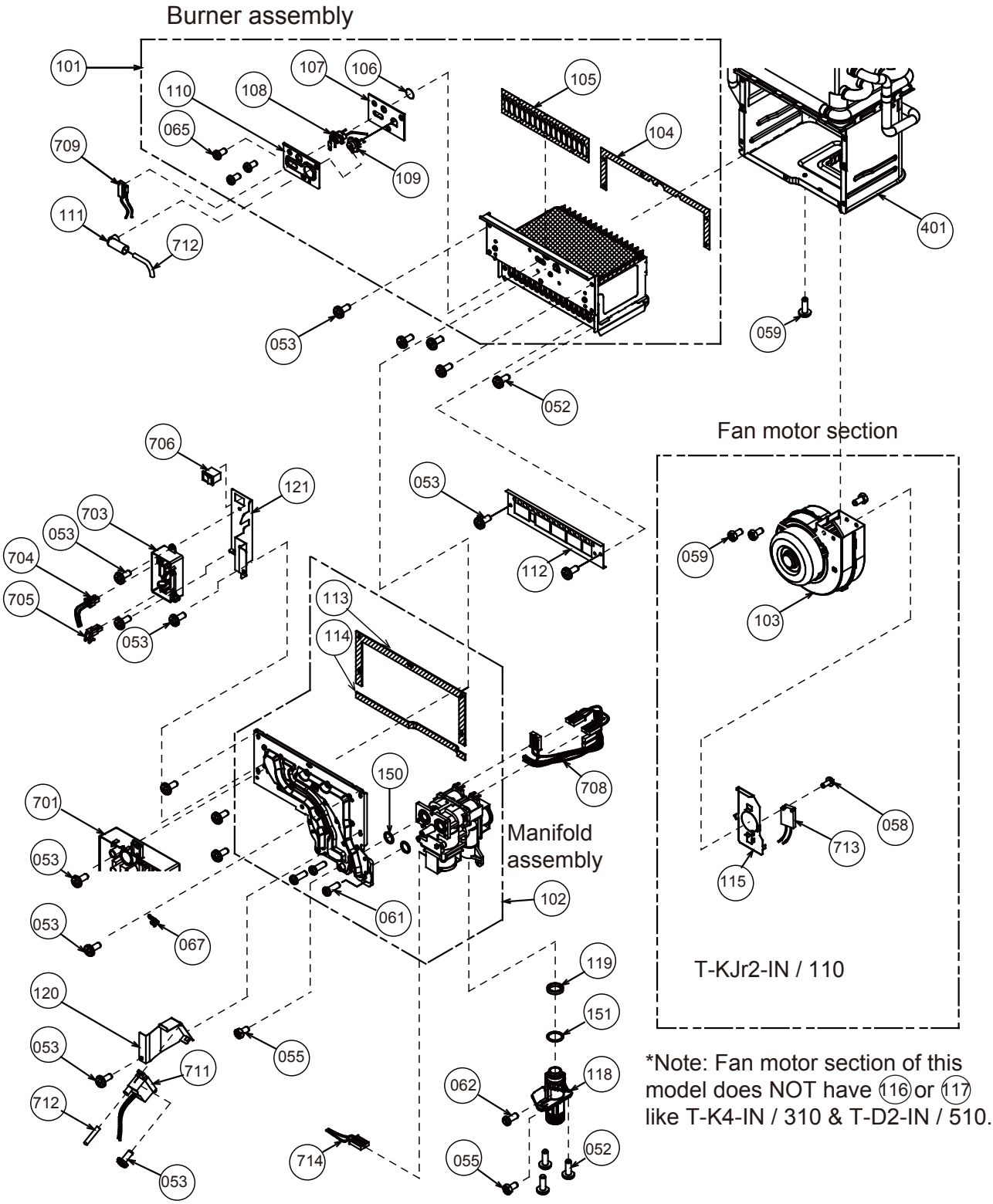

### T-D2-IN / 510

**TM-RE30**



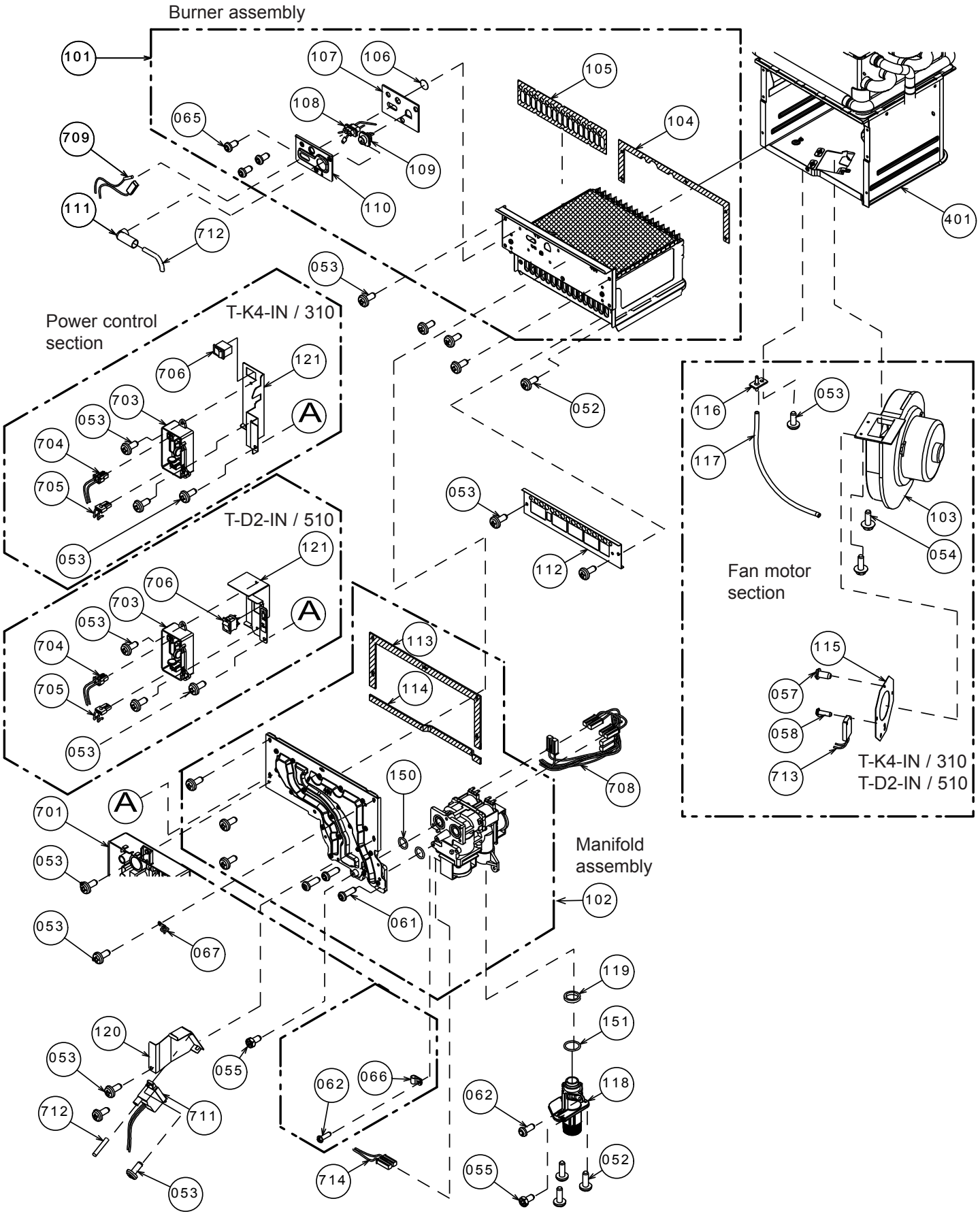
## Burner assembly

### T-KJr2-IN / 