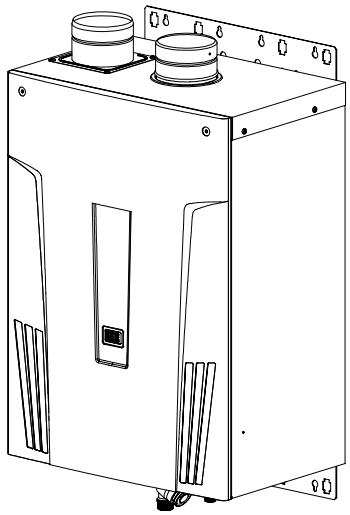
T-H2-DV / T-H2-OS

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



Gas Tankless Water Heater

Model T-H2-DV and T-H2-OS

Suitable for potable water heating and space heating

WARNING

This product must be installed and serviced by a licensed plumber, a licensed gas fitter, or a professional service technician. Improper installation and/or operation, or installation by an unqualified person, will void the warranty.

WARNING

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

FEATURING

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

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Toll Free: (888) 882-5244 USA
Toll Free: (877) 877-4953 CANADA

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SPECIFICATIONS
T-H2-DV and T-H2-OS

Natural Gas Input (Operating Range)		Min: 13,000 Btu/h Max: 199,000 Btu/h	
LPG Input (Operating Range)		Min: 13,000 Btu/h Max: 199,000 Btu/h	
Gas Connection		¾" NPT	
Water Connections		¾" NPT	
Condensate Drain Port Connection		½" NPT	
Water Pressure		15 - 150 psi*	
Natural Gas Pressure Inlet		Min. 5.0" WC Max. 10.5" WC	
LP Gas Pressure Inlet		Min. 8.0" WC Max. 14.0" WC	
Manifold Pressure of the **T-H2-DV**		Natural: 3.2" WC Propane: 5.5" WC	
Manifold Pressure of the **T-H2-OS**		Natural: 2.7" WC Propane: 4.6" WC	
Weight		73 lbs. (T-H2-DV) 70 lbs. (T-H2-OS)	
Dimensions		H25.6" x W18.5" x D12.4"	
Ignition		Electric Ignition	
Electric	Supply	120VAC (60Hz)	
	Consumption	Operation of the **T-H2-DV**	152 W (1.27A)
		Operation of the **T-H2-OS**	102W (0.85A)
		Standby	8.2 W (0.07A)
		Freeze-Protection	207 W (1.73A)

*40 psi or above is recommended for maximum flow

NOTE

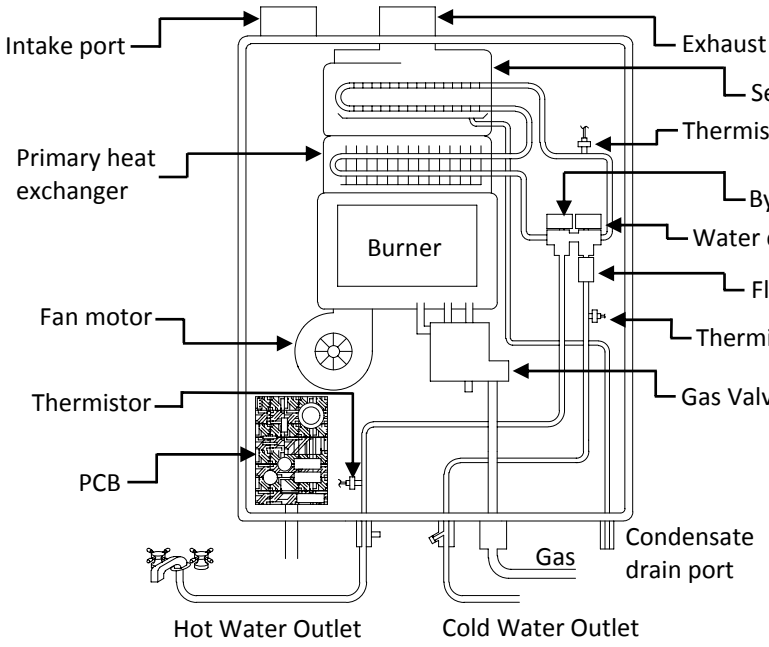
*Check the rating plate to ensure this product matches your specifications.

*In accordance with ANZI Z21.10.3 and SCAQMD Rule 1146.2, CO emission does not exceed 400 PPM for normal input

Takagi 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 T-H2-DV/T-H2-OS 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 with Takagi or its local representative.
- The T-H2-DV/T-H2-OS Water Heater is an on-demand, tankless water heater designed to efficiently supply endless hot water for your needs.
- The T-H2-DV/T-H2-OS are **high efficiency models** with an in-build secondary heat exchanger that absorbs latent heat from the exhaust gas.
- The principle behind the T-H2-DV/T-H2-OS Water Heater is simple:



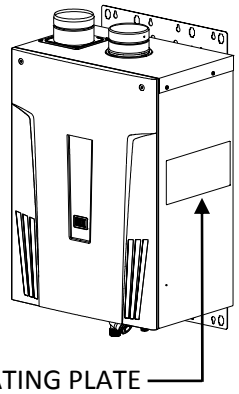
*This diagram illustrates Takagi's tankless water heater design concepts only and does not accurately represent to the T-H2-DV/T-H2-OS's physical description.

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 automatically ignites the burner.
5. Water circulates through the heat exchanger and then gets hot.
6. The computer will modulate the gas supply valve and water flow to produce the right amount of hot water at the correct temperature.
7. When the tap is turned off, the unit shuts down.

SAFETY GUIDELINES

GENERAL

1. Follow all local codes, or in the absence of local codes, follow the most recent edition of the National Fuel Gas Code: ANSI Z223.1/NFPA 54 in the USA or CAN/CSA B149.1 Natural Gas, Propane Installation Code in Canada.
2. Properly ground the unit in accordance with all local codes or in the absence of local codes, with the National Electrical Codes: ANSI/NFPA 70 in the USA or CSA standard C22.1 Canada Electrical Code Part 1 in Canada.
3. Carefully plan where you intend to install your T-H2-DV/T-H2-OS 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 p. 5).
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 and consult with TAKAGI**.
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.



WARNING

- Water temperatures over 125°F can cause severe burns instantly or death from scalding. The water temperature is set at 120°F (49°C) from the factory to minimize any scalding risk. Before bathing or showering always check the water temperature.

Prohibited

- 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 p. 19 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 Prevention System only works if the unit has electrical power. The warranty will not be covered if the heat exchanger is damaged due to freezing. Refer to the section on the Freeze Prevention System on p. 39 for more information.

INSTALLATION

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 at the beginning of this manual.

WARNING

- **Installation and service must be performed by a qualified installer (for example, a licensed plumber or gas fitter), otherwise the warranty by Takagi will be void.**
- **The installer (licensed professional) is responsible for the correct installation of your T-H2-DV/T-H2-OS Water Heater and for compliance with all national, state/provincial, and local codes.**

PLEASE READ THIS MANUAL CAREFULLY AND FOLLOW ALL DIRECTIONS.

CAUTION

- **The warranty will not cover damage caused by water quality.**
  - Only potable water or potable water / glycol mixtures 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.

- Although the T-H2-DV/T-H2-OS is designed to operate with minimal sound, **TAKAGI 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.**

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. Takagi 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.

- T-H2-DV/T-H2-OS are high efficiency products that create condensation. A condensation drain tube must be installed with the T-H2-DV/T-H2-OS to discharge condensate into a drain outlet. For more information, refer to p. 20.

- **TAKAGI does not recommend installing unit in an attic due to safety issues.** If you install your T-H2-DV/T-H2-OS in an attic:
  - Make sure your unit will have enough combustion air and proper ventilation.
  - Keep the area around your T-H2-DV/T-H2-OS clean. When dust collects on the flame sensor, the water heater will shut down on errors.
  - Locate 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.

GENERAL

1. Follow all local codes, or in the absence of local codes, follow the most recent edition of the National Fuel Gas Code: ANSI Z223.1/NFPA 54 in the USA or CAN/CSA B149.1 Natural Gas, Propane Installation Code in Canada.

2. The manifold gas pressure is preset at the factory. It is computer controlled and should not need adjustment.

3. Maintain proper space for servicing. Install the unit so that it can be connected or removed easily. Refer to p. 8, p.9 and p. 10 for proper clearances.

4. The electrical connection requires a means of disconnection, to terminate power to the water heater for servicing and safety purposes.

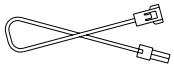
5. If you will be installing the unit in a contaminated area with a high level of dust, sand, flour, aerosols or other contaminants/chemicals, they can become airborne and enter and build up within the fan and burner causing damage to the unit.

6. Particles from flour, aerosols, and other contaminants may clog the air vent or reduce the functions of the rotating fan and cause improper burning of the gas. Regularly ensure that the area around the unit is dust- or debris-free; regular maintenance is recommended for these types of environment.

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 p. 15).

INCLUDED ACCESSORIES

Check that the installation manual, the communication cable, the warranty card and the TH-PA01 PVC adaptor are included with the unit (the adaptor comes with the T-H2-DV model only).
For details on how to connect the adaptor, refer to P.13.

1. Manual  Qty: 1	**2. Communication cable**  Qty: 1
3. Warranty Card  Qty: 1	**4. TH-PA01 PVC adaptor (T-H2-DV model only)**  Qty: 1

OPTIONAL ITEMS

1. TM-RE30 Temperature Remote Controller

The TM-RE30 Temperature Remote Controller has two functions. It allows the output temperature from the T-H2-DV/T-H2-OS to be adjusted within the range of 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 100°F, 105°F, 110°F, 115°F, 120°F, 125°F, 130°F, 135°F, 140°F, 145°F, 150°F, 155°F, 160°F, 165°F, 170°F, 175°F, 180°F and 185°F. See the trouble shooting section for information on possible error codes.

2. TH-PC02 Pipe cover

The TH-PC02 Pipe cover protects the plumbing pipes to the T-H2-DV/T-H2-OS from unexpected adjustments. This pipe cover is fixed to the bottom of the T-H2-DV/T-H2-OS, which hides the plumbing and improves the visual aspects of the whole installation for the water heater.

3. TK-KPWL4 and TK-KPWH4 T-Vent Wall thimble with Termination

TK-KPWL4

Louver Termination

TK-KPWH4

Hood Termination

These terminations are used when venting out through the wall and are compatible with the T-Vent pipe system.
These terminations are special stainless steel vents for gas appliances and are UL listed as Category II, III and IV. There are two types of terminations: the Louver termination and the Hood termination. For different wall thicknesses, there are 3 ranges of lengths available (refer to the T-Vent brochure for details).
Install these vent terminations in accordance with their installation instructions and any applicable local codes.

4. TH-NT01 Neutralizer kit

The TH-NT01 Neutralizer assembly neutralizes the condensate (acidic water) that forms in the secondary heat exchanger of the T-H2-DV/T-H2-OS.
It connects to the condensate drain port of the T-H2-DV/T-H2-OS by using connectors neutralizer kit. Refer to p. 21 for the details.

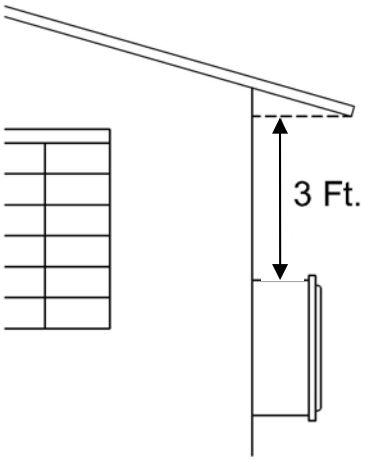
WARNING FOR INSTALLATIONS

FOR YOUR SAFETY, READ BEFORE INSTALLATION:

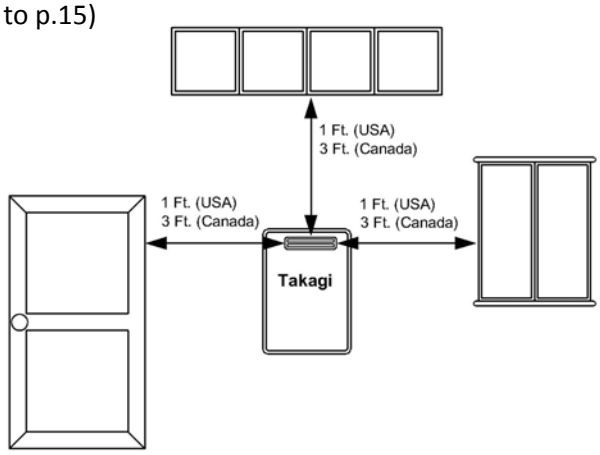
Do not install the heater where water, debris or flammable vapors may get into the flue terminal. This may cause damage to the heater and void the warranty.

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.

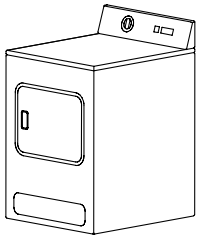
Do not install this water heater under an overhang less than 3 feet from its top or eaves. The area under an overhang must be open to three sides. (T-H2-OS only)



Do not install the water heater vent terminator within 1 ft. in the USA of any air intake or building opening, and with in 3 ft. in Canada of any air intake or building opening. (T-H2-OS only) (Refer to p.15)



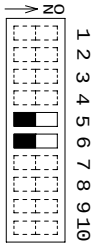
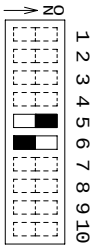
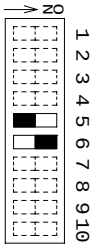
Do not install next to a dryer or any source of airborne debris that can be trapped inside the combustion chamber, unless the system is direct vented.

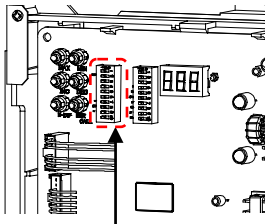


HIGH-ALTITUDE INSTALLATIONS

Check the elevation where your water heater is installed. Set dipswitches shown in the table below depending on the altitude. These dipswitches (No. 5 and No. 6) are on the computer board on the **left bank only.**

Left bank of dipswitches

Altitude	0 to 2,500 ft (DEFAULT)	2,500 to 4,000 ft	4,000 to 5,000 ft	Over 5,000 ft
Switch No.5	OFF	ON	OFF	Consult **TAKAGI** Technical Dept. at 1-888-882-5244
Switch No.6	OFF	OFF	ON	
				



Left bank of dipswitches

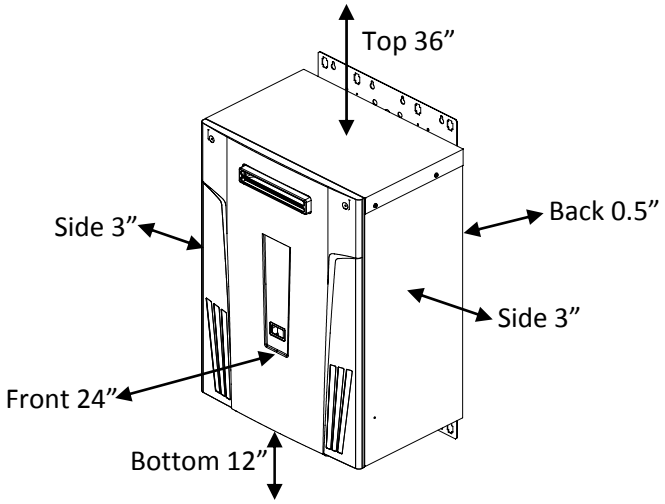
The dark squares indicate the direction the dipswitches should be set to.

DO NOT adjust any dipswitches on the right bank.

T-H2-OS INSTALLATION

1. **Install the T-H2-OS only in areas with mild, temperate climates.**
2. The T-H2-OS shall be wall-mounted or mounted on a stand. Locate the T-H2-OS in an open, unroofed area and maintain the following minimum clearances:

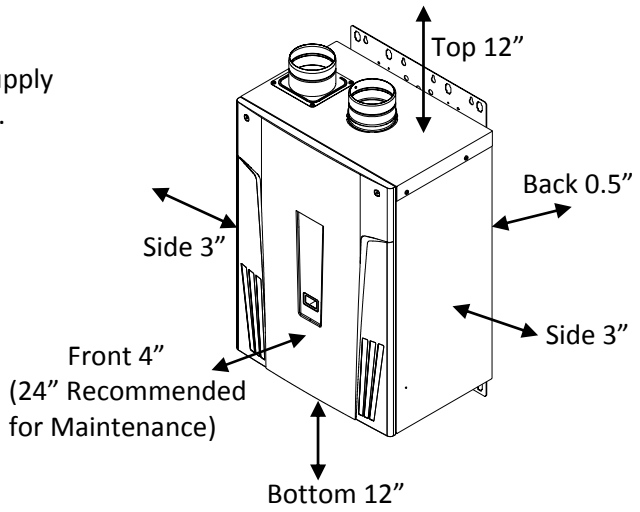
- There is a 3” clearance from the left and right sides of the unit to combustible and non-combustible surfaces. However, if any portion or area of the surface is exposed to the exhaust fumes (i.e. directly to the sides of the vent cap), that surface must be at least 24” away.
- Keep the clearances.



