

PLUS Line

Indirect-Fired Water Heaters Series 3

Manual

- Installation
- Maintenance
- Startup
- Parts

PLUS 100/110/119

GOLD PLUS 30/40/60/80

Ultra PLUS 40/60/80



WARNING

This manual must only be used by a qualified heating installer/service technician. **Before installing**, read all instructions, including this manual and any related manuals or supplements. Perform steps in the order given. Failure to comply could result in severe personal injury, death or substantial property damage.

NOTICE

User — Read important user safety information found on pages 2, 18, 19 and 20. Installation and service should only be performed by a qualified service technician. Retain this manual for future reference.



Read this page first

Hazard definitions

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

DANGER

Indicates presence of hazards that will cause severe personal injury, death or substantial property damage.

WARNING

Indicates presence of hazards that can cause severe personal injury, death or substantial property damage.

CAUTION

Indicates presence of hazards that will or can cause minor personal injury or property damage.

NOTICE

Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury or property damage.

WARNING

Read all instructions before installing. Failure to follow all instructions in proper order can cause severe personal injury, death or substantial property damage.

WARNING

Studies have indicated that dangerous bacteria, including legionella pneumophila, can form in the potable water distribution system if certain minimum water temperatures are not maintained. Contact your local health department for more information.



Hot Water Can Scald!

- Water heated to temperature for clothes washing, dish washing and other sanitizing needs can scald and cause permanent injury.
- Children, elderly, and infirm or physically handicapped persons are more likely to be permanently injured by hot water. Never leave them unattended in bathtub or shower. Never allow small children to use a hot water tap or draw their own bath.
 - If anyone using hot water in the building fits the above description, or if state laws or local codes require certain water temperatures at hot water taps, you must take special precautions:
 - Use lowest possible temperature setting.
 - Install some type of tempering device, such as an automatic mixing valve, at hot water tap or water heater. Automatic mixing valve must be selected and installed according to valve manufacturer's recommendations and instructions.
- Water passing out of drain valves may be extremely hot. To avoid injury:
 - Make sure all connections are tight.
 - Direct water flow away from any person.

Protection Must Be Taken Against Excessive Temperature and Pressure!
 — Installation of a Temperature & Pressure (T&P) relief valve is required.



Contents

Overview

This manual contains six sections, A through F.

Sections A, E and F apply to **ALL** GOLD Plus 30, 40, 60 or 80; *Ultra* PLUS 40, 60, or 80; and PLUS 100, 110, or 119 water heater installations, regardless of the boiler used. Section **A** gives guidelines for domestic water connections to the water heater. Section **E** lists replacement parts. Section **F** includes water heater dimensions and ratings.

Section B provides boiler-side piping, wiring and start-up information for installations with *Ultra* **Gas-fired boilers only**. Notice that ALL *Ultra* Gas-fired boiler installations require primary/secondary piping, as shown in Part B.

Sections C and D provide boiler-side piping and wiring information for installations with **all boilers except *Ultra* Gas**.

A. GENERAL INSTALLATION (ALL WATER HEATERS)	6
A1. Pre-installation	
Codes	6
Location	6
Recommended clearances.....	6
Operating restrictions.....	7
Code restrictions	7
A2. Water heater piping	
Temperature & pressure relief valve	8
Air vent.....	8
Piping drawings and drain valve information	9-12
Thermal expansion.....	13
Water hammer.....	13
General piping information	13
Domestic water piping	14
Boiler water.....	14
A3. Water heater wiring	
Water heater thermostat connection.....	15
A4. Water heater start-up	
Filling the inner (domestic water) tank	16
Filling the outer (boiler water) tank.....	16
Start-up checklist.....	17
A5. Adjusting water heater temperature	
Safety warning and General notes	18
Setting the thermostat — GOLD Plus 30/40/60/80 or <i>Ultra</i> Plus 40/60/80.....	19
Setting the thermostat — PLUS 100/110/119.....	19
A6. Water heater maintenance	
Maintenance schedule — Annual service by qualified technician.....	20
Maintenance schedule — Homeowner’s monthly maintenance	20
Filling.....	21
Draining.....	21
Draining inner (domestic water) tank	21
Draining outer (boiler water) tank.....	21
A7. Recirculation and heat tracing	
Maintaining domestic water temperature in the supply piping	22
Time delay at fixtures.....	22

(continued on next page)



Contents *continued*

Balancing	22
Components required	22
Connecting to the water heater	22
B. <i>Ultra</i> GAS-FIRED BOILER APPLICATIONS	24
B1. Install system water piping (space heating)	
System water piping methods.....	25
Boiler circulator	25
Sizing space heating system piping	25
Zoning with zone valves.....	26
Zoning with circulators.....	27
B2. Install boiler-to-water heater piping	
Combined space heating/water heating applications.....	28
Dedicated water heating-only applications.....	28
B3. Field wiring — <i>Ultra</i> Gas-fired boilers only	
Installation must comply with:.....	30
Line voltage connections	30
Wiring boiler circulator.....	30
Wiring water heater circulator	30
Wiring a system circulator	31
Routing line voltage wiring	31
Low voltage connections	31
Room thermostat (space heating)	31
Outdoor temperature sensor	31
Water heater thermostat	31
Additional limits.....	31
B4. Start-up — <i>Ultra</i> Gas-fired boilers only	
Follow boiler manual.....	33
Set space heating operation	33
Water heater operation	33
Water heater operation setup	33
Verify space heating operation	33
Verify water heater operation	34
Operating information.....	34
Replace boiler jacket front door.....	34
C. BOILER PIPING (EXCEPT <i>Ultra</i> GAS)	35
Zoning with pumps	
GOLD Plus 30/40/60/80 or <i>Ultra</i> Plus 40/60/80	
Two-pipe system piping — Figure 20.....	36
Primary/secondary piping — Figure 21.....	37
PLUS 100/110/119	
Primary/secondary piping — Figure 22.....	38
Zoning with zone valves	
Figure 23 (All water heater models)	39
Dedicated boiler applications	
GOLD Plus 30/40/60/80 or <i>Ultra</i> Plus 40/60/80	
Figure 24	40

(continued on next page)



Contents *continued*

PLUS 100/110/119	
Figure 25	41
Multiple water heater applications	
Multiple water heaters – water heater piping — Figures 26/27.....	42
Boiler water piping for multiple water heaters — Figure 28.....	43
Steam boiler applications	
Connecting water heater to steam boiler	44
Installation and start-up of water heaters connected to steam boilers.....	44
Steam boiler application piping and wiring (Figure 29).....	45
D. BOILER-SIDE WIRING & CONTROLS (EXCEPT <i>Ultra</i> GAS) ...	46
Wiring requirements	47
Wiring requirements — Circulators	47
Wiring requirements — Zone Valves.....	47
Boiler models requiring domestic priority with GOLD Plus 30	47
Zoning with pumps:	
Zoning with Weil-McLain circulator zone controller (WMCR)	
• Weil-McLain circulator zone controller (Figure 30)	48
Other options for for zoning with pumps	
• Using priority zone pump (Figure 31).....	49
• Using pump relays • Domestic priority with priority relay (Figure 32).....	50
• Using pump relays • No domestic priority (Figure 33)	51
• Pump relays • Priority with 3-way valve & priority relay (Figure 42)	60
Zoning with zone valves:	
Zoning with Weil-McLain zone valve controller (WMZV)	
• Domestic priority optional (controller switch) (Figure 34).....	52
Zoning with 4-wire zone valves	
• No domestic priority (Figure 35).....	53
• With or without domestic priority • Models 30/40/60/80 (Figure 37)	55
• With domestic priority • PLUS 100/110/119 (Figure 39)	57
• With priority using 2-way priority valve • PLUS 100/110/119 (Figure 40)	58
Zoning with 3-wire zone valves	
• No domestic priority (Figure 36).....	54
• With or without domestic priority • Models 30/40/60/80 (Figure 38)	56
• With domestic priority • PLUS 100/110/119 (Figure 39)	57
• With domestic priority using 2-way priority valve (Figure 41)	59
E. REPLACEMENT PARTS	61
GOLD Plus 30/40/60/80 or <i>Ultra</i> PLUS 40/60/80	62-63
PLUS 100/110/119	64-65
F. WATER HEATER DIMENSIONS & PERFORMANCE RATINGS	
Dimensions	66
Performance ratings	67
Warranty	68



A1 Pre-installation

Codes

Installation must conform with instructions in this manual and, where applicable:

- local, state, provincial, and national codes, laws, regulations and ordinances.
- in Canada — B149.1 or B149.2 Installation Code.

PLUS water heaters are exempt from ASME Section VIII, Division 1 Code construction per Interpretation VIII-1-86-136. Check with local codes for applicability.

Where recommendations in this manual differ from local or national codes, local or national codes take precedence.

Location

This water heater is not intended for outdoor installation.

Select a convenient location for water heater, based on domestic and boiler piping hook-ups.

Keeping the distance between boiler and water heater short will:

- reduce piping heat loss.
- provide minimum friction loss.

Install water heater so if tank or any connections should leak, the water flow will not cause damage to area near water heater, or to lower floors of structure. When such locations cannot be avoided, install a suitable drain pan under water heater. Drain pans are available at your local plumbing supply store.

This product is designed for vertical installation only.

Recommended clearances

Installation location must provide adequate clearances for servicing and proper operation of the water heater.

GOLD Plus 30/40/60/80 or Ultra Plus 40/60/80 (see Figure 1)

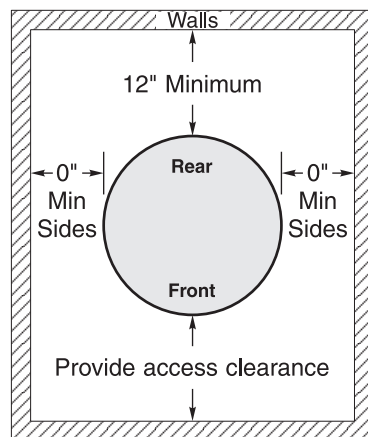
- Zero clearance is permissible to either side of water heater, but Instruction label or other labels may be hidden.
- Top (vertical) clearance is 12" minimum.
- Refer to boiler manual for boiler clearances.

PLUS 100/110/119 (see Figure 1)

- Zero clearance is permissible to either side of the water heater, but Instruction label or other labels may be hidden.
- Top (vertical) clearance is 12" minimum.
- Refer to boiler manual for boiler clearances.

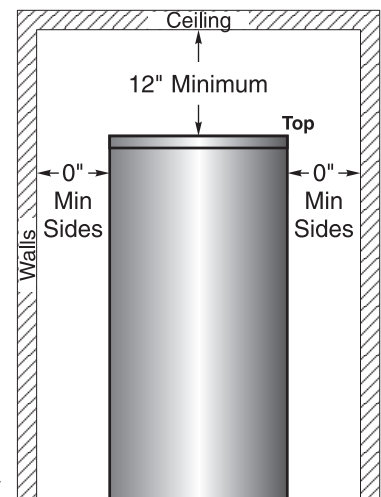
Figure 1

Clearance recommendations



6406-01

Top View



Front View



A1 Pre-installation *continued*

Operating restrictions

- Maximum domestic hot water temperature (**Use only for special high-temperature operational requirements**):
 - 160°F for GOLD Plus 30/40/60/80 or *Ultra* Plus 40/60/80.
 - 190°F for PLUS 100/110/119.
- Maximum boiler water temperature — 210°F.
- Maximum working pressure for inner (domestic water) tank — 150 psig.
- Maximum working pressure for outer (boiler water) tank — 45 psig.
- pH and chloride limits for water heaters are:
 - chloride — less than 80 mg/l.
 - pH — above 6 and less than 8.

Code restrictions

National Standard Plumbing Code

Single wall heat exchanger in water heater complies with National Standard Plumbing Code, provided that:

- boiler water (including additives) is practically non-toxic, having toxicity rating or class of 1, as listed in Clinical Toxicology of Commercial Products, and
- boiler water pressure is limited to maximum 30 psig by approved relief valve.

Uniform Plumbing Code

Single-wall heat exchangers are permitted if they satisfy all of the following requirements —

1. The heat transfer medium is potable water or contains only substances which are recognized as safe by the U. S. Food and Drug Administration.
2. The pressure of the heat transfer medium is maintained less than the normal minimum operating pressure of the potable water system.
Exception: Steam complying with #1, above.
3. The equipment is permanently labeled to indicate that only additives recognized as safe by the FDA shall be used in the heat transfer medium.

Other heat exchanger designs may be permitted where approved by the Administrative Authority.



A2 Water heater piping

Temperature & pressure (T & P) relief valve

CAUTION

To reduce risk of excessive pressures and temperatures in water heater, install temperature and pressure protective equipment required by local codes, but no less than a combination temperature and pressure relief valve certified by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials, as meeting the requirements for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems, ANSI Z21.22. This valve must be marked with a maximum working pressure of the water heater.

1. Size T&P relief valve by the following specifications, unless they conflict with local codes:
 - GOLD Plus 30/40/60/80 or *Ultra* Plus 40/60/80: 3/4” NPT with an AGA Rating of 100,000 BTU/hr, with a long element. Set to relieve at 150 psi. (Watts model 100XL-8 relief valve or equivalent.)
 - PLUS 100/110/119: 3/4” NPT with an AGA Rating of 200,000 BTU/hr, with a long element. Set to relieve at 150 psi. (Watts model 40XL-8 relief valve or equivalent.)

GOLD Plus, *Ultra* Plus and PLUS water heaters are exempt from ASME Section VIII per **Interpretation VIII-1-86-136**. Consult local codes for applicability.
2. Installing T&P relief valve –
 - GOLD Plus 30/40/60/80 or *Ultra* Plus 40/60/80 (Page 9)
 - Install T&P relief valve either:
 - a. in tapping marked **AUX**.
 - b. in run (straight through leg) of tee located at domestic hot water outlet of water heater. (Required for the Commonwealth of Massachusetts.) Use a long element T&P relief valve.
 - PLUS 100/110/119 (Page 11)
 - Install T&P relief valve either:
 - a. in tapping marked **AUX**.
 - b. in run (straight through leg) of tee located at domestic hot water outlet of water heater. (Required for the Commonwealth of Massachusetts.) Use a long element T&P relief valve.
 - 3. T&P relief valve discharge piping must be:
 - made of material serviceable for temperatures of 250°F or greater.
 - directed so that hot water flows away from all persons.
 - directed to a suitable place for disposal.
 - installed so as to allow complete draining of the T&P relief valve and discharge line.

T&P relief valve discharge piping must not be:

 - excessively long. Using more than 2 elbows or 15 feet of piping can reduce discharge capacity.
 - directly connected to a drain. Terminate discharge piping within 6” from floor. Refer to local codes.
 - plugged, reduced or restricted.

WARNING

Do not install any valve between T&P relief valve and tank connection, or on T&P relief valve discharge piping. Do not plug T&P relief valve or discharge piping. Improper placement and piping of T&P relief valve can cause severe personal injury, death or substantial property damage.

Air vent

WARNING

The boiler-side piping must be equipped with a diaphragm- or bladder-type expansion tank, NOT a closed-type expansion tank.

1. Remove plastic shipping cap from 1/2” NPT pipe fitting on top of water heater.
2. Install automatic air vent provided with water heater, using suitable pipe dope or tape.
3. Unscrew vent cap on air vent one full turn. Leave cap unscrewed one turn for normal venting.



A2 Water heater piping *continued*

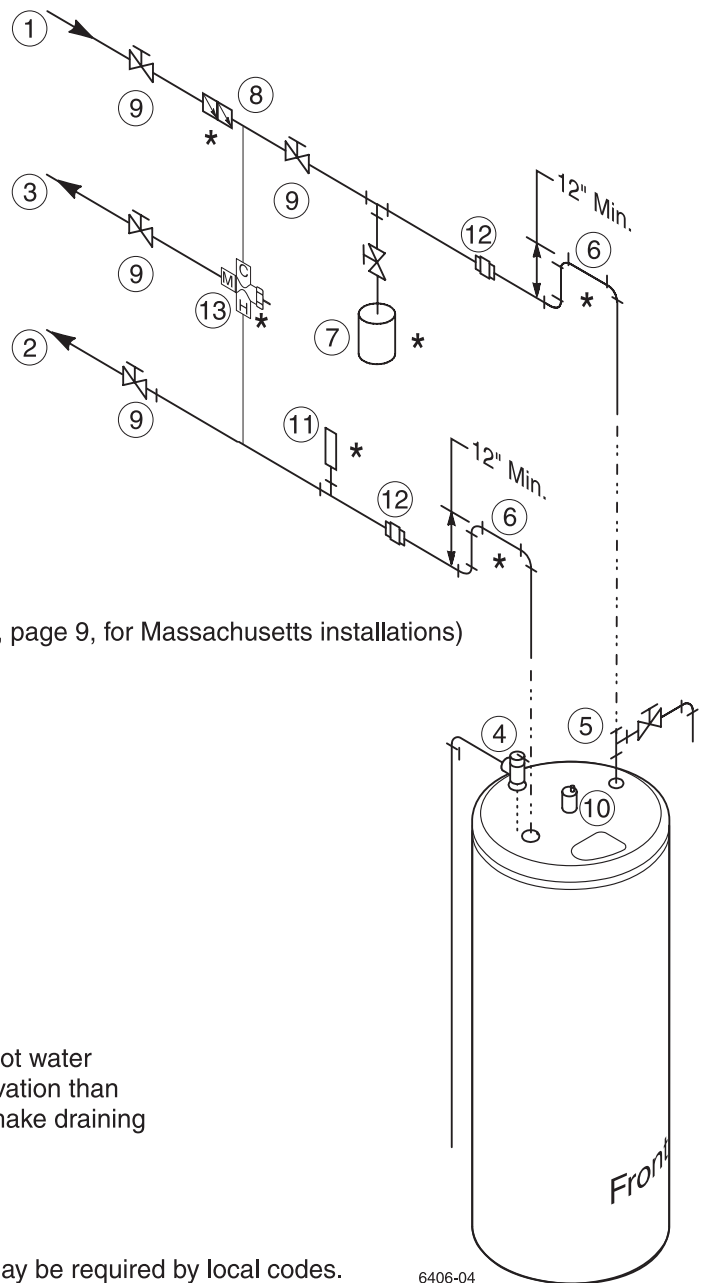
Figure 2
Piping — **OPTION 1**
GOLD Plus 30/40/60/80 or
Ultra Plus 40/60/80
(See Figure 3, page 10, for Option 2,
required for Massachusetts)

WARNING

An expansion tank may be required on the DHW piping. See Thermal expansion **WARNING** on page 13. Failure to comply could result in severe personal injury, death or substantial property damage.

- ① Cold water inlet
- ② Hot water outlet
- ③ Mixed water outlet
- ④ T & P relief valve (with long element)
- ⑤ Drain valve & brass tee (see Option 2, page 9, for Massachusetts installations)
- ⑥ Heat trap loop (12" minimum) *
- ⑦ Expansion tank (see page 12) *
- ⑧ Backflow preventer *
- ⑨ Shutoff valve, 3/4" NPT
- ⑩ Automatic air vent
- ⑪ Shock arrester *
- ⑫ Union, 3/4" NPT - Union on domestic hot water outlet should be piped at a higher elevation than domestic water drain valve. This will make draining water heater easier.
- ⑬ Mixing valve *

* Optional items shown with an asterisk may be required by local codes.



6406-04

NOTICE

When the water supply pressure is higher than 70 psig, install a pressure-reducing valve on the cold water supply line to prevent leakage from the T & P relief valve.

Drain valve
GOLD Plus 30/40/60/80
Option 1

Apply the following and Figure 2 to water heaters other than those installed in Massachusetts. For Commonwealth of Massachusetts installations, see Option 2, Figure 3, page 9.

1. Install the 3/4" NPT brass tee (supplied with water heater) in the domestic water inlet piping using suitable pipe dope or tape, located as shown in Figure 2.
2. Pipe the drain valve off of the brass tee as shown in Figure 2, using suitable pipe dope or tape.
3. For jurisdictions requiring a vacuum breaker, use the piping shown in Figure 3, page 9, (Option 2).



A2 Water heater piping *continued*

Figure 3
Piping — **OPTION 2**

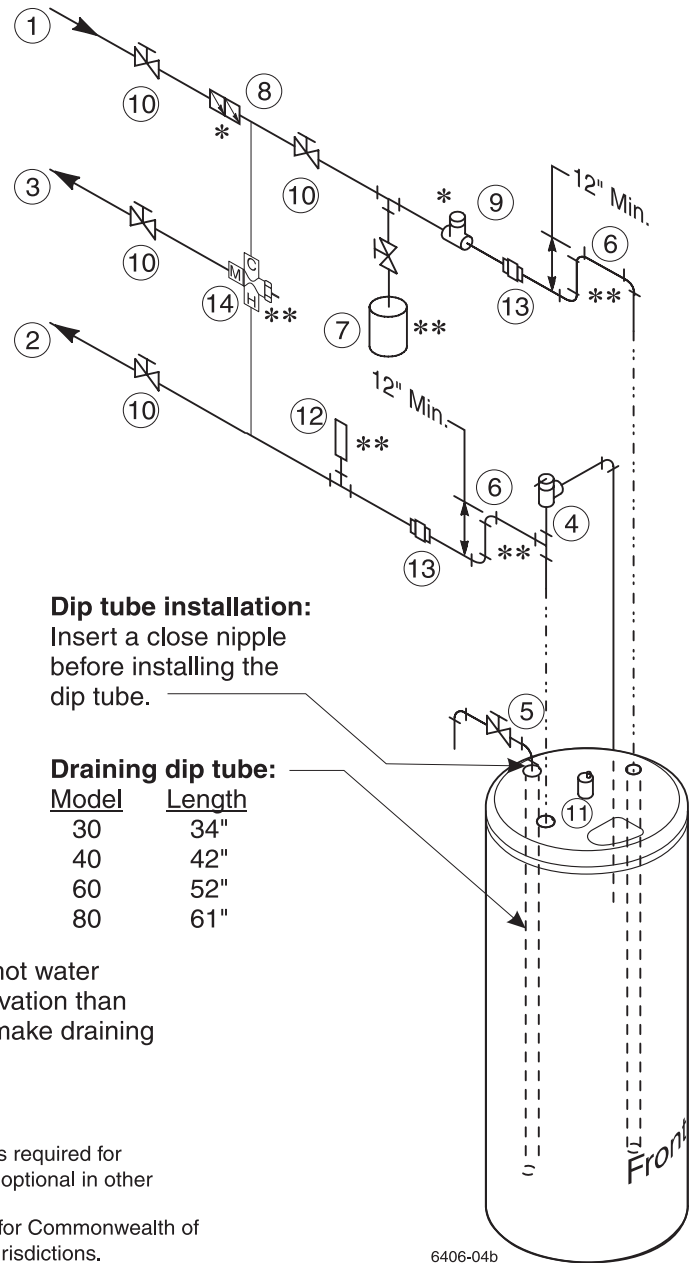
Models 30/40/60/80 or
Ultra Plus 40/60/80
(Required for Commonwealth of
Massachusetts)

WARNING

An expansion tank may be required on the DHW piping. See Thermal expansion **WARNING** on page 13. Failure to comply could result in severe personal injury, death or substantial property damage.

- ① Cold water inlet
- ② Hot water outlet
- ③ Mixed water outlet
- ④ Brass tee and T & P relief valve (with long element)
- ⑤ Drain valve & brass ell
- ⑥ Heat trap loop (12" minimum) **
- ⑦ Expansion tank (see page 12) **
- ⑧ Backflow preventer *
- ⑨ Vacuum breaker *
- ⑩ Shutoff valve, 3/4" NPT
- ⑪ Automatic air vent
- ⑫ Shock arrester **
- ⑬ Union, 3/4" NPT - Union on domestic hot water outlet should be piped at a higher elevation than domestic water drain valve. This will make draining water heater easier.
- ⑭ Mixing valve **

* Items shown with an asterisk are additional items required for Commonwealth of Massachusetts. They may be optional in other jurisdictions.
** Items shown with a double asterisk are optional for Commonwealth of Massachusetts. They may be required in other jurisdictions.



Dip tube installation:

Insert a close nipple before installing the dip tube.

Draining dip tube:

Model	Length
30	34"
40	42"
60	52"
80	61"

NOTICE

When the water supply pressure is higher than 70 psig, install a pressure-reducing valve on the cold water supply line to prevent leakage from the T & P relief valve.

Drain valve
GOLD Plus 30/40/60/80
or *Ultra Plus* 40/60/80
Option 2

Apply the following and Figure 3 to water heaters installed in Massachusetts. The drain valve is mounted in the AUX tapping on top of the water heater.

1. Insert a close nipple and then an open-ended "draining" dip tube into the **AUX** tapping on top of the heater.
2. Connect a 3/4" NPT elbow to the **AUX** tapping, using suitable pipe dope or tape.
3. Pipe the drain valve (supplied with water heater) to the elbow, using suitable pipe dope or tape, as shown in Figure 3.
4. Pipe the T & P relief valve in the run of the 3/4" NPT brass tee (supplied with heater), located in the domestic water outlet piping as shown in Figure 3.



A2 Water heater piping *continued*

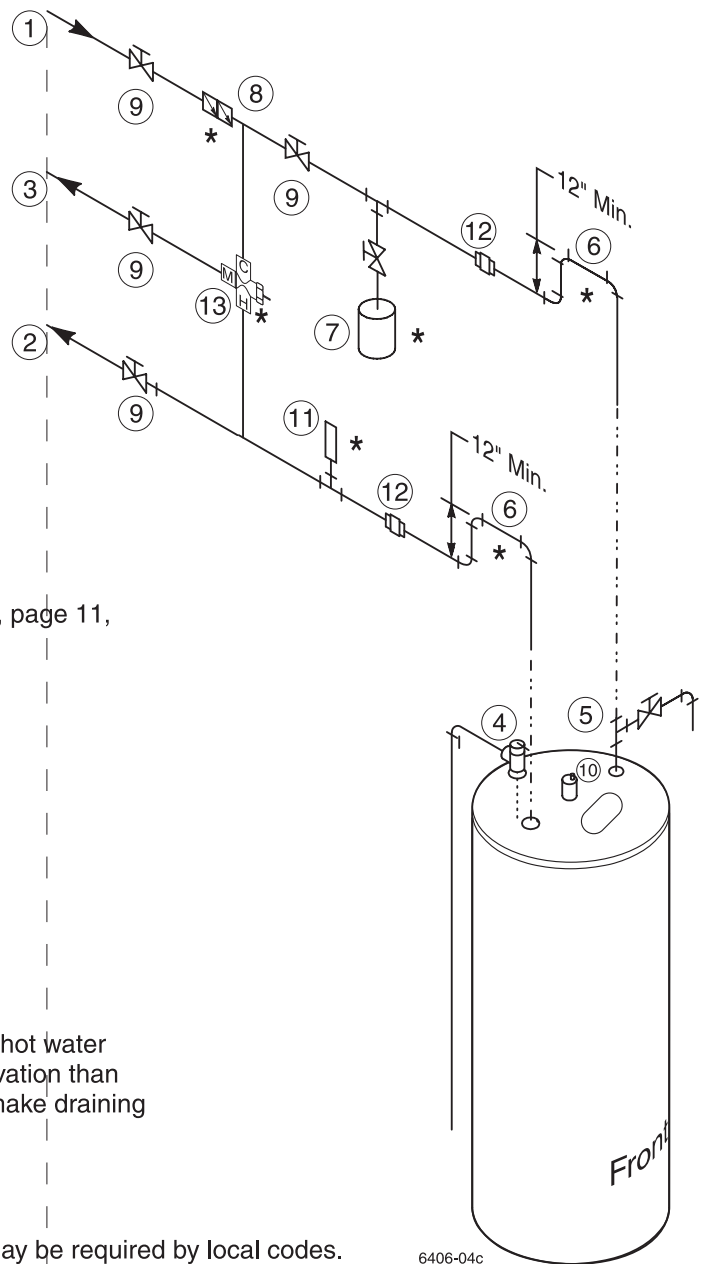
Figure 4
Piping — **OPTION 1**
PLUS 100/110/119
(See Figure 5, page 12, for **OPTION 2**,
required for Massachusetts)

WARNING

An expansion tank may be required on the DHW piping. See Thermal expansion **WARNING** on page 13. Failure to comply could result in severe personal injury, death or substantial property damage.

- ① Cold water inlet
- ② Hot water outlet
- ③ Mixed water outlet
- ④ T & P relief valve (with long element)
- ⑤ Drain valve & brass tee (see Option 2, page 11, for Massachusetts installations)
- ⑥ Heat trap loop (12" minimum) *
- ⑦ Expansion tank (see page 12) *
- ⑧ Backflow preventer *
- ⑨ Shutoff valve, 1½" NPT
- ⑩ Automatic air vent
- ⑪ Shock arrester *
- ⑫ Union, 1½" NPT - Union on domestic hot water outlet should be piped at a higher elevation than domestic water drain valve. This will make draining water heater easier.
- ⑬ Mixing valve *

* Optional items shown with an asterisk may be required by local codes.



