Installation and Operation Instruction

MODEL T - M1

MOBIUS Water Heater™

Gas Fired, Instantaneous, Tankless Water Heater

FEATURES
❑ ENDLESS HOT WATER SUPPLY
❑ ON-DEMAND HEATING
❑ PILOT-LESS SYSTEM
❑ COMPACT, SPACE SAVING
❑ COMPUTERIZED CONTROLS
❑ COMPUTERIZED SAFETY DEVICES
❑ MULTI-UNIT INSTALLATION READY

Store these instructions near to the water heater for reference purposes.

TAKAGI

TAKAGI INDUSTRIAL CO. USA Inc.
6 Goddard, Irvine, CA 92618
Tel. (949) 453 - 8388, FAX. (949) 453-8498
E-Mail: Takagi@takagi-usa.com
http://www.takagi-usa.com

FOR YOUR SAFETY - READ BEFORE OPERATING

FOR YOUR SAFETY - This product must be installed and serviced by a professional service trained technician. Installation and/or operation could create carbon monoxide gas and other dangerous gases, which can cause serious injury or death. Improper installation and/or operation 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.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- WHAT TO DO IF YOU SMELL GAS
    - Do not try light any appliance.
    - Do not touch any electrical 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.
- A trained technician, qualified installer, or service agency, must perform installation and service.

WARNING: To install this unit correctly, you must follow the procedures in this manual. If you do not do this, the warranty offered by Takagi Industrial Co. USA, Inc. will be voided.

Do not make any changes to the water heater, or to its gas controls, gas orifices, wiring or draft. Any modifications may void the warranty. If the unit must be modified because of special conditions, talk with a factory representative before beginning any changes.

CONTENTS

SPECIFICATIONS

Natural Gas Input	Min. 25,000 Btu Max. 235,000 Btu
LPG Input	Min. 25,000 Btu Max. 225,000 Btu
Gas Connection	¾" NPT
Water Connection	¾" NPT
Water Pressure	Min. 15 psi Max. 150 psi
Natural Gas Pressure Inlet	Min. 5" WC Max. 10.5" WC
LP Gas Pressure Inlet	Min. 11" WC Max. 14" WC
Manifold Pressure	Natural 2.2" WC Propane 2.7" WC
Weight	70 lbs.
Dimensions	24"x18"x 9"
Ignition	Electronic Ignition
Electrical Supply	AC 120 V

***

- Inlet gas pressure must be within above value.
- High altitude, before install in areas over 4,500 feet above sea level. Contact the manufacturer for a high altitude.
- Check the rating plate to insure this product matches your specifications.
- Takagi - USA is constantly improving our products, therefore specifications are subject to change without prior notice.

INTRODUCTION

This manual provides information necessary for the installation, operation, and maintenance of the MOBIUS Model T-M1 water heater.
The model designation is listed on the rating plate, which is attached to the front of the water heater. Please read all application and installation procedures completely before doing the installation. If you have any problems or questions regarding this equipment, consult the Takagi Industrial Co. USA, Inc. or local factory representative. Experience has shown that most operating problems are caused by improper installation.

FOR YOUR SAFETY

PLEASE READ THIS MANUAL CAREFULLY AND FOLLOW IT FOR YOUR SAFETY.

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.
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.
3. Carefully plan where to install the MOBIUS Water Heater. Ensure that the heater will have enough combustible air, proper ventilation, and will be located where water leakage will not cause damage. If there is a possibility of water damage install a suitable drain pan under the unit, but make sure that it does not restrict combustible airflow.
4. Check the rating plate for the correct gas type, gas pressure, water pressure, and electrical rating. If this unit does not match your requirements, do not install.

5. If any problem should occur, turn off all hot water taps and turn off the gas. Call a trained technician, the Gas Company, or the manufacturer.

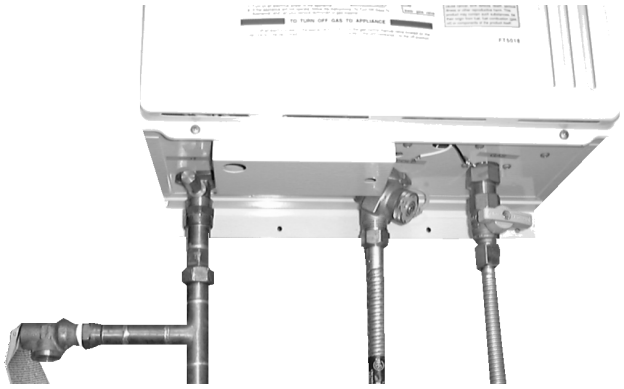
6. **WARNING:** Do not disconnect the electrical supply if the ambient temperatures will be near freezing. The Freeze Prevention Device will only work if the unit has proper electrical power. The Freeze Prevention Device is rated for temperatures down to 5ºF (-15ºC) in a wind free environment. Wind chill factor can cause the MOBIUS Water Heater to freeze and be damaged at temperatures above 5ºF (-15ºC). Refer to the section on Winterizing and the Freeze Prevention Device for more information. Weather related damage to the heat exchanger will not be covered under the warranty.

7. **WARNING:** Before bathing or showering always check the water temperature. Do not leave children or the infirm without supervision in a shower or bath. The water temperature is factory set at 140ºF (60ºC) to maximize the amount of hot water available without an optional temperature remote controller. Water temperatures over 125ºF can cause severe burns instantly, or death from scalds.

8. **WARNING:** Do not use this appliance if any part has been underwater. Immediately call a certified and trained technician to inspect and service the unit if necessary.

9. **WARNING:** Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

10. **WARNING:** Do not reverse the water and gas connections, this will damage your heater and can cause severe injury or death from scalds. Follow the diagram below when installing the MOBIUS water heater.

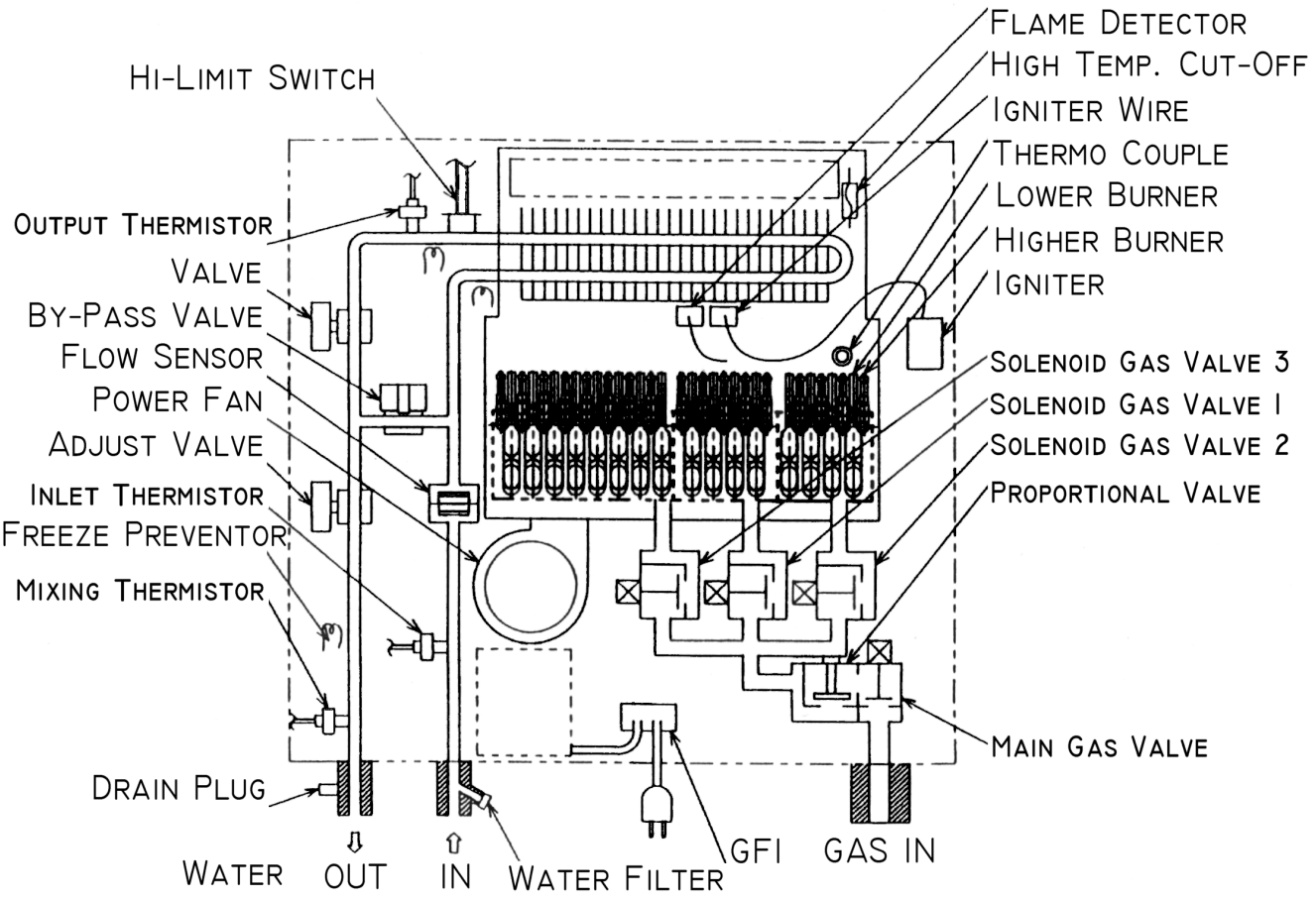


T&P Valve HOT COLD GAS

OPERATION

GENERAL

The MOBIUS Water Heater is an instantaneous, tankless water heater designed to supply an entire household or commercial hot water utilizing total efficiency. The principle behind the MOBIUS Water Heater is simple. Once a hot water tap is opened, water flows through the MOBIUS Water heater. The water flow sensor automatically commands the computer to electronically ignite the burners and the computer monitors the water temperature, water flow rate, and gas flow the insure you get the right amount of hot water with right temperature. While gas is being burned, the “fire on” lamp will be lit. Computer will modulate gas supply to gas valve and modulate water flow for steady out put hot water temperature.



0.75 gallons per minute is required to turn the burners on, but after the burners are ignited, the flow rate can drop to 0.6 gallons per minute to maintain and keep the water heater on. As long as water, gas and electricity are supplied, there will be an endless flow of hot water. The water heater will turn on when a tap is opened, and it will turn off when the tap is closed.

Temperature

The water temperature has been set on the computer by the factory to be Maximum 140º F (60º C). In order to achieve lower water temperatures, cold water needs to be mixed in with the hot, or an optional part No. TM-RE10 can be installed allowing manual adjustment of the output temperature for lower or higher.

WARNING: Temperatures above 125º F (52º C) can cause severe burns or death from scalding. Children, disabled and the elderly are at high risk of being injured. Feel the water temperature before bathing or showering. Do not leave children, disabled, and the elderly without supervision.
MOBIUS water heater will produce a flow rate of hot water that is depend on the inlet water temperature and the setting on the TM-RE10. Refer to the flow vs. temperature chart for the output capabilities end of this installation manual.

Freeze Prevention Devices

This unit comes equipped with heaters that discourage the unit from freezing, but for this freeze prevention system to operate there has to be electrical power to the unit.
The freeze prevention devices will not work if the electrical power source is disconnected. The unit has been rated for temperatures down to 5º F (-15º C) in a wind free environment. A wind chill factor will cause the unit to freeze at temperatures above 5º F (-15º C). Do not install the water heater in an area with extremely cold weather. This will void your warranty and Takagi - USA will not be responsible for any damage that occurs.
CAUTION: The pipe heaters are located on the MOBIUS Water Heater only. Any hot or cold water pipes located outside of the unit will not be protected. Properly protect and insulate these pipes from freezing.

Winterizing

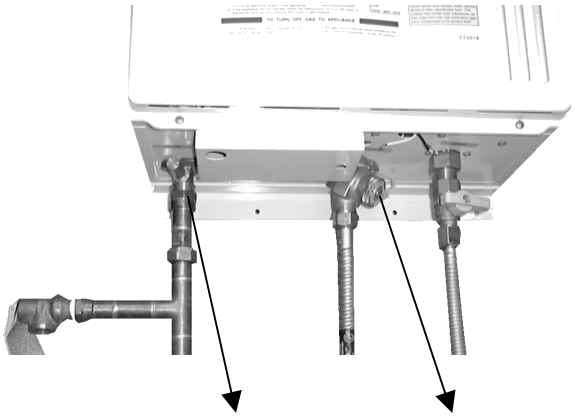
If the heater will not be used for a long period of time or if the temperatures will drop below 5º F (-15º C) with the wind chill factor, turn off the heater and drain the unit of water. This will keep it from freezing and being damaged. Follow these instructions carefully:

1. Turn off the power supply to the MOBIUS Water Heater.
2. Close the manual gas control valve located outside your heater.
3. Close the manual water shut off valve located on the water supply line.
4. Open all hot water taps in the house. (Bathroom, kitchen, laundry room, etc.). When the water flow has ceased, close all hot water taps.
5. Have a bucket or pan available to catch the water as it drains from the T-M1 drain plugs. Remove the drain plugs to drain all the water out of the unit.
6. Let sit for 5 minutes.
7. Securely screw the drain plugs back into place.

