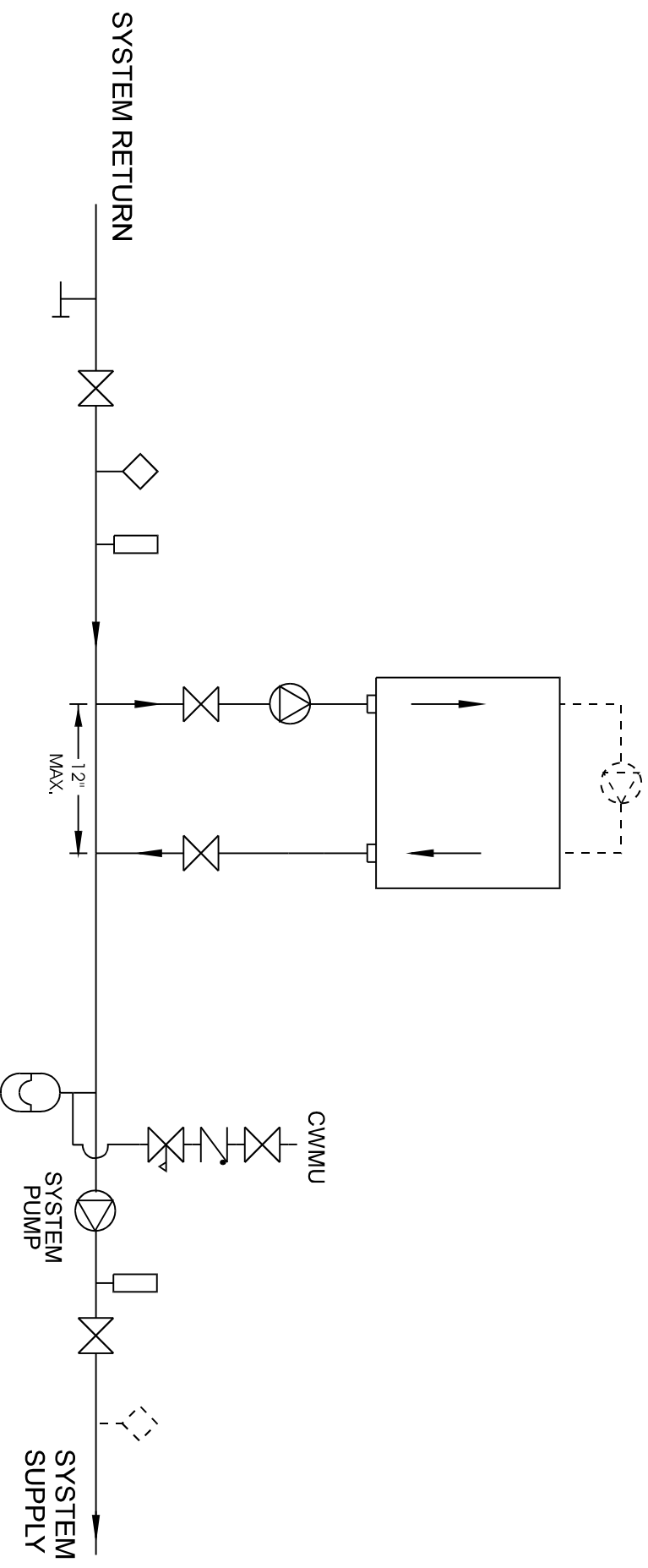


SINGLE BOILER - PRIMARY/SECONDARY



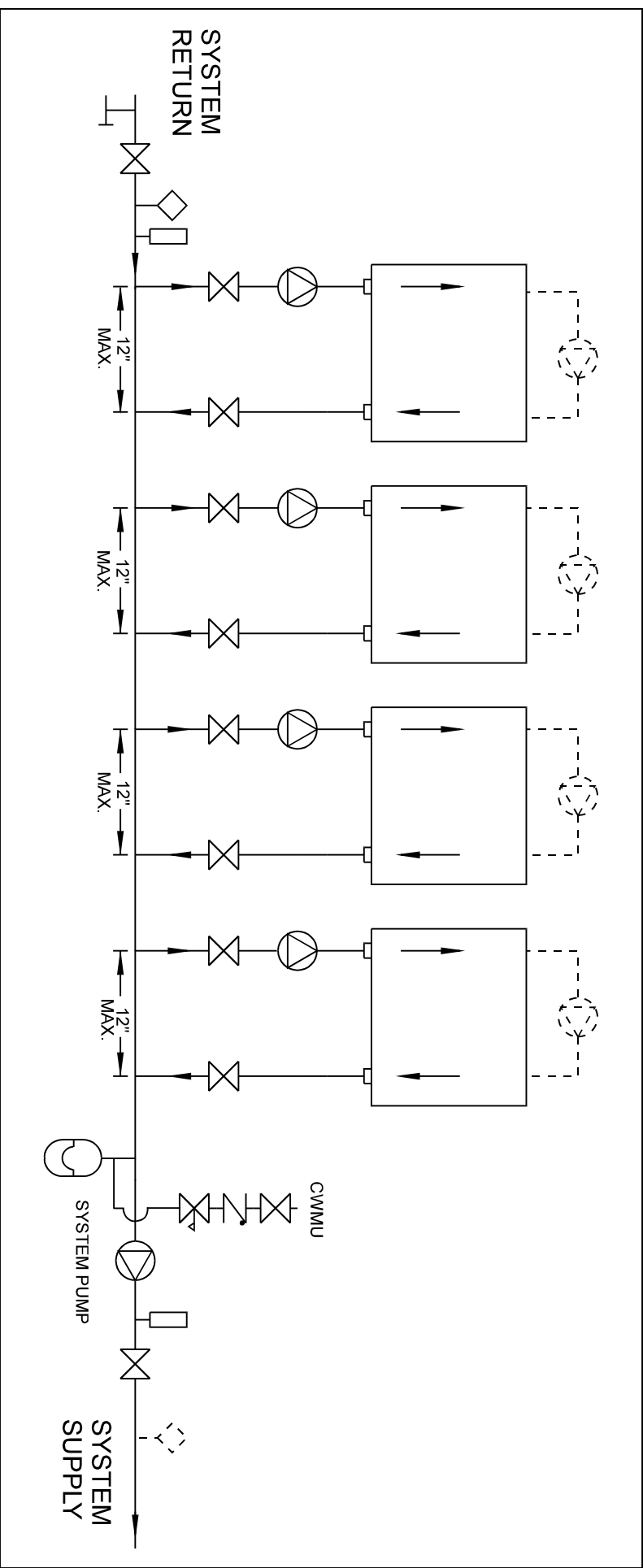
NOTES:

Primary/Secondary required for variable flow systems.
 Boiler circuit piping must equal boiler flange size.
 Primary (Boiler) Pump sized to boiler design flow requirements.
 Boiler water connections (inlet/outlet) vary per model. Verify connection orientation.

All boilers furnished with factory mounted outlet water temperature gauge.
 Dotted symbols indicate optional locations.
 Primary (Boiler) pump requires system temp. interlock.
 CWMLU = Cold Water Make-Up
 Temperature sensors require field interlock to boiler controls

PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

MULTIPLE BOILERS - PRIMARY/SECONDARY



NOTES:

Primary/Secondary required for variable flow systems.
Boiler circuit piping must equal boiler flange size.
Primary (Boiler) Pump sized to boiler design flow requirements.
Boiler water connections (inlet/outlet) vary per model. Verify connection orientation.