T-H2-DV INSTALLATION

T-H2-DV is equipped with a thermistor and hi-limit switch for the exhaust gas, detecting excess temperatures within the flue and enabling the unit to safely stop operations if needed. These components are always monitoring exhaust gas conditions in order to prevent heat damage to PVC (Plastic) venting if PVC is used.
If the exhaust gas temperature exceeds 140°F, these components will enable the unit to safely stop operations. (For the T-H2-OS model, these components are not available since there's no exhaust venting required.)

- T-H2-DV requires a 4" make-up intake air supply pipe. The intake pipe must be sealed airtight.
- Air supply pipe can be made of ABS, PVC, galvanized steel, corrugated stainless steel, or Category lll / IV stainless steel.
- Sidewall venting is recommended for the T-H2-DV. Vertical venting (roof termination) is acceptable.
- **TAKAGI** recommends running the exhaust vent and the intake pipe as parallel as possible.
- The TH-PA01 adaptor is used to make the connection between the T-H2-DV vent collar and PVC vent pipe easier and for maintenance purposes.



Keep the clearances.

VENTING INSTRUCTIONS

-General-

WARNING

Improper venting of this appliance can result in excessive levels of carbon monoxide which can result in severe personal injury or death.

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 T-H2-DV must be vented in accordance with the section "Venting of Equipment" of the latest edition of the Natural Fuel Gas Code: The ANSI Z223.1, All applicable local building codes, Section 7 of the CAN/CSA B149.1 Natural Gas in Canada, Propane Installation Code in Canada.
The use of venting materials approved for Category III/ IV appliances is recommended whenever possible. However, T-H2-DV may also be vented with plastic pipe materials such as PVC. For details, please refer to the Exhaust Vent (PVC Vent) section on p. 13. Vent installations in Canada which utilize plastic vent systems must use venting that complies with ULC S636.

-Exhaust vent (PVC & ABS vent) -

The T-H2-DV can be connected with PVC or ABS venting (temperature rated up to 149°F). However, **TAKAGI** recommends PVC (or ABS) venting certified to ULC S636 standards.

Item	Material	United States	Canada
Exhaust pipe & Fittings	Schedule 40 PVC	ANSI/ASTM D1785	ULC S636 Certified Materials Only
	PVC-DWV	ANSI/ASTM D2665	
	Schedule 40 CPVC	ANSI/ASTM F441	
	Schedule 40 ABS-DWV	ANSI/ASTM D2661	
Pipe Cement/Primer	PVC	ANSI/ASTM D2564	
	CPVC	ANSI/ASTM F493	
	ABS	ANSI/ASTM D2235	
NOTE: Do NOT Use Cellular Foam Core Pipe			

- The maximum length of exhaust vent piping must not exceed 50 ft. (deducting 5 ft. for each elbow used in the venting system). Do not use more than 5 elbows.
- When the horizontal vent run exceeds 5 ft., support the vent run at 3 ft. intervals with overhead hangars.

Diameter	Max. No. of Elbow	Max. Vertical & Horizontal (Total) Vent Length
4”	**5**	**50 ft.**

***For each elbow added, deduct 5 ft. from max. Vent length.**

No. of Elbows	Max. Vertical or Horizontal Length
0	**50 ft.**
1	**45 ft.**
2	**40 ft.**
5	**25 ft.**

For details on the vent connection to the T-H2-DV, refer to P.13.

-Exhaust vent (Stainless steel vent)-

This is a Category IV appliance and must be vented accordingly. The vent system must be sealed air tight. 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 160°F. For best results, a vent system should be as short and straight as possible.

- This T-H2-DV is a Category IV appliance and must be vented accordingly with any 4” vent approved for use with Category III / IV or Special BH type gas vent.
- **TAKAGI recommends the “T-Vent” line manufactured by TAKAGI** (Refer to Takagi’s “T-Vent” brochure for details). However, the following are also UL listed manufacturers: ProTech Systems Inc. (FasNSeal), Flex-L Inc., Z-Flex Inc. (Z-Vent III), Metal-Fab Inc., and Heat-Fab Inc. (Saf-T 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 / IV approved or Special BH vent pipe)**.**
- The maximum length of exhaust vent piping must not exceed 50 ft. (deducting 5 ft. for each elbow used in the venting system). Do not use more than 5 elbows.
- When the horizontal vent run exceeds 5 ft., support the vent run at 3 ft. intervals with overhead hangars.

Diameter	Max. No. of Elbow	Max. Vertical & Horizontal (Total) Vent Length
4"	5	50 ft.

***For each elbow added, deduct 5 ft. from max. Vent length.**

No. of Elbows	Max. Vertical or Horizontal Length
0	50 ft.
1	45 ft.
2	40 ft.
5	25 ft.

-Vent termination -

WARNING Improper installation can cause nausea or asphyxiation, severe injury or death from carbon monoxide and flue gases poisoning. Improper installation will void product warranty.

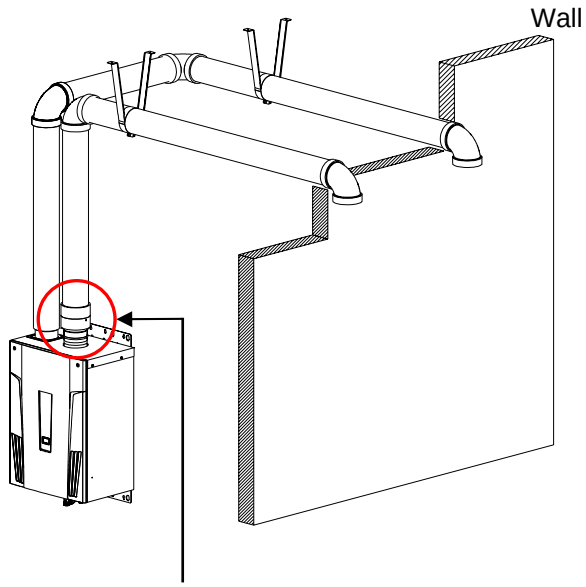
- The vent terminator provides a means of installing vent pipe through the building wall and must be located in accordance with ANSI Z223.1/NFPA 54, or in Canada with CAN/CSA-B149.1 and local applicable codes.
- A proper sidewall direct-vent terminator is recommended when the water heater is vented through a sidewall.

General rules for venting the T-H2-DV water heater are:

1. Place the water heater as close as possible to the vent terminator.
2. The vent collar of the water heater must be fastened directly to an unobstructed vent pipe or TH-PA01 adaptor.
3. Do not weld the vent pipe to the water heater collar.
4. Do not cut the vent collar of the unit.
5. The weight of the vent stack must not rest on the water heater.
6. The vent must be easily removable from the top of the water heater for normal service and inspection of the unit.
7. The water heater vent must not be connected to any other gas appliance or vent stack.
8. Avoid locating the water heater vent terminator 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.
9. Avoid using an oversized vent pipe or using extremely long runs of the pipe.
10. Locate the vent terminator so that it cannot be blocked by any debris, at any time. Most codes require that the terminator be at least 12 inches above grade, but the installer may determine if it should be higher depending on the job site condition and applicable codes.
11. For rooftop venting, a rain cap or other form of termination that prevents rain water from entering into the water heater must be installed.

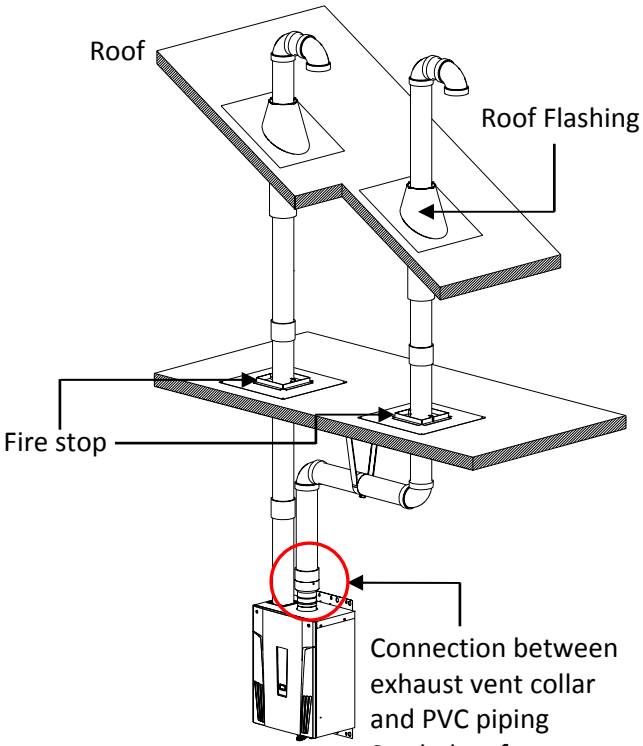
-PVC Venting Illustrations-

<Horizontal Installation Diagram>



Connection between exhaust vent collar and PVC piping
See below for instructions.

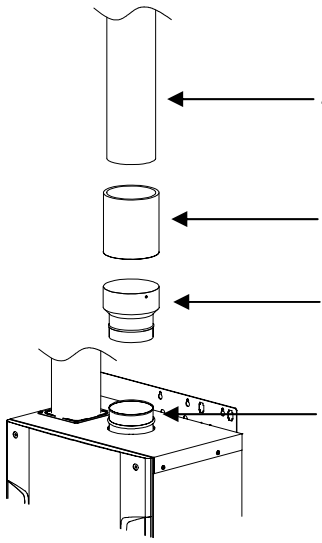
<Vertical Installation Diagram>



Connection between exhaust vent collar and PVC piping
See below for instructions.

<How to install PVC venting with the T-H2-DV>

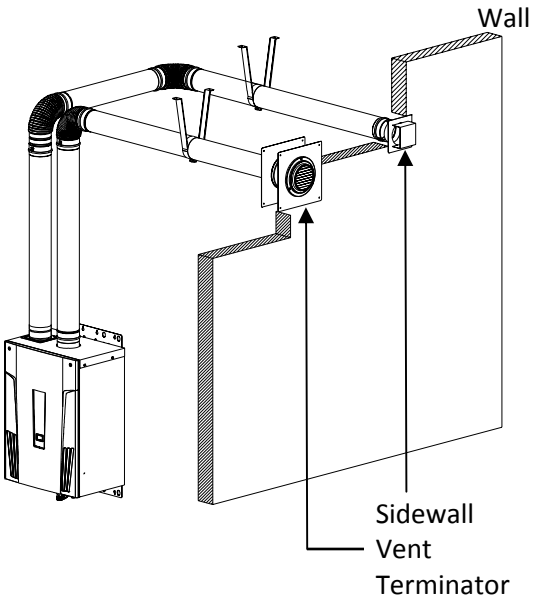
1. Connect the TH-PA01 PVC adaptor* directly on the exhaust vent collar of the T-H2-DV.
2. Connect a 4” PVC coupler to the TH-PA01 PVC adaptor.
3. From the coupler, continue on the rest of the vent run with 4” PVC pipe.



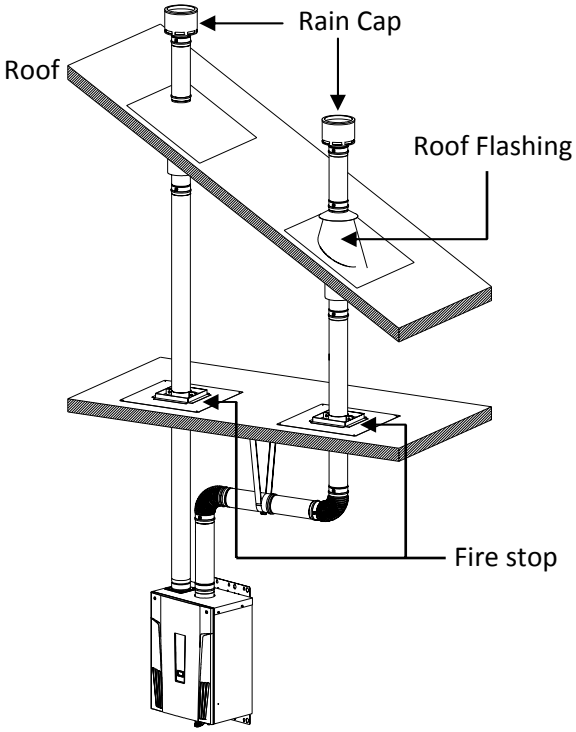
*TH-PA01 PVC adaptor is included with the T-H2-DV.

-Stainless steel Venting illustrations-

Horizontal Installation Diagram

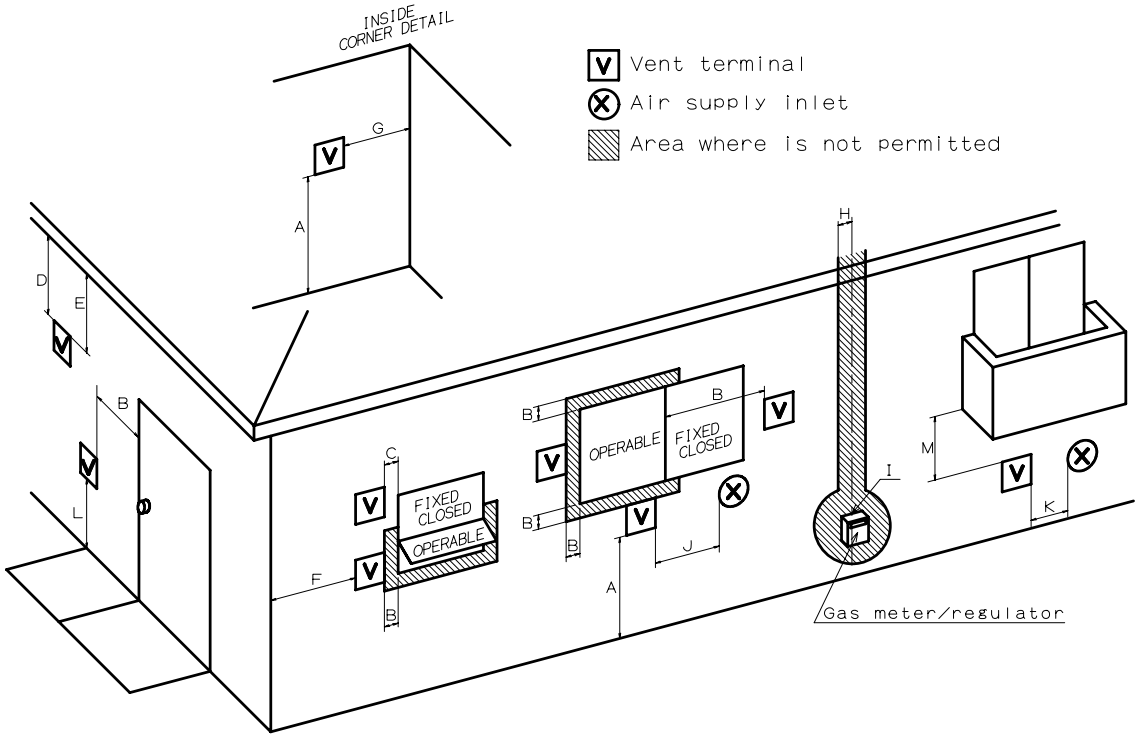


Vertical Installation Diagram



- Regarding the clearances from the exhaust terminator to the air inlet or opening, refer to the next few pages.
- Follow all vent system manufacturer's instructions and all local codes.
- Do not common vent or connect any vent from other appliances to the T-H2-DV vent.
- Use 4" Category III /IV approved or Special BH, single or double wall stainless steel vent pipe.

-Vent clearances-

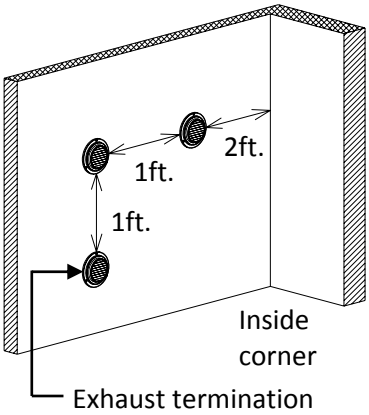


		Canada	U.S.A	
		Direct vent and other than Direct Vent	Direct vent	Other than Direct Vent
A	Clearance above grade, veranda, porch, deck, or balcony.	1 foot	1 foot	1 foot
B	Clearance to window or door that may be opened.	3 feet	1 foot	4 feet from below or side opening. 1 foot from above opening.
C	Clearance 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 ANSI Z223.1 / NFPA 54 or CAN/CSA-B149.1, please use clearances in accordance with local installation codes and the requirement of the gas supplier.				

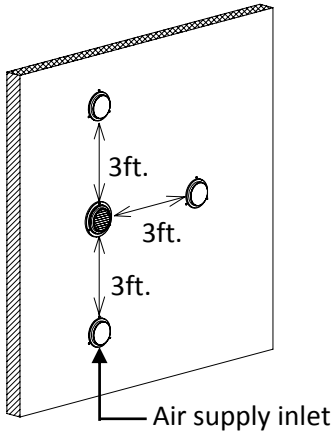
-Additional clearances -

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.

