



Mega-Stor® II

Stainless Steel, Indirect Water Heaters

INSTALLATION AND OPERATING INSTRUCTIONS

CAUTION

1. The heat transfer-medium must be water or other nontoxic fluid having a toxicity rating or Class of 1, as listed in *Clinical Toxicology of Commercial Products*, 5th edition.
2. The pressure of the heat transfer medium must be limited to a maximum of 30 PSIG by an approved safety or relief valve.



Quality
Value &
Service

Velocity Boiler Works, LLC
P.O. Box 14818
3633 I Street
Philadelphia, PA 19134
www.velocityboilerworks.com

IMPORTANT INFORMATION - READ CAREFULLY

NOTE: The equipment shall be installed in accordance with those installation regulations enforced in the area where the installation is to be made. These regulations shall be carefully followed in all cases. Authorities having jurisdiction shall be consulted before installations are made.

All wiring on indirect water heaters installed in the USA shall be made in accordance with the National Electrical Code and/or local regulations.

All wiring on indirect water heaters installed in Canada shall be made in accordance with the Canadian Electrical Code and/or local regulations.

The City of New York requires a Licensed Master Plumber supervise the installation of this product.

The Commonwealth of Massachusetts requires this product to be installed by a Licensed Plumber.

The following terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning product life.



DANGER

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



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury or property damage.



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death, serious injury or substantial property damage.

NOTICE

Indicates special instructions on installation, operation, or maintenance which are important but not related to personal injury hazards.



WARNING

Scald Hazard. This indirect water heater requires regular maintenance and service to operate safely. Follow the instructions contained in this manual.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Read and understand the entire manual before attempting installation, start-up operation, or service. Installation and service must be performed only by an experienced, skilled, and knowledgeable installer or service agency.

Installation is not complete unless a temperature and pressure relief valve is installed into the tapping located on top of the indirect water heater. - See Section V of this manual for details.

Burn Hazard. This indirect water heater contains very hot water under high pressure. Do not unscrew any pipe fittings nor attempt to disconnect any components without positively assuring the water is cool and has no pressure. Always wear protective clothing and equipment when installing, starting up or servicing this product to prevent scald injuries. Do not rely on the pressure or temperature gauges to determine the temperature and pressure of the water heater. Portions of this indirect water heater and connected piping become very hot while operating. Do not touch any components unless they are cool.

Failure to follow all instructions in the proper order can cause personal injury or death. Read all instructions, including all those contained in component manufacturers manuals which are provided before installing, starting up, operating, maintaining or servicing.

All cover plates, enclosures and guards must be in place at all times.

WARNINGS FOR THE HOMEOWNER

FOLLOW ALL INSTRUCTIONS and warnings printed in this manual and posted on the indirect water heater.


MAINTAIN THIS PRODUCT. To keep your indirect water heater safe and reliable, have a service technician maintain it as specified in this manual.

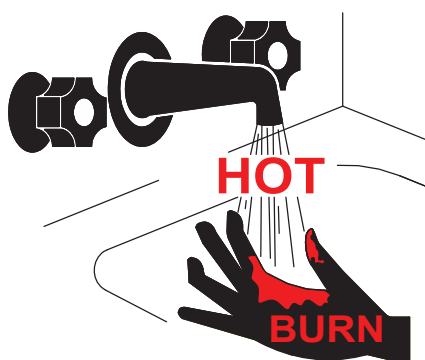
IF YOU ARE NOT QUALIFIED to install or service boilers and water heaters, do not install or service this one.

THIS INDIRECT WATER HEATER MAY LEAK WATER at the end of its useful life. Be sure to

protect walls, carpets, and valuables from water that could leak from the indirect water heater.

PROTECT YOUR HOME IN FREEZING WEATHER. A power outage, safety lockout, or component failure will prevent your boiler from lighting. In winter, your pipes or this indirect water heater may freeze and cause extensive property damage. Do not leave the heating system unattended during cold weather unless alarms or other safeguards are in place to prevent such damage.

DANGER



Water temperature over 125°F can cause severe burns instantly or death from scalds.

Children, disabled and elderly are at highest risk of being scalded.

See instruction manual before setting temperature at water heater.

Feel water before bathing or showering.

Temperature limiting valves are available, see manual.

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I. PRODUCT DESCRIPTION

This indirect water heater (IWH) is designed to generate domestic hot water in conjunction with a hot water boiler, or other suitable heat source, using forced boiler water circulation. This indirect water heater consists of a stainless steel tank in which a smooth stainless steel coil is located. Boiler water is pumped through the coil and heats the water in the tank. This product is not intended for use in pool heating applications or for heating any other fluid other than water. It is also not intended for use in gravity hot water heating systems.

This manual shows installations where a hot water boiler is used as the heat source for the IWH, however other heat sources (such as solar collectors) may be used provided that the following conditions are met:

- 1) The heat source must be able to provide a continuous supply of 180F water to the coil at the flow rates shown in Table 2.1. If lower temperatures and/or flow rates are used, the performance shown in Table 2.1 may not be achieved.
- 2) The thermostat provided with this IWH must be installed and wired in such a way that it will interrupt the flow of heat source water passing through the coil when its contacts open. **Failure to control the heat source flow using this thermostat could result in unreliable operation or personal injury or death due to scalding.**
- 3) The fluid passing through the coil must be water or other non-toxic fluid having a toxicity rating or Class of 1 as listed in *Clinical Toxicology of Commercial Products* (latest edition).
- 4) The heat source must be used in accordance with its manufacturer's instructions and those of the authority having jurisdiction.

IMPORTANT NOTE

All models have a stored volume of less than 120 Gallons. When installed in accordance with these instructions, stored potable water temperature in the tank is limited to a value of 210F or less by a temperature and pressure relief valve. The maximum possible heat transfer rate across the coil (heat input) is less than 200,000BTU/hr with 210F potable water provided that boiler or heat source water temperature is limited to:

MS2-030 – MS2-075: 250F
MS2-119: 220F

All models are therefore outside of the scope of both ASME Section IV, part HLW and ASME Section VIII when installed in accordance with these instructions and with the boiler or heat source water temperature limited as shown above.

II. SPECIFICATIONS

Model	First Hour Rating	Continuous Draw Rating	Standby Loss (°F/hr)	Minimum Boiler Output (MBH)	Boiler Water Through Coil	
	(Gal/hr)	(Gal/hr)			Min Flow (Gal/min)	Head Loss (ft w.c.)
MS2-030	162	138	1.4	87	8.0	2.6
MS2-040	192	162	1.1	101	8.0	2.8
MS2-050	236	193	0.9	121	8.0	2.9
MS2-075	307	238	1.0	150	8.0	4.5
MS2-119	497	417	1.4	264	14.0	4.2

Notes:

Ratings based on 77F DHW temperature rise (135F outlet temp) and 180F boiler supply temperature. The ratings in Table 2.1 were obtained at the heat source (boiler) output rates and heat source flow rates shown above. Other results shall be obtained under different conditions.

