T-M199 Instantaneous Water Heater

Installation Manual and Owner's Guide

Mobius Water Heater™

Model T-M199

Suitable for potable water heating and space heating

FEATURING

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

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.

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SPECIFICATION

Natural Gas Input (Operating Range)		Min: 25,000 Btu/h Max: 199,000 Btu/h	
LPG Input (Operating Range)		Min: 25,000 Btu/h Max: 199,000 Btu/h	
Gas Connection		¾" NTP	
Water Connections		¾" NTP	
Water Pressure		15 - 150 psi *	
Natural Gas Pressure Inlet		Min. 5.0" WC Max. 10.5" WC	
LP Gas Pressure Inlet		Min. 11" WC Max. 14" WC	
Manifold Pressure		Natural: 1.8" WC Propane: 2.3" WC	
Weight		70 lbs.	
Dimensions		H23.6" x W18.5" x D8.9"	
Ignition		Electric Ignition	
Electric	Supply	120VAC (60Hz)	
	Consumption	Operation	95 W
		Standby	14 W
		Freeze-Protection	140 W

*50 psi or above is recommended for maximum flow

NOTE

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

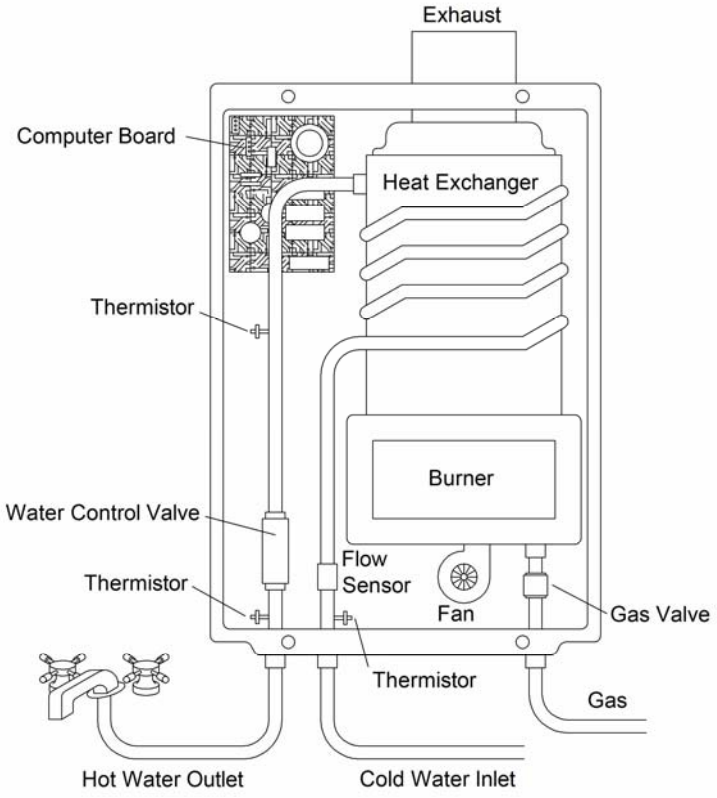
-In accordance with ANSI Z21.10.3 and SCAQMD Rule 1146.2, CO emission does not exceed 400 PPM for normal input

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

INTRODUCTION

- This manual provides information necessary for the installation, operation, and maintenance of the Model T-M199 water heater.
- The model description is listed on the rating plate which is attached to the front cover 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-M199 Water Heater is an instantaneous, tankless water heater designed to efficiently supply endless hot water for your needs.
- The principle behind the T-M199 Water Heater is simple:

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.



*This diagram is to illustrate Takagi's tankless water heater design concepts only and may not be accurate to the T-M199's physical description.

SAFETY GUIDELINES

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 Mobius T-M199 Water Heater and for compliance with all national, state/provincial, and local codes.**

***For all units installed in the state of Massachusetts, it is required that the installer either be a licensed plumber or licensed gas fitter.**

PLEASE READ THIS MANUAL CAREFULLY AND FOLLOW ALL DIRECTIONS.

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-M199 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.

Rating Plate

WARNING

- Water temperatures over 125ºF can cause severe burns instantly or death from scalding. The water temperature is set at 122ºF (50ºC) from the factory to minimize any scalding risk. Before bathing or showering always check the water temperature.

- Do not store or use gasoline or other flammables, vapors, or liquids in the vicinity of this appliance.
- Do not reverse the water and/or gas connections as this will damage the gas valves and can cause severe injury or death. Follow the diagram on p. 16 when installing your water heater:

Prohibited

- 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. 24 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.

CAUTION

- **The warranty will not cover damage caused by water quality.** Water hardness may affect the water heater. Water heater may be damaged.
- **TAKAGI recommends using the Takagi direct vent kit, when the water heater is installed in a beauty salon.** Some chemicals used in a beauty salon may affect the flame sensor. Water heater may not work properly.
- Although the T-M199 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.**
- 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. If there is no drain, 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.

WARNING

- **TAKAGI does not recommend installing unit in an attic due to safety issues.** If you install your T-M199 in an attic:
  - Make sure your unit will have enough combustion air and proper ventilation.
  - Keep the area around your T-M199 clean. When dust collects on the flame sensor, the water heater will shut down on errors.
  - If the above conditions cannot be met, use the direct vent conversion kit TK-TV11.
  - Locate unit for easy access for service and maintenance.
  - A drain pan is required to be installed under the water heater in case of leaks.

GENERAL

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

2. Maintain proper space for servicing. Install the unit so that it can be connected or removed easily. Refer to p. 7 and p. 8 for proper clearances.

3. The electrical connection requires a means for switching off the power supply.

4. If you will be installing the unit in a contaminated area with a high level of dust, sand, flour, aerosols or other contaminants, they can become airborne and enter and build up within the fan and burner causing damage to the unit. In those environments, please purchase the optional TK-TV11 direct vent conversion kit and convert the T-M199 to a sealed combustion unit. The warranty will not cover damage caused to the unit due to installation in a contaminated environment that has not been converted using the TK-TV11.

5. 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.

6. 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. 13).

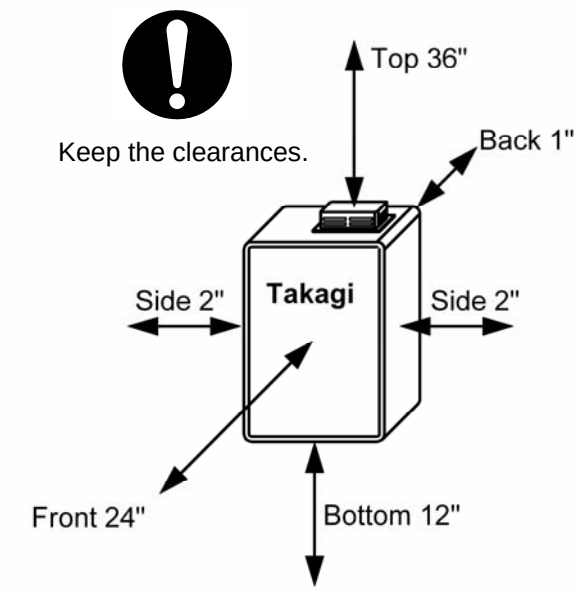
ACCESSORIES

Check that the installation manual, the communication cable, and the warranty card are included with the unit.

Items	
Manual	
Communication Cable	 Gray
Warranty Card	

OUTDOOR INSTALLATION

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. **Outdoor installation only for a mild climate.**
3. The outdoor vent cap must be used when unit is installed outdoor. Takagi requires the use of its part No. TM-TV06.
4. When installed outdoors, the T-M199 water heater shall be wall mounted only. Locate the water heater in an open, unroofed area and maintain the following minimum clearances:



WARNING

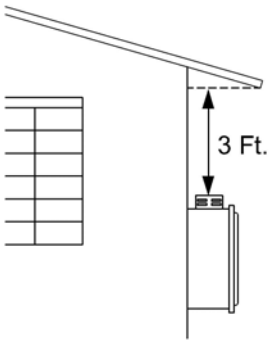
Do not install the heater where water, debris or flammable vapors may get into the flue terminal. This may cause damage to the heater and void the warranty.

Prohibited

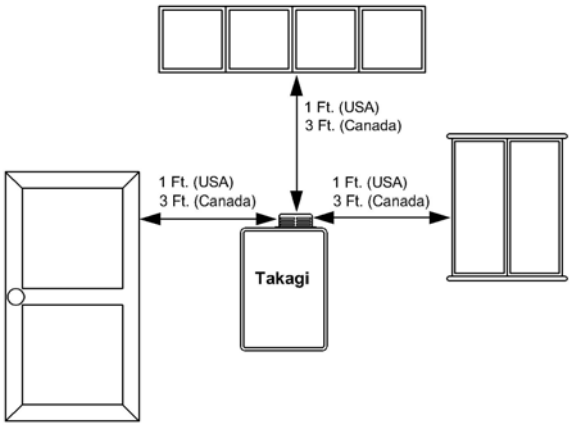
Do not have the vent terminal pointing toward any opening into a building. Do not locate your heater in a pit or location where gas and water can accumulate.

Prohibited

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.



Do not install the water heater vent terminator within 1 foot in the USA of any air intake or building opening, and with in 3 feet in Canada of any air intake or building opening (Refer to p.13).

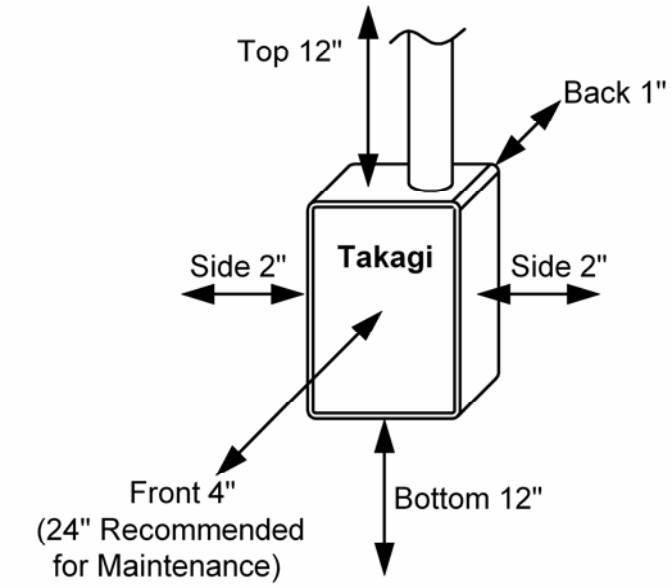


INDOOR INSTALLATION

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. When installed indoors, the T-M199 water heater shall be located in an area to maintain the following minimum clearances around the unit:

Keep the clearances.



Combustion Air Supply

The water heater location must provide enough air for proper combustion and ventilation of the surrounding area. See the latest edition of ANSI Standard Z223.1 or any applicable local codes. In general, these requirements specify that if the unit is installed in a confined space, there must be a permanent air supply opening.

Minimum recommended air supply opening size for water heater:

Water heater size	When drawing make-up air from outside the building	When drawing make-up air from inside the building (from other rooms within)
MAX 199,000 BTU	13.3 Sq. IN	199 Sq. IN
	When combustion air is supplied from outside the building, an opening communicating directly with the outside should have a minimum free area of one square inch per 15,000 BTUH input of the total input rating of water heater in the enclosed area.	When combustion air is supplied from inside the building, an opening communicating with the rest of the dwelling should have a minimum free area of one square inch per 1,000 BTUH input of the total input rating of water heater in the enclosed area. This opening should never be less than 199 sq. in.

Combustible Air Supplied by Mechanical fan or Make up air device

The T-M199 water heater is equipped with a combustible air sensor that will shut off the unit when inadequate combustible air supply to unit is detected.

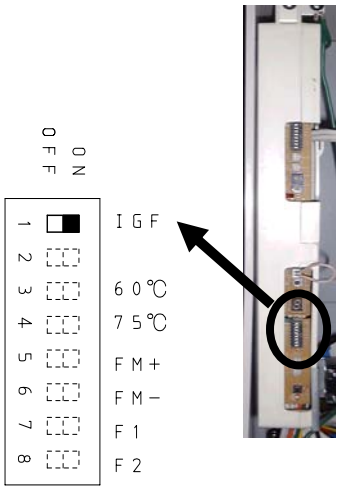
- If a mechanical fan or make up air device is used to supply air to the water heater or utility room, the installer should make sure it does not create drafts which could cause nuisance shutdowns.
- If a blower is necessary to provide adequate combustion air to the water heater, the blower and water heater must be set up so that the water heater cannot fire unless the blower is operating. Possible methods include the use of external flow sensors/transmitters and relays.