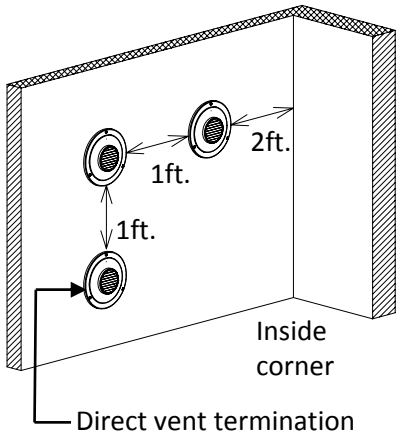
For sidewall terminations



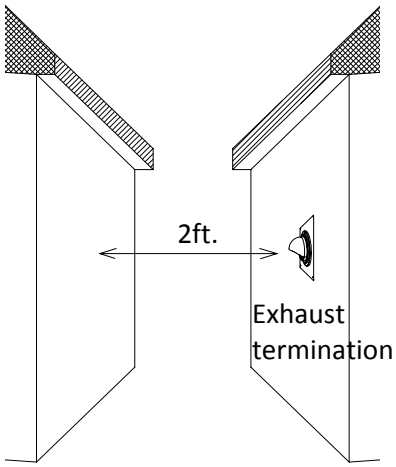
For multiple sidewall exhaust terminations (e.g. multi-unit systems), an exhaust termination must be at least 1 ft. away from another exhaust termination. An exhaust termination must also be at least 2 ft. away from an inside corner (if the adjacent wall is less than 2 ft. of length, the minimum required 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 3 ft. away from each other, no matter the orientation.

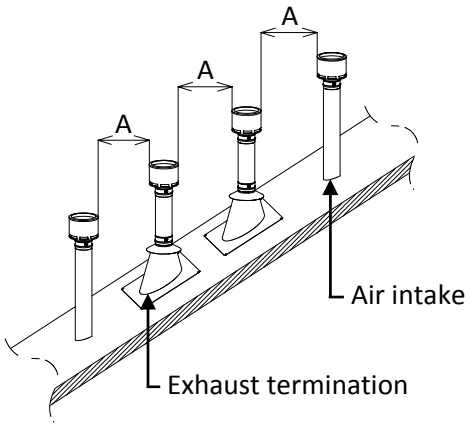


For multiple-unit, direct-vent sidewall terminations that combine the intake and exhaust into a single penetration, space each direct-vent termination at least 1 ft. away from each other, no matter the orientation. A direct-vent termination must also be at least 2 ft. away from an inside corner (if the adjacent wall is less than 2 ft. of length, the minimum required distance away from the inside corner will be equal to the length of that adjacent wall).

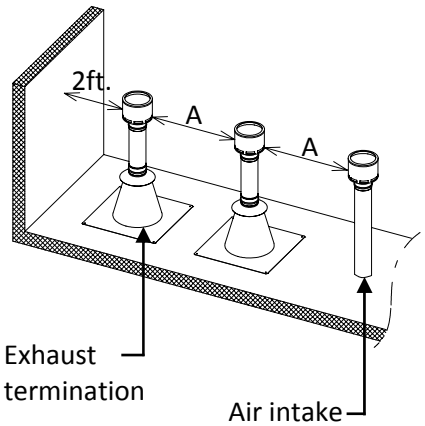


Exhaust and/or direct-vent sidewall terminations should be at least 2 ft. away from an opposite surface/wall. Do not place the termination directly in front of an opening into a building.

For rooftop terminations



A: in accordance with local codes



For multiple-unit rooftop terminations (whether for standard indoor 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. In the absence of such a code, an exhaust termination must be a horizontal distance of at least 2 ft. away from a wall or surface.

GAS SUPPLY AND GAS PIPE SIZING

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.

WARNING

- **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 vise versa cannot be done in the field. Contact your local distributor to get the correct unit for your gas type. Conversion done by anyone other than the manufacturer or Takagi Service Representative will void all warranty. **Takagi is not liable for any property and/or personal damage resulting from unauthorized conversions.**

***Check that the type of gas matches the rating plate first.**

1. The minimum and maximum inlet gas pressures are:

Gas type	Inlet gas pressure
Natural Gas	Min. 5.0” WC – Max. 10.5” WC
Propane Gas	Min. 8.0” WC – Max. 14.0” WC

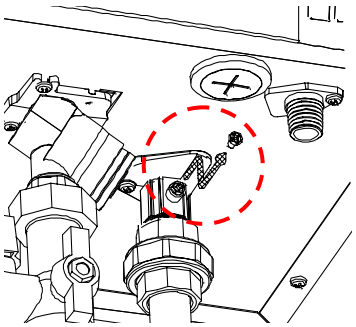
2. Gas pressure below this specified range for the T-H2-DV/T-H2-OS and/or insufficient gas volume will adversely affect performance. These pressures are measured when the T-H2-DV/T-H2-OS is in full operation.

3. 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.

4. Until testing of the main gas line supply pressure is completed, ensure the gas line to the T-H2-DV/T-H2-OS is disconnected to avoid any damage to the water heater.

-Measuring inlet gas pressure -

The T-H2-DV/T-H2-OS 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 T-H2-DV/T-H2-OS shown in the diagram to the right.
3. Connect the manometer to the pressure port.

4. Re-open the manual gas valve. Check to see that there are no gas leaks. Open some of the fixtures that use the highest flow rate to turn on the T-H2-DV/T-H2-OS.
5. Check the inlet gas pressure. When T-H2-DV/T-H2-OS is on maximum burn, the manometer should read from 5.0" to 10.5" WC for Natural gas, from 8.0" to 14.0" WC for Liquid Propane.

Size the gas pipe appropriately to supply the necessary volume of gas required for the T-H2-DV/T-H2-OS (199,000 BTU/h for both Natural Gas and Liquid Propane) using ANSI233.1/NFPA 54 in the USA or CAN/CSA B149.1 in Canada or local codes. Otherwise, flow capabilities and output temperatures will be limited.

1. Install a manual gas shut-off valve between the T-H2-DV/T-H2-OS and the gas supply line.
2. When the gas connections are completed, it is necessary to perform a gas leak test either by applying soapy water to all gas fittings and observing for bubbles or by using a gas leak detection device.
3. Always purge the gas line of any debris and/or water before connecting to the gas inlet.

-Natural Gas Supply Piping-

Maximum Delivery Capacity of Cubic Feet of Gas per Hour of IPS Pipe Carrying Natural Gas of 0.60 Specific Gravity Based on Pressure Drop of 0.5" WC

Based on Energy Content of 1000 BTU/Cubic Ft.: T-H2-DV/T-H2-OS requires 199 Cubic Ft./hr.

Unit: Cubic Feet per Hour

Pipe Size	Length in Feet												
Inches	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
¾"	363	249	200	171	152	138	127	118	111	104	93	84	72
1"	684	470	377	323	286	259	239	222	208	197	174	158	135
1 ¼"	1,404	965	775	663	588	532	490	456	428	404	358	324	278
1 ½"	2,103	1,445	1,161	993	880	798	734	683	641	605	536	486	416
2"	4,050	2,784	2,235	1,913	1,696	1,536	1,413	1,315	1,234	1,165	1,033	936	801

-Propane (LP) Gas Supply Piping-

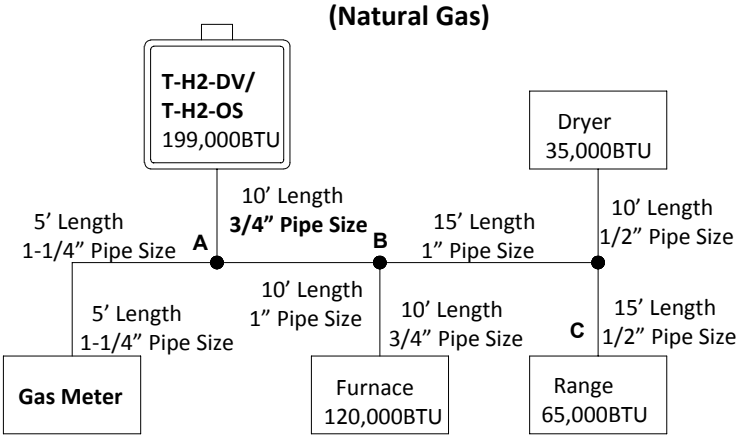
Maximum Capacity of Propane (LP) Gas Based on 11" WC supply pressure at a 0.5" WC pressure drop

Unit: kBTU per Hour

Pipe Size	Length in Feet												
Inches	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
¾"	567	393	315	267	237	217	196	185	173	162	146	132	112
1"	1,071	732	590	504	448	409	378	346	322	307	275	252	213
1 ¼"	2,205	1,496	1,212	1,039	913	834	771	724	677	630	567	511	440
1 ½"	3,307	2,299	1,858	1,559	1,417	1,275	1,181	1,086	1,023	976	866	787	675
2"	6,221	4,331	3,465	2,992	2,646	2,394	2,205	2,047	1,921	1,811	1,606	1,496	1,260

For more information, please see the next page.

Gas Sizing Example
(Natural Gas)



Based on Energy Content of 1000BTU/Cubic Ft:

Divide each appliance's BTU requirement by 1000BTU to get the appliances Cubic Ft. requirement.

Takagi into account the distance the appliance is from the gas meter, look in the above gas chart to properly size the line.

For sections of the gas line supplying gas to more than one appliance (Ex: Point A to Point B), add up the cubic ft. requirements of the appliances that are being supplied by that section, and size to the farthest appliance.

For Example: The section from A to B supplies gas to the furnace, range, and dryer. Adding up the BTU requirements and dividing by 1000 yields a cubic ft. requirement of 220 cubic ft. of gas. The farthest appliance is the range, which is 50 ft. away from the meter. Looking at the above chart, and under the column of 50ft., Section A to B needs to be 1" in order to supply 220 cubic ft.

WATER CONNECTIONS

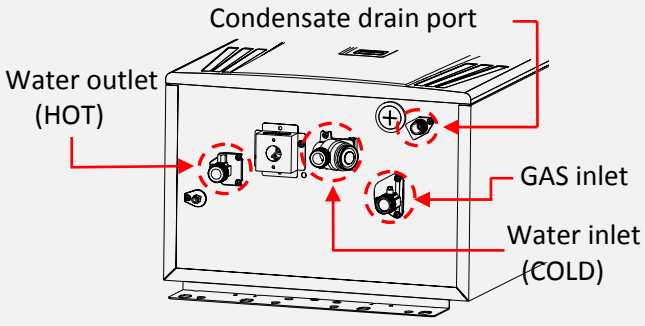
FOR YOUR SAFETY, READ BEFORE OPERATING:

Do not use this water heater if any part has been submersed under water. Immediately call a licensed professional to inspect the water heater and to replace any damaged parts.

1. All pipes, pipe fittings, valves and other components, including soldering materials, must be suitable for potable water systems.
2. A manual shut off valve must be installed on the cold water inlet to the water heater between the main water supply line and the T-H2-DV/T-H2-OS.
3. In addition, a manual shut off valve is also recommended on the hot water outlet of the unit. If the T-H2-DV/T-H2-OS is installed within, or subjected to, a closed loop water system, a thermal expansion tank must be installed.
4. **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.**
5. 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 flow.

CAUTION

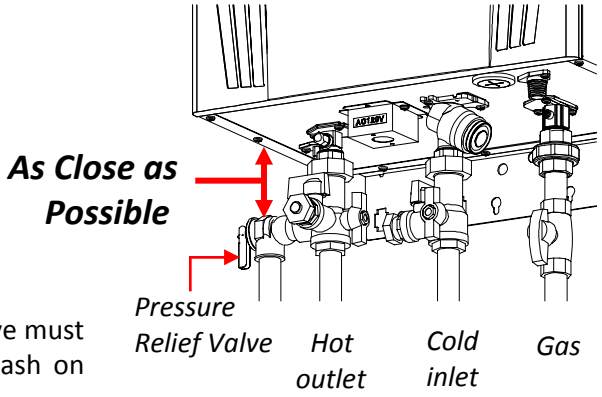
Do not reverse the hot outlet and cold inlet connections to the T-H2-DV/T-H2-OS Water Heater. This will not properly active the water heater.



PRESSURE RELIEF VALVE

The T-H2-DV/T-H2-OS has a high-temperature shut off switch built in as a standard safety feature (called a Hi-Limit switch) therefore a **"pressure only"** relief valve is required.

1. This unit does not come with an approved pressure relief valve.
2. An approved pressure relief valve must be installed on the hot water outlet.
3. The pressure relief valve must conform to ANSI Z21.22 or CAN 1-4.4 and installation must follow local code.
4. The discharge capacity must be at least 199,000 BTU/h.
5. The pressure relief valve needs to be rated for a maximum of 150 psi.

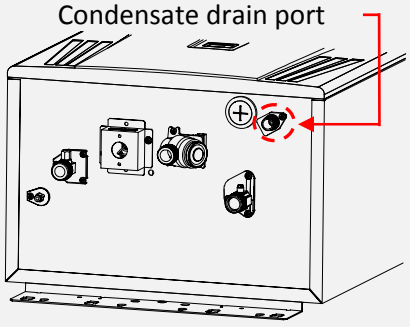


6. The discharge piping for the pressure relief valve must be directed so that the hot water cannot splash on anyone or on nearby equipment.
7. Attach the discharge tube to the pressure relief valve and run the end of the tube to within 6" from the floor. This discharge tube must allow free and complete drainage without any restrictions.
8. If the pressure relief valve installed on the T-H2-DV/T-H2-OS discharges periodically, this may be due to a defective thermal expansion tank or defective pressure relief valve.
9. The pressure relief valve must be manually operated periodically to check for correct operation.

CONDENSATE DRAIN

- The T-H2-DV/T-H2-OS does not include a built-in condensate neutralizer cartridge for reducing the pH level of condensate water. If local codes dictate that condensate must be neutralized prior to drainage, a condensate neutralizer must be installed. As an option, Takagi offers the TH-NT01 Neutralizer assembly (sold separately).
- In the absence of applicable local codes and regulations, **TAKAGI** recommends that condensate be disposed of into a standard drain. Connect a drain tube from the condensate drain port (shown below) located on the bottom of the T-H2-DV/T-H2-OS to a standard drain.

- **Follow all code requirements of the local authority on condensate neutralizers and whether or not they are required for the installation.**



-Condensate Drain Connections-

WARNING

- **Discharge condensate (acidic water) in accordance with all local codes and common safety practices.**

The T-H2-DV/T-H2-OS are high efficiency condensing water heaters that produce condensate (acidic water). The acidic condensate generated in the secondary heat exchanger can be neutralized by the TH-NT01 Neutralizer.

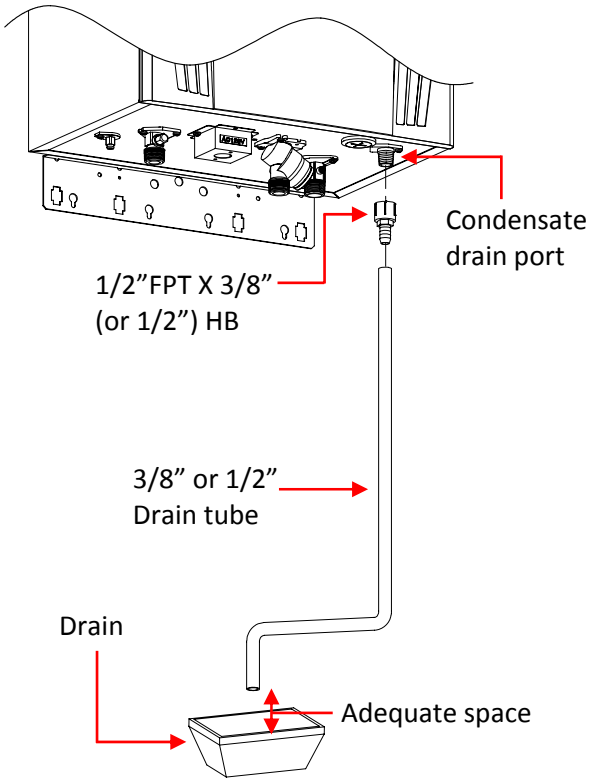
Case A: If a neutralizer is not required

1. Connect a 1/2" X 3/8" (or 1/2") HB Adaptor to the condensate drain port at the bottom of the T-H2-DV/T-H2-OS.
2. Connect a condensate drain tube to the 1/2" X 3/8" (or 1/2") HB Adaptor. **TAKAGI** recommends the material of the condensate tube be either EPDM or PVC.
3. Leave an adequate amount of space between the end of the drain tube and the actual drain, to facilitate proper drainage.