Pressure Ratings:

Maximum Allowable Tank Working Pressure - 150 psi
Design Hydrostatically Tested to 300 psi

FIGURE 2.2: MEGA-STOR II INDIRECT WATER HEATER

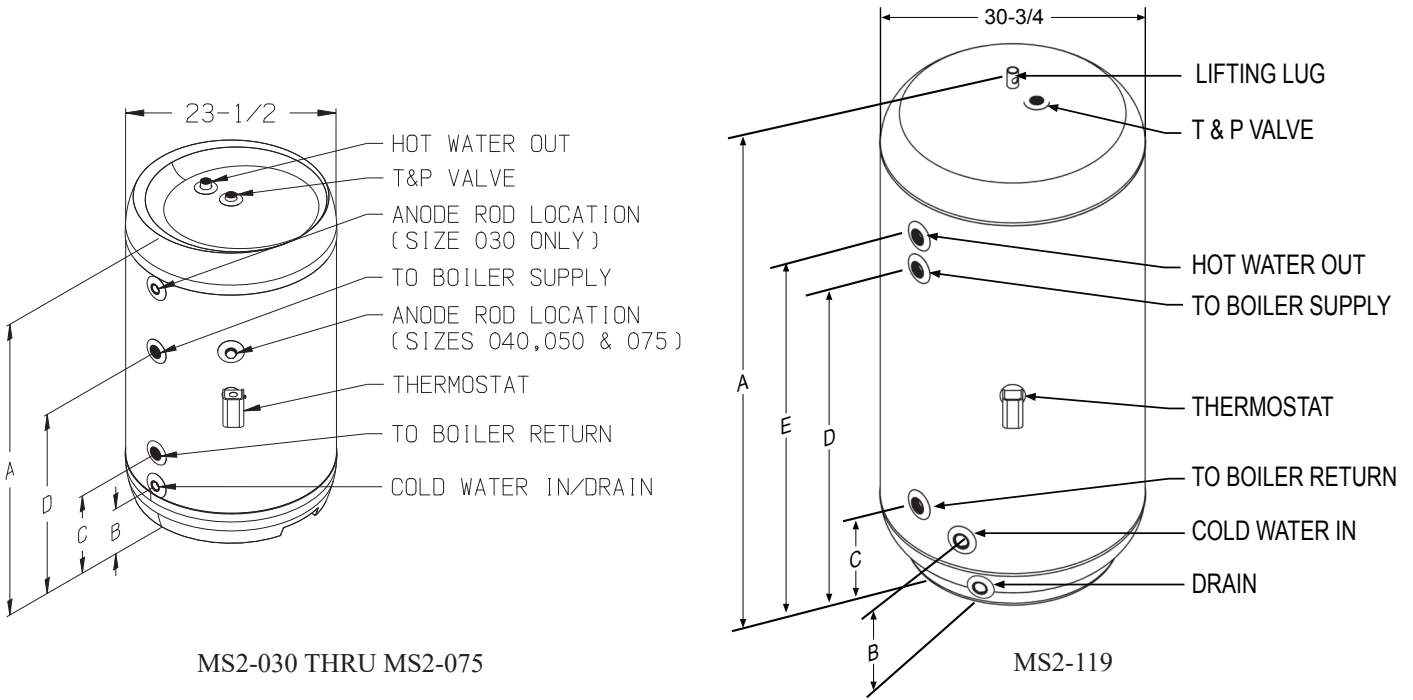


TABLE 2.3: PHYSICAL SPECIFICATIONS

Model	Potable Volume (Gal.)	Dimensions in Inches					Weight	
		A	B	C	D	E	Net	Full
MS2-030	30.1	33-1/8	6-1/8	10-1/2	21-1/8	---	69	328
MS2-040	37.9	39-3/8	6-1/8	10-1/2	24-1/4	---	82	407
MS2-050	50.6	49-3/4	6-1/8	10-1/2	26-5/8	---	112	545
MS2-075	74.0	68-3/4	6-1/8	10-1/2	29-3/8	---	146	777
MS2-119	111.3	62-7/8	10-1/4	12-1/2	44	48-3/8	251	1217

TABLE 2.4: CONNECTION SIZE (in. NPT)

Description	Model		
	MS2-030 - MS2-050	MS2-75	MS2-119
Cold Water Inlet	3/4F	1F	1-1/4F
To Boiler Return	1F	1F	1-1/4F
From Boiler Supply	1F	1F	1-1/4F
T&P Valve Tapping	3/4F	3/4F	1F
Hot Water Out	3/4F	1F	1-1/4F
Drain	-	-	3/4F

III. BEFORE STARTING INSTALLATION

- 1) Be sure that the planned installation is in accordance with all local codes.
- 2) Be certain the domestic water supply to the indirect water heater (IWH) has physical and chemical characteristics that fall within the limits shown below. Where questions exist as to the composition of the water on the job, a qualified water treatment expert should be consulted.
- 3) Read and understand all installation requirements in this manual.
- 4) Make sure that both this IWH and the boiler are sized to meet the domestic hot water demand. For basic sizing information see Appendix A.



CAUTION

Water used in this indirect water heater must have characteristics falling within the following limits:

PH 6.0 – 8.0

Chloride Content – Less than 80PPM

Maximum domestic hot water temperature – 150F

Water failing to meet these requirements may severely shorten the life of this product due to corrosion. Such corrosion damage is not covered by the warranty.

IV. LOCATING THE INDIRECT WATER HEATER

- 1) Table 2.3 shows the weight of each indirect water heater (IWH) filled with water. Make sure that the location chosen for the IWH is capable of supporting it.



WARNING

Failure to properly support an indirect water heater could result in property damage, personal injury or death.

- 2) Locate the IWH in a location where a leak in the tank, the adjacent piping, or an open T&P valve will not damage the surrounding structure. If the surrounding area is highly susceptible to water damage, install the IWH in a pan with a drain.
- 3) The IWH may be located some distance from the boiler provided the zone system is designed to provide the flow called for in Table 2.1 through the coil. Also, the further the IWH is from the boiler, the longer the response of the boiler will be to a call from the IWH thermostat. If long runs exist between the boiler and IWH it is advisable to insulate the piping.



WARNING

Like all water heaters, this product may leak water at the end of its useful life. Where water from such leakage could cause property damage, install this indirect water heater on a drain pan that is piped to a suitable drainage point.

V. PIPING

A) BOILER SIDE PIPING

CAUTION

1. The heat transfer-medium must be water or other nontoxic fluid having a toxicity rating or Class of 1, as listed in *Clinical Toxicology of Commercial Products*, 5th edition.
2. The pressure of the heat transfer medium must be limited to a maximum of 30 PSIG by an approved safety or relief valve.

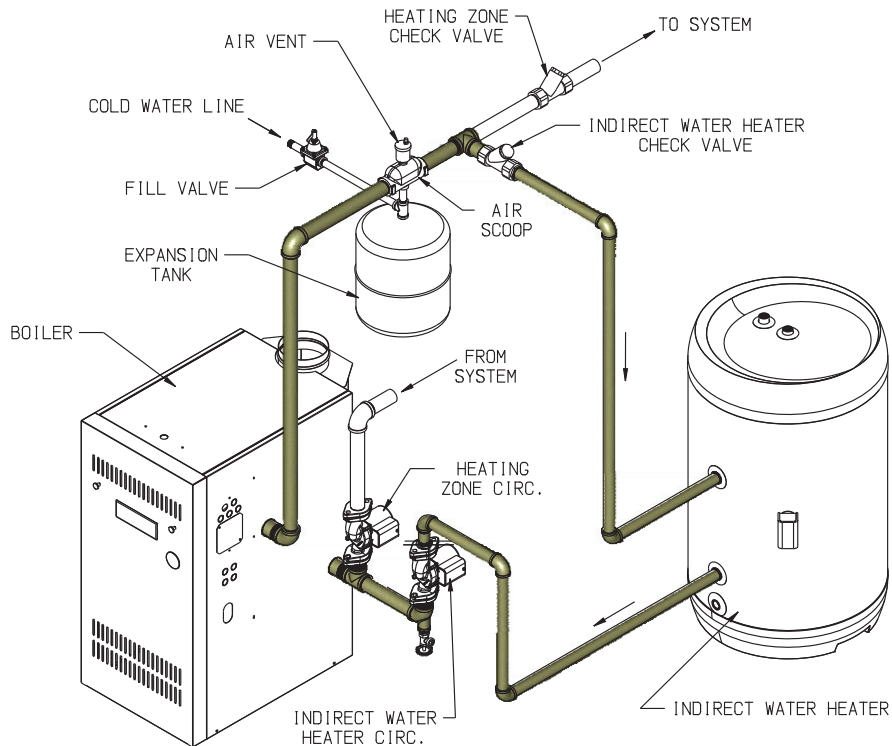
NOTICE

Use of the minimum pipe sizes shown in Table 7.2 is strongly recommended. Failure to size the indirect water heater boiler-side piping and circulator may result in failure of the water heater to meet the performance requirements shown in Table 2.1.

A typical boiler-side piping installation is shown in Figure 5.1. A circulator zone system is shown, but zoning can also be done using two or three-way zone valves, as long as the boiler water flow rate called for in Table 2.1 can be achieved (this requirement is harder to meet with some zone valves). If circulator zoning is used, check valves must be installed in each zone to prevent unwanted circulation through zones which are not calling for heat.