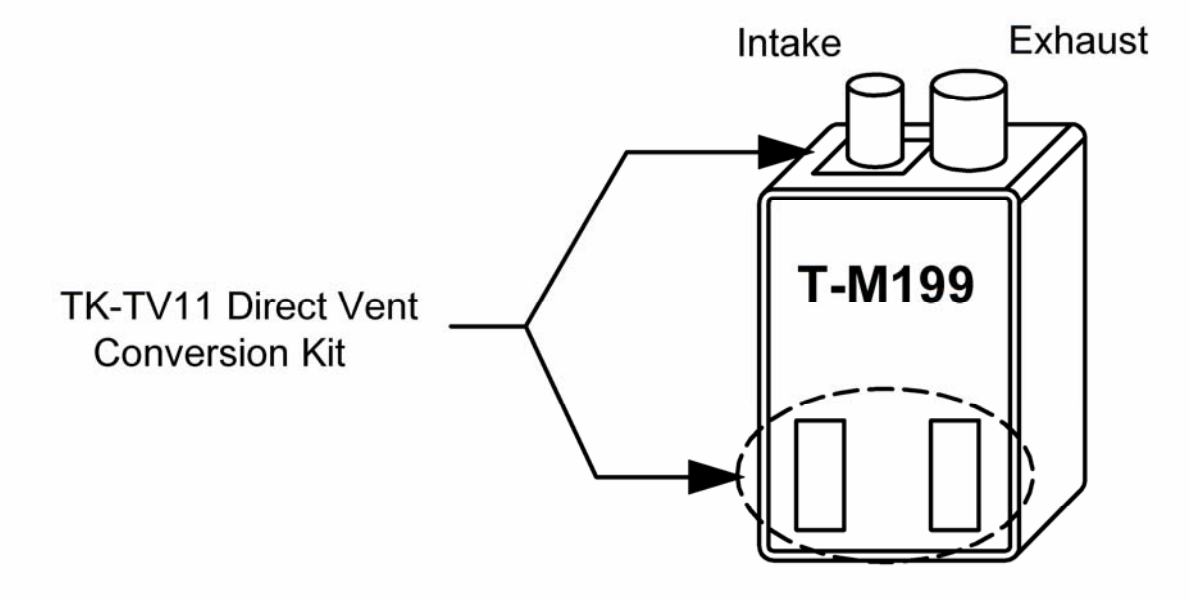
DIRECT INTAKE VENT SYSTEM

This T-M199 water heater may be converted to a direct vent (sealed combustion) appliance by installing an adapter (part No TK-TV11) which will bring all required combustible air from outside the building.

- The T-M199 must be installed in a location where the proper amount of combustible air will be available to it at all times without obstructions.
- If used as a direct vent appliance, the T-M199 requires a 3” combustible air supply pipe. The intake pipe must be sealed airtight.
- Air supply pipe can be made of ABS, PVC, galvanized steel, corrugated aluminum, corrugated stainless steel or Category III stainless steel.
- Sidewall venting is recommended for the direct vent system.
- Takagi recommends running the exhaust vent and the intake pipe parallel.

To convert the T-M199 to a direct vent unit, open the front cover and change the “IGF” dipswitch on the computer board to the “ON” position, as shown to the right.





VENTING INSTRUCTIONS

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

This water heater must be vented in accordance with the section “Venting of Equipment" of the latest edition of the Natural Fuel Gas Code: ANSI Z223.1, All applicable local building codes, Section 7 of CAN/CSA B149.1 Natural Gas in Canada, Propane Installation Code in Canada.

EXHAUST VENT

This is a Category III 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 350ºF. For best results, a vent system should be as short and straight as possible.

1. This Takagi water heater is a Category III appliance and must be vented accordingly with any 4” vent approved for use with Category III or Special BH type gas vent.

2. The following are 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).

3. Follow the vent pipe manufacturer’s instructions when installing the vent pipe.

4. Do not common vent this appliance with any other vented appliance (Do not terminate vent into a chimney. If the vent must go through the chimney, the vent must run all the way through the chimney with Category III approved or Special BH vent pipe)**.**

5. The maximum length of exhaust vent piping must not exceed 35 ft. deducting 5 ft. for each elbow used in the venting system. Do not use more than 3 elbows.

Diameter	Max. No. of Elbow	Max. Vertical or Horizontal run in Length
4”	3 Ea.	35 ft

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

No. of Elbows	Max. Vertical or Horizontal Length
0	35 ft.
1	30 ft.
2	25 ft.
3	20 ft.

6. When the horizontal vent run exceeds 5 ft., support the vent run at 3 ft. intervals with overhead hangars.

7. Takagi will not be responsible for any damage to the water heater caused by condensation from the vent. For horizontal runs, slope the vent run downwards toward the vent terminal at a rate of ¼” per foot. For horizontal runs that do not slope downward and for vertical runs, installing a condensate drip is recommended. Please refer to p. 12 for the diagrams.

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.

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.
- The sidewall vent terminator, TK-TV01, is recommended when the water heater is vented through a sidewall.
- Takagi recommends the use of the TK-TV05 with the TK-TV11 when converting to a direct vent unit.

General rules for venting the T-M199 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.

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.

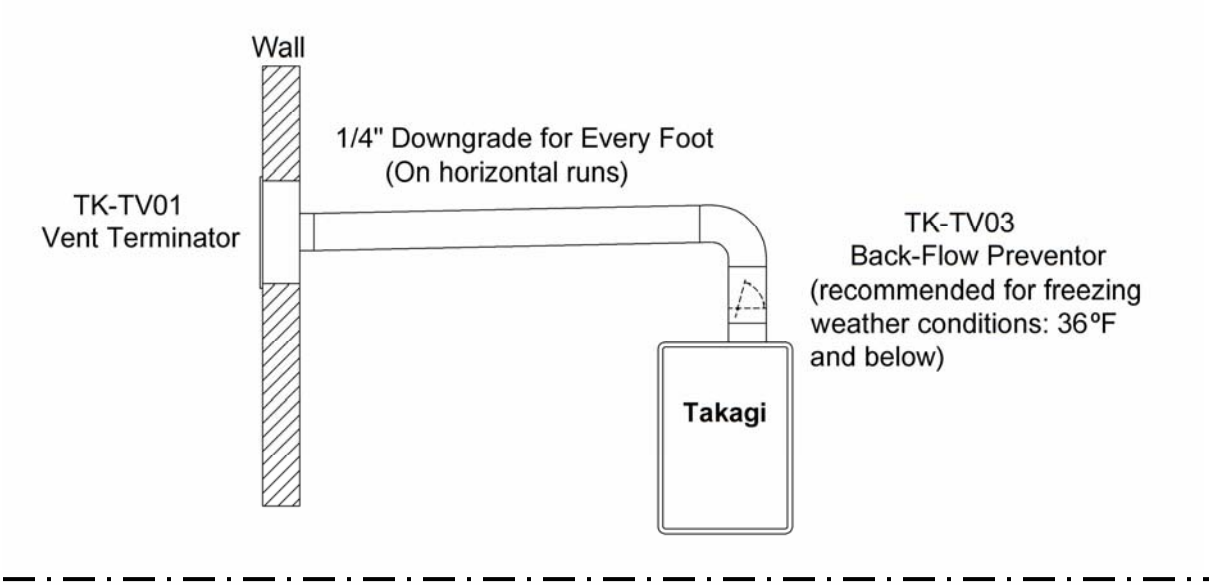
7. The water heater vent must not be connected to any other gas appliance or vent stack.

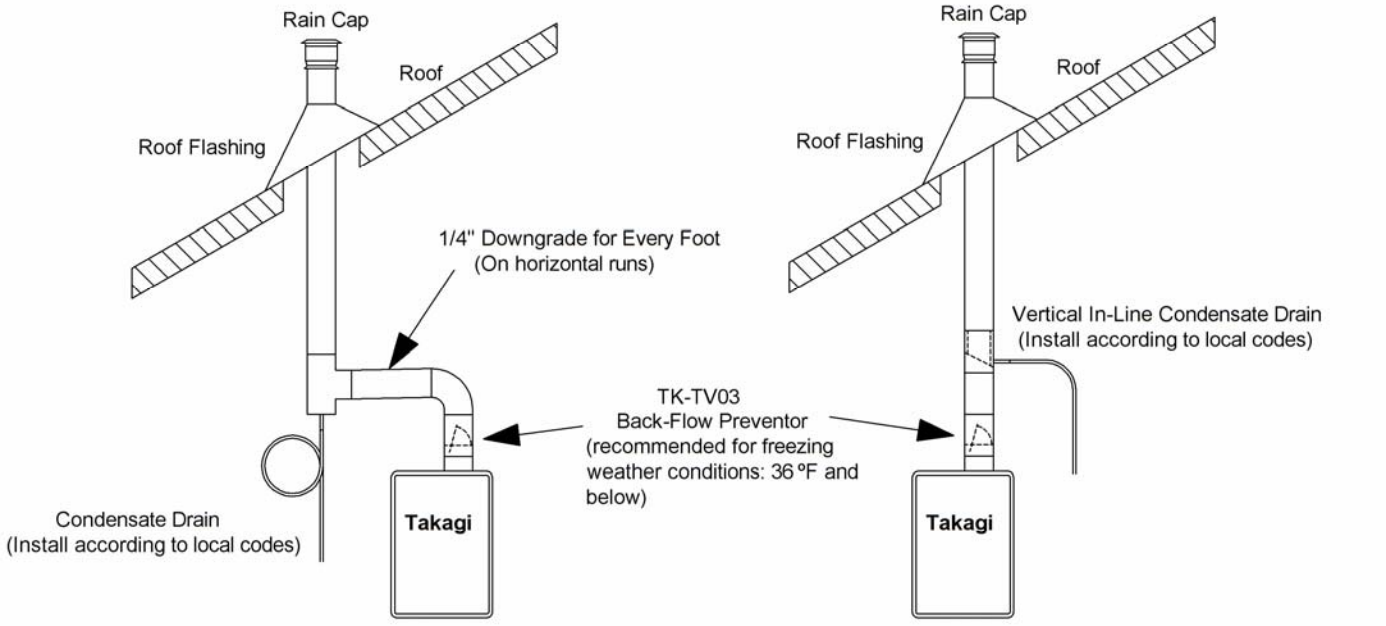
8. Avoid locating the water heater vent terminator near **any air intake devices**. These fans can pick up the exhaust flue products from the water heater and return them to the building. This can create a health hazard.

9. Avoid using an oversized vent pipe or using extremely long runs of the pipe.

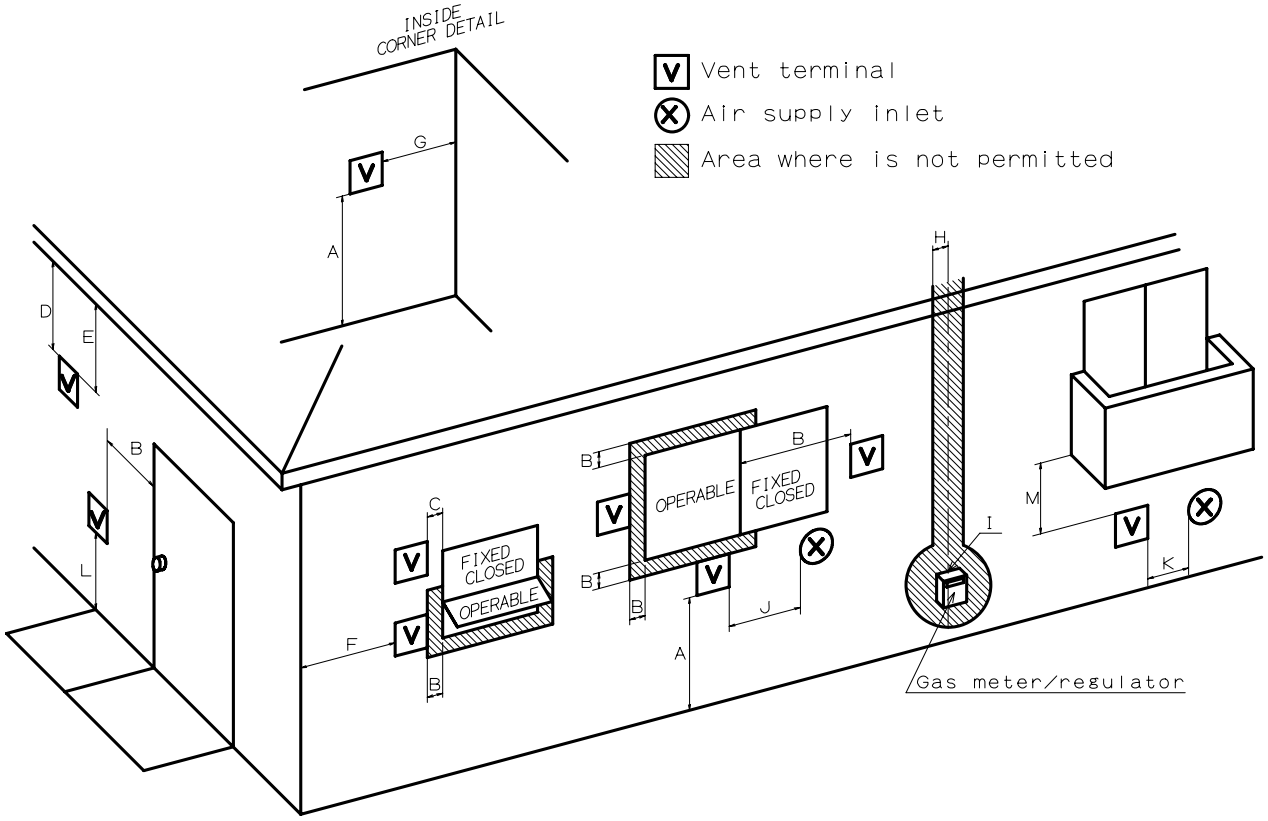
10. Locate the vent terminator so that it cannot be blocked by any debris, at any time. Most codes require that the terminator be at least 12 inches above grade, but the installer may determine if it should be higher depending on the job site condition and applicable codes.

