

# APPLICATION GUIDE FOR USE WITH

## HEATING ONLY & COMBI

### MODELS:

**MAH-125**

**MAC-150**

**DCC-150**

**DCB-125**

This manual has been prepared for use with the appropriate Installation, Operation and Maintenance Manual.



**ECR** international  
EST. 1928  
A Family of Heating & Cooling Brands.

Manufactured for:  
**ECR International, Inc.**  
2201 Dwyer Avenue, Utica NY 13501  
web site: [www.ecrinternational.com](http://www.ecrinternational.com)

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## IMPORTANT SAFETY INFORMATION

### 1. General

Boiler installation shall be completed by qualified agency. See Installation, Operation & Maintenance Manual for additional information.

#### **WARNING**

Fire, explosion, asphyxiation and electrical shock hazard. Improper installation could result in death or serious injury. Read this manual and understand all requirements before beginning installation.

### 2. Become familiar with symbols identifying potential hazards.



This is the safety alert symbol. Symbol alerts you to potential personal injury hazards. Obey all safety messages following this symbol to avoid possible injury or death.

#### **DANGER**

Indicates a hazardous situation which, if not avoided, WILL result in death or serious injury.

#### **WARNING**

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

#### **CAUTION**

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

### 3. Installation shall conform to requirements of authority having jurisdiction or in absence of such requirements:

- *United States*
  - National Fuel Gas Code, ANSI Z223.1/NFPA 54.
  - National Electrical Code, NFPA 70.
- *Canada*
  - Natural Gas and Propane Installation Code, CAN/CSA B149.1.
  - Canadian Electrical Code, Part I, Safety Standard for Electrical Installations, CSA C22.1

### 4. Where required by authority having jurisdiction, installation shall conform to Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

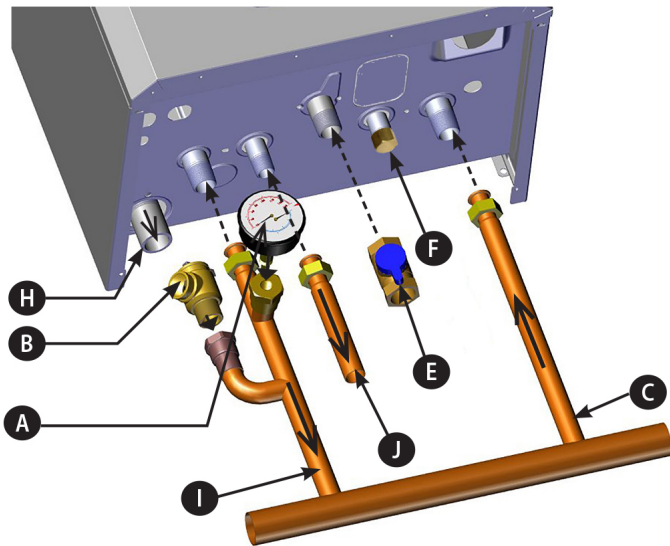
Additional manual reset low water cutoff or high limit may be required.

### 5. Requirements for Commonwealth of Massachusetts:

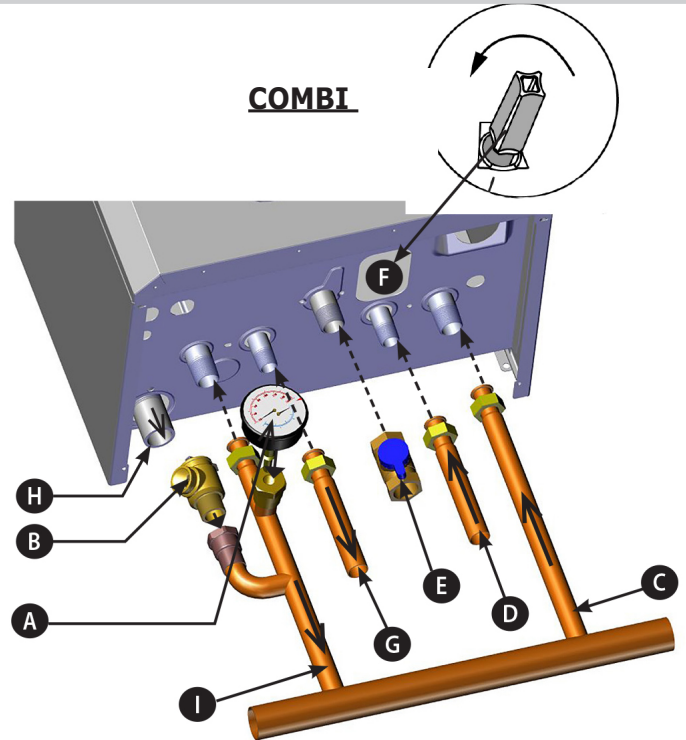
Boiler installation must conform to Commonwealth of Massachusetts code 248 CMR which includes but is not limited to:

- Installation by licensed plumber or gas fitter.

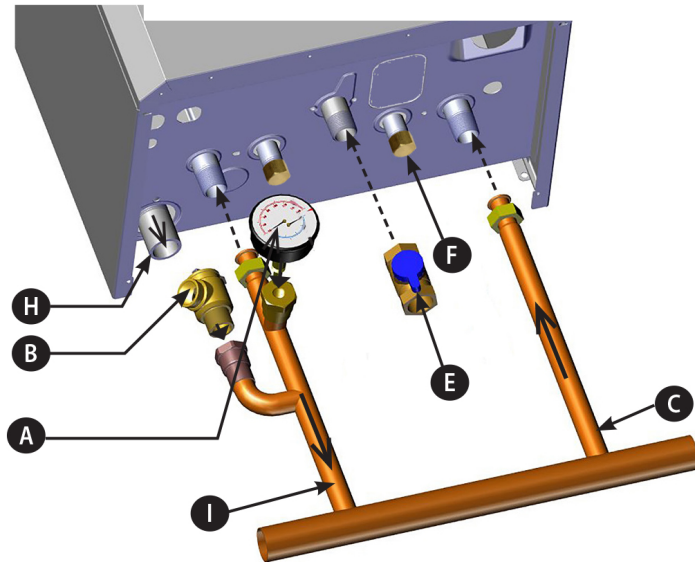
**HEATING ONLY  
WITH OPTIONAL INDIRECT DHW  
CONNECTION**



**COMBI**



**HEATING ONLY  
WITHOUT OPTIONAL INDIRECT  
DHW CONNECTION**



<b>A</b>	Pressure gauge	-
<b>B</b>	Pressure relief valve	30.00 psi / 2.11 bar
<b>C</b>	Heating return connection	3/4" / 22.2 mm
<b>D</b>	Cold DHW inlet tap/system filling connection for Combi boiler	1/2" / 15.9 mm
<b>E</b>	Gas shutoff connection	3/4"
<b>F</b>	Boiler filling connection	1/2" / 15.9 mm
<b>G</b>	DHW outlet Combi boiler	1/2" / 15.9 mm
<b>H</b>	Drain connection for condensate pipe	5/8" I.D.
<b>I</b>	Heating Supply connection	3/4" / 22.2 mm
<b>J</b>	Optional indirect DHW connection	3/4" / 22.2 mm



## HEATING ONLY - HYDRONIC PIPING

### Piping Legend

**Note**

Illustrations are meant to show system piping concept only. Installer is responsible for all equipment and detailing required by authority having jurisdiction.

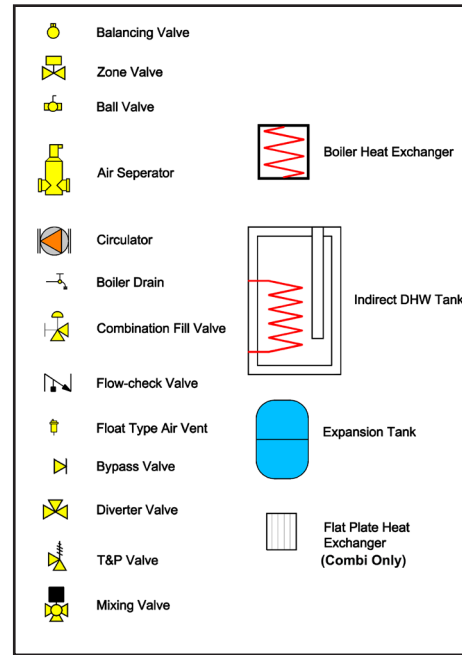
**Note**

Arrange piping to prevent water dripping onto boiler.

Piping installation, materials, and joining methods shall conform to requirements of authority having jurisdiction or in absence of such requirements:

- USA - National Fuel Gas Code, ANSI Z223.1/NFPA 54
- Canada - Natural Gas and Propane Installation Code, CAN/CSA B149.1

**Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve.** Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

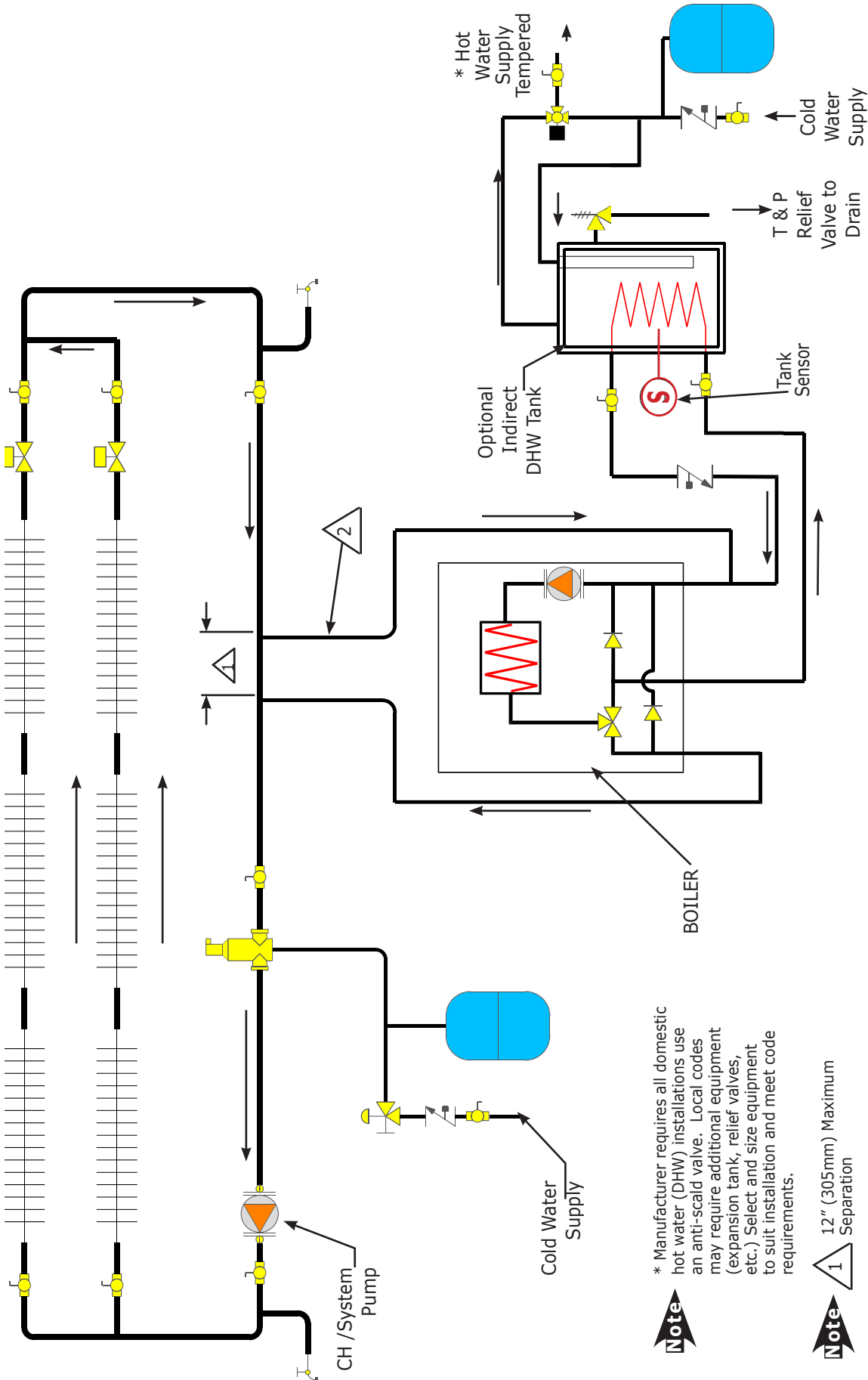


### Quick Reference Chart - Heating Only Boiler

Quick Reference Chart - Heating Only Boiler	
Hydronic Piping Description	Page
Single Boiler Primary/Secondary, Zoned System, WITH ZONE VALVES, and Optional Indirect Tank (Fig. 1)	5
Single Boiler Primary/Secondary, Zoned, WITH ZONE PUMPS, and (Optional) Indirect Tank (Fig. 2)	6
Single Boiler Primary/Secondary Series Loop PUMPING and Optional Indirect Tank (Fig. 3)	7
Wiring Description	Page
Heating Only Boiler <b>NO</b> Indirect Tank, Single Zone ( Fig. 4)	9
Heating Only Boiler <b>WITH</b> Indirect Tank and Sensor, Single Zone ( Fig. 5)	9
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# HEATING ONLY - HYDRONIC PIPING

**FIGURE 1 - Primary/Secondary, Zoned, WITH ZONE VALVES, (Optional) Indirect Tank**



**Note** \* Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve. Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

**Note** 1 12" (305mm) Maximum Separation

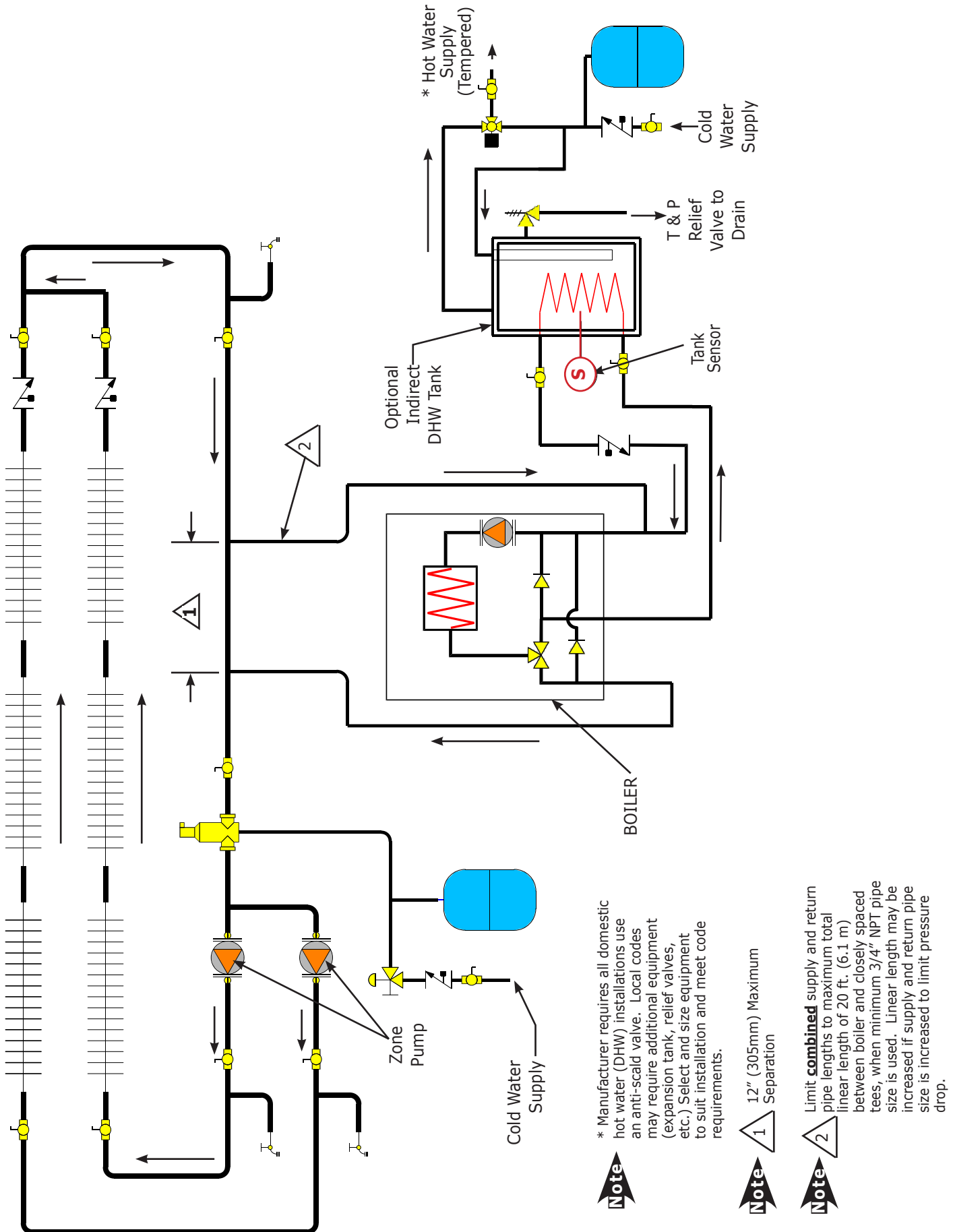
**Note** 2 Limit **combined** supply and return pipe lengths to maximum total linear length of 20 ft. (6.1 m) between boiler and closely spaced tees, when minimum 3/4" NPT pipe size is used. Linear length may be increased if supply and return pipe size is increased to limit pressure drop.

**Note** Use external pump relay or Argo Zone Control to interface system pump to boiler.

See wiring Figures 6 and 7.