NOTICE

When the water supply pressure is higher than 70 psig, install a pressure-reducing valve on the cold water supply line to prevent leakage from the T & P relief valve.

Drain valve
PLUS 100/110/119
Option 1

Apply the following and Figure 4 to water heaters other than those installed in Massachusetts. For Commonwealth of Massachusetts installations, see Option 2, Figure 5, page 11.

1. Install a brass tee in the domestic water inlet piping using suitable pipe dope or tape, located as shown in Figure 4.
2. Pipe the drain valve off of the brass tee as shown in Figure 4, using suitable pipe dope or tape.
3. For jurisdictions requiring a vacuum breaker, use the piping shown in Figure 5, page 11 (Option 2).
4. Obtain brass tee and drain valve from local supplier.



A2 Water heater piping *continued*

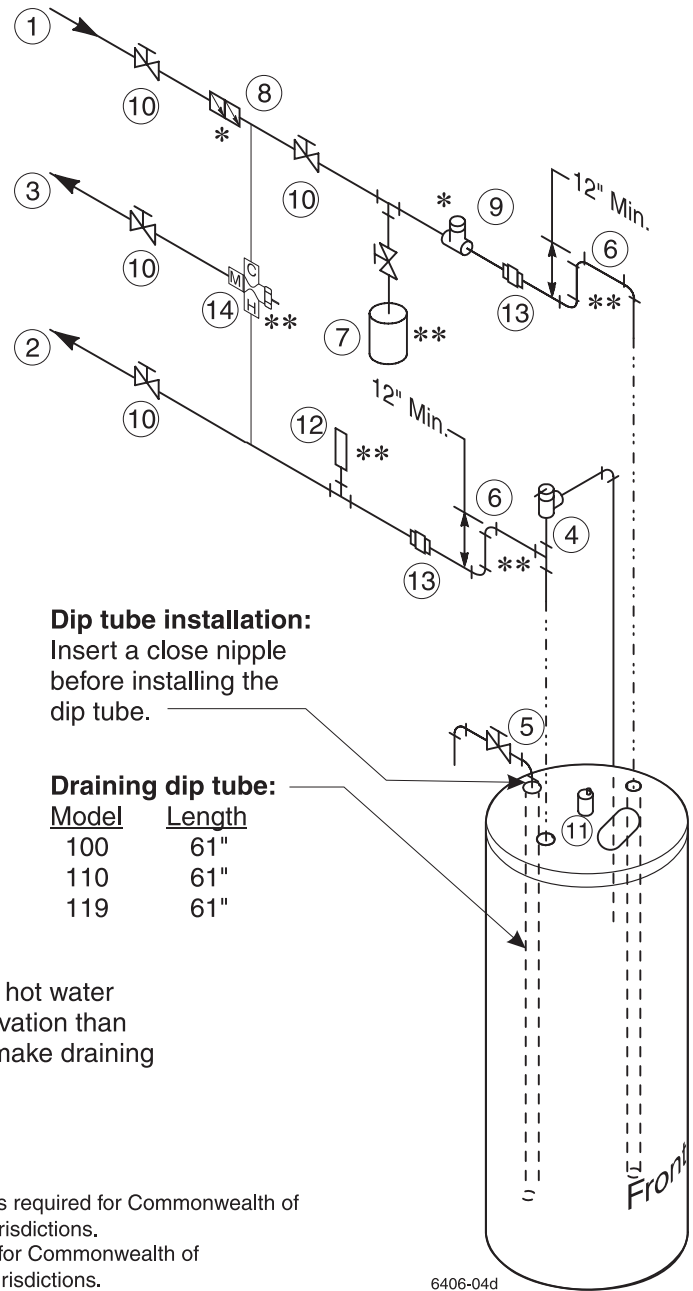
Figure 5
Piping — **OPTION 2**
PLUS 100/110/119
(Required for Commonwealth of Massachusetts)

WARNING

An expansion tank may be required on the DHW piping. See Thermal expansion **WARNING** on page 13. Failure to comply could result in severe personal injury, death or substantial property damage.

- ① Cold water inlet
- ② Hot water outlet
- ③ Mixed water outlet
- ④ Brass tee and T & P relief valve (with long element)
- ⑤ Drain valve & brass ell
- ⑥ Heat trap loop (12" minimum) **
- ⑦ Expansion tank (see page 12) **
- ⑧ Backflow preventer *
- ⑨ Vacuum breaker *
- ⑩ Shutoff valve, 1½" NPT
- ⑪ Automatic air vent
- ⑫ Shock arrester **
- ⑬ Union, 1½" NPT - Union on domestic hot water outlet should be piped at a higher elevation than domestic water drain valve. This will make draining water heater easier.
- ⑭ Mixing valve **

* Items shown with an asterisk are additional items required for Commonwealth of Massachusetts. They may be optional in other jurisdictions.
 ** Items shown with a double asterisk are optional for Commonwealth of Massachusetts. They may be required in other jurisdictions.



6406-04d

NOTICE

When the water supply pressure is higher than 70 psig, install a pressure-reducing valve on the cold water supply line to prevent leakage from the T & P relief valve.

Drain valve
PLUS 100/110/119
Option 2

- Apply the following and Figure 5 to water heaters installed in Massachusetts. The drain valve is mounted in the AUX tapping on top of the water heater.
1. Insert an open-ended "draining" dip tube into the **AUX** tapping on top of the heater.
 2. Connect an elbow to the **AUX** tapping, using suitable pipe dope or tape.
 3. Pipe the drain valve to the elbow, using suitable pipe dope or tape, as shown in Figure 5.
 4. Pipe the T & P relief valve in the run of the brass tee, located in the domestic water outlet piping as shown in Figure 5.
 5. Obtain brass tee and drain valve from local supplier.



A2

Water heater piping *continued*

Thermal expansion

WARNING

If a backflow preventer, check valve, or pressure reducing valve is piped on cold water inlet of water heater, you must install an expansion tank on cold water supply line to prevent normal thermal expansion from repeatedly forcing open T&P relief valve. The T&P relief valve is not intended for constant duty, such as relief of pressure due to repeated normal system expansion.

Refer to expansion tank manufacturer's instructions for proper sizing.

Failure to follow the above could result in severe personal injury, death or substantial property damage.

Water hammer

Dishwashers, clothes washers, and fast-closing positive shutoff valves incorporated in the system all contribute to creating water shock. Install a water hammer arrester to prevent damage to pipes and appliances. See control manufacturer's instructions for application and installation.

General piping information

- For domestic water piping, see pages 8 through 12.
- See pages 22–23, for domestic water recirculation piping.
- See Table 1 for piping connections:
 - All plumbing must meet or exceed all local, state and national plumbing codes.
 - Use pipe dope or tape suitable for potable water.
 - Use isolation valves to isolate system components.
- See Section B for *Ultra* Gas boiler and system piping or Sections C boiler and system piping with other boilers.

Table 1

Piping (Inches NPT)

Water Heater Model	Connections		Recommended Piping Between Water Heater and Boiler	Recirculation Dip Tube	
	Domestic Water Inlet/Outlet	Boiler Water Supply/Return		Length (inches)	Diameter (inches)
30	¾	1	1	34	¾
40	¾	1	1	42	¾
60	¾	1 ¼	1 ¼	52	¾
80	¾	1 ¼	1 ½	61	¾
100	1 ½	1 ½	1 ½	25	1 ½
110	1 ½	1 ½	1 ½	32	1 ½
119	1 ½	2	2	32	1 ½

WARNING

If domestic water-side pressure exceeds 70 psig, install a pressure reducing valve to prevent pressure spikes. Higher pressures can cause the heater pressure/temperature valve to lift or weep.



A2

Water heater piping *continued*

Domestic water piping

- Union on domestic hot water outlet should be piped at a higher elevation than domestic water drain valve. This will make draining water heater easier.
- Install unions for easy removal of water heater. Use dielectric unions or couplings to protect hot and cold water fittings from corrosion when connecting dissimilar materials such as copper and galvanized iron pipe.
- If copper pipe is used for domestic water connections, first solder pipe to a threaded adapter, and then screw adapter into cold water inlet on top of water heater. Inlet contains an internal plastic dip tube rated at 230°F, which can be damaged by heat from soldering.
- When the supply pressure is higher than 70 psig, install a pressure reducing valve on cold water supply line to prevent water loss through T&P relief valve.
- If water heater will replace tankless coil in boiler, disconnect piping to coil or remove coil from boiler and replace with a cover plate. Allow water to drain from coil. Do not plug tankless coil.

DANGER

Plugging tankless coil inlet and outlet will result in severe personal injury, death or substantial property damage.

Boiler water

- Boiler water (including additives) must be practically non-toxic, having toxicity rating or class of 1, as listed in Clinical Toxicology of Commercial Products.
- If antifreeze is used in boiler system, local codes may require a backflow preventer on cold water supply line. Use antifreeze specifically intended for hydronic heating systems. Inhibited propylene glycol is recommended.

DANGER

Do not use automotive, ethylene glycol or petroleum-based antifreeze. Do not use any undiluted antifreeze. This can cause severe personal injury, death or substantial property damage.



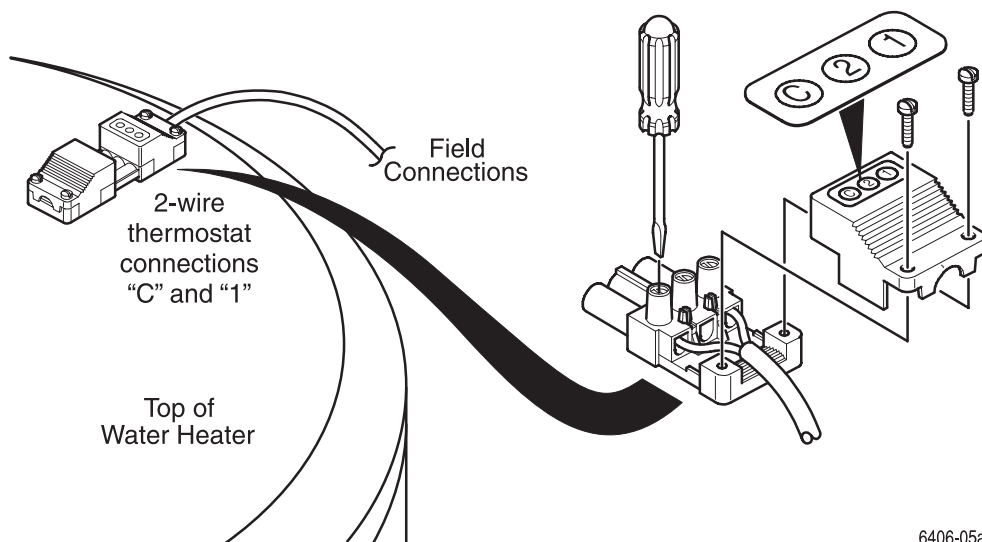
A3 Water heater wiring

Water heater thermostat connection

PLUS-Line indirect water heaters utilize a snap-set connector for easy wiring between water heater thermostat and boiler controls (also see Section B or D). See Figure 6, below.

Figure 6

Thermostat connection



6406-05a

NOTICE

Terminal **1** of the snap-set is the normally-open contact; terminal **2** is the normally-closed contact; terminal **C** is common.



A4 Water heater start-up

Filling the inner (domestic water) tank

CAUTION

- Inner tank must be completely filled and pressurized before pressurizing outer tank.
- Never use water heater unless inner and outer tanks are completely filled with water.

1. Close domestic water drain valve.
2. Open domestic water isolation valves for water heater.
3. Vent air from inner (domestic water) tank by opening nearest hot water faucet. Fill domestic water tank completely by allowing water to run until there is a constant flow of water.
4. Close hot water faucet.

Filling the outer (boiler water) tank

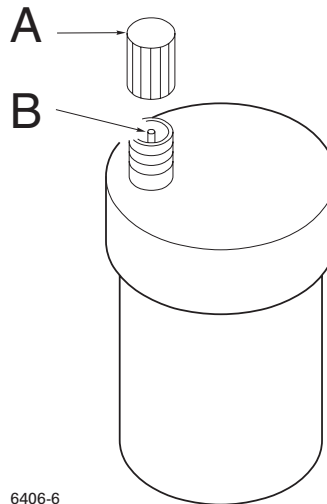
CAUTION

- Inner tank must be completely filled and pressurized before pressurizing outer tank.
- Never use water heater unless inner and outer tanks are completely filled with water.

1. Close boiler water drain valve at boiler water outlet of water heater.
2. Open water heater’s boiler water isolation valves.
3. Allow air to escape from outer (boiler water) tank by opening cap “A” (see Figure 7) on automatic air vent, located on top of water heater. See the **NOTICE** below.

Figure 7

Open cap on air vent to allow air to escape from outer tank



6406-6

NOTICE

For proper operation of the water heater, always leave vent cap unscrewed one full turn.

WARNING

The boiler-side piping must be equipped with a diaphragm- or bladder-type expansion tank, NOT a closed-type expansion tank.

4. Follow instructions furnished with boiler to fill with water.
5. When tank is full, air will stop escaping, and air vent will close. If air vent does not seat properly (i.e., water leaks out), remove cap “A”. Briefly push in valve “B” (see above) and release it to clean valve seat. Screw cap “A” on completely, then unscrew one turn.
6. If antifreeze is used in boiler water, check concentration. Boiler water (including additives) must be practically non-toxic, having a toxicity rating of Class 1, as listed in Clinical Toxicology of Commercial Products. Inhibited propylene glycol is recommended. Follow antifreeze manufacturer’s instructions.

WARNING

Do not use automotive, ethylene glycol or petroleum-based antifreeze. Do not use any undiluted antifreeze. This can cause severe personal injury, death or substantial property damage if ignored.




A4 **Water heater start-up** *continued*

Start-up checklist

- Long element T&P relief valve is properly installed and drain discharge is directed away from all persons.
- Both inner and outer tanks are filled with water.
- All air has been bled from both domestic and boiler water systems.
- Automatic air vent is installed and cap is unscrewed one full turn.
- Cold and hot water lines are correctly connected to domestic water system.
- Supply and return piping from boiler is correctly connected to water heater.
- All wiring is installed correctly.
- Thermostat on water heater is set according to system requirements. See pages 18–19.
- Boiler and water heater are operating properly.
- Fittings and piping have been checked for leaks.
- Installer has reviewed the following sections with system maintainer:
 - **Water Heater Start-Up**
 - **Adjusting Water Heater Temperature**
 - **Water Heater Maintenance**



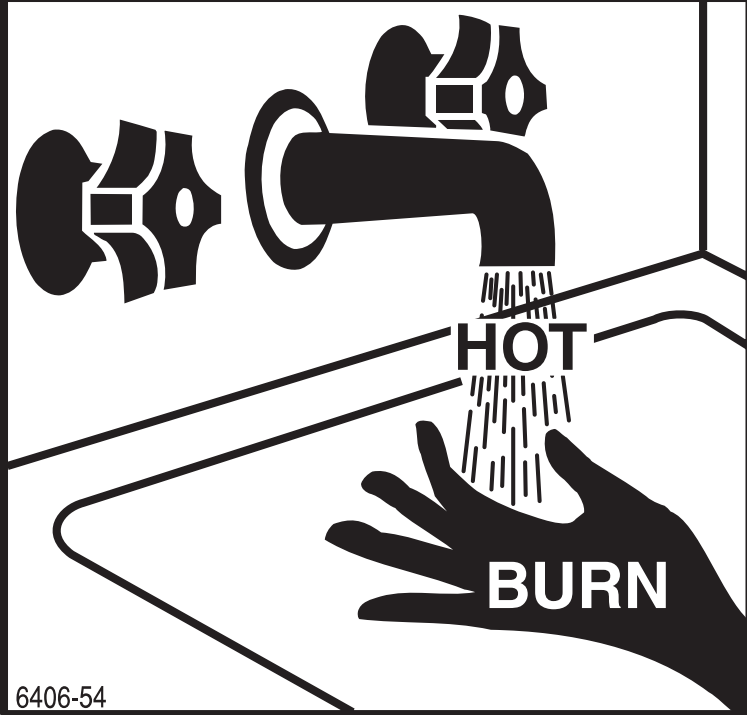
A5 Adjusting water heater temperature



DANGER

Hot Water Can Scald!

- Water temperature over 125°F can cause severe burns instantly, or death from scalds.
- Feel water before bathing or showering.
- Consumer Product Safety Commission and some states recommend temperature settings of 130°F or less. Setting thermostat higher than 130°F setting will increase risk of scald injury and can cause severe personal injury or death.
- Water heated to a temperature suitable for clothes washing, dish washing and other sanitizing needs will scald and cause permanent injury.
- Children and elderly, infirm, or physically handicapped persons are more likely to be injured by hot water. Never leave them unattended in or near a bathtub, shower or sink. Never allow small children to use a hot water faucet or draw their own bath. If anyone using hot water in the building fits this description, or if state laws or local codes require certain water temperatures at hot water faucets, take special precautions:
 - Install an automatic mixing valve at water heater or at each hot water faucet, bath, and shower outlet. Selection and installation must comply with valve manufacturer's recommendations and instructions.
 - Use the lowest practical temperature setting.
 - Check water temperature after any adjustment. You must follow "Setting the Thermostat" on page 19.



6406-54

General notes

- Household water usage patterns will affect water temperature at any faucet or shower. Occasionally check temperature at each point of use, then adjust thermostat accordingly. Always recheck temperature after adjusting thermostat.
- When hot water is used in repeated small quantities, a "stacking" effect can develop in hot water tank. The upper layer of water in tank can be much hotter than lower layers.
- Lowering the thermostat setting or installing automatic mixing valves as indicated in these instructions will reduce water temperature levels. Consult your installer or service technician.





A5 Adjusting water heater temperature *continued*

WARNING Studies have indicated that dangerous bacteria, including legionella pneumophila, can form in the potable water distribution system if certain minimum water temperatures are not maintained. Contact your local health department for more information.

Setting the thermostat GOLD Plus 30/40/60/80 or *Ultra* Plus 40/60/80



Water heater thermostat is factory set to its lowest temperature. The arrowhead indicator  on the label is the preferred starting point for setting temperature. This may or may not be suitable for your needs.

Turn thermostat knob **clockwise**  **to increase** water temperature.

Turn thermostat knob **counter-clockwise**  **to reduce** water temperature.

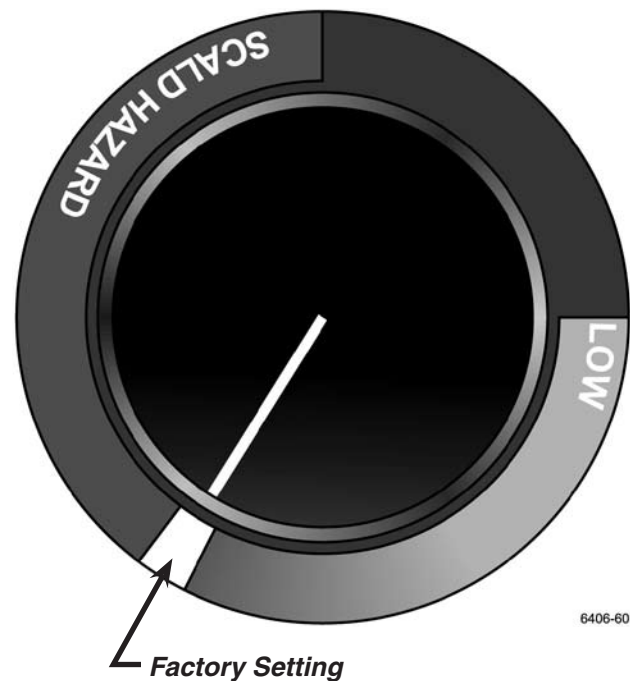
When decreasing temperature setting, the stored hot water must be used before checking temperature at faucet.

Check water temperature at a hot water faucet immediately after first heating cycle. Further temperature adjustment may be necessary as water heating system is used. Recheck water temperature at faucet after adjustment.


When adjusting thermostat, be sure boiler limit control is set a minimum 20°F higher.

WARNING At no time should boiler limit control be set above 210°F. This can cause severe personal injury, death or substantial property damage if ignored.

Setting the thermostat PLUS 100/110/119



Water heater thermostat is factory set to its lowest temperature. The white factory setting mark on the label is the preferred starting point for setting temperature. This may or may not be suitable for your needs.

Turn thermostat knob **clockwise**  **to increase** water temperature.

Turn thermostat knob **counter-clockwise**  **to reduce** water temperature.

When decreasing temperature setting, the stored hot water must be used before checking temperature at faucet.

Check water temperature at a hot water faucet immediately after first heating cycle. Further temperature adjustment may be necessary as water heating system is used. Recheck water temperature at faucet after adjustment.

When adjusting thermostat, be sure boiler limit control is set a minimum 20°F higher.

WARNING At no time should boiler limit control be set above 210°F. This can cause severe personal injury, death or substantial property damage if ignored.



A6

Water heater maintenance

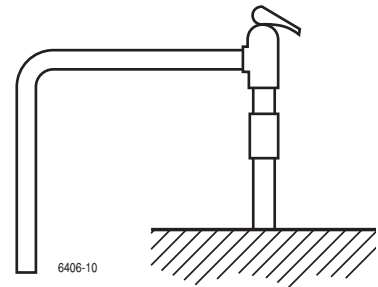
Maintenance schedule – annual service technician

Annual service by qualified service technician to include:

- Any procedures required by local codes.
- Check air vent operation.
- Verify system pressure. Air venting procedure may require adding water to bring system up to pressure, typically 12 psig.
- Manually operate T&P relief valve at least once a year. This will release some hot water.

WARNING

Before operating T&P relief valve, make sure no one is in front of or around T&P relief valve discharge piping. Hot discharge water can cause severe personal injury or substantial property damage.



- Move operating lever to open position for a few seconds and then move it back, allowing it to snap closed. After T&P relief valve is operated, if it continues to release water, close cold water inlet to water heater immediately. Follow draining instructions, and replace T&P relief valve. If T&P relief valve weeps periodically, it may be due to thermal expansion (see “Thermal Expansion”, page 13). Do not plug T&P relief valve or discharge piping.

WARNING

Plugging T&P relief valve or discharge piping can cause excessive pressure in water heater, resulting in severe personal injury, death or substantial property damage.

- Follow instructions on circulator to oil it, if oil-lubricated.
- Check valves, pipes and fittings for leaks.
- Check function of field-installed controls and valves (see control manufacturer’s instructions).
- Review homeowner’s maintenance responsibilities and their frequencies, including any not listed in the following paragraphs.

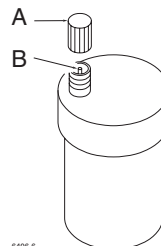
Maintenance schedule – monthly homeowner

Homeowner monthly maintenance to include:

- Check air vent operation:
 - Automatic air vent — remove cap (see Figure 8). Briefly push in valve and release it to clean valve seat. Screw cap on completely, then unscrew one turn. If air vent does not operate, call qualified service technician.

Figure 8

Remove air vent cap to check operation



- Visually check valves, pipes and fittings for leaks. Call qualified service technician to repair leaks.



A6

Water heater maintenance *continued*

Filling

See *Filling the Inner (Domestic Water) Tank*, and *Filling the Outer (Boiler Water) Tank*, on page 16.

Draining

Drain water heater if it will be shut off and exposed to freezing temperatures. Freezing water will expand and may damage water heater.

If boiler water contains sufficient antifreeze, then only the domestic water needs to be drained.

If boiler water does not contain sufficient antifreeze, then the boiler water and the domestic water must be drained.

CAUTION

Close boiler water isolation valves and relieve pressure to below 15 psi in outer tank before draining inner tank to prevent damage to inner tank.

If antifreeze is used in boiler water, check concentration. Boiler water (including additives) must be practically non-toxic, having toxicity rating or class of 1, as listed in *Clinical Toxicology of Commercial Products*. Inhibited propylene glycol is recommended. Follow antifreeze manufacturer's instructions.

WARNING

Do not use automotive, ethylene glycol or petroleum-based antifreeze. Do not use any undiluted antifreeze. This can cause severe personal injury, death or substantial property damage if ignored.

WARNING

Water from opened drain valves, unions and other connections may be extremely hot. To avoid severe personal injury, death or substantial property damage:

- Tighten all drain hose connections.
- Direct hot water away from all persons.

Draining inner (domestic water) tank

See piping drawings, pages 9–12.

1. Disconnect power supply to water heater.
 - If outer (boiler water) tank pressure is greater than 15 psig, relieve boiler pressure to less than 15 psig, and close isolation valves before proceeding.
2. Close cold water supply isolation valve.
3. Remove cap and connect a hose to domestic water drain valve. Hose should extend to drain at floor level to allow siphoning of domestic water tank.
4. Open union on domestic water outlet or hot water faucet at highest point above heater.
5. Open domestic water drain valve to start siphoning.
6. When draining is complete, close union or hot water faucet and domestic water drain valve.

Draining outer (boiler water) tank

See piping drawings, pages 9–12.

1. Disconnect power supply to water heater.
2. Close boiler water isolation valves between water heater and boiler.
3. Connect hose to boiler water drain valve at water heater. Open and drain water to a safe place.
4. To speed draining, loosen air vent on top of tank.
5. When draining is complete, close drain valve and retighten air vent.



A7 Recirculation and heat tracing

Maintaining domestic water temperature in the supply piping

Two options are available to maintain supply temperature available at or near the fixtures on storage water heating systems:

- **Recirculation**

Recirculation is used to reduce wait time for water use, to minimize hot water and energy waste caused during the waiting period, and to prevent degradation of the system supply water temperature. ASPE recommends recirculation when the distance from the water heater to the furthest fixture exceeds 100 feet or the time lag for hot water to reach a fixture(s) exceeds 30 seconds. Consult local codes and American Society of Plumbing Engineers (ASPE) Domestic Water Heating Design Manual, 1998, for further information.

- **Self-regulating heat tracing**

Self-regulating heat tracing may be a better alternative than recirculation for residential and small commercial applications. Self-regulating heat tracing uses electrical energy to maintain water temperature, but it eliminates the need for return piping and components required in a recirculation system.

Time delay at fixtures

Table 2 is from the ASPE Domestic Water Heating Design Manual, 1998. It shows the time required for usable hot water to arrive at a fixture based on the fixture flow rate (available from industry and manufacturer’s data) and the length and diameter of the dead-end branch pipe supplying the fixture. The time lag should generally not exceed 30 seconds. For residential and office applications, the owner may prefer a limit of 10 seconds.

You can use Table 2 as a guide to determining the location of circulation return lines relative to fixtures.

Balancing

When multiple branches are connected to the supply piping, each branch must be connected to the recirculation system. At each of these connections to the return piping, install shutoff valves, a flow metering device, check valve and a strainer as shown in Figure 9 on page 23. Check local codes for specific installation requirements.

These branches must be balanced to prevent pipe erosion and unacceptable time delays at some fixtures.

Balancing options include circuit setters, memory stop valves or factory preset devices (with flow metering provision in the piping).

Components required

For residential applications, consult pump manufacturer’s data for pump selection and additional components required.

On most commercial systems, install the devices shown in Figure 9, page 23, and any other devices or piping methods required by local codes. The check valves are required to prevent fixtures from taking hot water through the return lines. Shutoff valves are needed to allow cleaning and replacing balancing devices. Include strainers to remove sediment which could damage the pump and/or affect the flow balancing devices.

Size the pump and piping based on the temperature drop allowed between the water available at the water heater and the water delivered at the fixture. The return piping will almost always be smaller than the supply piping, but should never be smaller than ½” to prevent problems with the pump.

Make provision for removal of air in all return lines. Where the returns cannot be vented by topmost fixtures in the system, install automatic air venting at the top of the return piping.

Connecting to the water heater

Install a recirculation dip tube in the AUX tapping on top of the water heater. This requires mounting the T&P relief valve as shown for Option 2 in the piping diagrams, pages 10 and 12. See Figure 10, page 23, for the piping required to the water heater.