11. For rooftop venting, a rain cap must be installed.





- Regarding the clearance from the terminator to the air inlet or opening, refer to the next page.
- Install a condensation drain in the venting.
- Follow the vent system to vent manufacturer's instruction and local code.
- Do not common vent or connect any vent from other appliances to the T-M199 vent.
- Use 4" category III approved or Special BH, single or double wall stainless steel vent pipe.



		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.				

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: 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 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:

Natural Gas	**Min. 5.0” WC - Max. 10.5” WC**
Propane Gas	**Min. 11” WC - Max. 14” WC**

2. Gas pressure below this specified range for the T-M199 and/or insufficient gas volume will adversely affect performance.

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-M199 is disconnected to avoid any damage to the water heater.

Size the gas pipe appropriately to supply the necessary volume of gas required for the T-M199 (199,000 BTUH for Natural Gas or 199,000 BTUH for Liquid Propane) using ANSI233.1/NAPA 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-M199 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 before connecting to the heater 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 1100 BTU/Cubic Ft.: T-M199 requires 181 Cubic Ft./hr. **Unit: Cubic Feet per Hour**

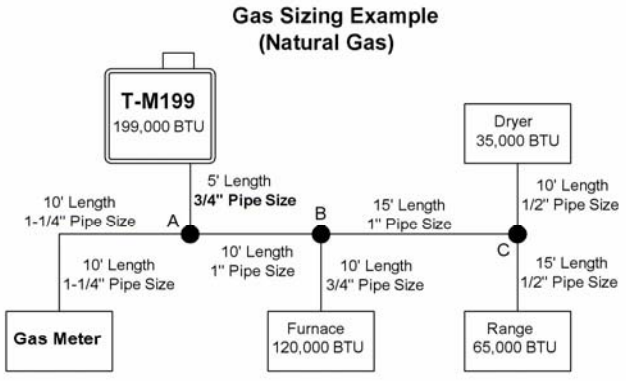
Pipe Size	Length in Feet												
inches	10'	20'	30'	40'	50'	60'	70'	80'	90'	100'	125'	150'	200'
¾"	363	249	200	171	152	138	127	118	111	104	93	84	72
1"	684	470	377	323	286	259	239	222	208	197	174	158	135
1 ¼"	1404	965	775	663	588	532	490	456	428	404	358	324	278
1 ½"	2103	1445	1161	993	880	798	734	683	641	605	536	486	416
2"	4050	2784	2235	1913	1696	1536	1413	1315	1234	1165	1033	936	801

Propane (LP) Gas Supply Piping

Maximum Capacity of Propane (LP) Gas Based on 11" WC supply pressure at a 1.0" 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"	1071	732	590	504	448	409	378	346	322	307	275	252	213
1 ¼"	2205	1496	1212	1039	913	834	771	724	677	630	567	511	440
1 ½"	3307	2299	1858	1559	1417	1275	1181	1086	1023	976	866	787	675
2"	6221	4331	3465	2992	2646	2394	2205	2047	1921	1811	1606	1496	1260



Based on Energy Content of 1100 BTU / Cubic Ft.:

Divide each appliance's BTU requirement by 1100 BTU to get the appliances Cubic Ft. requirement.

Taking 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 1100 yields a cubic ft. requirement of 200 cubic ft. of gas. The farthest appliance is the range, which is 60 ft. away from the meter. Looking at the above chart, and under the column of 60 ft., Section A to B needs to be 1" in order to supply 200 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.

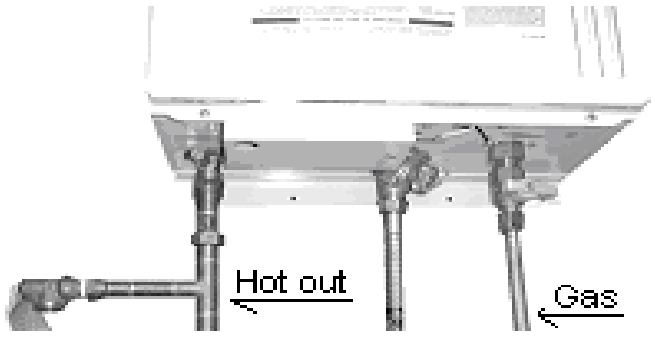
2. A manual shut off valve must be installed on the cold water inlet to the water heater between the main water supply line and the T-M199.

3. In addition, a manual shut off valve is also recommended on the hot water outlet of the unit. If the T-M199 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 optimum flow.

CAUTION: Do not reverse the hot outlet and cold inlet connections to the T-M199 Water Heater. This will not activate the water heater.



PRESSURE RELIEF VALVE

The Mobius T-M199 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/hr.

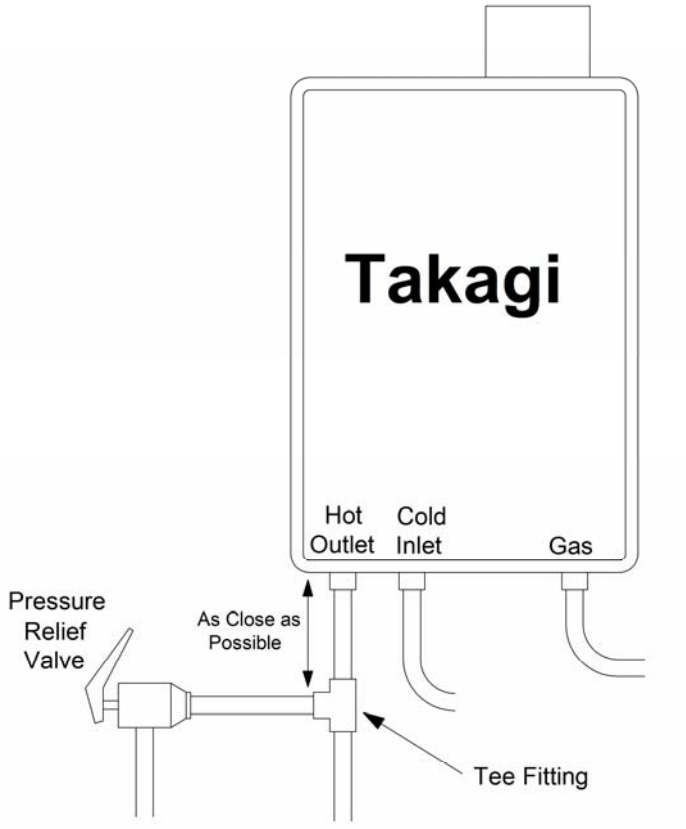
5. The pressure relief valve needs to be rated for a maximum of 150 psi.

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-M199 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.



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-M199, 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 heater must be electrically grounded. Do not attach the ground wire to either the gas or the water piping.

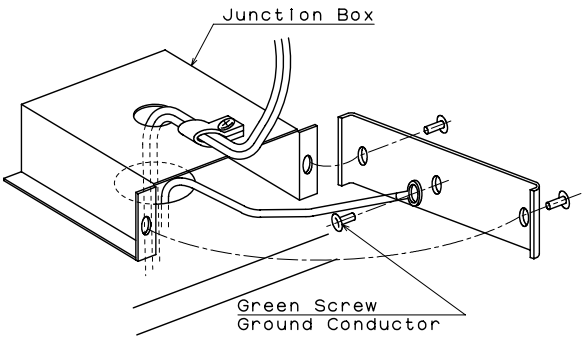
2. The Mobius T-M199 water heater requires **AC 120V 60 Hz electrical power supply that is properly grounded.**

- An on/off switch controlling the main power to the T-M199 must be provided for service reasons;
- Connect the power supply to the T-M199 exactly as shown in the wiring diagram;

3. A green screw is provided in the junction box to ground the connection.

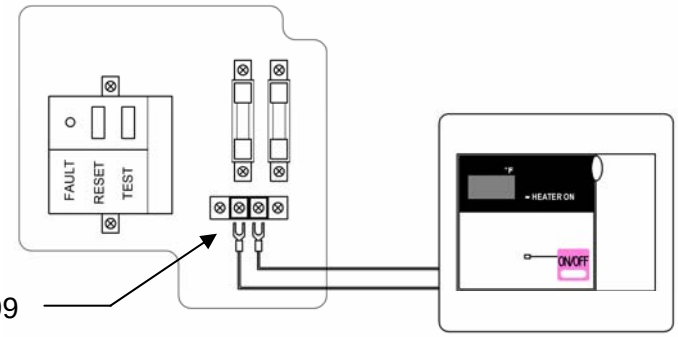
4. Can be hardwired or wired to a plug-in.

5. The use of a surge protector is recommended to protect the unit from power surges.



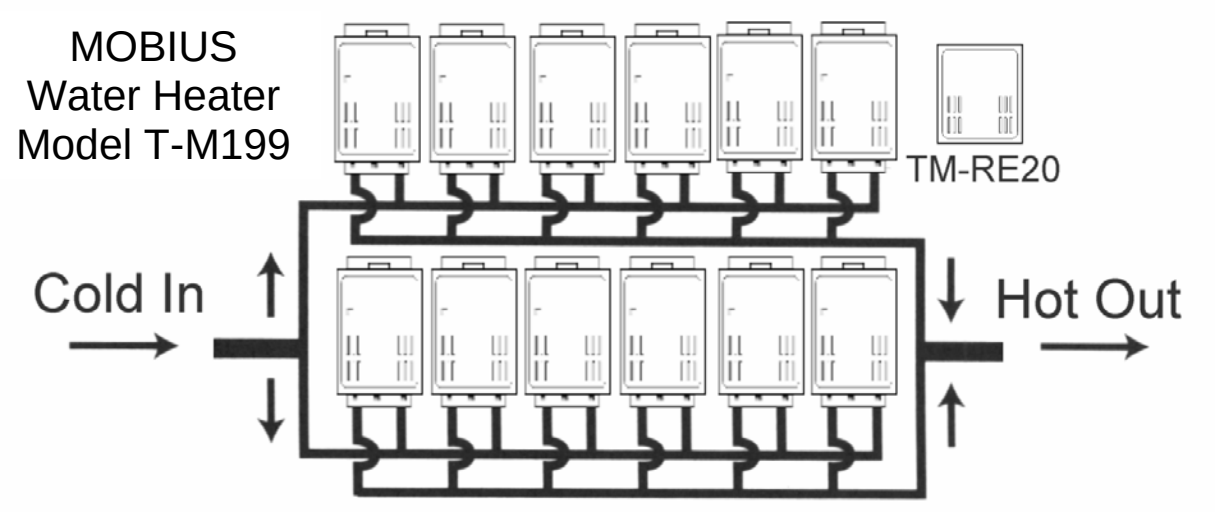
REMOTE CONTROLLER CONNECTION

- Minimum 18AWG wire (No polarity)
- Maximum 400 feet long
- Please follow the TM-RE10's manual



MULTI-UNIT SYSTEM FOR LARGE VOLUMES

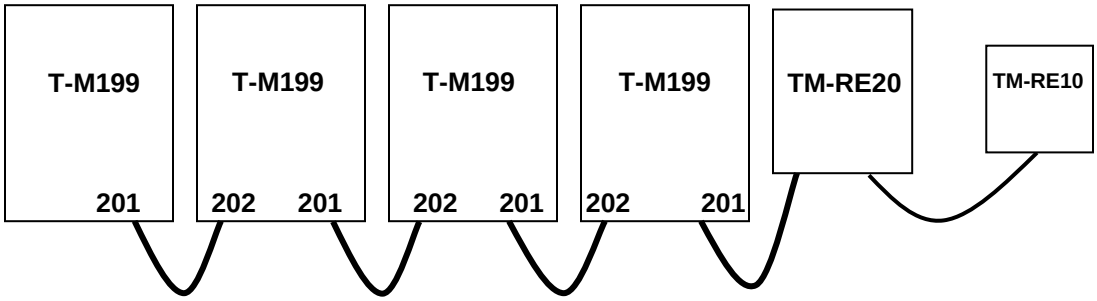
Multiple T-M199's can be combined for a multi-unit system, along with the Multiple Unit Controller and Temperature Remote Controller (Parts TM-RE20 and TM-RE10). Each set of controllers (one TM-RE20 and one TM-RE10) can control from 2 units to 20 units for commercial or residential applications. For a 20-unit system, the computer can modulate between the usage of 25,000 BTU to 3.98 Million BTU.