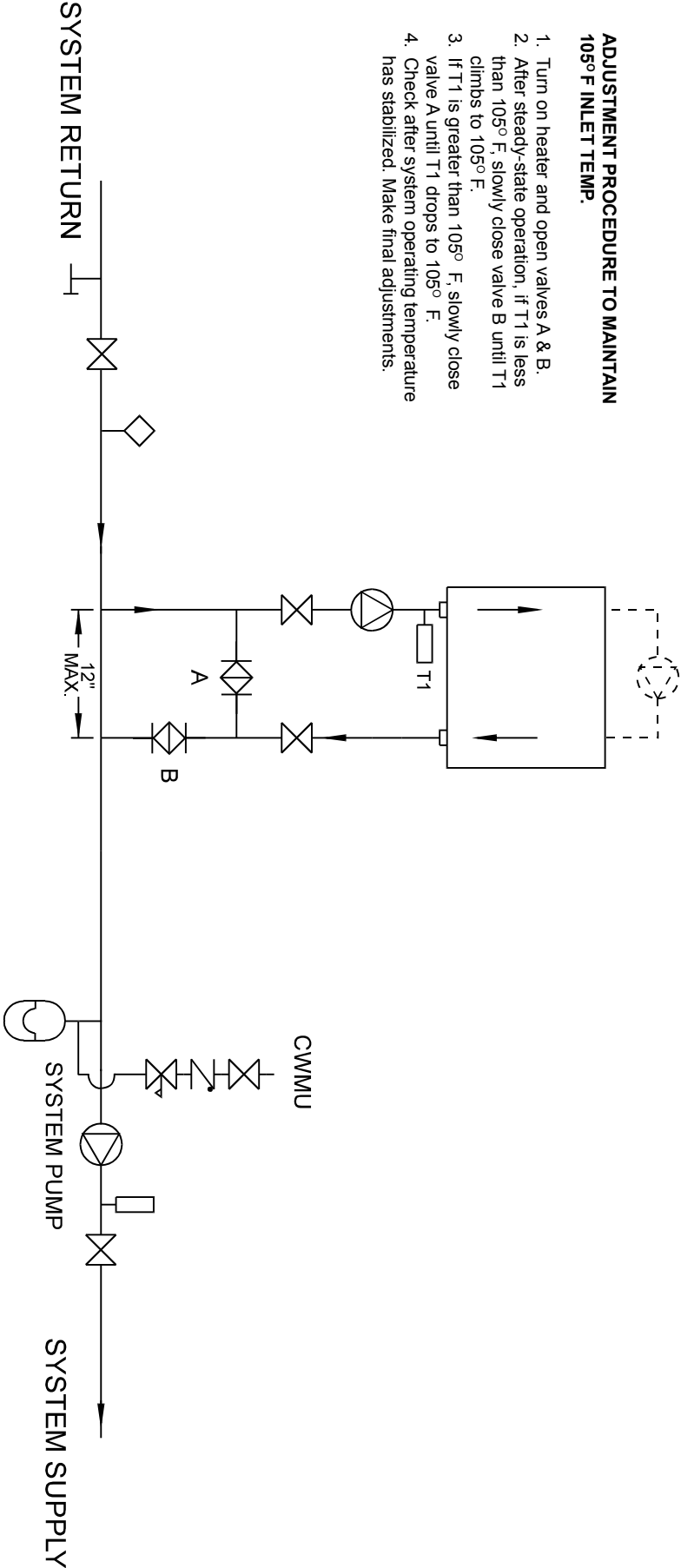
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PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

SINGLE BOILER, PRIMARY/SECONDARY, HEAT PUMP

**ADJUSTMENT PROCEDURE TO MAINTAIN
105° F INLET TEMP.**

1. Turn on heater and open valves A & B.
2. After steady-state operation, if T1 is less than 105° F, slowly close valve B until T1 climbs to 105° F.
3. If T1 is greater than 105° F, slowly close valve A until T1 drops to 105° F.
4. Check after system operating temperature has stabilized. Make final adjustments.