110



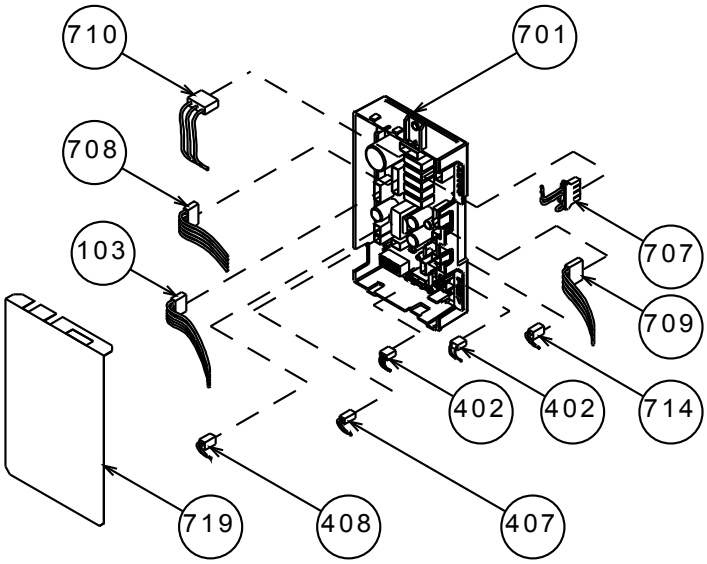

*Note: Fan motor section of this model does NOT have (116) or (117) like T-K4-IN / 310 & T-D2-IN / 510.