Table 5.2 shows combinations of circulators, pipe size, and equivalent length that will result in the flow rates called for in Table 2.1.

FIGURE 5.1: BOILER-SIDE PIPING USING CIRCULATOR ZONES



WARNING: BOILER RELIEF VALVE PIPING NOT SHOWN. INSTALL IN ACCORDANCE WITH BOILER MANUFACTURER'S INSTRUCTIONS.

The maximum equivalent length shown in Table 5.2 is that for the indirect water heater loop (IWH loop). The IWH loop piping is shaded in Figure 5.1. To calculate the equivalent length of this loop:

- 1) Count all fittings in the planned boiler loop.
- 2) Using Table 5.3, find the equivalent length of each fittings in the IWH loop. In doing this, keep the following in mind:
 - a. In many cases, there will be more than one pipe size in the IWH loop. As long as all piping in the loop exceeds the size shown in Table 5.2, conservative results can be obtained by treating all piping in the loop as though it were of the smallest size.
 - b. The equivalent length of most cast iron boilers can be safely treated as zero. This is often not the case, however, with condensing and water tube boilers. In such cases either use primary-secondary piping (Figure 5.4) or use an alternate method to size the pump and piping.
- 3) After the equivalent length for all fittings has been identified, total them and add the result to the total length of straight pipe in the loop. This sum is the total equivalent length for the IWH loop and must be less than that shown in Table 5.2 in order to use the circulators shown.
- 4) If primary-secondary piping is used as shown in Figure 5.4, calculation of equivalent length is exactly the same as shown above, except that IWH loop is the shaded piping in Figure 5.4 (i.e. the IWH loop does not pass through the boiler).

Example: A 40 gallon IWH is to be installed in the IWH loop piping shown in Figure 5.1 (shaded). The cast iron boiler has a negligible pressure drop. The loop consists of the following pipe and fittings:

<i>Qty</i>	<i>Size</i>	<i>Description</i>
3	1-1/4"	90 Elbow
1	1-1/4"	Turn in Tee
1	1-1/4"	Run of Tee
1	1-1/4"	Air scoop
1	1"	Swing check
5	1"	Elbows
5ft	1-1/4"	Straight pipe
15ft	1"	Straight pipe.

Solution: For simplicity, treat all pipe as though it were 1". Equivalent length is then calculated as follows:

<i>Qty</i>	<i>Description</i>	<i>Equiv. Length/fitting</i>	<i>Total Equiv. Length</i>
8	90 Elbow	2.8ft	22.4ft
1	Air scoop	3ft	3.0ft
1	Turn in tee	5.5ft	5.5ft
1	Swing Check	7.0ft	7.0ft
1	Run of Tee	1.8ft	1.8ft
20ft	Straight Pipe	1.0ft	20.0ft
<i>Grand Total Equivalent Length:</i>			<i>59.7 ft</i>

Since 59.7 is less than the 90ft maximum equivalent length shown in Table 5.2, the planned system will deliver the required flow using either a Taco 007 or Grundfos 15-42F.

TABLE 5.2: SELECT ACCEPTABLE INDIRECT WATER HEATER LOOP CONFIGURATIONS

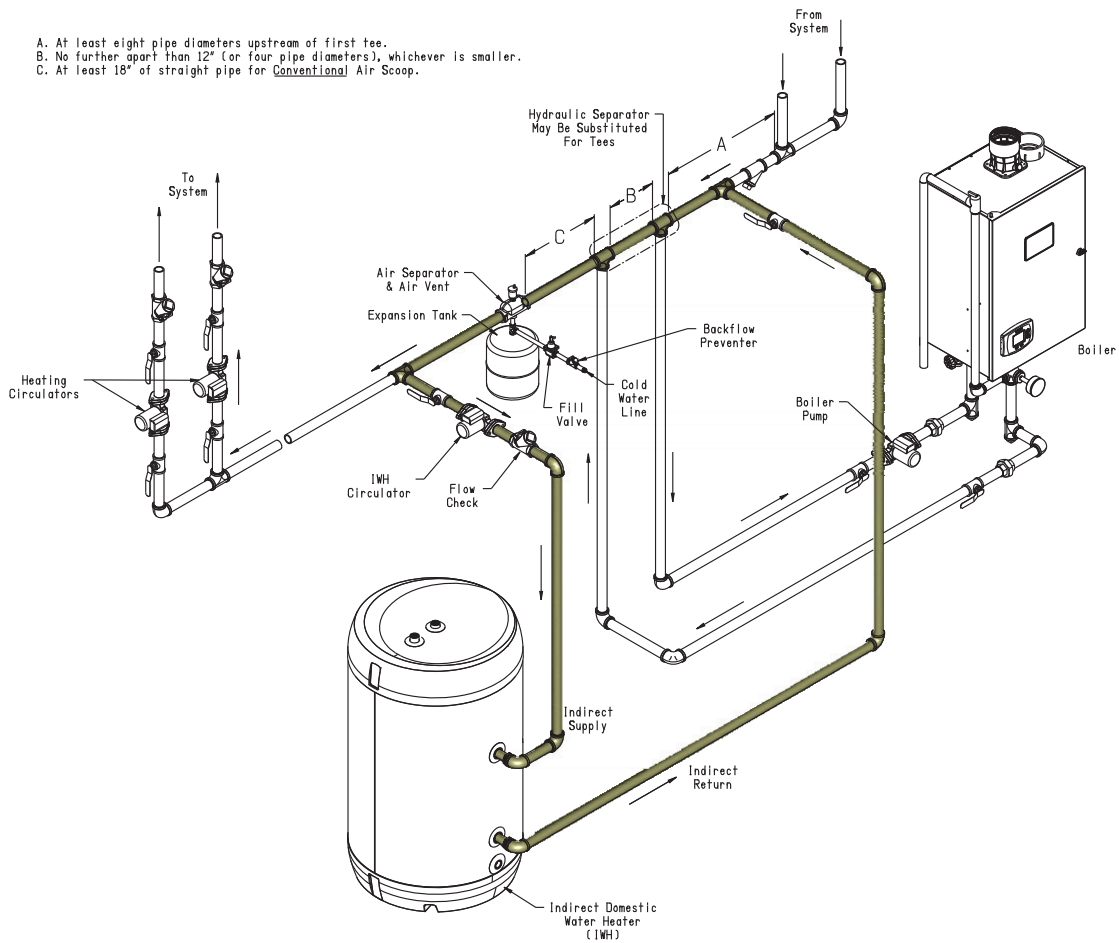
Model	Pipe Size	Max Equiv. Length (ft)	Circulator Model	
			Taco	Grundfos
MS2-030	1"	90	007	15-42F
MS2-040	1"	90	007	15-42F
MS2-050	1"	90	007	15-42F
MS2-075	1"	60	007	15-42F
MS2-075	1"	130	009	26-64F
MS2-119	1-1/4"	30	007	
MS2-119	1-1/4"	90	0010	
MS2-119	1-1/4"	190	0012	26-64F

**TABLE 5.3: EQUIVALENT LENGTHS FOR SELECT VALVES AND FITTINGS
(MAY BE USED FOR COPPER OR THREADED FITTINGS)**

Fitting	Nominal Pipe Size	
	1"	1-1/4"
90° Elbow	2.8	3.8
45° Elbow	1.4	1.9
90° Turn in Tee	5.5	8.0
Run of Tee	1.8	2.5
Gate Valve (Open)	0.7	0.8
Full Port Ball Valve	0.7	0.8
Swing Check Valve	7.0	10.0
Zone Valve (3.5 Cv)	Not Recommended	
Zone Valve (8.0 Cv)	46.1	
Air Scoop	3.0	8.0

FIGURE 5.4: PRIMARY-SECONDARY PIPING OF INDIRECT WATER HEATER

- A. At least eight pipe diameters upstream of first tee.
- B. No further apart than 12" (or four pipe diameters), whichever is smaller.
- C. At least 18" of straight pipe for Conventional Air Scoop.