Table 2

Time lag to obtain hot water at fixture for branch lengths of 10 and 25 feet

(ASPE Domestic Water Heating Design Manual)

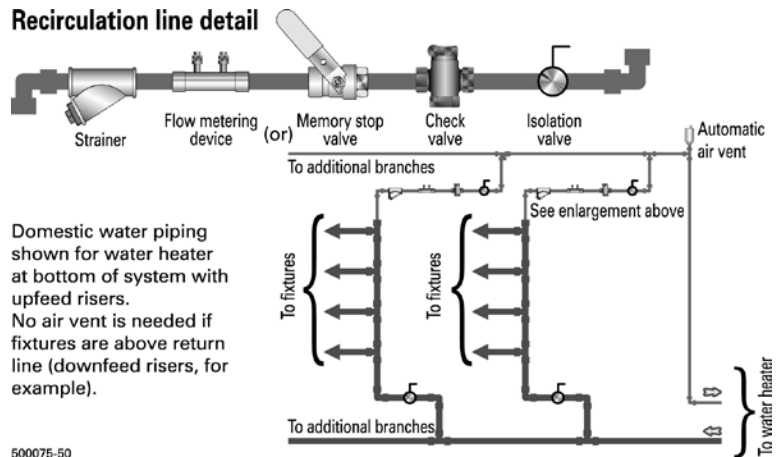
Time in seconds required to get hot water at fixture (from ASPE)									
Fixture flow rate (GPM) -		0.5		1.5		2.5		4.0	
Piping length (feet) -		10	25	10	25	10	25	10	25
Copper pipe	½"	25	63	8	21	5	13	3	8
	¾"	48	119	16	40	10	24	6	15
Steel pipe	½"	63	157	21	52	13	31	8	20
	¾"	91	228	30	76	18	46	11	28
CPVC pipe	½"	64	159	21	53	13	62	8	20
	¾"	95	238	32	79	19	48	12	30

NOTE: Select branch size and length for less than 31 seconds delay.



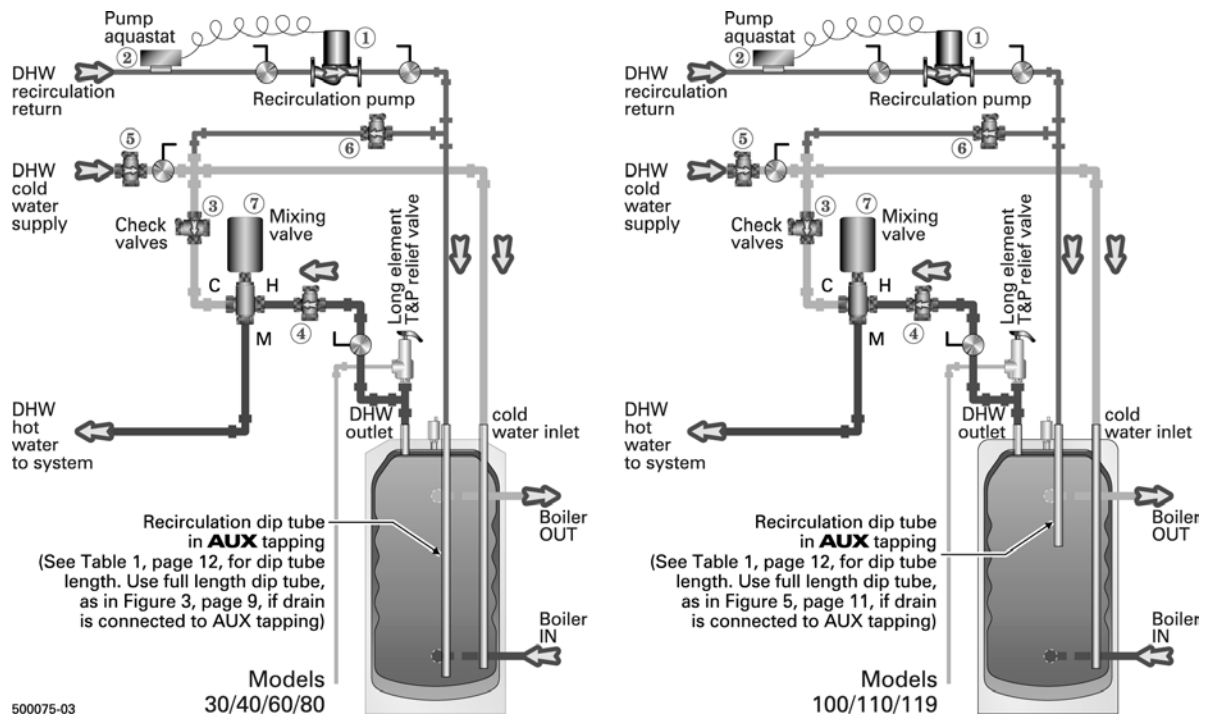
Figure 9

Recirculation components



500075-50

Figure 10 Recirculation connection at water heater



500075-03

Components

- 1 Circulator — Little flow is required to maintain a temperature in the piping. Size of circulator depends on minimum flow requirements of the tempering valve. Minimum flow rates of the tempering valve must be maintained.
- 2 Aquastat — Used to control the on-off position of the circulator. Aquastat is set 5° to 10° lower than mixed water outlet of the mixing valve (#7). The circulator cannot run continuously as bypass through the mixing valve will eventually allow the temperature on the piping to climb to the water heater temperature during draw periods.
- 3 – 6 Check valves — Assure the flow of water in one direction. Each check valve functions as follows: #3 and #4 prevent bypass in the event of pressure drop, #5 prevents thermal siphoning of hot water to the cold water supply, #6 prevents flow of cold water to the tempered water supply. A draw of tempered water will not result in flow of cold water into the return loop.

Operation

- During period of normal use (fixtures on) — Circulator is off. There is no flow through #6, there is flow through #5 equal to the flow at the fixtures, there is flow through #3 and/or #4 equal to flow at fixture.
- When all fixtures are off — Circulator is off. There is no flow through #3, #4, #5 or #6. Water temperature in piping is cooling.

- When temperature at aquastat #2 falls 10° below temperature to be maintained — Circulator is on. There is flow through #6 equal to the minimum required by the mixing valve, flow through #3 and #4 equals the flow of the circulator. There is no flow through #5.
- Aquastat reaches temperature — Circulator is off. There is no flow through #3, #4, #5 or #6.

Problems

- Missing check valves #3 or #4 — Extreme pressure drop can cause reverse flow of water; hot to cold supply or cold to hot supply.
- Missing check valve #5 — Hot water can migrate from the water heater back through the cold water supply.
- Missing check valve #6 — Cold water can be forced back through the tempered water supply when a fixture is opened.
- No aquastat #2 — Pump runs continuously. Small amount of water will pass through mixing valve. Eventually all hot water is flowing through valve. Recirculated water through cold port, hot water through hot port.
- Circulator too small — Mixing valve performance erratic.



B *Ultra* Gas-fired boiler applications

Ultra GAS

Overview

Follow the guidelines in this section to install *Ultra* Gas-fired boilers with PLUS or *Ultra* PLUS indirect water heaters. Install the domestic water piping and water heater following the guidelines of Section A. See Sections C and D for other boiler applications.

B1. Install system water piping	
System water piping methods.....	25
Boiler circulator	25
Sizing space heating system piping	25
Zoning with zone valves.....	26
Zoning with circulators.....	27
Combined space heating/water heating applications.....	28
Dedicated water heating-only applications	28
B2. Install boiler-to-water heater piping	
Combined space heating/water heating applications.....	28
Dedicated water heating-only applications	28
B3. Field wiring — <i>Ultra</i> Gas-fired boilers only	
Installation must comply with:.....	30
Line voltage connections	30
Wiring boiler circulator.....	30
Wiring PLUS circulator.....	30
Wiring a system circulator	31
Routing line voltage wiring	31
Low voltage connections	31
Room thermostat (space heating)	31
Outdoor temperature sensor	31
PLUS water heater thermostat.....	31
Additional limits.....	31
B4. Start-up — <i>Ultra</i> Gas-fired boilers only	
Follow boiler manual.....	33
Set space heating operation	33
Water heater operation	33
Water heater operation setup	33
Verify space heating operation	33
Verify water heater operation	34
Operating information	34
Replace boiler jacket front door.....	34



B1

Ultra GAS

Install system water piping (space heating)

System water piping methods

NOTICE All piping methods shown in this manual use primary/secondary connection to the boiler loop. These designs ensure proper flow through the *Ultra* Gas boiler, for the most efficient and reliable operation of the boiler and the heating system. For other piping methods, consult your local Weil-McLain representative or refer to separate *Ultra* Gas boiler piping guides.

Wall-mounted boilers — Piping can exit bottom of boiler enclosure. See separate wall-mounting instructions for details.

Expansion tank and make-up water

1. Ensure expansion tank size will handle boiler and system water volume and temperature. Allow 3 gallons for the boiler and its piping.

CAUTION Undersized expansion tanks cause system water to be lost from relief valve and make-up water to be added through fill valve. Eventual boiler failure can result due to excessive make-up water addition.

2. Tank must be located as shown in this supplement, or following recognized design methods. See tank manufacturer's instructions for details.
3. Connect the expansion tank to the air separator only if the separator is on the suction side of the system circulator. Always install the system fill connection at the same point as the expansion tank connection to the system.
4. The piping drawings in this manual show only diaphragm expansion tanks. Use only bladder-type or diaphragm-type tanks with PLUS indirect water heater applications.
5. Refer to the *Ultra* Boiler Manual for other system piping examples.

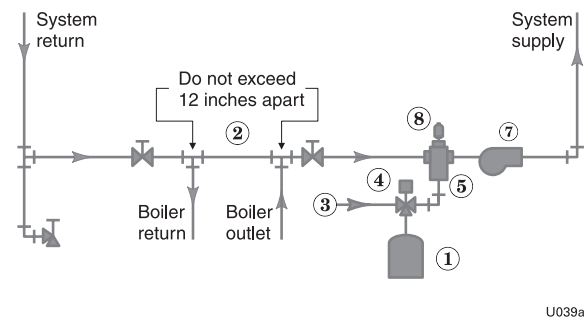
Diaphragm (or bladder) expansion tank

1. Always install an automatic air vent on top of the air separator to remove residual air from the system.
2. See Figure 11 for correct location of the expansion tank.

DO NOT USE a closed-type expansion tank

Figure 11 Expansion tank piping

Piping to diaphragm (or bladder) expansion tank



- | | |
|---------------------------------|----------------------|
| ① Diaphragm-type expansion tank | ⑤ Air separator |
| ② Primary/secondary connection | ⑥ Tank fitting |
| ③ Make-up water supply | ⑦ System circulator |
| ④ Fill valve, typical | ⑧ Automatic air vent |

WARNING

The boiler-side piping must be equipped with a diaphragm- or bladder-type expansion tank, NOT a closed-type expansion tank. This is necessary to allow venting air from the top of the indirect water heater boiler-side.

Boiler circulator

The boiler circulator is shipped loose. It must be located in either the return or supply piping, as shown in the appropriate piping diagram in this supplement or the Boiler Manual.

WARNING

DO NOT use the boiler circulator in any location other than those shown in this manual or the boiler manual. The boiler circulator is selected to ensure adequate flow through the *Ultra* boiler. Failure to comply could result in unreliable performance and nuisance shutdowns from insufficient flow.

Sizing space heat system piping

1. See Figures 12 and 13, pages 26 and 27, or the *Ultra* Gas Boiler Manual for recommended piping. In all diagrams, the space heating system is isolated from the boiler loop by the primary/secondary connection.
2. Size the piping and components in the space heating



Ultra GAS

B1

Install system water piping (space heating) (continued)

Zoning with zone valves

1. Connect boiler to system as shown in Figure 12 when zone valve zoning. The primary/secondary piping shown ensures the boiler loop will have sufficient flow. It also avoids applying the high head of the boiler circulator to the zone valves.
2. Connect water heater (domestic hot water) piping to indirect storage water heater as shown in Section A of this manual.

NOTICE The *Ultra PhD* Control Module turns off space heating during water heater heating. The boiler circulator will turn off, preventing hot water from circulating to the system. The flow/check valve shown on the boiler outlet piping prevents gravity circulation in the boiler loop during water heater heating.

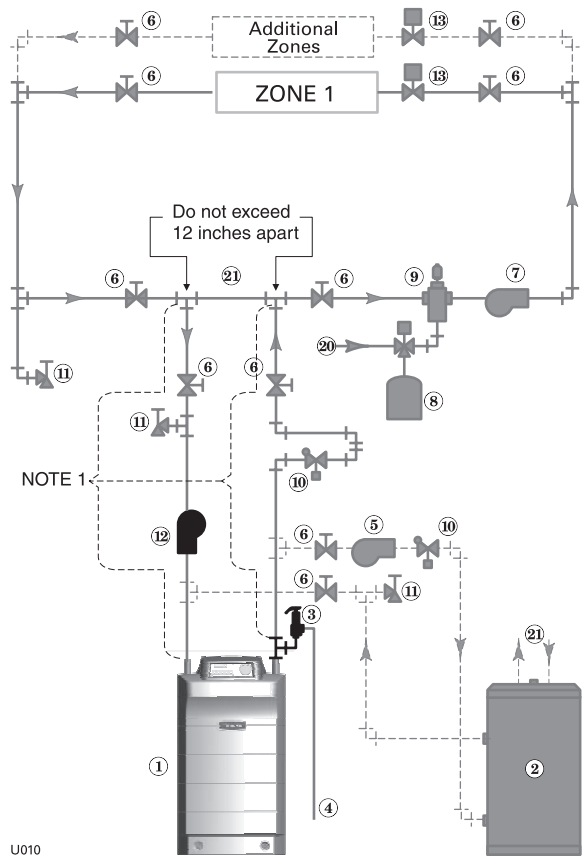
3. Controlling the system circulator
 - a. To cycle the system circulator from the *Ultra PhD* control module, add a circulator relay wired to the boiler circulator terminals as shown on page 30.

NOTE 1: To ensure adequate flow rate through the boiler, use the following pipe size on all boiler loop piping (connecting boiler to and from the primary/secondary connection, item 21):

- Ultra-80* or *Ultra-105* – 1" or larger.
- Ultra-155* or *Ultra-230* – 1¼" or larger.
- Ultra-310* – 1½" or larger.

WARNING Use at least the minimum piping size above and pipe the boiler using only primary/secondary piping as shown. Failure to follow these guidelines could result in system problems.

Figure 12 Zone valve zoning plus optional water heater piping



U010

Legend Figure 12

- | | |
|---|---|
| <ol style="list-style-type: none"> 1 <i>Ultra</i> boiler 2 PLUS-Line indirect water heater 3 Boiler relief valve (see boiler manual for piping details) 4 Boiler relief valve discharge piping (see boiler manual for details) 5 Water heater circulator (see page 7 for suggested sizing) 6 Isolation valves 7 System circulator 8 Diaphragm (or bladder) type expansion tank (see page 3 for piping of closed-type expansion tank, if used) | <ol style="list-style-type: none"> 9 Air separator [with automatic air vent only on systems using diaphragm (or bladder) type expansion tank] 10 Flow/check valves (with weighted seats to prevent gravity circulation) 11 Purge/drain valves 12 Boiler circulator 13 Zone valves, typical 20 Make-up water supply 21 Primary/secondary connection <p>■ — Supplied with boiler
 ■ — By others (not included with boiler)</p> |
|---|---|



B1

Ultra GAS

Install system water piping (space heating) (continued)

Zoning with circulators

1. Connect boiler to system as shown in Figure 13 when circulator zoning. The boiler circulator cannot be used for a zone. It must supply only the boiler loop.
2. Install a separate circulator for each zone.
3. Connect water heater (domestic hot water) piping to indirect storage water heater as shown in Section A of this manual.

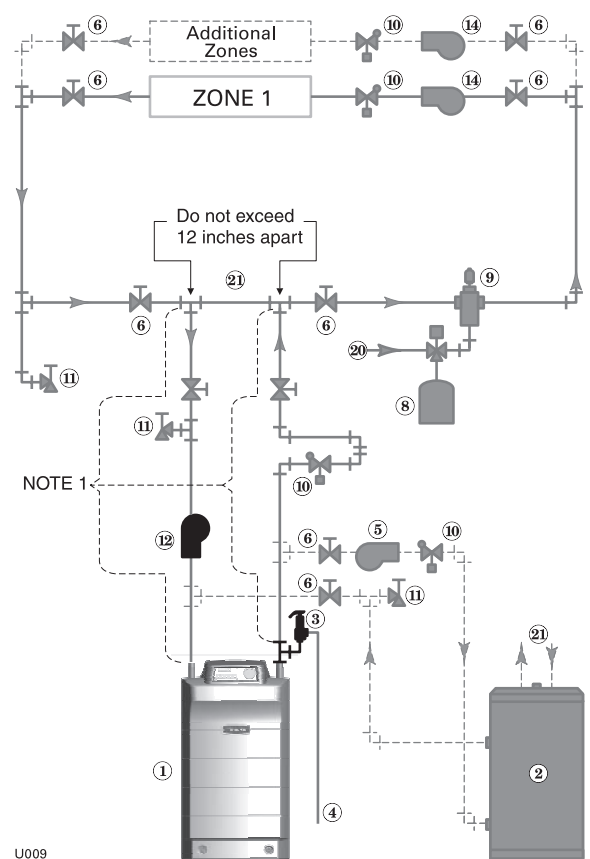
NOTICE The *Ultra PhD* Control Module turns off space heating during water heater heating. The boiler circulator will turn off, preventing hot water from circulating to the system. The flow/check valve shown on the boiler outlet piping prevents gravity circulation in the boiler loop during water heater heating.

NOTE 1: To ensure adequate flow rate through the boiler, use the following pipe size on all boiler loop piping (connecting boiler to and from the primary/secondary connection, item 21):

- Ultra-80* or *Ultra-105* – 1" or larger.
- Ultra-155* or *Ultra-230* – 1¼" or larger.
- Ultra-310* – 1½" or larger.

WARNING Use at least the minimum piping size above and pipe the boiler using only primary/secondary piping as shown. Failure to follow these guidelines could result in system problems.

Figure 13 Circulator zoning plus optional water heater piping



U009

Legend Figure 13

- | | |
|---|--|
| <ul style="list-style-type: none"> 1 <i>Ultra</i> boiler 2 PLUS-Line indirect water heater 3 Boiler relief valve (see boiler manual for piping details) 4 Boiler relief valve discharge piping (see boiler manual for details) 5 Water heater circulator (see page 7 for suggested sizing) 6 Isolation valves 7 System circulator 8 Diaphragm (or bladder) type expansion tank (see page 3 for piping of closed-type expansion tank, if used) 9 Air separator [with automatic air vent only on systems using diaphragm (or bladder) type expansion tank] | <ul style="list-style-type: none"> 10 Flow/check valves (with weighted seats to prevent gravity circulation) 11 Purge/drain valves 12 Boiler circulator 14 Zone circulators, typical 20 Make-up water supply 21 Primary/secondary connection ■ — Supplied with boiler ■ — By others (not included with boiler) |
|---|--|



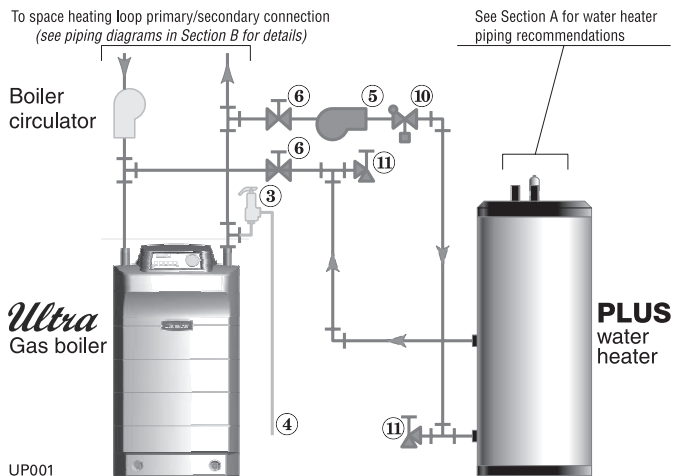
Ultra GAS

B2 Install boiler-to-water heater piping

Combined space heating/water heating applications

- Figure 14 shows recommended piping between *Ultra* Gas boiler and PLUS water heater. All show direct connection of the water heater piping to the boiler because the boiler circulator shuts down during water heater operation.
- Table 3, page 29, uses the recommended flow rates for the PLUS water heater and minimum flow rates for the *Ultra* Gas boiler to provide recommended water heater piping and circulator sizing. If using another circulator, verify it is at least equal to the Taco selection given in Table 3, page 29. For general information on head loss through boiler and boiler-to-water heater piping, refer to the *Ultra* Gas Boiler Manual.
- Procedure:**
 - Step 1:** Select *Ultra* Gas Boiler model and water heater model in Table 3, page 29.
 - Step 2:** Read recommended minimum flow rate, GPM, in table.
 - Step 3:** Read across to find recommended minimum pipe size for boiler-to-water heater piping.
 - Step 4:** Read across to find recommended Taco circulator model. Use a circulator with a pump curve at least equal to the Taco circulator shown. See Figure 16, page 29 for pump curves of typical Taco circulators.

Figure 14 Boiler-to-water heater piping — Combined space heating/water heating application

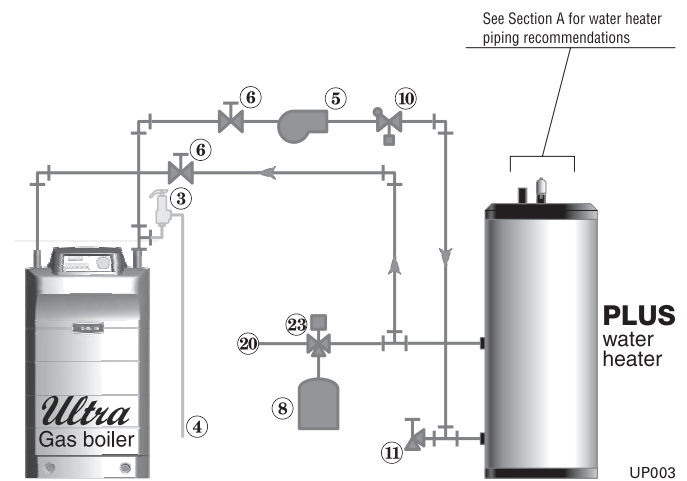


- 3 Boiler relief valve (see Boiler Manual for piping details)
- 4 Relief valve discharge piping (see Boiler Manual for details)
- 5 Water heater circulator — must be at least equal in capacity to circulator recommended in Table 3, page 29
- 6 Isolation valves
- 10 Flow/check valve (with weighted seat to prevent gravity circulation)
- 11 Purge/drain valves

Dedicated water heating-only applications

- Figure 15 shows recommended piping between *Ultra* Gas Boiler and PLUS water heater for dedicated water-heating only applications.
- Pipe sizing:**
Table 4, page 29, provides the recommended minimum pipe size for boiler-to-water heater piping.
- Circulator:**
Use the circulator recommended in Table 4, page 29. Install the circulator as shown in Figure 15.
- Procedure:**
 - Step 1:** Select *Ultra* Gas Boiler model and water heater model in Table 4, page 29.
 - Step 2:** Read flow rate expected using the circulator specified in the last column.
 - Step 3:** Size connecting piping as listed under “Boiler piping” in the table.

Figure 15 Boiler-to-water heater piping — Dedicated water-heating only application



- 3 Boiler relief valve (see Boiler Manual for piping details)
- 4 Relief valve discharge piping (see Boiler Manual for details)
- 5 Water heater circulator — (see Table 4, page 29)
- 8 Expansion tank (diaphragm or bladder type)
- 6 Isolation valves
- 10 Flow/check valve (with weighted seat)
- 11 Purge/drain valve
- 20 Fill line to fill valve (item 23)



NOTICE

The following ratings are for Ultra Gas boilers only, with supply water temperature at 190°F. For boilers other than Ultra Gas, see page 67 for ratings.



Table 3 Combined space heating/water heating (see Notes)

Boiler	PLUS Model	1st Hour rating, GPH		Boiler piping		Head losses, Feet w.c.				DHW Pump
		115°F	140°F	GPM	Rec. size	Boiler	Heater	Piping	TOTAL	
Ultra-80	40	160	124	6.6	1"	5.8	1.0	2.4	9.2	007
	60	168	132							
	80	176	140							
	100	190	155							
	110	210	175							
	119	230	190							
Ultra-105	40	203	141	6.4	1"	5.9	1.0	2.3	9.3	007
	60	211	162							
	80	219	170							
	100	230	185							
	110	250	205							
	119	270	225							
Ultra-155	40	238	153	8.7	1"	5.7	1.0	3.9	10.6	0010
	60	294	190	9.6	1½"	7.1	1.0	2.3	10.5	
	80	302	230	10.8	1½"	9.0	1.0	2.8	12.8	0012
	100	315	245							
	110	335	265							
	119	355	285							
Ultra-230	40	248	160	12.0	1½"	8.2	1.0	3.4	12.6	0012
	60	330	196	13.5	1½"	10.0	1.0	4.2	15.2	0014
	80	411	305							
	100	440	335							
	110	460	355							
	119	480	375							
Ultra-310	40	254	164							
	60	351	208	18.6	1½"	8.5	1.0	3.3	12.8	0011
	80	579	373	22.0	1½"	11.2	1.0	4.5	16.6	0013
	100	440	335							
	110	460	355							
	119	480	375							

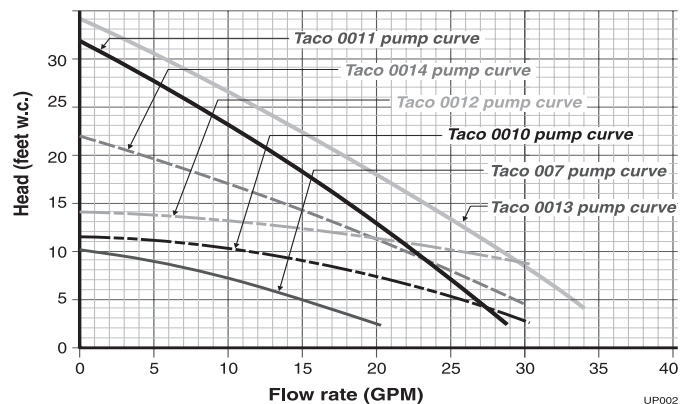
Table 4 Dedicated water-heating, using circulator supplied with boiler (see Notes)

Boiler	PLUS Model	1st Hour rating, GPH		Boiler piping		Head losses, Feet w.c.				Circ.
		115°F	140°F	GPM	Rec. size	Boiler	Heater	Piping	TOTAL	
Ultra-80	40	160	124	6.6	1"	5.8	1.0	2.4	9.2	007
	60	168	132							
	80	176	140							
	100	190	155							
	110	210	175							
	119	230	190							
Ultra-105	40	203	141	6.4	1"	5.9	1.0	2.3	9.2	007
	60	211	162							
	80	219	170							
	100	230	185							
	110	250	205							
	119	270	225							
Ultra-155	40	250	160	12.1	1½"	11.4	1.0	4.5	16.9	0014
	60	295	220							
	80	305	230							
	100	315	245							
	110	335	265							
	119	355	285							
Ultra-230	40	240	170	13.5	1½"	10.0	1.0	5.2	16.2	0014
	60	335	220							
	80	430	325							
	100	440	335							
	110	460	355							
	119	480	375							
Ultra-310	40	240	170	18.3	1½"	8.3	1.0	4.2	13.5	0014
	60	335	220							
	80	580	410							
	100	590	435							
	110	610	465							
	119	630	485							

Notes Tables 3 and 4

- First hour ratings in Tables 3 and 4 are based on:
 - 115°F or 140°F domestic outlet water supply temperature from water heater.
 - 50°F domestic water inlet temperature.
 - 190°F boiler water temperature leaving Ultra Gas boiler.
 - Circulator and pipe sizes as given in the Tables.
- If the net Btu/hr rating of the boiler is close to the space heating load (for combined systems) — or if there is an unusually large demand for domestic water — increased boiler capacity may be required.

Figure 16 Pump curves for Taco circulators





Ultra GAS

B3 Field wiring — *Ultra* Gas boilers only

WARNING **ELECTRICAL SHOCK HAZARD**
 — For your safety, turn off electrical power supply at service entrance panel before making any electrical connections to avoid possible electric shock hazard. Failure to do so can cause severe personal injury or death.

NOTICE Wiring must be N.E.C. Class 1.
 If original wiring as supplied with boiler must be replaced, use only type 105 °C wire or equivalent.
 Boiler must be electrically grounded as required by National Electrical Code ANSI/NFPA 70 – latest edition.

Line voltage connections

1. Connect 120 VAC power wiring to line voltage terminal strip in left compartment of electrical entrance, as shown in Figure 17, item 1.
2. Provide and install a fused disconnect or service switch (15 amp. recommended) as required by the code. (See Figure 17, item 2)

Wiring boiler circulator

1. The Taco 0011 circulator supplied with the boiler is wired one of two locations, depending on whether system is combined space heating/water heating or dedicated water-heating only. Boiler circulator is shipped loose. Wire Boiler circulator to terminals (refer to Figure 17):
 - a. Combined system: terminals 5, 6, and 7 (installed as Figure 17, item 3).
 - b. Dedicated system: terminals 3, 4, and ground wire nut (installed as Figure 17, item 5).