# HEATING ONLY - HYDRONIC PIPING

**FIGURE 2 - Primary/Secondary, Zoned, WITH ZONE PUMPS, (Optional) Indirect Tank**



**Note** \* Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve. Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

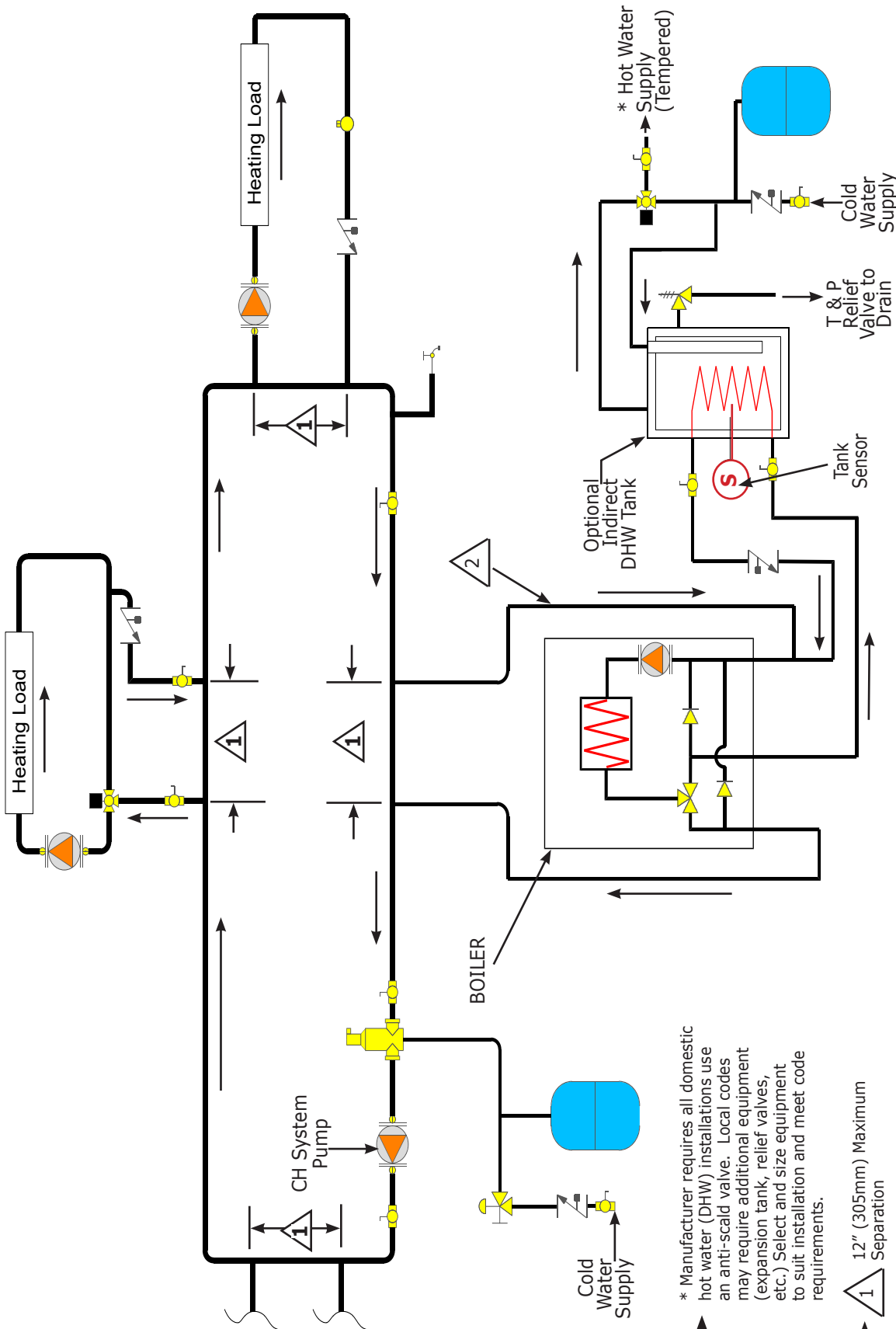
**Note** 1 12" (305mm) Maximum Separation

**Note** 2 Limit **combined** supply and return pipe lengths to maximum total linear length of 20 ft. (6.1 m) between boiler and closely spaced tees, when minimum 3/4" NPT pipe size is used. Linear length may be increased if supply and return pipe size is increased to limit pressure drop.

See wiring Figures 8 and 9.


# HEATING ONLY - HYDRONIC PIPING

**FIGURE 3 - Primary/Secondary, Series Loop Pumping, (Optional) Indirect Tank**



**Note** \* Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve. Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

**Note**  12" (305mm) Maximum Separation

**Note**  Limit **combined** supply and return pipe lengths to maximum total linear length of 20 ft. (6.1 m) between boiler and closely spaced tees, when minimum 3/4" NPT pipe size is used. Linear length may be increased if supply and return pipe size is increased to limit pressure drop.

**Note** Use external pump relay and Argo Zone Control to interface system pump to boiler.

See wiring Figures 8, 9 and 16.

## Boiler Wiring Diagrams

All field wiring shall conform to the authority having jurisdiction or, in the absence of such requirements to:

**USA:** National Electrical Code, ANSI/NFPA 70,

**Canada:** Canadian Electrical Code, Part I, CSA

C22.1: Safety Standard for Electrical Installations.



**DO NOT** use 120 V thermostat terminals (M1- #1 and #2).

**DO NOT** wire DHW mechanical thermostat to Argo Control or Heating Only Boiler control.

Use **ONLY** DHW Tank Sensor (M2- terminals #9 and #10).

### A. Indirect Storage Tank is NOT used:

- Connect M2 terminals #6 and #7 to Argo AR822 (T-T) terminals.
- See Wiring Figures 4 and 16.

### B. System Pump is used:

- For Single Zone, Multi Zone and Series Loop Piping See instructions and wiring diagrams. See Figures 4,5,6,7 and 16

### C. Use of Indirect Storage Tank (DHW):

- Indirect storage tank, use only tank sensor to interface with boiler. Wire sensor to M2 terminals #9 and #10.
- Use of booster pump to increase flow rate to indirect tank is not recommended by manufacturer.
- Locate tank as close to boiler as possible.
- Size DHW tank, piping, and system to use only internal boiler pump.
- See available pump head/flow rate chart, page 26 of this manual.
- Change PO3 parameter on boiler control from 08 to 05. See Parameter Setting, in the Installation, Operation, and Maintenance Manual, Section 14.
- See Wiring Figure 5.

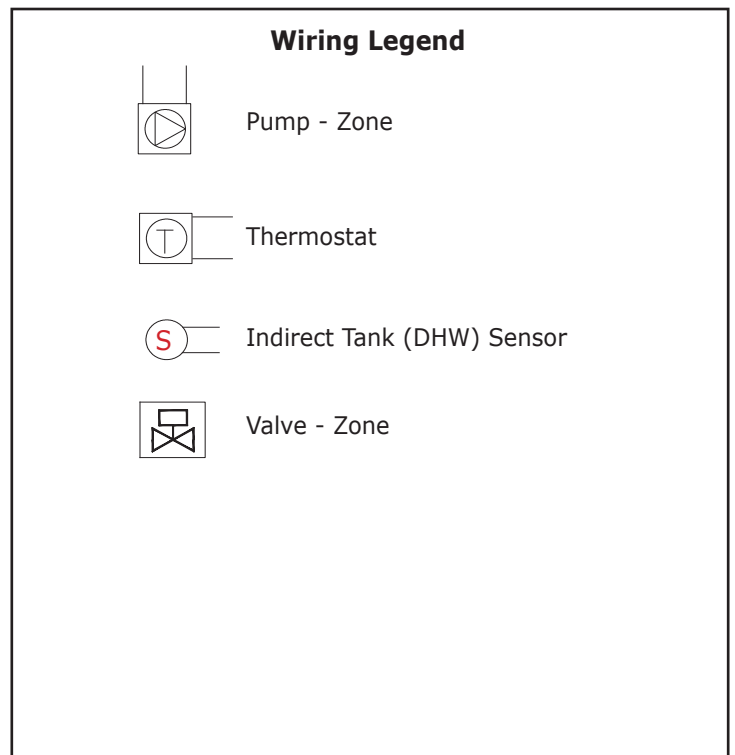


FIGURE 4 - Heating Only Boiler NO Indirect Tank- Single Zone

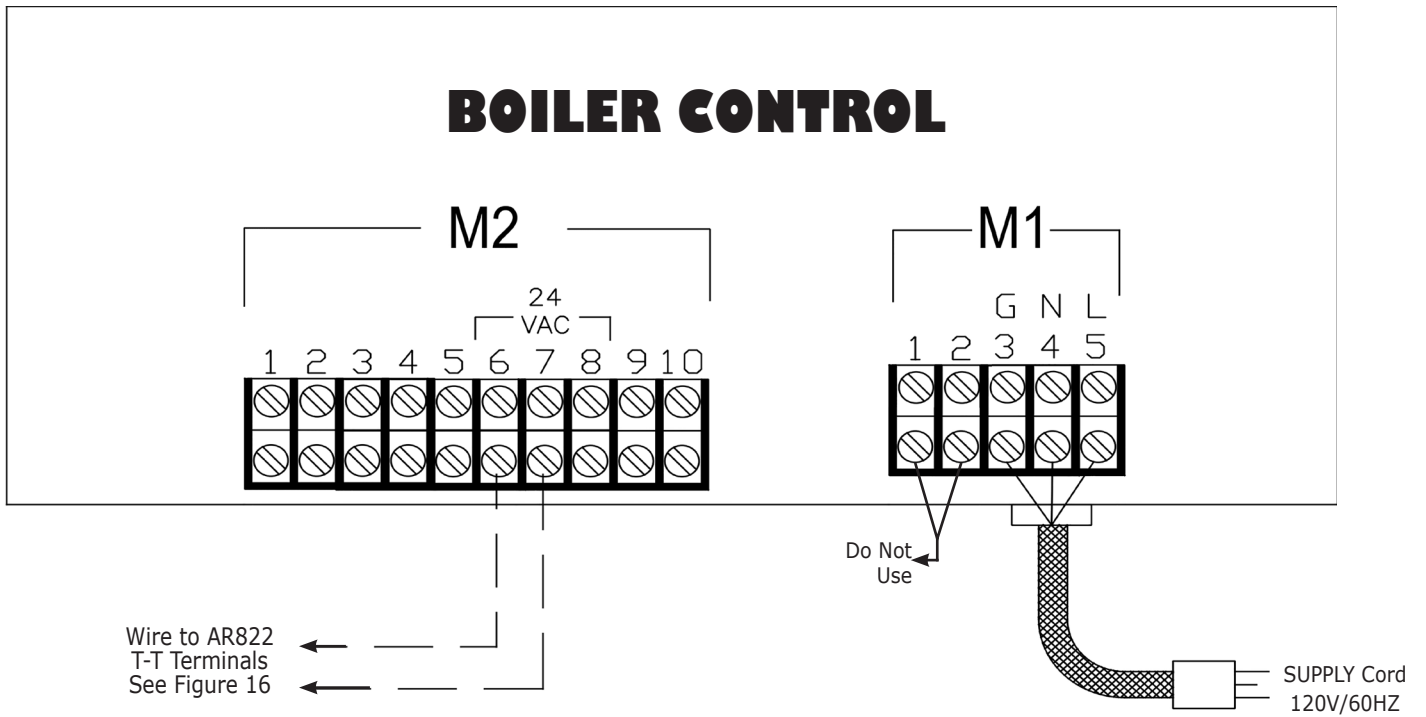
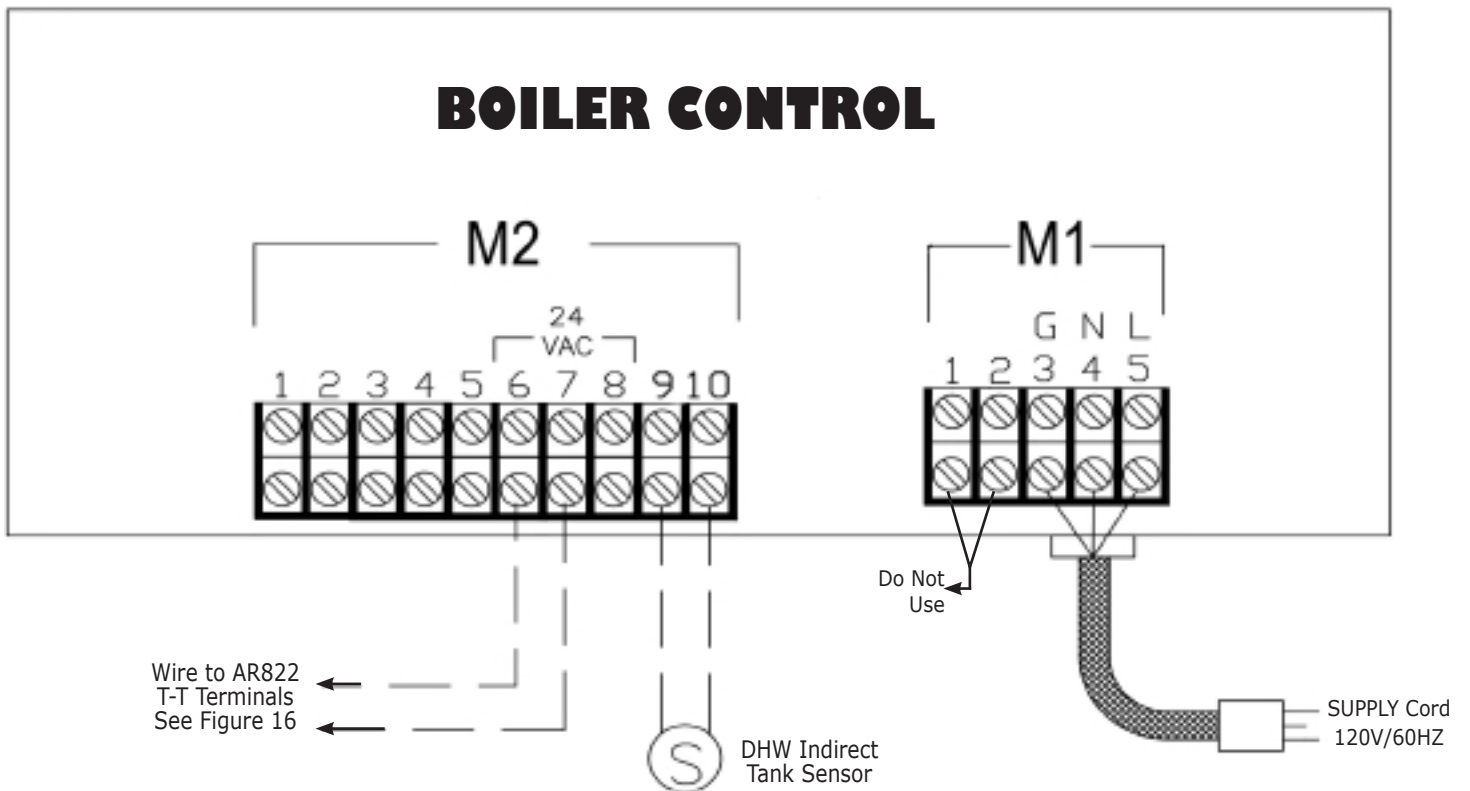


FIGURE 5 - Heating Only Boiler WITH Indirect Tank and Sensor Single Zone



**Change PO3 parameter on boiler control from 08 to 05**

### D. Multi-Zoned Valve System:

1. If only Central Heating is required on multi-zone valve application :
  - Connect Boiler call for heat contacts M2 (24 VAC) terminals #6 and #7 to Argo Zone control X-X terminals.
  - Zone thermostats and valves are wired to Argo Control.
  - Central Heating (CH) system pump is wired to Argo Primary Pump terminals.
  - See wiring Figure 6.
  
2. If DHW tank is applied to Multi-Zone Valve application - use Indirect Tank Sensor:
  - Attach Indirect Tank sensor to boiler control M2 terminals #9 & #10. Boiler control will set priority for DHW operation.
  - Wire Boiler call for heat contacts M2 (24 VAC) terminals #6 & #7 to Argo Zone control X-X Terminals.
  - Zone thermostats and valves are wired to Argo Control.
  - Central Heating (CH) system pump is wired to Argo Primary Pump terminals.
  - Change PO3 parameter on boiler control from 08 to 05. See Parameter Setting, in the Installation, Operation, and Maintenance Manual, Section 14.
  - See wiring Figure 7.