B) DOMESTIC SIDE PIPING

BASIC DOMESTIC PIPING

Figure 5.6 shows typical domestic water piping. All components except the control are provided by the installer. The function of the components shown are as follows:

- a) Temperature Control (required) - This control is provided by the factory and must be installed in the control well location shown in Figure 2.2. Remove the cover and loosen the clamping screw. Apply the silver heat conductive compound supplied to bulb. Insert the capillary bulb so that it is “bottomed out” in the control well as shown in Figure 5.5 and screw the control clamp securely in the well groove at the end of the well. See Section VI for wiring details and Section VII for instructions on adjusting the temperature setting.
- b) Shut-off valves (recommended) - Use to isolate the indirect water heater (IWH) for servicing.
- c) Backflow Preventer (required by some codes) - Use to prevent water from backing out of the IWH in the event that inlet water pressure drops.
- d) Expansion Tank (required when a backflow preventer is used) - This expansion tank absorbs the increased volume caused by heating water. If a backflow preventer is installed, this expansion tank is required because the increased water volume will otherwise have no place to go and the T&P valve will open. Use an expansion tank designed for use on domestic water systems. Refer to the expansion tank manufacturer’s literature for the proper size expansion tank to use.



CAUTION

If an expansion tank is used, do not put any valves between the expansion tank and Indirect Water Heater inlet.

- e) Unions (optional) - Use to disconnect the IWH in the event that this is necessary.
- f) Drain (Required) - Used to drain the IWH for inspection or servicing. This drain valve is supplied by the installer. For models MS2-030 through MS2-075, install this valve in the cold water supply where it can be used to drain the tank. A dedicated drain valve connection is provided on the MS2-119.
- g) Temperature/Pressure Relief Valve (“T&P Valve” – Required) - Opens to relieve excess pressure or temperature which has developed in the Indirect Water Heater’s storage tank. This valve must comply with Z21.22 *Standard for Relief Valves and Automatic Gas Shut-off Devices for Hot Water Supply Systems* and must meet the following requirements:

Maximum Pressure Setting - 150psi
Maximum Temperature Setting - 210F
Inlet Size ¾” NPT Male.
Temperature Probe Element length (below male thread) 3 – 8 inches.
Minimum CSA capacity – Per Table 5.7

Note that minimum required CSA rating is specified in BTU/hr and depends upon the maximum high limit setting on the boiler. For low pressure steam boiler installations (where boiler water is drawn from below the water line) use the 221 - 250F column.

Pipe this valve as shown in Figure 5.6. Run the discharge pipe to a location where hot water will not cause injury or damage. Leave a 6” gap between the T&P valve pipe termination and the drain or closest obstruction. Do not run the



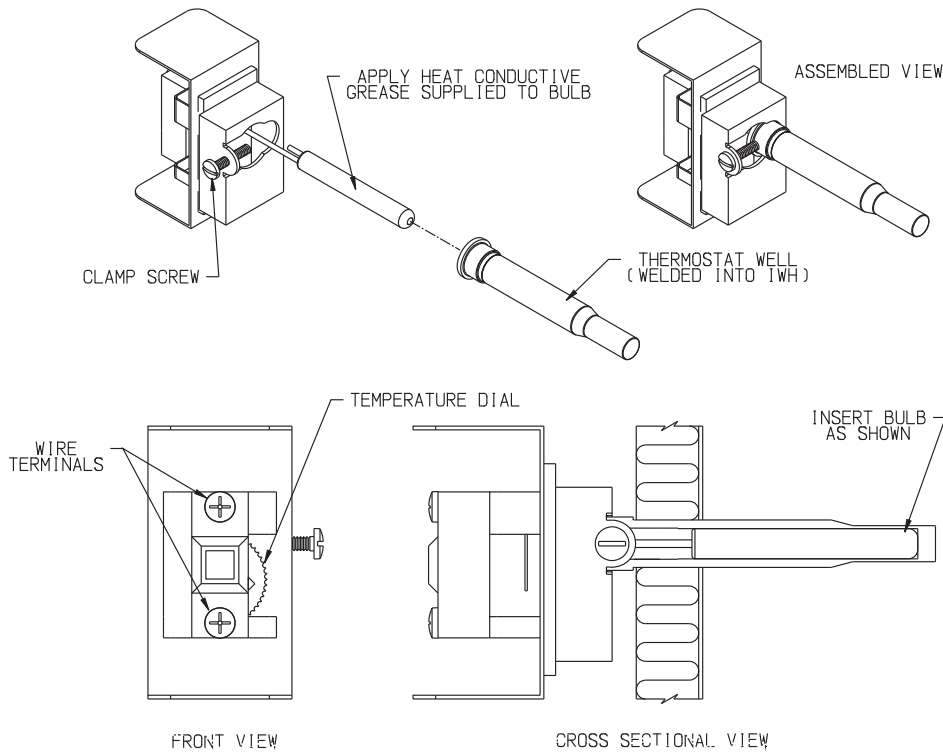
WARNING

Do not put any valves between the relief valve and the tank.

Do not reduce discharge pipe size.

Do not pipe the relief valve to a point where it could be exposed to freezing temperatures or become plugged by debris.

FIGURE 5.5: AQUASTAT INSTALLATION



T&P valve discharge to the outdoors or to other locations where water in this pipe could freeze or become blocked by debris. Make sure all discharge piping is pitched so as to allow complete drainage of any water in the line.

h) Heat Trap (Optional) - The heat trap retards the migration of heat from the IWH up the hot water supply pipe.

i) Vacuum Breaker (Recommended) - This valve protects the IWH in the event that the pressure in the tank falls below atmospheric. Use a Watts N-36 or equivalent.

PIPING WITH A “TEMPERATURE LIMITING VALVE”

Usually, the maximum temperature of the outlet water will stay near the setting of the control. In some cases, however, hot water usage patterns can cause the outlet water temperature to rise significantly above the control setting. The temperature of water going to the fixtures may be more carefully controlled through the use of a thermostatic mixing valve. This device blends a controlled amount of cold water with the hot water leaving the IWH so that water at a more constant temperature exits the mixing valve. Typical thermostatic mixing valve piping is illustrated in Figure 5.8. Consult a licensed plumber or the local plumbing authority for requirements in your area.



WARNING

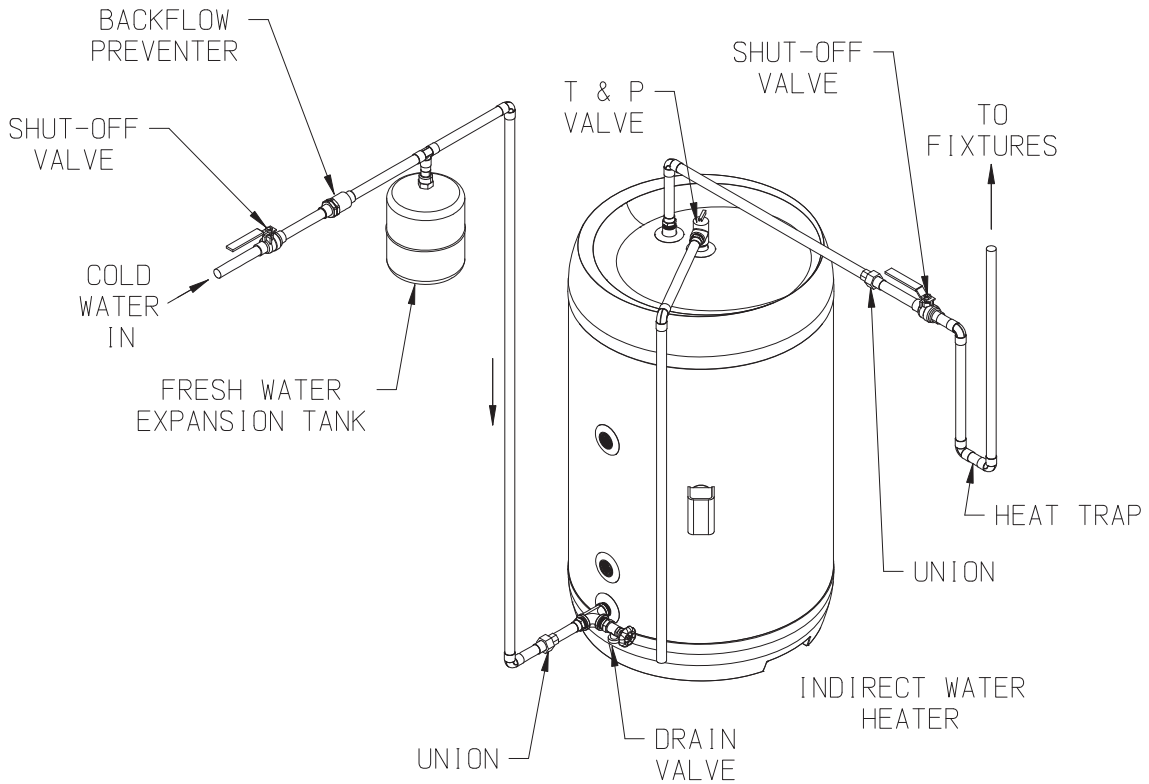
A thermostatic mixing valve does not eliminate the risk of scalding.