## T-K4-IN / 310 & T-D2-IN / 510



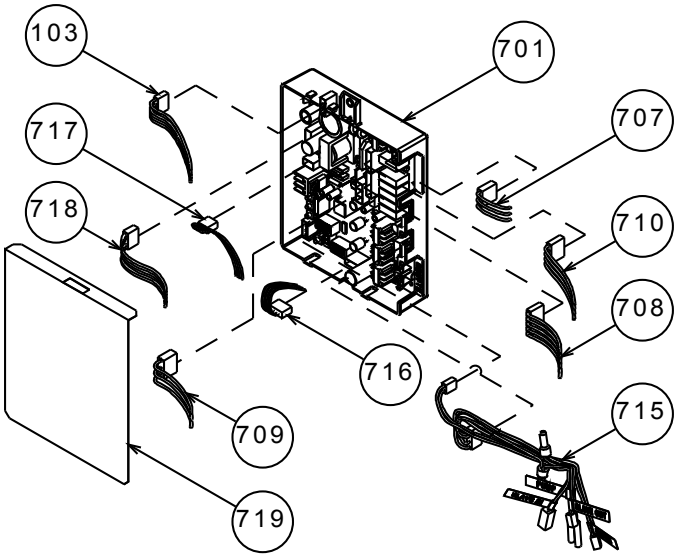
## Computer board assembly

### T-KJr2-IN / 110 & T-K4-IN / 310



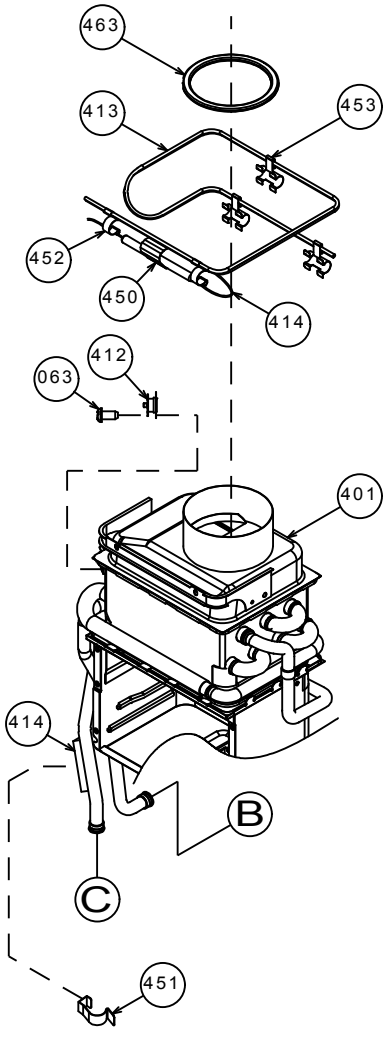

## Computer board assembly

### T-D2-IN / 510



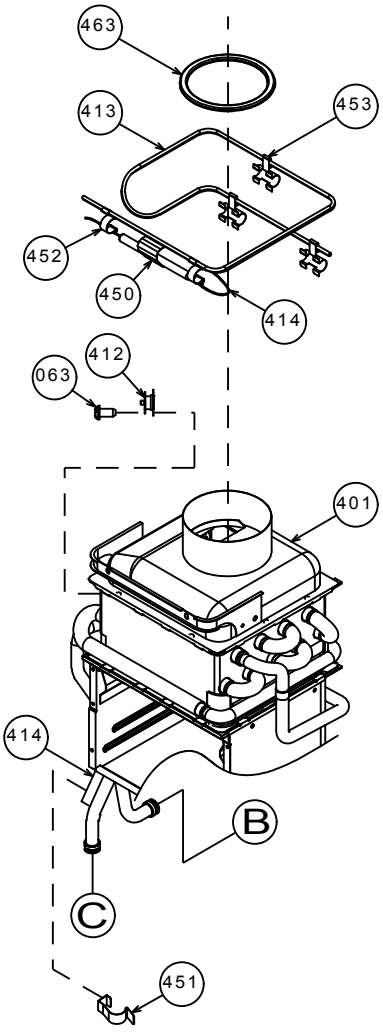

## Water way assembly

### T-KJr2-IN / 110



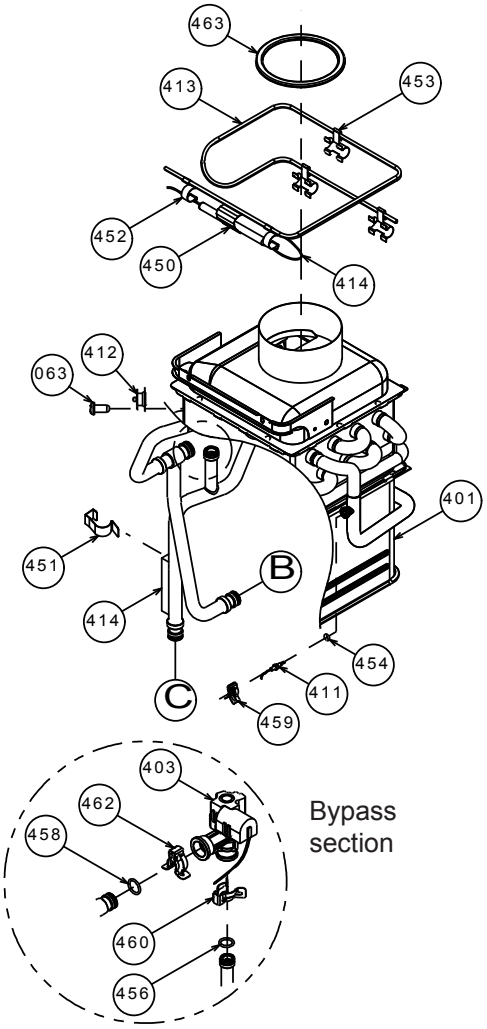

## Water way assembly

### T-K4-IN / 310

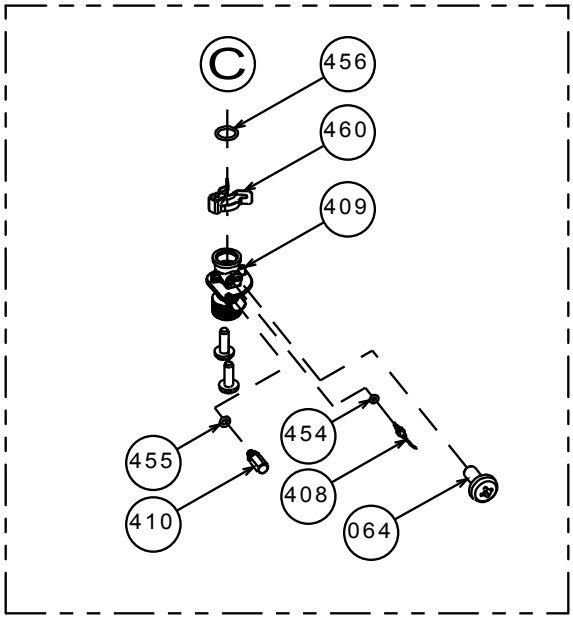


## Water way assembly

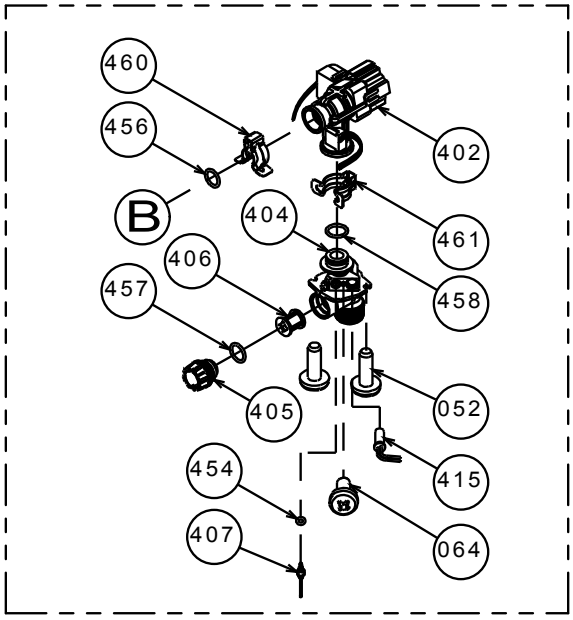
### T-D2-IN / 510




## Water outlet section




## Water inlet section



## PARTS LIST

| Item # | Description | Part # |
|---|---|---|
| 1 | Case assembly for T-KJr2-IN / 110 | EK415 |
| | Case assembly for T-K4-IN / 310 & T-D2-IN / 510 | EK402 |
| 2 | Front cover for T-KJr2-IN / 110 | EK419 |
| | Front cover for T-K4-IN / 310 | EK403 |
| | Front cover for T-D2-IN / 510 | EK434 |
| 3 | Air blockage plate for T-KJr2-IN / 110, T-K4-IN / 310 & T-D2-IN / 510 | EK401 |
| 4 | Bracket | EKJ09 |
| 7 | Back guard panel for T-KJr2-IN / 110 | EX00M |
| | Back guard panel for T-K4-IN / 310 & T-D2-IN / 510 | EKK5H |
| 50 | Screw M4×12 (w/Washer) | EW000 |
| 51 | Screw M4×10 (w/Washer) | EW001 |
| 52 | Screw M4×10 (Coated) | EW002 |
| 53 | Screw M4x10 | EW003 |
| 54 | Hex head screw M4×12 (w/Washer) | EW004 |
| 55 | Hex head screw M4x8 (for gas test pressure port) | EW005 |
| 56 | Screw M4x10 | EX014 |
| 57 | Screw M3x6 SUS3 | EW00B |
| 58 | Screw M3x10 | EW008 |
| 59 | Pan screw M4x12 (w/Washer) | EW00H |
| 60 | Pan screw M4x10 FEZN | EW024 |
| 61 | Tap tight screw M4x12 FEZN | EKK31 |
| 62 | Pan screw M4x10 | EW006 |
| 63 | Screw M3x6 | EW00A |
| 64 | Screw M4x6 | EW009 |