To restart heater, follow these steps:

1. Make sure all hot water taps are closed and the drain plugs are securely attached.
2. Purge the water line of debris.
3. Turn on the manual water control valve located on the water supply line.
4. Open all the hot water taps to verify water flows to the taps. Then close hot water taps.

5. Turn on the manual gas control valve located on the gas supply line.
6. Turn on the power supply to the MOBIUS Water Heater.



DRAIN **DRAIN AND FILTER**

INSTALLATION

This section is for the installer. The installer is responsible for the correct installation of the MOBIUS Water Heater.
For Your Safety: Only a certified and trained service technician or qualified plumber may service or install your product.

General

All gas water heaters require careful and correct installation to insure safe and efficient operation. This manual must be followed exactly.

1. Read the For Your Safety section in the beginning of this manual.
2. The regulator 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.
4. The electrical connection requires a means for switching off the power supply.
5. Avoid installing the unit in an area with high levels of dust, sand or debris. These particles may clog the air vent or impair the function of the fan, leading to improper combustion. Regular maintenance is needed in these environments.
6. Do not install the unit where the exhaust vent is pointing into any opening in a building or where the noise may disturb neighbors.

Accessories

Check that all parts listed below were included with the unit.

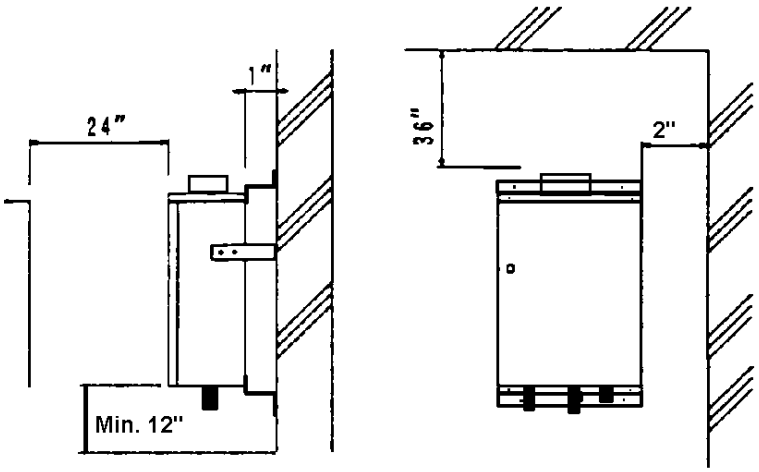
Installation Manual, Warranty Card and Optional Part Information

OUTDOOR INSTALLATION

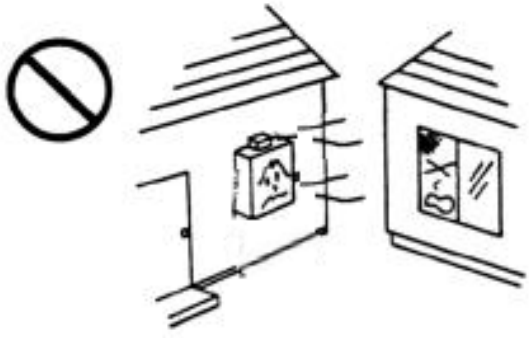
Follow all local codes. In the absence of local codes, follow the National Fuel Gas Code ANSI Z221.23.
Install the water heater in an open, uncovered area, and maintain the following minimum clearances. The MOBIUS water heater must be installed hanging from a wall.

Piping side (Bottom)	12”
Front (Maintenance space)	Open
Back of heater	1”
Top of heater	36”

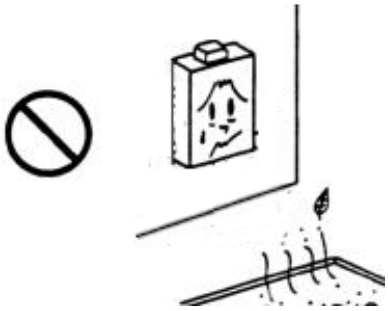
Do not install this water heater under an overhang without a 3 feet clearance between the MOBIUS water heater and eaves or any obstacles. The area under an overhang must be open to three sides. In case install two or more unit manifold, side clearance will be 0.5” between Water heaters.



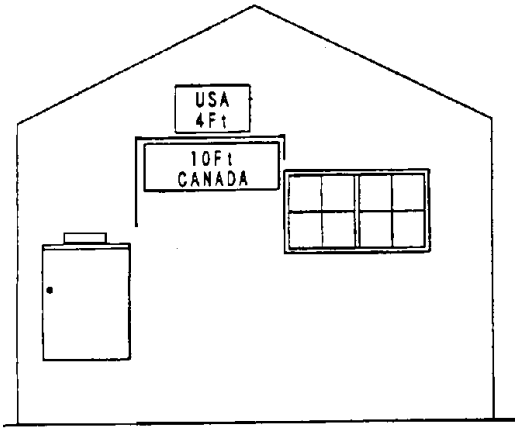
WARNING: Do not have the flue terminal pointing toward any opening into a building. Do not locate your heater in a pit or location where gas and water can accumulate.



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 manufacture warranty will void.



WARNING: In the USA, do not install the water heater vent terminator within 4 feet of any air intake opening into a building. In Canada do not install the water heater vent terminator within 10 feet any air intake opening into a building.



WARNING: Improper installation can cause nausea or asphyxiation from carbon monoxide and flue gases which could result in severe injury or death. Improper installation will void product warranty.
For high altitude installation above 4,500 feet, contact the manufacturer on how to handle this situation.

WARNING: when it installs in outside, use proper vent terminator to top of the water heater or Part No. TM-TV02 kit for outside installation vent terminator.

INDOOR INSTALLATION

FOR INDOOR INSTALLATION: ∗CUT PRESSURE SWITCH JUMP WIRE THEN INSTALL 4” VENT PIPE DIRECTLY ON FLUE OUTLET. ∗ : **PLEASE**! Look inside unit.

Combustion Air Supply

The water heater should be located in an area where enough air is available for proper combustion and ventilation of the surrounding area. Follow the latest edition of ANSI Standard Z223.1 and any your local codes that are applicable.

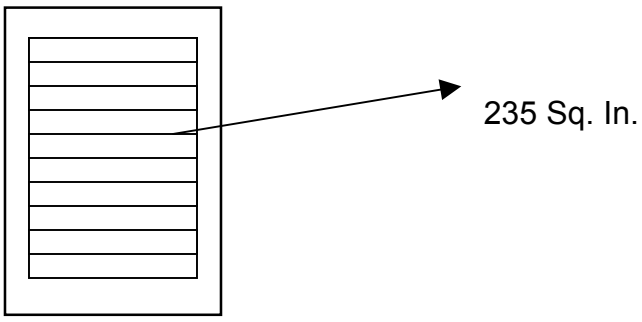
In general these requirements specify that if the unit is installed in a confined space, there must be permanent air supply openings.

Minimum recommended Air supply to water heater

Water heater size	Outside air area	Inside air area
Max. 235.000 BTU	59 Sq. IN	235 Sq. IN

Air Supply from Outside Building: When combustion air is supplied directly through an outside wall, such as intake louvers openings into the dwelling. Each opening should give a minimum free area of one square inch per 4000 BTUH of the total input ratings of all appliances in the enclosed area.

Air Supply from Inside Building: When combustion air is supplied from inside the building, Each opening should give a minimum free area of one square inch per 1000 BTUH of the total input ratings of all appliances in the enclosed area. These openings should never be less than 100 Sq. IN.



Exhaust Fans and Ventilation: The MOBIUS water heater is equipped with a combustible air detector to measure whether there is enough air for proper combustion. If there is not, the water heater will not work until air is provided properly.
Any equipment, which uses air from an enclosed space, can deplete the air from that area. This can result in exhaust flowing from the flue to the enclosed space, which could result in the accumulation of dangerous exhaust fumes in the space where the water heater is installed. Additional air must be supplied to compensate for any exhaust effect.
If a blower of fan is used to supply air to the water heater room, the installer should make sure it does not create drafts, which could cause unwanted shutdowns. If a blower is necessary to provide adequate combustion air to the water heater, a switch or equivalent device must be wired into the water heater control circuit to prevent the water heater from firing unless the blower is operating.

Venting Instructions

GENERAL
This water heater must be vented in accordance with "Venting of Equipment" section of the latest edition of the National Fuel Gas Code, ANSI Z223.1 and all applicable local building codes.

WARNING: Improper venting of this appliance can result in excessive levels of Carbon Monoxide, which can result in severe personal injury or death.

Here are some general rules for venting system for MOBIUS water heater.

1. Place the water heater as close as possible to the vent.
2. The vent collar on the water heater must be fastened directly to an unobstructed vent pipe.
3. Do not weld the vent pipe to the water heater collar. The weight of the stack must not rest on the water heater. The flue must be easily removable for normal service and inspection of the unit.
4. The water heater must not be common vented with a fireplace, wood stove or other equipment.
5. Avoid terminating the water heater vent near any air-conditioning or air-supply fans. 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.
6. Avoid using an oversized vent pipe or using extremely long runs of the pipe. This may cause excessive cooling and condensation of flue gases.

A) Vent Connections

The MOBIUS water heater should be vented as Category I with Single-wall metal pipe. The vent system must be gas tight. All seams and joint must be sealed with silicone sealant or adhesive tape having a minimum temperature rating of 400º F. For best results, a horizontal vent system should be as short and straight as possible with Single wall Galvanized steel or Stainless steel vent pipe. Single wall metal pipe shall be constructed of galvanized sheet steel not less than 0.0304 in. thick, or of other approved, noncombustible, corrosion - resistant material.

When installing the vent system, all applicable national and local codes must be followed. If thimbles, fire stops or other protective devices are going to be installed which will penetrate any combustible or noncombustible construction, be sure to follow all applicable national and local codes.
Fan assisted appliances: Follow the requirement as indicated in the latest edition of ANSI Z233.1/NFPA 54.

The entire vent system must not exceed the size specified in table.

Venting

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.

When the horizontal vent run exceeds 5 ft the following criteria must be observed;
- Support the vent run at 3 ft intervals with overhead hanger.
- Pitch up the vent run toward the vent terminal at a rate of 1/ 4” per foot.

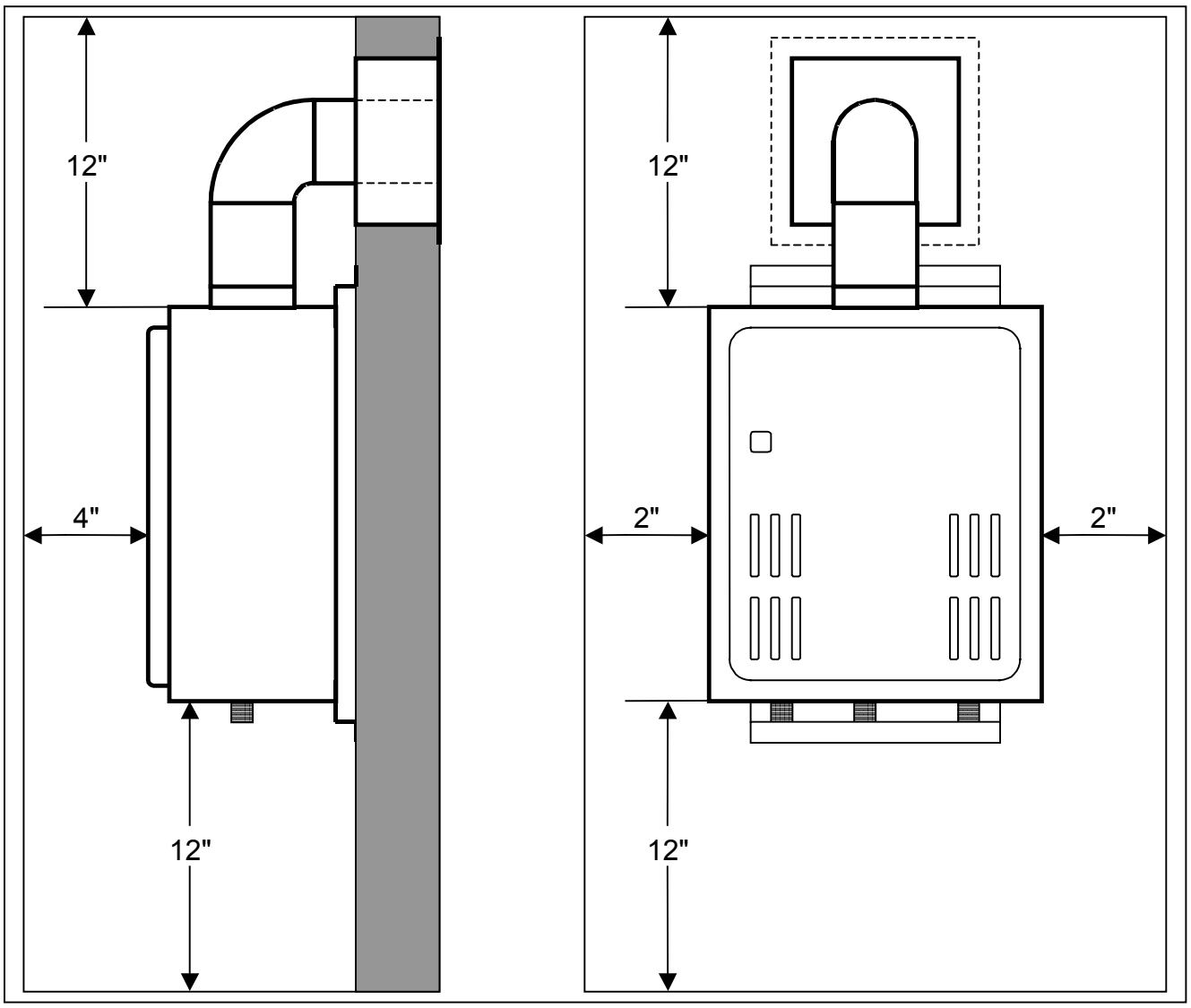
Indoor Installation Clearances

Bottom (Plumbing side)	12”
Front (Maintenance space)	Min. 4”
Back of heater	1”
Sides∗	2”
Top of heater	12"

∗: Install two or more unit manifold, side clearance will be 0.5” between Water heater.