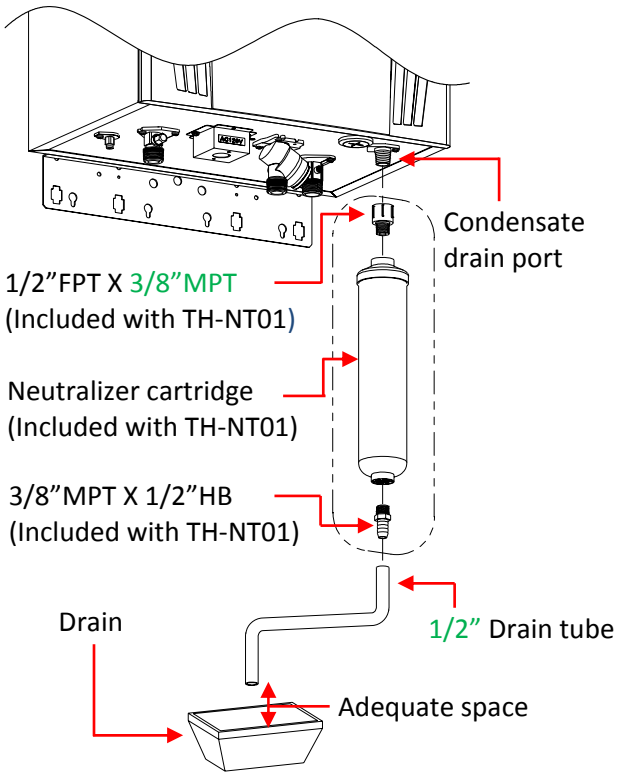
Case B: If a neutralizer is required (installing the TH-NT01 Neutralizer assembly)

1. Connect the 1/2" FPT X 3/8" MPT Adaptor to the condensate drain port at the bottom of the T-H2-DV/T-H2-OS.
2. Connect the TH-NT01 Neutralizer to the 3/8" MPT connection of the adaptor. There is a flow direction indicator on the neutralizer. Please orient the neutralizer in the proper direction.
3. Connect a 1/2" drain tube to the other end of neutralizer.
4. Leave an adequate amount of space between the end of the drain tube and the actual drain, to facilitate proper drainage.

Case A



Case B



WARNING

- The condensate drain is at atmospheric pressure (non-pressurized) and therefore must be allowed to drain freely with gravity only. Please ensure that there are no blockages along the condensate drain tube. **All portions of the condensate drain (neutralizer and drain tube) must be at a lower elevation than the T-H2-DV/T-H2-OS to prevent condensate water from building up inside the heat exchanger.**
- Condensate cannot be effectively neutralized if the neutralizer elements inside the TH-NT01 have been completely consumed. Condensate will remain acidic and can possibly cause damage to items such as pipes, concrete, etc., if drained improperly.
- The TH-NT01 Neutralizer cartridge is designed to last for 3 years before replacement. However, the actual life of the neutralizer may vary, depending on the application and usage. Please ensure that the cartridge is properly replaced before the neutralizer elements have been completely consumed.
- All preventative measures and safety practices must be adhered to when draining condensate. **TAKAGI** will not be responsible for any damage caused by condensate.
- A drain pan, or other means of protection against water damage, is required to be installed under the water heater in case of leaks.

ELECTRICAL CONNECTIONS

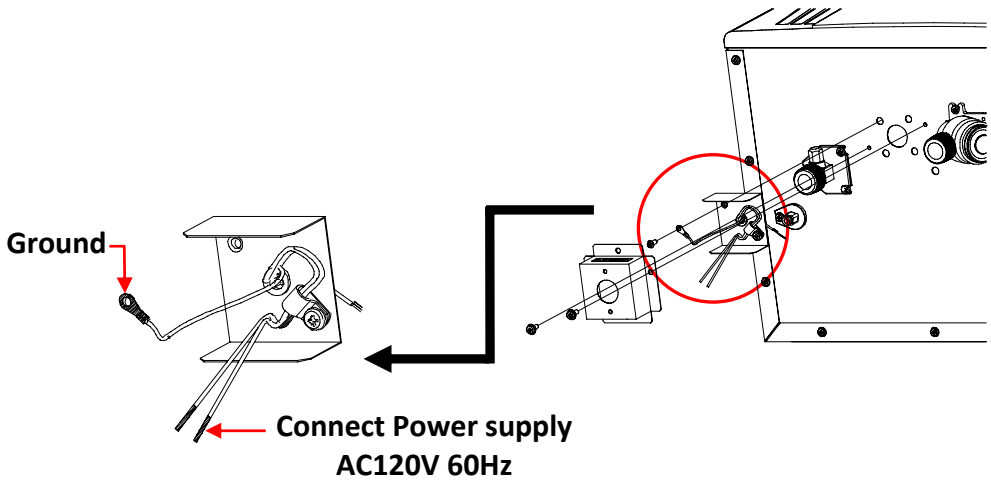
WARNING

Follow the electrical code requirements of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of the National Electrical Code ANSI/NFPA 70 in the U.S. or the latest edition of CSA C22.1 Canadian Electrical Code, Part 1, in Canada.

CAUTION

When servicing or replacing parts within the T-H2-DV/T-H2-OS, label all wires prior to disconnection to facilitate an easy and error-free reconnection. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

1. The T-H2-DV/T-H2-OS must be electrically grounded. Do not attach the ground wire to either the gas or the water piping.
2. The T-H2-DV/T-H2-OS requires **AC 120V 60 Hz electrical power supply that is properly grounded.**
   - A proper disconnect (i.e. on/off switch, power plug, etc.) controlling the main power to the T-H2-DV/T-H2-OS must be provided for service reasons. (Must comply with local codes).
   - Connect the power supply to the T-H2-DV/T-H2-OS exactly as shown in the wiring diagram;
3. A green screw is provided in the junction box to ground the connection.
4. Can be hardwired or wired to a plug-in.
5. The use of a surge protector is recommended in order to protect the unit from power surges.



TM-RE30 REMOTE CONTROLLER CONNECTION

1. Disconnect power supply from the T-H2-DV/T-H2-OS.
2. Take off the T-H2-DV/T-H2-OS's front cover.
3. Locate the remote controller terminal, pictured below (located around the upper right-hand side of the computer board).
4. Open the plastic cover of the TM-RE30, and then attach the two fork terminals to connector base of the backside the TM-RE30 with two screws. Make sure the terminals are firmly fixed.
5. Pull the remote's wires through the rubber grommet at the bottom of the water heater's casing.
6. Properly attach the remote's wires to the remote controller terminal on the computer board. (No polarity)

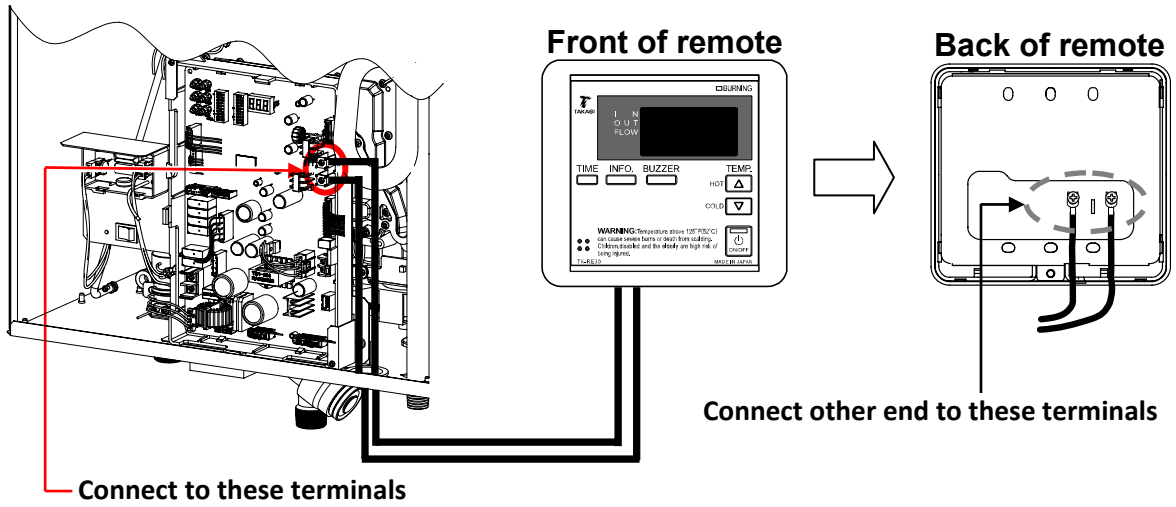
   ***Do NOT jump.**

7. Replace Front Cover securely.
8. Wires used for the remote controller connection must be:

   - Minimum 18AWG wire (No polarity)
   - Maximum 400 feet long

*For detailed connection instructions to the TM-RE30, refer to the TM-RE30's Installation Manual.

Remote controller terminal of the T-H2-DV/T-H2-OS

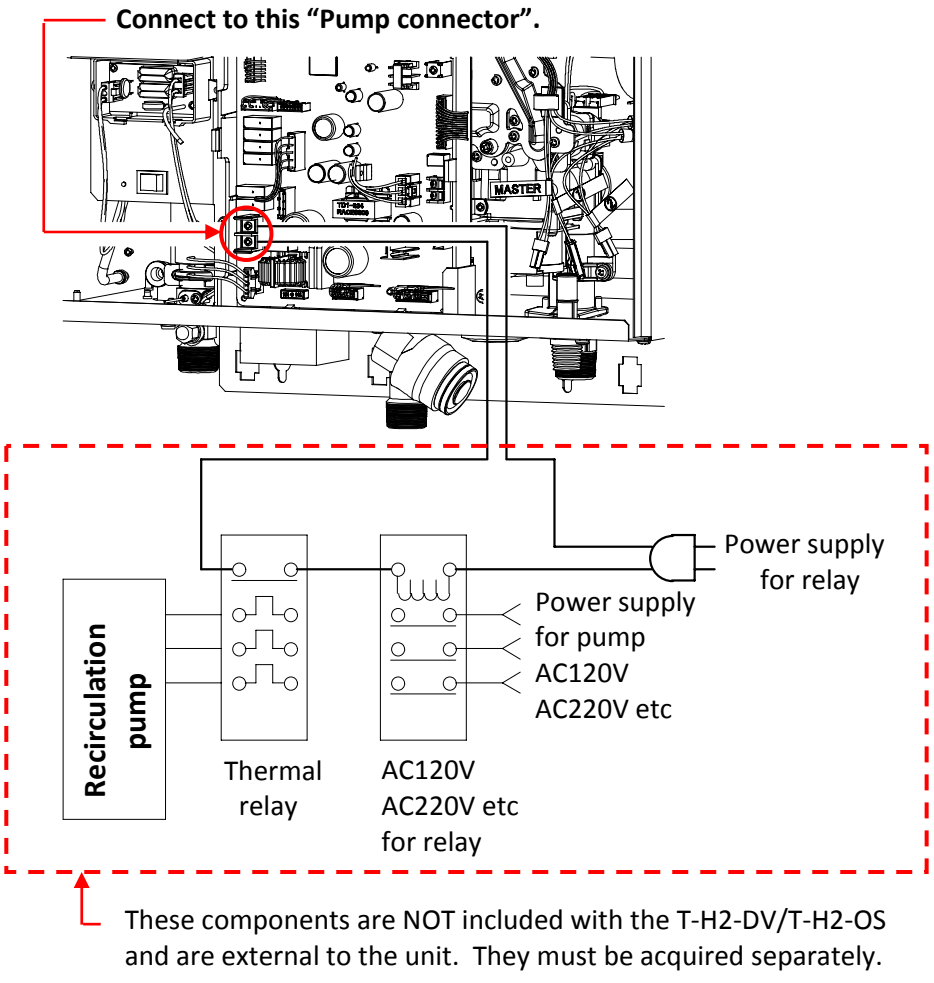


PUMP CONTROL CONNECTION

The T-H2-DV/T-H2-OS 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 T-H2-DV/T-H2-OS 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 T-H2-DV/T-H2-OS as shown in the diagram below. (In an Easy-Link system, connect the pump ONLY to the "**MASTER**" 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 T-H2-DV/T-H2-OS's internal thermistors as a temperature control, the recirculation pump will only turn on when recirculation is needed.

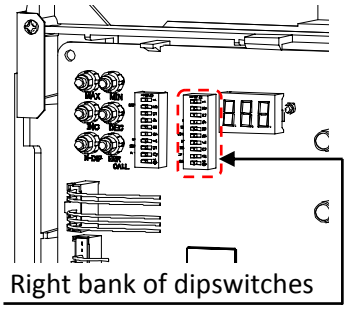
CAUTION

In an Easy-Link system, the pump must be connected to the "Pump connector" in the "MASTER unit" only. If the pump is connected to any of the **"SLAVE units"**, the pump will not work.



PUMP CONTROL MODES

The T-H2-DV/T-H2-OS provides the four types of the pump control modes. The pump control modes are selected by changing dipswitch settings. The dipswitches that change the pump control modes are located in the **right bank** of dipswitches in the upper-left quadrant of the computer board in the T-H2-DV/T-H2-OS. (See right.) These 4 modes only affect pumps that are connected to the T-H2-DV/T-H2-OS pump control (p.25)


Right bank of dipswitches

A) Recirculation Control: No. 5 ON

Feature: Maintaining temperature in a standard recirculation loop, providing hot water in a quicker amount of time.

Function: The pump is only set to run when the temperature of the water in the recirculation loop is more than 9°F below the set temperature of the T-H2-DV/T-H2-OS.
The pump will run for about 1 minute every 30 minutes to determine whether the water temperature in the entire recirculation loop is more than 9°F below the set temperature.
If the water temperature is more than 9°F below the set temperature, the pump will remain running until the water in the loop reaches the set temperature. Otherwise, the pump will stop for another 30 minutes.
If the inlet thermistor of water heaters detects that the water temperature is more than 9°F below the set temperature before those 30 minutes have elapsed, the pump will activate immediately and remain running until the water in the loop reaches the set temperature.

B) Storage Tank Circulation Control: No.6 ON

Feature: This is to ensure a higher rate of recovery for storage tank applications.

Function: The T-H2-DV/T-H2-OS heats the water 5.4°F higher than its set temperature. The circulation pump between the storage tank and the water heater will continually remain running. After set temperature has been reached in the storage tank, the T-H2-DV/T-H2-OS will fire off and limit the water flow rate to less than 2.6 GPM, to continually monitor the temperature throughout the system.

Note: In this mode, the pump will continually remain running.

C) Energy Conserving Recirculation: No.5 and No.6 ON

Feature: Operates similarly to the standard Recirculation Control mode, but saves more energy by limiting the temperature within the recirculation loop.

Function: The temperature of the recirculation loop is never kept above 120°F (49 °C), regardless of the set temperature of the T-H2-DV/T-H2-OS.

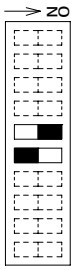
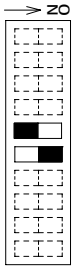
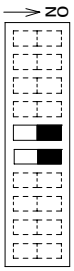
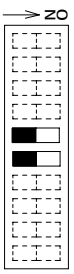
D) Normal Control (Default setting): No.5 and No.6 OFF

Feature: This mode provides no special pump control. Pump activation can only be turned ON or OFF by the TM-RE30 remote controller.

Function: The pump will run continually all the time as long as there is a power supply to the T-H2-DV/T-H2-OS. The pump will only stop when the TM-RE30 remote is turned off. Water in the loop will be maintained at the set temperature of the water heater.

Dipswitch settings for the Pump control modes

Right bank of dipswitches

Pump mode	A) Recirculation Control	B) Storage Tank Circulation Control	C) Energy Conserving Recirculation	D) Normal Control (Default)
Switch No.5	ON	OFF	ON	OFF
Switch No.6	OFF	ON	ON	OFF
				

The dark squares indicate the direction the dipswitch should be set to.

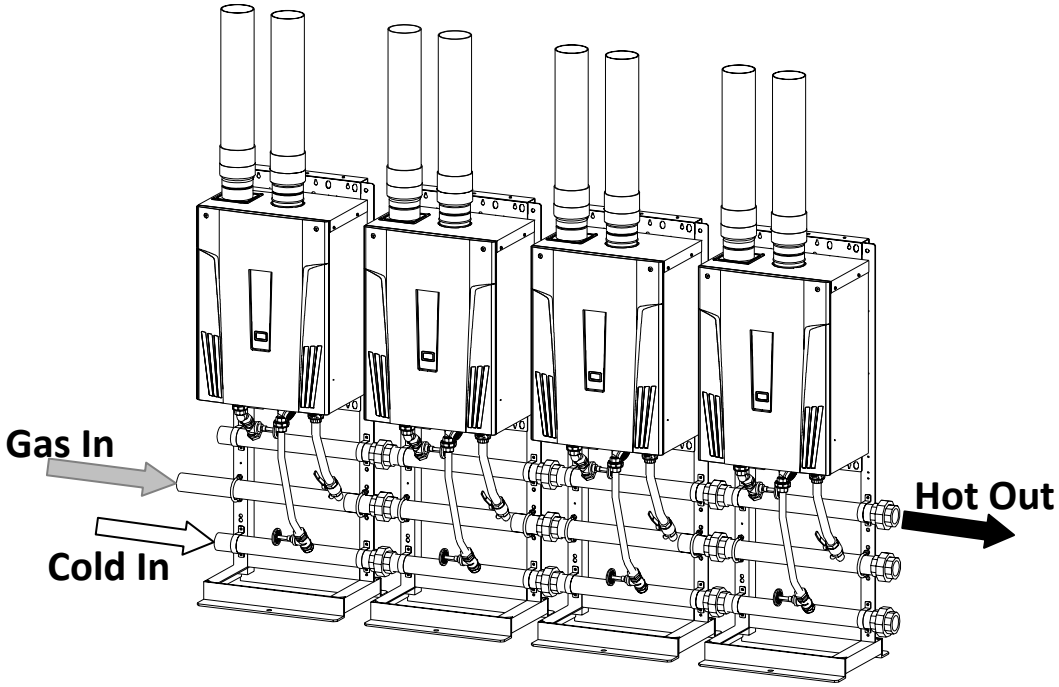
EASY-LINK SYSTEM

-General-

The T-H2-DV/T-H2-OS 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 unit.