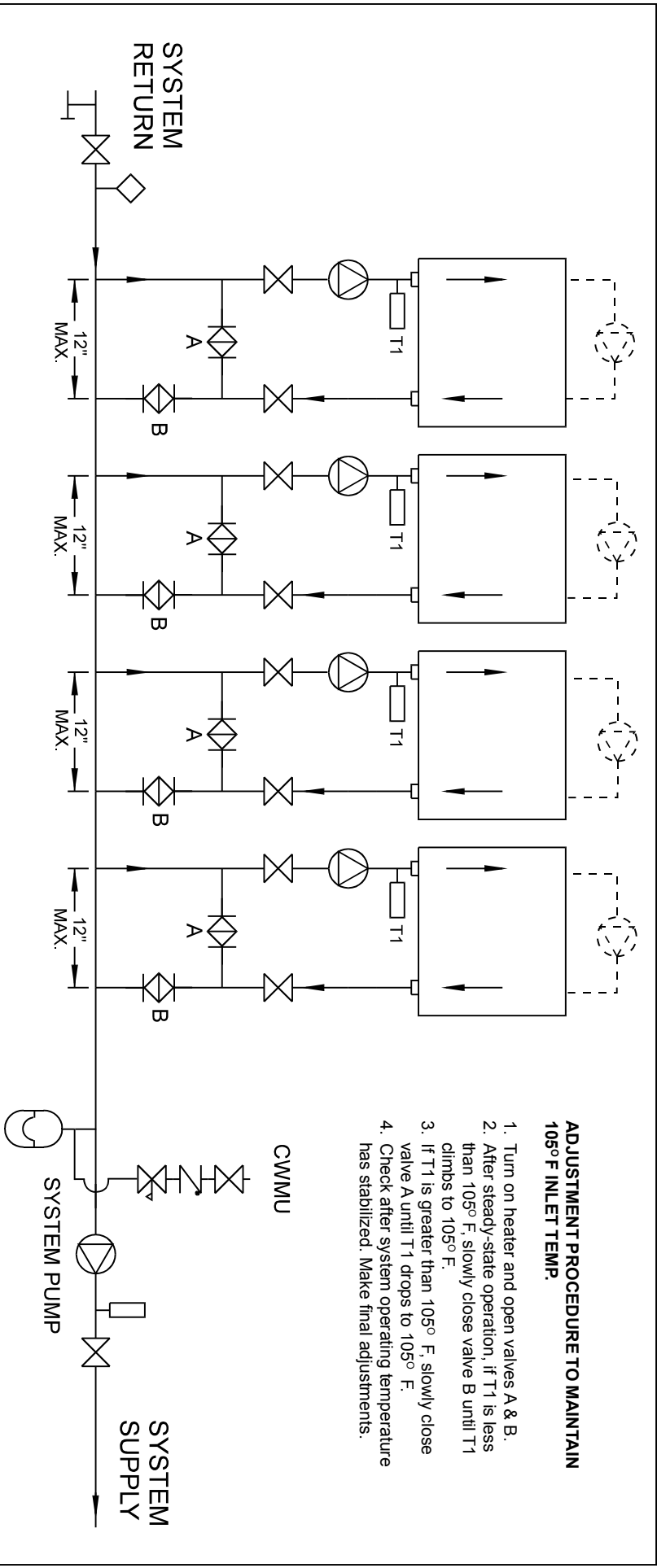
NOTES:

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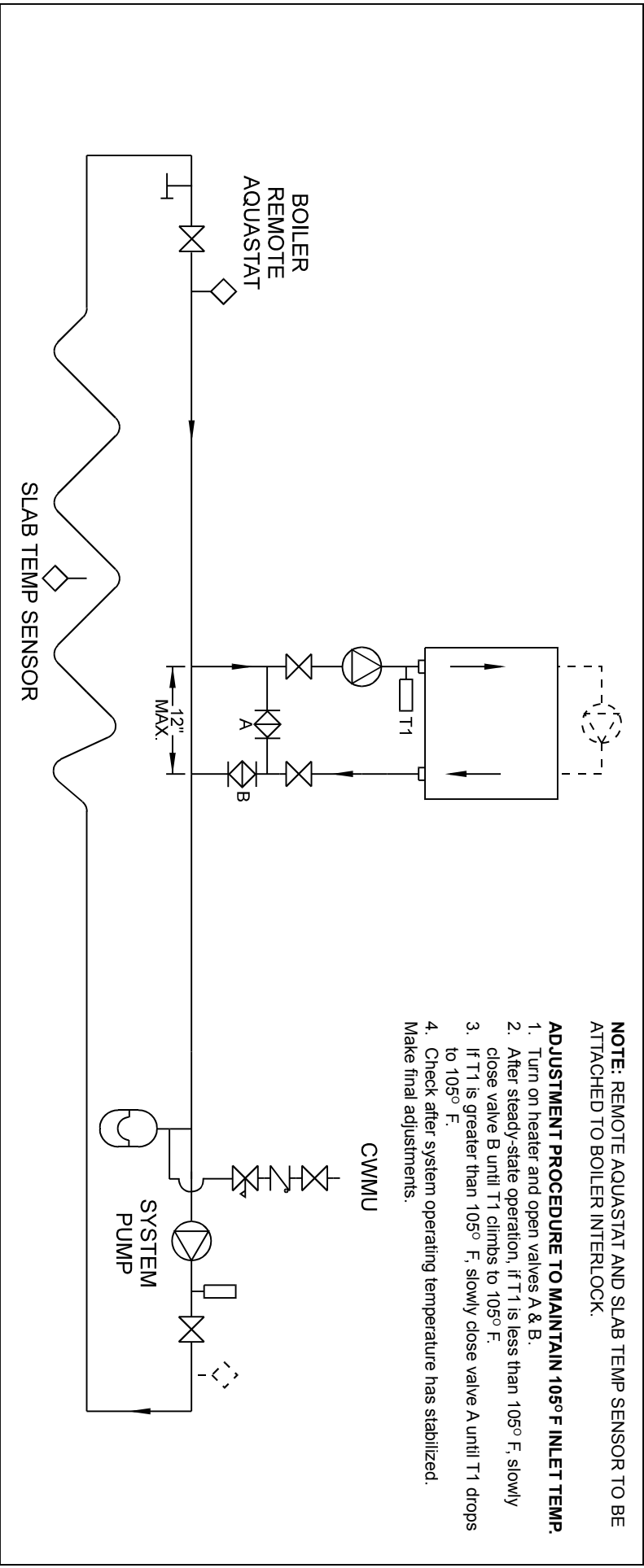
PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