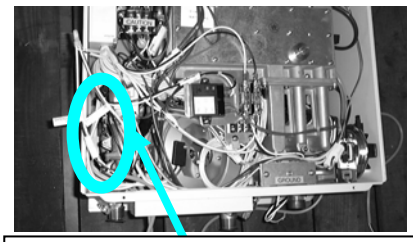


An individual cutoff switch is recommended for each unit in a multi-unit system for the purpose of maintenance.

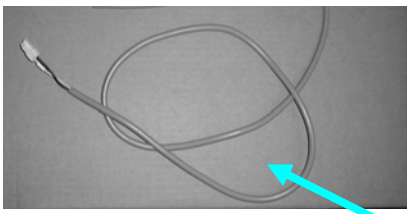
Multi-Unit System Connection Diagram

Multi-Unit Controller (TM-RE20) and Temperature Remote Controller (TM-RE10) wiring:

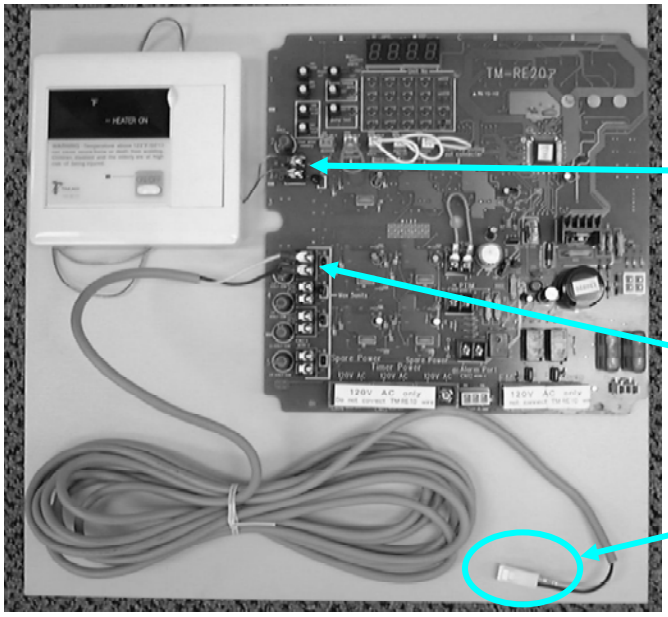




Wire No. 201 (Male Adapter) and No. 202 (Female Adapter)



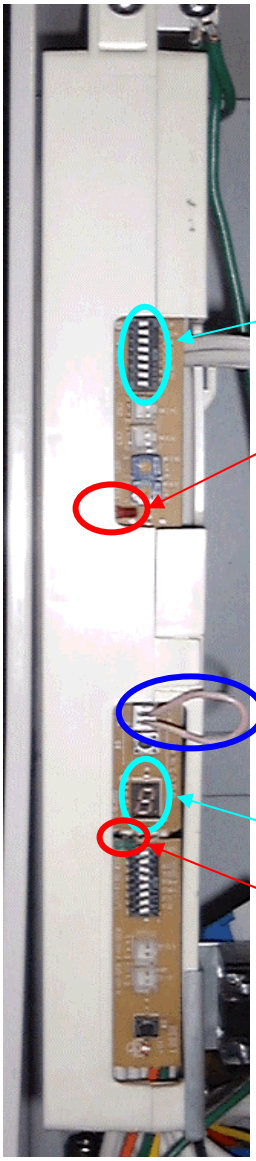
T-M199 Comunication Cables are included with the TM-RE20. TM-RE10 Cables use 18 gage wire and can be up to 250 ft. long.



TM-RE10 Port:
Use 18 Gage Wire.
No Polarity

There are four Ports. Each port can connect up to five T-M199's. No Polarity.

This end connects to Wire No. 201 in the first T-M199



Please don't change these dipswitch settings. The switches are already correctly set from the factory.

When the unit is operating, this red LED will be lit.

Multi-Mode Jump Connector:

For Multi-Unit System mode, permanently pull the jump connector out. For single-unit mode, leave the jump connector in.
When the jump connector is removed for multi-mode, please keep this connector safely stored away for future maintenance (the jumper is located behind the "Do Not Remove" label.

Error Signal LED:
This LED shows error codes for the units, which also show on the TM-RE10 and TM-RE20. Error code definitions are p. 30 in this Installation Manual.

If the unit has power and is ready to operate, this green LED will be lit.

Pump Connection on TM-RE20 Multi-Unit Controller:

The TM-RE20 Multi-Unit Controller includes a pump control port (shown in diagram below) that provides the option of using the TM-RE20 to control a circulation pump. Two jumpers ("Store" and "Re-cir") are located in the upper-left quadrant of the board and are shown in the diagram below. Depending on whether the jumpers are removed or in-place, the pump will be controlled differently.

A) "Re-cir" Jumper Removed, "Store" Jumper In-Place: Re-circulation Control

The pump is only made to run at duration when the temperature of the water in the re-circulation loop is not close to the set temperature of the T-M199. The pump will run for about 1 minute every 30 minutes to determine whether or not water heating is required (if the inlet thermistor senses that the water has gotten too cold, the pump will activate before 30 minutes have elapsed). If heating is required, the pump will remain on until the water in the loop gets up to the T-M199's set temperature.

B) "Store" Jumper Removed, "Re-cir" Jumper In-Place: Storage Tank Circulation Control

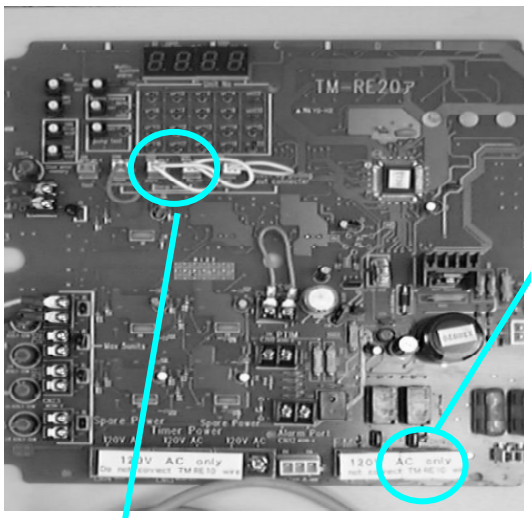
The T-M199 will heat the water 5.4°F higher than its set temperature (except for set temperatures 182°F). This is to ensure a higher rate of recovery for storage tank applications. The circulation pump (from storage tank to T-M199) will always remain on.

C) Both "Store" and "Re-cir" Jumpers Removed: Energy Conserving Re-circulation

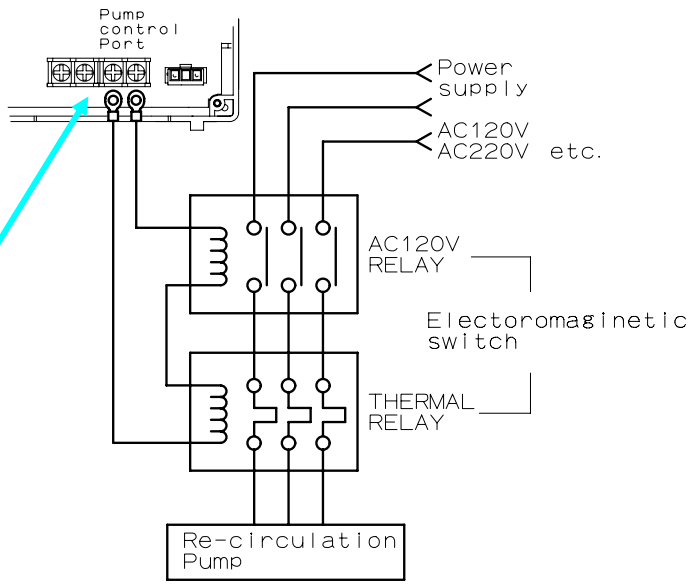
The control is exactly the same as scenario A), except that the water in the loop will only be heated up to 122°F, regardless of the T-M199's set temperature (this only effective at conserving energy if the set temperature of the T-M199 is higher than 122°F). The pump will only activate if the temperature in the loop falls below 113°F and if activation meets the T-M199's minimum BTU requirements.

D) **Both "Store" and "Re-cir" Jumpers In-Place: No Control**

This provides no control for the pump. If a pump is connected to the pump control port with both jumpers in place, the pump will be made to run all the time.



"Store" and "Re-cir" jumper



*Do not connect the pump directly to the pump control port. Please connect pump with the use of relays, as shown in above diagram

INITIAL OPERATION

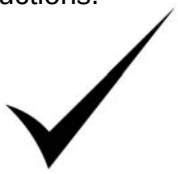
FOR YOUR SAFETY, READ BEFORE OPERATING:

- **Check the GAS and WATER CONNECTIONS** for leaks before firing it 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 next to 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. 14.
- 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 heater.
- **Purge the GAS and WATER LINES** to remove any air pocket.
- 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:

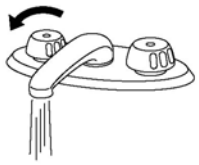
- Do not try to start the water heater.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

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



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

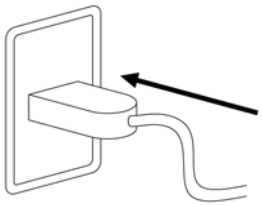
3. Open a hot water tap to verify that water is flowing to that tap.



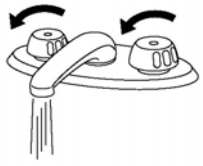
Then close the hot water tap.

4. Fully open the manual gas control valve installed.

5. Turn on the 120 volt 60 Hz power supply to the T-M199 water heater.



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

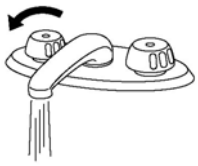


NORMAL OPERATION

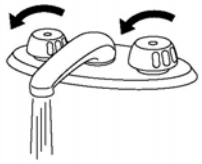
- Flow rate to activate the T-M199 : 0.75 gallon per minute
- Flow rate to keep the T-M199 running : 0.6 gallon per minute

1. NORMAL OPERATION WITHOUT REMOTE CONTROLLER

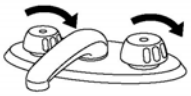
1. Open a hot water tap.



2. Mix cold water with the hot to get the correct temperature water.

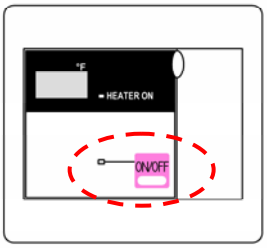


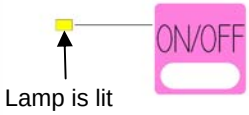
3. Close the hot water tap.



2. NORMAL OPERATION WITH REMOTE CONTROLLER: TM-RE10 (Optional)

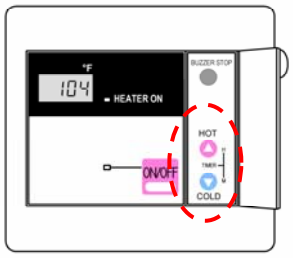
1. Press the power ON/OFF button.

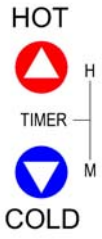




The temperature will be displayed on the remote controller.
*When the remote controller is OFF, the time is displayed.

2. Set temperature. (Example: 104°F)





When the red jumper on the back of the TM-RE10 is **installed**, the temperature options are below.

99	100	102	104	106	108	110	111	113	115	117	122	131	140	158	167

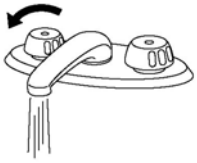
When the red jumper on the back of the TM-RE10 is **removed**, the temperature options are below.

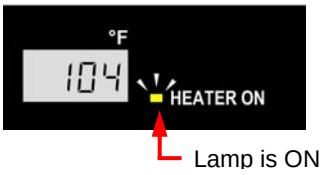
99	100	102	104	106	108	110	111	113	122	131	140	149	158	167	182*

* “H” is displayed on the TM-RE10 when the set temperature is 182°F.

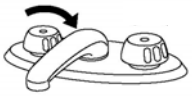
(unit: °F)

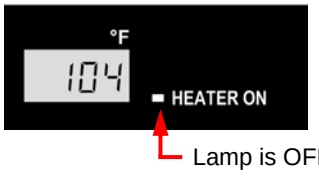
3. Open a hot water tap.
Mix cold water with the hot if you need.





4. Close the hot water tap.





WARNING

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

- The outlet hot water temperature of the Mobius T-M199 water heater is factory set at 122°F.
- Feel the water temperature before bathing or showering.

FLOW

- 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.43 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-M199 is rated for 246 gallons per hour (GPH) or 4.1 gallons per minute (GPM) for Natural Gas, and 270 GPH or 4.5 GPM for Liquid Propane, when raising the water temperature by 77°F (from 58°F to 135°F).
- Refer to the chart on the right for typical household plumbing fixture flow rates to determine what the Mobius T-M199 can do in a household application.