B) Vent Termination

A sidewall vent terminal must be used when the water heater is vented through a wall. The manufacture recommends Takagi Parts No. TK-TV01 as a vent terminator. The vent terminal provides a means of installing vent pipe penetrating through a wall. Locate this in accordance with ANSI Z223.1/NFPA 54.
Install the vent terminal in a location that will not be blocked by snow or water flooded area. Most areas have codes requiring the terminal to be 12 inches above the grade, but the installer may determine it should be higher depending on local conditions and applicable city codes.



GAS SUPPLY AND PIPING SIZING

This unit needs a manual gas control valve (system shutoff valve) that must be placed on the unit before it is connected to the gas supply line.
Check the gas inlet pressure and that the type of gas matches the rating plate located on your water heater. Insufficient gas pressure will cause your MOBIUS Water Heater to be inefficient and not work properly. Size the gas supply piping correctly following ANSI233.1/NFPA 54, or by local code.

The minimum and maximum inlet gas pressures are listed below:

Natural Gas	Min. 5” WC Max. 10.5” WC
Propane Gas	Min. 11” WC Max. 14” WC

In order to get a correct reading of the inlet supply pressure, the water heater and all other gas appliances sharing the gas supply line must be firing at maximum capacity when the pressure is measured. Maximum gas pressures must not exceed this value. If the gas pressure is insufficient, this may be the result of an undersized gas supply pipe. The MOBIUS water heater will not perform to its maximum capabilities without enough gas supply. After connecting the unit, check for gas leaks by applying soapy water to all gas fittings and connections. Soap bubbles are a sign of gas leaks.
This appliance and its individual shut-off valve must be isolated from the gas supply piping system by unplugging the unit and turning off the main gas valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi. The appliance and its gas connections must be leak tested before placing the unit in operation.
Always use approved connectors to connect the unit to the gas line. Always purge the gas line of any debris before connection to the heater.

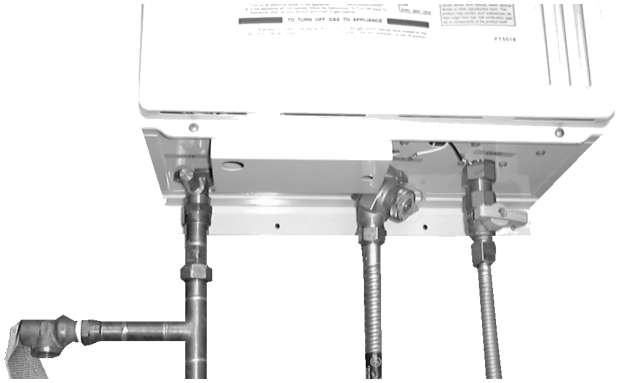
WARNING: Conversion of this unit from natural gas to propane or propane to natural gas cannot be done in the field. Contact your local retailer or distributor to get the correct unit for your gas type.

Recommend Gas pipe size for MOBIUS Water Heater	
Distance from Gas Meter	Pipe Size (inches)
0' - 20'	3/4"
20' - 80'	1"
80' - 300	1-1/4"

NOTE: These Tables are for Natural Gas (0.60 Specific Gravity) and base on Pressure Drop of 0.5 Inch water columns. This tables are Gas pipe will supply gas straight to water heater without any tab.

Water Connections

An approved manual water control valve must be placed on the cold water supply line. All soldering materials and piping materials must be useable with potable water.
If the water heater is installed in a closed water system, means shall be provided to control thermal expansion. Contact the water supplier or local plumbing inspector on how to control this situation. After installing the water heater, purge the water line to remove all debris and air from it. It may damage the heater if installer does not do this act.
There is a wire mesh filter on the coldwater inlet, which discourages debris from entering the heater. This will need to be cleaned periodically to ensure that the T-M1 has a long life cycle.



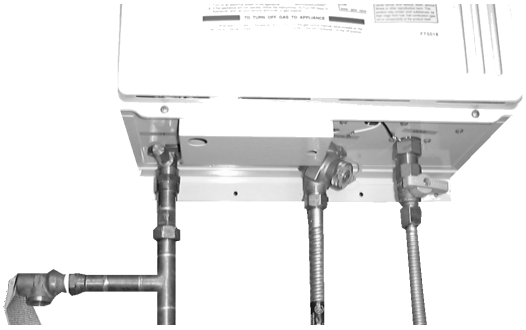
WARNING: Do not reverse the hot outlet and cold supply line connections to the MOBIUS Water Heater. This will result in dangerous operation and void the warranty. Make sure the hot and cold lines are connected properly. Refer to the FOR YOUR SAFETY section at the front of this manual.

TEMPERATURE AND PRESSURE RELIEF VALVE

This unit does not come with an approved temperature and pressure relief valve, however an approved temperature and pressure relief valve must be installed on the hot water outlet. A "Tee" fitting should be used to attach the temperature and pressure relief valve.
The temperature and pressure relief valve must meet not exceed the following:

Temperature Relief	210º F
Pressure Relief	150 psi

The discharge capacity must be at least 235,000 Btu/hr. The discharge piping for the temperature and pressure relief valve must be directed so that if it becomes necessary, no one will be hurt and nothing will be damaged by the escaping water. Attach the run-off tube to the temperature and pressure relief valve, and run the end of the tube to within 6" of the floor. Do not install any reducing couplings, valves, or any other type of restriction in this line. This run-off tube must be installed to allow free and complete drainage of both the valve and the run-off tube.
If the temperature and pressure relief valve on the appliance discharges periodically, this may be due either to thermal expansion in a closed water supply system, or a defective temperature and pressure relief valve. If the T&P valve is the problem, replace it with a new one. If not, contact the water supplier or a local plumbing inspector for how to correct this situation.
The temperature and pressure relief valve must be manually operated once a year to check for correct operation.
Should overheating occur, or should the gas supply fail to shut off, turn off the manual gas control valve to the appliance.



T & P Valve

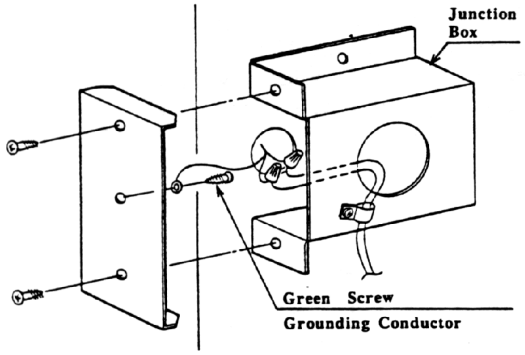
CAUTION: The pipe heaters are located on the MOBIUS Water Heater only. Any hot or cold water pipes located outside of the unit will not be protected. Properly protect and insulate these pipes from freezing.

Electrical Connections

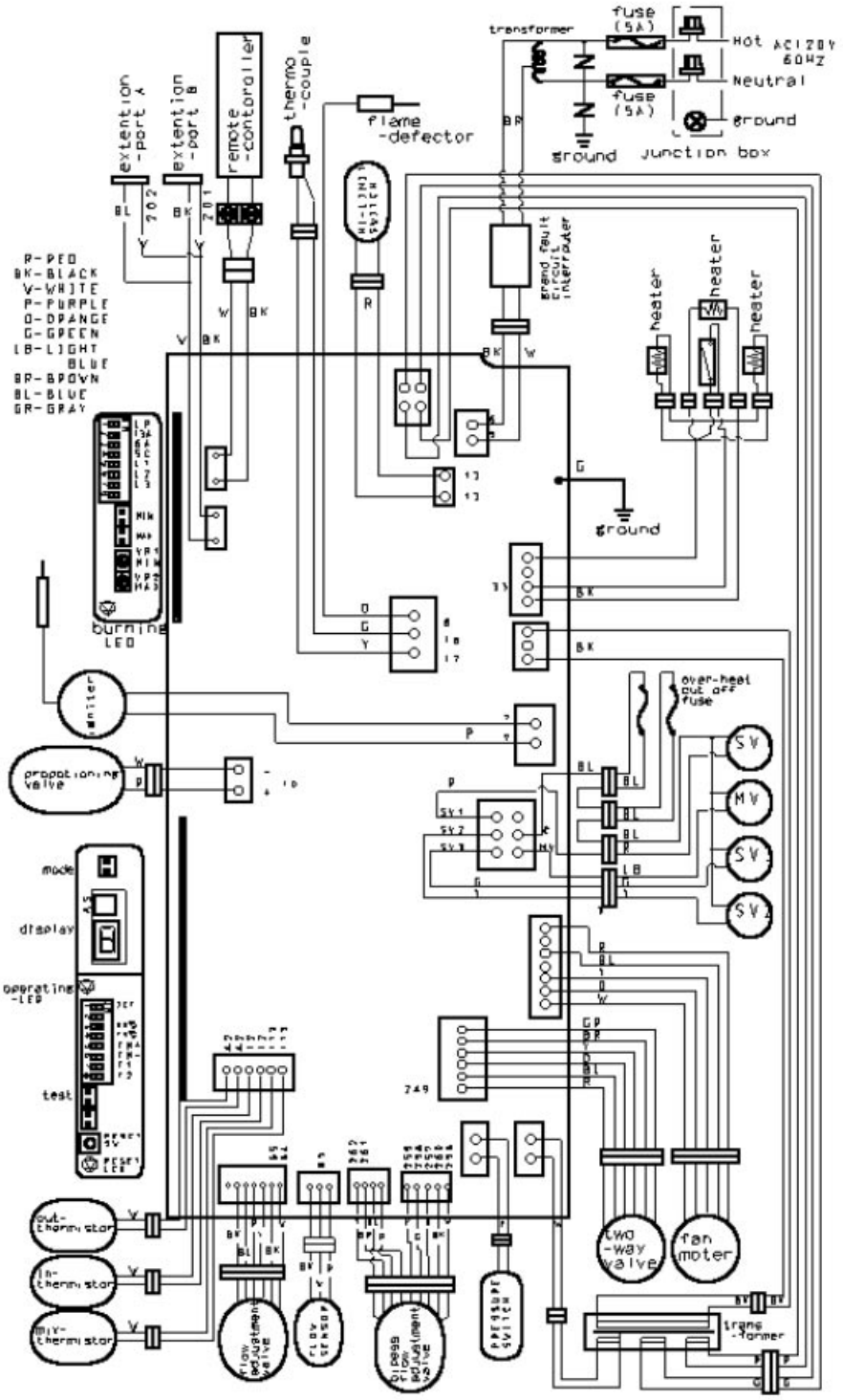
WARNING: The heater must be electrically grounded. Follow the requirements of the local authority having jurisdiction. In the absence of such requirements, follow the latest edition of the National Electrical Code ANSI/NFPA 70.
Do not rely on the gas or water piping to ground the metal parts of the water heater, because plastic pipe or dielectric unions may isolate the water heater electrically. Service and maintenance personnel who work on or around the water heater may be standing on wet floors, and could be electrocuted by an un-grounded water heater.

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring error can cause improper and dangerous operation. Verify proper operation after servicing.
The MOBIUS water heater requires an electrical power supply of 120 VAC, 60 Hz, and it must be properly grounded to function.

- A means for switching off the 120 VAC power supply must be provided.
- Wire the heater exactly as shown in the wiring diagram.
- A green screw is provided in the junction box for the grounding connection.



Refer to the wiring diagram. There is a copy of the wiring diagram located on the inside panel of the appliance.



Wiring Diagram

Also wiring diagram is located on the inside panel of the appliance.
Electrical Rating: 120 VAC, 60 Hz, 0.8 A.
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.

STARTING THE SYSTEM

For your safety, read before operating.