Set the thermostat as low as practical.

Feel water before bathing or showering.

If anti-scald or antichill protection is required, use devices specifically designed for such service. Install these devices in accordance with their manufacturer’s instructions.

FIGURE 5.6: BASIC DOMESTIC WATER PIPING



! WARNING

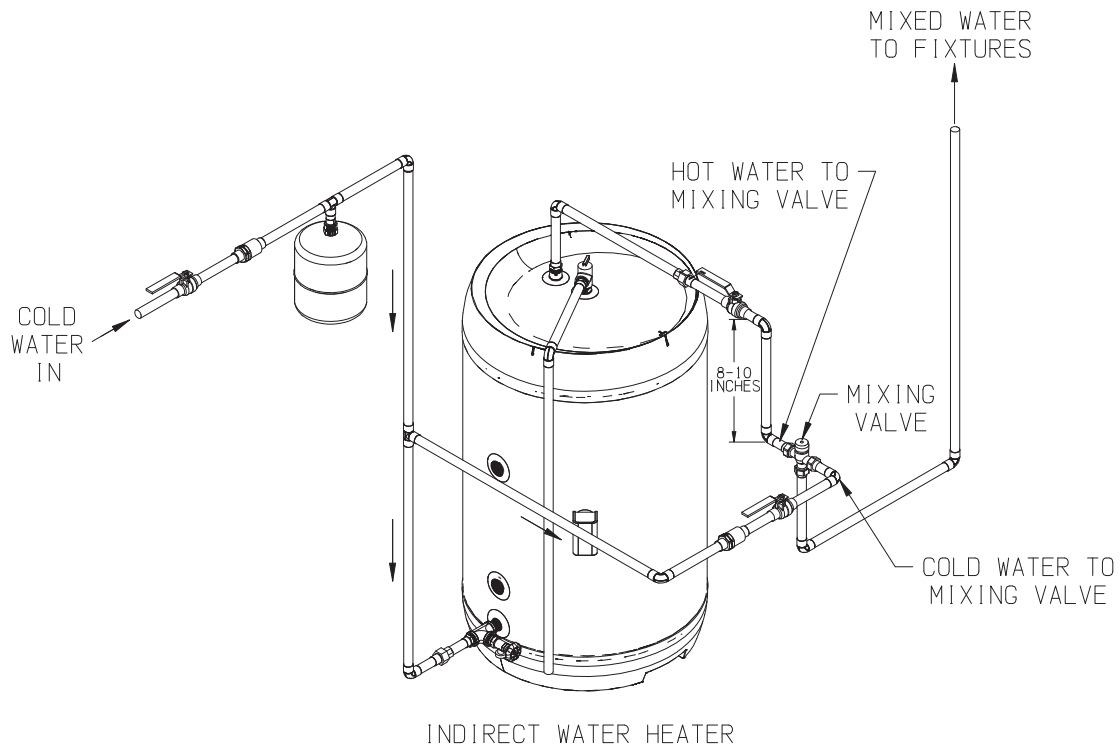
If IWH is replacing a tankless coil, drain tankless coil and leave open to atmosphere. Do not plug coil.

TABLE 5.7: MINIMUM T&P VALVE CAPACITY REQUIREMENTS (BTU/hr)

Model	Max Boiler Water Limit Setting	
	220°F or Less	221° - 250°F
MS2-030	100,000	112,300
MS2-040	100,000	133,700
MS2-050	100,000	156,300
MS2-075	115,000	195,600
MS2-119	199,900	Note 1

1. Not permitted unless the combined output of all boilers connected to this indirect water heater is less than 200,000 BTU/hr. If this condition is met, install a T&P valve having a capacity of 200,000 BTU/hr.
2. Maximum T&P Valve Pressure Setting - 150 psi
3. Maximum T&P Valve Pressure Setting - 210°F

FIGURE 5.8: DOMESTIC HOT WATER PIPING USING A MIXING VALVE



! WARNING

If anti-scald or anti-chill protection is required, use devices specifically designed for such service. Install in accordance with their manufacturer's instructions.

! CAUTION

Do not attempt to use the anode rod tapping to make field connections of any type. Attempts to do so may result in unreliable operation or premature tank failure.

VI. WIRING

The following general notes apply to all wiring:

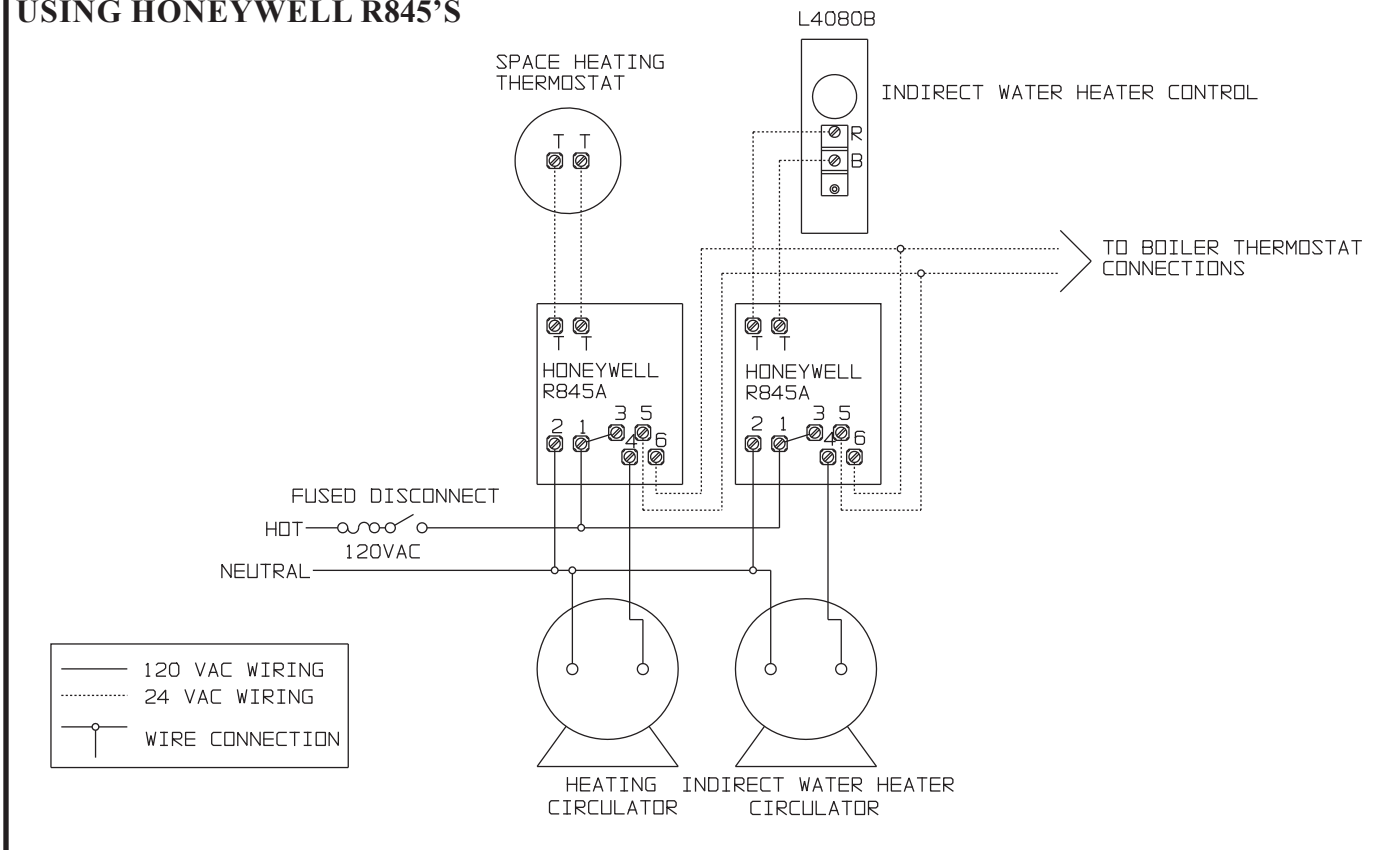
- 1) Wiring must be done in accordance with all codes. In the absence of any codes the system must be wired in accordance with the National Electric Code (ANSI/NFPA 70).
- 2) The indirect water heater (IWH) is equipped with Honeywell a L4080B series temperature control. This control has a set of contacts which make upon a call for domestic water and break when this temperature is satisfied.