| 65 | Pan screw M4x8 | EW00D |
| 66 | Nylon clamp | EC00X |
| 67 | Wire clamp 60 | EM167 |
| 101 | Burner assembly for T-KJr2-IN / 110 | EK417 |
| | Burner assembly for T-K4-IN / 310 & T-D2-IN / 510 | EKH5W |
| 102 | Manifold with gas valve assembly LP for T-KJr2-IN / 110 | EK429 |
| | Manifold with gas valve assembly LP for T-K4-IN / 310 & T-D2-IN / 510 | EKH6T |
| | Manifold with gas valve assembly NA for T-KJr2-IN / 110 | EK421 |
| | Manifold with gas valve assembly NA for T-K4-IN / 310 & T-D2-IN / 510 | EKK5K |
| 103 | Fan motor for T-KJr2-IN / 110 | EX02E |
| | Fan motor for T-K4-IN / 110 & T-D2-IN / 510 | EKK25 |
| 104 | Burner holder gasket for T-KJr2-IN / 110 | EX00V |
| | Burner holder gasket for T-K4-IN / 310 & T-D2-IN / 510 | EKK0G |
| 105 | Burner gasket | EKK2X |
| 106 | Burner window | EKK2V |
| 107 | Rod holder gasket | EKK2W |
| 108 | Flame rod & AFR Rod for T-KJr2-IN / 110 | EX00R |
| | Flame rod & AFR Rod for T-K4-IN / 310 &T-D2-IN / 510 | EKK0E |
| 109 | Igniter rod for T-KJr2-IN / 110 | EX00S |
| | Igniter rod for T-K4-IN / 310 & T-D2-IN / 510 | EKK0F |
| 110 | Rod holder for T-KJr2-IN /110 | EX00U |
| | Rod holder for T-K4-IN / 310 & T-D2-IN / 510 | EKK32 |
| 111 | Rod cap | EKN61 |
| 112 | Burner damper for T-KJr2-IN / 110 | EK430 |
| | Burner damper for T-K4-IN / 310 & T-D2-IN / 510 | EK2AJ |
| 113 | Manifold gasket A | EKK2Y |
| 114 | Manifold gasket B | EKK2K |
| 115 | Fan damper for T-KJr2-IN / 110 | EK416 |
| | Fan damper for T-K4-IN / 310 & T-D2-IN / 510 | TU001 |
| 116 | Pressure port for T-K4-IN / 310 & T-D2-IN / 510 | EKK2D |
| 117 | Combustion chamber tube for T-K4-IN / 310 & T-D2-IN / 510 | EKK2N |
| 118 | Gas inlet | EKK1E |