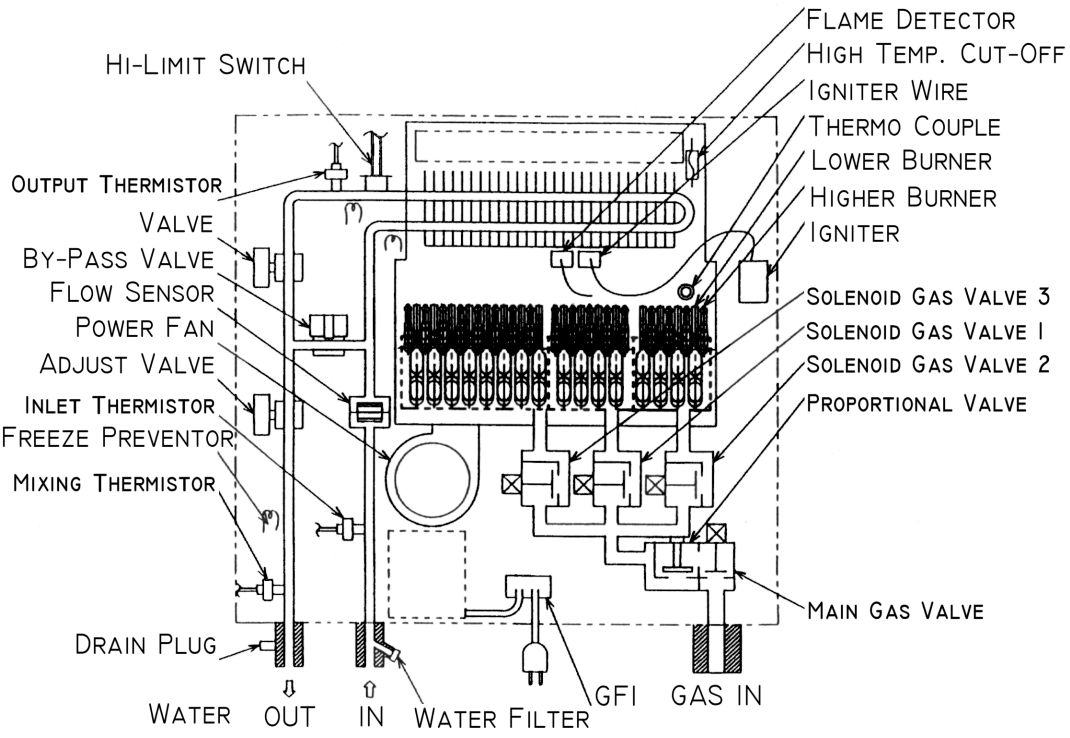
a) This water heater does not have a pilot. It is equipped with an ignition device, which automatically lights the burner. Do not try to light the burner by hand.
b) Before operating, make sure that a gas leak is not evident by smelling the area around the T-K1. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.
c) Use only a hand to turn the gas valve knob. Never use tools. If the knob will not turn by hand, do not try to repair it, call qualified service technician. Force or attempted repair may result in a fire or explosion due to the gas leakage.
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 parts that have been under water.

WHAT TO DO IF YOU SMELL GAS

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

Operating Instructions

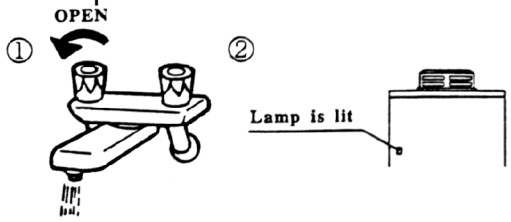
The MOBIUS Water Heater is an instantaneous, tankless water heater designed to supply your entire household and commercial hot water needs utilizing total efficiency. The principle behind the MOBIUS Water Heater is simple. Once you open a hot water tap, water flows through the MOBIUS Water heater. The water flow sensor automatically commands the computer to electronically ignite the burners and the computer monitors the water temperature, water flow rate, and gas flow the insure you get the right amount of hot water with right temperature hot water. After the burners are ignited the "fire on" lamp is lit. Computer will modulate gas supply to valve and water flow. 0.75 gallons per minute is required to turn the burners on, after the burners are ignited, the flow rate can be lowered to 0.6 gallons per minute to maintain and still keep the heater on.
Now as long as you have water, gas and electricity, you will get an endless hot water. Open a hot water tap to turn on your water heater. Close the hot water tap to turn off your water heater.



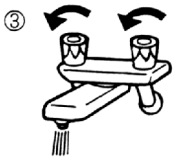
Normal Operation

To Turn on Your MOBIUS water heater

1. Open a hot water tap.
2. Burners will ignite. “Fire On” lamp will be lit.

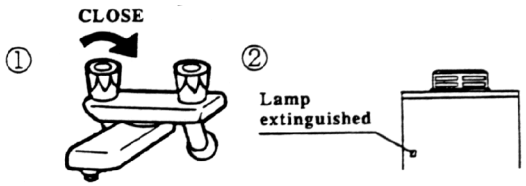


3. Mix with cold water to get the correct temperature.



To Turn off your Flash water heater

1. Close the hot water tap
2. “Fire On” lamp extinguished.



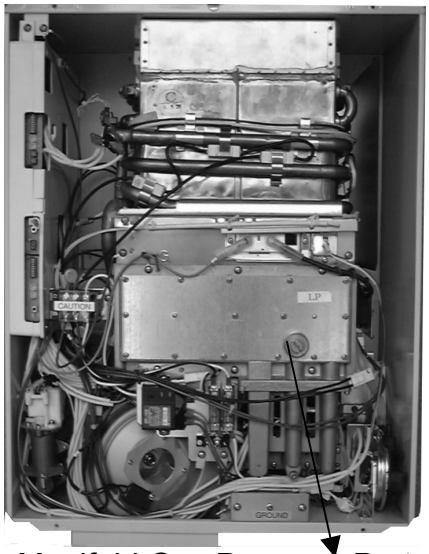
Start Up

Once the unit has been properly installed, check the gas and water connections for leaks. Check for proper ventilation and combustible air to the heater. **Purge the gas and water lines to remove debris.** Then follow these steps to turn on your unit.

1. Close the manual gas control valve located on the gas line.
2. Fully open the manual water control valve on the water supply line.
3. Open a hot water tap, to verify that water will flow to that tap. Then close the hot water tap.
4. Fully open the manual gas control valve.
5. Turn on the 120 volt 60 Hz power supply to the MOBIUS Water Heater.
6. Now you are ready to enjoy hours of endless hot water.

TO TURN OFF GAS APPLIANCE

Close the manual gate valve on the gas inlet line. Then turn off the power supply.



Manifold Gas Pressure Port

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 MOBIUS water heater is factory set 140 °F.
WARNING: 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 the infirm without supervised.

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 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.

Maintenance and Service

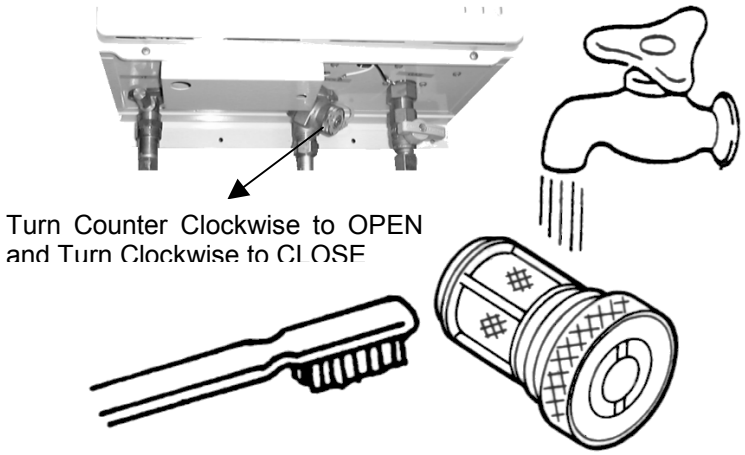
WARNING: Always turn off the electrical power supply, the manual gas control valve, and the manual water valve when servicing.

The unit should be checked once a year by a certified and trained technician. If repairs are needed, a certified and trained technician should do the repairs and services.

Regular Maintenance

Do this the first time immediately after installation.

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



These systems and parts should be checked at least once a year.

1. Venting system.
2. Burner.
3. Manually test the temperature and pressure relief valve to insure correct operation.
4. Periodically clean of the water filter (refer to figure above).
5. Heat exchanger. Remove the thermistor and check for a mineral coating. A mineral coating on the thermistor requires flushing the heat exchanger with a de-scaling solution. Allowing deposit build up will void your warranty and shorten the life of your water heater.

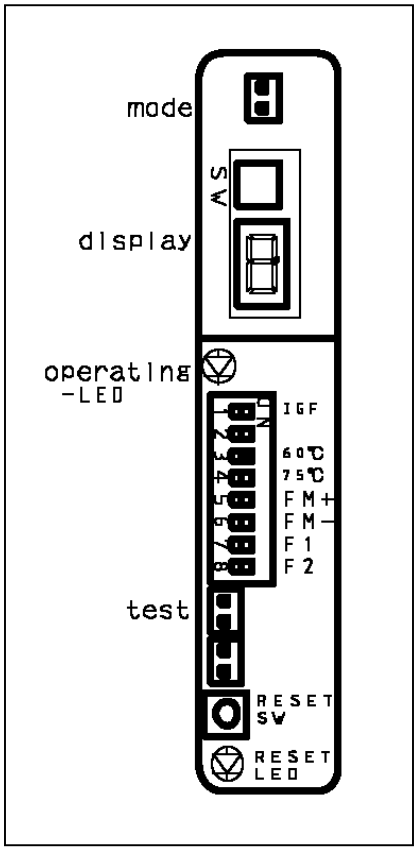
Cleaning the Heat Exchanger

If the heat exchanger must be cleaned, follow this procedure.

1. Shut off all power to the water heater.
2. Use re-circulation method.
3. Wear Gloves when handling de-scaling solution.
4. Always ware EYE PROTECTION.
5. All equipment being de-scaled should be properly vented to prevent gas pressure build-up during the cleaning operation.
6. Clean out any debris, which has fallen to the coldwater inlet filter.

MOBIUS Water Heater Troubleshooting:

The MOBIUS Water Heater Model T-M1 has a built in self-diagnostic computer mode for safety and convenience in case of necessary maintenance service.