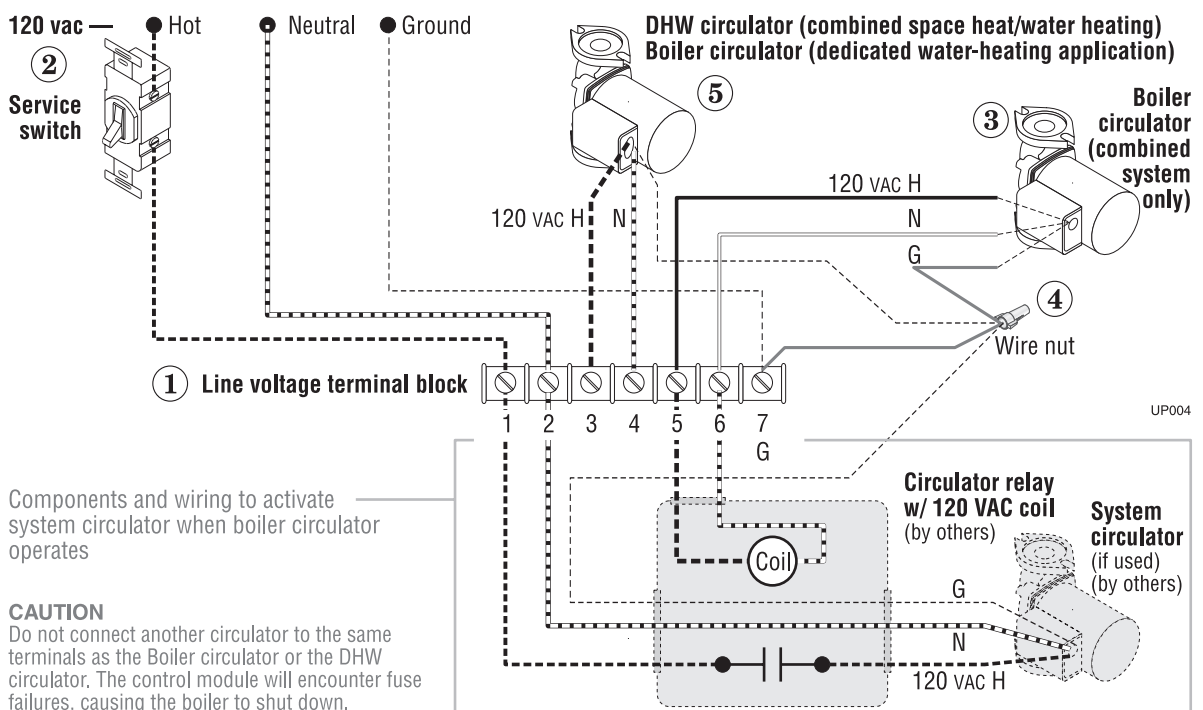
Installation must comply with:

1. National Electrical Code and any other national, state, provincial or local codes or regulations.
2. In Canada, CSA C22.1 Canadian Electrical Code Part 1, and any local codes.

Wiring water heater circulator

1. For combined systems, connect water heater circulator to line voltage terminal strip terminals 3 and 4 and ground wire nut. See Figure 17.

Figure 17 Line voltage field wiring connections (service switch provided by installer)





B3 Field wiring — *Ultra* Gas boilers only (continued)

Wiring a system circulator

1. For combined systems, to activate a system circulator when the Boiler circulator operates, wire as shown at bottom of Figure 17, page 30.
2. You must install a relay as shown. DO NOT wire in parallel with the Boiler circulator. See **CAUTION** in Figure 17.

Routing line voltage wiring

1. Route line voltage connections to the jacket openings shown in Figure 18.

Low voltage connections

(Fig. 18)

1. Connect low voltage wiring to low voltage terminal strip (Figure 19, page 32, item 1) as shown in Figure 19 and the boiler wiring diagram.
2. Route all low voltage wires through grommeted jacket opening to right of low voltage terminal strip, as shown in Figure 18.

Room thermostat (space heating)

1. For combined space heating/water heating systems, connect Figure 19, item 2, room thermostat or end switch (isolated contact only) between terminals 5 and 6.
2. Install thermostat on inside wall away from influences of drafts, hot or cold water pipes, lighting fixtures, television, sunrays, or fireplaces.
3. Thermostat anticipator (if applicable):
 - a. If connected directly to boiler, set for 0.1 amps.
 - b. If connected to relays or other devices, set to match total electrical power requirements of connected devices. See device manufacturers' specifications and thermostat instructions for details.

Outdoor temperature sensor

1. Outdoor reset operation applies only to combined space heating/water heating systems.
2. Connect outdoor temperature sensor (Figure 19, item 6) between terminals 1 and 2 to enable outdoor reset operation of the *Ultra* Gasboiler. If fixed-temperature operation is required, do not install outdoor sensor.
3. Mount sensor on exterior wall, shielded from direct sunlight or flow of heat or cooling from other sources.

4. Install a summer/winter switch (Figure 19, item 7) across terminals 1 and 2 to force fixed-temperature operation during summer months. (When the switch is closed, boiler will attempt to maintain constant temperature.)
5. Route sensor wires through the grommeted hole at right of the electrical entrance (see Figure 18).

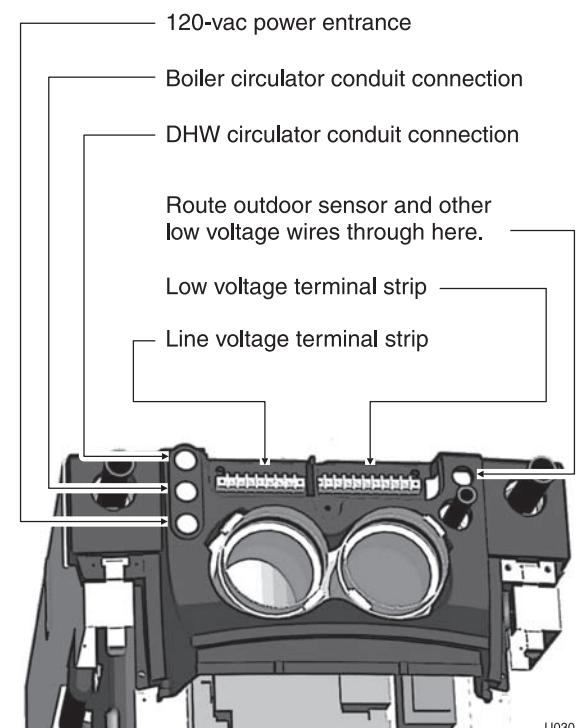
Water heater thermostat

1. Connect PLUS water heater aquastat terminals "C" and "1" to *Ultra* Gas boiler low voltage terminal strip between terminals 3 and 4 (Figure 9, item 3).

Additional limits

1. Connect additional limit controls and interlocks between the terminals shown in Figure 19.
2. Controls connected between terminals 6 and 7 (see Figure 19, item 4) will cause a soft lockout (automatic reset). When limit(s) closes, boiler will resume normal operation.
3. Controls connected between terminals 6 and 8 (see Figure 19, item 5). will cause a hard lockout (manual reset). The boiler will only restart after the Ultra display panel RESET switch is pressed.

Figure 18 Routing field wiring



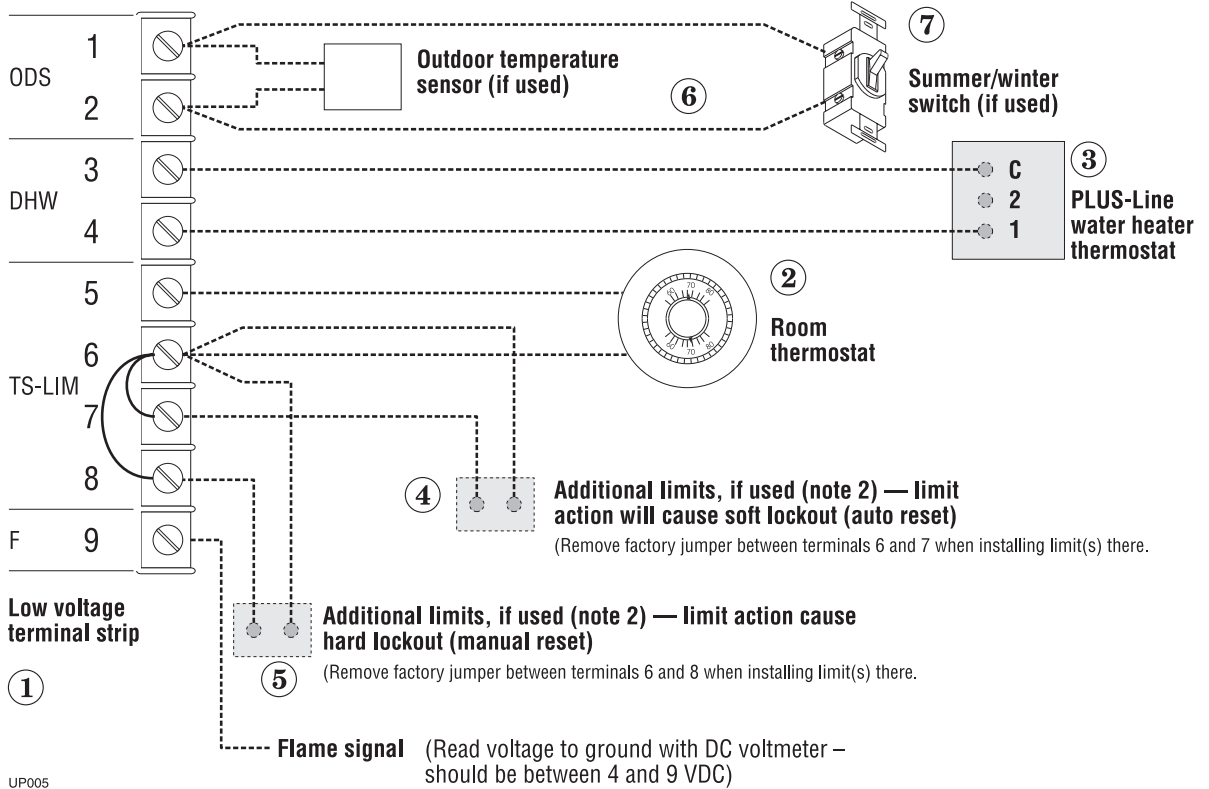


Ultra GAS

B3 Field wiring — Ultra Gas boilers only *(continued)*

Figure 19

Low voltage field wiring connections



NOTICE Summer/winter switch (item 7) — Install a summer/winter switch, if desired, to disable the boiler (space heating) circulator during non-heating months. Connect switch across the outdoor sensor terminals. When switch closes, the boiler circulator is disabled and the boiler operates only on call for DHW heating.



B4

Ultra GAS

Start-up — *Ultra* Gas boilers only

Follow boiler manual

1. Follow all procedures in the *Ultra* Gas boiler manual to start up and verify operation of the boiler.

Set space heating operation

Verify space heating mode

1. Press the “Mode” button until the display shows “Para.” This is the parameter mode.
2. Press the “Step” button until the display first digit shows “3.”
3. The last digit must show “1.” If any other number displays, press the “+” button until “1” shows in the right-hand digit. Press the “Store” button to save this setting.

Set space heating target temperature

1. Press the *Ultra* control panel “Step” button until the display first digit shows “4.” The right 3 digits show the outlet water temperature setting.
2. Press the “+” or “-” button to change the setting to the desired outlet water temperature. (The factory default setting is 190 °F.)
 - a. Outdoor sensor installed — Setting is the target temperature for outdoor temperature at or below 32 °F. At higher outside temperatures, the *Ultra* PhD control module calculates the target temperature. (See *Ultra* Control Supplement for detailed discussion of outdoor reset.)
When a summer/winter switch is used, closing the switch will disable the boiler (space heating) circulator during summer operation.
 - b. Outdoor sensor not installed — Setting is the target temperature at all times.
3. Press the “Store” button to save the setting.

Water heater operation

1. The PLUS water heater thermostat must be connected to low voltage terminal strip terminals 3 and 4 as shown on page 10.
2. When the water heater thermostat calls for heat, the module shuts down the boiler circulator, activates the water heater circulator and immediately sets target outlet water temperature to 190°F. This provides automatic priority heat allocation to the indirect water heater for maximum response and recovery.
3. The water heater circulator continues for 30 seconds after the heating cycle to deliver the most possible heat.

Water heater operation setup

1. Go to step 2 if the control is in Parameter mode already. Press the “Mode” button until the display shows “Para” (parameter mode).
2. Press the “Step” button until the display first digit shows “2.”
3. The last digit must show “1.” If any other number displays, press the “+” button until “1” shows in the right-hand digit. Press the “Store” button to save this setting.
4. The *Ultra* PhD control module turns on the PLUS circulator when the indirect water heater operating control closes. The control module shuts off the boiler circulator (stops space heating) during calls for DHW heating.

Verify space heating operation

NOTE: “[_ _ _]” in the following indicates the characters that should show on the *Ultra* display panel. “180” in the right 3 places means the display shows the measured boiler water temperature. The number shown will not necessarily be 180.

1. Turn down aquastat on PLUS tank. If necessary, turn off power and remove one of the PLUS aquastat wires to ensure boiler will not receive a DHW heat call.
2. Turn off power to boiler at service switch.
3. Wait a few seconds, then turn on power to boiler.
 - [R180] (*self-check* on power-up, for a few seconds)
 - [0180] (*no call for heat*)
4. Raise room thermostat to call for heat.
 - [5180] (*blower/circulator on*) The blower and boiler circulator energize and the control checks for air flow.
 - [1180] (*prepurge*) After a few seconds delay (control self-check), blower speed will increase to ignition speed. The blower will run in prepurge for 10 seconds.
 - [2180] (*ignition*) After prepurge, the control module opens the gas valve and starts ignition spark.
 - a. If burner flame proves within 4.5 seconds, burner continues to fire. Burner will fire at start-up rate — 50% of maximum input — for about 10 seconds to allow flame to stabilize.
 - b. If burner flame does not prove within 4.5 seconds, control module attempts ignition sequence again. Flame must prove within 5 attempts or control will lockout (display will show [E 02]).
 - c. Verify flame failure operation by closing boiler manual gas cock to prevent gas flow. Open manual gas valve after testing.



B4 Start-up – Ultra Gas boilers only *(continued)*

- After this low fire period, the burner is allowed to modulate. Firing rate depends on actual outlet water temperature versus target temperature.
- 5. Allow boiler to bring water temperature to target temperature.
 - [5:80] (*target temperature reached*) The burner will shut down. The blower will run in postpurge (see below), then turn off. The boiler circulator continues to run as long as there is a call for heat.
- 6. Lower room thermostat to stop call for heat.
 - [1:80] (*postpurge*) When the room thermostat is satisfied (call for heat ended), the burner turns off. The blower will continue for a 15-second postpurge, then turn off. (If another call for heat occurs, the boiler will remain off for one minute before starting again, and the display will show [5:80].)
 - [0:80] (*no call for heat*) Boiler is now in standby mode (waiting for heat call).
- 7. Repeat above steps several times to verify operation.
- 8. Return the room thermostat to normal setting.
 - c. Verify flame failure operation by closing boiler manual gas valve to prevent gas flow. Open gas cock after testing.
- [4:80] (*burner on, PLUS*) Once flame is proven and stable, the burner is allowed to modulate. Firing rate depends on actual outlet water temperature versus target temperature.
- 5. Allow boiler to bring water temperature to target temperature.
 - [5:80] (*target temperature reached*) The burner will shut down. The blower will run in postpurge (see below), then turn off. The PLUS circulator continues to run as long as there is a call for PLUS heating.
- 6. Lower PLUS aquastat to stop call for heat.
 - [1:80] (*postpurge*) When the room thermostat is satisfied (call for heat ended), the burner turns off. The blower will continue for a 15-second postpurge, then turn off. (If another PLUS call for heat occurs, the boiler will begin the heating cycle immediately.)
 - [8:80] (*PLUS circulator run-on*) The PLUS circulator continues to run for 30 seconds.
 - [0:80] (*no call for heat*) Boiler is now in standby mode (waiting for heat call).
- 7. Repeat above steps several times to verify operation.
- 8. Return the PLUS aquastat to normal setting.

Verify water heater operation

1. Reconnect PLUS aquastat wiring to boiler if necessary.
2. Turn off power to boiler at service switch.
3. Wait a few seconds, then turn on power to boiler.
 - [R:80] (*self-check* on power-up, for a few seconds)
 - [0:80] (*no call for heat*)
4. Raise PLUS aquastat above tank temperature, to call for heat.
 - [5:80] (*blower/circulator on*) The blower and PLUS circulator energize and the control checks for air flow.
 - [1:80] (*prepurge*) Blower speed will increase to ignition speed. The blower will run in prepurge for 10 seconds.
 - [2:80] (*ignition*) After prepurge, the control module opens the gas valve and starts ignition spark.
 - a. If burner flame proves within 4.5 seconds, burner continues to fire. Burner will fire at start-up rate — 50% of maximum input — for about 10 seconds to allow flame to stabilize.
 - b. If burner flame does not prove within 4.5 seconds, control module attempts ignition sequence again. Flame must prove within 5 attempts or control will lockout (display will show [E 02]).

Operating information

1. To check operating conditions (actual and target temperatures, for example), see *Ultra Gas Boiler Manual* for an explanation of the *Ultra* control module Information mode.
2. During normal operation (no shutdown or lock-out), the right 3 display digits show actual boiler outlet water temperature.

Replace jacket front door

WARNING

Replace boiler jacket front door after installation or servicing. The boiler front door must be securely fastened to the boiler to prevent boiler from drawing air from inside the boiler room. This is particularly important if the boiler is located in the same room as other appliances. Failure to keep the door securely fastened could result in severe personal injury or death.



C Boiler-side piping (except *Ultra Gas*)

NOTICE

This section provides suggested boiler-side and system piping for boilers other than *Ultra Gas*-fired boilers (see Section B for *Ultra Gas* applications). You will find suggested piping for:

- single or multiple water heaters
- zoned systems using zone valves or circulators
- dedicated boiler applications
- recirculation piping

Make sure to apply an appropriate control wiring method. Each piping diagram lists compatible control wiring diagrams in Section D.

Zoning with pumps

GOLD PLUS 30/40/60/80 or *Ultra* PLUS 40/60/80

Two-pipe system piping — Figure 20.....	36
Primary/secondary piping — Figure 21.....	37

PLUS 100/110/119

Primary/secondary piping — Figure 22.....	38
---	----

Zoning with zone valves

Figure 23 (All water heater models)	39
---	----

Dedicated boiler applications

GOLD PLUS 30/40/60/80 or *Ultra* PLUS 40/60/80

Figure 24	40
-----------------	----

PLUS 100/110/119

Figure 25	41
-----------------	----

Multiple water heater applications

Multiple water heaters – water heater piping — Figures 26/27.....	42
Boiler water piping for multiple water heaters — Figure 28.....	43

Connecting a water heater to a steam boiler

Figure 29	45
-----------------	----



C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 20

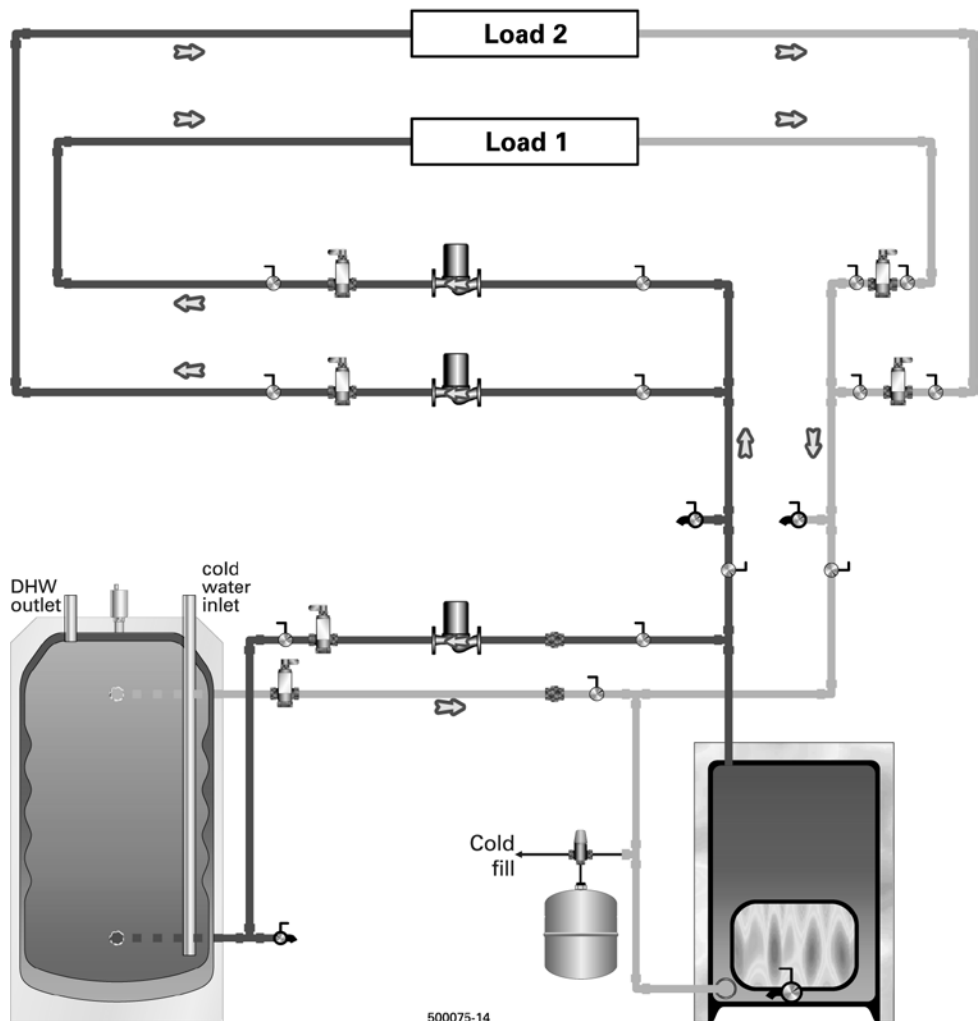
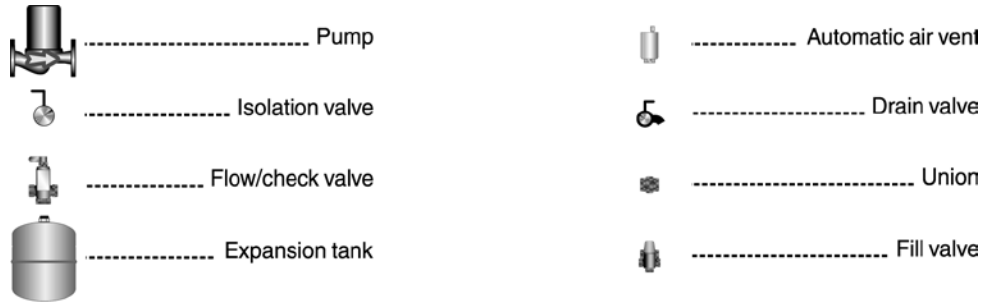
GOLD Plus 30/40/60/80
Ultra Plus 40/60/80

• Zoning with pumps

- Place pumps at beginnings of zones. Placing them at the ends of zones could result in heating idle zones.
- Size manifold piping for total flow of all zone pumps.
- Locate flow/check valves as close as possible to water heater boiler side connections — to reduce heat loss between cycles.
- Pipe GV boilers only as shown on page 24.

Wiring options:

- Figure 30, page 48 — WMCR zone controller, optional priority
- Figure 31, page 49 — Priority zone pump
- Figure 32, page 50 — Pump relays with domestic priority
- Figure 33, page 51 — Pump relays without domestic priority



Notes

1. This drawing is conceptual only. It shows representative piping components and layout. Weil-McLain does not represent that this drawing meets any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.



C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 21

GOLD Plus 30/40/60/80

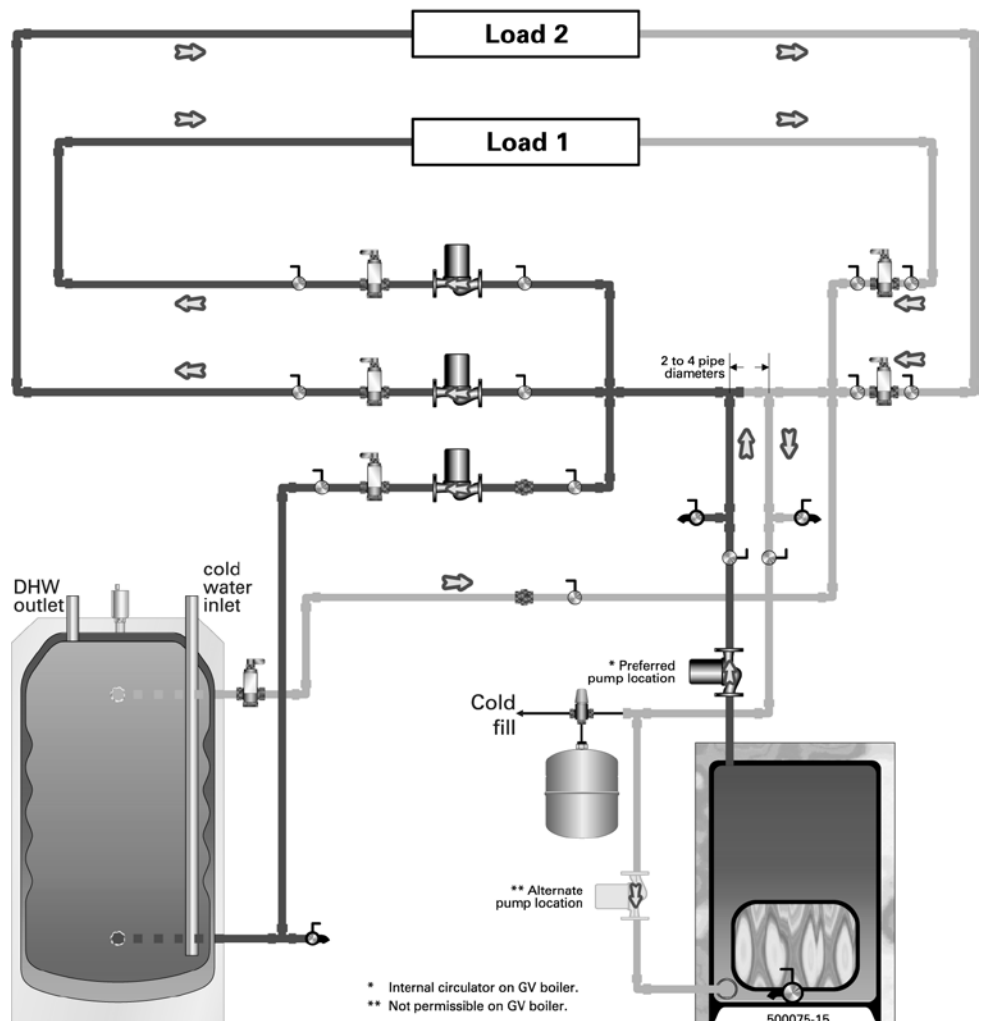
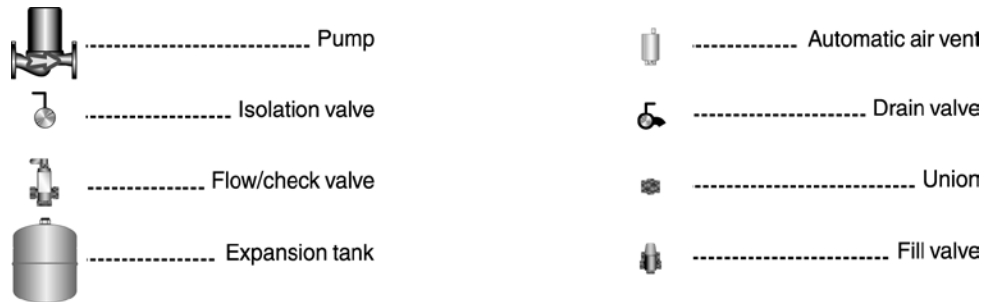
Ultra Plus 40/60/80

- Zoning with pumps
- Primary/secondary piping

- **Place** pumps at beginnings of zones. Placing them at the ends of zones could result in heating idle zones.
- **Size** primary circuit manifold for total flow of all zone pumps, with pressure drop of no more than 1 foot W.C.
- **Locate** flow/check valves as close as possible to water heater boiler side connections — to reduce heat loss between cycles.