A. BASIC CIRCULATOR ZONE WIRING

Figure 6.1 is a connections diagram for a non-priority circulator zone system using Honeywell R845A's. The R845A is equipped with two sets of contacts (3,4 and 5,6) which become made when the T and T terminals are made. Terminals 1 and 2 on the R845A are supplied with 120 VAC to power its internal transformer. In this application one R845A is provided for each zone including that of the IWH.

When any thermostat (including the thermostat on the IWH calls for heat, the relay in the R845A for that zone becomes energized. Terminals 3 and 4 become "made", energizing the circulator. Terminals 5 and 6 are also made which start the boiler.

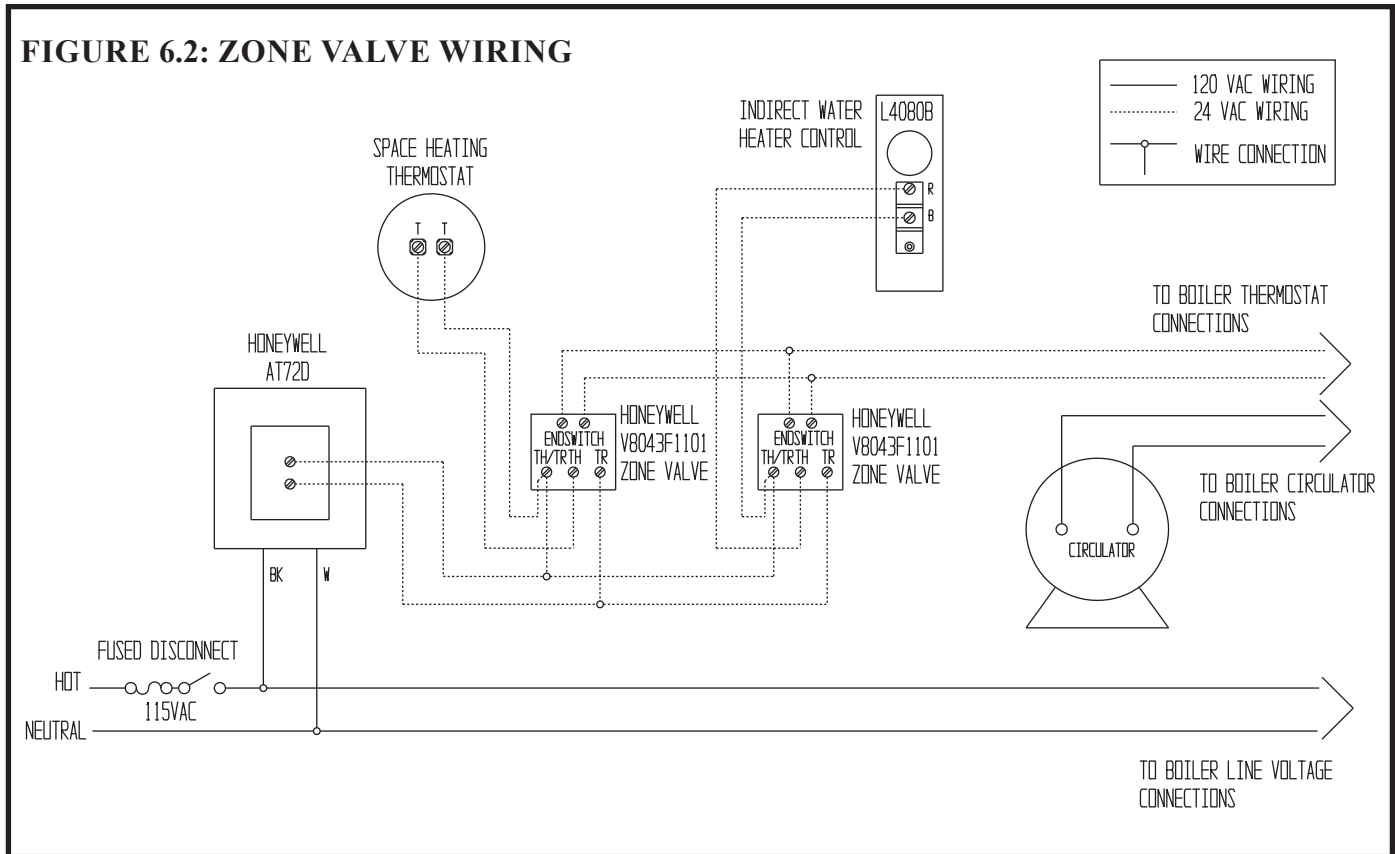
**FIGURE 6.1: CIRC. ZONE WIRING (NON-PRIORITY)
USING HONEYWELL R845'S**



B. ZONE VALVES

Figure 6.2 is a connections diagram for a zone system using Honeywell V8043F motorized zone valves. The motor on these valves is connected between TH and TR. TH/TR is provided for the electrician's convenience as a binding post and is connected to nothing inside the valve. The "end switch" terminals are connected to a set of switch contacts inside the valve which become made when the valve is open.

A call for heat from any thermostat or the IWH aquastat results in the application of 24 volts across the motor in that zone's zone valve. This drives open the zone valve. When the valve has opened, the endswitch in that zone valve makes and brings on the boiler.



C. ZONE PANELS

Consult the zone panel manufacturer's instructions for proper indirect water heater wiring.

WARNING

- Regardless of the control system selected, the L4080B on the indirect water heater must be the only control that will permit boiler water to flow through the indirect water heater.
- Use of other temperature controls in place of the L4080B supplied with this indirect water heater could result in personal injury or death due to scalding.

VII. START-UP AND CHECK-OUT

- 1) Make sure that the system is free of leaks and that air is purged from the system.



DANGER

Never attempt to fill a hot empty boiler



WARNING

Fix any leaks found before proceeding further. Leakage from the boiler piping can result in severe damage to the boiler.

- 2) Many soldering fluxes contain zinc chloride which can cause severe corrosion damage to stainless steel. After completing all domestic water connections, flush the indirect water heater (IWH) thoroughly before leaving the installation. This is particularly important if the IWH will be unused for an extended period of time after installation.
- 3) Make sure that all electrical connections are correctly made and that no exposed high voltage wiring is present.
- 4) Temporarily disable the burner.
- 5) Make sure that each zone valve or circulator operates when, and only when, its thermostat calls for heat. Let each zone operate long enough to purge any remaining air from the system.
- 6) Re-enable the burner and allow the IWH zone to operate. Make sure that the IWH control shuts down the zone when it is satisfied.
- 7) The setting of control determines the maximum water temperature in the tank. The differential of the control is a fixed 8°F with a 150°F maximum setting, set by the manufacturer to the lowest setting of 100°F.

For the most energy efficient operation, adjust the control for the minimum water temperature necessary to meet domestic water needs. Because hot water presents a scald hazard, it is best to set the control at 120°F or lower and raise it only if necessary to provide adequate hot water. See Table 7.2 for more information about scalding.