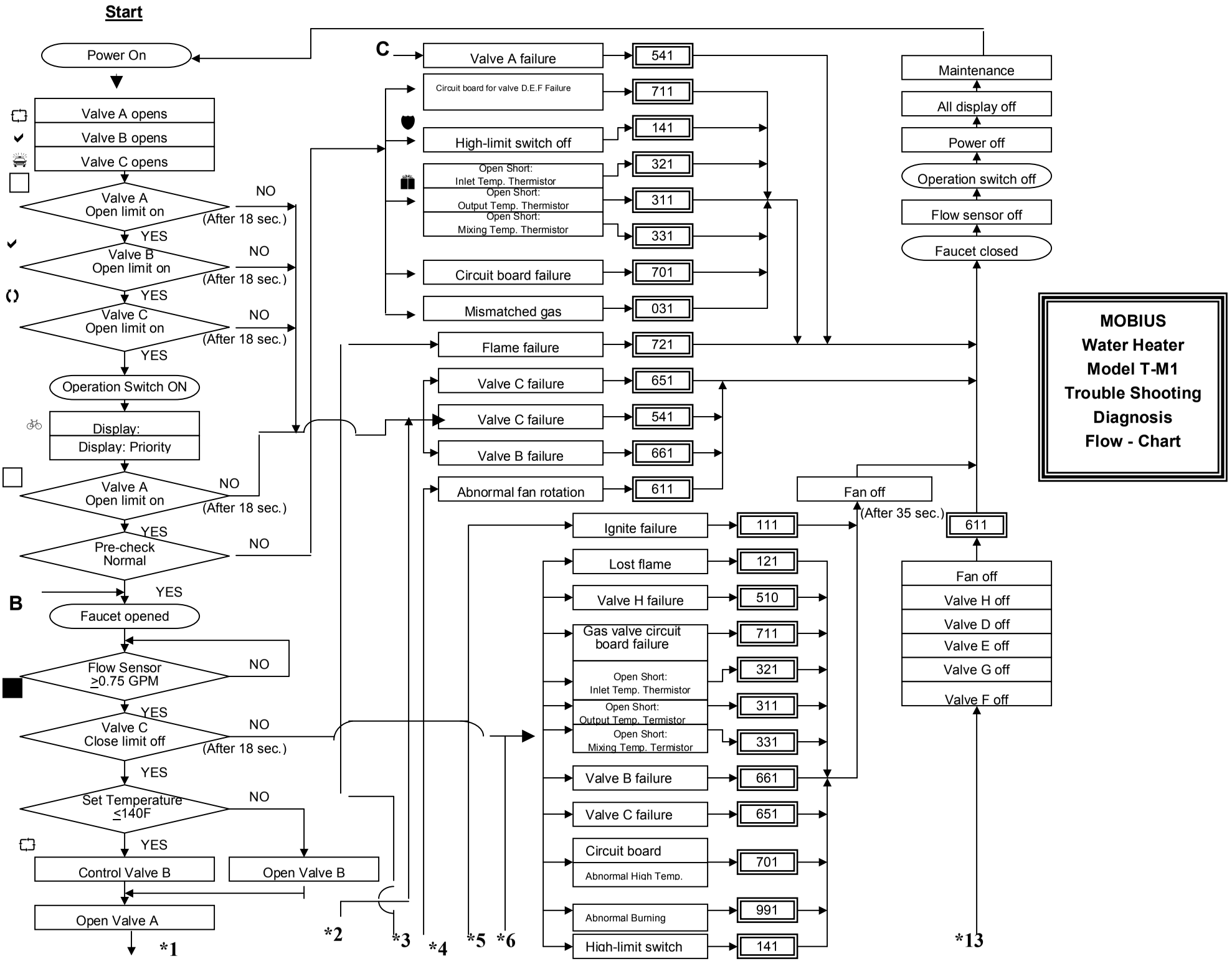


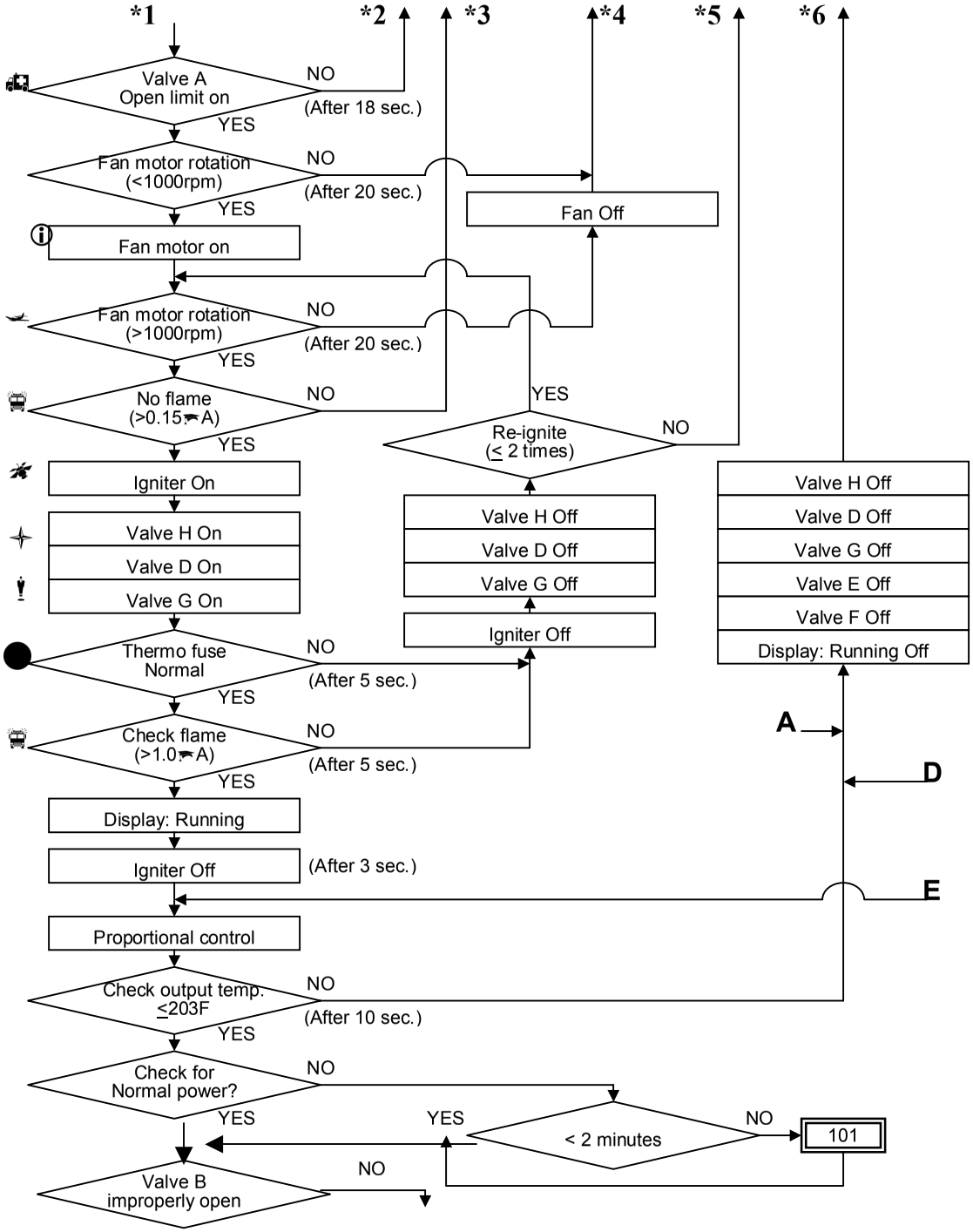
On the T-M1 computer board, a numeric error code will appear when the MOBIUS water heater has a problem. This error code will identify the symptoms of the problem and indicate what service is necessary.
The T-M1 consists of five main systems. These are the temperature control, the gas control, the water control, the burner control, and the main computer control systems.

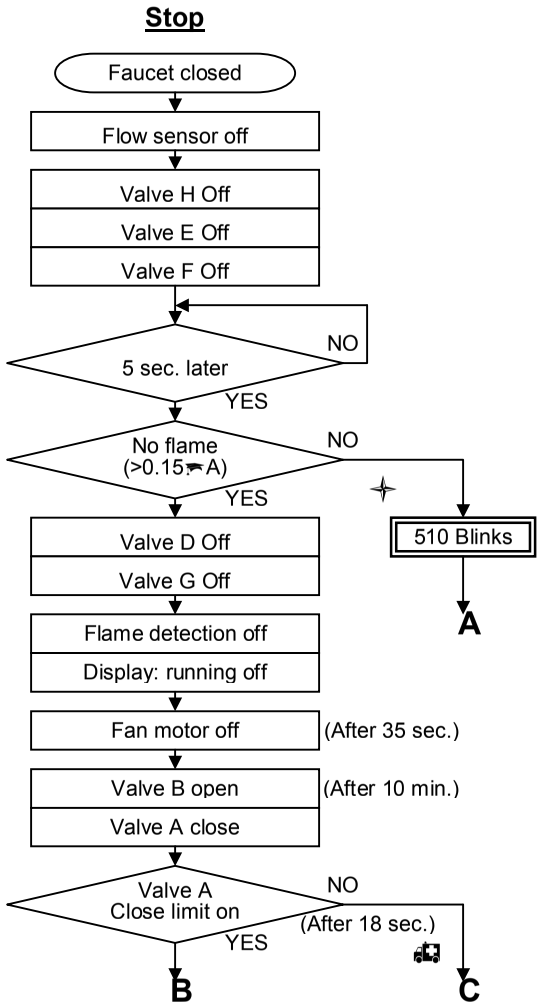
Error N0.	Component
031,141,711,741, 751	Main Computer Control
701	Temperature Control (Setting Temp. + over 50 °F)
111, 121	Burner Flame
311, 321,331	Temperature control
391,611,721,991	Burner control
501	Gas control
651, 661,541	Water control
101	Combustible Air
112	Vent pipe

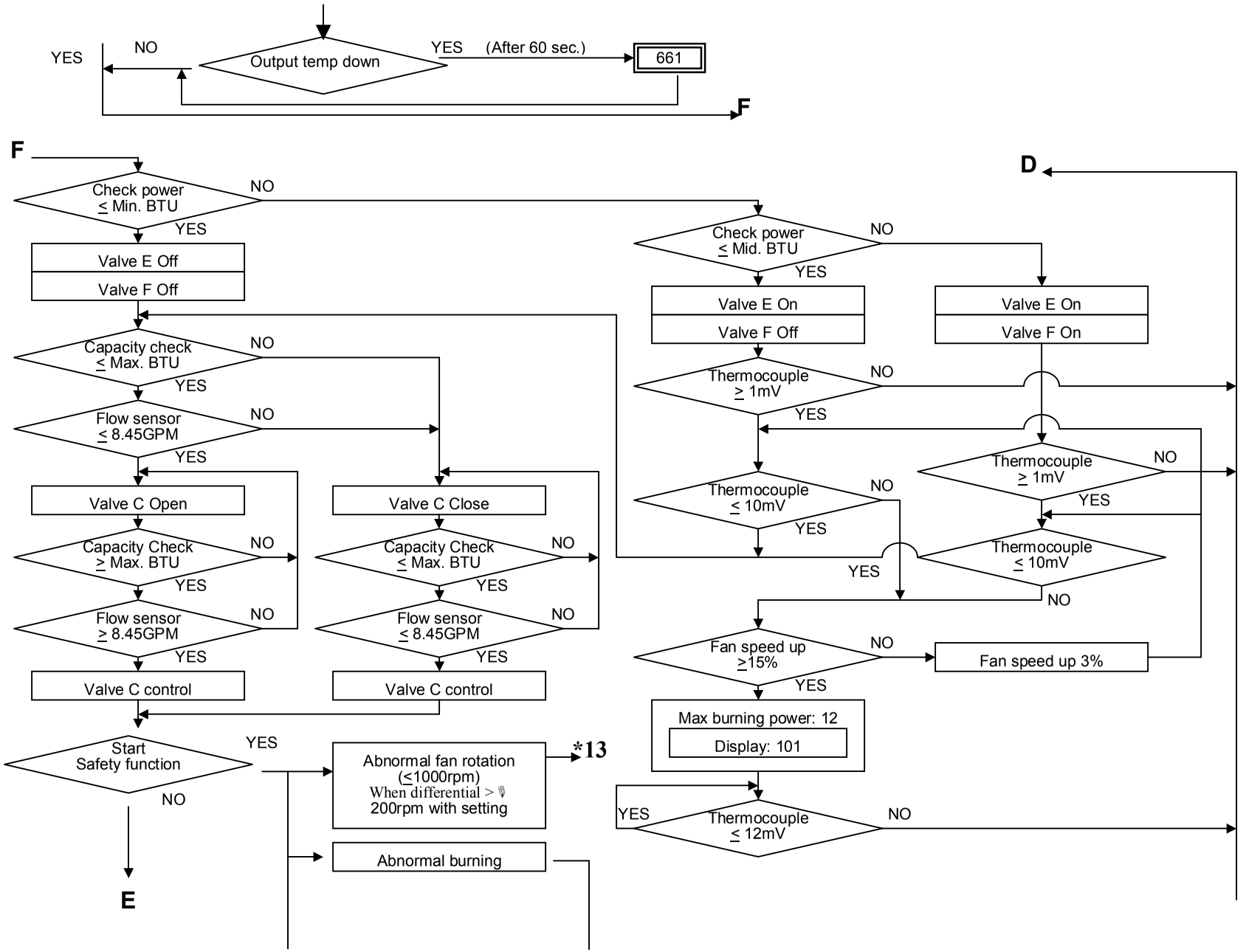
Trouble Shooting Flow chart:

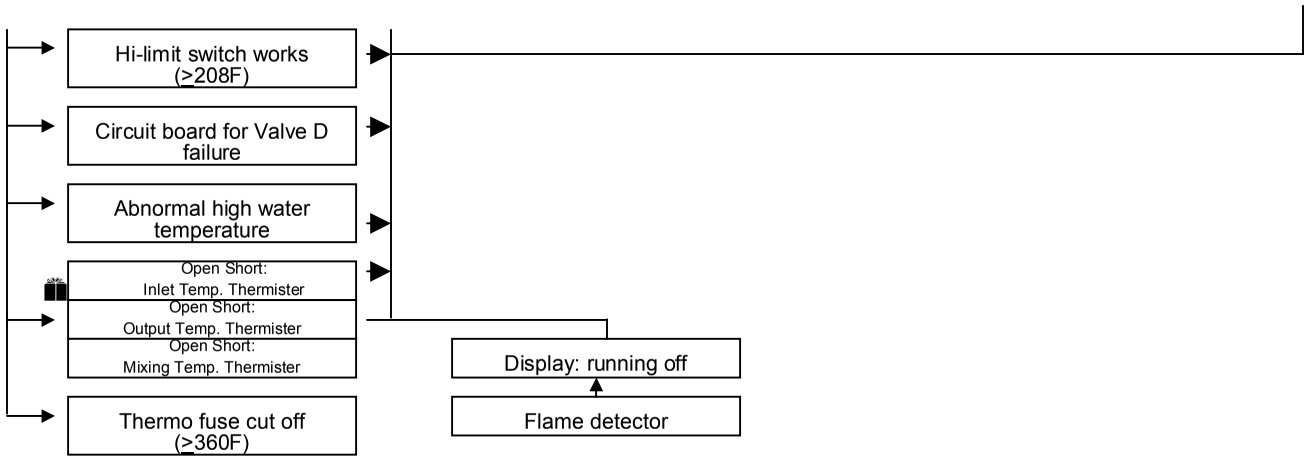
The MOBIUS water heater is one of the most trouble free water heaters there are.
However, if there is trouble, use the error code on the computer to follow this trouble shooting flow chart.