Wiring options:

- **Figure 30**, page 48 — WMCR zone controller, optional priority
- **Figure 31**, page 49 — Priority zone pump
- **Figure 32**, page 50 — Pump relays with domestic priority
- **Figure 33**, page 51 — Pump relays without domestic priority



* Internal circulator on GV boiler.
 ** Not permissible on GV boiler.

Notes

1. This drawing is conceptual only. It shows representative piping components and layout. Weil-McLain does not represent that this drawing meets any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.



C Boiler-side piping (except *Ultra Gas*) *continued*

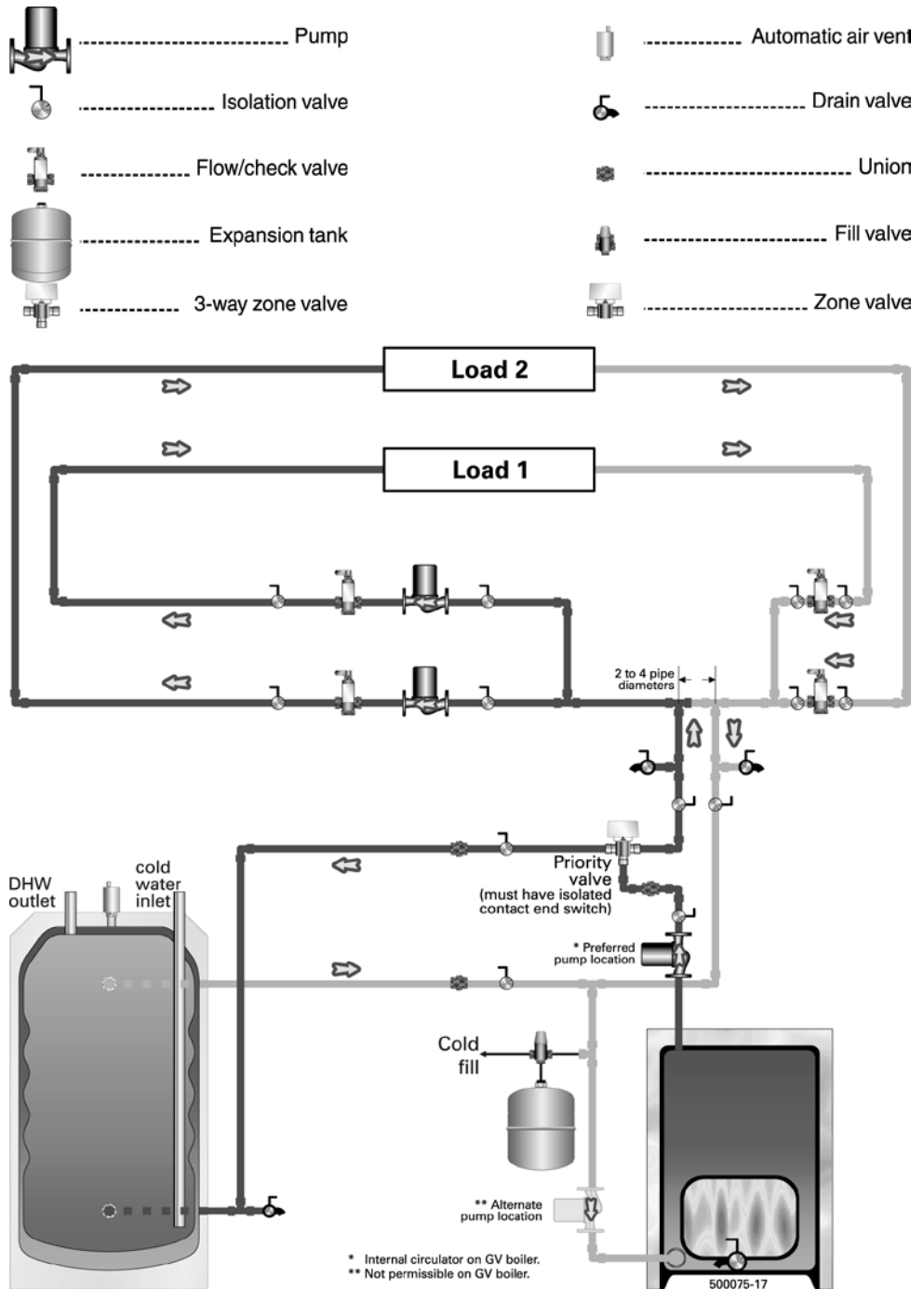
Figure 22

GOLD Plus 30/40/60/80
Ultra Plus 40/60/80
 PLUS 100/110/119

- Zoning with pumps
- Primary/secondary piping
- Place pumps at beginnings of zones. Placing them at the ends of zones could result in heating idle zones.
- Size primary circuit manifold for total flow of all zone pumps, with pressure drop of no more than 1 foot W.C.

Wiring options:

- Figure 42, page 60 — Pump relays and 3-way priority valve and priority relay



Notes

1. This drawing is conceptual only. It shows representative piping components and layout. Weil-McLain does not represent that this drawing meets any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.



C Boiler-side piping (except *Ultra Gas*) continued

Figure 23

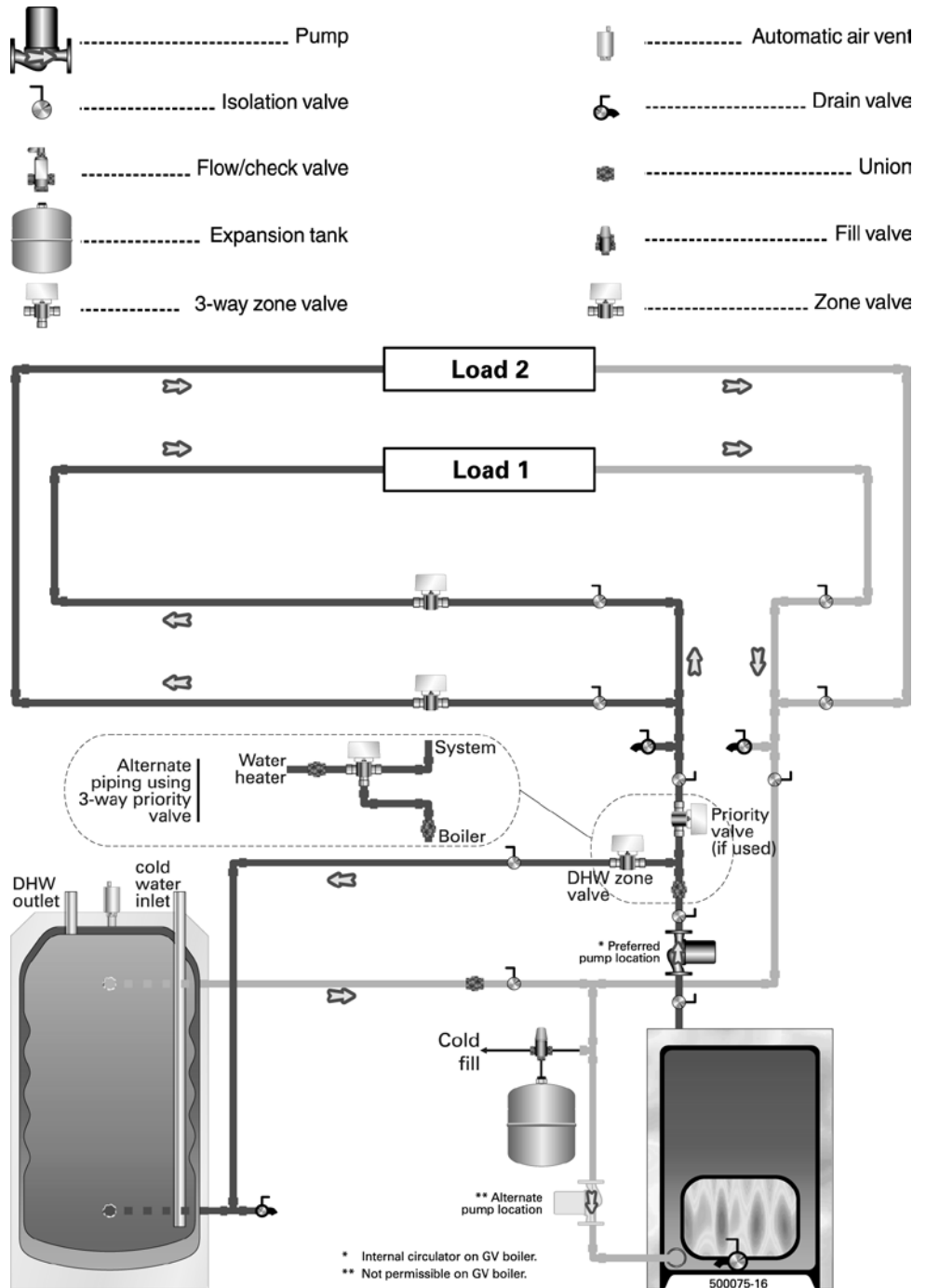
GOLD Plus 30/40/60/80
Ultra Plus 40/60/80
PLUS 100/110/119

• **Zoning with zone valves**

- **Place pumps at beginnings of zones.** Placing them at the ends of zones could result in heating idle zones.
- **Size manifold piping for total flow of all zone pumps.**

Wiring options:

- **Figure 34, page 52** — WMZV zone valve controller, priority optional (priority valve not required)
- **Figure 40, page 58 or Figure 41, page 59** — Priority using 2-way valve
- **Figure 37, page 55 or Figure 38, page 56** — Priority with 2-way priority valve and 2-way zone valve on water heater circuit
- **Figure 35, page 53 or Figure 36, page 54** — No priority, using 2-way zone valve on water heater circuit



Notes

1. This drawing is conceptual only. It shows representative piping components and layout. Weil-McLain does not represent that this drawing meets any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.

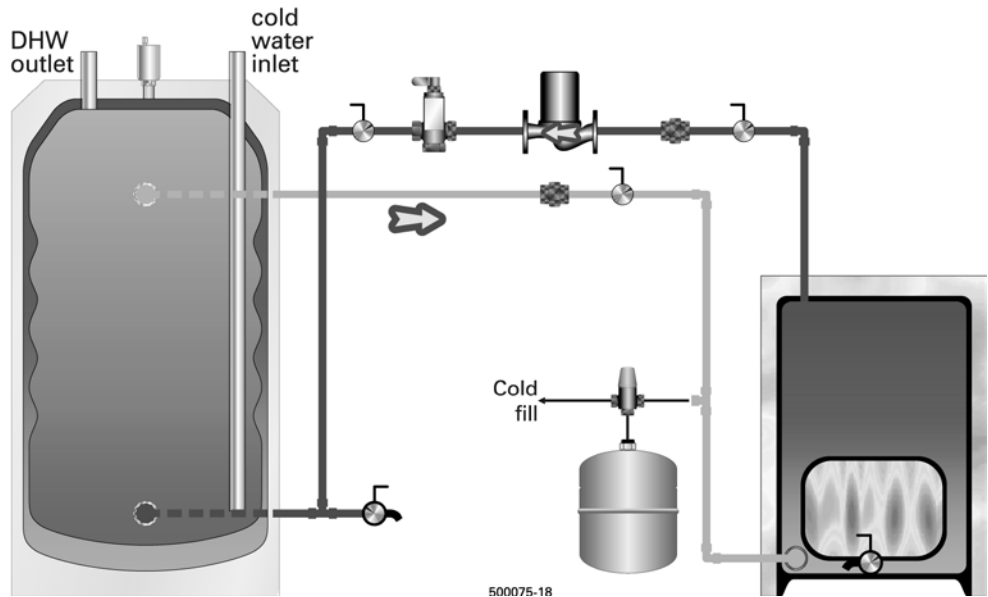
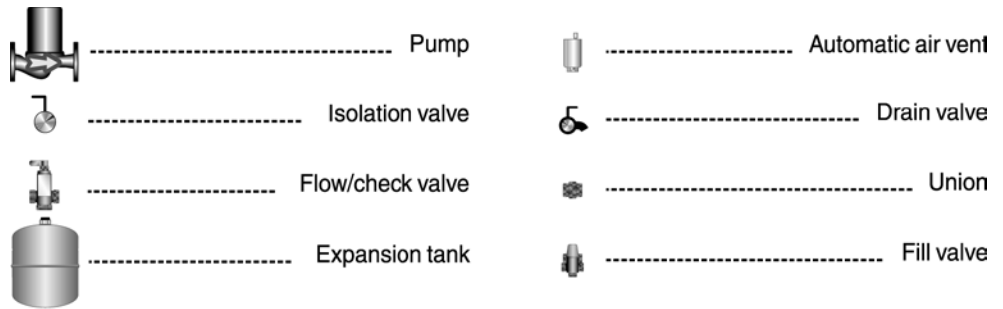


C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 24

Dedicated single boiler with single water heater
In residential application (typically GOLD Plus 30/40/60/80 or Ultra Plus 40/60/80).

- **Locate flow/check valve as close as possible to water heater boiler side connections — to reduce heat loss between cycles.**



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.
3. Recommended piping for PLUS 100/110/119 water heaters used in residential applications.



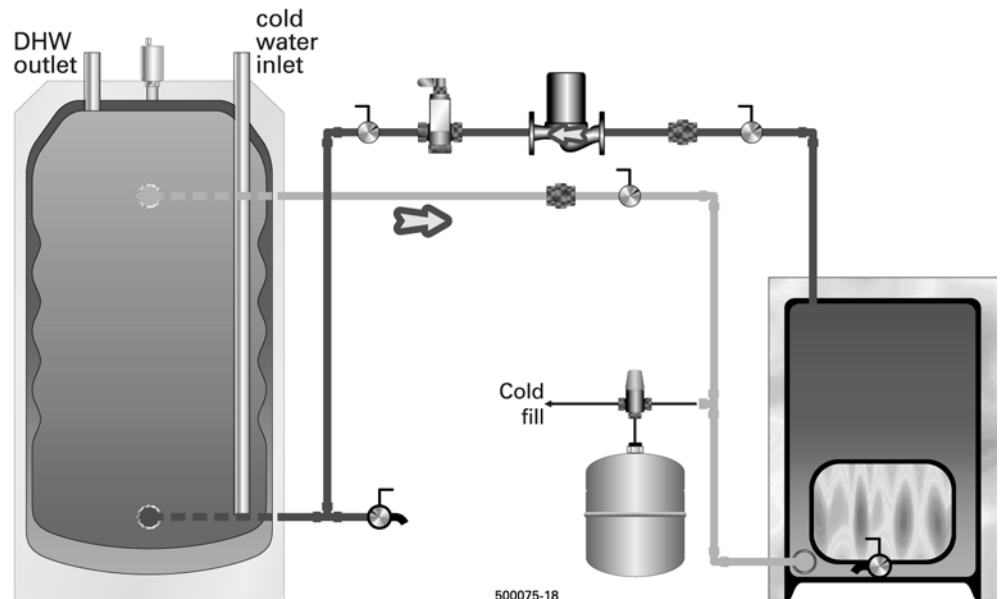
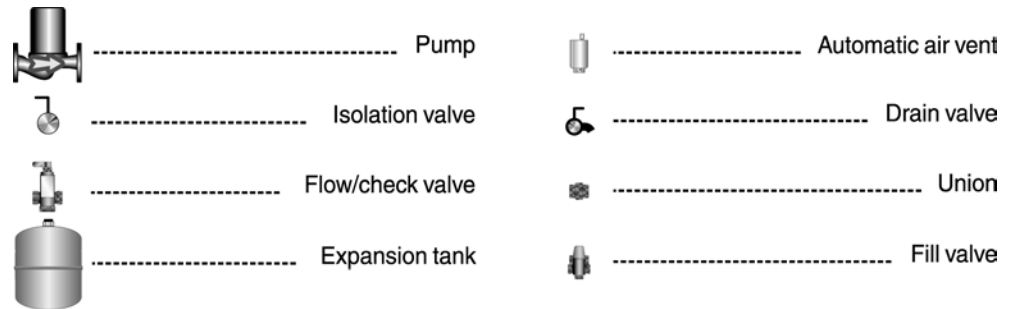
C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 25

Dedicated single boiler with single water heater

In commercial application (typically PLUS 100/110/119).

- **Locate** flow/check valve as close as possible to water heater boiler side connections — to reduce heat loss between cycles.



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.
3. Recommended piping for GOLD Plus 30/40/60/80 water heaters used in commercial applications.



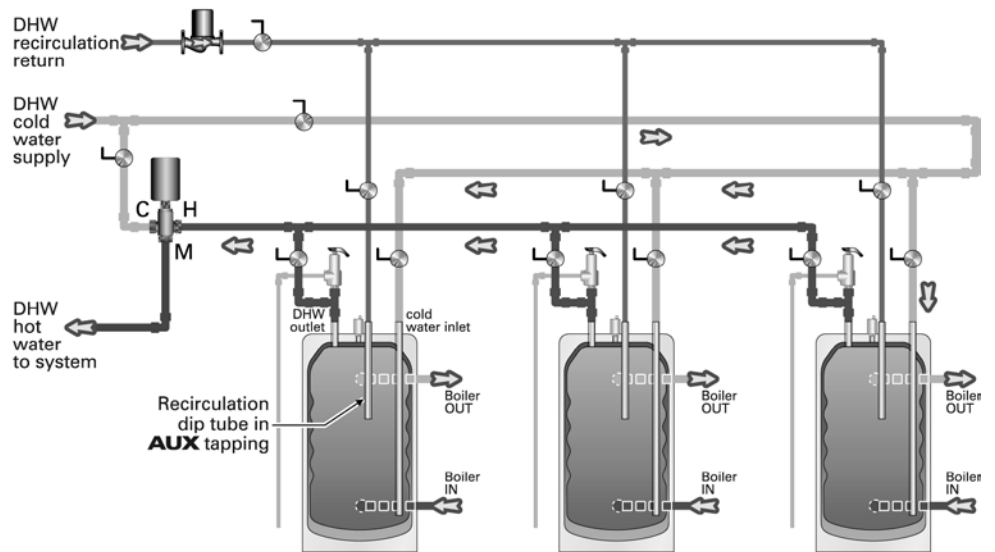
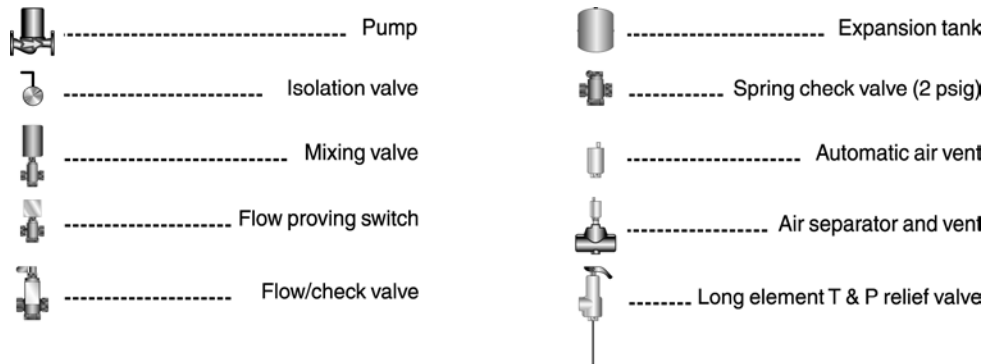
C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 26

Multiple water heaters — domestic water piping

WARNING

Failure to install automatic mixing valve where recommended can result in severe personal injury or death.



500075-20

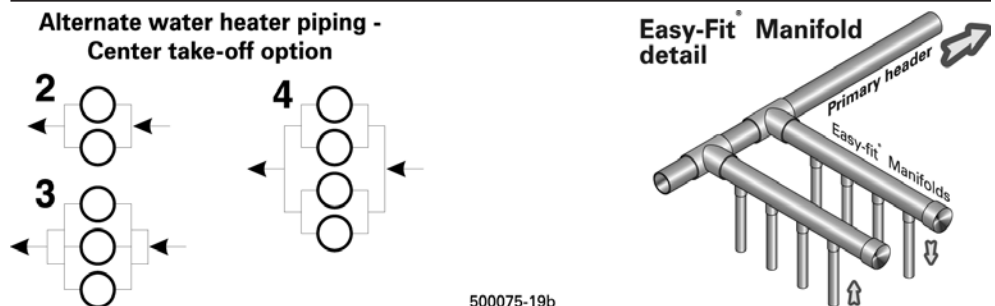
Water heaters (front)

Notes

1. The drawings on this page are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that these drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Any one PLUS tank thermostat may be utilized to control heater temperature.
3. Install automatic mixing valve at either the system hot water connection or at each water heater.
4. See pages 32-33 for additional recirculation information and piping detail.

Figure 27

Details for Figure 28, page 43 — alternate water heater piping and Easy-Fit[®] Manifold detail



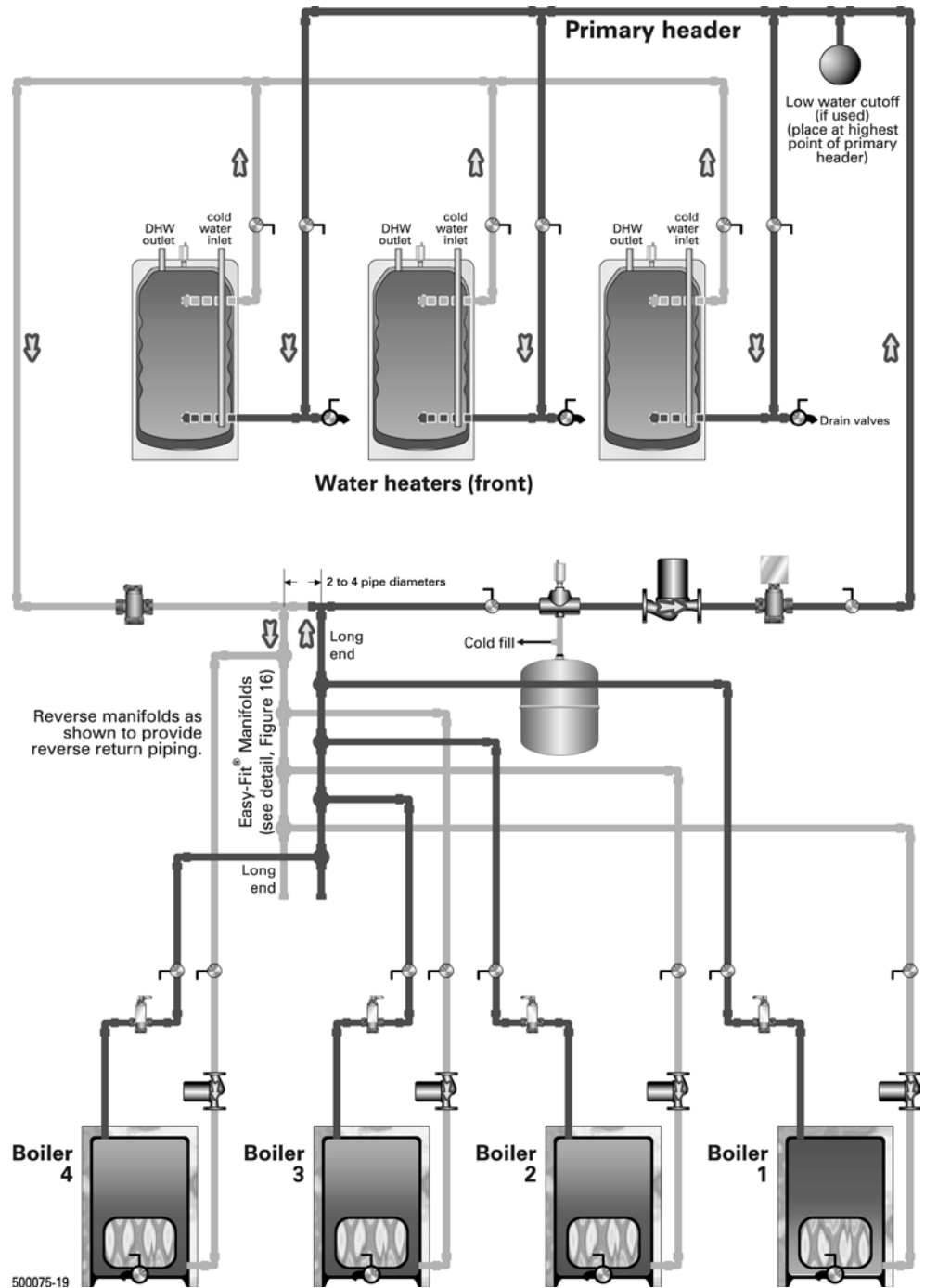
500075-19b



C Boiler-side piping (except *Ultra Gas*) *continued*

Figure 28

Multiple water heaters and dedicated multiple boilers — boiler water piping —
boiler water piping
 (see legend and details in Figure 26, page 42)



Notes

1. This drawing is conceptual only. It shows representative piping components and layout. Weil-McLain does not represent that this drawing meets any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawing. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.



C Boiler-side piping (except *Ultra Gas*) *continued*

WARNING

ON STEAM BOILER APPLICATIONS ONLY — You must replace the automatic air vent supplied with the water heater with a manual air vent. Failure to do so could result in severe personal injury, death or substantial property damage.

Connecting water heater to steam boiler

When designing steam and domestic hot water systems, there are some key issues that must be taken into consideration during the initial design phase. By designing the system properly from the start, you can avoid problems and have a hot water loop in a steam boiler system.

Special considerations:

- Keep the loop temperature below the flash point. Flashing can result in noise and circulator damage or shortened life.
- Be sure the loop is completely closed, with no automatic air vents or anything that could allow air to enter the system when the pump shuts off. Use manual air vents only to prevent the possibility of flooding the boiler.
- Pipe supply from one side of the boiler, return to the opposite side.
- Supply from a tapping that is high enough to prevent introducing sediment into the piping and circulator yet still positions the circulator below the water line. Avoid the mud leg of the boiler.
- Use an all bronze circulator (avoid wet rotor circulators). This will reduce clogging and will resist the corrosion potential from the steam condensate.
- Make sure the circulator is properly sized. If the pump runs too far out on the curve, cavitation potential increases significantly.
- Return piping should be dedicated domestic return.
- Use (2) flow/check valves as shown to reduce the potential for gravity circulation. Do not use spring-loaded check valves in place of the flow/check valves shown in Figure 29 on page 45.

Installation and start-up of water heaters connected to steam boilers

See Figure 29, page 45, for suggested piping schematic. Pipe the domestic water connections to the water heater per Section A of this manual.

- Boiler connections for the water heater must be below the water line.
- For steam piping, refer to the boiler manual.
- Replace the automatic air vent furnished with the water heater with a manual air vent.
- Wire the water heater and circulator to the boiler per suggested wiring in Figure 29.

To fill the boiler and water heater:

- Close isolation valves 5 and 6 (Figure 29) to isolate the boiler.
- Fill the boiler to the recommended water level per the boiler manual. Fill the domestic side of the water heater per Section A of this manual.
- To fill the water heater outer tank with boiler water, isolation valves 5 and 6 must remain closed. Valves 1 and 2 should be fully opened. Drain valves 3 and 4 should also be fully opened.
- Open the water heater manual air vent to bleed the system of air.

NOTICE

Open the water heater manual air vent one turn only.

- Fill the boiler/water heater system through drain valve 3 until a steady stream of water flows through drain valve 4, initially purging the system of air.
- Continue to fill the boiler/water heater system while closing drain valve 4.
- When drain valve 4 is fully closed and a steady stream of water is exiting at the air vent, close the manual air vent tightly. Drain valve 3 can now be closed.

CAUTION

Water may spray from the manual air vent.

- Open isolation valve 5 (at the front of the boiler). Then open valve 6.
- Start the boiler per instructions given in the boiler manual.



C Boiler-side piping (except *Ultra Gas*) continued

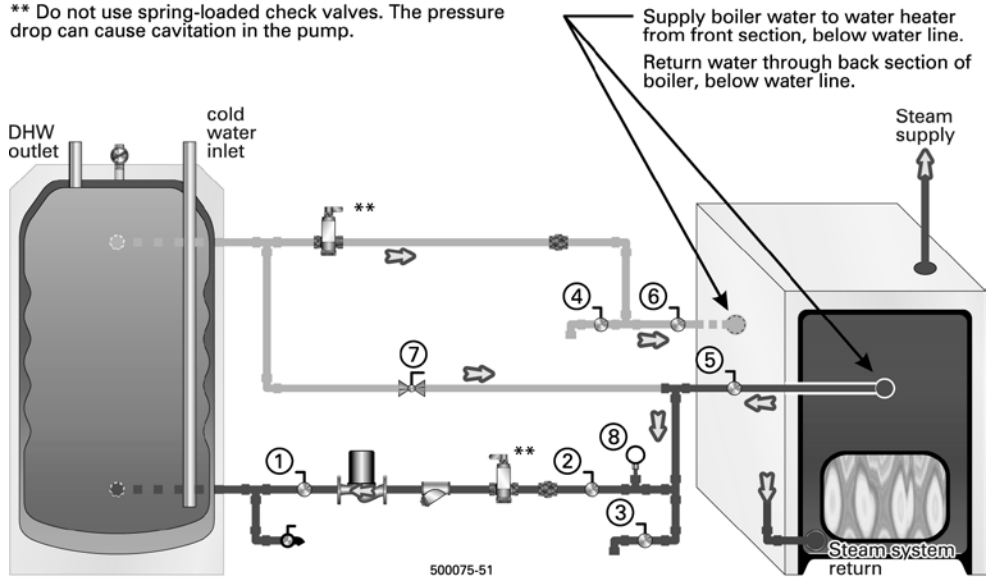
Figure 29

Steam boiler application
 Domestic water heating using water pumped from steam boiler

- **Locate** flow/check valve as close as possible to water heater boiler side connections — to reduce heat loss between cycles.