| 119 | Gas inlet ring | EKK2Z |
| 120 | Igniter plate | EKK1B |
| 121 | Surge box plate for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK4H |
| | Surge box plate for T-D2-IN / 510 | EK436 |
| 150 | O-ring P18 NBR (Black) | EZP18 |
| 151 | O-ring P20 NBR (Black) | EK042 |
| 401 | Heat exchanger assembly for T-KJr2-IN / 110 | EK418 |
| | Heat exchanger assembly for T-K4-IN / 310 | EK406 |
| | Heat exchanger assembly for T-D2-IN / 510 | TU002 |
| 402 | Flow adjustment valve/Flow sensor for T-KJr2-IN / 110 & T-K4-IN / 310 | EK427 |
| | Flow adjustment valve/Flow sensor for T-D2-IN / 510 | EK438 |
| 403 | Bypass valve for T-D2-IN / 510 | EKK0U |
| 404 | Water inlet | EKK1U |
| 405 | Inlet drain plug | EKK2B |
| 406 | Inlet water filter | EKK2C |
| 407 | Inlet thermistor for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK4J |
| | Inlet thermistor for T-D2-IN / 510 | EKK38 |
| 408 | Outlet thermistor for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK55 |
| | Mixing thermistor for T-D2-IN / 510 | EKK1A |
| 409 | Water outlet | EKK1V |
| 410 | Outlet drain plug | EKK2E |
| 411 | Output thermistor for T-D2-IN / 510 | EKK2T |
| 412 | Hi-Limit switch for T-KJr2-IN / 110 & T-K4-IN / 310 | EM212 |
| | Hi-Limit switch for T-D2-IN / 510 | EKN34 |
| 413 | Overheat-cut-off fuse | EK333 |
| 414 | Heater | EKK2R |
| 415 | Inlet heater | EKK2P |
| 450 | Pipe heater fixing plate | EKK27 |
| 451 | Heater fixing plate 16 | EK031 |
| 452 | Fuse fixing plate 18 | EKK26 |
| 453 | Fuse fixing plate 14 | EK029 |
| 454 | O-ring P4 FKM | EZM04 |
| 455 | O-ring P6 FKM | EZM06 |
| 456 | O-ring P14 FKM | EZM14 |
| 457 | O-ring P15 FKM | EZM15 |
| 458 | O-ring P16 FKM | EZM16 |