Start
Power On
Valve A opens
Valve B opens
Valve C opens
Valve A Open limit on
NO
(After 18 sec.)
YES
Valve B Open limit on
NO
(After 18 sec.)
YES
Valve C Open limit on
NO
(After 18 sec.)
YES
Operation Switch ON
Display:
Display: Priority
Valve A Open limit on
NO
(After 18 sec.)
YES
Pre-check Normal
NO
YES
B
Faucet opened
Flow Sensor ≥0.75 GPM
NO
YES
Valve C Close limit off
NO
(After 18 sec.)
YES
Set Temperature ≤140F
NO
YES
Control Valve B
Open Valve B
Open Valve A
*1
C
Valve A failure
541
Circuit board for valve D.E.F Failure
711
High-limit switch off
141
Open Short: Inlet Temp. Thermistor
321
Open Short: Output Temp. Thermistor
311
Open Short: Mixing Temp. Thermistor
331
Circuit board failure
701
Mismatched gas
031
Flame failure
721
Valve C failure
651
Valve C failure
541
Valve B failure
661
Abnormal fan rotation
611
Ignite failure
111
Lost flame
121
Valve H failure
510
Gas valve circuit board failure
711
Open Short: Inlet Temp. Thermistor
321
Open Short: Output Temp. Termistor
311
Open Short: Mixing Temp. Termistor
331
Valve B failure
661
Valve C failure
651
Circuit board Abnormal High Temp.
701
Abnormal Burning
991
High-limit switch
141
*2
*3
*4
*5
*6
Fan off
(After 35 sec.)
611
Maintenance
All display off
Power off
Operation switch off
Flow sensor off
Faucet closed
611
Fan off
Valve H off
Valve D off
Valve E off
Valve G off
Valve F off
*13
MOBIUS
Water Heater
Model T-M1
Trouble Shooting
Diagnosis
Flow - Chart


*1
*2
*3
*4
*5
*6
Valve A Open limit on
NO
(After 18 sec.)
YES
Fan motor rotation (<1000rpm)
NO
(After 20 sec.)
YES
Fan Off
Fan motor on
Fan motor rotation (>1000rpm)
NO
(After 20 sec.)
YES
No flame (>0.15μA)
NO
YES
Re-ignite (≤ 2 times)
NO
YES
Igniter On
Valve H On
Valve D On
Valve G On
Valve H Off
Valve D Off
Valve G Off
Igniter Off
Valve H Off
Valve D Off
Valve G Off
Valve E Off
Valve F Off
Display: Running Off
Thermo fuse Normal
NO
(After 5 sec.)
YES
Check flame (>1.0μA)
NO
(After 5 sec.)
YES
A
D
E
Display: Running
Igniter Off
(After 3 sec.)
Proportional control
Check output temp. ≤203F
NO
(After 10 sec.)
YES
Check for Normal power?
NO
YES
YES
< 2 minutes
NO
101
Valve B improperly open
NO


Stop
Faucet closed
Flow sensor off
Valve H Off
Valve E Off
Valve F Off
NO
5 sec. later
YES
No flame (>0.15μA)
NO
YES
510 Blinks
A
Valve D Off
Valve G Off
Flame detection off
Display: running off
Fan motor off
(After 35 sec.)
Valve B open
(After 10 min.)
Valve A close
Valve A Close limit on
NO
(After 18 sec.)
YES
B
C


YES
NO
Output temp down
YES
(After 60 sec.)
661
F
F
Check power ≤ Min. BTU
NO
YES
Valve E Off
Valve F Off
Capacity check ≤ Max. BTU
NO
YES
Flow sensor ≤ 8.45GPM
NO
YES
Valve C Open
Capacity Check ≥ Max. BTU
NO
YES
Flow sensor ≥ 8.45GPM
NO
YES
Valve C control
Valve C Close
Capacity Check ≤ Max. BTU
NO
YES
Flow sensor ≤ 8.45GPM
NO
YES
Valve C control
Start Safety function
YES
NO
Abnormal fan rotation (≤1000rpm) When differential > 200rpm with setting
*13
Abnormal burning
E
Check power ≤ Mid. BTU
NO
YES
Valve E On
Valve F Off
Thermocouple ≥ 1mV
NO
YES
Thermocouple ≤ 10mV
NO
YES
Valve E On
Valve F On
Thermocouple ≥ 1mV
NO
YES
Thermocouple ≤ 10mV
YES
NO
Fan speed up ≥15%
NO
YES
Fan speed up 3%
Max burning power: 12
Display: 101
YES
Thermocouple ≤ 12mV
NO
D



<Water Valves>

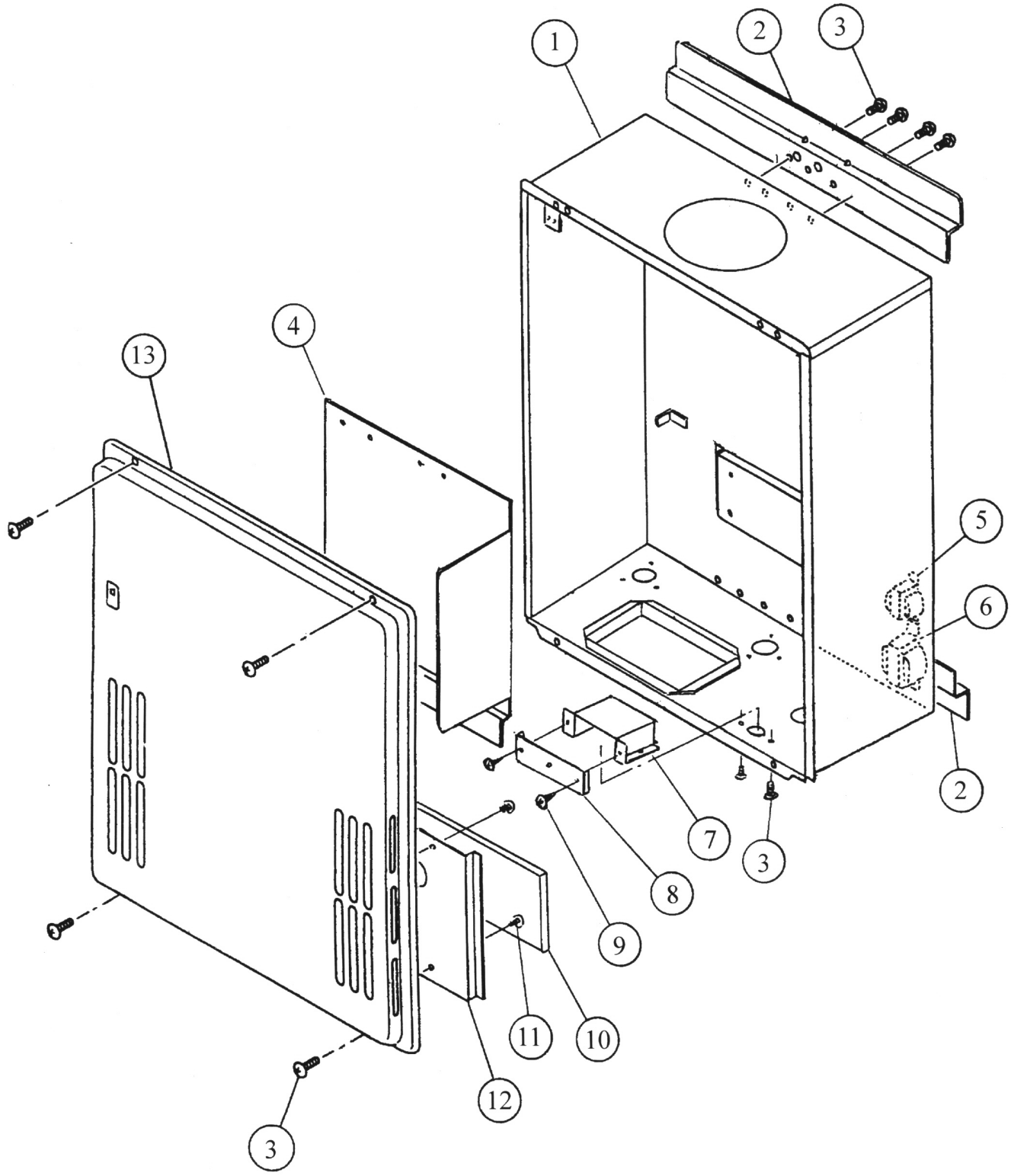
Valve A	Water Outlet Valve (Two way valve)
Valve B	Bypass Flow Adjustment Valve
Valve C	Flow Adjustment Valve