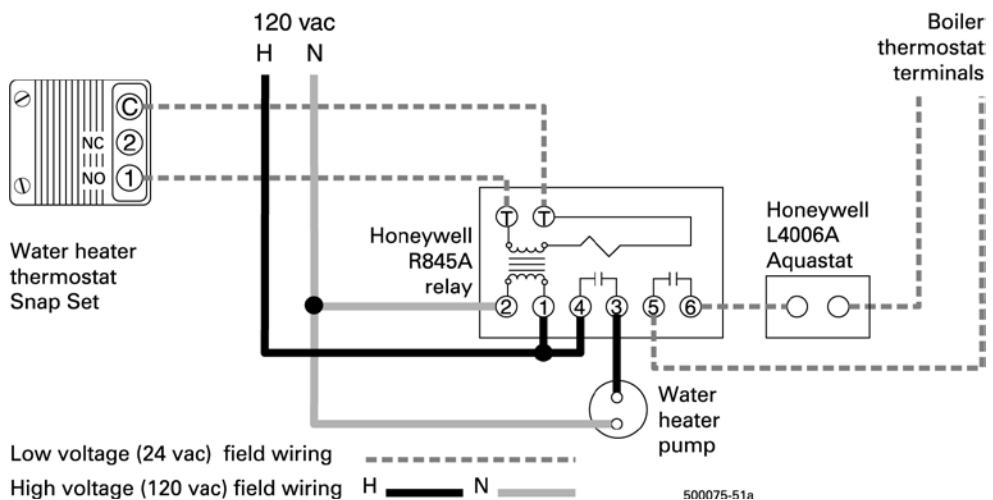


** Do not use spring-loaded check valves. The pressure drop can cause cavitation in the pump.



NOTICE

Use ball valve 7 to blend some of the water returning to the boiler with the hot water coming from the boiler. This will reduce the possibility of flashing (cavitation) in the circulator. Slowly open valve 7 until temperature gauge 8 reads 200°F. Lock or remove the handle from valve 7 after adjusting.



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*)

NOTICE

This section provides suggested boiler-side wiring and control suggestions for boilers covered in Section C of this manual. Section D does not apply to *Ultra Gas*-fired boilers, covered in Section B. In Section D, you will find suggested wiring for:

- zoning with zone valves
- zoning with circulators
- wiring with and without domestic priority
- using separate relays or zone controllers

Make sure to use a compatible piping method as shown in the Section C. (Each wiring diagram lists compatible piping alternatives.)

WIRING REQUIREMENTS 47

 Wiring requirements — Circulators 47

 Wiring requirements — Zone Valves..... 47

 Boiler models requiring domestic priority with GOLD Plus 30 47

ZONING WITH PUMPS:

Zoning with Weil-McLain circulator zone controller (WMCR)

 • Weil-McLain circulator zone controller..... 48

Other options for for zoning with pumps

 • Using priority zone pump 49

 • Using pump relays • Domestic priority with priority relay 50

 • Using pump relays • No domestic priority 51

 • Pumps relays • Domestic priority with 3-way priority valve & priority relay 60

ZONING WITH ZONE VALVES:

Zoning with Weil-McLain zone valve controller (WMZV)

 • Domestic priority optional (controller switch) 52

Zoning with 4-wire zone valves

 • No domestic priority 53

 • With or without priority • GOLD Plus 30/40/60/80 or *Ultra Plus* 40/60/80..... 55

 • With domestic priority • PLUS 100/110/119 57

 • With domestic priority using 2-way priority valve • PLUS 100/110/119 58

Zoning with 3-wire zone valves

 • No domestic priority 54

 • With or without priority • GOLD Plus 30/40/60/80 or *Ultra Plus* 40/60/80..... 56

 • With domestic priority • PLUS 100/110/119 57

 • With domestic priority using 2-way priority valve..... 59



D Boiler-side wiring & controls (except *Ultra Gas*) continued

WARNING Electrical shock hazard.
Can cause severe personal injury, death or substantial property damage. Disconnect power before installing and/or servicing.

Wiring requirements

1. All wiring must be a minimum of 18 gauge and installed in accordance with:
 - U.S.A. — National Electrical Code and any other national, state or local code requirements having jurisdiction.
 - Canada — CSA C22.1 Canadian Electrical Code Part 1 and any other national, provincial and local code requirements having jurisdiction.
2. If original wire as supplied with appliance must be replaced, Type 90° C or its equivalent must be used.
3. Refer to control component instructions packed with boiler for application information.
4. An optional service switch may be installed in water heater electrical circuit. This switch would only shut off the water heater, not the home heating system. Do not shut off water heater if there is a chance of freezing.
5. All electrical contacts are shown with no power applied - off shelf condition.

Circulators

6. Size priority relay for total amp draw of all circulators.

Zone Valves

7. Size transformer for maximum load of all zone valves.
8. Priority valve (Figures 40–41, pages 58–59) is closed when heating domestic water.

NOTICE Domestic priority is recommended for the boilers listed in Table 5, below, when used with GOLD Plus 30 water heaters:

Table 5

These boiler models should use domestic priority when used with heater GOLD Plus 30

Boiler Models	
CGa	25/3/4/5/6/7/8
GV, CGi, CG, CGs, CGx	3/4/5/6
EG	35/40/45/50
68, GO	2/3/4



D Boiler-side wiring & controls (except *Ultra Gas*) continued

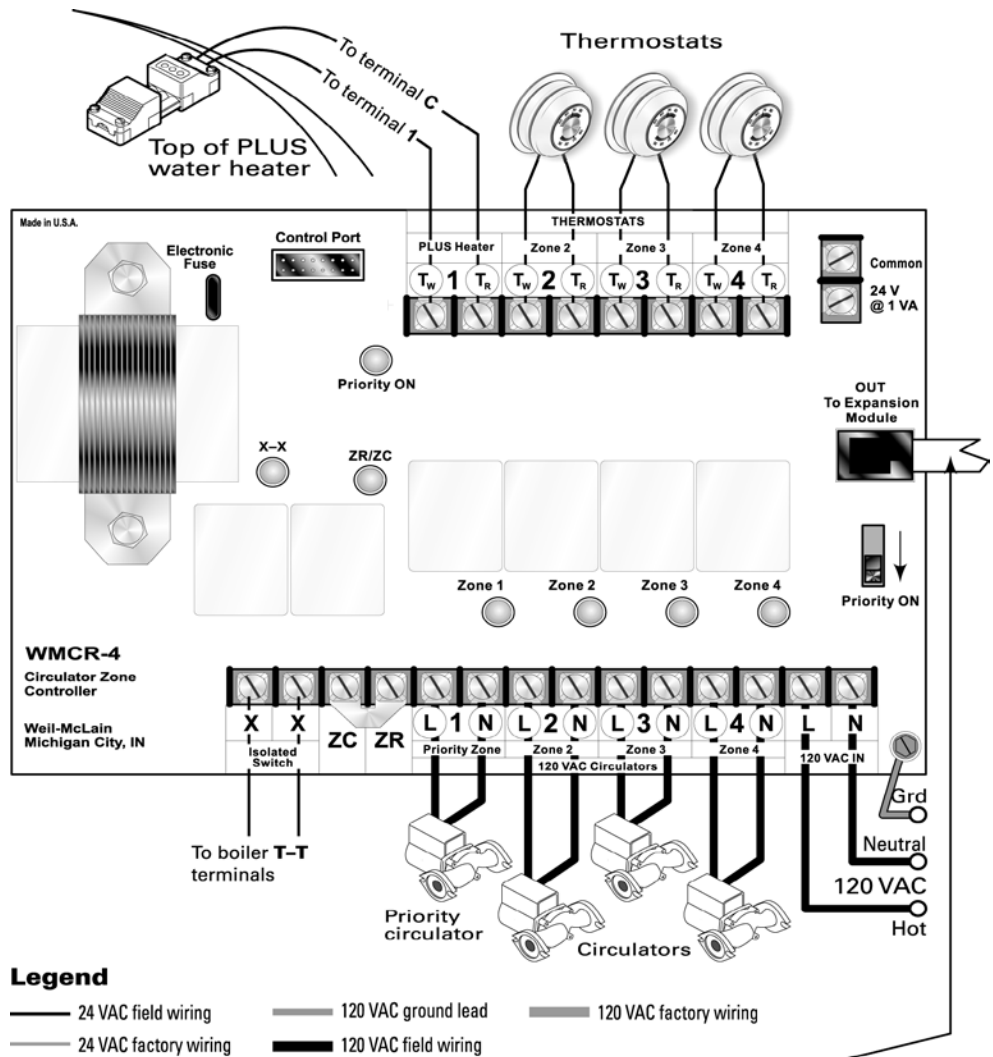
Figure 30 Domestic water priority with Weil-McLain WMCR Circulator Zone Controller

Typical wiring:

- Zoning with pumps
- Weil-McLain circulator zone controller (WMCR-4 shown)
- Refer to *Wiring requirements* on page 47.

System piping —

- Apply this wiring to systems in:
- Figure 20, page 36
 - Figure 21, page 37



Notice:
 WMCR-4 (4-zone control) is shown. Also available are:
 WMCR-2 (2-zone)
 WMCR-3 (3-zone)
 WMCR-6 (6-zone)

Optional:
 Provide additional zones by connecting to WMCR-1E or WMCR-4E Expansion Modules. See WMCR manual for examples.
DO NOT exceed a total of 15 zones.

50075-40

Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 31

Typical wiring :

- Zoning with pumps
- Using priority zone pump
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 20, page 36
- Figure 21, page 37

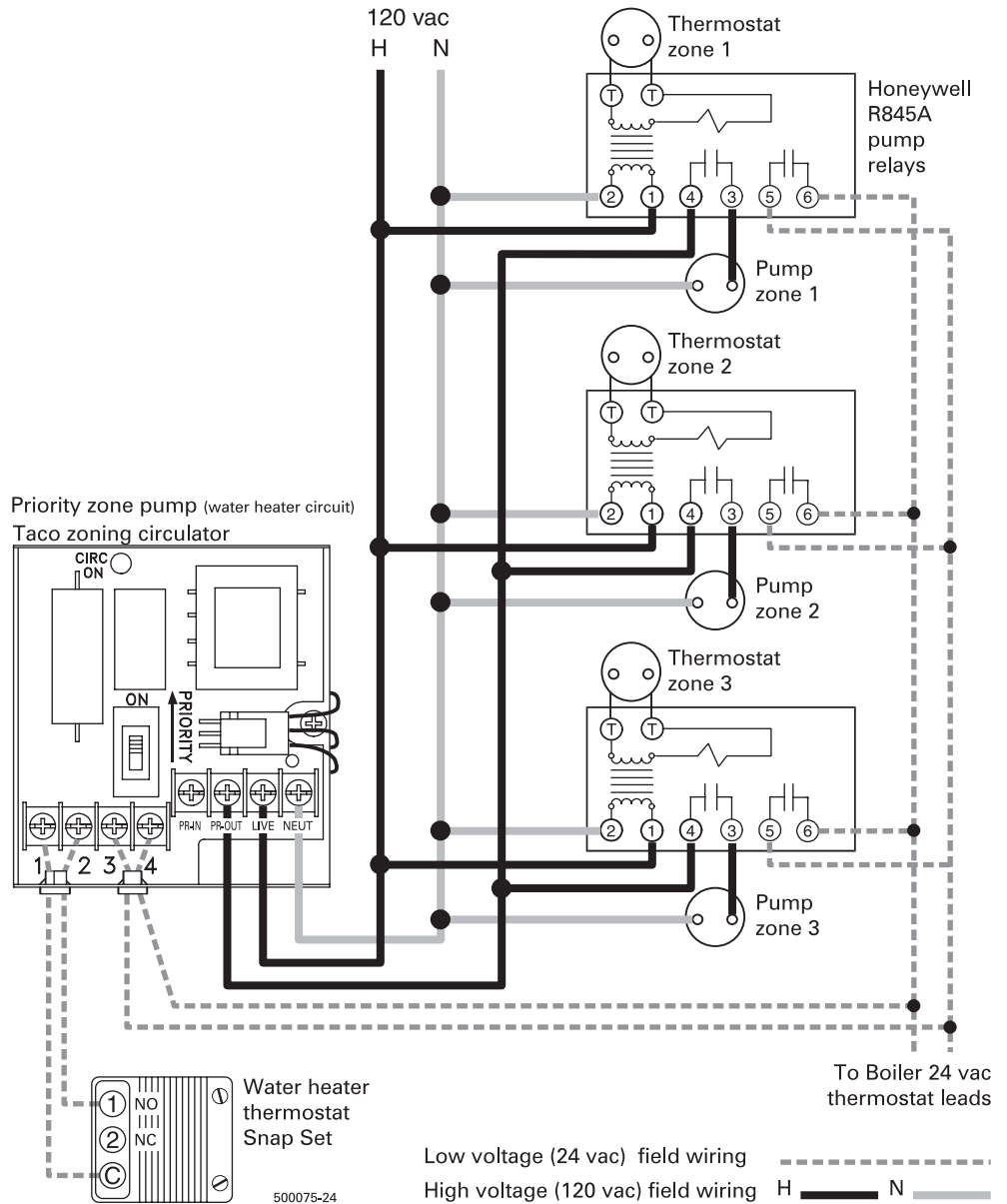
NOTICE

Primary/secondary piping systems

Boiler loop pump (for primary/secondary piping systems, as in Figure 21, page 37) should be powered by the boiler control or transformer/relay for packaged residential boilers. Provide a pump relay for this pump when pump relay is not provided with boiler.

Pump zones

Maximum of 4 total pump zones when wiring one zone for priority.



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 32

Typical wiring:

- Zoning with pumps
- Using pump relays
- Domestic priority with priority relay
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

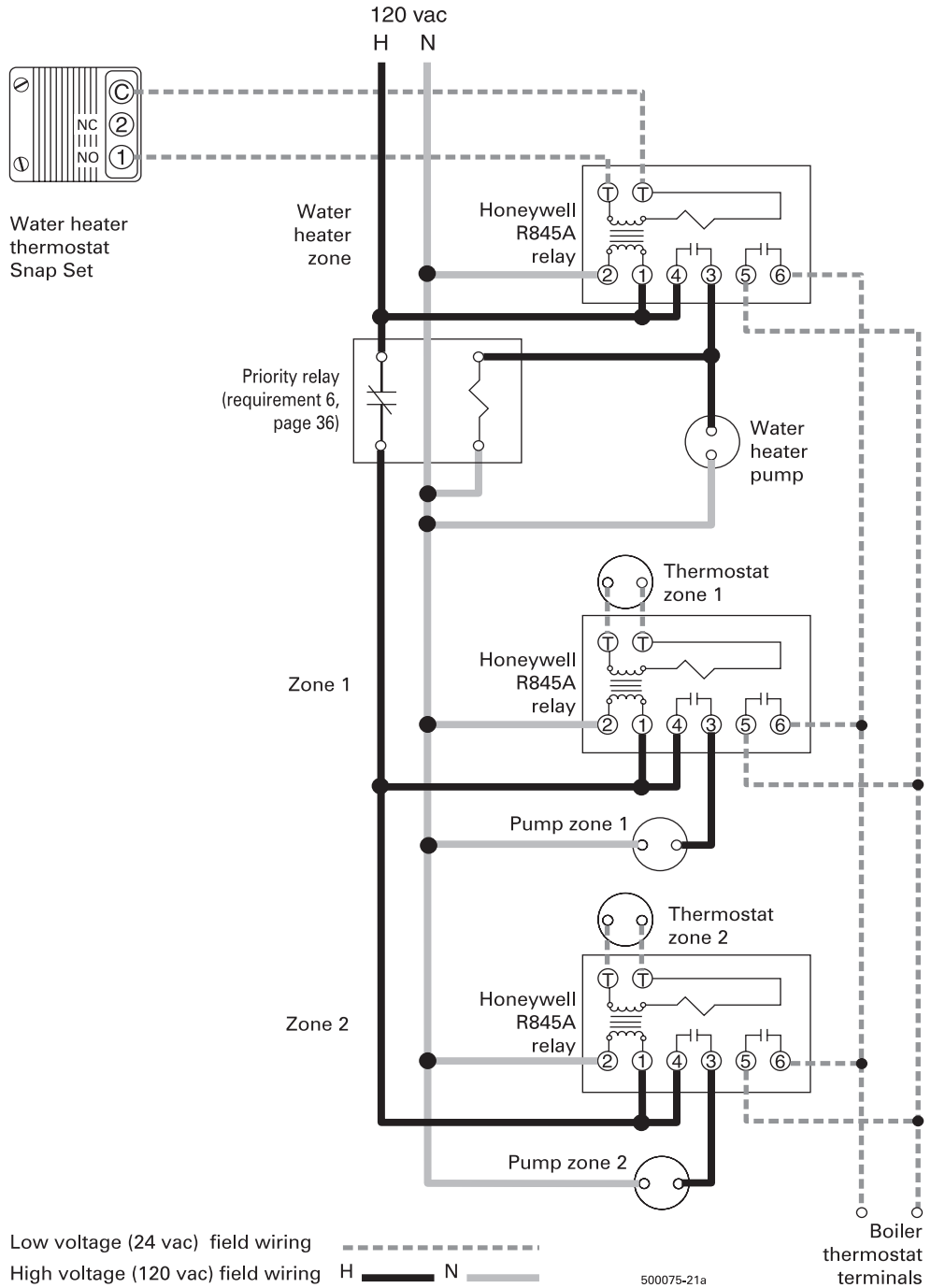
Apply this wiring to systems in:

- Figure 20, page 36
- Figure 21, page 37

NOTICE

Primary/secondary piping systems

Boiler loop pump (for primary/secondary piping systems, as in Figure 21, page 37) should be powered by the boiler control or transformer/relay for packaged residential boilers. Provide a pump relay for this pump when pump relay is not provided with boiler.



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 33

Typical wiring:

- Zoning with pumps
- Using pump relays
- No domestic priority

• Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.

• Refer to *Wiring requirements* on page 35.

System piping —

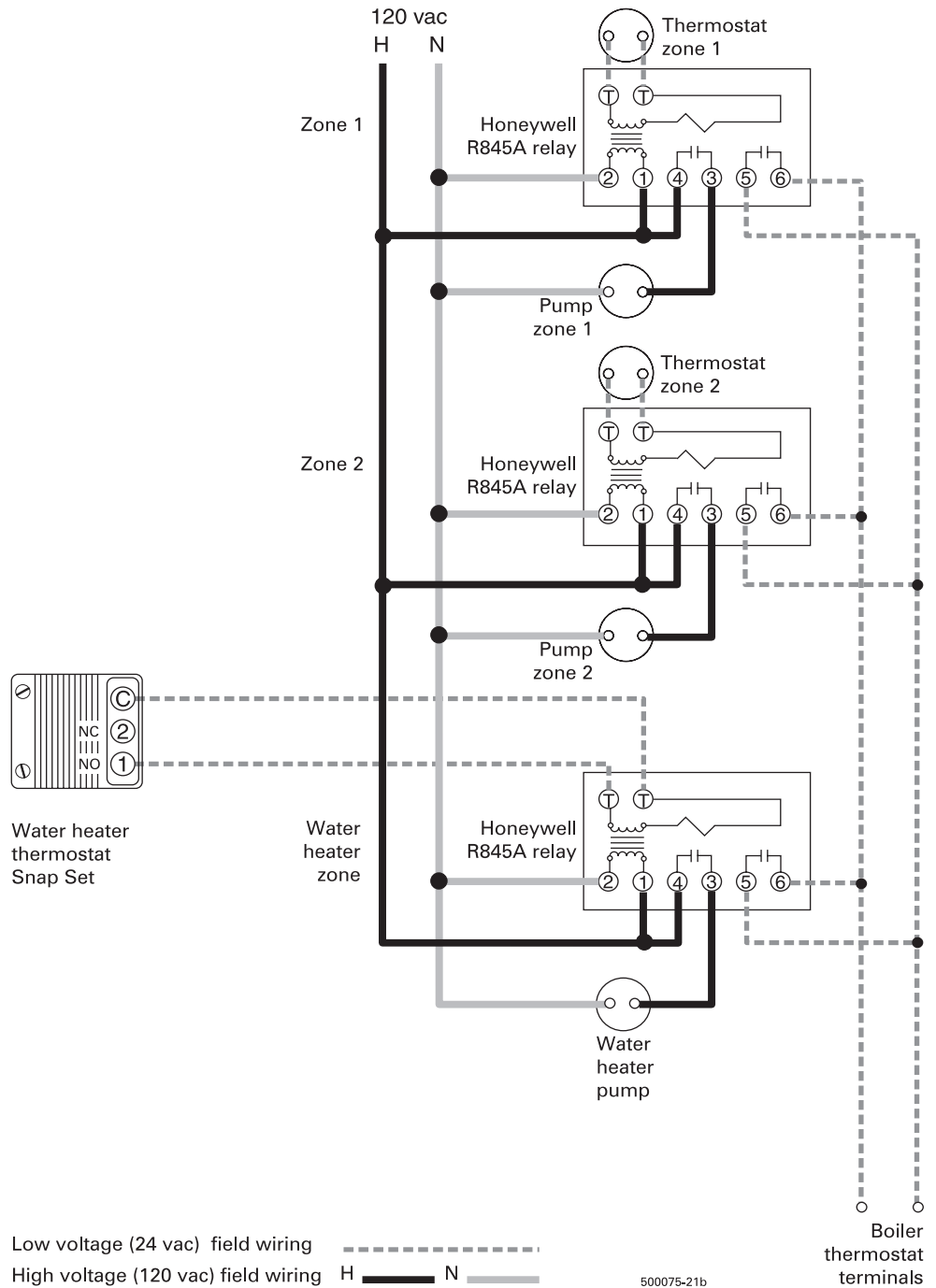
Apply this wiring to systems in:

- Figure 20, page 36
- Figure 21, page 37

NOTICE

Primary/secondary piping systems

Boiler loop pump (for primary/secondary piping systems, as in Figure 21, page 37) should be powered by the boiler control or transformer/relay for packaged residential boilers. Provide a pump relay for this pump when pump relay is not provided with boiler.



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 34 Domestic water priority with Weil-McLain WMZV Zone Valve Controller

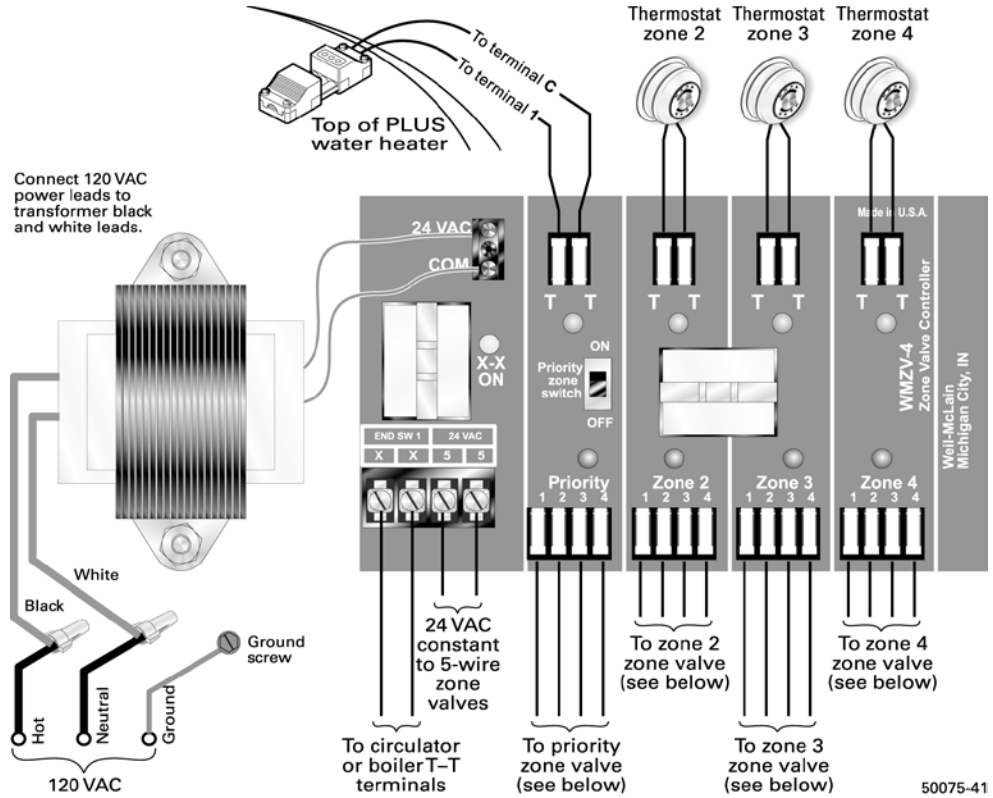
Typical wiring:

- Zoning with Weil-McLain zone valve controller (WMZV-4 shown)
- Domestic priority optional (controller switch)
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 23, page 39 (using 2-way water heater zone valve and no priority valve)



50075-41

NOTICE

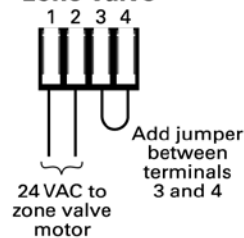
Install all zone valves per valve manufacturer's instructions.

Notice:
If PRIORITY ZONE SWITCH is in **ON** position, zones 2 to 4 will not operate when priority zone is actuated.

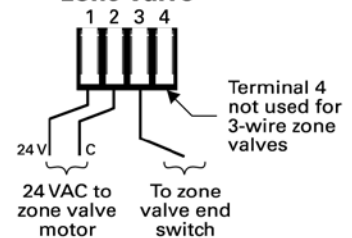
Notice:
WMZV-4 (4-zone control) is shown. Also available is the WMZV-6 (6-zone).