MULTIPLE BOILERS, PRIMARY/SECONDARY, HEAT PUMP



PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

SINGLE BOILER, PRIMARY/SECONDARY, RADIANT PIPE



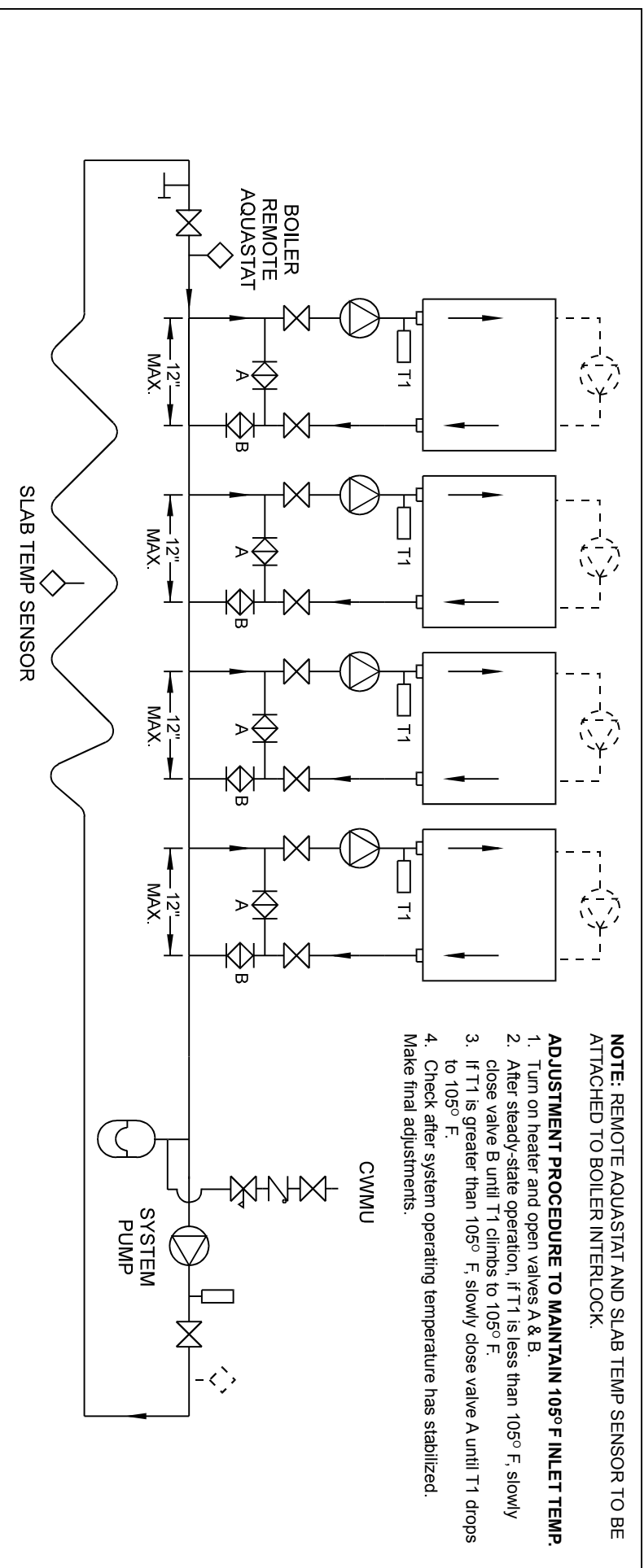
NOTES:

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Boiler water connections (inlet/outlet) vary per model. Verify connection orientation.

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CWMU = Cold Water Make-Up
Temperature sensors require field interlock to boiler controls

PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

MULTIPLE BOILERS, PRIMARY/SECONDARY, RADIANT PIPE



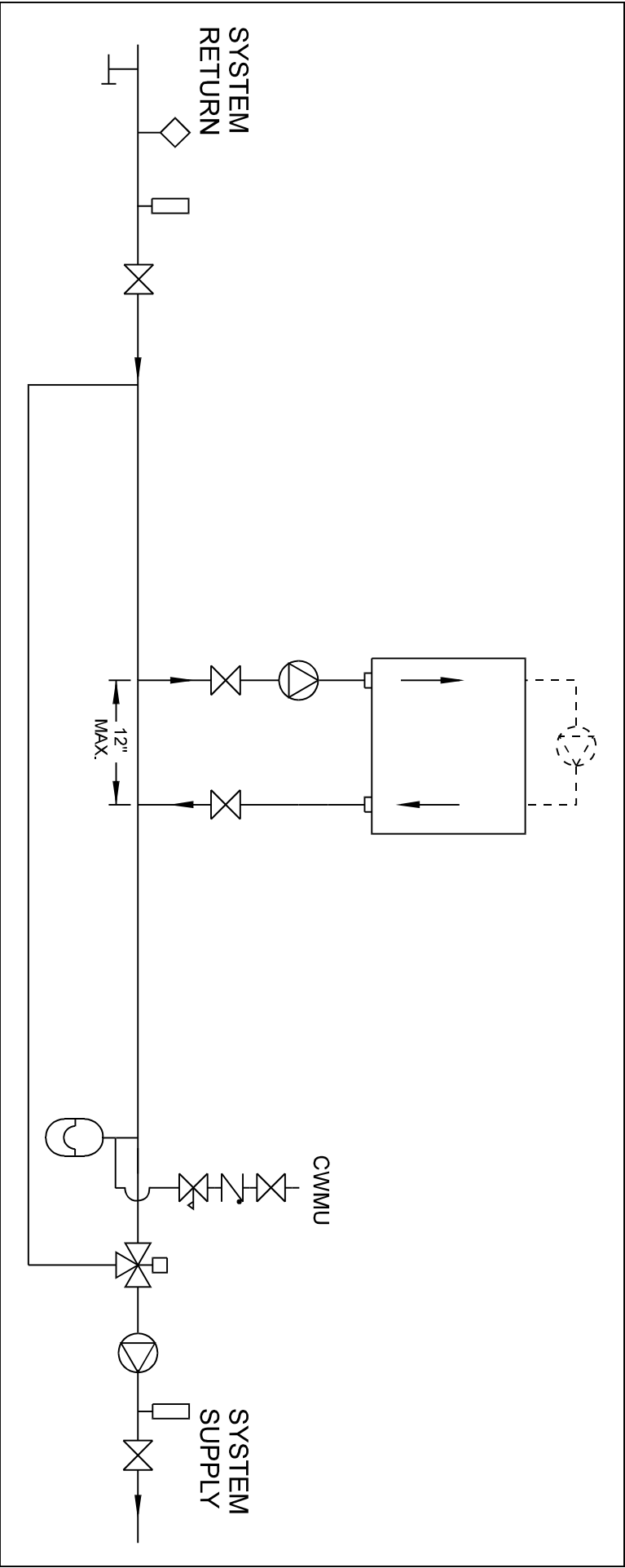
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PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