Household Flow Rates

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

Taken from UPC 1997

FREEZE PROTECTION SYSTEM

- This unit comes equipped with heating blocks to prevent freezing which can damage the heat exchanger.
- For this freeze prevention 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.
- The freeze protection system will activate when the temperature drops to 36.5°F (2.5°C) and is rated to protect the unit down to 5°F (-15°C) in a wind-free environment.
- Do NOT install the water heater in an area that is subject to temperatures (including wind chill) below 5ºF (-15ºC), this will void the warranty and Takagi will not be responsible for any damage to the heat exchanger as a result of freezing.
- In any areas subject to freezing temperatures, Takagi requires the use of its back flow vent damper (Part No. TK-TV03) 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 or if the temperatures (including the wind chill) will drop below 5 ºF (-15 ºC):

  1. Drain the unit of water. Refer to p. 27.

  2. Turn off your heater.

This will keep your unit from freezing and being damaged.

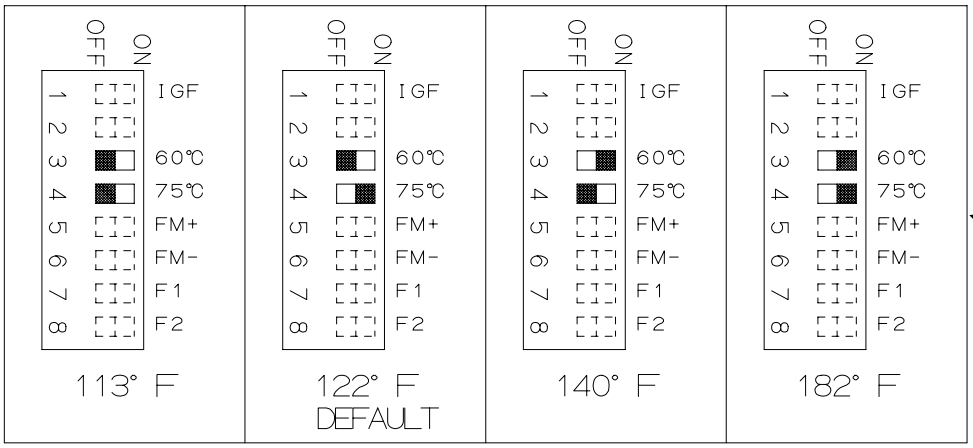
CAUTION: Only pipes within the water heater are protected by the freeze protection system. Any water pipes (hot or cold) located outside the unit will not be protected. Properly protect and insulate these pipes from freezing.

TEMPERATURE SETTINGS

- There are 4 preset temperatures that you can select from by changing the dipswitch settings on the computer board.
- The temperature has been preset at the factory to 122ºF (50ºC).
- If you desire to change the set temperature with dipswitches, please refer to the diagram on below. These temperatures are available: 113ºF, 122ºF, 140ºF, and 182ºF. **Temperatures 140ºF and 182ºF are for commercial or heating applications only**.
- If you desire a hot water temperature other than the 4 preset settings, please purchase the optional temperature remote controller (part No. TM-RE10).
- With this optional TM-RE10 you can set the temperature from 99ºF to 182ºF with various increments.
- Please read the instructions carefully prior to installing the TM-RE10, as failure to do so could damage the temperature controller and/or the water heater, which will void the warranty.

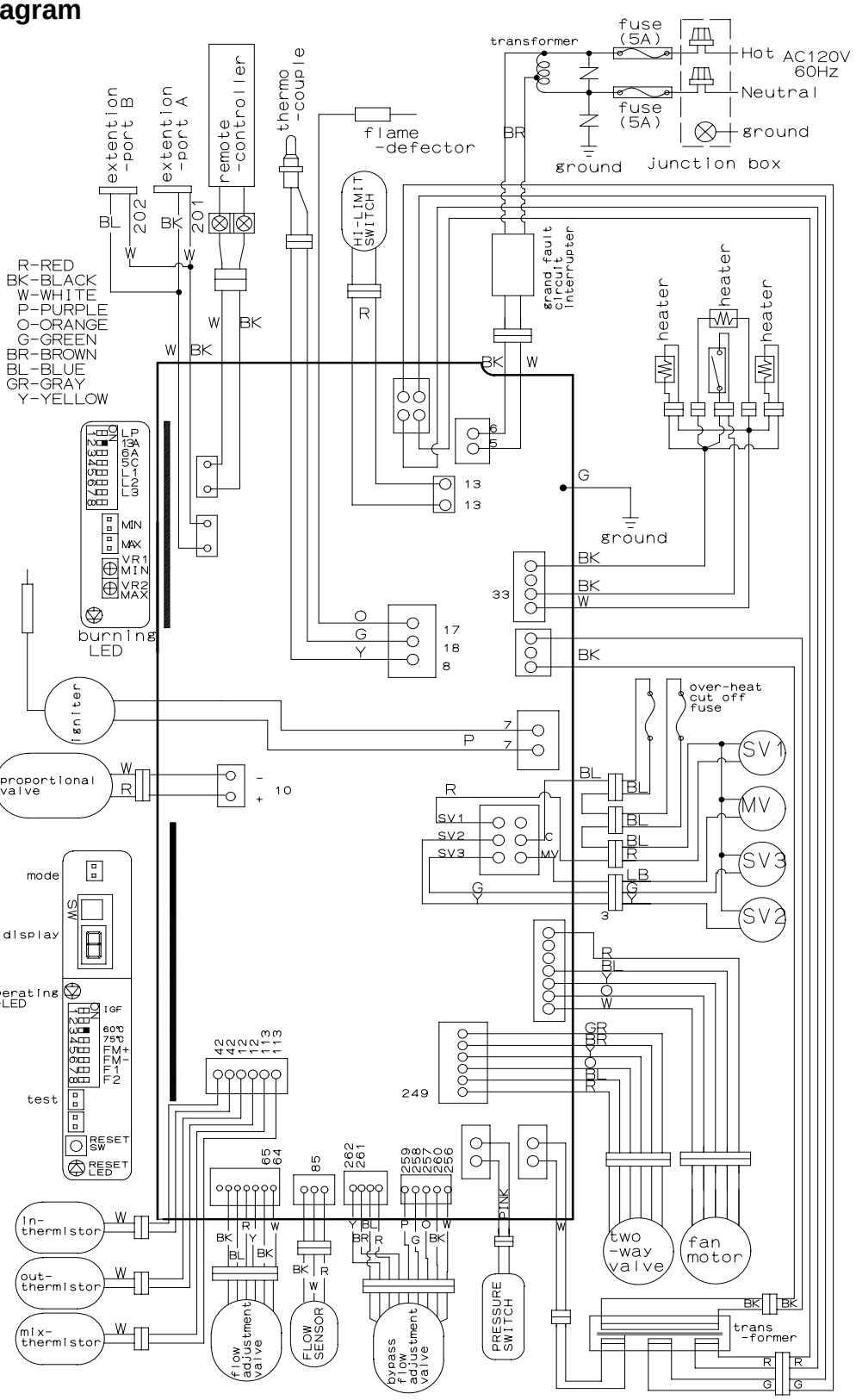
- **Turn off the power supply to the heater before changing the dipswitch settings.**

Temperature Settings



The dark squares are the directions the dipswitches should be set to.
Only adjust the dipswitches with darkened squares.

Wiring Diagram



Wiring Diagram

A wiring diagram is located on the inside front panel of the appliance.
Electrical Rating: 120 VAC, 60 Hz.
Note: If any of the original wiring supplied with this appliance must be replaced, it must be replaced with appliance wiring material (180c) or its equivalent. Wires are available through the manufacturer.

MAINTENANCE AND SERVICE

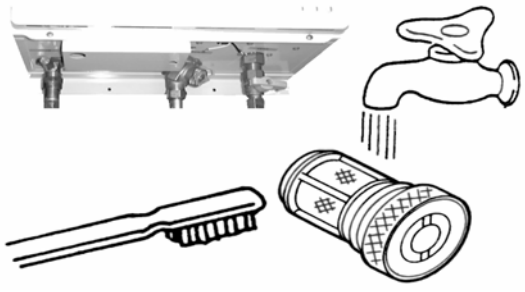
WARNING: Turn off the electrical power supply and close the manual gas control valve and the manual water control valve before servicing.

- 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 professional. If repairs are needed, any repairs should be done by a licensed professional.

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 drain plugs 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.**



GENERAL TROUBLESHOOTING

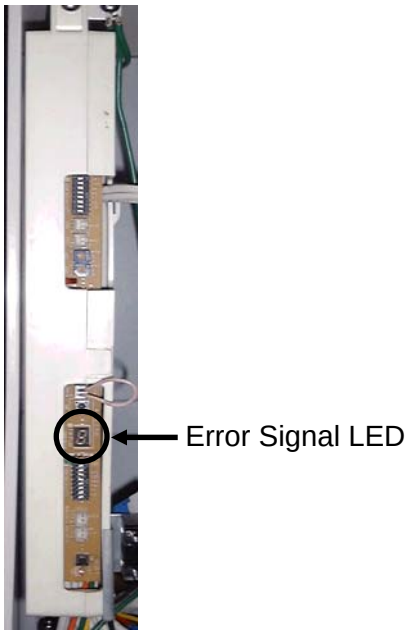
~ TEMPERATURE and AMOUNT OF HOT WATER ~	
PROBLEM	**POSSIBLE SOLUTIONS**
It takes long time to get hot water at the fixtures.	• The time it takes to deliver hot water from the T-M199 to your fixtures depends on the length of piping between the two. The longer the distance or the bigger the pipes, the 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. 35)
The water is not hot enough.	• Compare the flow and temperature. See the chart on p. 43. • Check cross plumbing between cold water lines and hot water lines. • Is the gas supply valve fully open? (p. 22) • Is the gas line sized properly? (p. 15) • Is the gas supply pressure enough? (p. 14) • Is the set temperature set too low? (p. 23)
The water is too hot.	• Is the set temperature set too high? (p. 23)
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? (p. 23) • Is the gas supply valve fully open? (p. 22) • Is the water supply valve fully open? (p. 16) • Is the filter on cold water inlet clean? (p. 27) • Is the hot water fixture sufficiently open to draw at least 0.75 GPM through the water heater? (p. 23) • Is the unit frozen? • Is there enough gas in the tank? (for LP)
The hot water gets cold and stays cold.	• Is the flow rate enough to keep the T-M199 running? (p. 23) • If there is a recirculation system installed, does the recirculation line have enough check valves? • Is the gas supply valve fully open? (p. 22) • Is the filter on cold water inlet clean? (p. 27) • Are the fixtures clean of debris and obstructions?
Fluctuation in hot water temperature.	• Is the filter on cold water inlet clean? (p. 27) • Is the gas line sized properly? (p. 15) • Is the supply gas pressure enough? (p. 14) • Check for cross connection between cold water lines and hot water lines.

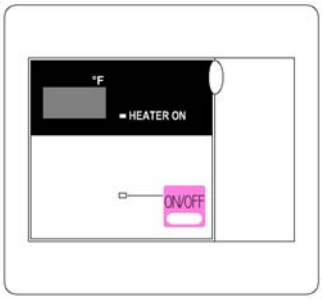
~ WATER HEATER ~	
PROBLEM	**POSSIBLE SOLUTIONS**
Unit does not ignite when water goes through the unit.	• Is the flow rate over 0.75 GPM? (p. 23) • Check for the filter on cold water inlet. (p. 27) • Check for reverse connection and cross connection. • If you use the remote controller, is the power button turned on? (p. 23)
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 push all exhaust gas out of the flue.
Abnormal sounds come from the unit.	• Contact TAKAGI.

~ REMOTE CONTROLLER: TM-RE10 (OPTIONAL) ~	
PROBLEM	**POSSIBLE SOLUTIONS**
It is unable to change the set temperature to above 140 ºF on remote controller while the unit running.	• This is a safety device. Please stop the water flow through the unit: once stopped, you will be able to change the set temperature to above 140ºF.
Remote controller does not display anything when the power button is turned on.	• Make sure the unit gets power supply. • Make sure the connection to the unit is correct. (p. 18)
An ERROR code is displayed.	• Please see the p. 32.

TROUBLESHOOTING – ERROR CODES

- All Takagi 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 TM-RE10 (if installed) or at the Error Signal LED shown below on the computer board to communicate the source of the problem.
- Consult the following chart for the cause of an error code.





TM-RE10 (Optional)

Error	Symptom	Error	Symptom	Error	Symptom
031	Incorrect Dipswitch Settings	331	Mixing Thermistor	701	Proportional Valve / Computer
101	Warning for 991 Error Code	391	Abnormal Thermocouple	711	Solenoid Gas Valve / Computer
111	Failed Ignition	441	Flow Sensor	721	False Flame Detection
121	Flame Loss	510	Abnormal Main Gas Valve	741	Remote Controller
141	Hi-Limit Switch	541	Abnormal Two-Way Valve	761	Multi-system Controller
211	Pressure Switch	611	Abnormal Fan Motor	991	Imperfect combustion
311	Output Thermistor	651	Abnormal Flow Adjustment Valve		
321	Inlet Thermistor	661	Abnormal Bypass Valve		

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. Force 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 gas 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 retailer or manufacturer.

WARNING

The outlet hot water temperature of the T-M199 water heater is factory set at 122 ºF.
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 ºF 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.