You can manifold from 2 to 4 units without the need for a multi-system controller. A 4-unit system has full automatic modulation between 13,000 BTU/h and 796,000 BTU/h.



CAUTION

- The T-H2-DV/T-H2-OS 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.
- **The T-H2-DV/T-H2-OS cannot be linked with other different Takagi models in an Easy-Link system.**

-Easy-Link Connection Procedures-

1. Verify the set temperatures of all units within the system. Every single T-H2-DV/T-H2-OS must be set to the same set temperature.
2. Select one unit to be the "**MASTER**" unit.
3. "**MASTER**" unit

   Locate the two banks of dipswitches to the left of the 3-digit 7-seg. LED on the computer board of the T-H2-DV/T-H2-OS that you select to be the "**MASTER**" unit. Change dipswitch No. 10 on the **right bank of dipswitches to the ON position.** Do not change any dipswitches on any of the "**SLAVE**" units.

4. Between the "**MASTER**" and the "**SLAVE-1**" units

   Connect the **"MASTER connector"** of the **"MASTER" unit** to the **"[1] connector"** of the **"SLAVE-1" unit**.

5. Between the "**SLAVE-1**" and the "**SLAVE-2**" units

   Connect the **"[2] connector"** of the **"SLAVE-1" unit** to the **"[1] connector"** of the **"SLAVE-2" unit**.

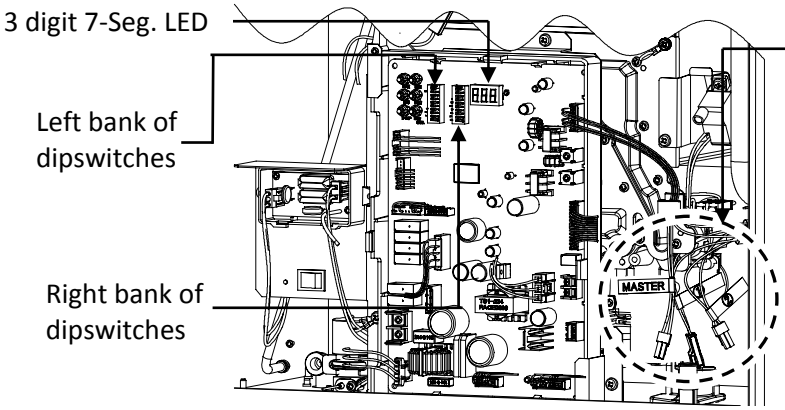
6. Between the "**SLAVE-2**" and the "**SLAVE-3**" units

   Connect the **"[2] connector"** of the **"SLAVE-2" unit** to the **"[1] connector"** of the **"SLAVE-3" unit**.

7. Make sure the "3-digit 7-seg. LED" of all the units' computer boards display the unit #. The numbering system of the T-H2-DV/T-H2-OS automatically allocates the unit # to each water heater in the Easy-Link system, in accordance with the table below.

Master unit	**Unit # : 1**
Slave units	**Unit # : 2, 3 and 4**

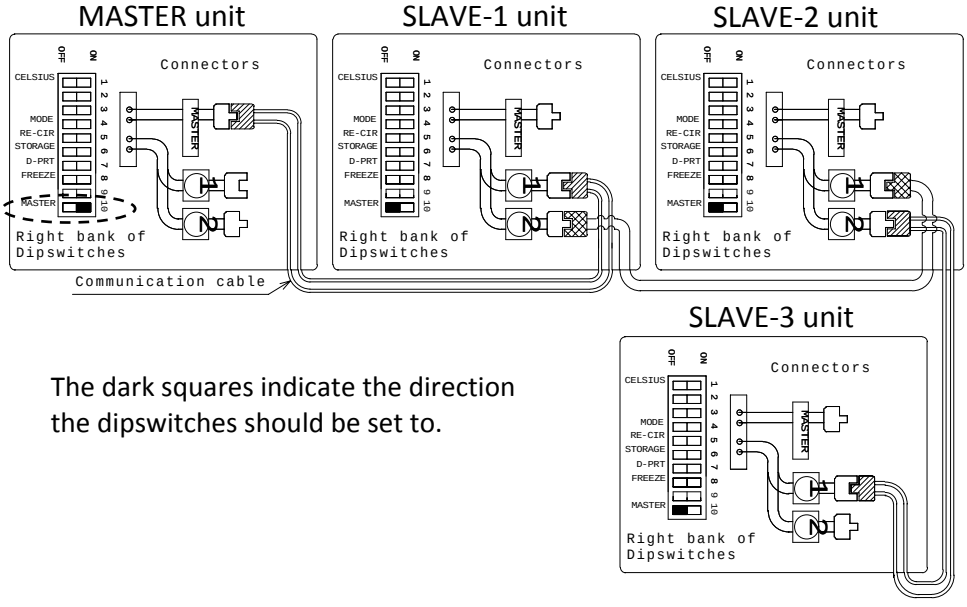
(A) T-H2-DV/T-H2-OS Computer board



Easy-Link connectors are next to the computer board.

When setting a unit to a "MASTER" unit, adjust dipswitch No.10 on the **right bank of dipswitches only (see diagram).**

(B) Basic diagram of connections among the T-H2s.



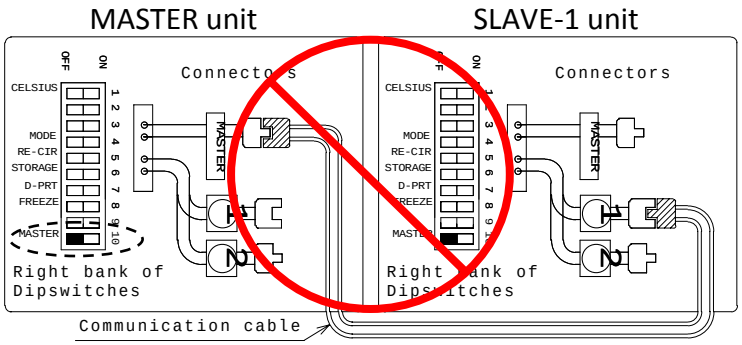
The dark squares indicate the direction the dipswitches should be set to.

(C) Examples of incorrect settings and/or connections

CASE 1:

- **Unless you change dipswitch No.10 of the "MASTER" unit to the "ON" position, the system will not work as an Easy-Link system.** The units will operate as individual units.

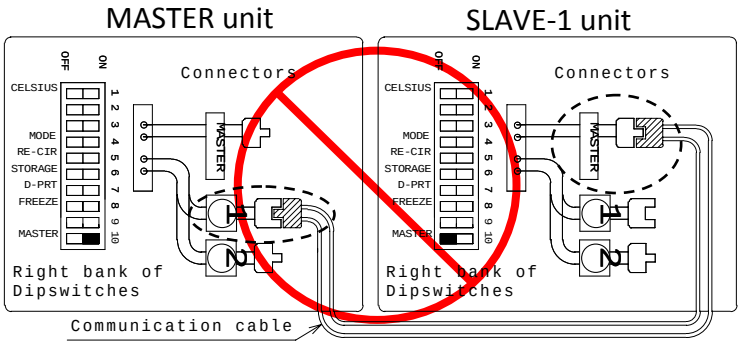
Wrong dipswitch setting on the **"MASTER" unit**

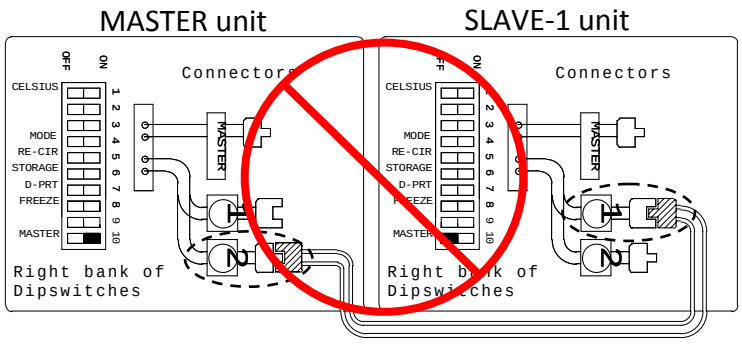


CASE 2:

- If you connect the **"[1] (or [2])" connector** of the **"MASTER" unit** to the **"MASTER (or [1])" connector** of the **"SLAVE-1" unit**, the system will not work as an Easy-link system. The units will operate as individual units.

Wrong connection between the **"MASTER" unit** and the **"SLAVE-1" unit**

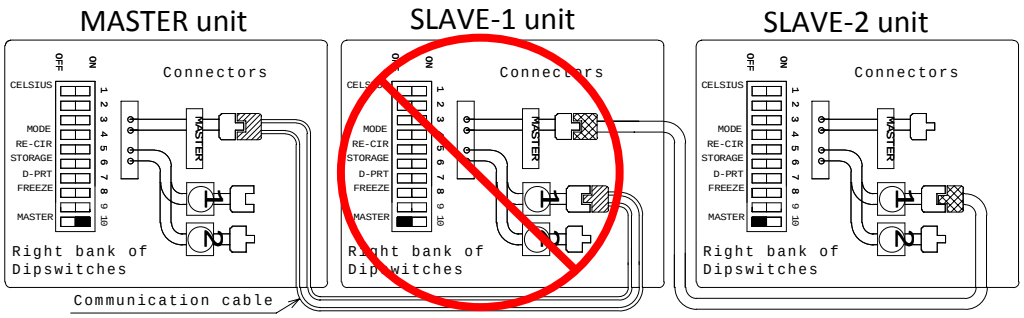




CASE 3:

If you connect the **"MASTER connector"** of the **"SLAVE-1" unit** to the **"[1] connector"** of the **"SLAVE-2" unit**, the **"SLAVE-2" unit** will operate as an individual unit, and will not be part of the Easy-Link system.

Wrong connection between the **"SLAVE-1" unit** and the **"SLAVE-2" unit**



WARNING

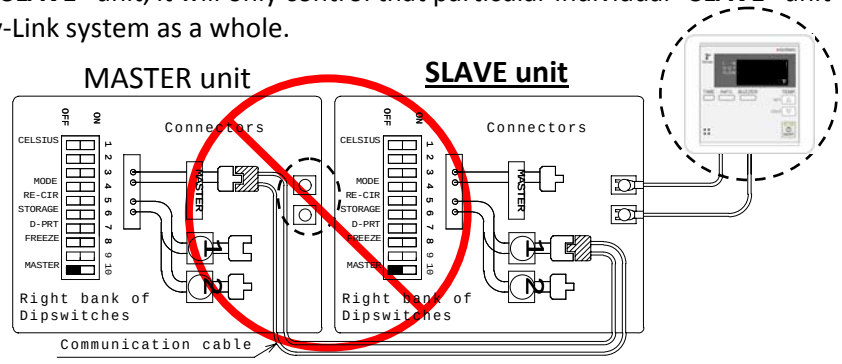
Prohibited

Connecting two "**MASTER** 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 MASTER -to- MASTER connection with the communication cable. Do not splice or modify connectors.

CASE 4:

- If a TM-RE30 remote controller (optional) is used, it has to be connected to the "**MASTER**" unit. If the TM-RE30 is connected to a "**SLAVE**" unit, it will only control that particular individual "**SLAVE**" unit and will not control the Easy-Link system as a whole.

TM-RE30 connected to incorrect unit



- The TM-RE30 is not required for the Easy-Link system.
- If running the Easy-Link system without the TM-RE30, please make sure the temperature settings on ALL the units are set to the same settings. Otherwise, the units may not operate properly.
- If the TM-RE30 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.

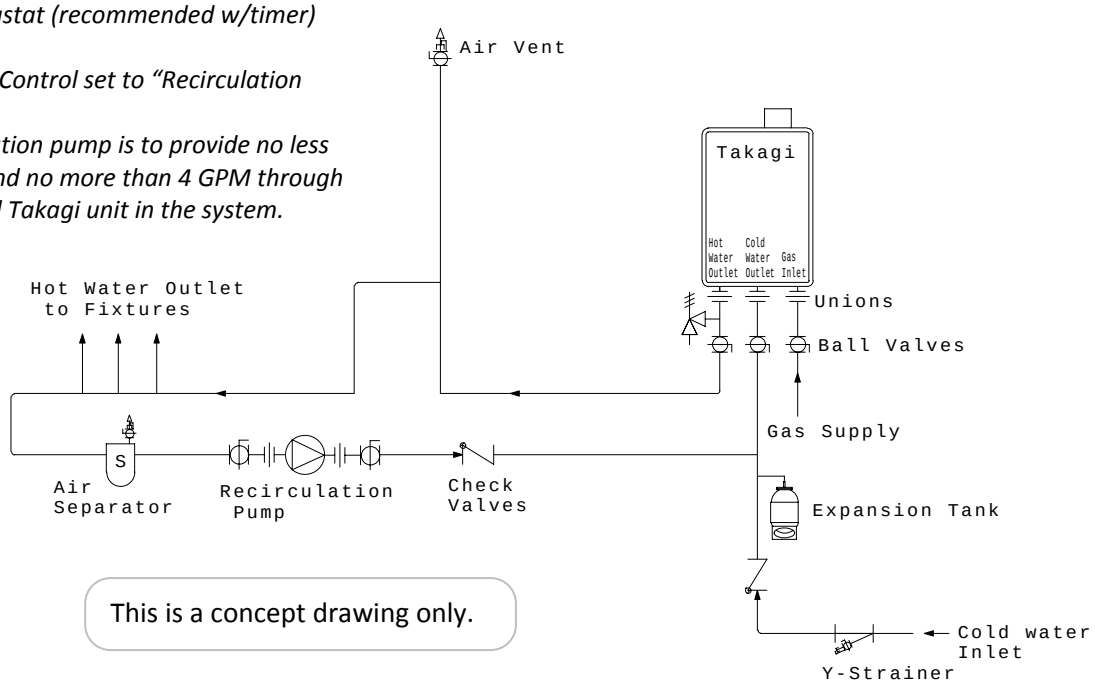
APPLICATIONS

WARNING-Space-Heating Applications

- **In order to purge air in water pipes within a closed-loop system, an air vent and air separator should be installed in to 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 T-H2-DV/T-H2-OS 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.
- 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 125 °F can cause severe burns instantly or death from scalds.
- Chemicals such as diluted Glycol can be used for radiant floor, Hydro/fan coil air or Baseboard heating only. The diluted solution of glycol must contain between 25% and 55% of Glycol. Be aware that in closed-loop glycol systems, low pressure in the heat exchanger can cause low-temperature boiling, resulting in excessive noise and damage to the water heater. Consult with the glycol maker for specifications prior to use.

-Recirculation-

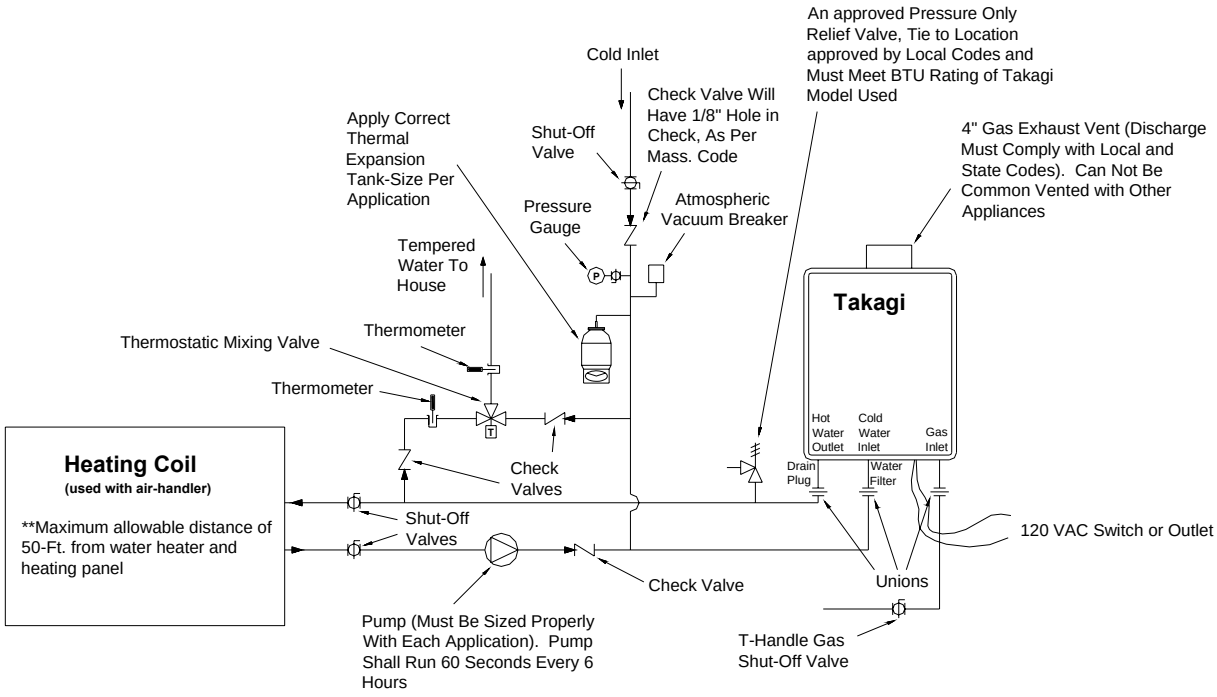
** The recirculation pump is to be controlled by:*
-Dual-set aquastat (recommended w/timer)
OR
-Takagi Pump Control set to "Recirculation Mode"
** The recirculation pump is to provide no less than 2 GPM and no more than 4 GPM through each activated Takagi unit in the system.*



This is a concept drawing only.