**Note**

**DO NOT** use 120 V thermostat terminals (M1- #1 and #2) .

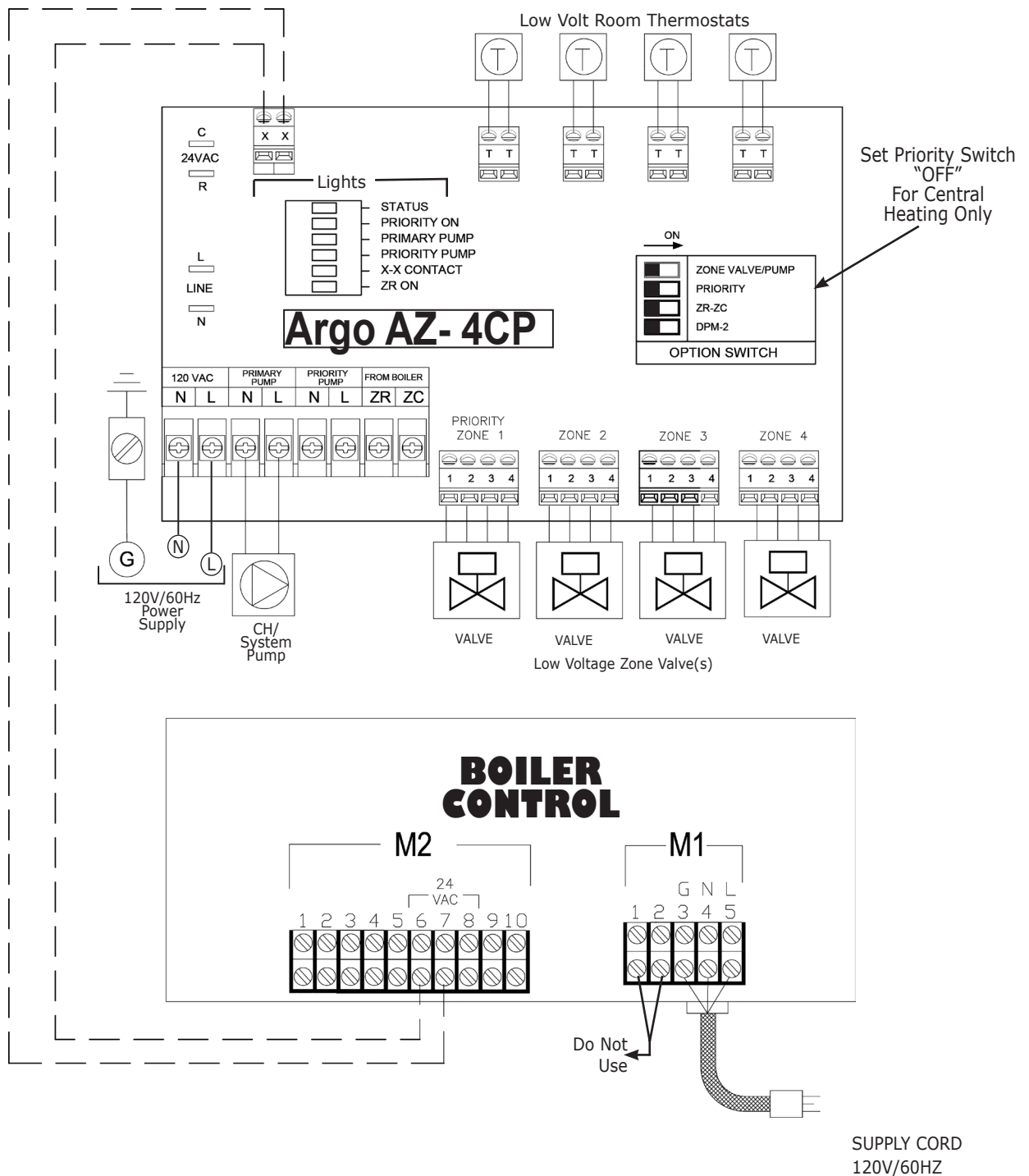
**DO NOT** wire DHW mechanical thermostat to Argo Control or Heating Only Boiler control.

**Note**

Set Argo priority switch to **OFF** position.

# HEATING ONLY - WIRING DIAGRAM

**FIGURE 6 - Zoned System, with Multiple ZONE VALVES, *WITHOUT* Indirect Tank**

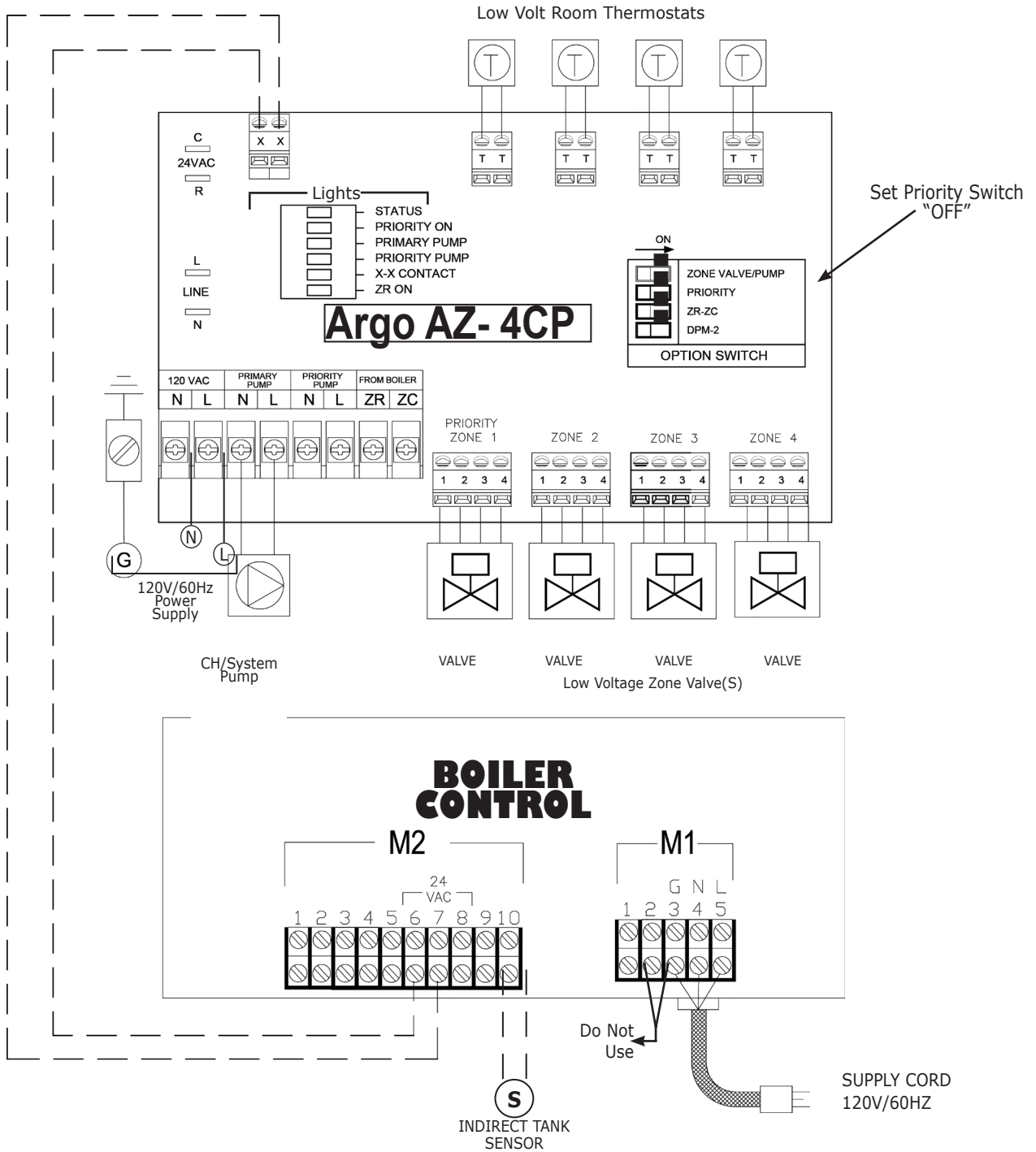


**DO NOT** use 120V Thermostat Terminals M1 (#1 and #2).



# HEATING ONLY - WIRING DIAGRAM

**FIGURE 7 - Zoned System, with Multiple ZONE VALVES, WITH Indirect Tank and Sensor**



**DO NOT** use 120V Thermostat Terminals M1 (#1 and #2).

**Change P03 parameter on boiler control from 08 to 05**

### E. Multi-Zone Pump System Using Argo ARM Controller:

**1** - If Indirect Storage Tank **IS NOT** applied to a multi-zoned piping system:

- Boiler thermostat contacts (M2 Terminals #6 and #7) are wired to Argo ARM Zone Pump Control Terminals (X-X)
- Zone thermostats and zone pumps are wired to ARGO Controller
- Priority Switch OFF
- CH Heating only
- See Wiring Figure 8

**2** - If Indirect Storage Tank **IS** applied to multi-zoned pump piping assembly:

- Indirect storage tank sensor is used to regulate storage tank temperature. Wire sensor to M2 terminals #9 and #10.
- Use of booster pump to increase flow rate to indirect tank is not recommended by manufacturer.
- Locate tank close to boiler as possible and size DHW tank/piping/system to use only the internal boiler pump.
- See available pump/head/flow rate chart page 26 of this manual.
- DHW circuit is controlled by boiler control and is Priority heat demand.
- Set Argo priority switch "OFF". Zone 1 priority **IS NOT** used.
- See wiring Figure 9

**3** - If Series Loop Piping is applied:

Wire system pump to Argo AR822 Relay and interface with boiler M2 (terminals #6 and #7) and Argo ARM Zone Control. See wiring Figures 8, 9 and 16.

**Note**

**DO NOT** use 120 V thermostat terminals (M1- #1 and #2).

**DO NOT** wire DHW mechanical thermostat to Argo Control or Heating Only Boiler control.

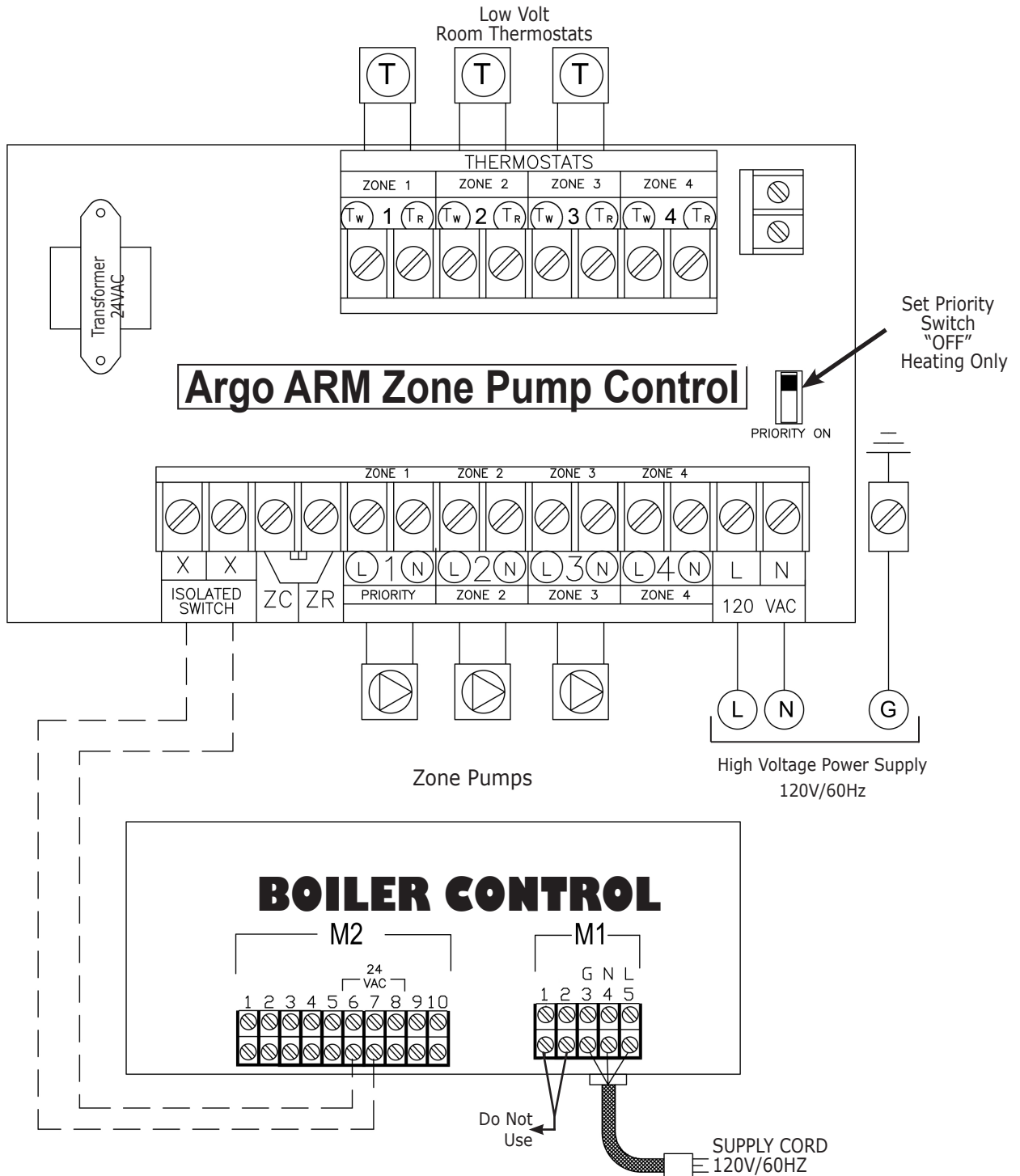
Use **ONLY** DHW Tank Sensor (M2-terminals #9 and #10).

**Note**

When using Indirect Storage Tank change PO3 parameter on boiler control from 08 to 05. See Parameter Setting, in the Installation, Operation, and Maintenance Manual, Section 14.

# HEATING ONLY - WIRING DIAGRAM

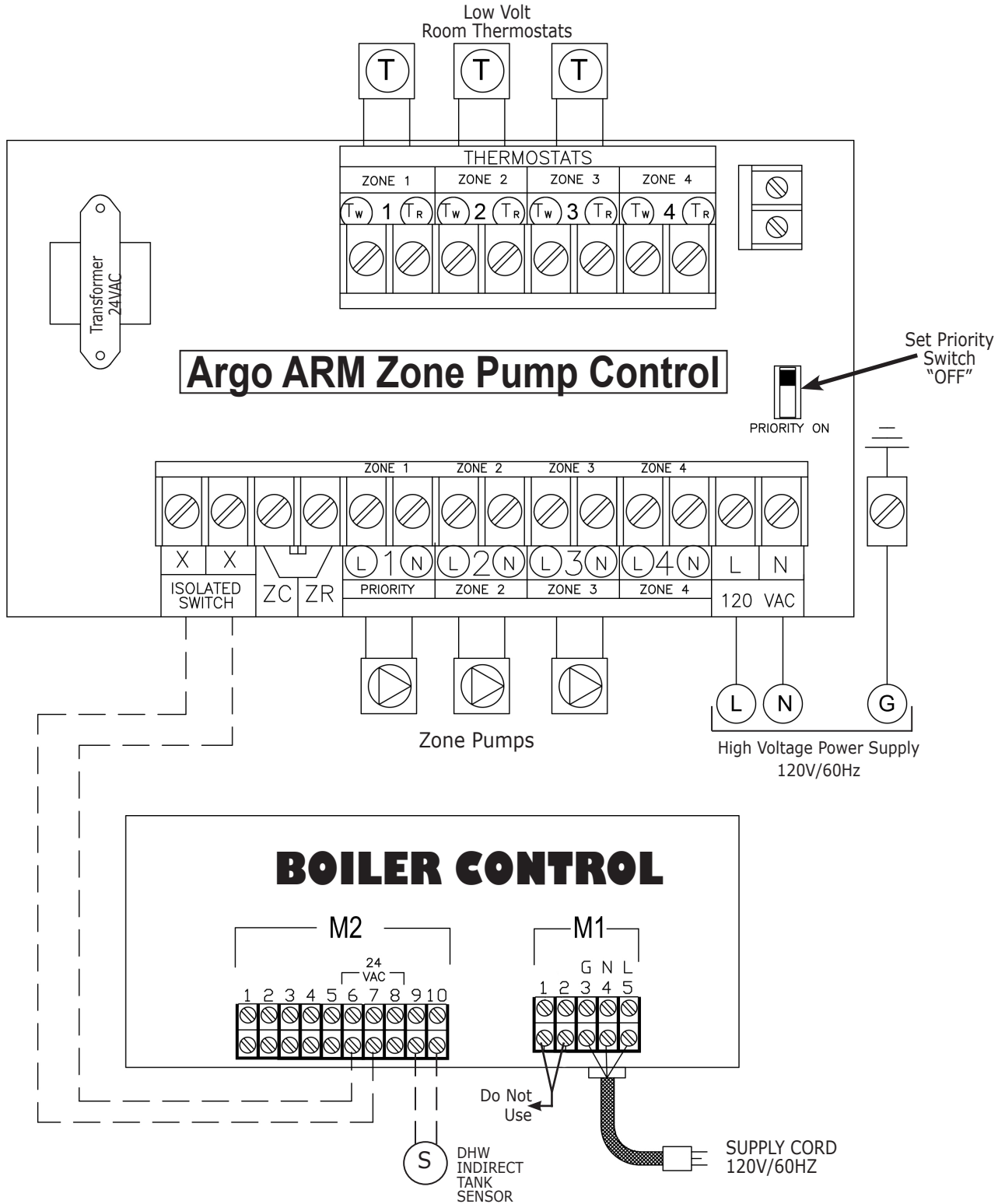
**FIGURE 8 - Boiler WITH MULTIPLE ZONE PUMPS, *WITHOUT* Indirect Tank (DHW)**



**DO NOT** use 120V Thermostat Terminals M1 (#1 and #2).

# HEATING ONLY - WIRING DIAGRAM

**FIGURE 9 - Boiler WITH MULTIPLE ZONE PUMPS, WITH Indirect Tank (DHW)**



**DO NOT** use 120V Thermostat Terminals M1 (#1 and #2).

**Change PO3 parameter on boiler control from 08 to 05**

## COMBI- HYDRONIC PIPING

**A.** Piping installation, materials, and joining methods shall conform to requirements of authority having jurisdiction or in absence of such requirements:

- USA - National Fuel Gas Code, ANSI Z223.1/NFPA 54
- Canada - Natural Gas and Propane Installation Code, CAN/CSA B149.1