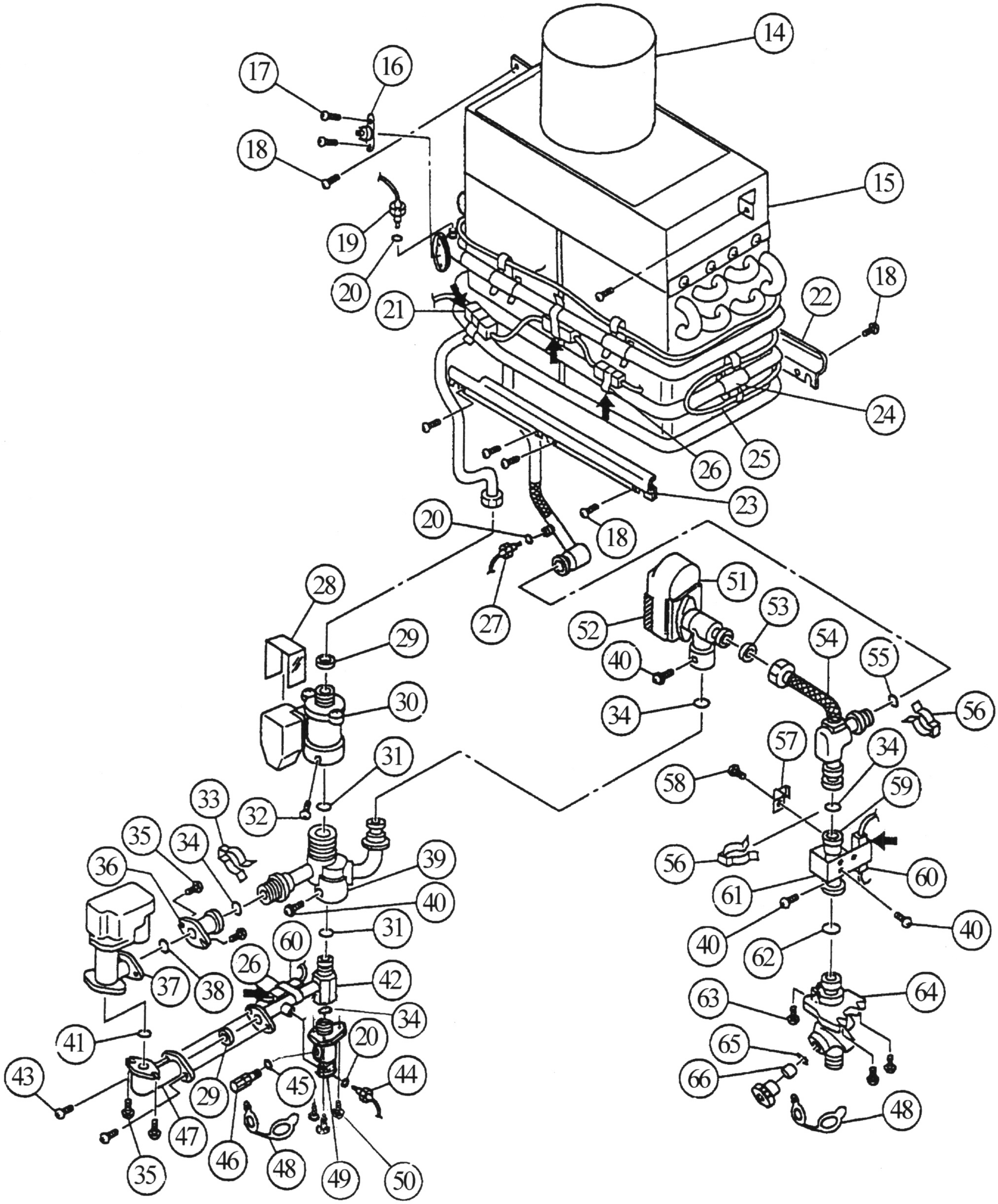
<Gas Valve>

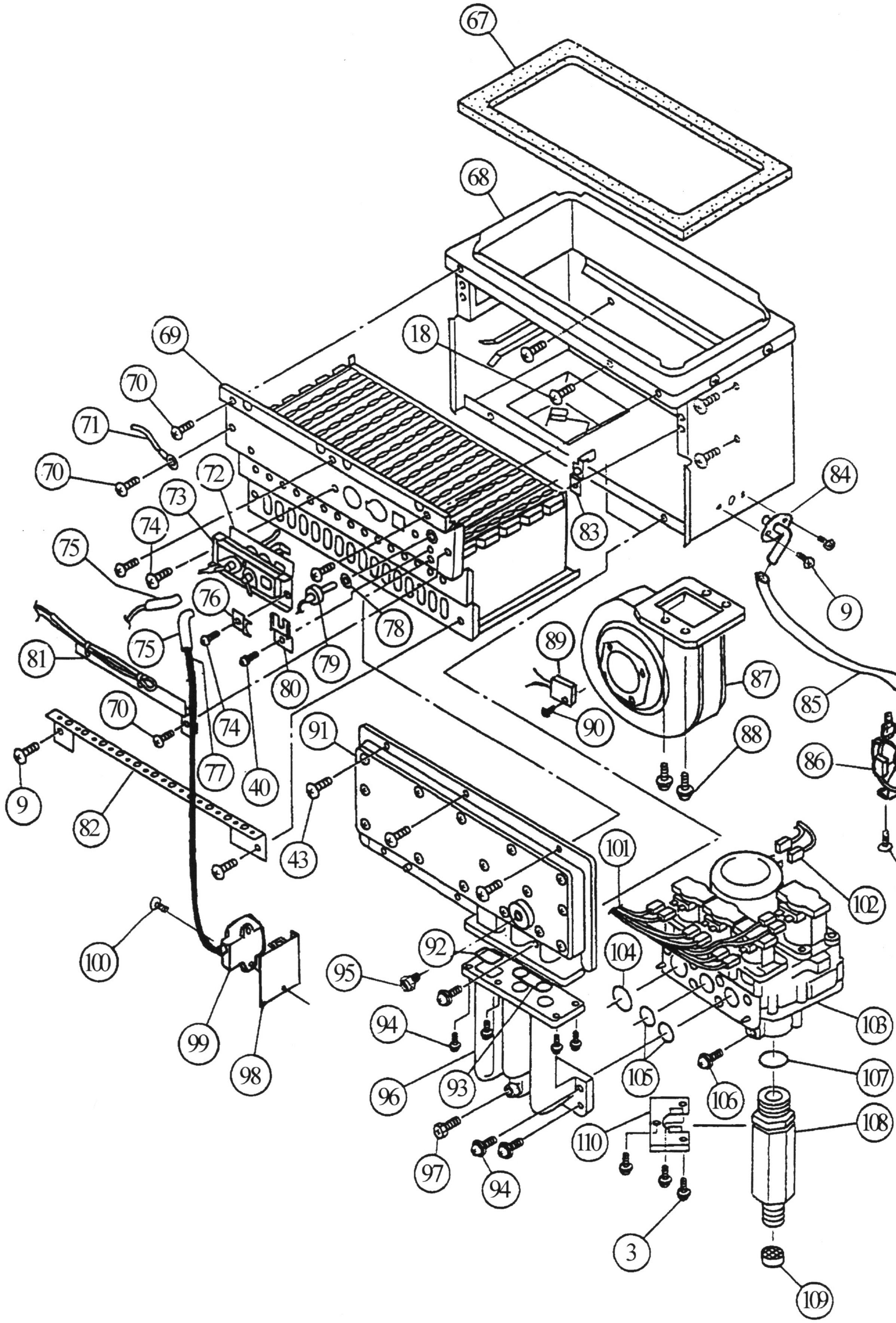
Valve D	Solenoid Valve 1
Valve E	Solenoid Valve 2
Valve F	Solenoid Valve 3
Valve G	Proportional Valve
Valve H	Gas Inlet Valve (Main Valve)

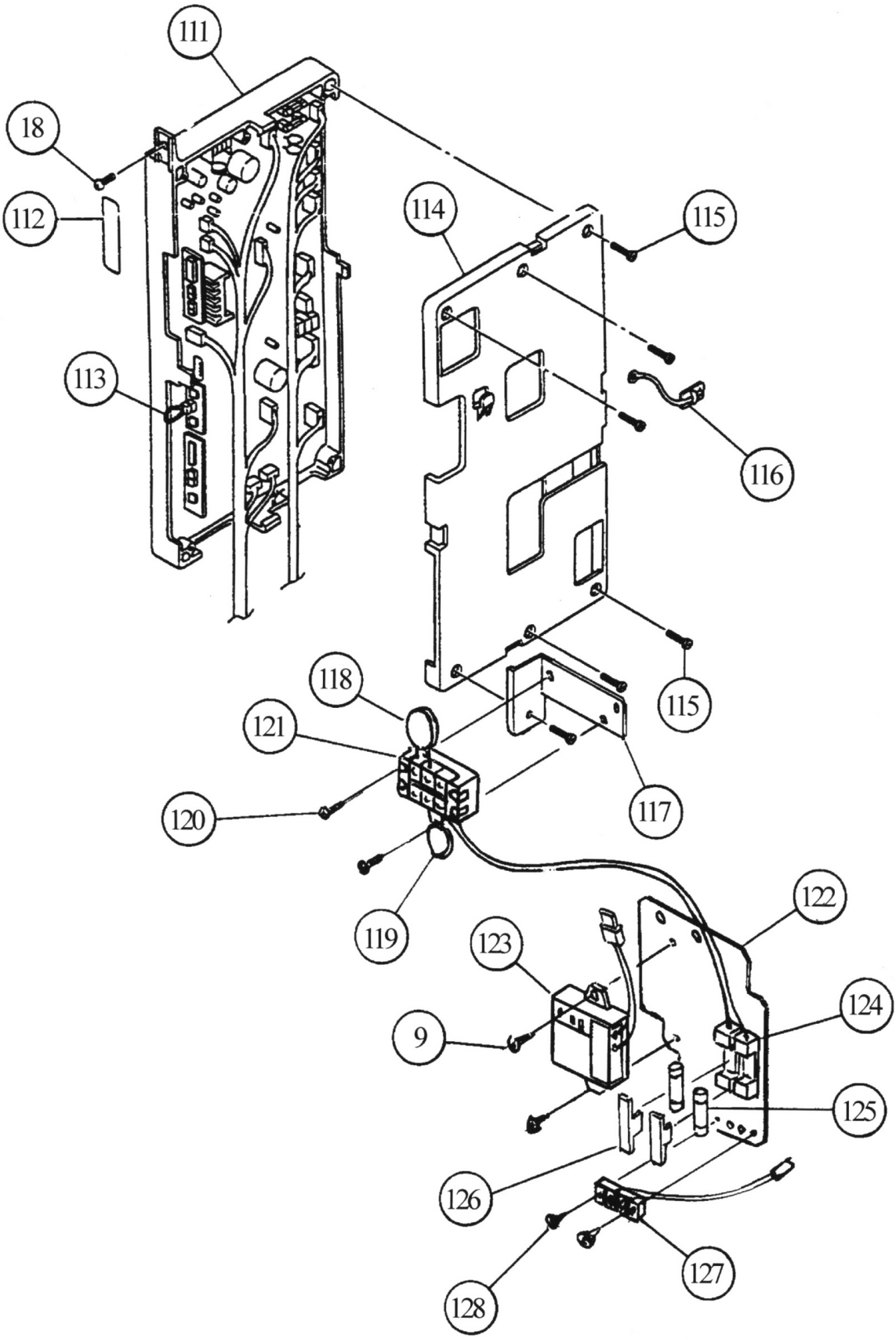
Error	Symptom	Error	Symptom	Error	Symptom
31	Wrong Gas Type	331	Mixing Thermistor Fail	701	Mixing Thermistor Abnormality
101	Insufficient Gas Supply	391	Thermocouple Abnormality	711	Gas Solenoid Valve Abnormality
111	Ignition Failure	510	Main Gas Valve Abnormality	721	Computer Pre-post Check Problem
121	Flame Loss	541	Two-Way Valve Abnormality	741	Main Remote Control Problem
141	Hi-Limit Switch	611	Fan Motor Abnormality	751	Temperature Remote Control Problem
311	Output Thermistor Fail	651	Bypass Valve Abnormality	761	Multi-system Controller Problem
321	Inlet Thermistor Fail	661	Flow Adjust. Valve Abnormality	991	Abnormal Burning

MOBIUS Water Heater
Parts List and Component Diagram




14
17
16
18
15
19
20
21
18
22
24
25
26
23
20
18
27
28
29
30
51
52
53
40
54
55
34
56
31
32
33
57
34
58
59
35
34
39
36
40
56
61
60
31
40
40
60
62
26
37
38
42
63
64
34
41
20
65
43
44
66
29
45
48
47
46
48
49
50
35


67
68
18
69
70
71
70
72
73
74
75
83
84
9
76
75
78
79
80
81
89
87
70
74
90
85
40
77
91
88
86
9
82
43
101
3
102
104
100
92
95
103
94
99
98
96
93
105
106
107
108
110
97
94
3
109


111
18
112
113
114
115
116
115
118
121
120
117
119
122
123
9
124
125
126
127
128

MOBIUS Water Heater

Part List

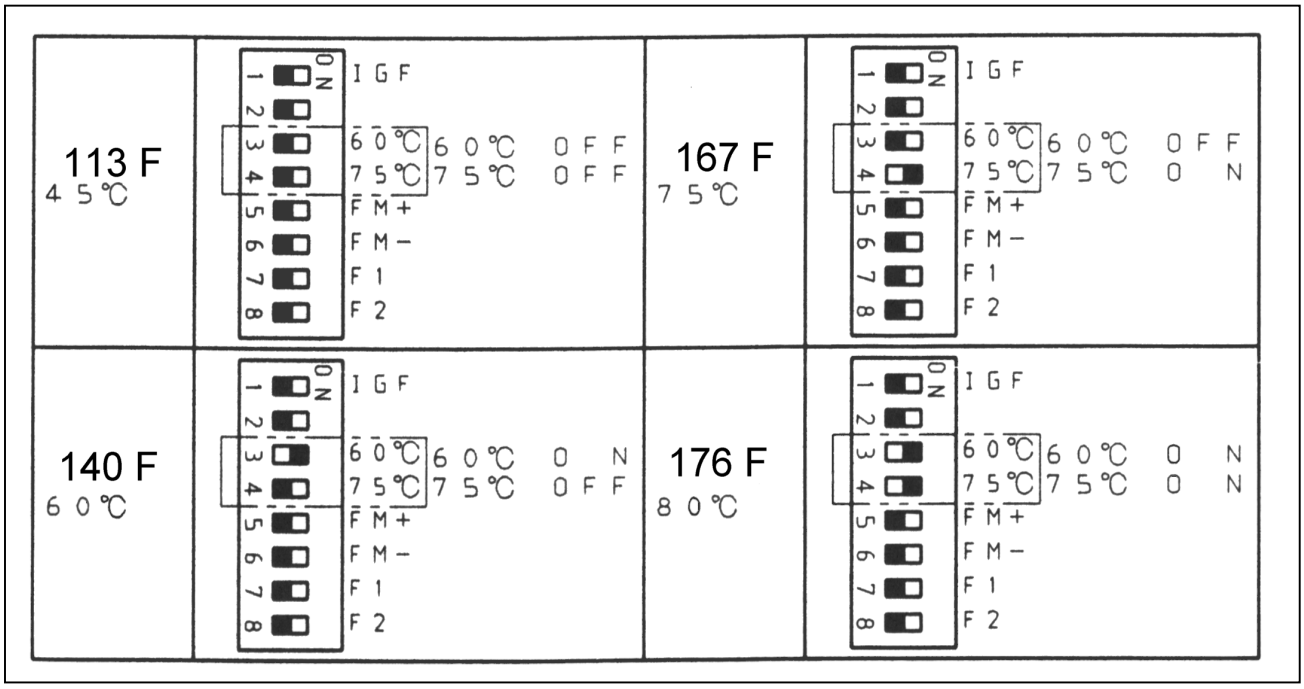
Part No.	Description	Part No.	Description
1	Case Assembly	65	O-ring P25
2	Brackets	66	Filter
3	Screw (W) M4 x 10	67	Packing
4	Back Guard Panel	68	Combustion Chamber
5	Transformer A	69	Burner Assembly
6	Transformer B	70	Screw M4 x 12
7	Junction Box	71	Wire Holder
8	Junction Box Cover	72	Spark Electrode Holder Packing
9	Screw M4 x 8	73	Spark Electrode Holder
10	Sound Insulation	74	Screw M4 x 10
11	Screw M4 x 8 (Coated)	75	Silicon Cap
12	Weather Protection Panel	76	Spark Electrode Fixing Plate
13	Front Cover	77	High Voltage Igniter Cable
14	Exhaust Pipe	78	O-ring (seal)
15	Heat Exchanger Assembly	79	Thermocouple
16	Hi-Limit Switch	80	Thermocouple Fixing Plate
17	Screw M3 x 6	81	Overheat Cut Off Fuse
18	Screw M4 x 10 (coated)	82	Damper
19	Output Thermistor	83	Washer
20	O-ring P4	84	Pressure Switch Port
21	Heater Block 604	85	Silicon Tube
22	Heat Exchanger Fixing Plate (Back)	86	Pressure Switch
23	Heat Exchanger Fixing Plate (Front)	87	Fan Motor
24	Over Heat Cut Off Fuse Fixing Plate	88	Screw M4 x 12 Hex
25	Over Heat Cut Off Fuse	89	Thermostat
26	Heater Block Fixing Plate	90	Screw (W) M3 x 10
27	Inlet Thermistor	91	Manifold
28	Two Way Valve Cover	92	Manifold Gas Pressure Port
29	Silicon O-ring M26	93	Gasket
30	Two Way Valve Assembly	94	Screw M4 x 12
31	O-ring P20	95	Manifold Gas Pressure Tap
32	Screw M4 x 8	96	Gas Coupling
33	Quick Release Plate	97	Screw M4 x 8 (Washer & Hex head)
34	O-ring JASO#1017	98	Igniter Fixing Plate
35	Screw M4 x 12	99	Igniter
36	Flange	100	Screw M4 x 6
37	Flow Adjustment Valve	101	Solenoid Valve Wire
38	O-ring P16	102	Proportional Valve Wire
39	Bypass Junction	103	Gas Valve Unit