-Dual-purpose hot water heating- (Domestic and Space Heating):

Diagramatic Layout of Radiant Heating and Domestic Water Heater Per Mass. Code



** The circulation pump is to provide no less than 2 GPM through each activated Takagi unit in the system.*

WARNING

- **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, or in the absence of local codes, follow the most recent edition of the National Standard Code, ANSI Z21.10.3.
- This illustration is a concept design only. The reference to the 1/8th hole in check is only for the State of Massachusetts. 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 **TAKAGI.**

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 p. 17.
- 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 T-H2-DV/T-H2-OS.
- **Purge the GAS and WATER LINES** to remove any air pockets.
- 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.

CAUTION

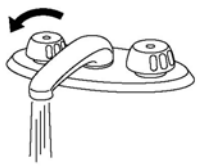
IF YOU SMELL GAS:

- Do not try to start the T-H2-DV/T-H2-OS.
- 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 p. 40 for instructions.

2. Fully open the manual water control valve on the water supply line.

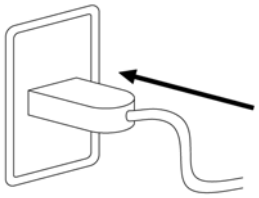
3. Open a hot water tap to verify that water is flowing to that tap.



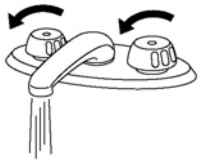
Then close the hot water tap.

4. Fully open the manual gas control valve installed.

5. Turn on the 120 volt 60 Hz power supply to the T-H2-DV/T-H2-OS 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 of 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 Owners 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 counter clockwise ↺ 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 water heater" 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:

1. Far away from heater.
2. In approved containers.
3. Tightly closed
4. Out of children's reach

Vapors:

1. Cannot be seen
2. Vapors are heavier than air
3. Go a long way on the floor
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 T-H2-DV/T-H2-OS water heater is factory set at 120 °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.

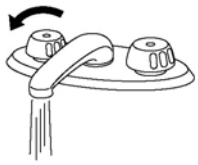
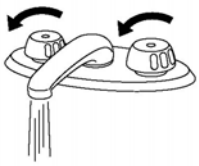
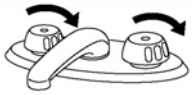
DANGER

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

WARNING: California Proposition 65 lists chemical substances known to the state to cause cancer, birth defects, death, serious illness or other reproductive harm. This product may contain such substances, be their origin from fuel combustion (gas, oil) or components of the product itself.

NORMAL OPERATION

GENERAL

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

- Flow rate to activate the T-H2-DV/T-H2-OS : 0.5 gallon per minute
- Flow rate to keep the T-H2-DV/T-H2-OS running : 0.4 gallon per minute

WARNING

Hot Water temperatures over 125°F can cause severe burns instantly or death from scalding.

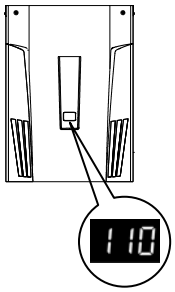
- The outlet hot water temperature of the T-H2-DV/T-H2-OS water heater is factory set at 120°F.
- Feel the water temperature before bathing or showering.

TEMPERATURE SETTINGS

-ON THE T-H2-DV/T-H2-OS-

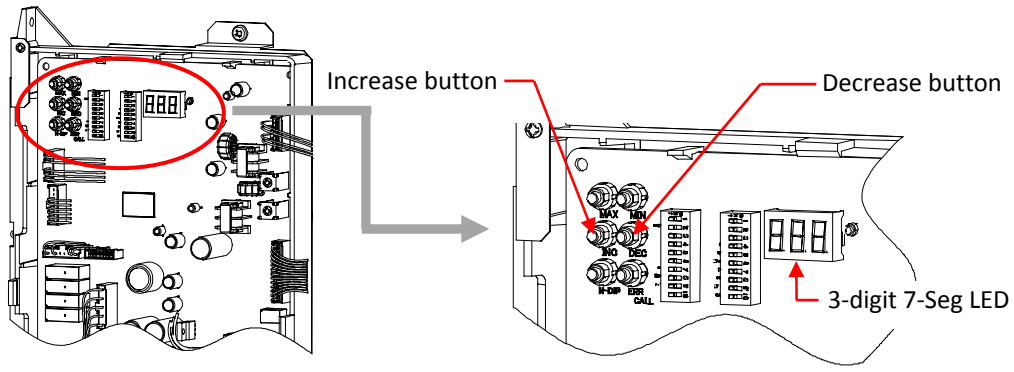
On T-H2-DV/T-H2-OS, changing the temperature setting can be done simply by using the 3-digit 7-seg. LED, and the “Increase” & “Decrease” buttons on the computer board (TM-RE30 remote controller is not required)

T-H2-DV/T-H2-OS



- The T-H2-DV/T-H2-OS will display the set temperature on the 3-digit 7-Seg. LED on the computer board. This LED is visible through a small window on the unit’s front cover.
- If the TM-RE30 is installed, refer to the TM-RE30 Installation Manual included with the remote for setting temperature.

Figure.1



T-H2-DV/T-H2-OS computer board

Temperatures available (unit:°F)

100	**105**	**110**	**115**	**120**	**125**	**135**	**140**	**145**	**150**	**155**	**160**	**165**	**170**	**175**	**185**

- The temperature has been preset at the factory to 120°F (49°C).
- If temperatures other than the ones listed above are required, the TM-RE30 can provide a couple more temperature options. Refer to p. 7 for a list of available temperatures on the TM-RE30.
- When the flow sensor detects flow higher than 0.5 GPM, a single LED tick mark on the left side of the 3-digit 7-Seg. LED will blink to indicate that the unit is working.

Example: tick mark next to the 110°F set temperature display 

<How to set the hot water temperature of the water heater>

1. Take off the T-H2-DV/T-H2-OS's front cover.
2. Press the either "**Increase**" button or the "**Decrease**" button on the computer board to increase or decrease the set temperature. The 3-digit 7-Seg. LED will display the available set temperatures. (Figure.1)

 Set temperature (Example 110°F)

3. Scroll to the desired set temperature.

DO NOT set to 185 °F if you use your T-H2-DV/T-H2-OS in a recirculation system. This will cause damage to the heater and void the warranty.

FLOW

- The flow rate through the T-H2-DV/T-H2-OS is limited to a maximum of 9.0 GPM.
- The temperature setting, along with the supply temperature of the water will determine the flow rate output of the unit.
- Please refer to the temperature vs. gallons per minute chart on p. 50 to determine the likely flow rates based on your local ground water temperature and your desired outlet water temperature combination.

- Based on the United States Department of Energy method of testing water heater output, the T-H2-DV/T-H2-OS is rated for 285 gallons per hour (GPH) or 4.8 gallons per minute (GPM) for Natural Gas, and 285 GPH or 4.8 GPM for Liquid Propane, when raising the water temperature by 77°F (from 58°F to 135°F).
- Refer to the chart to the right for typical household plumbing fixture flow rates to determine what the T-H2-DV/T-H2-OS can do in a household application.

Household Flow Rates

Appliance / Use	**Flow Rate** (GPM)
Lavatory Faucet	1.0
Bath Tub	4.0 – 10.0
Shower	2.0
Kitchen Sink	1.5
Dishwasher	1.5
Washing machine	4.0

Taken from UPC 2006

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 surrounding and/or outside temperatures drop below 36.5°F (2.5°C).
- In any areas subject to freezing temperatures, **TAKAGI** highly recommends an indoor installation with the T-H2-DV model. In such an installation, 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. It is the installer's responsibility to be aware of these issues and take all preventative measures. **TAKAGI** will not be responsible for any damage to the heat exchanger as a result of freezing.
- **TAKAGI** also highly recommends the use of a back flow vent damper to minimize the amount of cold air entering through the exhaust venting when the water heater is off.
- If you will not be using your heater for a long period of time:
    1. Completely drain the unit of water. Refer to p. 40.
    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

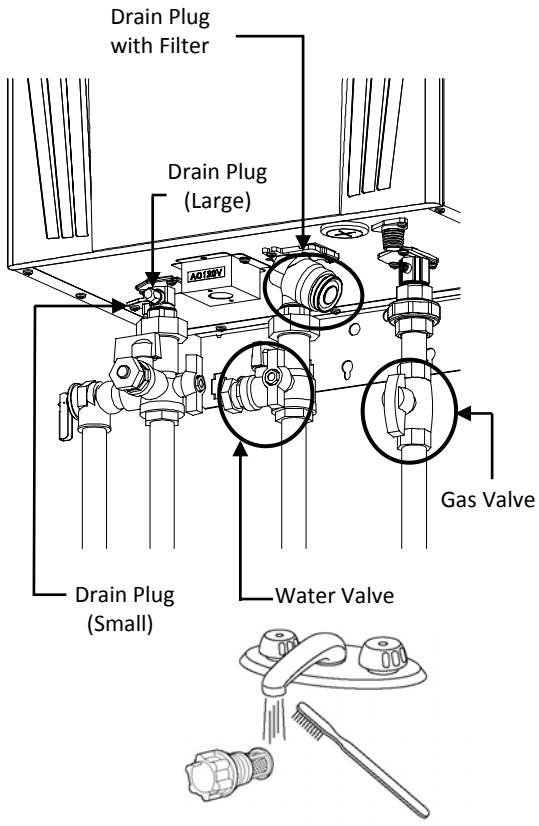
Turn off the electrical power supply and close the manual gas control valve and the manual water control valve before servicing.

- Clean the cold-water inlet filter. (Refer to diagram below)
- Be sure that all openings for combustion and ventilation air are not blocked.
- Check that the exhaust vent pipe is not blocked.
- Check the gas pressure.
- Keep the area around the water heater clear. Remove any combustible materials, gasoline or any flammable vapors and liquids.

TAKAGI 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

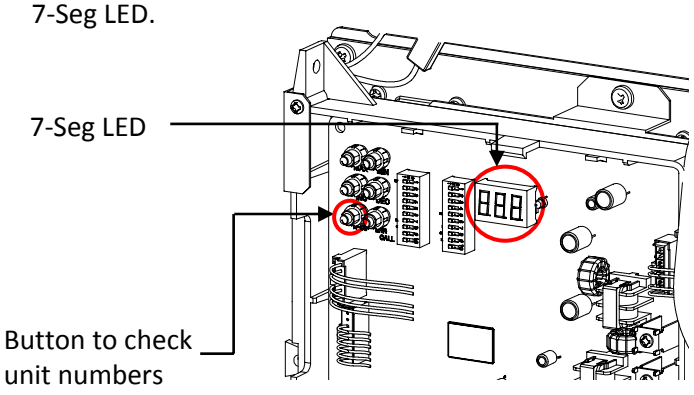
1. Close the manual gas shut off valve.
2. Turn off power to the unit, and then turn on again.
3. Wait 30 seconds, and then turn off power to the unit, yet again.
4. Close the water shut off valve.
5. Open all hot water taps in the house. When the residual water flow has ceased, close all hot water taps.
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 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.**



TROUBLESHOOTING

GENERAL

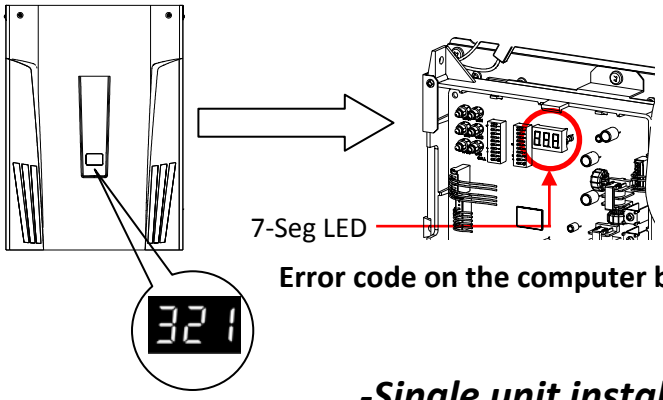
	PROBLEM	SOLUTIONS
-TEMPERATURE and AMOUNT OF HOT WATER-	It takes long time to get hot water at the fixtures.	• The time it takes to deliver hot water from the T-H2-DV/T-H2-OS to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the pipes, the longer it will take to get hot water. • If you would like to receive hot water to your fixtures quicker, you may want to consider a hot water recirculation system. (p. 32)
	The water is not hot enough.	• Compare the flow and temperature. See the chart on p. 50. • Check cross plumbing between cold water lines and hot water lines. • Is the gas supply valve fully open? (p. 34) • Is the gas line sized properly? (p. 18) • Is the gas supply pressure enough? (p. 17) • Is the set temperature set too low? (p. 37, 38)
	The water is too hot.	• Is the set temperature set too high? (p. 37, 38)
	The hot water is not available when a fixture is opened.	• Make sure the unit gets 120V 60Hz power supply. • If you are using the remote controller, is the power button turned on? • Is the gas supply valve fully open? (p. 34) • Is the water supply valve fully open? (p. 34) • Is the filter on cold water inlet clean? (p. 40) • Is the hot water fixture sufficiently open to draw at least 0.5 GPM through the water heater? (p. 37) • Is the unit frozen? • Is there enough gas in the tank? (for LP)
	The hot water turns cold and stays cold.	• Is the flow rate enough to keep the T-H2-DV/T-H2-OS running? (p. 37) • If there is a recirculation system installed, does the recirculation line have enough check valves? • Is the gas supply valve fully open? (p. 34) • Is the filter on cold water inlet clean? (p. 40) • Are the fixtures clean of debris and obstructions?
	Fluctuation in hot water temperature.	• Is the filter on cold water inlet clean? (p. 40) • Is the gas line sized properly? (p. 18) • Is the supply gas pressure enough? (p. 17) • Check for cross connection between cold water lines and hot water lines.

	PROBLEM	SOLUTIONS
- WATER HEATER -	Unit does not ignite when water goes through the unit.	• Is the flow rate over 0.5 GPM? (p. 37) • Check for the filter on cold water inlet. (p. 40) • Check for reverse connection and cross connection. • If you use the remote controller, is the power button turned on?
	The fan motor is still spinning after operation has stopped.	• This is normal. After operation has stopped, the fan motor keeps running for 35 seconds in order to re-ignite quickly, as well as purge all the exhaust gas out of the flue.
	Abnormal sounds come from the unit.	• Contact **TAKAGI**.
-TM-RE30 (OPTIONAL)-	Remote controller does not display anything when the power button is turned on.	Press the ON/OFF button. If the lamp lights up ⇒ • This is normal. When the unit has not operated for five minutes or more, the display turns off to converse energy. If the lamp does not light ⇒ • Make sure the unit has power supply. Make sure the connection to the unit is correct.(p. 24)
	An ERROR code is displayed.	• Please see p. 43.
-EASY-LINK SYSTEM-	How are the unit numbers assigned?	• For an Easy-Link system, the Master unit is always labeled #1 and all other subsequence Slave units are numbered randomly. • To check which numbers are assigned to which Slave units, push the button on the computer board of any Slave unit as shown below. The unit number will be displayed on the 7-Seg LED. 

ERROR CODES

- T-H2-DV/T-H2-OS units are self diagnostic for safety and convenience when trouble shooting.
- If there is a problem with the installation or the unit, it will display a numerical error code on the 3-digit 7-Seg. LED on the computer board (visible through a window on the front cover) or TM-RE30 (if installed) to communicate the source of the problem.
- Consult the table on the following page for the cause of each error code.

T-H2-SV/T-H2-OS



Error code on the computer board

Error code on the TM-RE30

-Single unit installations-

The 7-Seg LED and TM-RE30 displays the whole 3-digit error code.