**B. Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve.** Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

**Note** → Arrange piping to prevent water dripping onto boiler.

### Quick Reference Chart - Combi Boiler

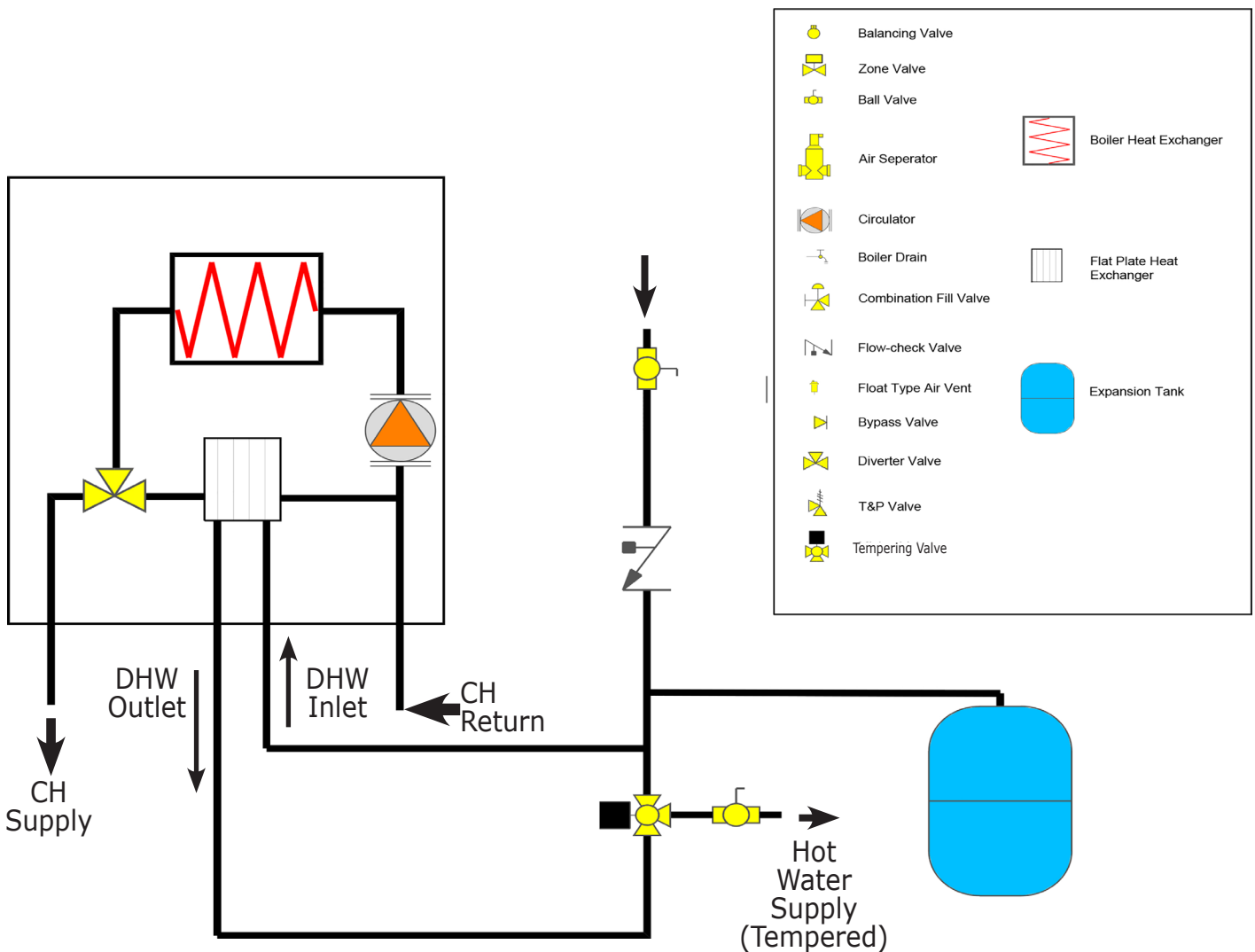
Hydronic Piping Description	Page
<b>ANTI-SCALD WARNING AND PIPING RECOMMENDATION</b>	<b>17</b>
Combi Primary/Secondary Zoned System WITH ZONE VALVES and System Pump (Fig. 10)	18
Combi Primary/Secondary Zoned WITH ZONE PUMPS (Fig. 11)	19
Combi Primary/Secondary Series Loop PUMPING (Fig. 12)	20
Wiring Description	Page
Combi Boiler with System Supply Pump, Single Zone (Fig. 13)	21
Combi Boiler with Multiple Zone Valves (Fig. 14)	22
Combi Boiler with Multiple Zone Pumps (Fig. 15)	23



# WARNING

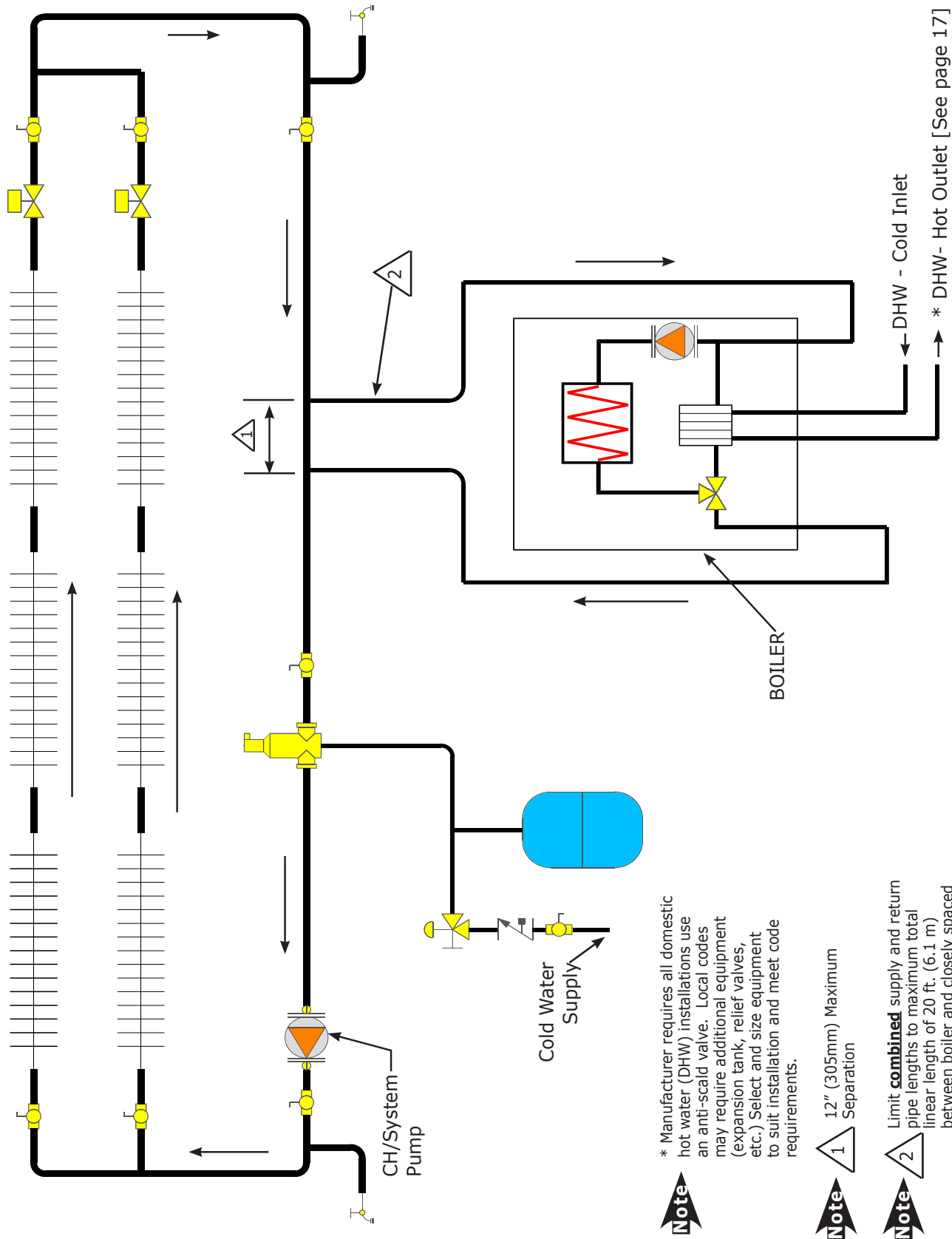
Burn and scald hazard!  
Manufacturer requires installation  
of field supplied anti-scald valve.  
Failure to follow these instructions could  
result in death or serious injury.

## COMBI - DHW ANTI-SCALD PIPING



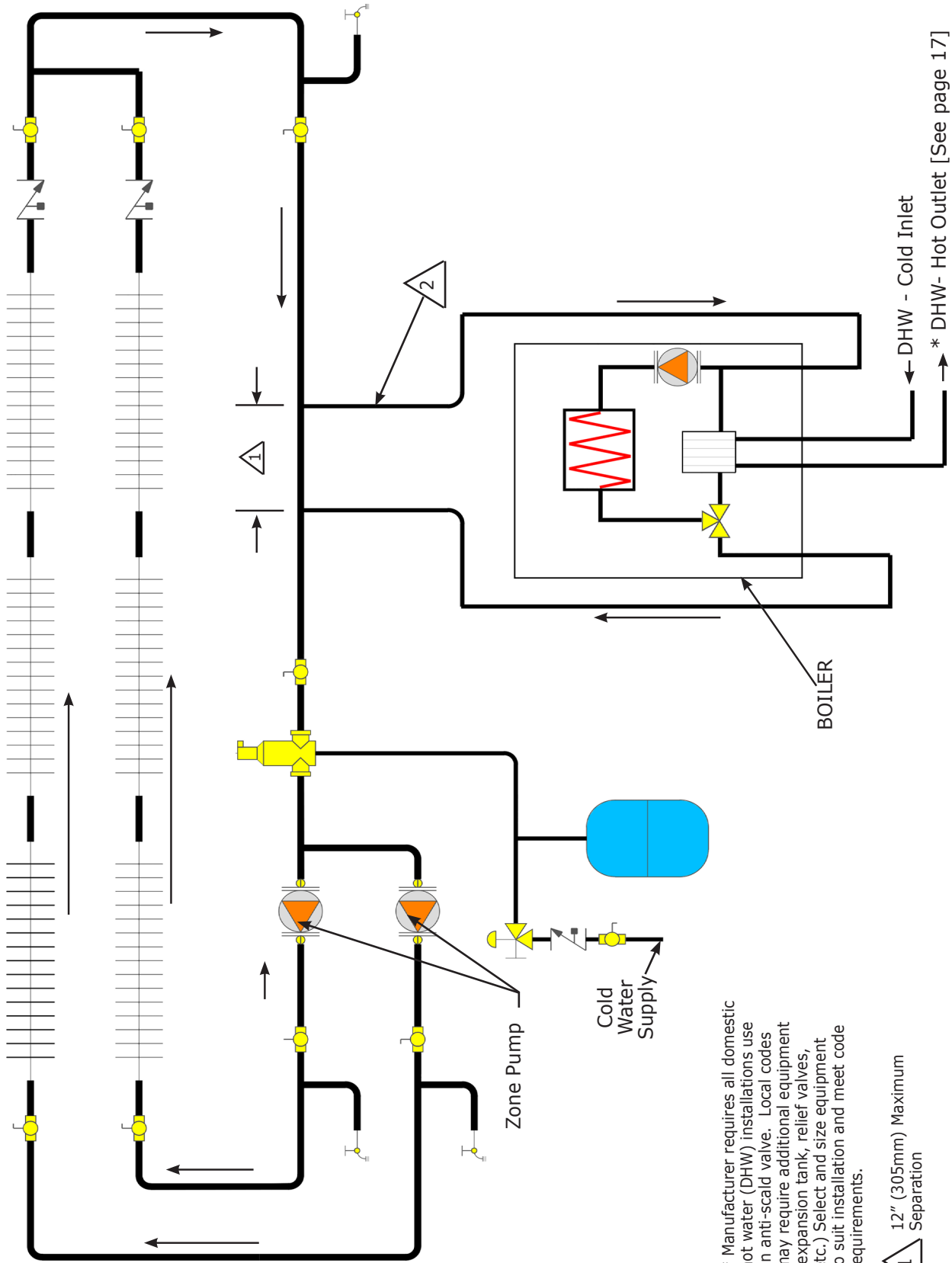
# COMBI - HYDRONIC PIPING

**FIGURE 10 - Combi - Primary/Secondary, Zoned, WITH ZONE VALVES and System Pump**



See wiring Figure 14.  
Use with external system pump relay or Argo Zone Control to interface System Pump to boiler.

FIGURE 11 - Combi - Primary/Secondary, Zoned, WITH ZONE PUMPS



**Note** \* Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve. Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

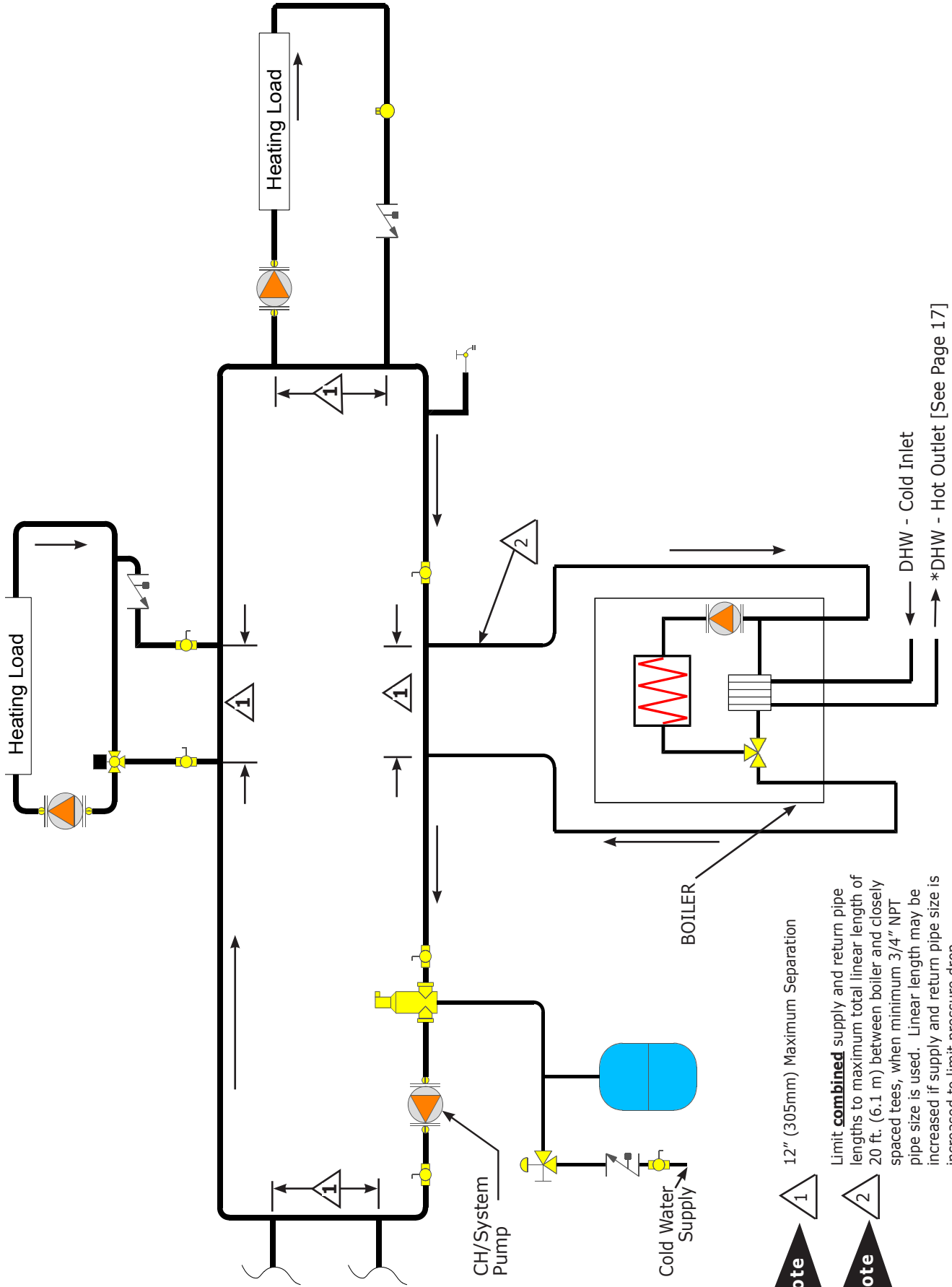
**Note** 1 12" (305mm) Maximum Separation

**Note** 2 Limit **combined** supply and return pipe lengths to maximum total linear length of 20 ft. (6.1 m) between boiler and closely spaced tees, when minimum 3/4" NPT pipe size is used. Linear length may be increased if supply and return pipe size is increased to limit pressure drop.

See wiring Figures 15 and 16.



FIGURE 12 - Combi - Primary/Secondary, Series Loop PUMPING



- Note 1** 12" (305mm) Maximum Separation
- Note 2** Limit **combined** supply and return pipe lengths to maximum total linear length of 20 ft. (6.1 m) between boiler and closely spaced tees, when minimum 3/4" NPT pipe size is used. Linear length may be increased if supply and return pipe size is increased to limit pressure drop

\* Manufacturer requires all domestic hot water (DHW) installations use an anti-scald valve. Local codes may require additional equipment (expansion tank, relief valves, etc.) Select and size equipment to suit installation and meet code requirements.

See wiring Figures 15 and 16.  
Use with external system pump relay and Argo Zone Control to interface System Pump to boiler See page 25.