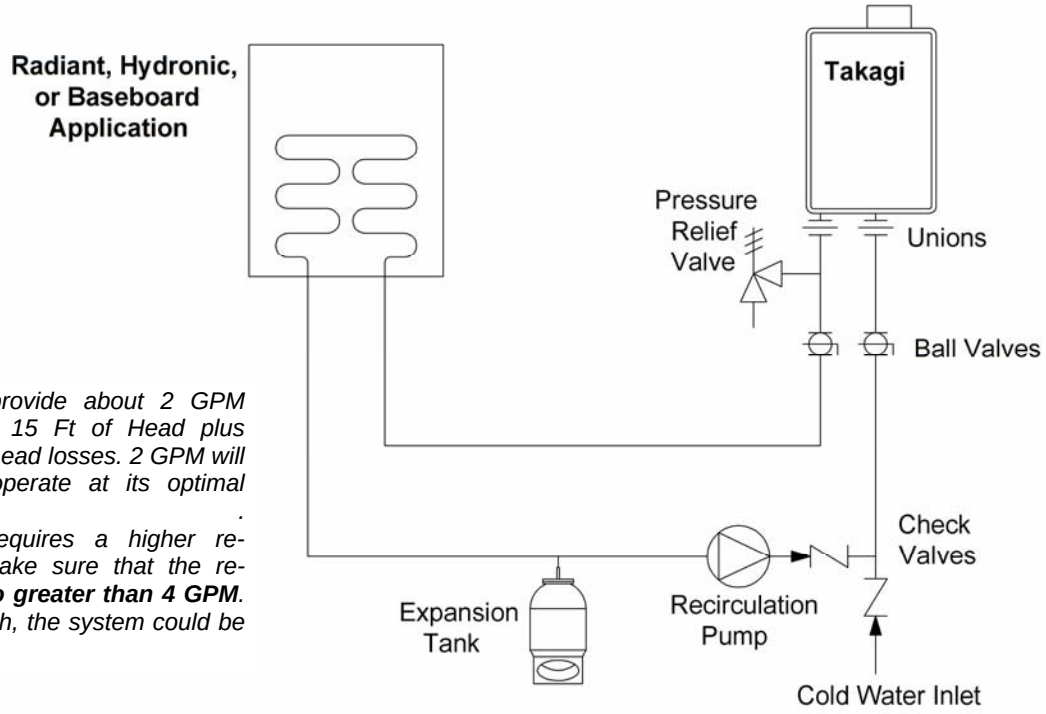
Applications

Space Heating Applications

WARNING

- Toxic chemicals used in boiler treatments such as alcohol, glycerol and glycol group must not be introduced into the system when used for open loop potable water and space heating.
- The T-M199 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 LESS than 30% of Glycol.

Heating application only:

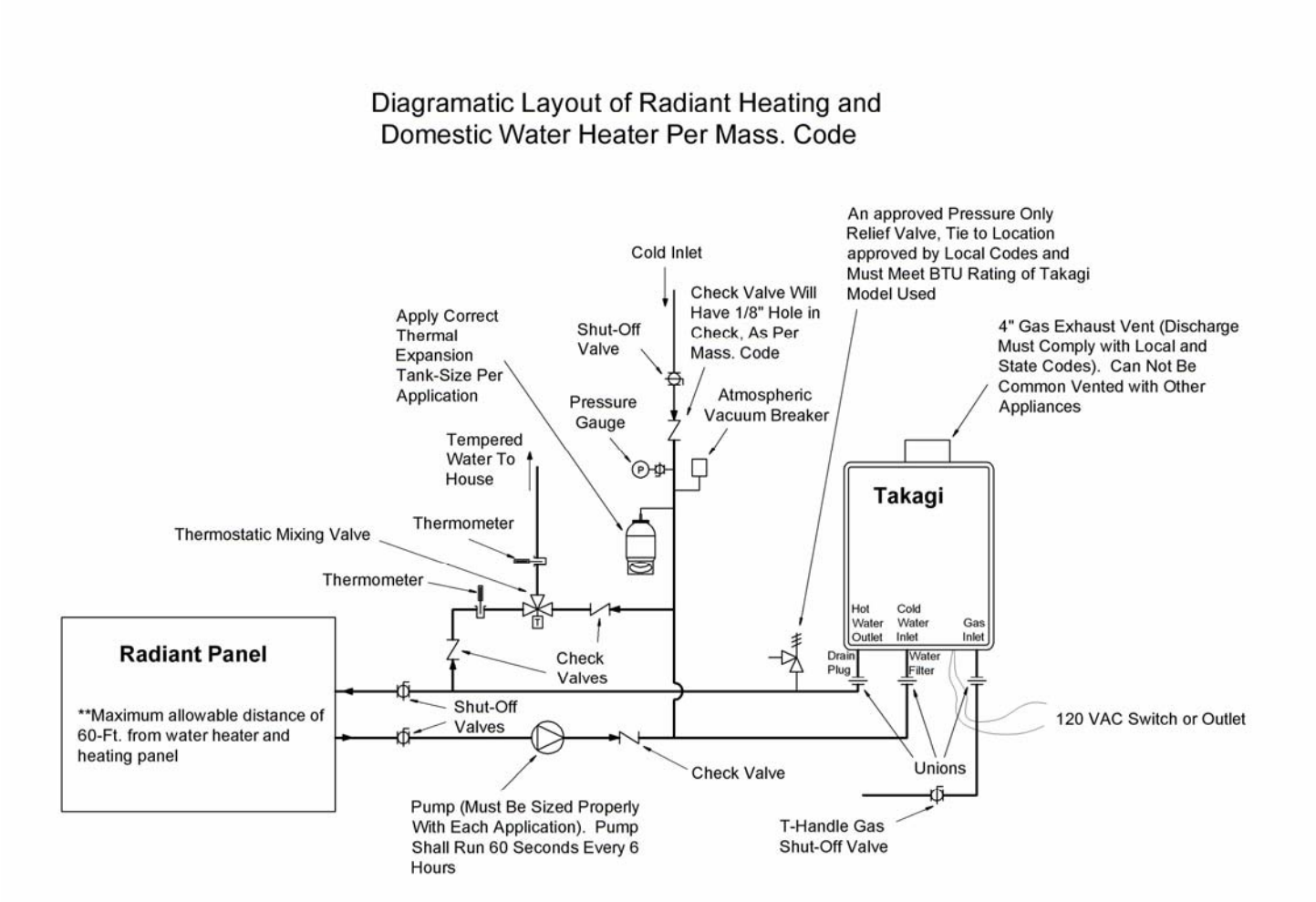


** Size the pump to provide about 2 GPM through the system at 15 Ft of Head plus applications and piping head losses. 2 GPM will allow the system to operate at its optimal performance.*

** If the application requires a higher re-circulating flow rate, make sure that the re-circulating flow rate is **no greater than 4 GPM**. If the flow rate is too high, the system could be damaged by erosion.*

This is a concept drawing only.

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



** Size the pump to provide at least 2 GPM through the system at 15 Ft of Head plus applications and piping head losses. 2 GPM will allow the system to operate at its optimal performance.*
** If the application requires a higher re-circulating flow rate, make sure that the re-circulating flow rate is **no greater than 4 GPM**. If the flow rate is too high, the system could be damaged by erosion.*

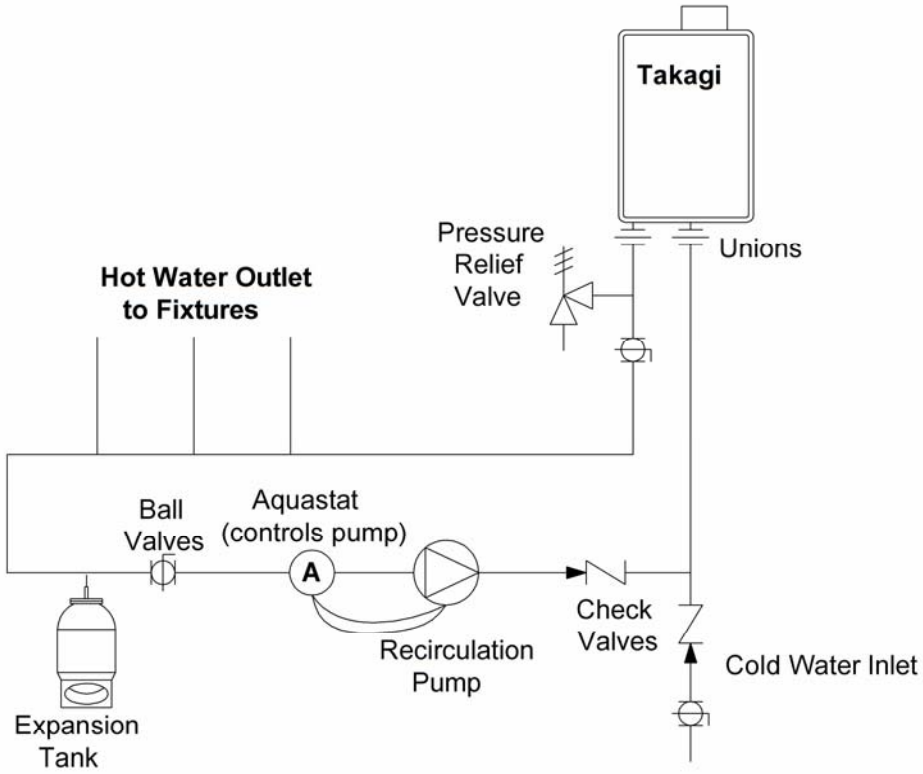
Priority Control Devices such as a flow switch, an Aquastat or other electronic controller can be used to prioritize the domestic water system over the heating system.

Warning: 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.

Warning: 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 Technical Department at (888) 882-5244

Recirculation:

** Size the pump to provide at least 2 GPM through the system at 15 Ft of Head plus piping head losses. 2 GPM will allow the system to operate at its optimal performance.*
** If the application requires a higher re-circulating flow rate, make sure that the re-circulating flow rate is* ***no greater than 4 GPM****. If the flow rate is too high, the system could be damaged by erosion.*



This is a concept drawing only.

Optional Items

1. TM-RE10 Temperature Remote Controller

The TM-RE10 Temperature Remote Controller has two functions. It allows the output temperature from the T-M199 to be adjusted within the range of 99 °F to 182 °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 99°F, 100°F, 102°F, 104°F, 106°F, 108°F, 110°F, 111°F, 113°F, 115°F, 117°F, 122°F, 131°F, 140°F, 149°F, 158°F, and 167°F or 182°F. See the trouble shooting section for information on possible error codes.

2. TK-TV01 Vent Terminator

This terminator can be used where a T-M199 is going to be vented out through a wall. This is a CSA tested Takagi component. Connect the Category III stainless steel vent pipe from the top of the unit to the backside of this terminator to exhaust flue gases through the wall without a thimble. Install this vent terminator in accordance with Takagi's installation instructions and any applicable codes.

3. TK-TV03 Vent Damper

The TK-TV03 Vent Damper prevents the backflow of air through the exhaust vent. This is a CSA tested Takagi component. This helps prevent harmful exhaust gases from entering the home, as well as helping to prevent the unit from freezing in areas where cold air can be blown or drawn into the exhaust system. Install this vent damper in accordance with Takagi's installation instructions, and any applicable codes.

4. TM-TV06 Vent Cap

The TM-TV06 Vent Cap is for outdoor installation with the T-M199 water heater. The cap is installed on the top of the unit, instead of connecting an exhaust vent pipe. The cap will prevent any debris that might be in the environment from entering the unit and causing damage or a fire hazard, as well as preventing rain or other weather from entering the unit.

5. TK-TV05 Direct Vent Terminator

This terminator can be used where a T-M199 is going to be vented out through a wall. This is a CSA tested Takagi's component. Connect the Category III stainless steel vent pipe from the top of the unit to the backside of this terminator to exhaust flue gases through the wall without a thimble. Install this vent terminator in accordance with Takagi's installation instructions and any applicable local codes. Exhaust vent pipe use Category III 4" and intake air 3".