<u>Example</u>: If your unit has the "321" error code (inlet thermistor failure)

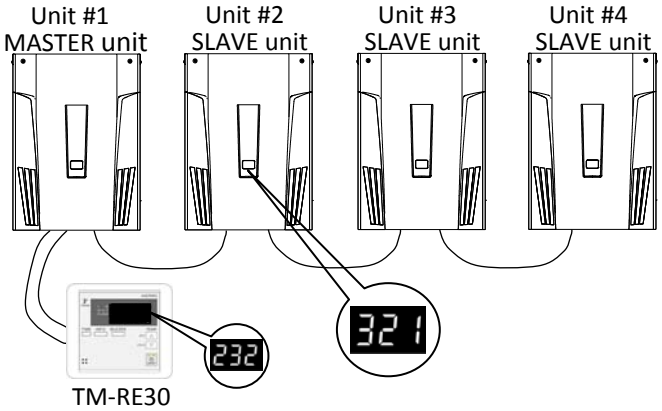
- **Water heater:** It will display "321" on the 7-Seg LED.
- **TM-RE30:** It will display "321" on its screen.

-Easy-Link system-

The 7-Seg LED of the individual unit with the error in question displays the whole 3-digit error code. The TM-RE30 (if installed) displays a 3-digit number which signifies which unit has the error, and what the error code is.

<u>Example:</u> If Unit #2 has the "321" error code (inlet thermistor failure)

- **Water heater #2:** It will display "321" on the 7-Seg LED, just like in the Single Unit example.
- **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 there is a problem with the installation or the T-H2-DV/T-H2-OS, it will display a numerical error code on the 7-seg LED of the computer board or the TM-RE30 (if installed) to communicate the source of the problem.

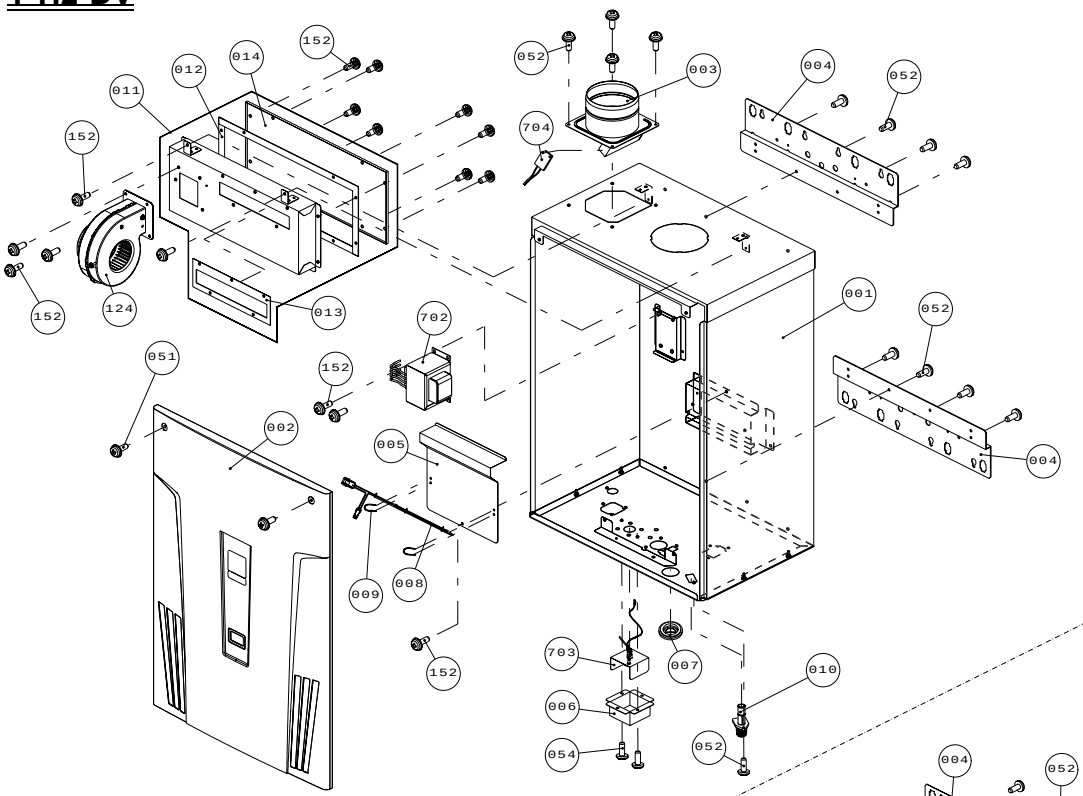
Error Code	Malfunction description	Diagnosis
031	Incorrect dipswitch settings	Check the dipswitch settings on PCB
101	Warning for the “991” error code	Call **TAKAGI** Technical Dept. at 1-888-882-5244
111	Ignition failure	Check gas supply
121	Loss of flame	
311	Output thermistor failure	Call **TAKAGI** Technical Dept. at 1-888-882-5244
321	Inlet thermistor failure	
331	Mixing thermistor failure	
341	Exhaust thermistor failure (Only T-H2-DV)	
391	Air-fuel Ratio Rod Failure	
441	Flow Sensor Failure (Only Easy-Link system)	
510	Abnormal Main Gas Valve	
551	Abnormal Gas Solenoid Valve	
611	Fan Motor Fault	
621	Exhaust fan motor Fault (Only T-H2-DV)	
631	Abnormal External Pump	
651	Water Control Valve Fault (Flow Adjustment function) (Only Easy-Link system)	
661	Water Control Valve Fault (Bypass valve function)	
701	Computer board Fault	
711	Gas Solenoid Valve drive circuit failure	
721	False Flame Detection	
741	Miscommunication between T-H2-DV/T-H2-OS and TM-RE30	
761	Miscommunication in Easy-Link	
941	Abnormal exhaust temperature (Only T-H2-DV)	
991	Imperfect combustion	

COMPONENTS DIAGRAM

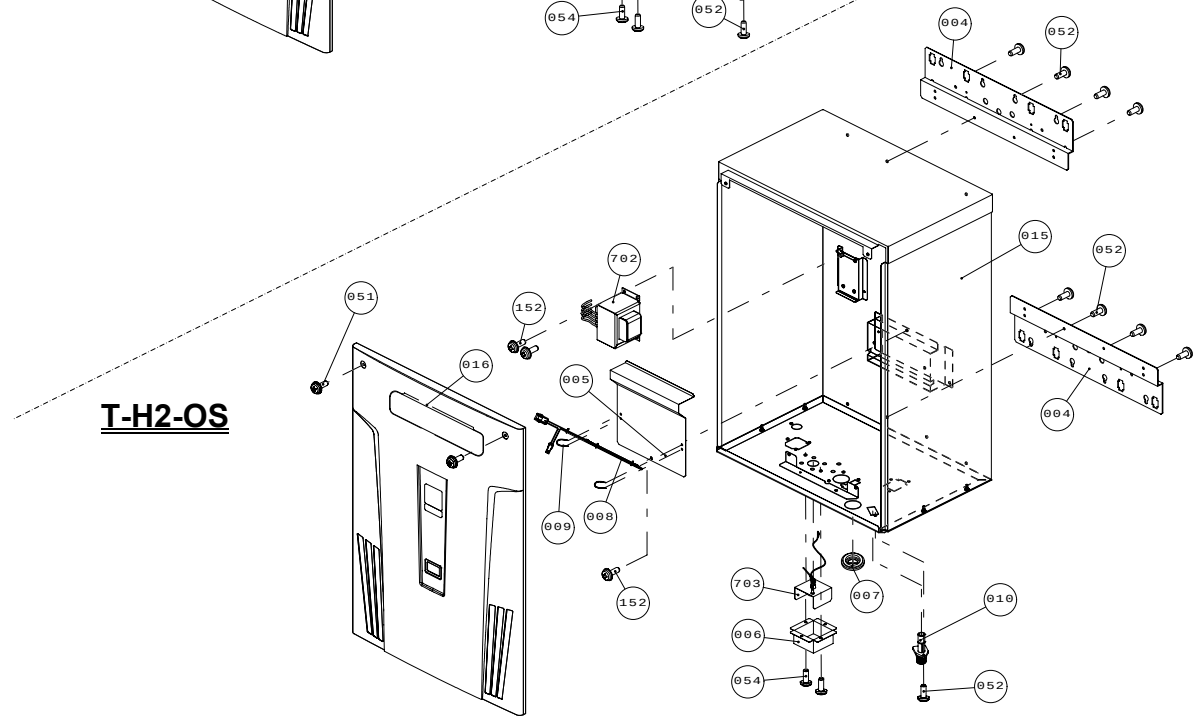
Case assembly

Other than the case assembly (No.15) and front cover (No.16), all of the T-H2-OS's parts are the same as the T-H2-DV. The T-H2-OS doesn't have fan motor for exhaust (No.124).

T-H2-DV

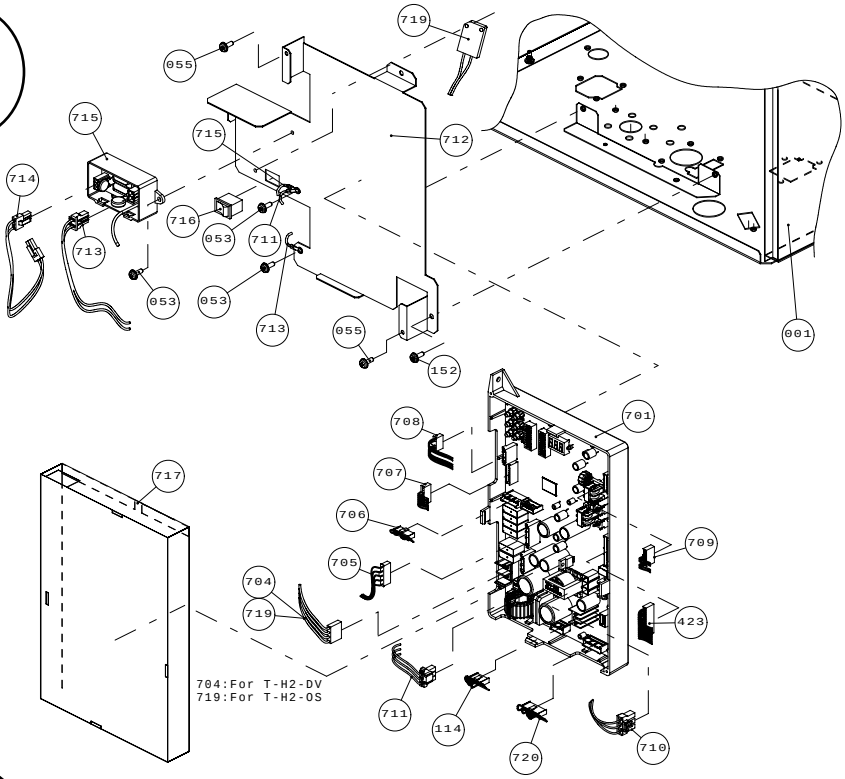


T-H2-OS



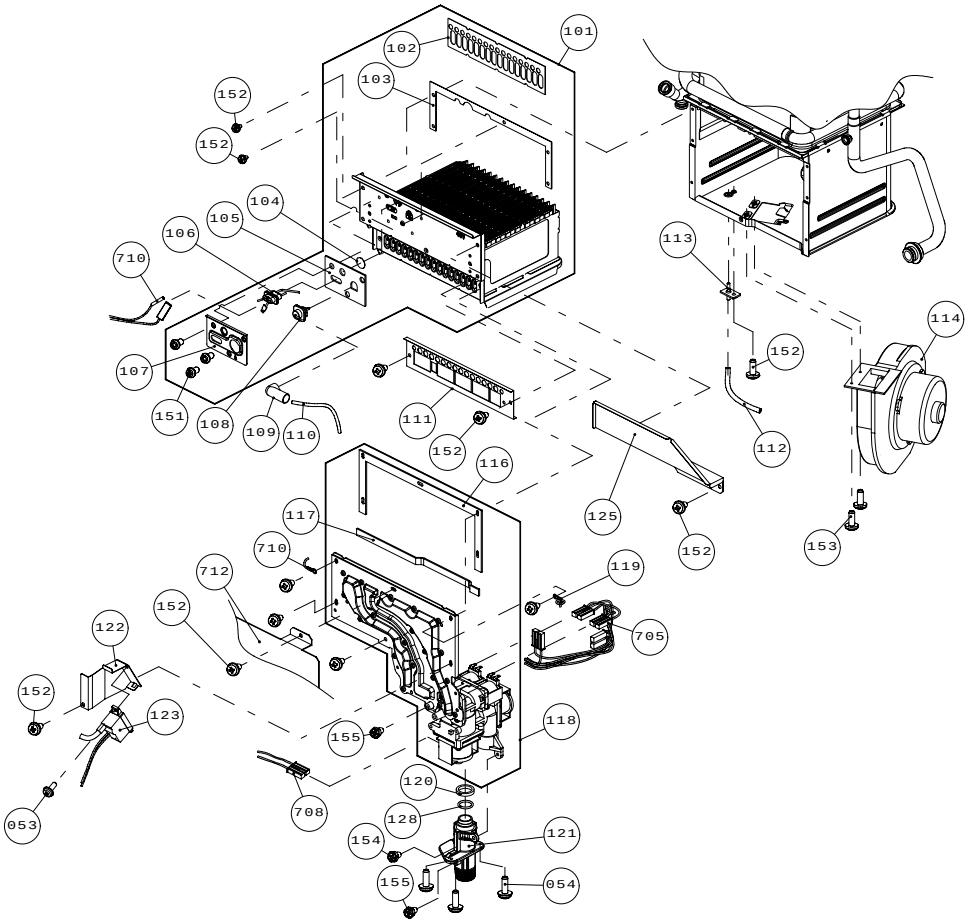
Computer board assembly

Other than Part# 719, the T-H2-DV and the T-H2-OS share the same components. The T-H2-OS doesn't have exhaust thermistor assembly (No.706) and exhaust fan motor wire (No.720).



Burner assembly

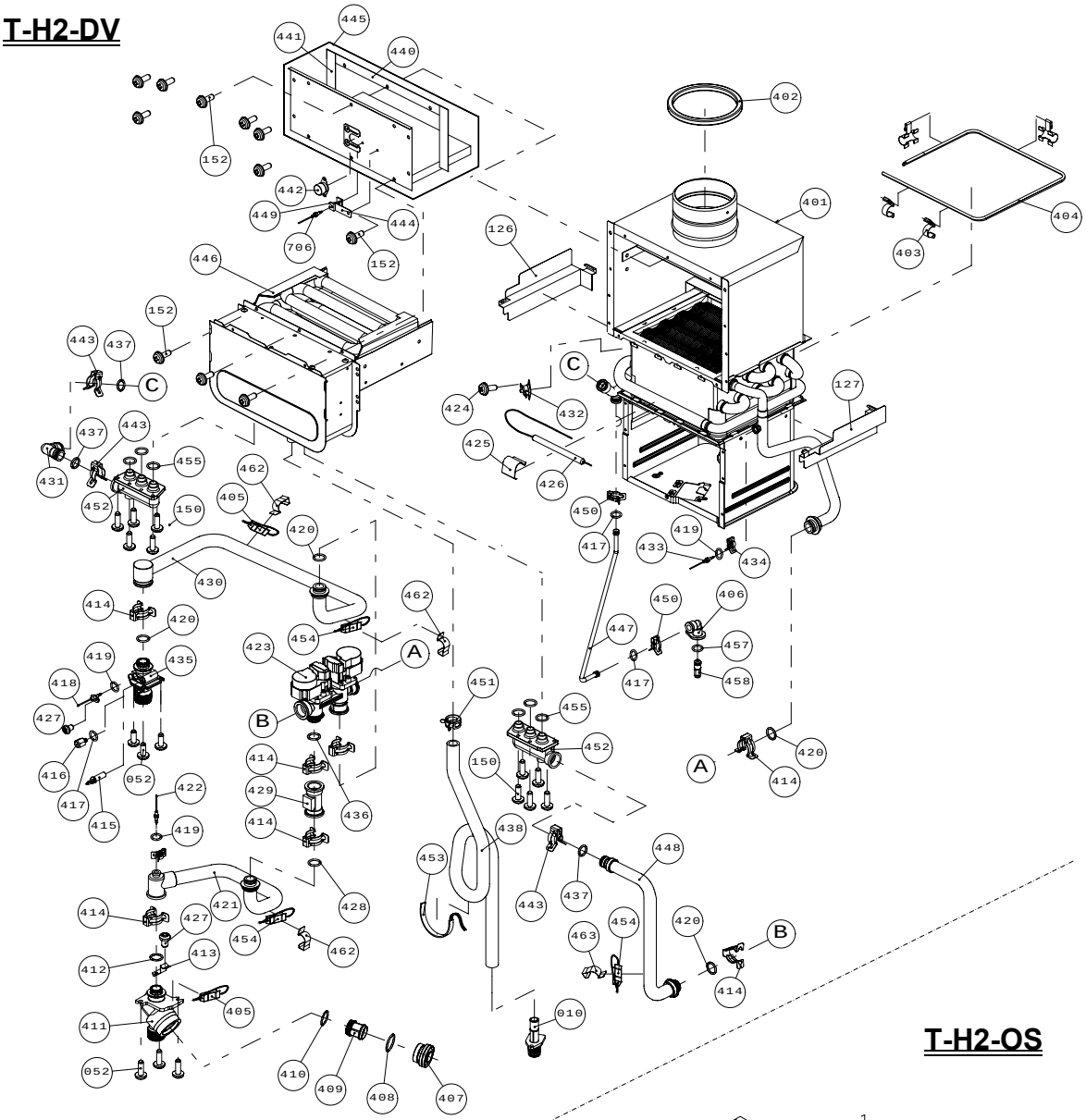
The T-H2-DV and the T-H2-OS share the same components.