## COMBI BOILER - WIRING DIAGRAMS

### 1. Wiring Diagrams

All field wiring shall conform to the authority having jurisdiction or, in the absence of such requirements to:

**USA:** National Electrical Code, ANSI/NFPA 70,

**Canada:** Canadian Electrical Code, Part I, CSA

C22.1: Safety Standard for Electrical Installations.

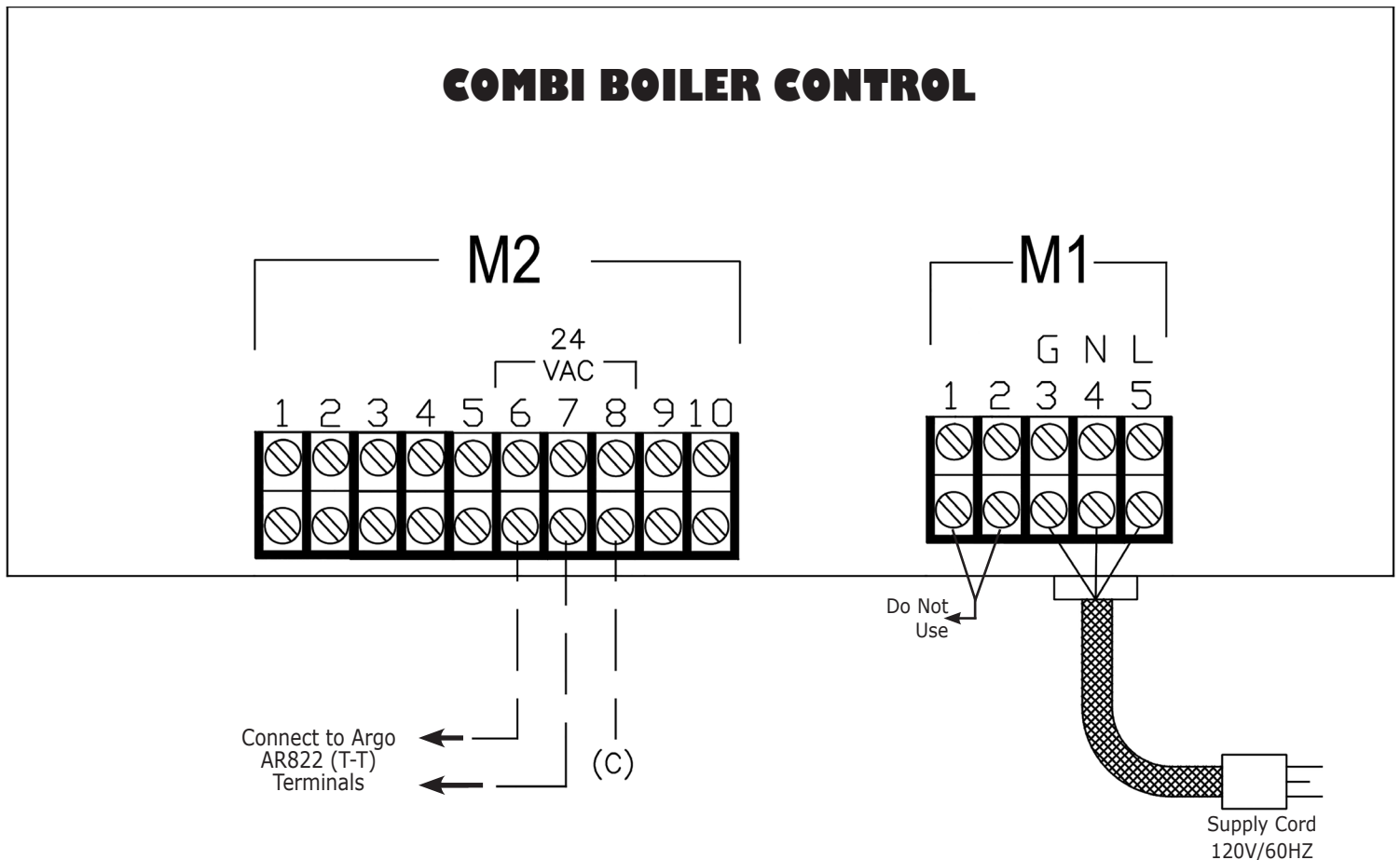
2. Connect M2 terminals #6 and #7 to Argo AR822 (T-T) terminals. See Figure 13.

### 3. System Pump is Used:

- For Single Zone piping use - External pump relay (AR822) to interface central heating system pump operation with either Heating Only or Combi Boiler Control. See Figure 16.
- For Multi Zone Valve piping - Wire system pump to Argo AZ primary pump terminals. See Figure 14.
- Multi Zone Pump/Series Loop (Only) - see Piping Figure 16. External pump - Instruction and Wiring.

**Note** **DO NOT** use 120 V thermostat terminals (M1- #1 and #2).

**FIGURE 13 - Combi Boiler with System Supply Pump - Single Zone**



# COMBI BOILER - WIRING DIAGRAMS

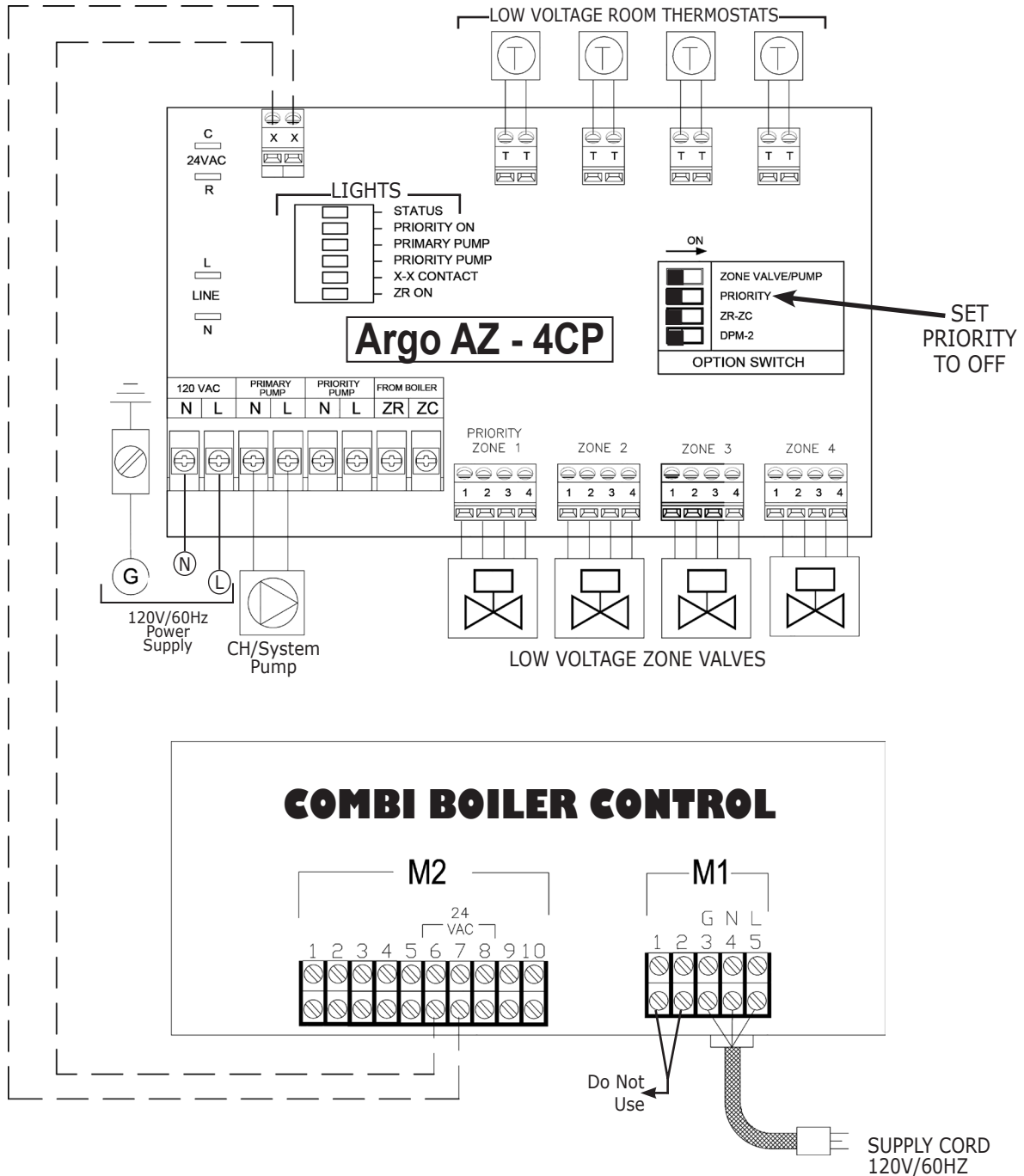
## 4. Use of Multi-Zone Valve System

Boiler call for heat contacts M2 terminals #6 and #7 are wired to Argo Zone Control (x-x) terminals. Zone thermostats and zone valves are wired to Argo Zone Controller. Connect CH/System Pump to Primary Pump terminals on Argo Control. See Figure 14.

Set Argo Priority Switch to OFF position. This disables priority operation and all zone valves will operate independently.

Refer to Argo Controller instructions for switch setting and operation information.

**FIGURE 14 - Combi Boiler with Multiple Zone Valves**



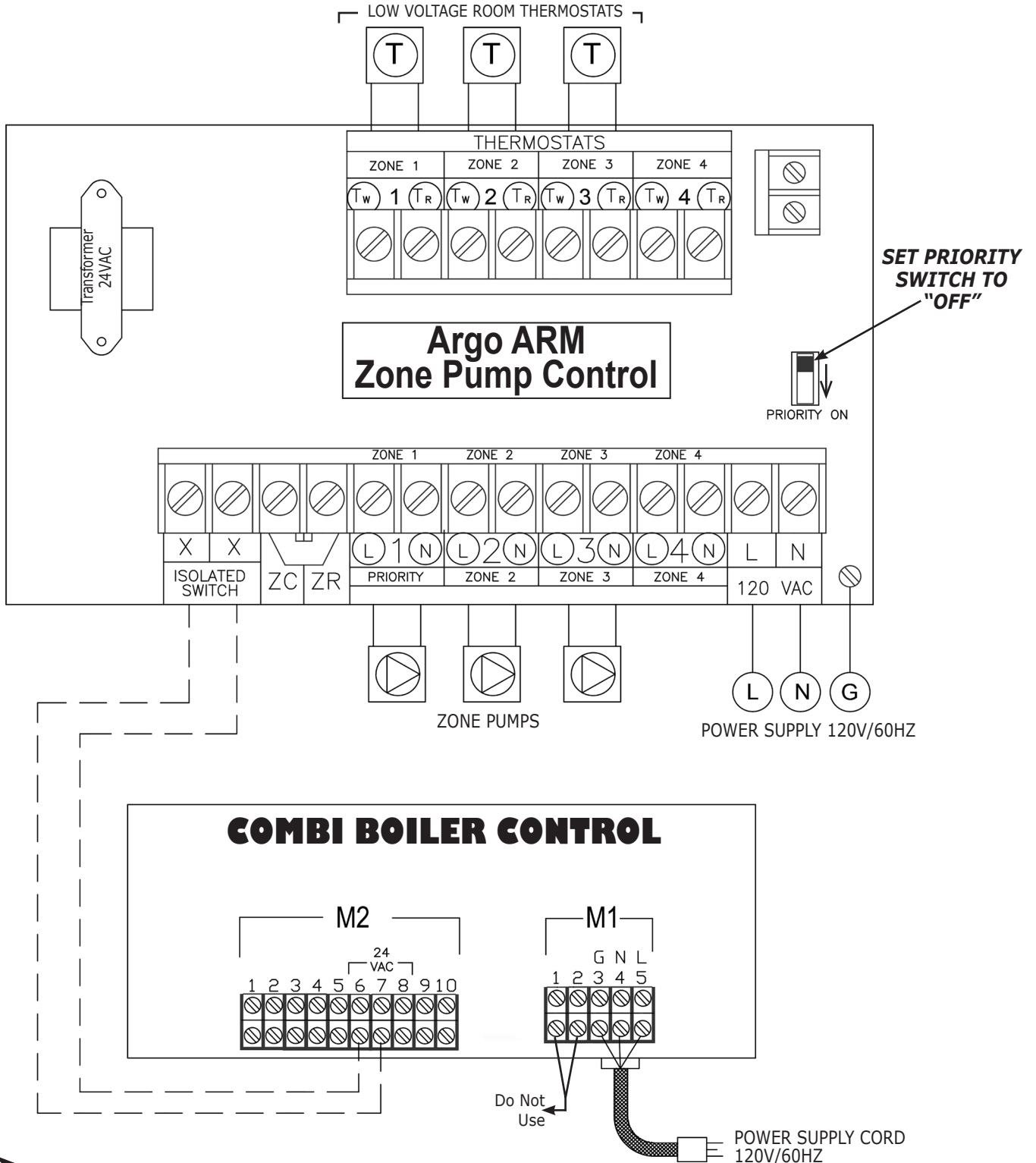
**Note** **DO NOT** Use 120 V thermostat terminals M1 (#1 and #2).

# COMBI BOILER - WIRING DIAGRAMS

## 5. Use of Multi-Zone Pump System

Boiler Thermostat contacts M2 terminals #6 and #7 are wired to Argo ARM Zone Pump Control terminals (x-x). Use Argo ARM Zone Pump Controller and wire as shown in Figure 15.

**FIGURE 15 - Combi Boiler with Multiple Zone PUMPS**



**Note** **DO NOT** Use 120 V thermostat terminals M1 (#1 and #2).

## INSTRUCTIONS AND WIRING DIAGRAM FOR ADDING EXTERNAL PUMP TO HEATING ONLY AND COMBI BOILERS

Installation shall be completed by qualified agency.

### **WARNING**

Fire, explosion, asphyxiation and electrical shock hazard. Improper installation could result in death or serious injury. Read this instruction and understand all requirements, including requirements of authority having jurisdiction, before beginning installation. Installation not complete until appliance operation verified per Installation, Operation & Maintenance Manual provided with boiler.

1. Follow instructions to TURN OFF GAS TO APPLIANCE found on Operation Instructions label on boiler or in Installation, Operation & Maintenance Manual. Verify all electrical power to boiler is turned off.

### **WARNING**

Electric shock hazard. Turn OFF electrical power supply at service panel.

2. Verify all power to boiler is turned OFF at service panel.
3. Follow Installation, Operation & Maintenance manual to remove front jacket panel(s).

### **WARNING**

Burn hazard. Verify heat exchanger has cooled or use appropriate personal protection equipment.

4. Inspect combustion chamber through sight glass. Verify flame is not present.
5. See relay wiring attached.
6. Resume operation using OPERATING INSTRUCTIONS found on Operating Instructions label on boiler or in Installation, Operation & Maintenance Manual.
7. Verify proper operation by following START UP PROCEDURE in Installation, Operation & Maintenance Manual.
8. Follow Installation, Operation & Maintenance manual to install front jacket panel(s).

#### **For Single Zone Piping:**

External pump relay (AR-822) is required to interface Central Heating (CH) system supply pump operation with Heating Only or Combi Boiler Control.

See External Pump - Instruction and Wiring, Figure 16A or 16B.

#### **For Multi-Zone Piping:**

1. Connect CH/System supply pump to Argo AZ Control primary pump contacts.
2. For Multi Zone/Series Loop Piping, see Figures 3 and 12: Use Argo AR822 Control AND Argo ARM Zone Control to sequence system pump to zone pumps and boiler operation. See Figure 16C.

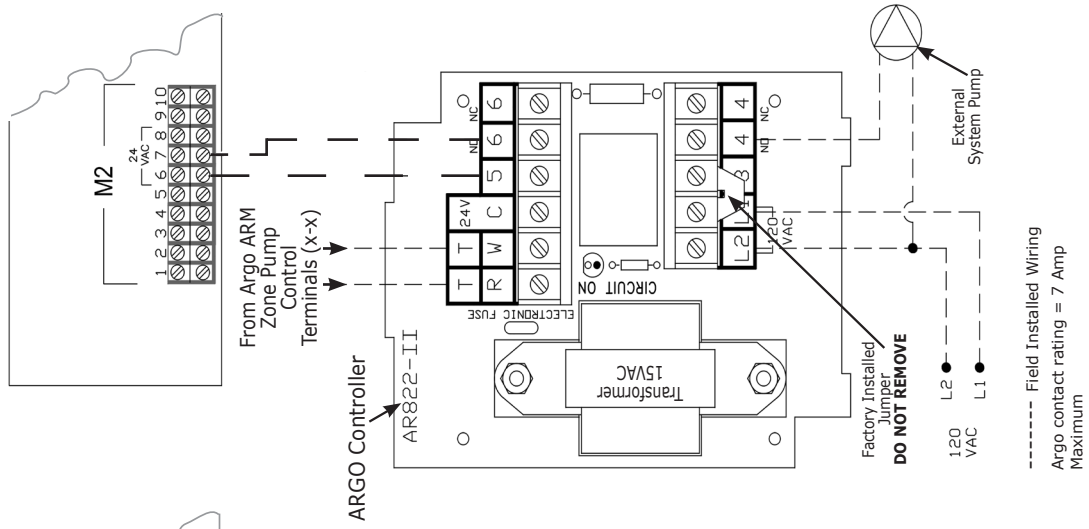
See : Heating Only Boiler - Wiring Figures 6 and 7  
Heating Only Boiler - Piping Figures 1 and 3.  
Combi Wiring - Figure 14  
Combi Boiler Piping - Figures 10 and 12.