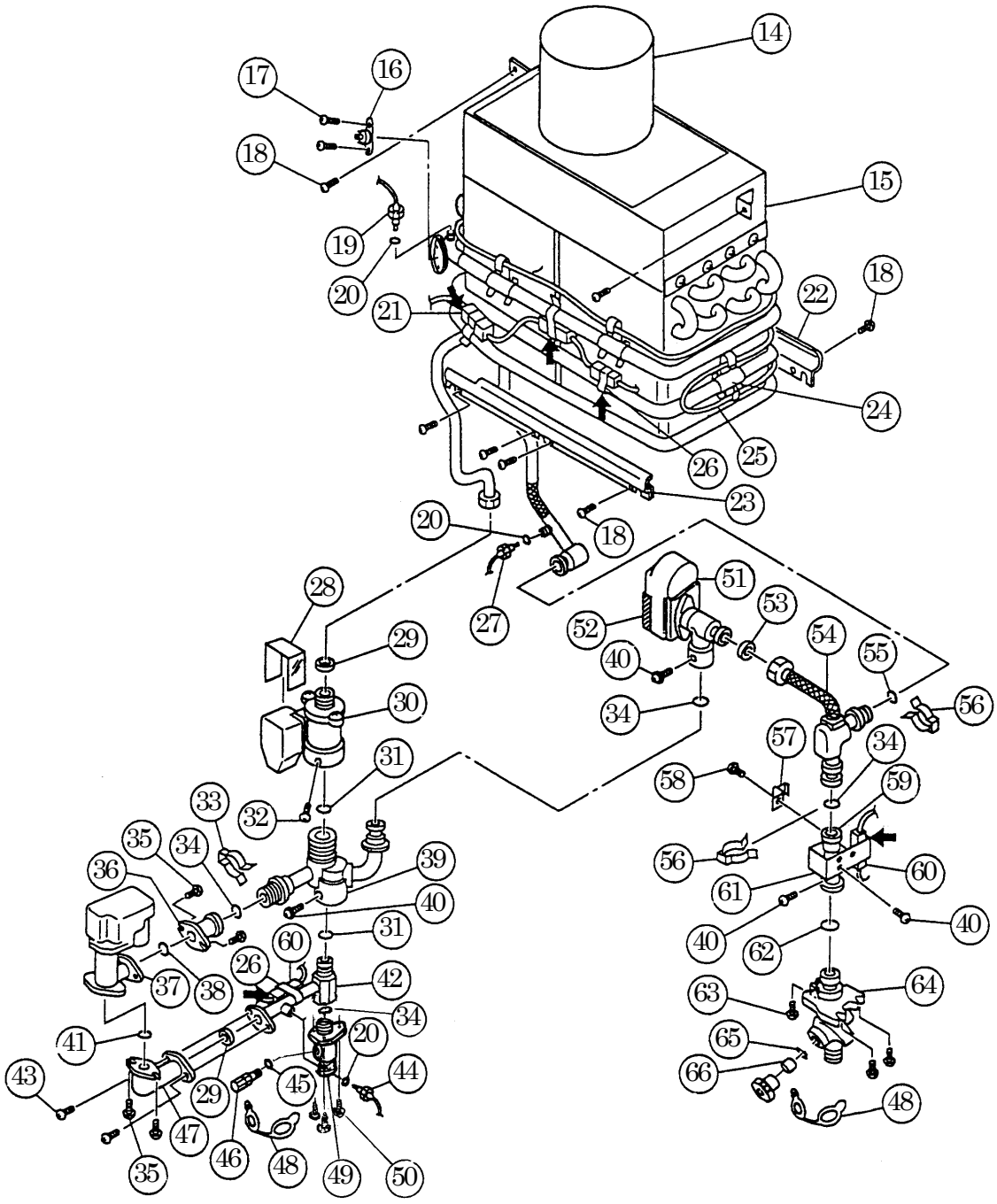
6. TK-TV11 Direct Venting Kit

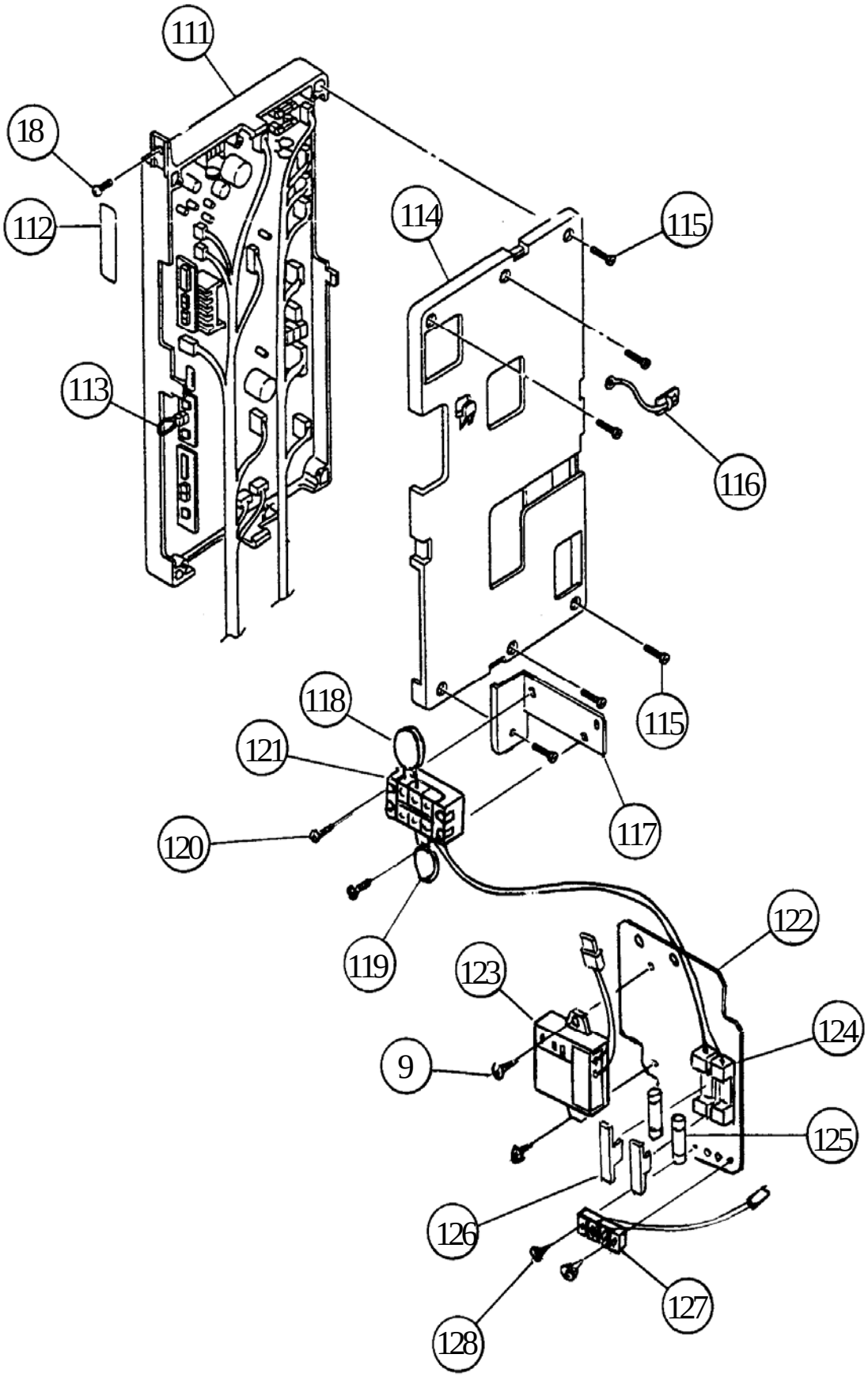
This kit can be used convert the T-M199 from a conventional vent system to a direct vent (or sealed combustion) system. This is a CSA tested conversion kit. Install this conversion kit in accordance with Takagi's installation instructions and any applicable codes.

7. TM-RE20 Multi system controller

The TM-RE20 is the multi- system controller for the T-M199. This can control a maximum of 20 T-M199's, from 25,000 BTU to 3,980,000 BTU. It also works as a diagnostic tool that will give a concise error code whenever there is a problem with the unit. Usage of the TM-RE20 requires having the TM-RE10.

Component Diagram

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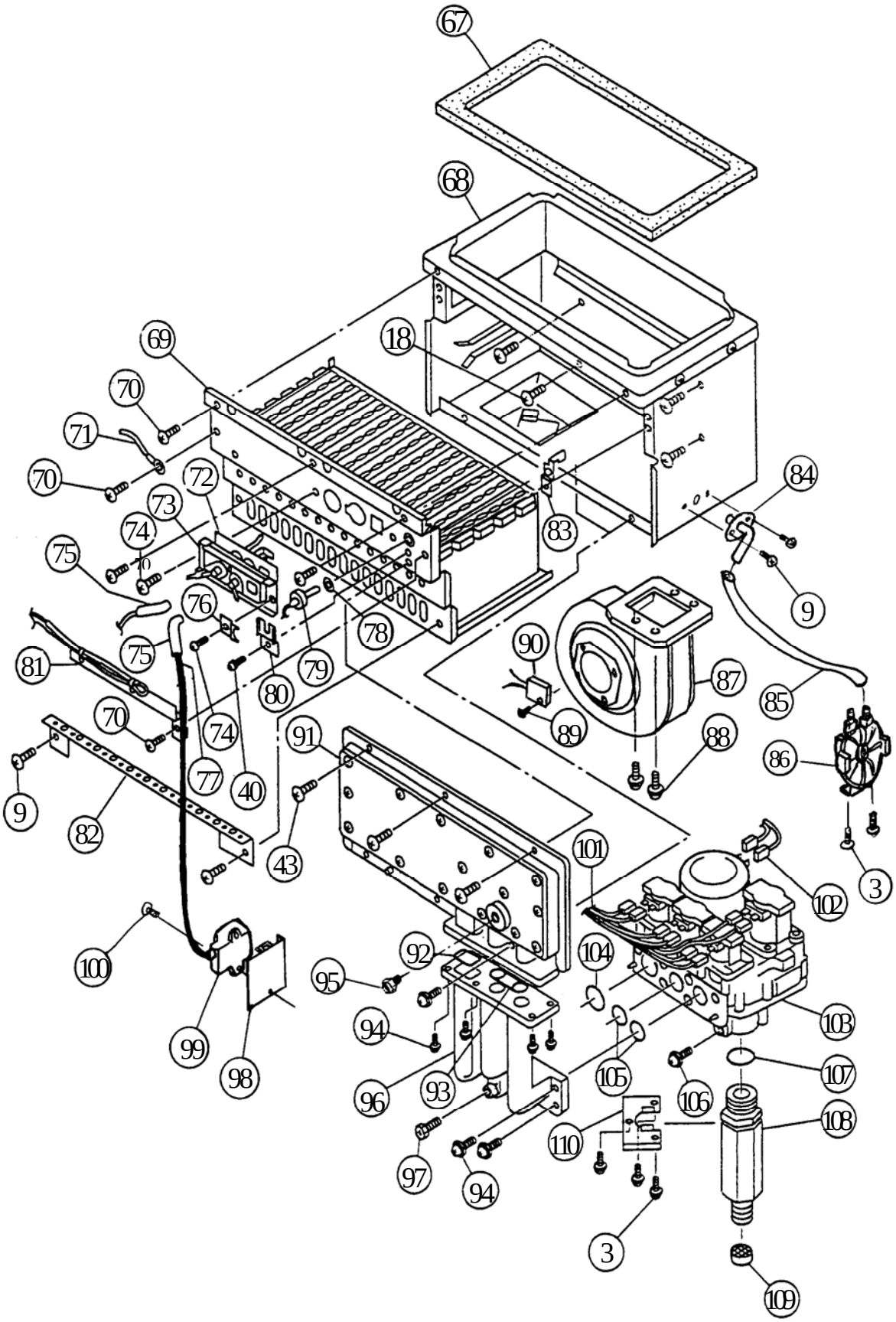
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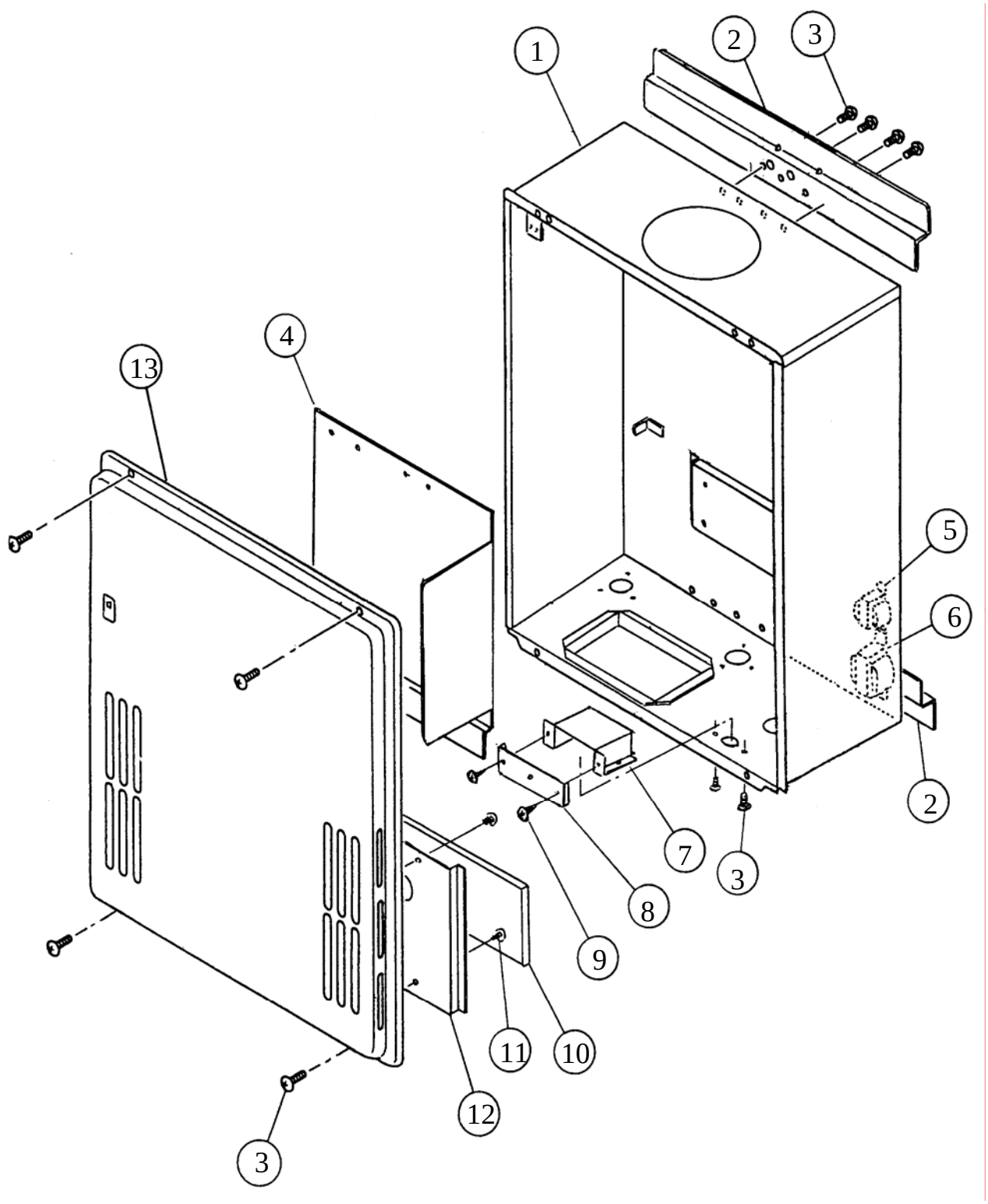
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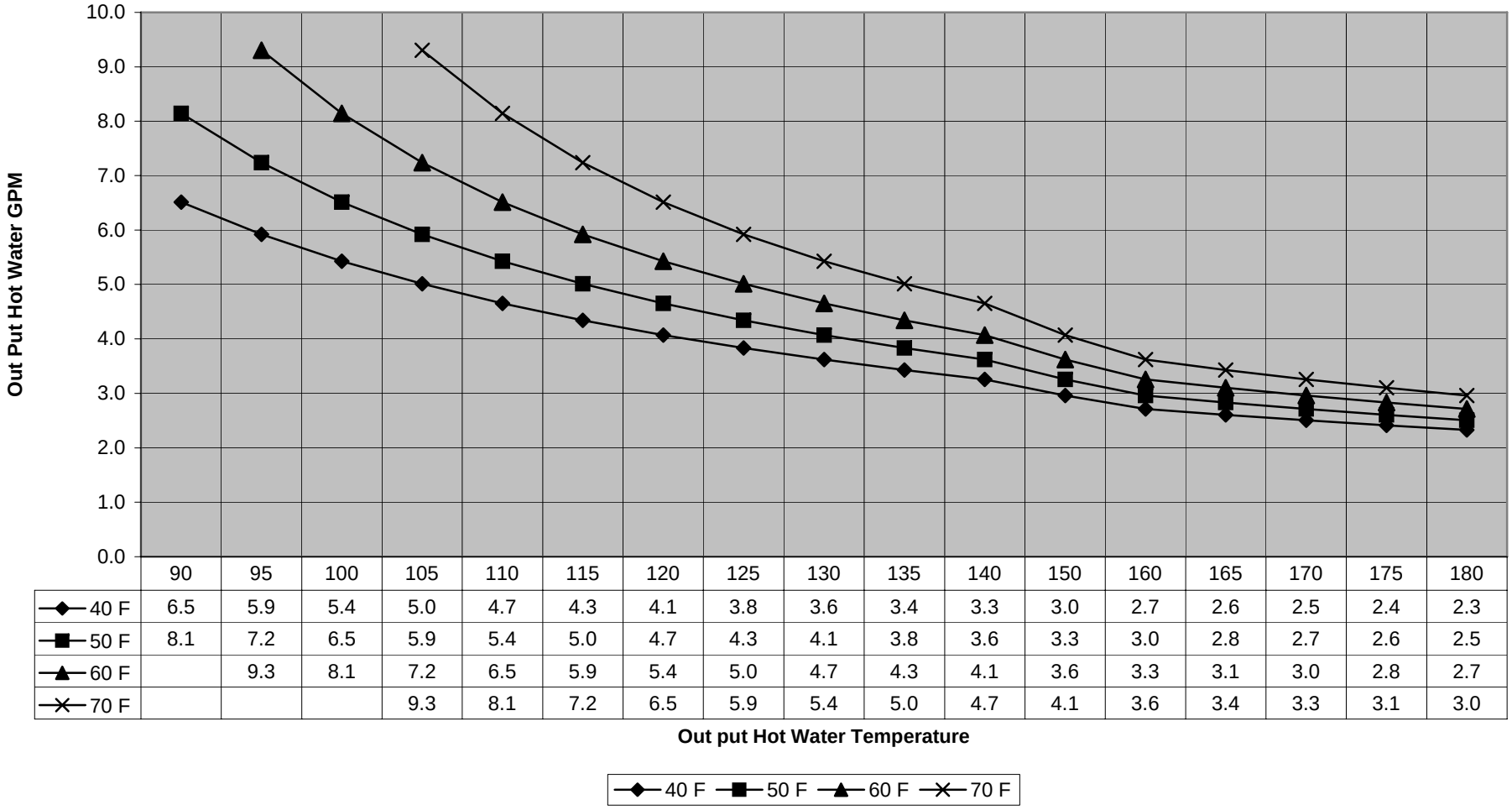
Parts List