- a) Adjust the dial shown in Figure 7.1 until the desired temperature setting on the dial is aligned with the arrow shown.
- b) After the IWH completes a heat-up cycle, check the water temperature at the faucet. Allow enough water to flow to ensure that the water temperature reflects the tank temperature. Adjust the IWH temperature setting as necessary.
 - i) Adjusting to a lower temperature setting will not immediately affect the water temperature. Draw sufficient water or allow the water heater to sit until a heat-up cycle is initiated. Repeat steps a) and b).
 - ii) Adjusting to a higher temperature setting may not immediately affect the water temperature if a heat-up cycle begins, return to steps a) and b). If a heat-up cycle does not begin, draw sufficient water or allow the water heater to sit until a heat-up cycle is initiated. Repeat steps a) and b).

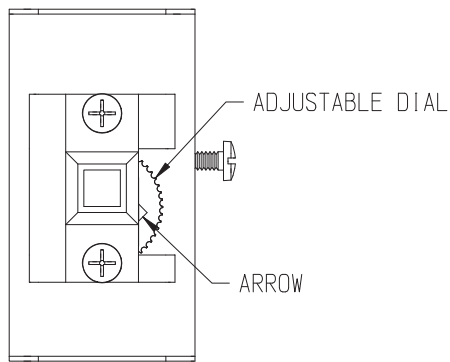


FIGURE 7.1: TEMPERATURE CONTROL

APPROXIMATE TIME/TEMPERATURE RELATIONSHIPS FOR SCALDING	
120°F	More than 5 minutes
125°F	1-1/2 to 2 minutes
130°F	About 30 seconds
135°F	About 10 seconds
140°F	Less than 5 seconds
145°F	Less than 3 seconds
150°F	About 1-1/2 seconds
155°F	About 1 second

TABLE 7.2: SCALD RISK

VIII. MAINTENANCE

This indirect water heater (IWH) is an extremely simple device and as such requires very little maintenance. There are, however, several items which should be checked out on an annual or as needed basis to ensure a safe reliable supply of hot water:

* If the indirect water heater is equipped with an anode rod, inspect the rod on an annual basis and replace if necessary. This anode rod is located above the boiler supply on the MS2-030 and above the thermostat on the MS2-040 thru MS2-075 as shown in Figure 2.2. To inspect it, drain the tank and then unscrew the rod. When new, it is approximately 3/4" in diameter and 19" long. If it has lost more than half of its original size, or if the aluminum portion of the rod is no longer securely bonded to the brass nut, replace the rod.



WARNING

The water in the tank is normally hot and under pressure. It may cause scald injuries if the anode rod is loosened without removing pressure and draining the tank. Anode inspection and replacement should only be attempted by a professional plumber or HVAC technician.

NOTICE

- **Failure to inspect/replace the anode rod as prescribed above may cause premature failure of the indirect water heater, which is not covered under warranty.**
- **The tapping for the anode rod is 3/4" "G" thread, which relies on an "O"-ring for sealing. Use only the anode rod shown in Parts section of this manual as a replacement. Do not apply Teflon tape, or other sealants, to the anode rod threads.**

* Verify proper operation of the L4080B control.

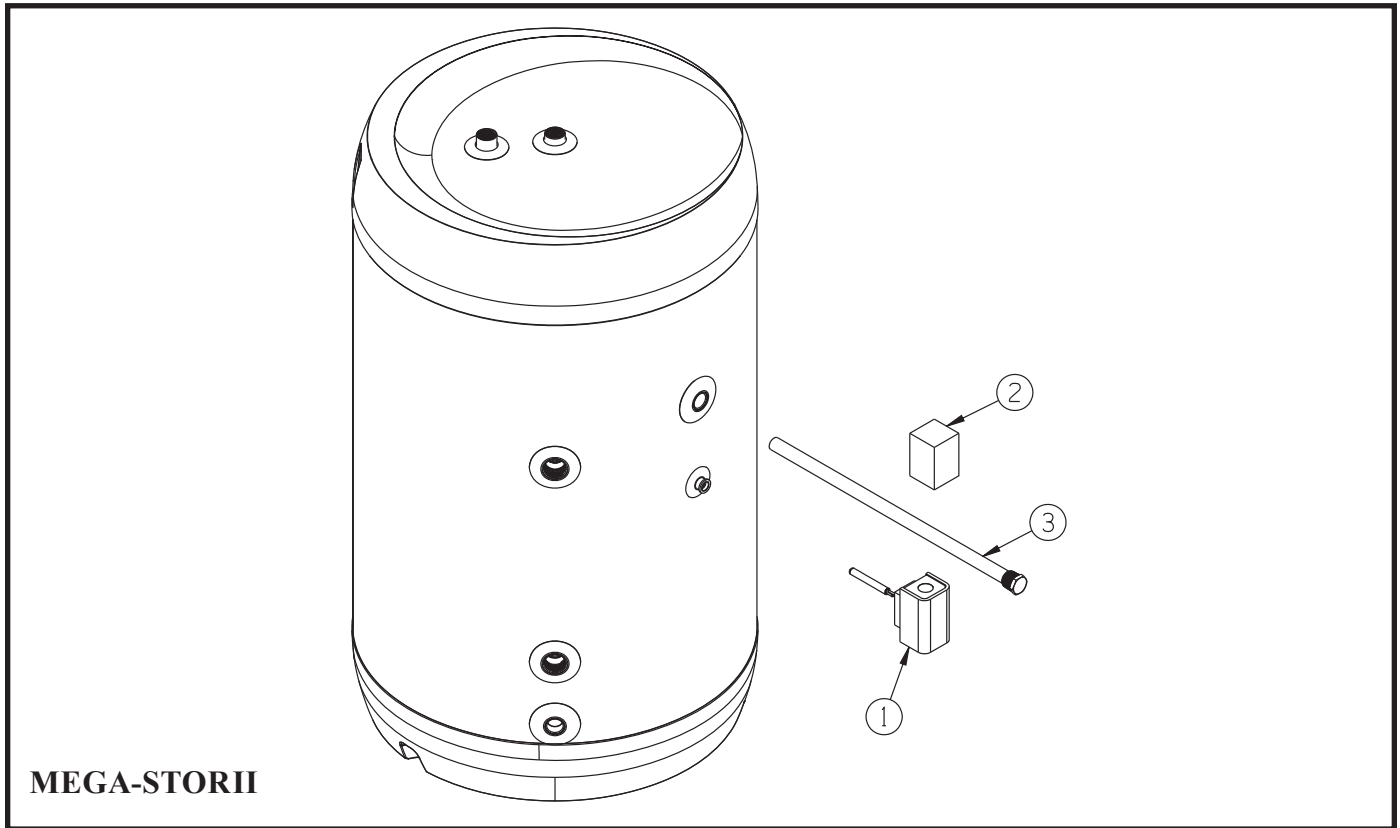
* Make sure the boiler and domestic water piping is free of leaks.

* If there is an oil lubricated circulator in the system, make sure that it is lubricated as called for by the circulator manufacturer.

* The IWH depends upon the boiler for a source of heat and is therefore only as reliable as the boiler. Make sure that the boiler is maintained in accordance with the boiler manufacturer's instructions.

* If a water treatment system is required to keep the water chemistry within the parameters shown in page 7, make sure that this system is properly maintained.

IX. PARTS



<u>Key #</u>	<u>Part #</u>	<u>Description</u>	<u>Qty./Tank</u>
1	3503405	Thermostat (L4080B1352)	1
2	350085	Heat conductive grease, 1/2 oz.	1
3	220400	Anode Rod Kit (MS2-030 thru MS2-075 only)	1

APPENDIX A. SIZING

NOTICE

The following procedures are used to size indirect water heaters based on the amount of hot water which will be required during a given hour. In doing so it is assumed that this demand will be evenly spread out over the course of the entire hour.

THESE SIZING PROCEDURES ARE PROVIDED AS A GUIDE TO ASSIST THE PROFESSIONAL INSTALLER IN SIZING INDIRECT WATER HEATERS. BECAUSE OF THE LARGE VARIETY OF DEMAND SITUATIONS ENCOUNTERED IN THE FIELD, THE SUITABILITY OF THESE PROCEDURES TO ALL INSTALLATIONS CANNOT BE GUARANTEED.