## ADDITION OF AN EXTERNAL PUMP

**FIGURE 16 - External Pump/Relay Wiring Diagram , Heating Only And Combi Boilers - Single Zone, And Wiring External System Pump for Series Loop /Multi Zone Piping**

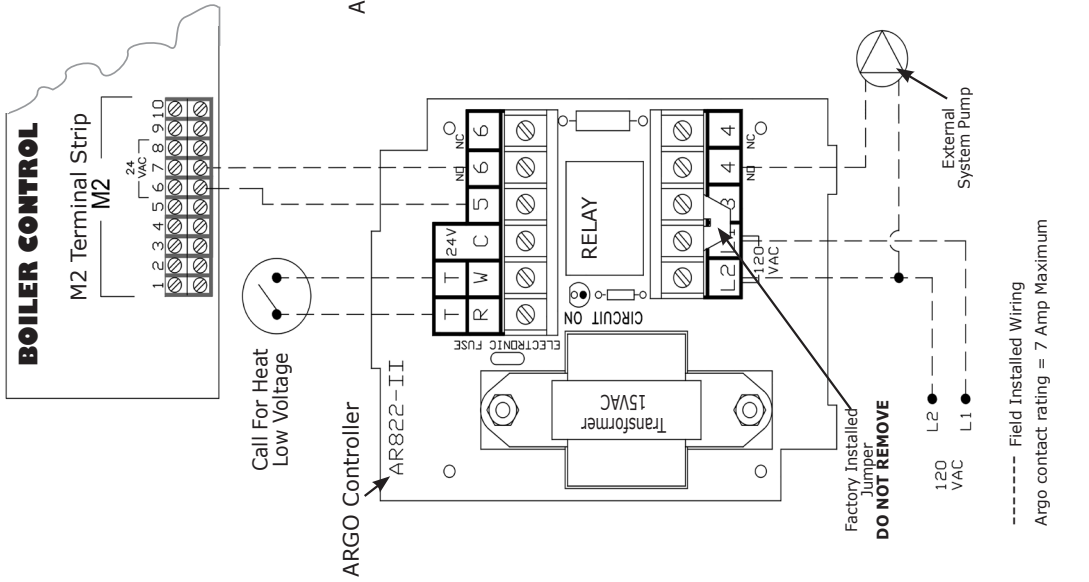
### C) Multi Zone

Heating Only or Combi  
Boiler Series Loop Only



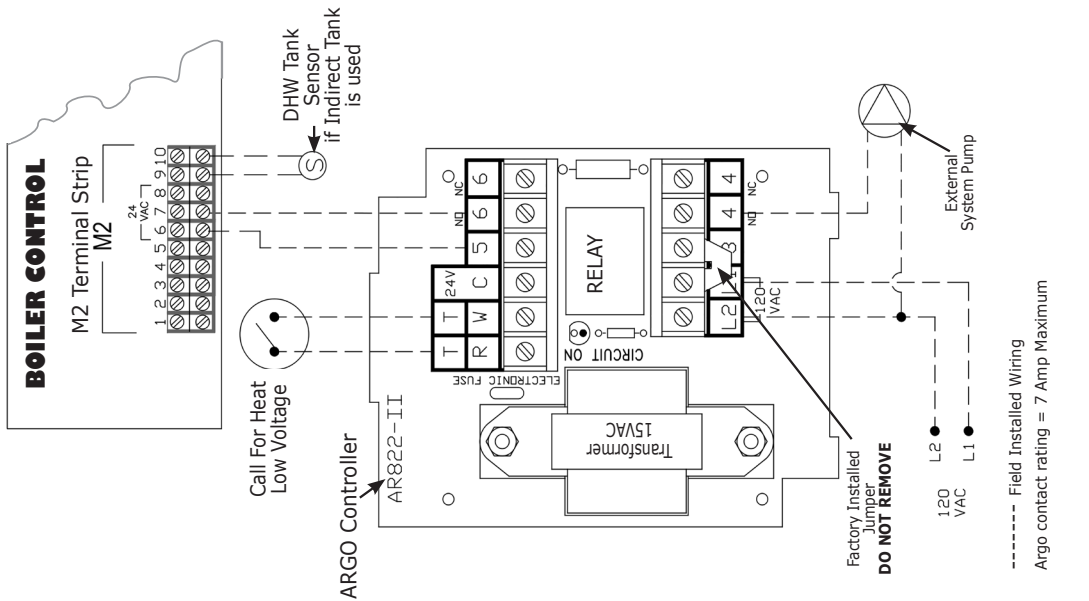
### B) Single Zone

Combi Boiler



### A) Single Zone

Heating Only

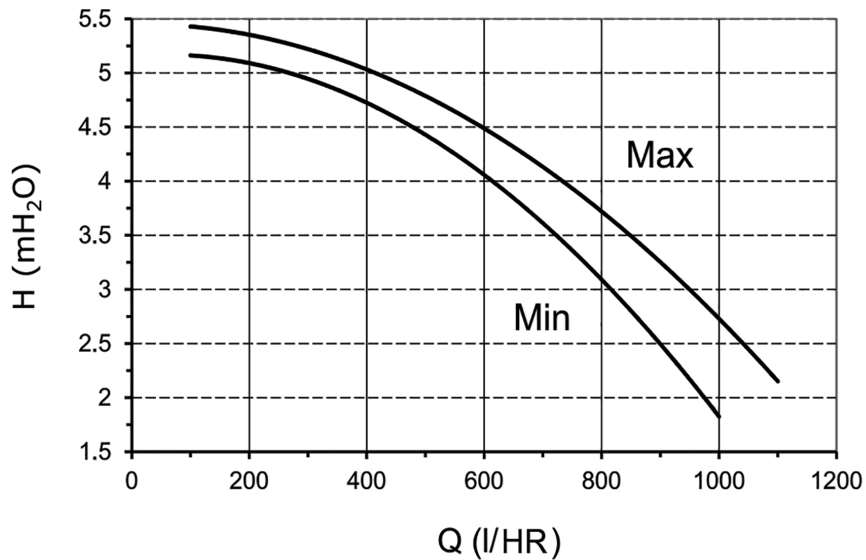
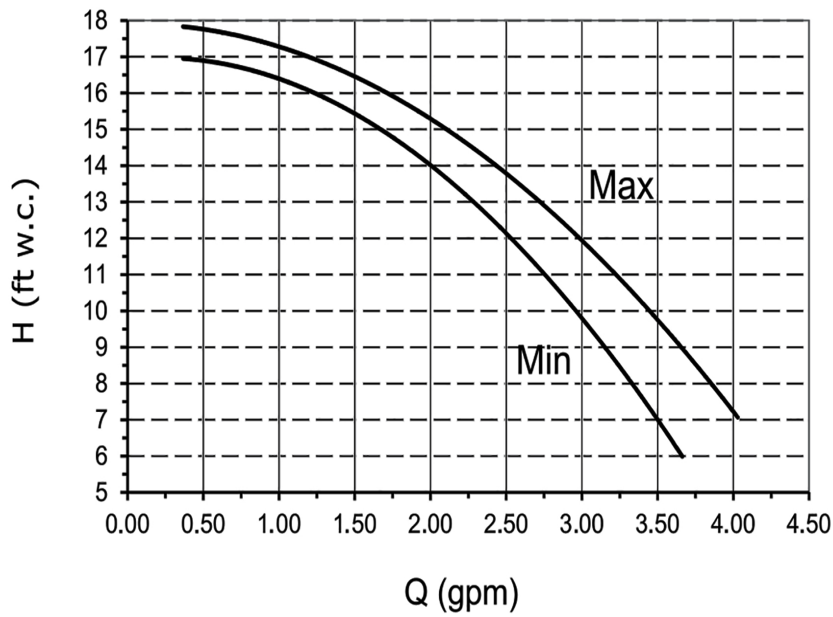


## AVAILABLE PUMP HEAD

### Available Pump Head

**Note** → The intended use of this pump is a boiler loop. Do not use as system pump.

Q	WATER FLOW RATE	MIN	Minimum speed of modulation
H	HEAD	MAX	Maximum speed of modulation



## OPTIONAL EQUIPMENT

### Optional Equipment

1. Outdoor Air Sensor, if used.
  - A. Boiler automatically recognizes sensor when used.
  - B. See Chart 1 for sensor data. Sensor part number BD710487302V
  - C. Locate outdoor sensor to protect against wind and direct sunlight. Mounting instructions provided with sensor.
  - D. Maximum wire length is 100 ft (30m) for 22 ga. wire, or 150 ft (45m) for 18 ga. wire.
  - E. Connect wires to M2 OUTDOOR SENSOR terminals 4 & 5. Wires are interchangeable. See Accessories.
  
2. Sensor for Indirect DHW Tank (Heating Only Boiler).
  - A. See Chart 2 for sensor data.  
See Accessories section of this manual for wiring diagram.

**CHART 1 - OUTDOOR AIR SENSOR DATA**

T [°F]	R [Ohm]	T [°F]	R [Ohm]
-4.0	7,578	53.6	1,690
-2.2	7,193	55.4	1,621
-0.4	6,831	57.2	1,555
1.4	6,489	59.0	1,492
3.2	6,166	60.8	1,433
5.0	5,861	62.6	1,375
6.8	5,574	64.4	1,321
8.6	5,303	66.2	1,268
10.4	5,046	68.0	1,218
12.2	4,804	69.8	1,170
14.0	4,574	71.6	1,125
15.8	4,358	73.4	1,081
17.6	4,152	75.2	1,040
19.4	3,958	77.0	1,000
21.2	3,774	78.8	962
23.0	3,600	80.6	926
24.8	3,435	82.4	892
26.6	3,279	84.2	858
28.4	3,131	86.0	827
30.2	2,990	87.8	796
32.0	2,857	89.6	767
33.8	2,730	91.4	740
35.6	2,610	93.2	713
37.4	2,496	95.0	687
39.2	2,387	96.8	663
41.0	2,284	98.6	640
42.8	2,186	100.4	617
44.6	2,093	102.2	595
46.4	2,004	100.4	617
48.2	1,920	102.2	595
50.0	1,840	104.0	575
51.8	1,763	106.0	556

**CHART 2 - INDIRECT TANK SENSOR DATA**

T [°F]	R [Ohm]	T [°F]	R [Ohm]
32.0	32,505	86.0	8,060
33.8	30,898	87.8	7,726
35.6	29,381	89.6	7,407
37.4	27,946	91.4	7,103
39.2	26,590	93.2	6,813
41.0	25,308	95.0	6,537
42.8	24,094	96.8	6,273
44.6	22,946	98.6	6,021
46.4	21,859	100.4	5,781
48.2	20,829	102.2	5,551
50.0	19,854	104.0	5,332
51.8	18,930	105.8	5,123
53.6	18,054	107.6	4,923
55.4	17,223	109.4	4,732
57.2	16,436	111.2	4,549
59.0	15,689	113.0	4,374
60.8	14,980	114.8	4,207
62.6	14,306	116.6	4,047
64.4	13,667	118.4	3,894
66.2	13,060	120.2	3,748
68.0	12,483	122.0	3,608
69.8	11,935	123.8	3,473
71.6	11,414	125.6	3,345
73.4	10,919	127.4	3,222
75.2	10,447	129.2	3,104
77.0	9,999	131.0	2,991
78.8	9,572	132.8	2,882
80.6	9,166	134.6	2,778
82.4	8,779	136.4	2,679
84.2	8,411	138.2	2,583



## Accessories:

### 1. Outdoor Temperature Sensor Kit - BD710487302V

Use Outdoor Sensor Kit with Heating Only or Combi Boilers. Wire Control to boiler M2 terminal strip terminals #4 and #5 as shown below.

Install/locate Control according to instructions supplied with sensor kit and Installation, Operation and Maintenance Manual (IOM).

Setting "Kt" Climate Curve:

Start boiler in CH mode. Depress CH control button once.



Boiler control will recognize installed OAS sensor. Display will change to show current default "Kt" value. Note display value.

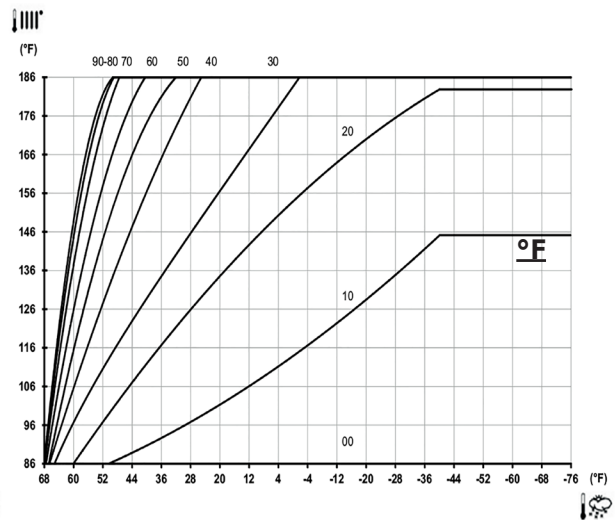
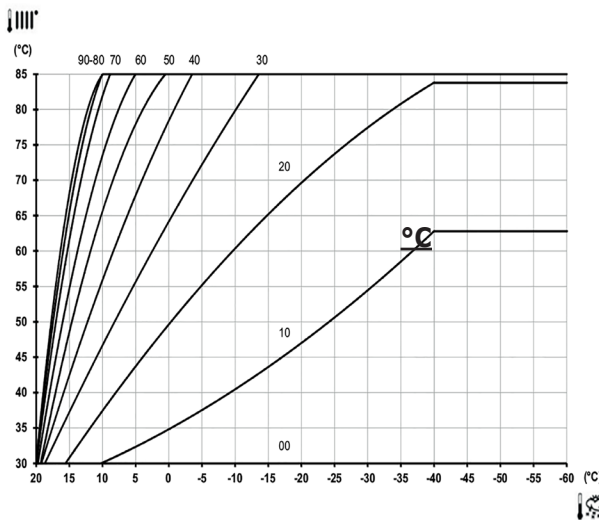
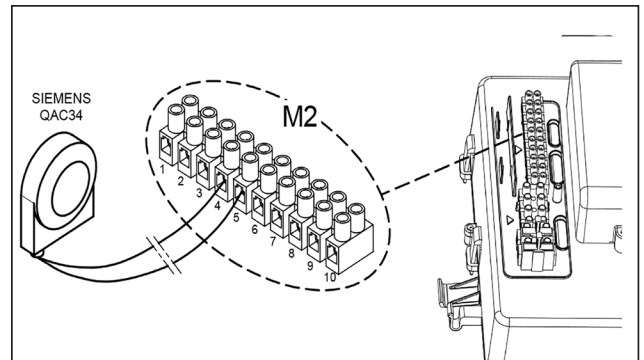
When operation in CH mode, Kt value setting will over ride maximum CH boiler control set point based on current outdoor temperature.

- Refer to applicable °F (or °C) chart,
- Identify Kt range that will satisfy the desired boiler delivery temperature based on average (extreme) outdoor temperature range expected for climate location.

- Use lower value of range as the desired Kt value.  
(example): to deliver 186°F water @ OT of -20°F = Kt range is 90 thru 25. Select 25.
- To change "default" Kt value on boiler control use +/- CH Heating buttons.

When scrolling has stopped, boiler will automatically "SAVE" value as new Kt default value and automatically return to CH mode when no Kt adjustment activity is sensed. Kt values can be changed in +/- 1 point increments.

To return to check or change current Kt "default value" - depress one of the CH setpoint adjustment buttons (once), while in any heating or standby mode. Adjust Kt value to obtain desired comfort level.

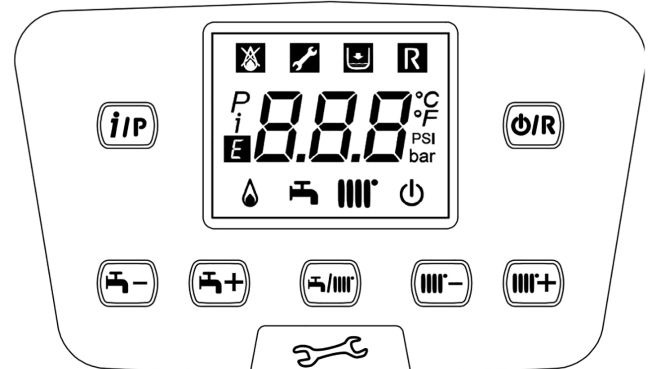


**Note** For temperatures below -40°F (-40°C), maximum heating flow temperature set point no longer increases and curves on the graph become horizontal.

#### BUTTONS Key

	DHW temperature adjustment (+ to increase the temperature and - to decrease it)
	Heating water temperature adjustment (+ to increase the temperature and - to decrease it)
	Boiler operating information
	Operating mode: DHW - DHW & Heating - Heating Only
	Off - Reset - Exit menu/functions

#### Boiler Control Panel



2. Indirect Storage Tank Sensor Kit

Heating Only boiler can be electrically connected to Indirect Storage Tank.

Diagram of hydraulic connection of external indirect storage tank is shown below.