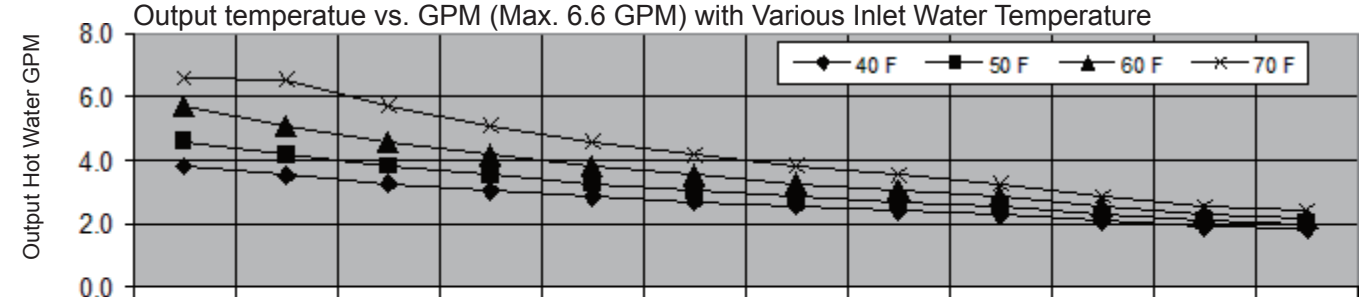
| Item # | Description | Part # |
|---|---|---|
| 459 | Fastener "4-11" for T-D2-IN / 510 | EKH30 |
| 460 | Fastener "14-22" | EKK24 |
| 461 | Fastener “16A” | EM192 |
| 462 | Fastener “16-25A” for T-D2-IN / 510 | EKK39 |
| 463 | Silicon ring | EKN50 |
| 701 | Computer board for T-KJr2-IN / 110 | EK420 |
| | Computer board for T-K4-IN / 310 | EK414 |
| | Computer board for T-D2-IN / 510 | EK439 |
| 702 | Transformer | EKH09 |
| 703 | Surge box | EK428 |
| 704 | AC120V wire | EK146 |
| 705 | Transformer wire for T-KJr2-IN / 110 | EK408 |
| | Transformer wire for T-K4-IN / 310 & T-D2-IN / 510 | EK440 |
| 706 | AC120V Power ON-OFF switch | EKK4V |
| 707 | Switch wire for T-KJr2-IN / 110 | EK407 |
| | Switch wire for T-K4-IN / 310 & T-D2-IN / 510 | EK441 |
| 708 | Gas valve wire for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK3K |
| | Gas valve wire for T-D2-IN / 510 | EKK10 |
| 709 | Flame rod wire for T-KJr2-IN / 110 | EK431 |
| | Flame rod wire for T-K4-IN / 310 | EKK3L |
| | Flame rod wire for T-D2-IN / 510 | EKK11 |
| 710 | EH-IG wire for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK3R |
| | EH-IG wire for T-D2-IN / 510 | EKK0Z |
| 711 | Igniter | EKN74 |
| 712 | High voltage igniter cable | EKK2M |
| 713 | Freeze protection thermostat | EKJ59 |
| 714 | Proportional gas valve wire for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK58 |
| | Proportional gas valve wire for T-D2-IN / 510 | EKK12 |
| 715 | Pump and multi cable for T-D2-IN / 510 | EKK36 |
| 716 | Thermistors wire for T-D2-IN / 510 | EKK1Z |
| 717 | RS-VG wire for T-D2-IN / 510 | EKK35 |
| 718 | Water valves wire for T-D2-IN / 510 | EKK33 |
| 719 | Computer board cover for T-KJr2-IN / 110 & T-K4-IN / 310 | EKK49 |
| | Computer board cover for T-D2-IN / 510 | EKK1M |
| 720 | Rubber grommet for Indoor models | EK148 |
| 721 | Cable strap for Indoor models | EW022 |
| 722 | Temperature remote controller for T-KJr2-IN / 110 & T-K4-IN / 310 | TK-RE02 |
| | Temperature remote controller for T-D2-IN / 510 | TM-RE30 |

## OUTPUT TEMPERATURE CHART

Chart is based on properly sized gas line

**T-KJr2-IN / 110 Model**

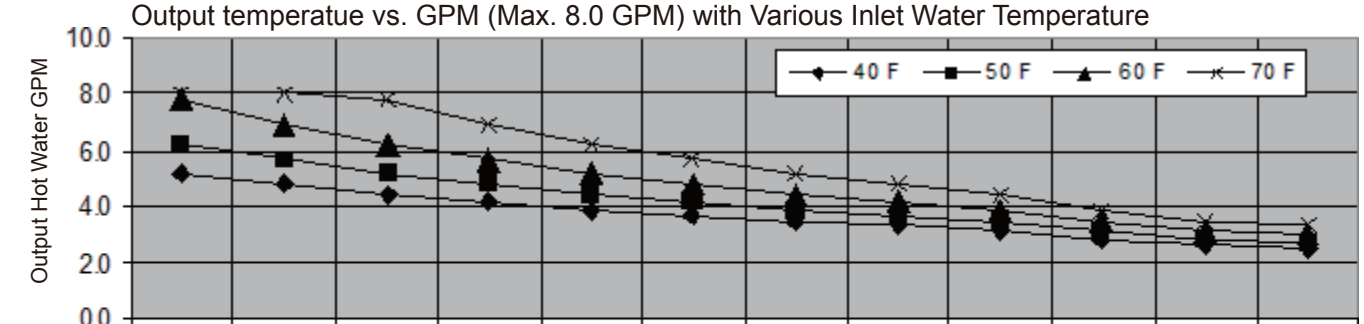
Output temperatue vs. GPM (Max. 6.6 GPM) with Various Inlet Water Temperature