Residential Applications

Table A.1 shows the minimum sized indirect water heater (IWH) that should be considered for one and two family homes based on the numbers of bedrooms and bathrooms being served. In cases where the boiler is sized significantly larger than that shown in column (e) in order to meet space heating demand, there is usually no need to add boiler capacity just for the IWH. Note that the sizing recommendations shown in Table A.1 may not provide satisfactory performance when there are unusually high peak demands, such as when multiple showers are used simultaneously or when a hot tub is filled. To address these cases, review Tables A.2 and A.3 and make adjustments to IWH model and/or boiler size, to make sure that the peak demand can be satisfied. For hot tubs, it is recommended that the IWH model have a domestic water volume at least as large as the nominal volume of the tub.

Commercial Applications

Use a fixture count method to determine the domestic hot water demand, such as that shown in the Service Water Heating chapter of the *ASHRAE Applications Handbook*. Then use the data provided in Tables 2.1, A.2, and A.3 to select the boiler and IWH.

Table A.1: Indirect Water Heater Sizing for Typical One and Two Family Units

(a)	(b)	(c)	(d)	(e)
Number of Bathrooms	Number of Bedrooms	Model	First Hour Requirement (GPH)	Min. Boiler Output (MBH)
1 to 1 1/2	1	MS2-030	43	27
	2	MS2-040	60	36
	3	MS2-040	60	36
2 to 2 1/2	2	MS2-040	60	36
	3	MS2-040	70	36
	4	MS2-040	72	38
	5	MS2-050	90	50
3 to 3 1/2	3	MS2-050	72	50
	4	MS2-050	82	50
	5	MS2-050	90	50
	6	MS2-050	92	50

**Table 3.2: Maximum Possible Continuous Draw
(180F Boiler Supply, 77F DHW Rise, 135F Outlet)**

(a)	(b)	(c)
Model	Continuous Draw (Gal/min)	Min Boiler Output (MBH)
MS2-030	2.3	87
MS2-040	2.7	101
MS2-050	3.2	121
MS2-075	3.9	150
MS2-119	6.9	264

Table 3.3: AHRI First Draw Rating*

(a)	(b)	(c)
Model	Draw Rate (GPM)	First Draw Rating (Gal)
MS2-030	2.3	23
MS2-040	2.7	31
MS2-050	3.2	44
MS2-075	3.9	69
MS2-119	6.9	81

* First Draw Rating is the amount of stored water available from a fully recovered indirect water heater, with no boiler output during the draw, before the outlet temperature falls by 25F. At draw rates higher than that shown in column (b), less stored hot water may be available.

CONSUMER WARRANTY INFORMATION
MEGA-STOR2: STAINLESS STEEL INDIRECT WATER HEATER

By this warranty statement Velocity Boiler Works, LLC of Philadelphia, Pennsylvania issues a limited warranty subject to the terms and conditions stated below. This limited warranty applies to the stainless steel indirect-fired water heater series labeled MEGA-STOR2.

LIMITED ONE YEAR WARRANTY ON ALL MEGA-STOR2 COMPONENT PARTS MANUFACTURED BY OTHERS:

Velocity Boiler Works, LLC warrants that its indirect-fired water heater labeled MEGA-STOR2 to be free from defects in material and workmanship, under normal usage, for a period of one year from the date of original installation. In the event that any part of such a water heater is found to be defective in material or workmanship during this one year period, Velocity Boiler Works, LLC will repair or replace, at its option, the defective component parts (consisting of the Honeywell Aquastat).

LIMITED WARRANTY ON MEGA-STOR2 TANK ASSEMBLY – INITIAL COVERAGE (Residential Use Only):

Velocity Boiler Works, LLC further warrants that the stainless steel tank and stainless steel coil shall be free of leaks during normal use and service for an eight(8) year period from date of manufacture. Residential use is defined as a single or two-family residence. In the event that any part of such a water heater is found to be defective in material or workmanship during this eight(8) year period, Velocity Boiler Works, LLC will repair or replace, at its option, the water heater.

LIMITED LIFETIME ON MEGA-STOR2 TANK ASSEMBLY - EXTENDED COVERAGE (Residential Use Only):

Velocity Boiler Works, LLC further warrants that the stainless steel tank and stainless steel coil shall be free of leaks during normal use and service for the remaining lifetime of the water heater. In the event that any part of such a water heater is found to be defective in material or workmanship during this extended period, Velocity Boiler Works, LLC will repair or replace, at its option, the water heater. *This extended warranty coverage is only available to the original owner of the indirect fired water heater, in its original installation location. This extended warranty coverage is non-transferable. If at the time of request for extended coverage, the original consumer/purchaser cannot provide a copy of the on-line warranty registration receipt, the warranty period shall revert to the "initial coverage" of eight (8) years from the date of manufacture. Product must be registered within 90 days of installation to acquire the Limited lifetime coverage.*

LIMITED WARRANTY ON MEGA-STOR2 TANK ASSEMBLY (Commercial Use Only):

Velocity Boiler Works, LLC. further warrants that the stainless steel tank and stainless steel coil shall be free of leaks during normal use and service for a period of five(5) years from date of installation when installed in commercial buildings, multiple family dwellings (other than single or two-family), or institutional applications. In the event that any part of such a water heater is found to be defective in material or workmanship during this five (5) year period, Velocity Boiler Works, LLC will repair or replace, at its option, the water heater.

It is expressly agreed between Velocity Boiler Works, LLC and the original consumer/purchaser that repair or replacement are the exclusive remedies of the original consumer/purchaser.

THIS WARRANTY DOES NOT COVER:

- Any component parts that are part of the indirect-fired water heater system but not furnished by Velocity Boiler Works, LLC as part of the residential indirect-fired water heater.
- This warranty does not cover expenses for removal or reinstallation. The homeowner will be responsible for the cost of removing and reinstalling the alleged defective part or its replacement and all labor and material connected therewith, and transportation to and from Velocity Boiler Works, LLC
- This warranty cannot be considered as a guarantee of workmanship of an installer connected with the installation of the Velocity Boiler Works, LLC indirect-fired water heater, or as imposing on Velocity Boiler Works, LLC liability of any nature for unsatisfactory performance as a result of faulty workmanship in the installation, which liability is expressly disclaimed.
- Any indirect-fired water heater operated at water temperatures over 150°F and water pressure over 150 P.S.I.
- Any failure or malfunction resulting from improper or negligent operation, accident or abuse (including freezing).
- Any failure or malfunction resulting from failure to keep the tank full of potable water, free to circulate at all times and with the tank free of damaging sediment.
- Any indirect-fired water heater that is used for non-potable applications such as pool or process heating.
- Any indirect-fired water heater that is installed in a residence containing any type of water softener system that is not installed and maintained in accordance with the manufacturer's specifications.
- Any indirect-fired water heater that has potable water with the following characteristics: chloride levels in excess of 80 PPM, measurable amounts of any compound containing chlorine, or PH less than 6.0 or greater than 8.0.
- Any failure or malfunction resulting from lack of maintenance in accordance with the Installation and Operating Instructions.

This warranty is subject to the condition that the residential indirect-fired water heater must have been installed by a heating contractor whose principal occupation is the sale and installation of plumbing, heating and / or air conditioning equipment.

IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY SHALL BE LIMITED TO THE DURATION OF THE EXPRESS WARRANTY. VELOCITY BOILER WORKS, LLC EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY.

In order to obtain warranty service under this warranty, the consumer must notify the installer, who in turn, will notify the Velocity Boiler Works, LLC distributor. If this action does not result in warranty service, the homeowner or installer should write to Velocity Boiler Works, LLC at 3633 "I" Street, Philadelphia, PA 19134 giving full details in support of the claim.

VELOCITY BOILER WORKS, LLC

Customer Services Dept. 3633 "I" St., Philadelphia, PA 19134

MS2 2-13-18

IMPORTANT: LIMITED LIFETIME WARRANTY Coverage "Extended Coverage" only available with registration of your product within 90 days of installation at www.VelocityBoilerWorks.com