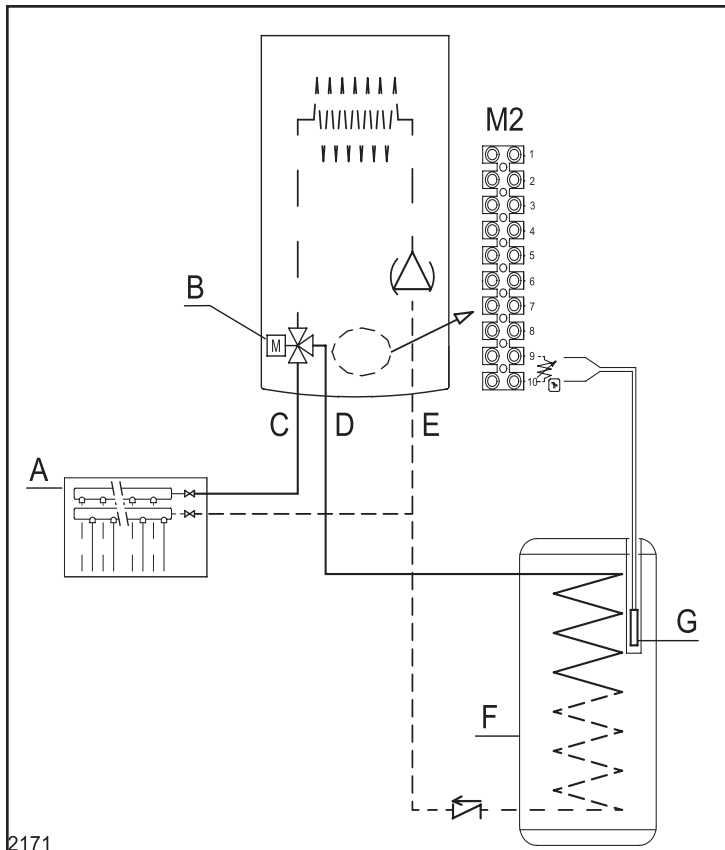
Connect DHW priority sensor to terminals #9 and #10 on terminal block M2. The element of the sensor must be inserted in the sensor well located on the indirect storage tank.

Make sure the exchange capacity of the storage boiler coil is appropriate for power of the boiler. Adjust DHW temperature (+95°F...+140°F / +35°C...+60°C) by pressing buttons on boiler control panel.

**Note** → Parameter PO3 for Heating Only boiler, with no indirect tank remains Factory Set at 08. No change is required.

If adding an Indirect Tank to Heating Only Boiler - change PO3 parameter from 08 to 05. See Section 14, Parameter Settings, in boiler's Installation, Operation, and Maintenance Manual.

Parameter PO3 for COMBI boiler factory set at 00 requires no change.



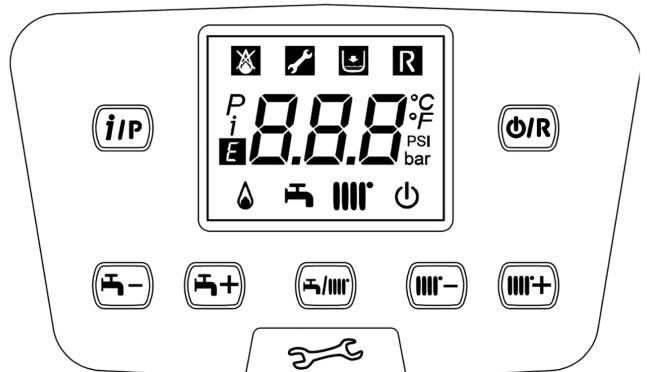
<b>A</b>	Heating System
<b>B</b>	Three way diverter valve
<b>C</b>	Heating water flow
<b>D</b>	Heating supply to DHW indirect storage tank coil
<b>E</b>	Heating water return
<b>F</b>	Tank
<b>G</b>	DHW priority sensor tank

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BUTTONS Key

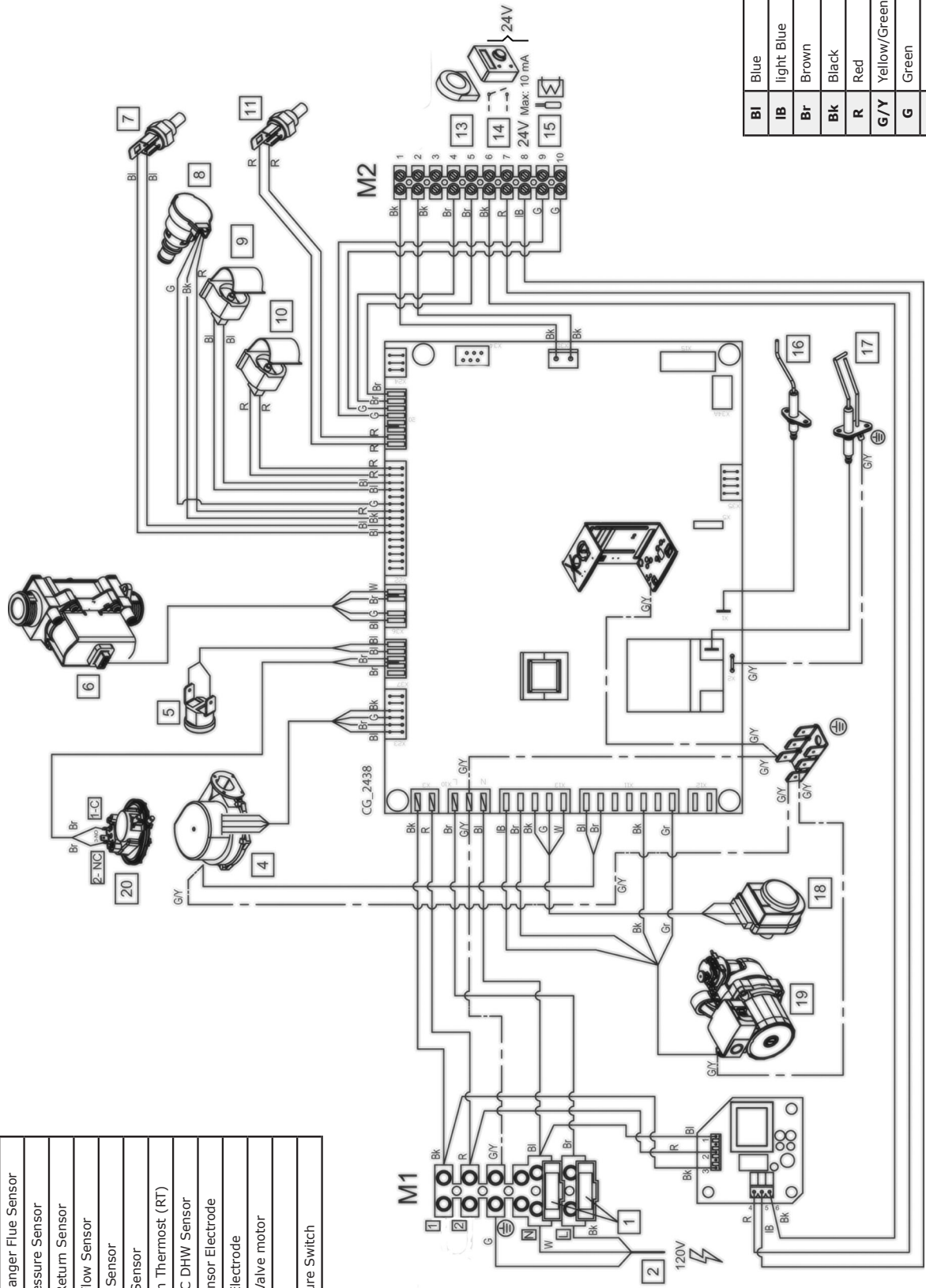
	DHW temperature adjustment (+ to increase the temperature and - to decrease it)
	Heating water temperature adjustment (+ to increase the temperature and - to decrease it)
	Boiler operating information
	Operating mode: DHW – DHW & Heating – Heating Only
	Off – Reset – Exit menu/functions

Boiler Control Panel



# HEATING ONLY BOILER - WIRING DIAGRAM

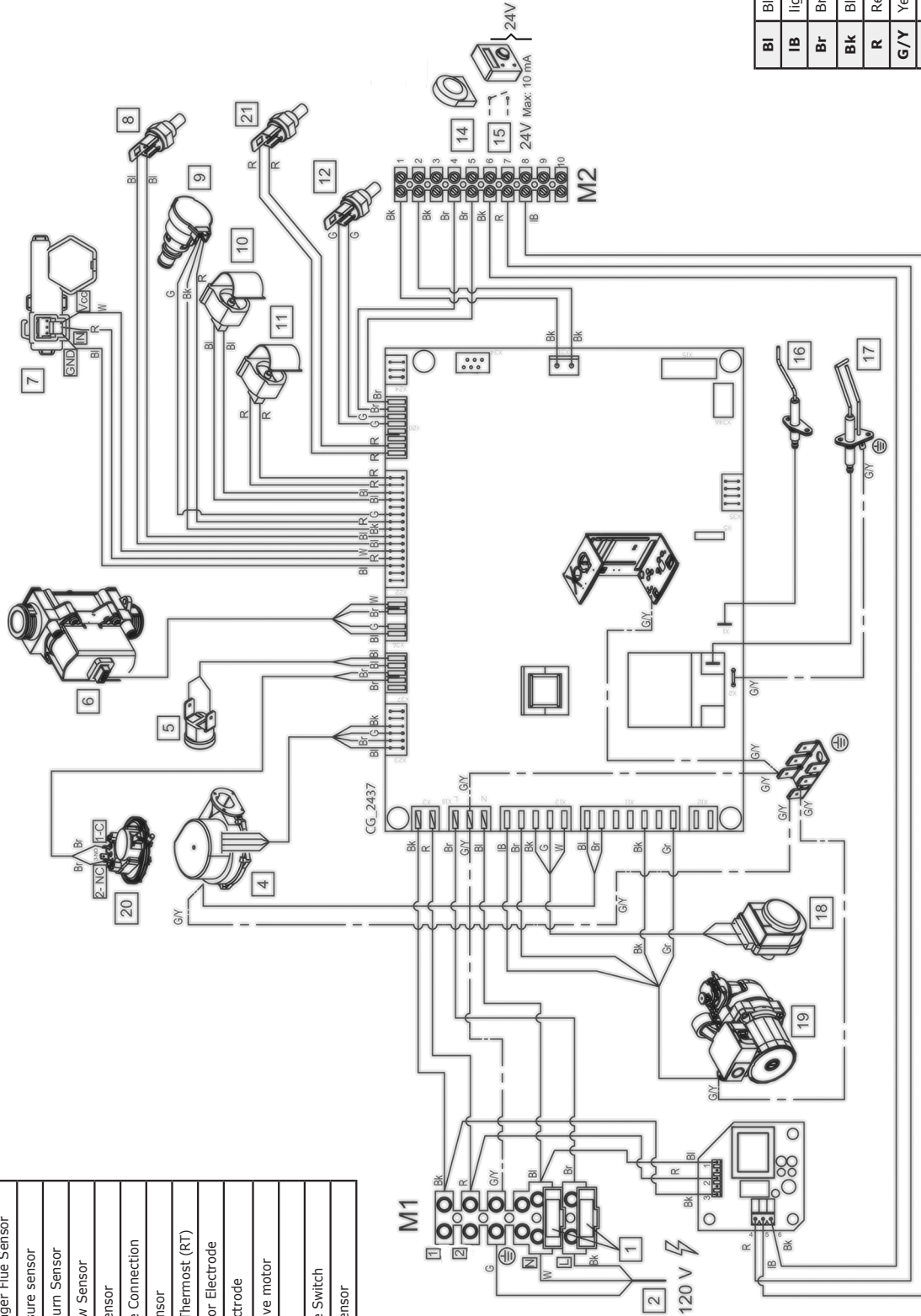
1	Fuses
2	120 V Power Supply
4	Fan
5	Central Heating Water Highlimit
6	Gas Valve
7	NTC Exchanger Flue Sensor
8	Water Pressure Sensor
9	Heating Return Sensor
10	Heating Flow Sensor
11	NTC Flue Sensor
13	Outdoor Sensor
14	24V Room Thermost (RT)
15	Boiler NTC DHW Sensor
16	Flame Sensor Electrode
17	Ignition Electrode
18	Diverter Valve motor
19	Pump
20	Air Pressure Switch



Bl	Blue
lB	light Blue
Br	Brown
Bk	Black
R	Red
G/Y	Yellow/Green
G	Green
W	White
Gr	Grey
Y	Yellow

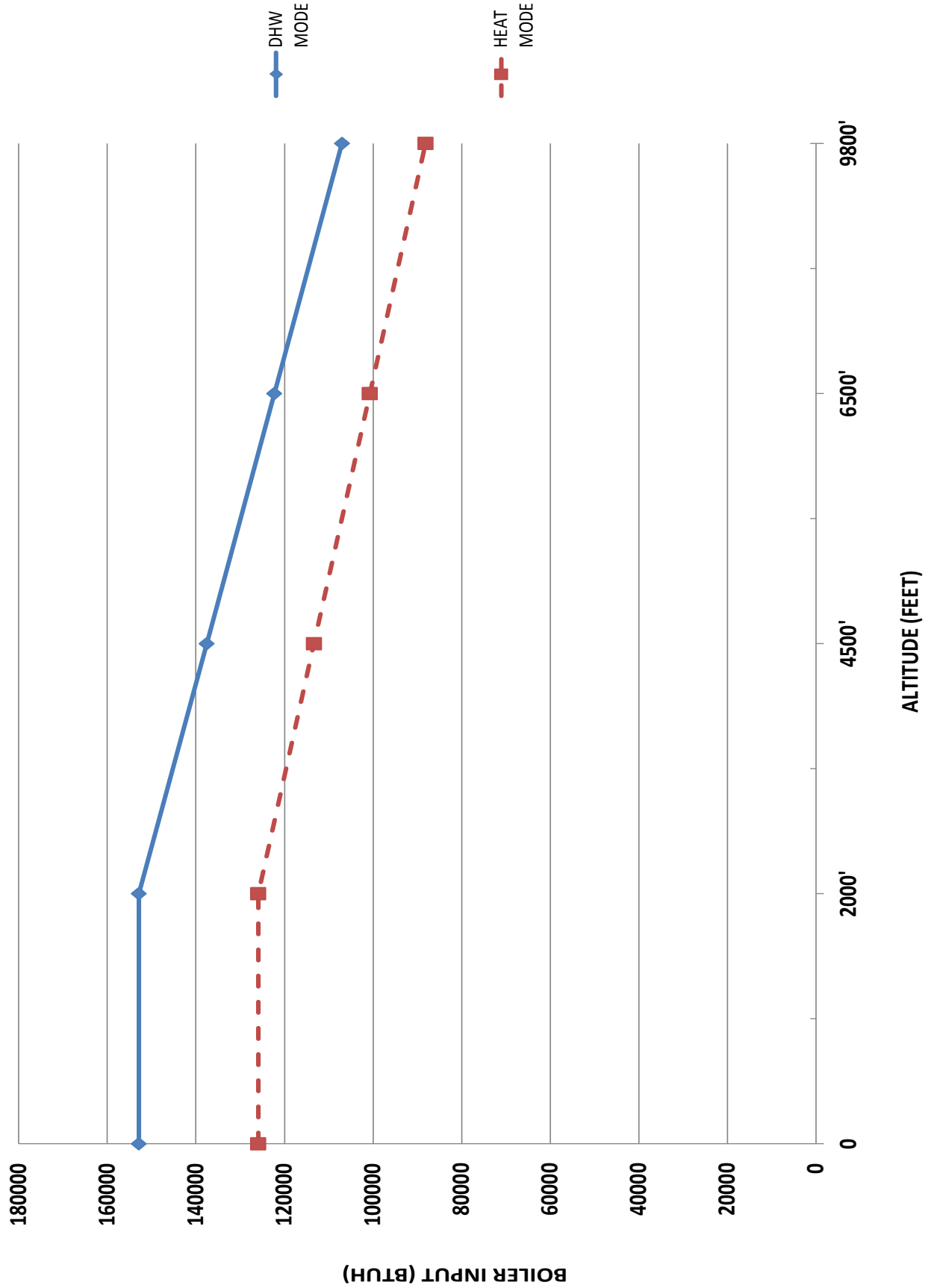
# COMBI BOILER - WIRING DIAGRAM

1	Fuses
2	120 V Power Supply
3	120 V Room Thermostat (RT)
4	Fan
5	Central Heating Water Highlimit
6	Gasd Valve
7	DHW Priority Sensor
8	NTC Exchanger Flue Sensor
9	Water Pressure sensor
10	Heating Return Sensor
11	Heating Flow Sensor
12	NTC Flue Sensor
13	Low Voltage Connection
14	Outdoor Sensor
14	24V Room Thermost (RT)
16	Flame Sensor Electrode
17	Ignition Electrode
18	Diverter Valve motor
19	Pump
20	Air Pressure Switch
21	NTC Flue Sensor



BI	Blue
IB	light Blue
Br	Brown
Bk	Black
R	Red
G/Y	Yellow/Green
G	Green
W	White
Gr	Grey
Y	Yellow

CALCULATED EFFECTS OF HI-ALTITUDE ON BOILER PERFORMANCE



# NOTICE

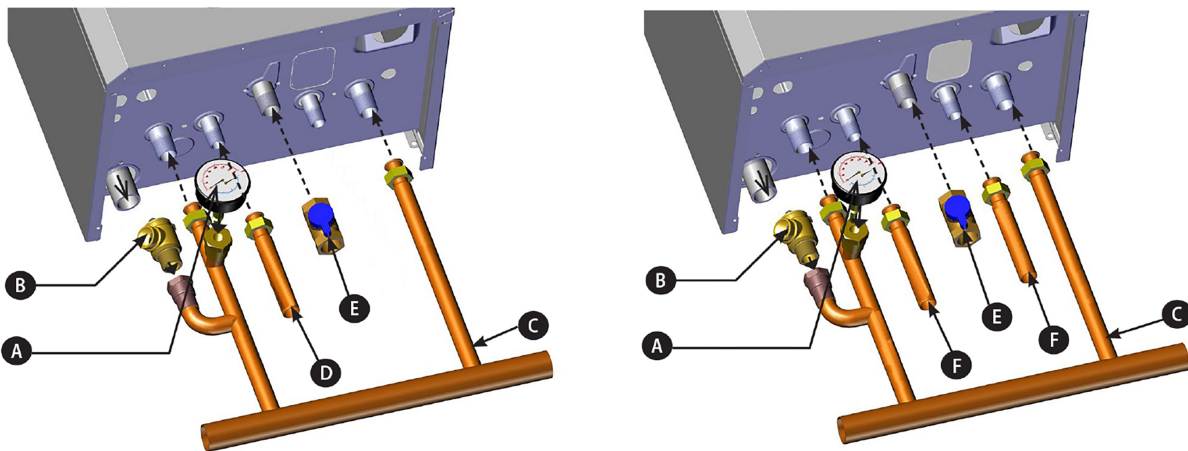
Do not solder fittings when they are threaded onto boiler. Heating the boiler fittings will cause failure of the gaskets and water leaks.