40	Screw M4 x 6	104	O-ring P22
41	O-ring P18	105	O-ring P18
42	Water Outlet Connection	106	Screw M4 x 8
43	Screw M4 x 14	107	O-ring P26
44	Mixing Thermistor	108	Gas Inlet
45	O-ring P6	109	Gas Filter
46	Drain Plug	110	Gas Inlet Fixing Plate
47	Mixing Connection	111	Computer Board
48	Drain Plug Band	112	Computer Board Sticker
49	Water Outlet	113	Mode Port
50	Screw (W) M4 x 12	114	Control Box
51	Bypass Flow Adjustment Valve	115	Screw M3 x 25
52	Bypass Valve Cover	116	Wire Holder
53	Silicon O-ring M22	117	Condenser Terminal Plate
54	Bypass Connection	118	Surge Absorber: A
55	O-ring JASO3#1017	119	Surge Absorber: B
56	Clamp	120	Screw M4 x 16
57	Heater Fixing Plate	121	Condenser Terminal
58	Screw M4 x 6	122	Power Distribution Plate
59	Flow Sensor	123	Ground Fault Circuit Interrupter
60	Heater 102	124	Fuse Box
61	Magnetic Protection Plate	125	Fuse
62	O-ring JASO#1019	126	Fuse Cover
63	Screw M4 x 14 (coated)	127	Remote Control Terminal
64	Water Inlet	128	Screw M3 x 12

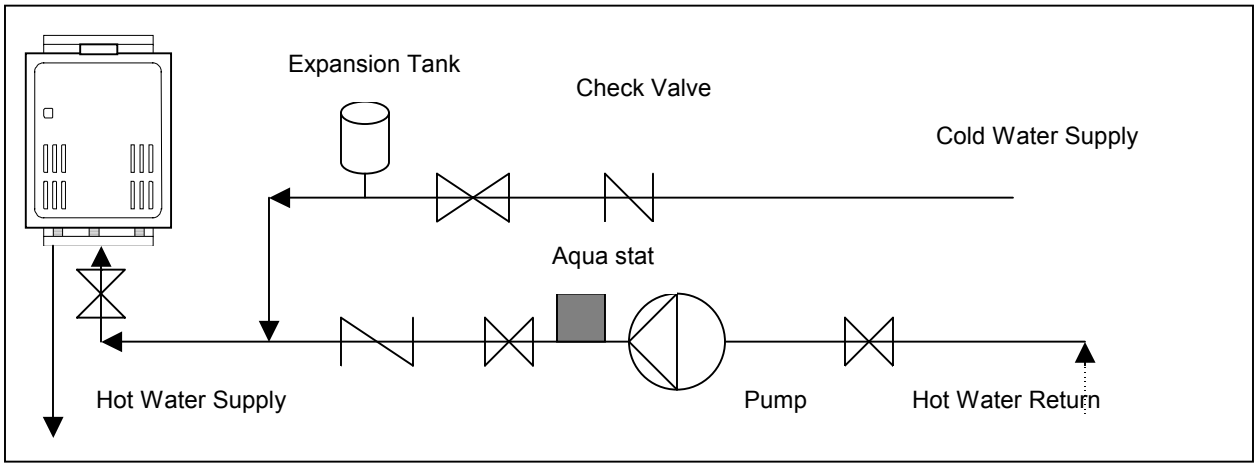
MOBIUS Water Heater Application

Hot Water Output Temperature Setting:

The hot water output temperature on the MOBIUS water heater can be adjusted with an optional remote controller (Part TM-RE10, 95 °F to 176 °F) or manually with computer control board dipswitches. The dipswitches can adjust between the following temperatures; 113 °F, 140 °F, 167 °F, and 176 °F. The failsafe temperature is 140 °F.



Hot Water Re-circulation system:



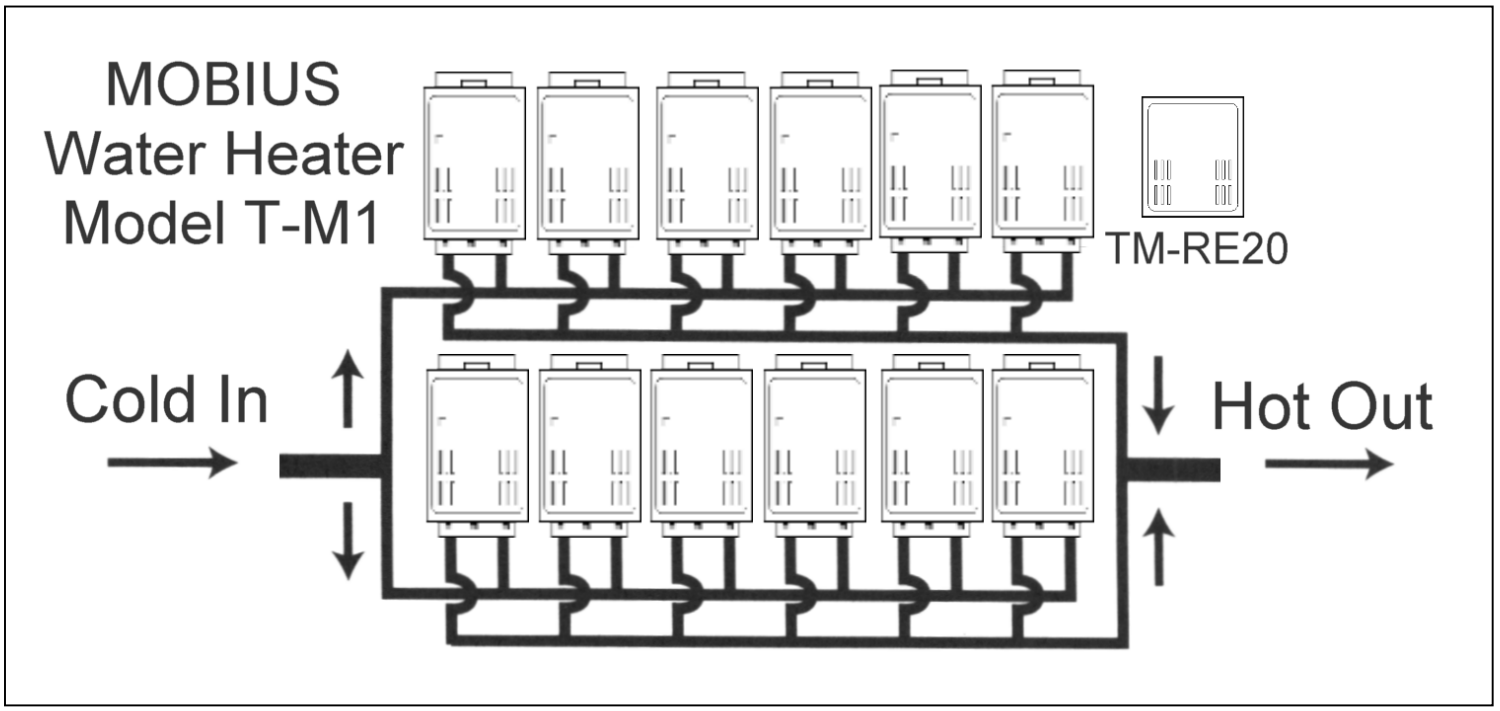
For more detailed Information, information and diagrams can be attained from a trained technician, qualified installer, service agency, or from the manufacturer's technical department.

Hydro-Heating and Radiant Heating System Application:

For More Detailed Information: Contact a trained technician, qualified installer, service agency, or the manufacturer's technical department.

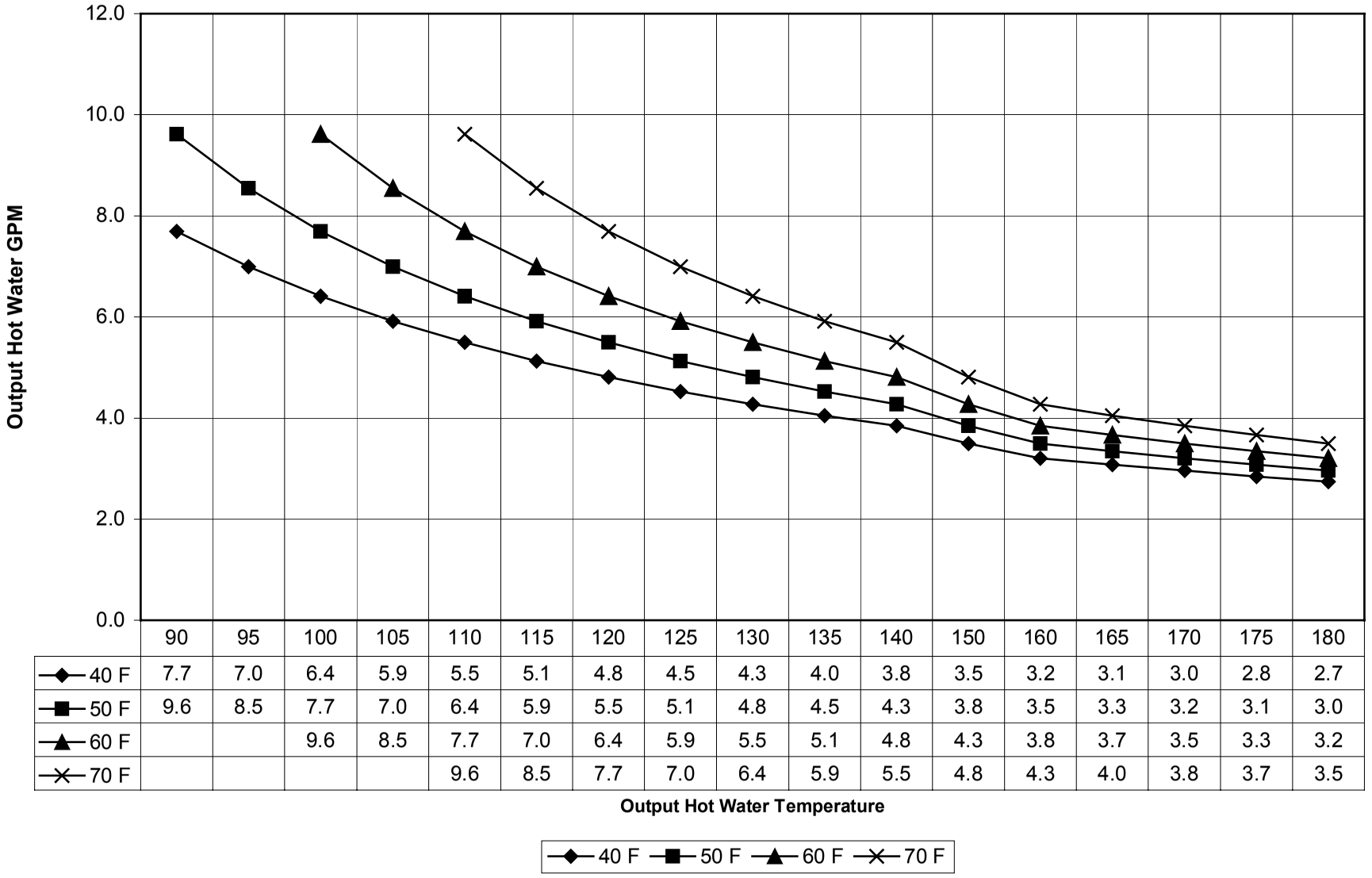
Manifolded Multi-System Application for Large Volume.

The MOBIUS Water Heater is fully capable of being used in a manifolded multiple-unit system using the Multi-System Computer Control (Optional Part TM-RE20). This Multi-System Computer Control can manifold from 2 units to 20 units for commercial and residential application.
A single Multi-System can burn gas in the range of 26,000 BTU to 4.7 Million BTU, and the computer will completely modulate the system.



For More Detailed Information: Contact a trained technician, qualified installer, service agency, or the manufacturer's technical department.

Output Temperature vs. GPM (Max. 9.6 GPM) for Various Input Water Temperature



	90	95	100	105	110	115	120	125	130	135	140	150	160	165	170	175	180
40 F	7.7	7.0	6.4	5.9	5.5	5.1	4.8	4.5	4.3	4.0	3.8	3.5	3.2	3.1	3.0	2.8	2.7
50 F	9.6	8.5	7.7	7.0	6.4	5.9	5.5	5.1	4.8	4.5	4.3	3.8	3.5	3.3	3.2	3.1	3.0
60 F			9.6	8.5	7.7	7.0	6.4	5.9	5.5	5.1	4.8	4.3	3.8	3.7	3.5	3.3	3.2
70 F					9.6	8.5	7.7	7.0	6.4	5.9	5.5	4.8	4.3	4.0	3.8	3.7	3.5