| Incoming Temp. | Set Temp. 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 | 160 | 165 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 F | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.5 | 2.4 | 2.3 | 2.1 | 1.9 | 1.8 |
| 50 F | 4.6 | 4.2 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.5 | 2.3 | 2.1 | 2.0 |
| 60 F | 5.7 | 5.1 | 4.6 | 4.2 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.5 | 2.3 | 2.2 |
| 70 F | 6.6 | 6.6 | 5.7 | 5.1 | 4.6 | 4.2 | 3.8 | 3.5 | 3.3 | 2.9 | 2.5 | 2.4 |

**T-K4-IN / 310 Model**

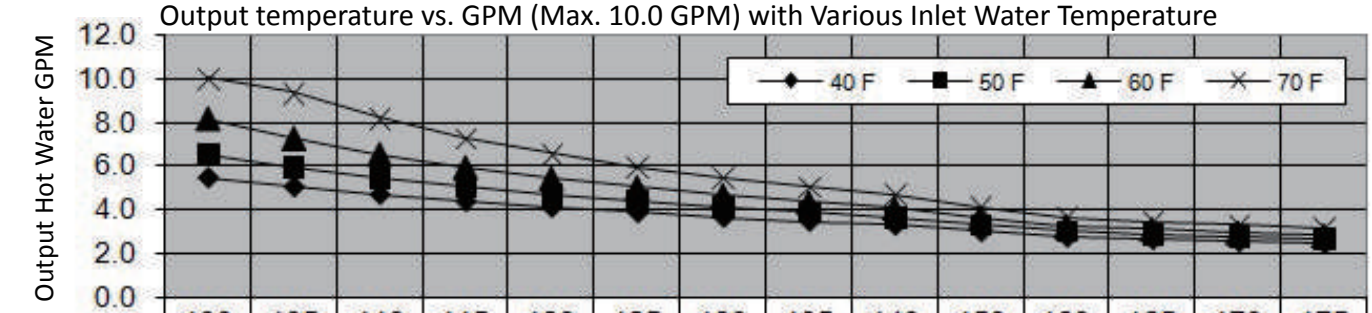
Output temperatue vs. GPM (Max. 8.0 GPM) with Various Inlet Water Temperature




| Incoming Temp. | Set Temp. 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 | 160 | 165 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 F | 5.2 | 4.8 | 4.4 | 4.1 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 2.8 | 2.6 | 2.5 |
| 50 F | 6.2 | 5.7 | 5.2 | 4.8 | 4.4 | 4.1 | 3.9 | 3.7 | 3.5 | 3.1 | 2.8 | 2.7 |
| 60 F | 7.8 | 6.9 | 6.2 | 5.7 | 5.2 | 4.8 | 4.4 | 4.1 | 3.9 | 3.5 | 3.1 | 3.0 |
| 70 F | 8.0 | 8.0 | 7.8 | 6.9 | 6.2 | 5.7 | 5.2 | 4.8 | 4.4 | 3.9 | 3.5 | 3.3 |

**T-D2-IN / 510 Model**

Output temperature vs. GPM (Max. 10.0 GPM) with Various Inlet Water Temperature




| Incoming Temp. | Set Temp. 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 | 160 | 165 | 170 | 175 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40 F | 5.4 | 5.0 | 4.7 | 4.3 | 4.1 | 3.8 | 3.6 | 3.4 | 3.3 | 3.0 | 2.7 | 2.6 | 2.5 | 2.4 |
| 50 F | 6.5 | 5.9 | 5.4 | 5.0 | 4.7 | 4.3 | 4.1 | 3.8 | 3.6 | 3.3 | 3.0 | 2.8 | 2.7 | 2.6 |
| 60 F | 8.1 | 7.2 | 6.5 | 5.9 | 5.4 | 5.0 | 4.7 | 4.3 | 4.1 | 3.6 | 3.3 | 3.1 | 3.0 | 2.8 |
| 70 F | 10.0 | 9.3 | 8.1 | 7.2 | 6.5 | 5.9 | 5.4 | 5.0 | 4.7 | 4.1 | 3.6 | 3.4 | 3.3 | 3.1 |

*When the set temperature is 55 °C (131 °F) or higher, maximum flow rate is limited to 8.0 GPM.

# LIMITED WARRANTY

1. The manufacturer warrants this product against defects in materials or workmanship as described in this document if installed within the United States or Canada. The manufacturer or its authorized Service Representative will, at its sole discretion, repair or replace any failed or defective mechanical or electrical parts, or components thereof, or, if the manufacturer or its authorized Service Representative cannot replace said parts, and repair is not commercially practicable, the manufacturer or its authorized Service Representative will refund the purchase price. The manufacturer or its authorized Service Representative may, at its sole discretion, use new, refurbished or reconditioned parts.