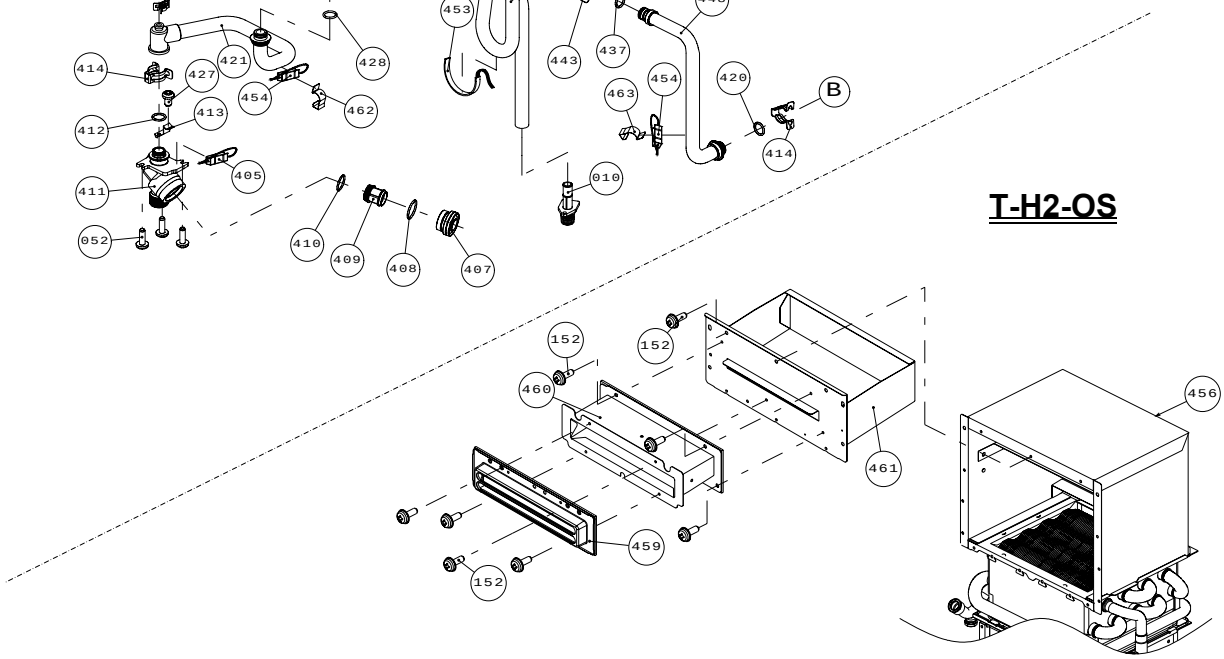
Water way assembly

Other than Part# 456, Part# 459, Part# 460 and Part# 461, the T-H2-DV and the T-H2-OS share the same components. The T-H2-OS doesn't have hi-limit switch for exhaust (No.442) and exhaust thermistor assembly (No.706).

T-H2-DV



T-H2-OS

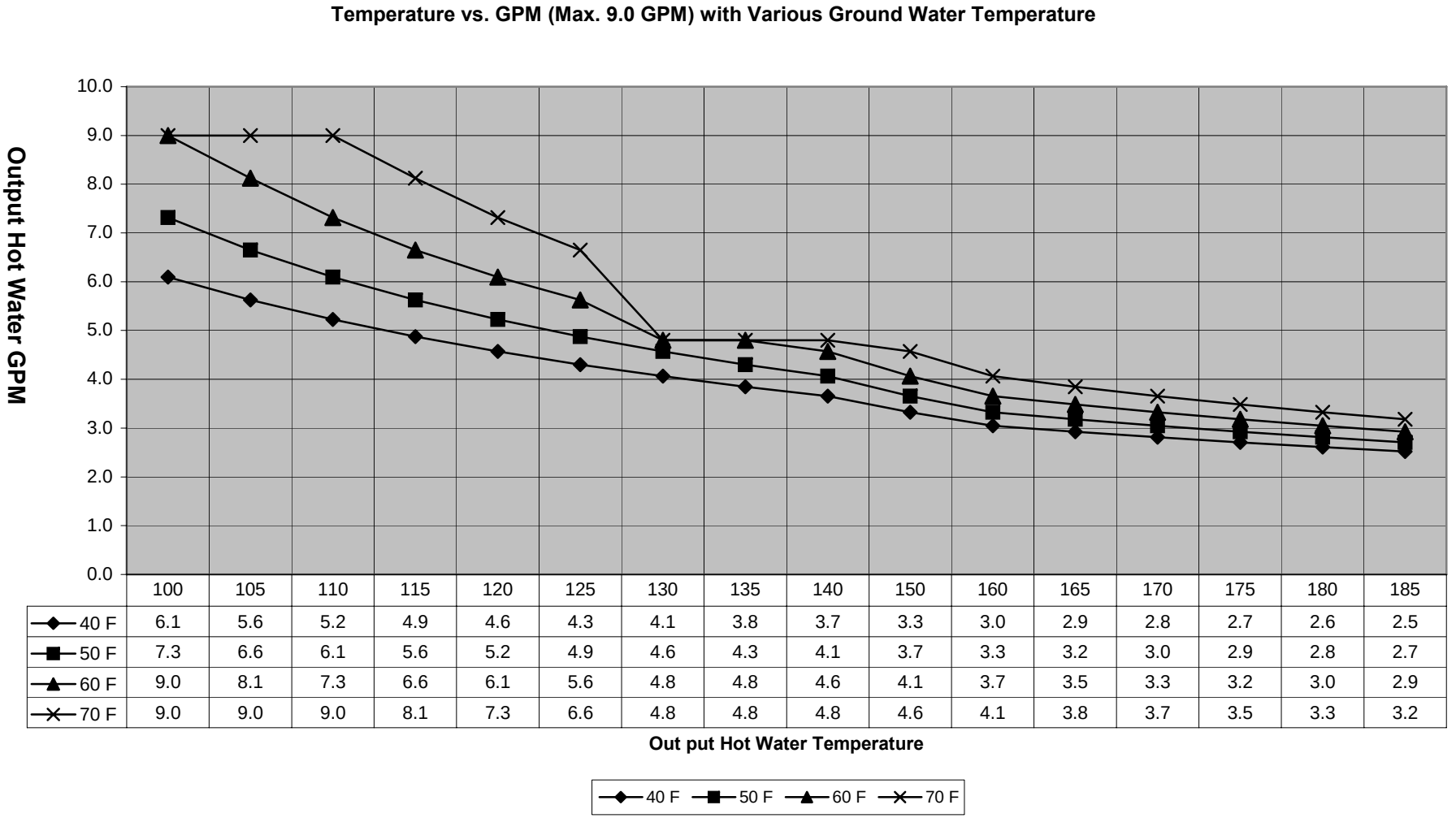


PARTS LIST

Item#	Part#	Description	Item#	Part#	Description
001	EKH5B	Case assembly for T-H2-DV	117	EKK2K	Manifold gasket B
002	EKH5M	Front cover for T-H2-DV	118	EKH6T	Manifold assembly with gas valve assembly LP
003	EV00K	Intake air port assembly			
004	EM335	Bracket		EKH6U	Manifold assembly with gas valve assembly NA
005	EKH5D	Back guard panel			
006	EKJ64	Junction box	119	EM167	Wire clamp 60
007	EX13M	Rubber bush	120	EKK2Z	Gas inlet ring
008	EM484	Overheat-cut off-fuse for combustion chamber	121	EKK1E	Gas inlet
			122	EKK1B	Igniter plate
009	EKK22	Fastener	123	EKN74	Igniter
010	EKH23	Condensate drain port	124	EKH5T	Fan motor for exhaust
011	EKH5K	Duct	125	EX12X	Heat exchanger protection plate (Front)
012	EKH4G	Duct gasket A			
013	EKH4K	Duct gasket B	126	EX12Y	Heat exchanger protection plate (Right)
014	EKH73	Duct cover plate			
015	EKH5C	Case assembly for T-H2-OS	127	EX12Z	Heat exchanger protection plate (Left)
016	EKH61	Front cover for T-H2-OS			
051	EW000	Screw M4×12 (W/Washer)	128	EK042	O-ring P20 NBR
052	EW002	Screw M4×10 (Coated)	150	EW012	Screw M4×8
053	EX010	Pan screw M4×10	151	EW00D	Pan screw M4×8
054	EW02B	Screw M4×10	152	EW003	Screw M4×10
055	EW023	Pan screw M3×10	153	EW00H	Pan screw M4×12 (W/Washer)
101	EKH5W	Burner assembly	154	EW006	Pan screw M4×10
102	EKK2X	Burner gasket	155	EW005	Hex head screw M4×8
103	EKK0G	Burner holder gasket	401	EKH5P	Heat exchanger assembly for T-H2-DV
104	EKK2V	Burner window			
105	EKK2W	Rod holder gasket	402	EKN50	Silicon ring
106	EKK0E	Flame rod	403	EKK26	Fuse fixing plate 18
107	EKK32	Rod holder	404	EX02A	Overheat-cut-off fuse
108	EKK0F	Igniter rod	405	EX002	Heater 101
109	EKN61	Rod cap	406	EKH40	Drain port
110	EKK2M	High voltage ignite cable	407	EM222	Filter plug
111	EKH5G	Damper	408	EZF25	O-ring P25 FKM
112	EKK2N	Urethane tube	409	EX006	Water inlet filter
113	EKK2D	Pressure port	410	EZH21	O-ring JASO# 1021 FKM
114	EKK25	Fan motor	411	EM404	Water inlet
116	EKK2Y	Manifold gasket A	412	EZH16	O-ring JASO# 1016 FKM

Item#	Part#	Description	Item#	Part#	Description
413	EX021	Heater plate	450	EX12K	Fastener “6-15”
414	EX01H	Fastener “16AG”	451	EKH1Y	Band B
415	EKK2P	Outlet heater	452	EX13B	Header
416	EK239	Outlet drain plug	453	EX13P	Flat heater
417	EZF06	O-ring P6 FKM	454	EX13R	3 array heater
418	EX00H	Mixing thermistor	455	EZF12	O-ring P12 FKM
419	EZF04	O-ring P4 FKM	456	EKH63	Heat exchanger assembly for T-H2-OS
420	EZF16	O-ring P16 FKM			
421	EKH74	Cold pipe	457	EZF03	O-ring P3 FKM
422	EKK38	Inlet thermistor	458	EX13A	Secondary heat exchanger drain plug
423	EKH32	Water control valve			
424	EW00A	Screw M3×6	459	EX13J	Exhaust port
425	EKK27	Pipe heater fixing plate	460	EKH65	Exhaust chamber assembly
426	EKJ47	Pipe heater 120	461	EKH62	Secondary heat exchanger plate
427	EW00L	Pan screw M4×6 (W/Washer)	462	EKH38	Heater fixing plate 20
428	EZF15	O-ring P15 FKM	463	EK031	Heater fixing plate 16
429	EKH33	Flow sensor	701	EKH4E	T-H2-DV/T-H2-OS PCB
430	EKH75	Hot pipe	702	EM296	Transformer
431	EX137	Joint elbow	703	EKJ66	Junction box inner plate
432	EKN34	Hi-limit switch	704	EKH6K	Freeze protection and EH-IG wire for T-H2-DV
433	EKK2T	Output thermistor			
434	EKH30	Fastener “4-11”	705	EKH6V	Gas valve wire
435	EKJ02	Water outlet	706	EKH6E	Exhaust thermistor assembly
436	EZH17	O-ring JASO# 1017 FKM	707	EKH6J	Thermistors wire
437	EZF14	O-ring P14 FKM	708	EKK12	Proportional gas valve wire
438	EKH6H	Drain tube	709	EKH6F	Pump and multi-cable
440	EKH4H	Secondary heat exchanger plate gasket A	710	EKH69	Flame rod wire
			711	EKH6D	Switch wire
441	EKH4J	Secondary heat exchanger	712	EKH71	PCB fixing plate
442	EKH6G	Hi-limit switch for exhaust	713	EKK3C	AC120V wire
443	EKK24	Fastener “14-22”	714	EKH6C	AC120V Transformer wire
444	EX13H	Thermistor fixing plate	715	EKH67	Fuse box
445	EKH5N	Secondary heat exchanger plate	716	EKK4V	AC120V power ON-OFF switch
446	EKH6X	Secondary heat exchanger	717	EKH68	PCB cover
447	EKH66	Drain pipe	718	EC00X	Nylon clamp
448	EKH78	Secondary heat exchanger out pipe	719	EKH7A	Freeze protection and EH-IG wire for T-H2-OS
449	EX13L	Exhaust thermistor gasket	720	EKH6A	Exhaust fan motor wire

OUTPUT TEMPERATURE CHART



	100	105	110	115	120	125	130	135	140	150	160	165	170	175	180	185
40 F	6.1	5.6	5.2	4.9	4.6	4.3	4.1	3.8	3.7	3.3	3.0	2.9	2.8	2.7	2.6	2.5
50 F	7.3	6.6	6.1	5.6	5.2	4.9	4.6	4.3	4.1	3.7	3.3	3.2	3.0	2.9	2.8	2.7
60 F	9.0	8.1	7.3	6.6	6.1	5.6	4.8	4.8	4.6	4.1	3.7	3.5	3.3	3.2	3.0	2.9
70 F	9.0	9.0	9.0	8.1	7.3	6.6	4.8	4.8	4.8	4.6	4.1	3.8	3.7	3.5	3.3	3.2

*When the set temperature is 130°F or higher, maximum flow rate is limited to 4.8 GPM.

WARRANTY

Product Registration and Limited Warranty

1. Product registration card or form:
   The enclosed product registration card must be completed and returned within 45 days of original purchasing date by retail buyer. Copy of proof of original purchasing date must be sent in with the warranty card. The customer may register online with attached proof of original purchasing date via the Internet (www.takagi.com/warranty). **THE CARD OR FORM IS FOR PRODUCT REGISTRATION. FAILURE TO COMPLETE AND RETURN THE CARD OR FORM DOES NOT DIMINISH YOUR WARRANTY RIGHTS.**

2. 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, Takagi Industrial Co. USA, Inc., will honor the warranty to the original retail buyer at the original location only, 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 FOLLOWING TABLES. 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 TAKAGI 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.**

3. Warranty for models: **T-H2-DV & T-H2-OS**

[Unit: Year]

<table>
<tr><th colspan="3">Application</th><th>HX(1)</th><th>Parts</th><th>Labor</th></tr>
<tr><td rowspan="6">Single Family Domestic Hot Water</td><td colspan="2">No Recirculation</td><td rowspan="2">10</td><td rowspan="3">5</td><td rowspan="4">1(3)</td></tr>
<tr><td colspan="2">On-Demand Recirculation(2)</td></tr>
<tr><td rowspan="4">w/ Standard Recirculation</td><td>Aquastat Control</td><td rowspan="2">5</td></tr>
<tr><td>Takagi Pump Control</td></tr>
<tr><td>Timer Only</td><td rowspan="2">3</td><td rowspan="2">3</td></tr>
<tr><td>No Pump Control (24 hr.)</td></tr>
<tr><td rowspan="6">Commercial or Multi-Family Domestic Hot Water</td><td colspan="2">No Recirculation</td><td rowspan="4">5</td><td rowspan="4">5</td><td rowspan="4">1(3)</td></tr>
<tr><td colspan="2">On-Demand Recirculation(2)</td></tr>
<tr><td rowspan="4">w/ Standard Recirculation</td><td>Aquastat Control</td></tr>
<tr><td>Takagi Pump Control</td></tr>
<tr><td>Timer Only</td><td rowspan="2">3</td><td rowspan="2">3</td></tr>
<tr><td>No Pump Control (24 hr.)</td></tr>
<tr><td>Heating(4)</td><td colspan="2">All Types</td><td>5</td><td>5</td><td>1(3)</td></tr>
</table>

(1) Heat exchanger

(2) An on-demand recirculation system is a system that utilizes either a push-button or other type of manual activation (as opposed to automatic activation with a temperature sensor or timer) to activate the circulation pump. An on-demand recirculation system can use either the existing cold water line as the return line or have its own dedicated return line.

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

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

4. Repair, Replacement or Refund:
   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.

5. 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.

6. THIS WARRANTY WILL NOT COVER THE FOLLOWING:

- Any Takagi product that is not installed 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 Takagi 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 Takagi product not installed in compliance with all applicable local & state codes, ordinances, and good trade practices.
- Any Takagi 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 Takagi 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 or potable water / glycol mixtures 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.