- Legend**
- 24 VAC field wiring
 - 24 VAC factory wiring
 - 120 VAC field wiring
 - 120 VAC factory wiring
 - 120 VAC ground lead

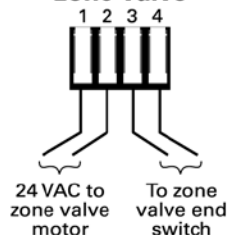
Connecting 2-wire zone valve



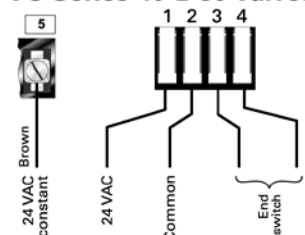
Connecting 3-wire zone valve



Connecting 4-wire zone valve



Connecting 5-wire VC Series 40 & 80 valves





D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 35

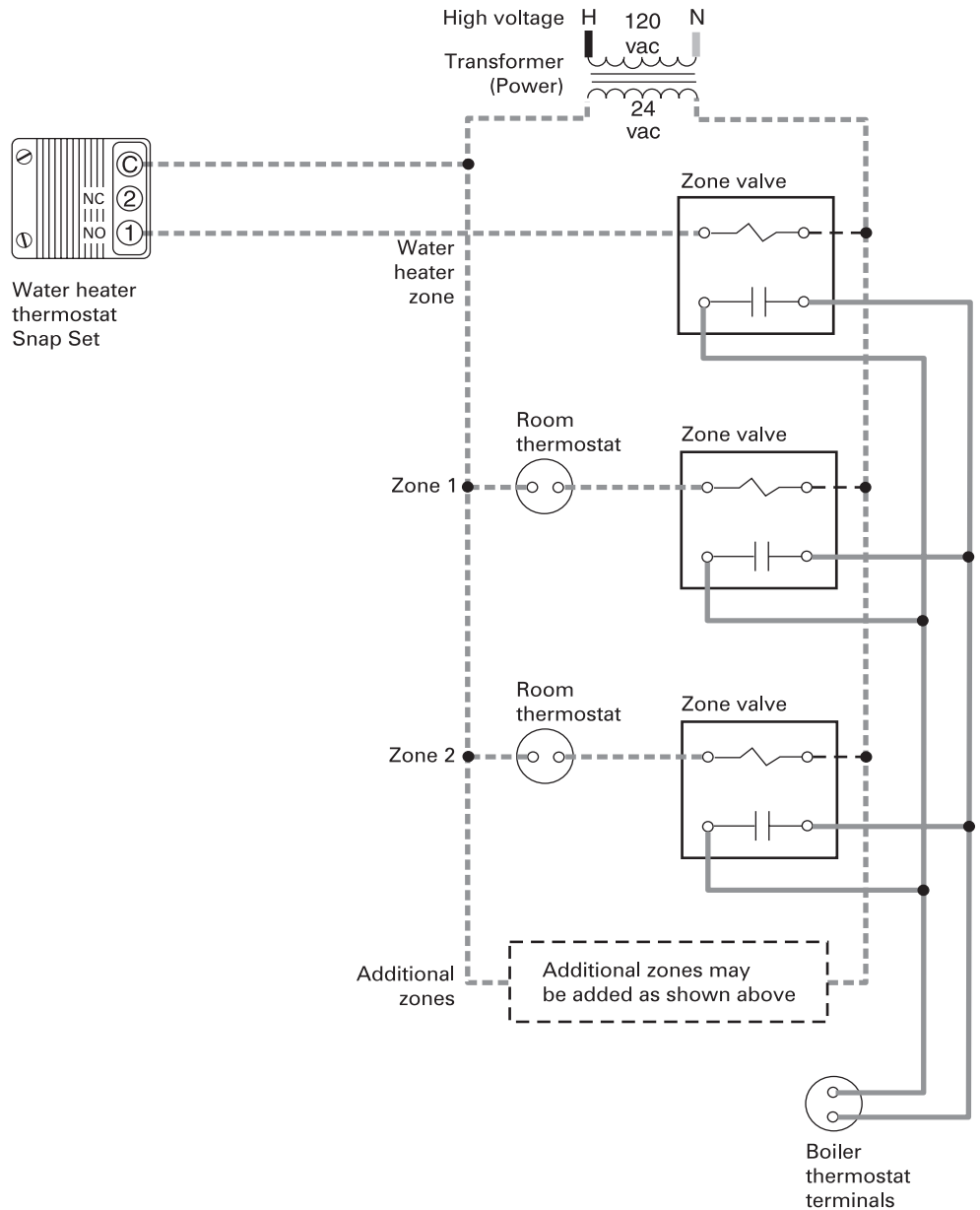
Typical wiring:

- Zoning with 4-wire zone valves
- No domestic priority
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 23, page 39 (using 2-way water heater zone valve and no priority valve)



Low voltage boiler field wiring —————
 Low voltage (24 vac) field wiring - - - - -
 High voltage (120 vac) field wiring H ——— N ———

500075-22a

Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 36

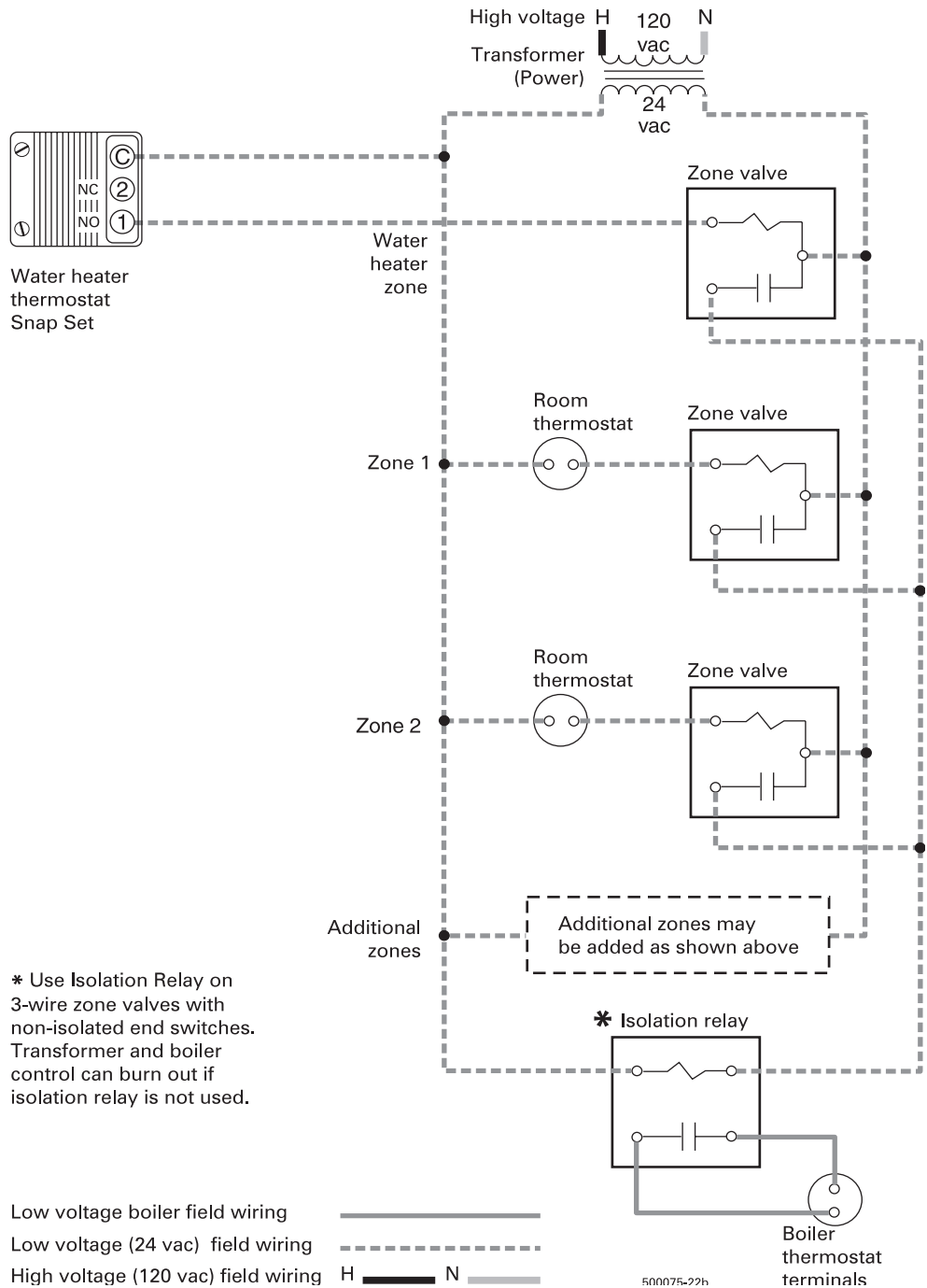
Typical wiring:

- Zoning with 3-wire zone valves
- No domestic priority
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 23, page 39 (using 2-way water heater zone valve and no priority valve)



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 37

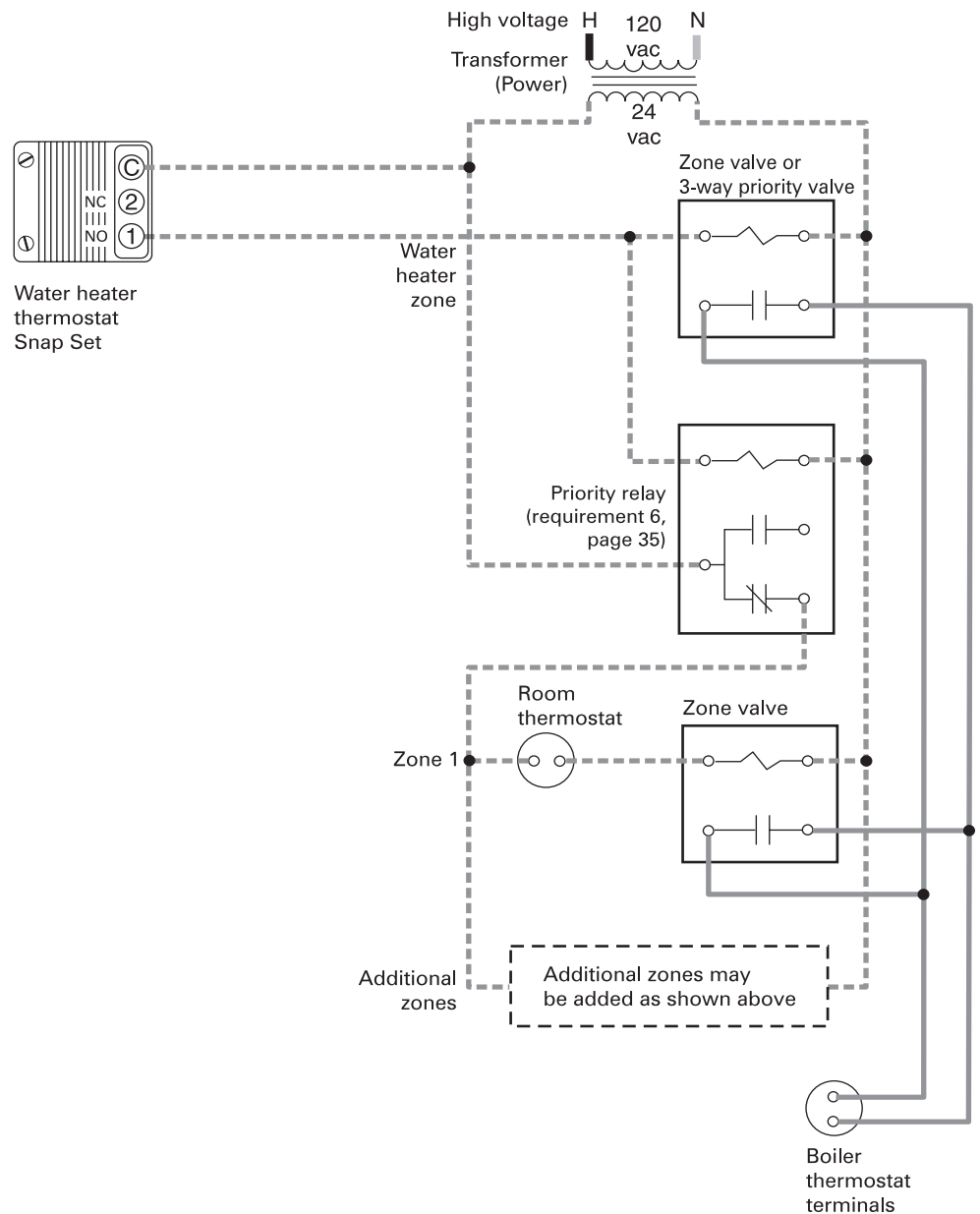
Typical wiring:

- **Zoning with 4-wire zone valves**
- **With OR without domestic priority**
- **GOLD Plus 30/40/60/80 or Ultra Plus 40/60/80**
- **Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.**
- **Refer to *Wiring requirements* on page 47.**

System piping —

Apply this wiring to systems in:

- **Figure 23, page 39 (using 3-way priority valve or NO priority using 2-way water heater zone valve and no priority valve)**



Low voltage boiler field wiring —————
 Low voltage (24 vac) field wiring - - - - -
 High voltage (120 vac) field wiring H ——— N ———

500075-23a

Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 38

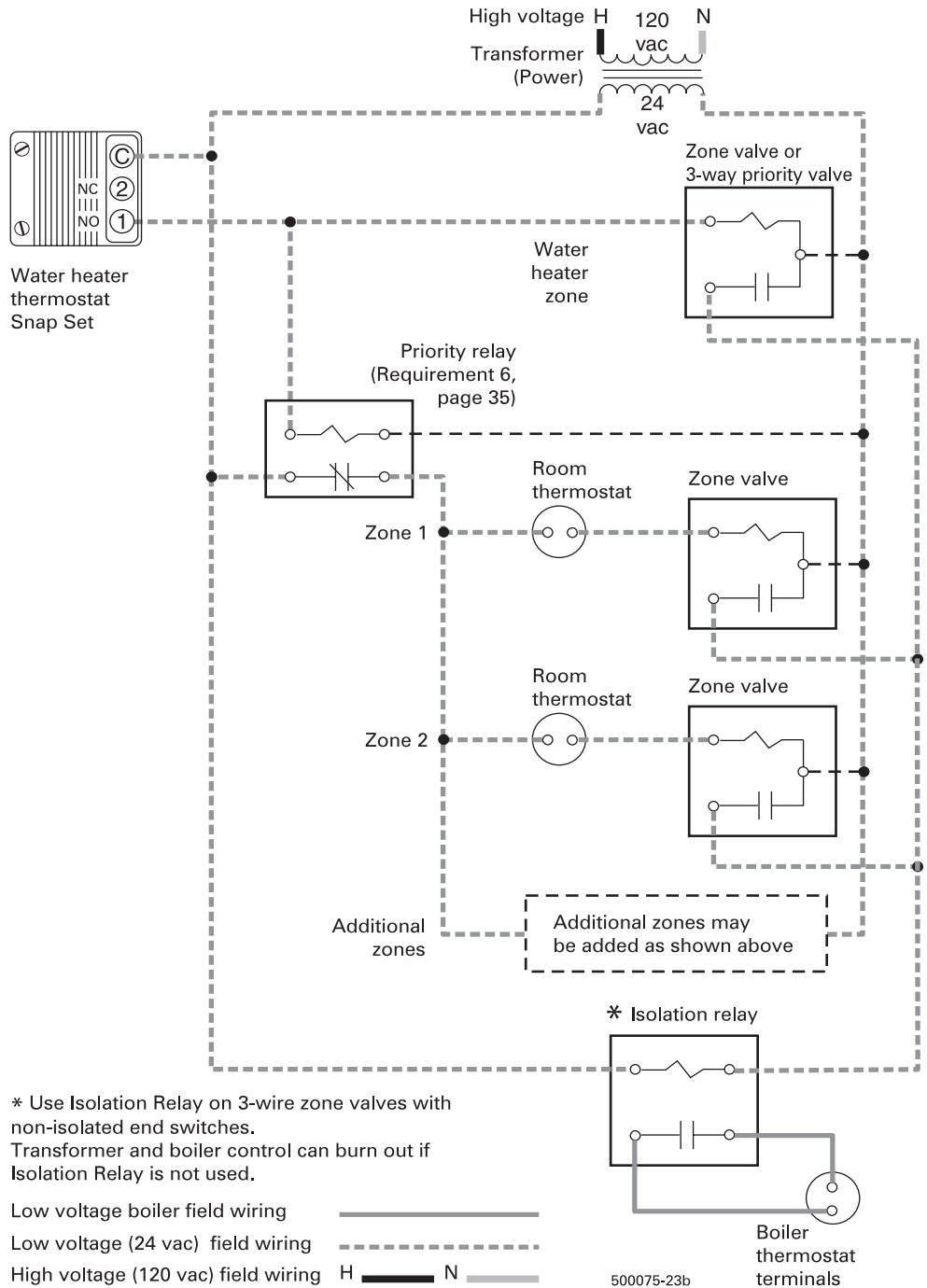
Typical wiring:

- **Zoning with 3-wire zone valves**
- **With OR without domestic priority**
- **GOLD Plus 30/40/60/80 or *Ultra Plus* 40/60/80**
- **Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.**
- **Refer to *Wiring requirements* on page 47.**

System piping —

Apply this wiring to systems in:

- **Figure 23, page 39 (using 3-way priority valve or NO priority using 2-way water heater zone valve and no priority valve)**



* Use Isolation Relay on 3-wire zone valves with non-isolated end switches. Transformer and boiler control can burn out if Isolation Relay is not used.

Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) *continued*

Figure 39

Typical wiring:

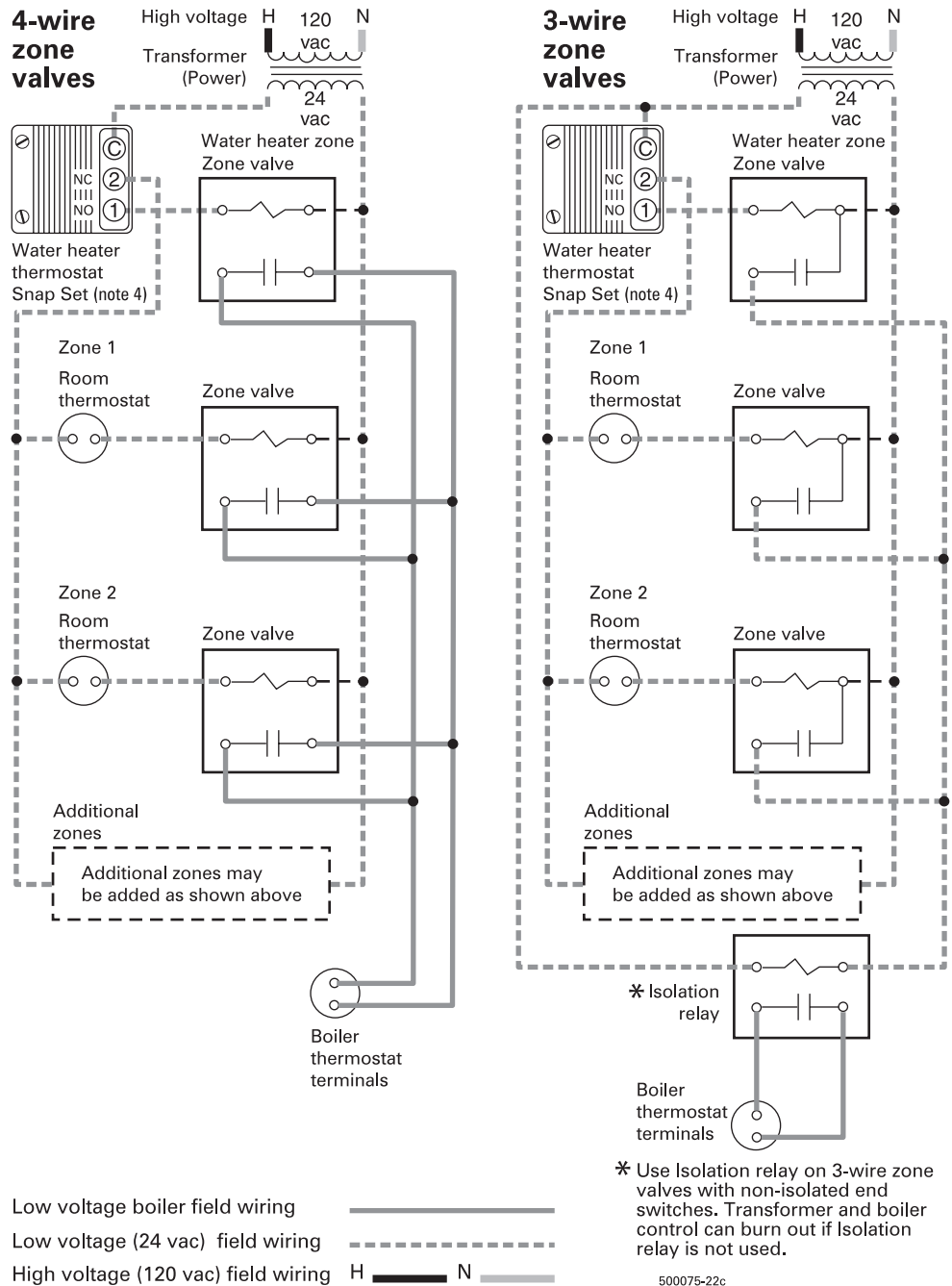
- Zoning with zone valves
- With domestic priority
- PLUS 100/110/119 only
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.

- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 23, page 39 (using 2-way water heater zone valve and no priority valve)



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.
4. Contact rating of water heater thermostat is 0.5 amp at 24 VAC.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 40

Typical wiring:

- Zoning with 4-wire zone valves
- With domestic priority using 2-way priority valve
- PLUS 100/110/119 only

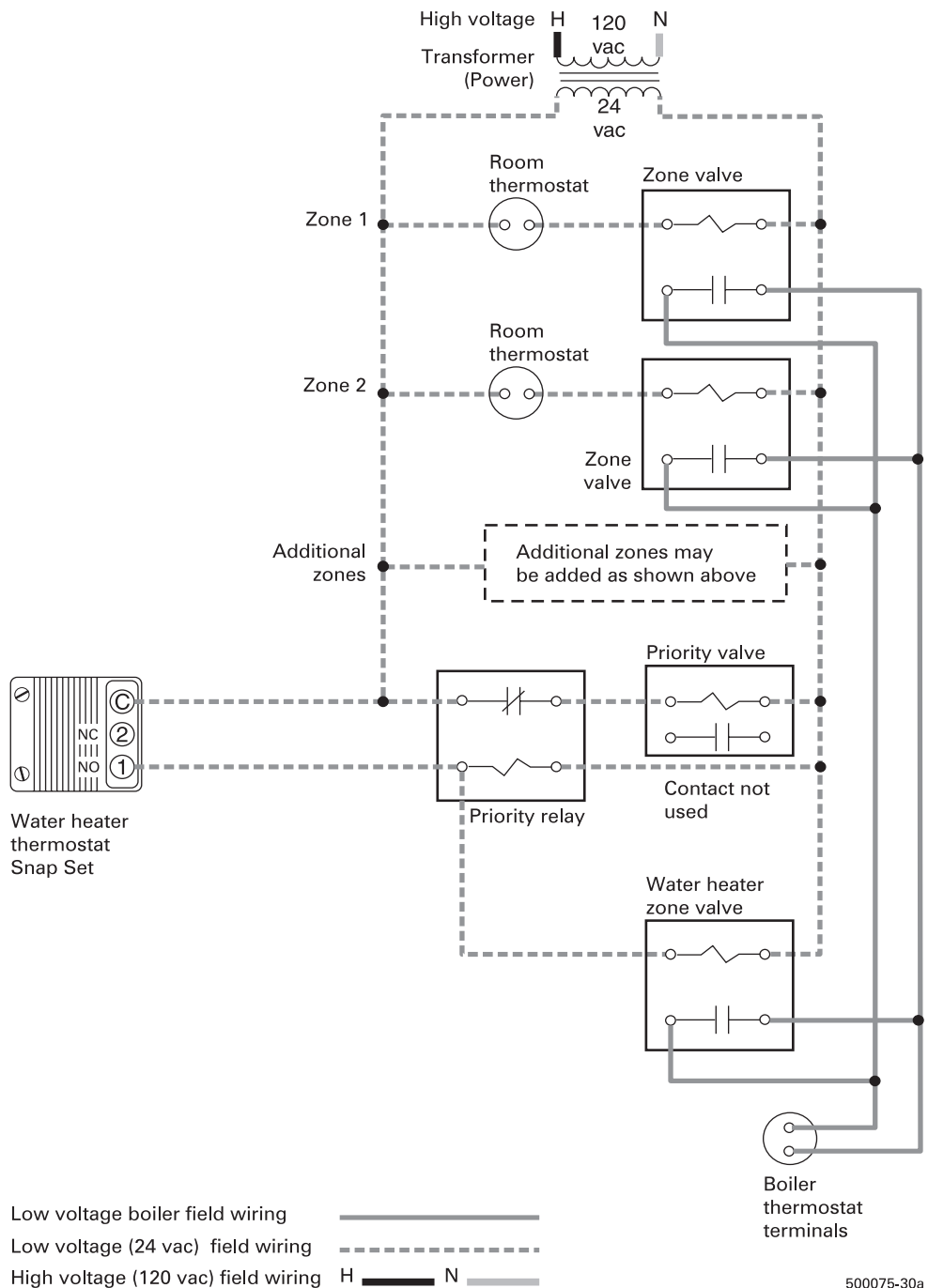
• Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.

• Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 23, page 39, (using 2-way water heater zone valve and 2-way priority valve)



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except *Ultra Gas*) continued

Figure 41

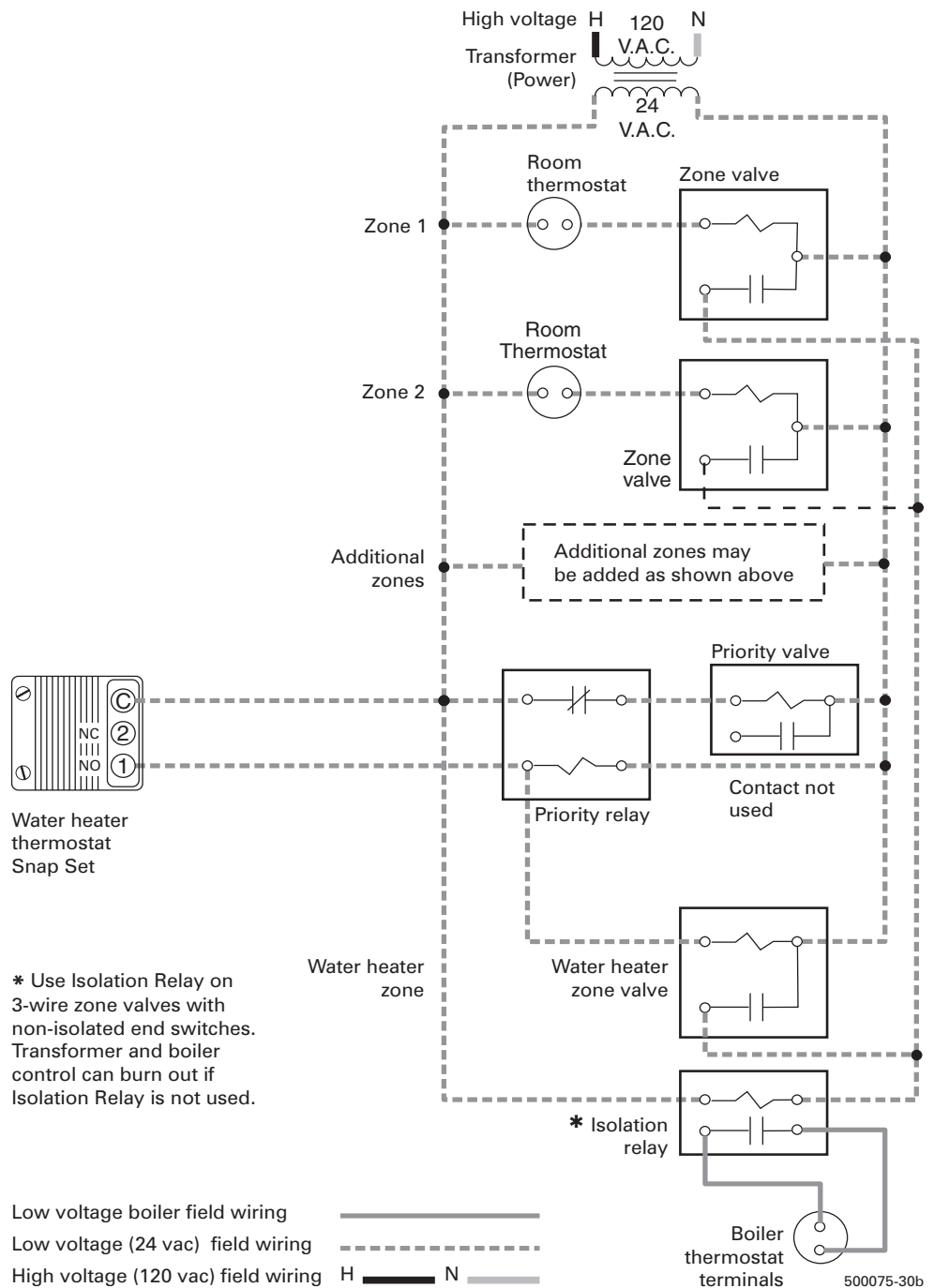
Typical wiring:

- **Zoning with 3-wire zone valves**
- **With domestic priority using 2-way priority valve**
- **Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.**
- **Refer to *Wiring requirements* on page 47.**

System piping —

Apply this wiring to systems in:

- **Figure 23, page 39 (using 2-way water heater zone valve and 2-way priority valve)**



Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



D Boiler-side wiring & controls (except Ultra Gas) *continued*

Figure 42

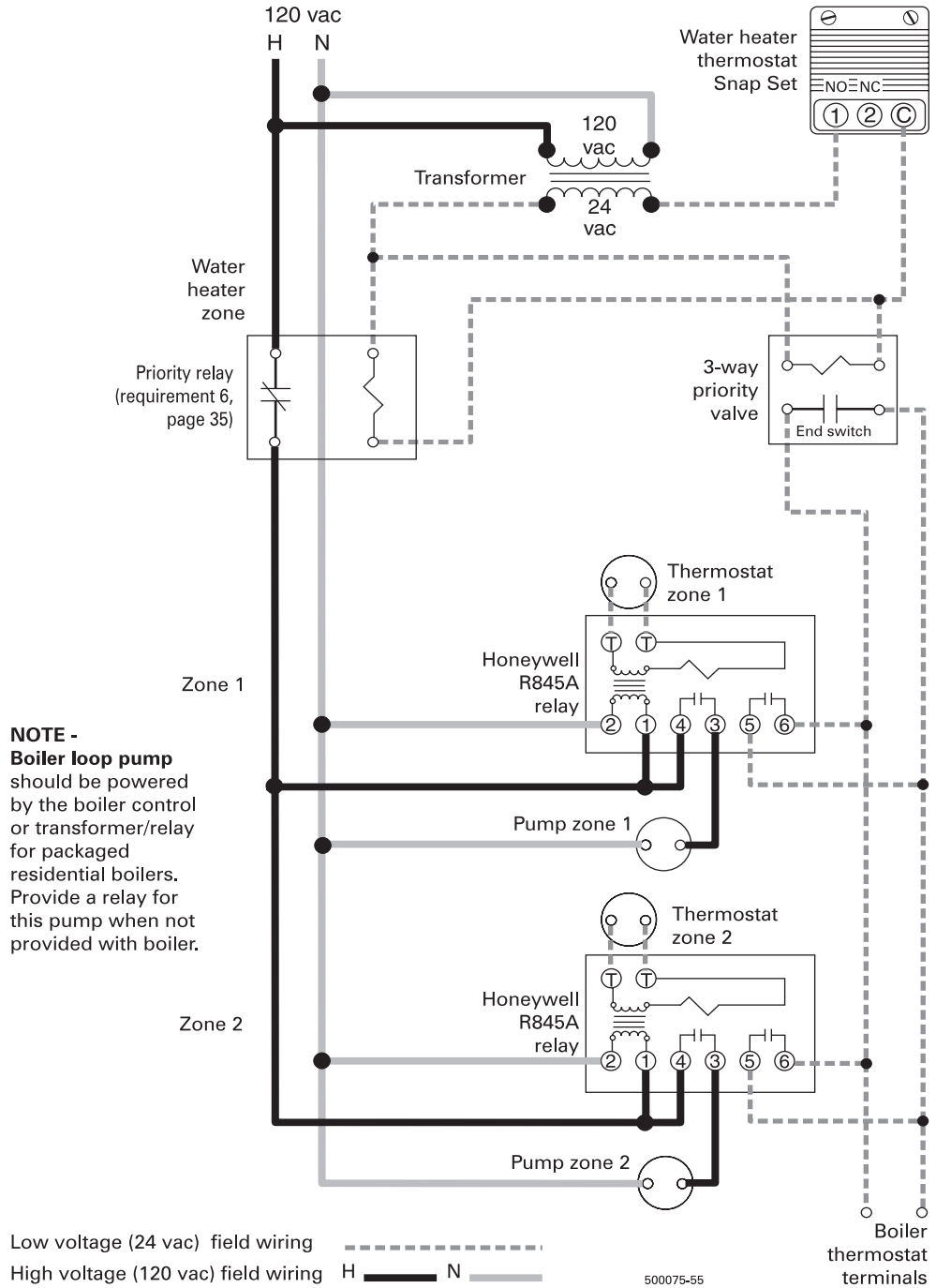
Typical wiring:

- Zoning with pumps
- Pump relays
- Domestic priority with 3-way priority valve and priority relay
- Also refer to *Weil-McLain Boiler Zone Wiring Guide* for further details.
- Refer to *Wiring requirements* on page 47.