1. Use piping accessories as shown below.
2. Do any soldering away from the boiler, then thread soldered assembly to Boiler connections.

## Factory Supplied Trim

The boiler features quick connection removable fittings.

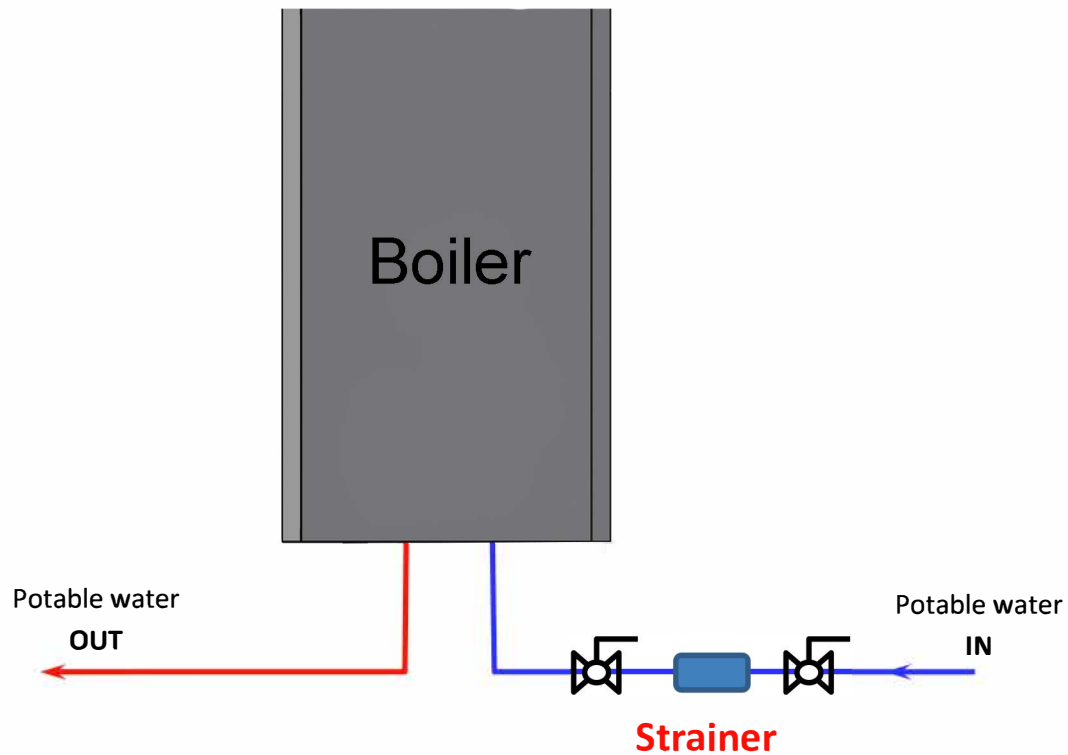
The connections on the bottom of the boiler are all straight threaded - standard tapered fittings cannot be used to connect to the boiler.



ITEM	DESCRIPTION
A	Pressure Temperature Gauge
B	Pressure Relief Valve (3/4")
C	Heating System Supply/Return Connection - copper stubs (1 1/4")
D	Optional indirect connection on heating only boiler - copper stub (3/4")
E	Gas Shut Off (3/4")
F	DHW combi only - Inlet & Outlet Connections - copper stub (1/2")

240011834 Rev A





### Manufacturer Recommendation

A strainer filtering potable water before entering the boiler is highly recommended to prevent errors and lockouts. The strainer prevents any sedimentation and debris from your water supply piping from entering the boiler. Debris carried from the water supply will clog DHW water flow sensor resulting in error codes and causing boiler to lockout.

Locate the strainer as close to the boiler as possible and place on DHW (domestic hot water) inlet connection located at bottom of the boiler.

**APPLICATION TABLE - INDIRECT TANK SIZING**

<b>'HEATING ONLY' BOILER (125,000 BTUH)</b>						
		<b>BOILER OUTPUT (BTUH/HR)</b>				<b>MAX. OUTPUT</b>
		<b>50,000</b>	<b>60,000</b>	<b>80,000</b>	<b>100,000</b>	
<b>H2O30</b>						
<b>1st HOUR RATING (GAL/HR)</b>	<b>140 F</b>	94	106	106	106	106
	<b>115 F</b>	119	138	158	158	158
<b>CONTINUOUS RATING (GAL/HR)</b>	<b>140 F</b>	67	79	79	79	79
	<b>115 F</b>	92	111	131	131	131
<b>H2O40 / H2O40L</b>						
<b>1st HOUR RATING (GAL/HR)</b>	<b>140 F</b>	103	115	119	119	119
	<b>115 F</b>	128	147	174	174	174
<b>CONTINUOUS RATING (GAL/HR)</b>	<b>140 F</b>	67	79	83	83	83
	<b>115 F</b>	92	111	138	138	138
<b>H2O50</b>						
<b>1st HOUR RATING (GAL/HR)</b>	<b>140 F</b>	112	124	133	133	133
	<b>115 F</b>	137	156	192	192	192
<b>CONTINUOUS RATING (GAL/HR)</b>	<b>140 F</b>	67	79	88	88	88
	<b>115 F</b>	92	111	147	147	147
<b>H2O60 / H2O60L</b>						
<b>1st HOUR RATING (GAL/HR)</b>	<b>140 F</b>	121	133	147	147	147
	<b>115 F</b>	146	165	208	208	208
<b>CONTINUOUS RATING (GAL/HR)</b>	<b>140 F</b>	67	79	93	93	93
	<b>115 F</b>	92	111	154	154	154

**Notes:**  
 176 °F Boiler Supply Water Temperature  
 AHRI Rating Conditions - 50 °F Inlet Water  
 @ 4.0 GPM FLOW RATE



## LOW WATER CUTOFF

### Low Water Cut Off - Heating Only and Combi Boilers

These guidelines are supplied when necessary to install an additional Low Water Cut Off (LWCO), for sensing a low water level condition in a boiler, as required by the Authority Having Jurisdiction.

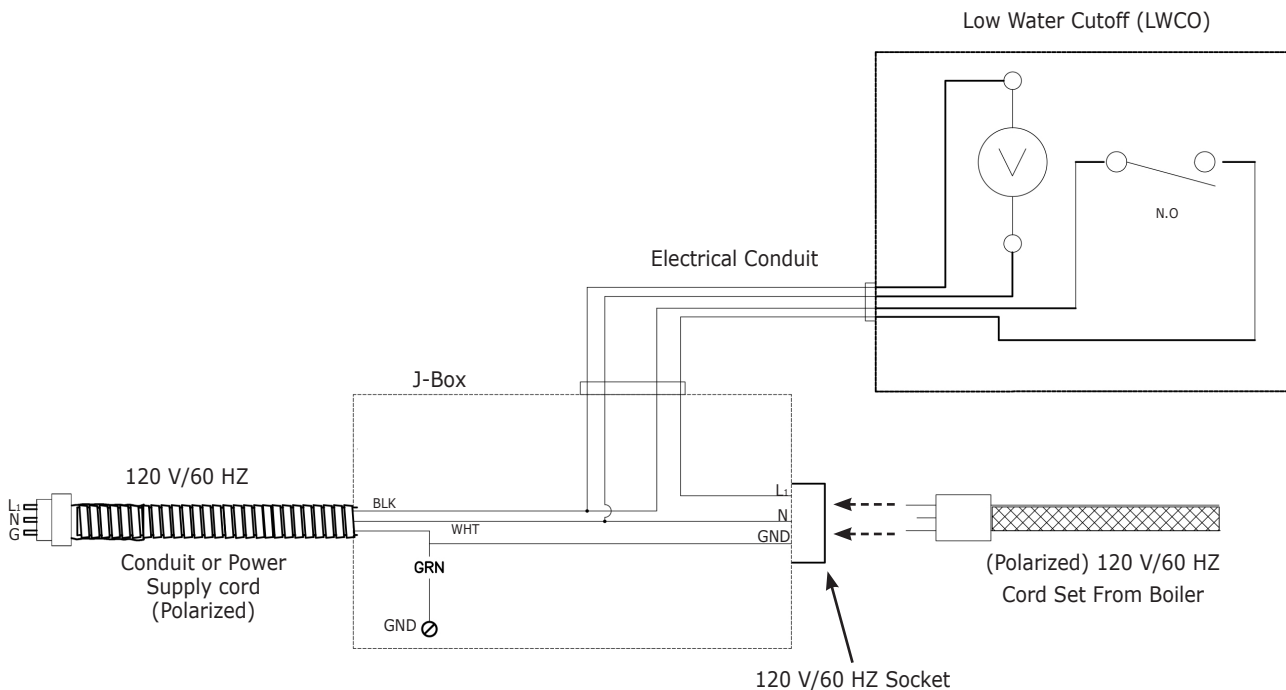
Follow LWCO manufacturer installation instructions for type of LWCO selected in addition to these instructions.

LWCO shall be 120V/60HZ control and dry contacts sized for load being connected. Wire control to boiler. See Figure 1.

Connect LWCO device to the system ground. Ground in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements, with the National Electrical Code (NEC) or Canadian Electrical Code CEC.

- Locate LWCO sensing device in the supply piping, above the minimum height of boiler. See Figure 2, Piping Diagram.
- Position control in HORIZONTAL piping to assure proper boiler protection (upright or 90° rotation).
- For proper operation, sensing element of the LWCO control shall be positioned in the tee to sense the main water stream. Maintain minimum 1/4" spacing from pipe walls. Element shall NOT contact the rear, or side walls of the tee. See Figure 3.
- Install an air vent using a tee to avoid nuisance shutdowns.
- Apply small amount of pipe sealant to threaded connections.
- Arrange piping to prevent water dripping onto boiler.
- DO NOT install water shutoff valve between boiler and LWCO sensing device.

**FIGURE 1 - LWCO Wiring Diagram**

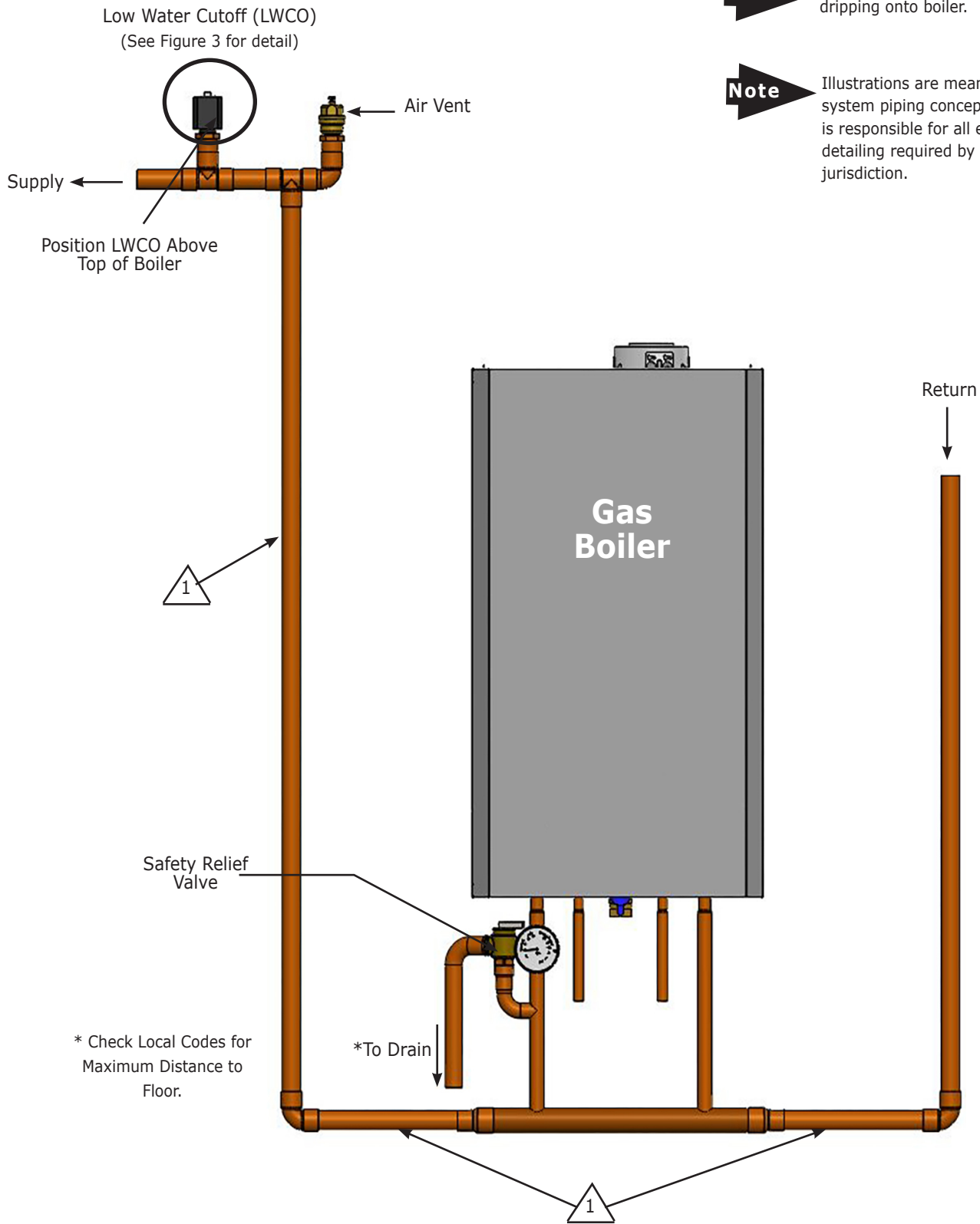


# LOW WATER CUTOFF

**FIGURE 2 - Piping Diagram - LWCO Location**

**Note** Arrange piping to prevent water dripping onto boiler.

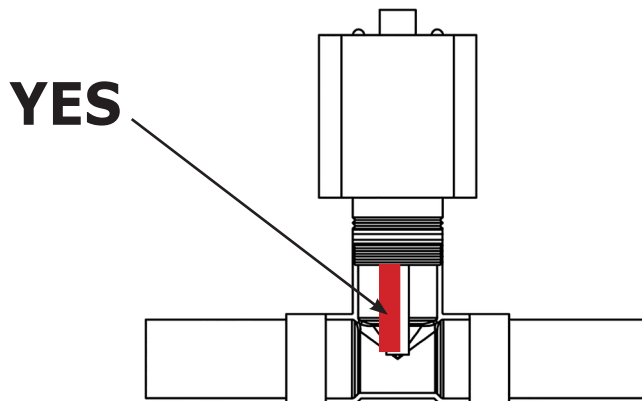
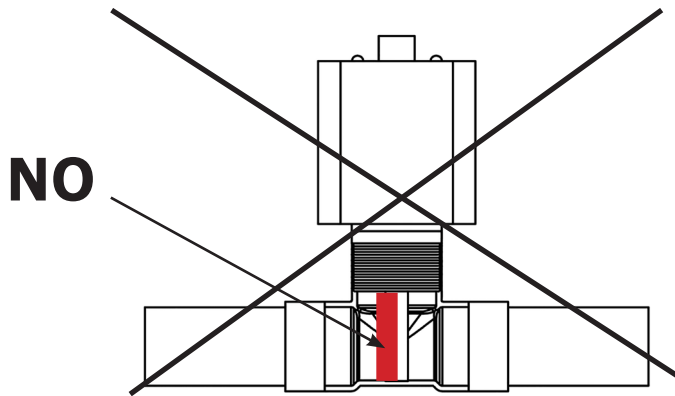
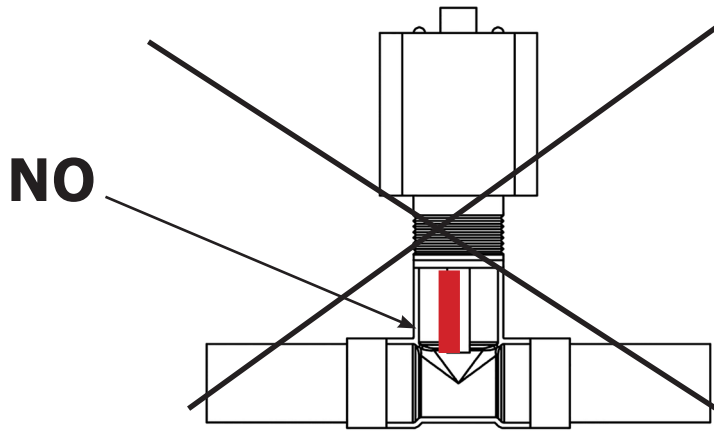
**Note** Illustrations are meant to show system piping concept only. Installer is responsible for all equipment and detailing required by authority having jurisdiction.



**Note** 1 DO NOT PLACE ISOLATION VALVE BEFORE TEE OR LWCO.

**LOW WATER CUTOFF**

**FIGURE 3 - Low Water Cutoff - Detail**





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