Part No.	Description	Part No.	Description
1	Case Assembly	35	Screw M4 x 12
2	Brackets	36	Flange
3	Screw (W) M4 x 10	37	Flow Adjustment Valve
4	Back Guard Panel	38	O-ring P16
5	Transformer	39	Bypass Junction
6	Transformer	40	Screw M4 x 6
7	Junction Box	41	O-ring P18
8	Junction Box Cover	42	Water Outlet Connection
9	Screw M4 x 8	43	Screw M4 x 14
10	Sound Insulation	44	Mixing Thermistor
11	Screw M4 x 8 (Coated)	45	O-ring P6
12	Weather Protection Panel	46	Drain Plug
13	Front Cover	47	Mixing Connection
14	Exhaust Pipe	48	Drain Plug Band
15	Heat Exchanger Assembly	49	Water Outlet
16	Hi-Limit Switch	50	Screw (W) M4 x 12
17	Screw M3 x 6	51	Bypass Flow Adjustment Valve
18	Screw M4 x 10 (coated)	52	Bypass Valve
19	Outlet-Thermistor	53	Silicon O-ring M22
20	O-ring P4	54	Bypass Connection
21	Heater Block 604	55	O-ring JASO3 #1017
22	Heat Exchanger Fixing Plate (Back)	56	Clamp
23	Heat Exchanger Fixing Plate (Front)	57	Heater Fixing Plate
24	Over Heat Cut Off Fuse Fixing Plate	58	Screw M4 x 6
25	Over Heat Cut Off Fuse	59	Flow Sensor
26	Heater Block Fixing Plate	60	Heater 102
27	Inlet-Thermistor	61	Magnetic Protection Plate
28	Two Way Valve Cover	62	O-ring JASO #1019
29	Silicon O-ring M26	63	Screw M4 x 14 (coated)
30	Two Way Valve Assembly	64	Water Inlet
31	O-ring P20	65	O-ring P25
32	Screw M4 x 8	66	Filter
33	Quick Release Plate	67	Packing
34	O-ring JASO#1016	68	Combustion Chamber

69	Burner Assembly	99	Igniter
70	Screw M4- 12	100	Screw M4 x 6
71	Wire Holder	101	Solenoid Valve Wire
72	Spark Electrode Holder Packing	102	Proportional Valve Wire
73	Spark Electrode Holder	103	Gas Valve Unit
74	Screw M4 x 10	104	O-ring P22
75	Silicon Cap	105	O-ring P18
76	Spark Electrode Fixing Plate	106	Screw M4 x 8
77	High Voltage Igniter Cable	107	O-ring P26
78	O-ring (seal)	108	Gas Inlet
79	Thermo couple	109	Gas Filter
80	Thermo couple Fixing Plate	110	Gas Inlet Fixing Plate
81	Overheat Cut off Fuse	111	Computer Board
82	Damper	112	Computer Board Sticker
83	Washer	113	Mode Port
84	Pressure Switch Port	114	Control Box
85	Silicon Tube	115	Screw M3 x 25
86	Pressure Switch	116	Wire Holder
87	Fan Motor	117	Terminal Holder
88	Screw M4 x 12 Hex	118	Surge Absorber: A
89	Thermostat	119	Surge Absorber: B
90	Screw (W) M3 x 10	120	Screw M4 x 16
91	Manifold	121	Terminal
92	Gas Joint Packing	122	Power Distribution Plate
93	Gasket	123	Ground Fault Circuit Interrupter
94	Screw M4 x 12	124	Fuse Box
95	Manifold Gas Pressure Tap	125	Fuse
96	Gas Coupling	126	Fuse Cover
97	Screw M4 x 8 (Hex Head)	127	Remote Control Terminal
98	Igniter Fixing Plate	128	Screw M3 x 12

Out Put Temperature vs. GPM (Max. 9.6 GPM) with Various Ground Water Temperature
Correct Gas pipe size can be expect this chart



	90	95	100	105	110	115	120	125	130	135	140	150	160	165	170	175	180
40 F	6.5	5.9	5.4	5.0	4.7	4.3	4.1	3.8	3.6	3.4	3.3	3.0	2.7	2.6	2.5	2.4	2.3
50 F	8.1	7.2	6.5	5.9	5.4	5.0	4.7	4.3	4.1	3.8	3.6	3.3	3.0	2.8	2.7	2.6	2.5
60 F		9.3	8.1	7.2	6.5	5.9	5.4	5.0	4.7	4.3	4.1	3.6	3.3	3.1	3.0	2.8	2.7
70 F				9.3	8.1	7.2	6.5	5.9	5.4	5.0	4.7	4.1	3.6	3.4	3.3	3.1	3.0

Warranty

Takagi units must be **installed by licensed professionals**; installation done by anyone other than licensed professionals will result in the **Nullification of the Takagi warranty**.
To be protected by the warranty, the enclosed warranty card must be completed and returned within 45 days of original purchasing date by retailed buyer. Proof of copy of original purchasing date must be sent in with the warranty card. Failure to return the warranty card in due time will void any warranty claims. Based on the condition herein, the customer may register online with attached proof of original purchasing date via the Internet (www.takagi.com/warranty).

General terms of limited warranty:
The manufacturer, Takagi Industrial Co. USA, Inc. will honor our warranty to the original retailed buyer only, and it is not transferable. This warranty strictly covers failed mechanical and electrical parts due to factory defects in normal usage and within the applicable period specified below excluding field labor expenses for service, repairs, reinstallation, permits, or removal and disposal of the failed water heater, or defective component parts and shipping. Takagi is not liable for any special, incidental, or indirect consequential damages including property or personal damages, loss of use, failure to install drain pan under unit, or inconvenience.

Parts Warranty:
If a mechanical and/or electrical part **except the heat-exchanger** fails within five (5) years in normal residential and three (3) years in commercial with proper installation (see instruction from installation manual) from the purchasing date, Takagi Industrial Co. USA Inc. will furnish a replacement part(s) excluding field labor and shipping.

Heat-Exchanger Warranty:
If the heat-exchanger fails within ten (10) years in normal residential operation with proper installation (see instruction from installation manual) from the installation date, Takagi Industrial Co. USA Inc. will furnish a brand new heat-exchanger or a refurbished or conditioned tank-less water heater with same model. For commercial, industrial or/ and recirculation applications or/ and more than a single family residential dwelling, the heat-exchanger is covered within three (3) years of usage excluding labor and shipping.

This warranty will not cover the followings:
1. Any Takagi unit that is not installed by a licensed plumber, gas installer, or contractor.
2. Defects or malfunctions due to improper installation, abnormal application, and lack of maintenance.
3. Damage due to abuse, accident, fire, flood, freezing, or any act of GOD.
4. Failure of Takagi unit due to the water heater being operated in a corrosive, chemically contaminated, lint, fiber glass, or any similar environment.
5. Failure of Takagi unit due to abnormal hardness water quality (scale build up), incorrect water pressure, untreated well water, high (excessive) supplied gas pressure from Uniform Plumbing Code specifications.
6. Failure due to excessive temperature that is higher than the factory calibrated temperature limits.
7. Failure or damage due to unauthorized alterations, attachments, repair and/or improperly converted gas type as specified on the rating plate.
8. Damage due to freezing environment without proper preventive measure as instructed in the installation manual.
9. Damage from condensation due to extensive vent length without condensation drip and/or not following the installation manual.
10. Damage from not installed in accordance with applicable local, state codes, ordinances and good trade practices.
11. Unit is installed outside the United States of America and Canada excluding U.S. territories.