2. Warranty for all models

| Application Type | Heat Exchanger | Parts | Labor(1) |
|---|---|---|---|
| Single Family Domestic Hot Water | 15(2)(3) | 5 | 1 |
| Commercial or Multi-Family Domestic Hot Water | 10(2)(3) | | |
| Heating | 10(3)(4) | | |

(1) Limited Labor Coverage
- The manufacturer will provide for reasonable labor charges associated with warranty repairs or replacements within one (1) year from the date of purchase. The manufacturer will only pay directly to the service provider.
- Warranty service must be performed by an authorized Service Representative. A list of authorized Service Representatives is available upon request.
- All warranty claims and warranty service must be authorized and approved by the manufacturer.

(2) Includes recirculation and storage tank applications with proper circulation pump control (e.g. aquastat and/or timer).
- Lack of a proper pump control will reduce the heat exchanger and parts warranty to 3 years

(3) In all applications, the total of length of operation time must be less than 3,000 hours for the T-KJr2-IN / 110 and T-K4-IN / 310, and less than 9,000 hours for the T-D2-IN / 510.

(4) Includes dual-purpose applications (combination heating and domestic).

3. General terms of limited warranty:
This limited warranty gives you specific legal rights, and you may also have other rights which vary from State to State. The manufacturer will honor the warranty to the original retail buyer at the original location only, within the United States or Canada, and it is not transferable.
**THIS WARRANTY COVERS ONLY FAILED MECHANICAL AND ELECTRICAL PARTS DUE TO FACTORY DEFECTS UNDER NORMAL USAGE FOR THE PRODUCT'S INTENDED PURPOSES AND WITHIN THE APPLICABLE PERIOD SPECIFIED IN THE TABLE ABOVE. ONLY DIRECT DAMAGES SHALL BE RECOVERABLE BY A CLAIMANT UNDER THIS LIMITED WARRANTY AND, IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, BREACH OF WARRANTY, TORT LIABILITY (INCLUDING NEGLIGENCE), STRICT LIABILITY, INDEMNITY OR OTHERWISE WILL BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR INDIRECT CONSEQUENTIAL DAMAGES INCLUDING PROPERTY DAMAGE, PERSONAL DAMAGES, LOSS OF USE, OR INCONVENIENCE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.**

4. Limitation on Duration of Implied Warranties:
**ANY IMPLIED WARRANTIES ARISING UNDER STATE LAW, INCLUDING THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, SHALL IN NO EVENT EXTEND PAST THE EXPIRATION OF ANY WARRANTY PERIOD HEREUNDER. SOME STATES DO NO ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.**

5. **THIS WARRANTY WILL NOT COVER THE FOLLOWING:**
- Any product that is not installed or serviced by a licensed plumber, gas installer, or contractor.
- Damages due to accidents, abuse, misuse, improper installation, misapplication, or incorrect sizing.
- Damages due to fires, flooding, freezing, electrical surges, or any Acts of God.
- Damages due to unauthorized alterations, attachments, and/or repairs.
- Damages due to a lack of maintenance (e.g. water filter, water treatment system, vent blockage, etc.).
- Any product installed in an improper environment (e.g. corrosive, dusty, chemically contaminated, excessive lint, etc.).
- Freeze damage that occurs without taking proper preventive measures as described in the installation manual.
- Condensate damage due to improperly installed or lack of a condensate trap (drain).

- Any product not installed in compliance with all applicable local & provincial codes, ordinances, and good trade practices.
- Any product sold to or installed in areas outside of the fifty states (and the District of Columbia) of the United States of America and Canada.
- Any product installed in applications that cause the water heater to activate more than 300 times per day. (This averages to an activation every 5 minutes in a 24-hour period.)
- Any failures that are not due to defects in materials or workmanship (mechanical and/or electrical parts).
- Damages due to improper installation:
  - Gas: incorrect gas pipe sizing, incorrect gas meter sizing, incorrect gas type, and/or gas pressures that fall outside the product's specified range.
  - Water: incorrect water pipe sizing, water pressures that fall outside the product's specified range, recirculation flow rates that fall outside the product's specified range (air removal), and/or lack of proper methods of air removal in a closed-loop, circulation system. (See installation manual for details.)
  - Electric: supply power voltages that fall outside the product's specified range.
- Damages due to water quality:
  - Introduction of liquids other than potable water into the product.
  - Introduction of pool water, spa water, or any chemically treated water into the product.
  - Introduction of hard water measuring more than 7 grains per gallon (120 ppm) for single family domestic applications or more than 4 grains per gallon (70 ppm) for all other types of applications into the product.
  - Introduction of untreated or poorly treated well water into the product.
  - Introduction of water with pH levels less than 6.5 and greater than 8.5 into the product.

If you have any questions,
please call 1-888-479-8324