System piping —

Apply this wiring to systems in:

- Figure 22, page 38



NOTE -
Boiler loop pump
 should be powered by the boiler control or transformer/relay for packaged residential boilers. Provide a relay for this pump when not provided with boiler.

Notes

1. These drawings are conceptual only. They show representative piping components and layout. Weil-McLain does not represent that the drawings meet any particular mechanical or building codes. The installer is responsible for inclusion of all required safety devices, or other miscellaneous piping hardware not shown on drawings. The installer is responsible for proper sizing/selection of all hardware shown on this diagram.
2. Follow component manufacturer's instructions for installation of all items shown.
3. See Weil-McLain installation instructions for specific details on installing the boiler.



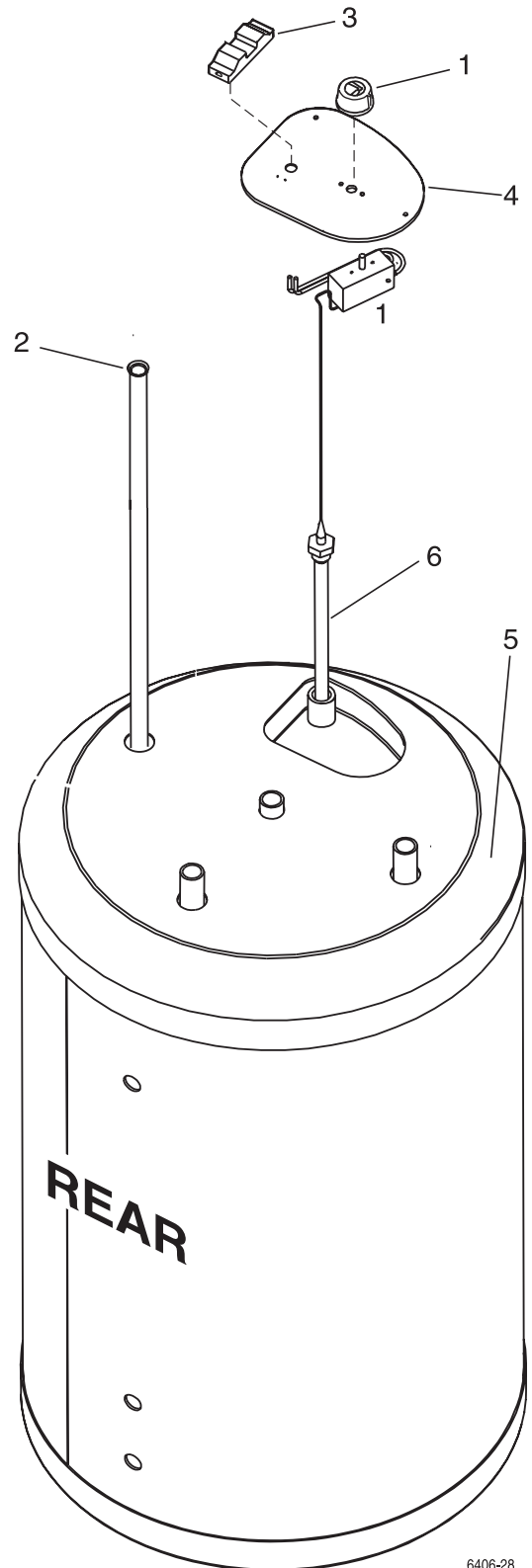
E Replacement parts – Series 3 only

A. GOLD Plus 30, 40, 60 or 80 <i>Ultra Plus 40, 60 or 80</i>	50
B. PLUS 100, 110 or 119	52



E Replacement parts continued

**GOLD Plus 30/40/60/80 or
Ultra PLUS 40/60/80
Series 3**



6406-28



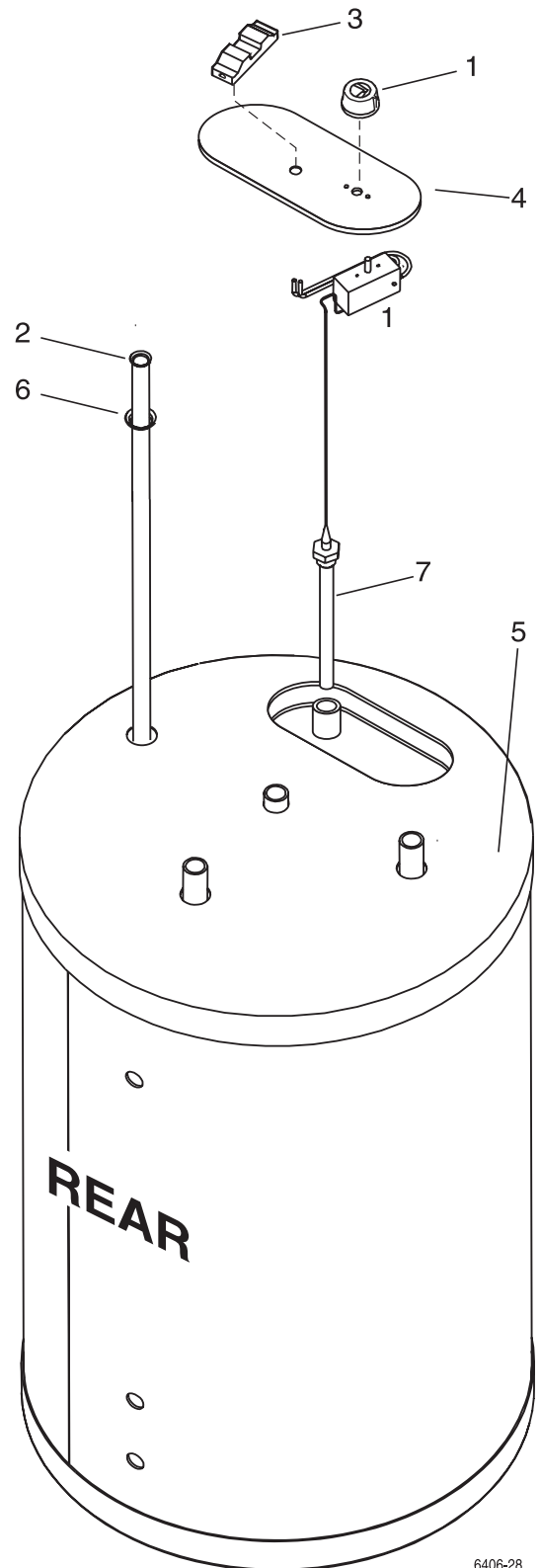
E Replacement parts *continued*

Replacement parts — GOLD Plus 30/40/60/80, Ultra Plus 40/60/80, Series 3				
Item	Description	Size	Manufacturer	Weil-McLain Part Number
1	Thermostat Kit with Knob - No Cover Plate		Weil-McLain	633-900-130
not shown	Drain Valve Kit		Weil-McLain	633-900-117
2	Dip Tube Kit, GOLD Plus 30	3/4"	Weil-McLain	633-900-118
	Dip Tube Kit, GOLD Plus 40, Ultra PLUS 40	3/4"	Weil-McLain	633-900-119
	Dip Tube Kit, GOLD Plus 60, Ultra PLUS 60	3/4"	Weil-McLain	633-900-120
	Dip Tube Kit, GOLD Plus 80, Ultra PLUS 80	3/4"	Weil-McLain	633-900-125
3	Snap-Set with Wire Connector		Weil-McLain	635-600-145
4	Cover Plate and Plastic Fasteners		Weil-McLain	633-900-200
not shown	Thermostat with Cover Plate Kit		Weil-McLain	633-900-102
5	Plastic Top Cover (specific to tank size)		Weil-McLain	633-800-440
6	Drywell replacement kit, Gold Plus 30		Weil-McLain	635-600-061
	Drywell replacement kit, Gold Plus 40, Ultra PLUS 40		Weil-McLain	635-600-062
	Drywell replacement kit, Gold Plus 60, Ultra PLUS 60		Weil-McLain	635-600-063
	Drywell replacement kit, Gold Plus 80, Ultra PLUS 80		Weil-McLain	635-600-064



E Replacement parts *continued*

PLUS 100/110/119
Series 3



6406-28



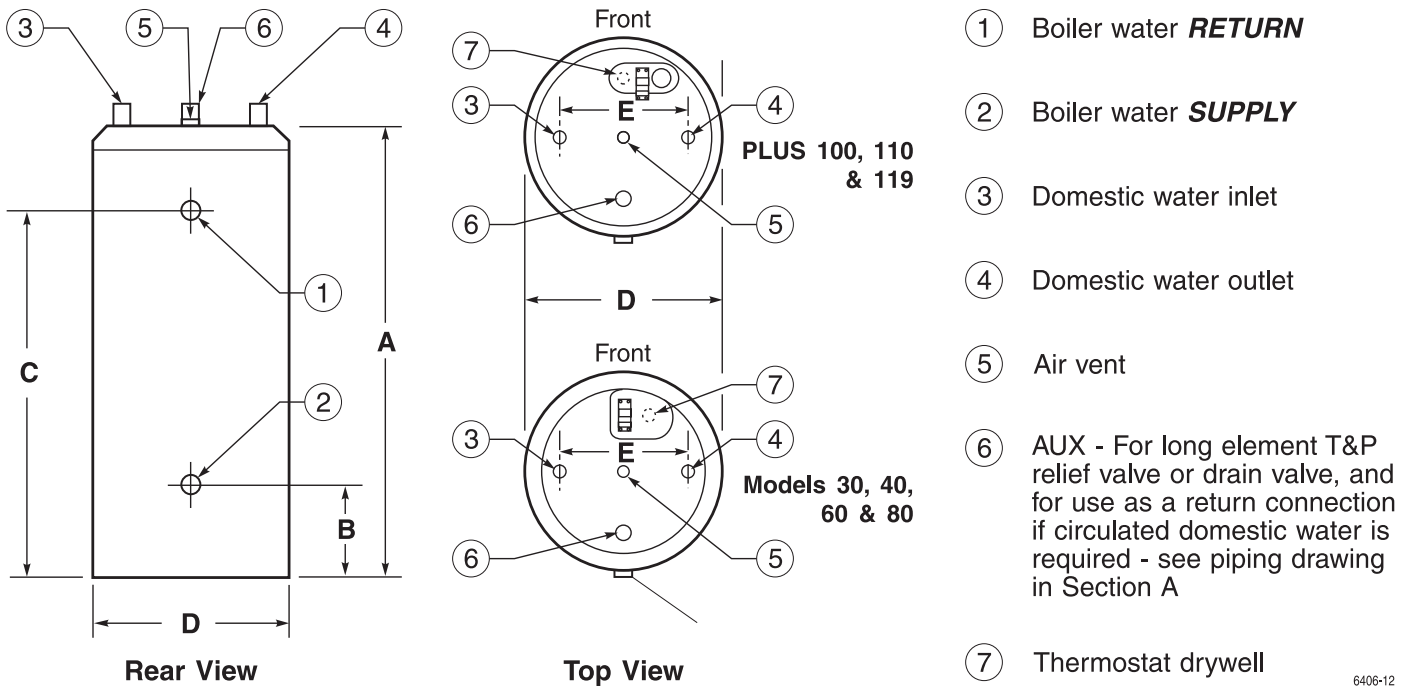
E Replacement parts *continued*

Replacement parts — PLUS 100/110/119 Series 3				
Item	Description	Size	Manufacturer	Weil-McLain Part Number
1	Thermostat Kit with Knob - No Cover Plate		Weil-McLain	635-100-010
2	PLUS100/110/119 Dip Tube Kit	1½"	Weil-McLain	633-900-115
3	Snap-Set with Wire Connector		Weil-McLain	635-600-080
4	Cover Plate and Plastic Fasteners for 100/110/119		Weil-McLain	635-600-205
not shown	Thermostat with Cover Plate Kit		Weil-McLain	635-100-010
5	Plastic Top Cover (specific to tank size)		Weil-McLain Weil-McLain	633-800-441 633-800-442
				100/110 119
6	Dip Tube "O" Ring	1½"	Weil-McLain	635-600-098
7	Drywell Replacement Kit for 100/110/119		Weil-McLain	635-600-065



F Water heater dimensions

Dimensions — PLUS-Line indirect water heaters, Series 3



6406-12

PLUS-Line Indirect-Fired Water Heaters — Series 3												
Water Heater Model	Storage		Heating surface	Head loss on Boiler-side	Dimensions							Ship. weight (approx.)
	DHW side	Boiler side			DHW inlet/outlet (items 3 / 4)	Boiler water supply/return (items 1 / 2)	A	B	C	D	E	
	Gallons	Gallons										
GOLD Plus 30	28	5	13	¾	¾	1	38	9	30	22 ¼	14 ¼	135
GOLD Plus 40 Ultra Plus 40	36	6	16	1	¾	1	46	9	38	22 ¼	14 ¼	155
GOLD Plus 60 Ultra Plus 60	46	8	20	1 ¼	¾	1 ¼	57	9	49	22 ¼	14 ¼	180
GOLD Plus 80 Ultra Plus 80	56	8	24	1 ½	¾	1 ¼	66	9	58 ¼	22 ¼	14 ¼	200
PLUS 100	70	14	29	2	1 ½	1 ½	61	10	50 ½	26 ½	10 ⅝	271
PLUS 110	95	25	34	2	1 ½	1 ½	78	10	67 ¼	26 ½	10 ⅝	362
PLUS 119	119	30	42	2 ½	1 ½	2	73 ¼	10	63	32 ¼	10 ⅝	479



F Water heater performance ratings

NOTICE

For water heater to achieve the rated performance below: Boiler water must be supplied to the water heater at at least 200°F, and the boiler water flow rate must be no less than given in the tables below. For *Ultra* Gas boiler applications, with supply water at 190°F, see the ratings in Section B of this manual)

Boiler DOE Heating Capacity MBH	First Hour Rating Capacity (GPH) – Boiler Water Supply at 200°F / Domestic Water from 50°F to 140°F													
	GOLD Plus 30	Boiler Water GPM Minimum	GOLD/ Ultra Plus 40	Boiler Water GPM Minimum	GOLD/ Ultra Plus 60	Boiler Water GPM Minimum	GOLD/ Ultra Plus 80	Boiler Water GPM Minimum	PLUS 100	Boiler Water GPM Minimum	PLUS 110	Boiler Water GPM Minimum	PLUS 119	Boiler Water GPM Minimum
50	90	8	95	9	105	13	115	20	125	18	145	25	165	28
70	120		125		130		140		150		170		190	
90	140		150		160		165		180		200		215	
110	140		170		185		195		205		225		245	
130	140		170		210		220		230		250		270	
150	140		170		220		245		260		280		295	
170	140		170		220		275		285		305		325	
190	140		170		220		300		310		330		350	
210	140		170		220		325		340		360		375	
250	140		170		220		380		390		410		430	
300	140		170		220		410		435		480		495	
350	140		170		220		410		435		525		565	
400	140		170		220		410		435		525		630	
450	140		170		220		410		435		525		630	
500	140		170		220		410		435		525		630	

Boiler DOE Heating Capacity MBH	First Hour Rating Capacity (GPH) – Boiler Water Supply at 200°F / Domestic Water from 50°F to 115°F													
	GOLD Plus 30	Boiler Water GPM Minimum	GOLD/ Ultra Plus 40	Boiler Water GPM Minimum	GOLD/ Ultra Plus 60	Boiler Water GPM Minimum	GOLD/ Ultra Plus 80	Boiler Water GPM Minimum	PLUS 100	Boiler Water GPM Minimum	PLUS 110	Boiler Water GPM Minimum	PLUS 119	Boiler Water GPM Minimum
50	115	8	125	9	130	13	140	20	150	24	170	26	190	28
70	155		160		170		175		185		205		225	
90	190		195		205		215		225		245		265	
110	230		235		240		250		260		280		300	
130	230		260		280		285		300		320		335	
150	230		260		315		325		335		355		375	
170	230		260		355		360		370		390		410	
190	230		260		365		400		410		430		450	
210	230		260		365		435		445		465		485	
250	230		260		365		510		520		540		560	
300	230		260		365		600		610		630		650	
350	230		260		365		670		690		725		745	
400	230		260		365		670		690		775		835	
450	230		260		365		670		690		775		930	
500	230		260		365		670		690		775		970	

Weil-McLain Limited Warranties

Residential & Commercial Cast Iron Boilers

- † Residential Water Warranty — Limited Lifetime
- † Residential Steam Warranty — Limited 10 Year
- † Commercial Warranty — Limited 10 Year

First Year — (All Residential & Commercial Cast Iron Boilers) Weil-McLain warrants that its cast iron boilers are free from defects in material and workmanship for one year from date of installation. If any parts are found to be defective from such defects, Weil-McLain will provide replacement of such defective parts.

Second Through Tenth Year — (Residential & Commercial Water/Steam) Weil-McLain warrants that the cast iron sections of its water and steam boilers are free from defects in material and workmanship from the date of installation for the second through the tenth year. If, during such time, any section is found to be defective, Weil-McLain will provide replacement of such defective section(s).

Eleventh Year and Beyond — (Residential Water Only) Weil-McLain warrants that the cast iron sections of its residential water boilers are free from defects in material and workmanship for the eleventh year and beyond from the date of installation. If, during such time period, any section(s) is found to be defective, Weil-McLain will provide replacement of such defective section(s) upon the payment of a proportionate charge based on the time the boiler has been in service. The proportionate charge will be equal to the appropriate percentage of the list price of such section(s) at the time the warranty claim is made, and will be determined as follows: 11th year-5%; 12th year-10%; 13th year-15%; 14th year-20%; 15th year-25%; 16th year-30%; 17th year-35%; 18th year-40%; 19th year-45%; 20th year-50%; 21st year-55%; 22nd year-60%; 23rd year-65%; 24th year-70%; 25th year & beyond -75%.

These warranties do not cover boilers operated with combustion air contaminated externally by chemical vapors or with improper fuel additives, or with water conditions which may have caused unusual deposits in the cast iron sections.

See section "For all Weil-McLain Products" for additional warranty information.

Weil-McLain Ultra Cast Aluminum Boilers

- † Residential Warranty — Limited 15 Year (includes 5-Year Ultra Protection Plan)
- † Commercial Warranty — Limited 15 Year (does NOT include Ultra HPP)

First Through Fifth Year — Weil-McLain warrants that its cast aluminum boilers are free from defects in material and workmanship for one year from the date of installation and the heat exchanger is free from defects in material and workmanship for five years from the date of installation. If any parts in the first year, or the heat exchanger in the first five years are found to be defective from such defects, Weil-McLain will provide replacement of such defective parts or heat exchanger. *In addition to the product warranty, Weil-McLain will provide a 5-Year "Ultra" Homeowner Protection Plan ("UHPP") for residential applications only to cover parts and labor for five years from the date of installation provided only if the Ultra boiler is properly registered with the UHPP Administrator within one month of the date of installation. UHPP claims must be processed directly through the Plan Administrator and not through Weil-McLain.*

Sixth Through Tenth Year — Weil-McLain warrants that the heat exchangers of its cast aluminum boilers are free from defects in material and workmanship for the sixth through the tenth year from the date of installation. If, during such time, the heat exchanger is found to be defective, Weil-McLain will provide replacement of such defective heat exchanger.

Eleventh Through Fifteenth Year — Weil-McLain warrants that the heat exchangers of its cast aluminum boilers are free from defects in material and workmanship for the eleventh through fifteenth year from the date of installation. If, during such time period, the heat exchanger is found to be defective, Weil-McLain will provide replacement for such defective heat exchanger upon the payment of a proportionate charge based on the time the boiler has been in service. The proportionate charge will be equal to the appropriate percentage of the list price of such heat exchanger at the time the warranty claim is made, and will be determined as follows: 11th year - 10%; 12th year - 20%; 13th year - 40%; 14th year - 60%; 15th year - 80%; 16th year & beyond - 100%.

This warranty does not cover boilers operated with combustion air contaminated externally by chemical vapors or with improper fuel additives, or with water/system conditions which may have caused heat exchanger failure.

See section "For all Weil-McLain Products" for additional warranty information.

For All Weil-McLain Products: These warranties are subject to the condition that the Weil-McLain Product(s) must have been installed in accordance with manufacturers' instructions by a heating contractor whose principal occupation is the sale and installation of plumbing, heating and/or air conditioning equipment. These warranties extend only to the first retail purchaser of the products and only to a product that has not been moved from its original installation site.

In addition to each product warranty listed, Weil-McLain warranties do not cover:

1. Components that are part of the heating system (products) but were not furnished by Weil-McLain as a part of the heating system (products).
2. The workmanship of any installer of Weil-McLain's product(s). In addition, this warranty does not assume any liability of any nature for unsatisfactory performance caused by improper installation.
3. Any costs for labor for removal and reinstallation of the alleged defective part, transportation to Weil-McLain, if necessary, and any other materials necessary to perform the exchange.
4. Any products that have a failure or malfunction resulting from improper or negligent operation, accident, abuse, freezing, misuse, unauthorized alteration or improper repair or maintenance.
5. Improper adjustments (including boiler/burner), control settings, care or maintenance. Information is in the installation, start-up, operations, owner/user's manuals, service/maintenance instructions, and other printed/technical information provided with the product or direct from Weil-McLain or weil-mclain.com.

Indirect-Fired Water Heaters

- † Residential Water Heater Warranty — Limited Lifetime
- † Commercial Water Heater Warranty — Limited 15 Year

First Year — (Residential and Commercial Water Heaters) Weil-McLain warrants that its indirect-fired water heaters are free from defects in material and workmanship for one year from the date of installation. If any parts are found to be defective from such defects, Weil-McLain will provide replacement of such defective parts.

Second Year and Beyond — (Residential Only)
Second Through Fifth Years — (Commercial Only)

Weil-McLain warrants that the tank assembly components of its indirect-fired water heaters are free from defects in material and workmanship for the second through the fifth year from the date of installation (commercial only), or for the second year from the date of installation and beyond (for residential only). If, during such time periods, a leak in the tank assembly should occur, Weil-McLain will provide replacement for the original tank assembly.

Sixth Year through Fifteenth Year — (Commercial Only) Weil-McLain warrants that the tank assembly components of its commercial indirect-fired water heaters are free from defects in material and workmanship for the sixth year through the fifteenth year following the date of installation. If, during such time period, a leak in the tank assembly should occur, Weil-McLain will provide replacement for such defective tank assembly. Such replacement will be furnished with the nearest comparable model available from Weil-McLain at the time of such replacement and upon payment of a proportionate charge. Proportionate charges will be equal to the appropriate percentage of the current list price of such commercial indirect-fired water heater at the time warranty claim is made and will be determined as follows: 6th & 7th year-55%; 8th & 9th year-60%; 10th & 11th year-65%; 12th & 13th year-70%; 14th & 15th year-75%.

These warranties do not cover:

1. Any water heater not initially installed with a new temperature-pressure relief valve bearing the listing of the American Society of Mechanical Engineers (A.S.M.E.) at the time of the water heater installation.
2. Any water heater that has a failure or malfunction resulting from a.) failure to keep the tank full of potable water; b.) failure to assure that water in the tank is free to circulate at all times; or c.) failure to keep the tank free of water sediment or scale deposits.
3. Any water heater that has potable water in the unit with a chloride or chlorine content higher than 80 mg/liter.
4. Any water heater installed in a residence containing any type of water softener system that is not installed and maintained in accordance with manufacturer's specifications.
5. Any water heater installation where non-metallic piping products without an oxygen barrier are used.
6. Any water heater used for non-potable application such as pool or process heating.

See section "For all Weil-McLain Products" for additional warranty information.

Radiant Heating Products

- † Radiant Heating Products Warranty — Limited 30 Year
- † IPP & IPC Products Warranty — Limited 3 Year

Weil-McLain warrants that its AlumiPex and Qual-Pex radiant heating products are free from defects in material and workmanship for thirty years (three years for IPP and IPC products) from the date of installation. If any parts are found to be defective from such defects during such time period, Weil-McLain will provide replacement of such defective parts. It is expressly understood that failure as a result of freezing of water within the pipes (tubing) does not constitute a defect in material or workmanship and shall not be covered by this warranty.

See section "For all Weil-McLain Products" for additional warranty information.

Parts and Accessories

- † Parts and Accessories Warranty — Limited 1 Year

Weil-McLain warrants that parts and accessories that were purchased through Weil-McLain are free from defects in material and workmanship for one year from the date of installation. If any parts and/or accessories are found to be defective from such defects during such time period, Weil-McLain will provide replacement of such defective parts. Parts and accessories covered under this warranty include only those items that are not covered under other Weil-McLain product warranties.

See section "For all Weil-McLain Products" for additional warranty information.

NOTE: Residential warranties do not cover any residential products installed in buildings other than one or two family dwelling units, unless they are buildings with individual residential products for each dwelling unit.

THE WARRANTIES DESCRIBED HEREIN ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY. WEIL-McLAIN EXPRESSLY DISCLAIMS AND EXCLUDES ANY LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, INDIRECT OR PUNITIVE DAMAGES FOR BREACH OF ANY EXPRESS WARRANTY. For prompt product warranty claims, notify the installer who, in turn, will notify the Weil-McLain distributor from whom he purchased the boiler. If this action does not result in warranty resolution, contact Weil-McLain Consumer Relations Department, 500 Blaine Street, Michigan City, Indiana 46360, with details in support of the warranty claim. Alleged defective part or parts must be returned through the same trade channel in accordance with the Weil-McLain procedure currently in force for handling returned goods for the purpose of inspection to determine cause of failure. Weil-McLain will furnish new part(s) to an authorized Weil-McLain distributor who, in turn will furnish the new part (s) to the heating contractor who installed the boiler. If you have any questions about the coverage of this warranty, contact Weil-McLain at the address above.



Weil-McLain
500 Blaine Street
Michigan City, IN 46360-2388
<http://www.weil-mclain.com>