SINGLE BOILER, PRIMARY/SECONDARY WITH 3-WAY VALVE



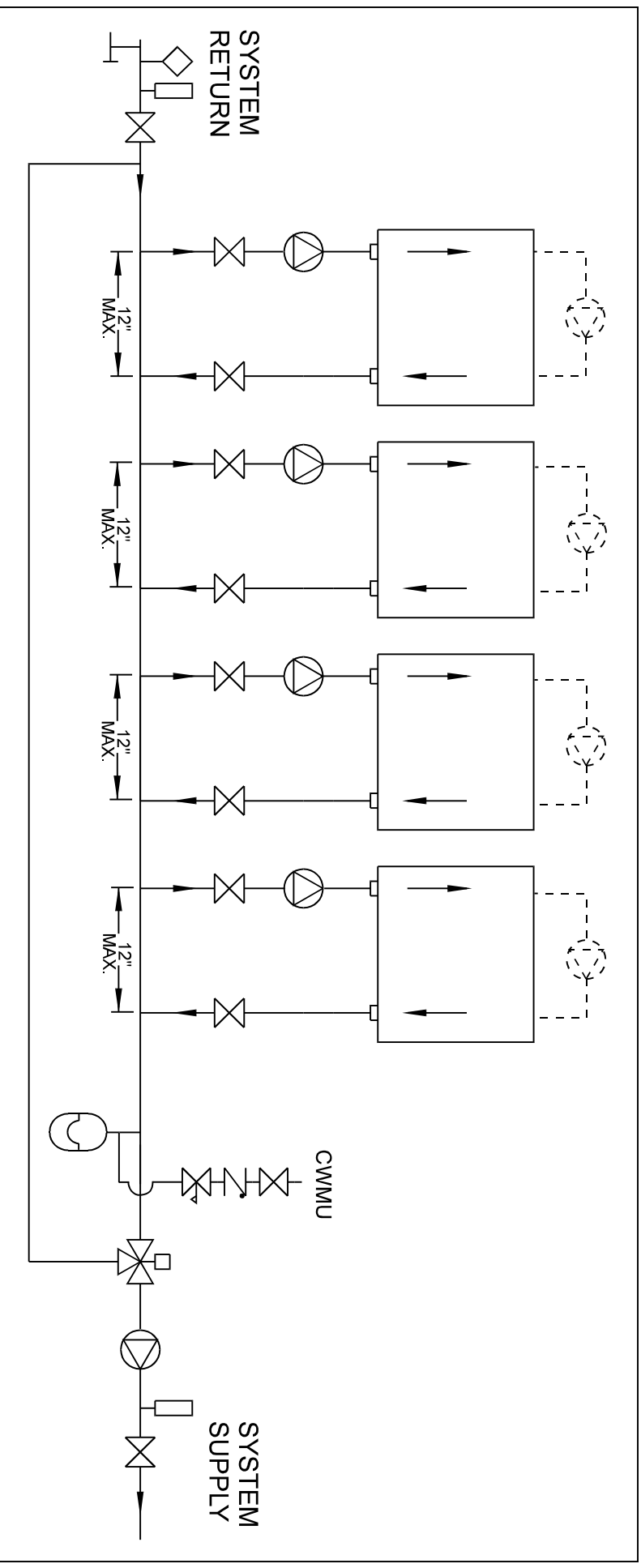
NOTES:

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 Primary (Boiler) Pump sized to boiler design flow requirements.
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MULTIPLE BOILERS, PRIMARY/SECONDARY WITH 3-WAY VALVE



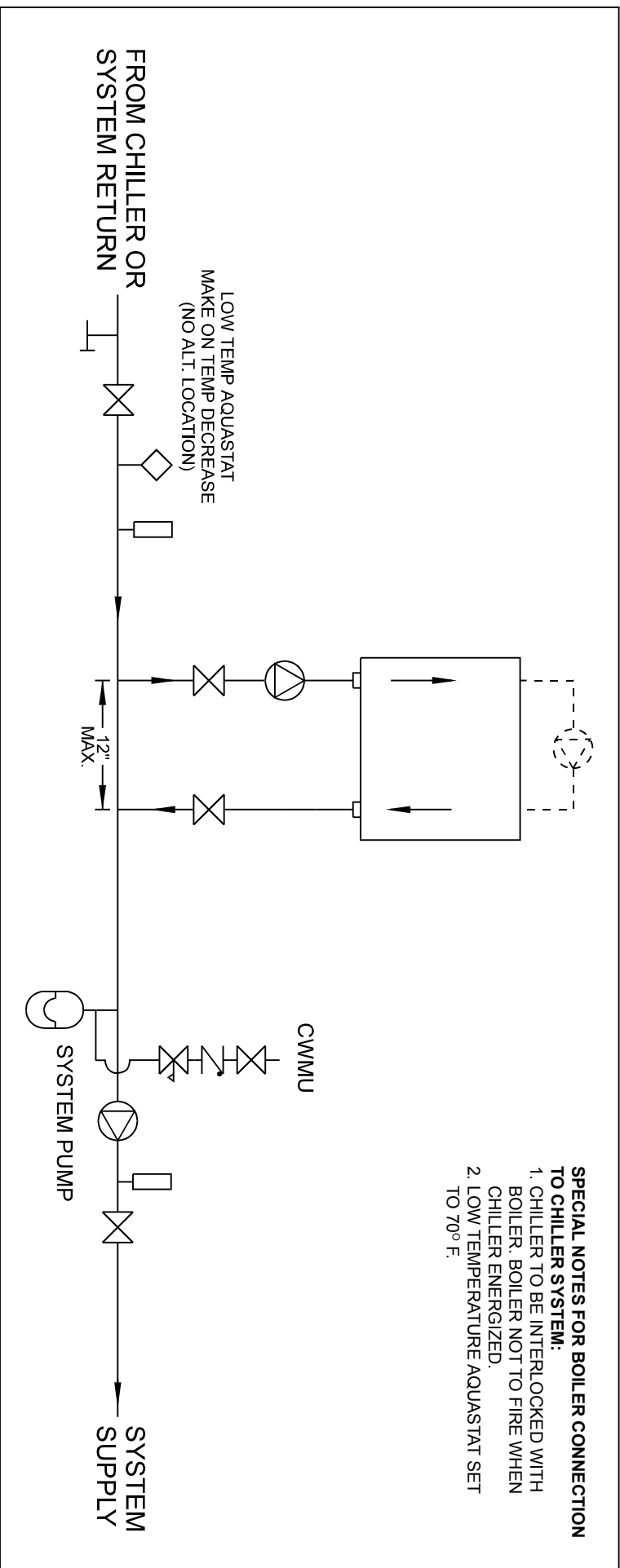
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PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

SINGLE BOILER/CHILLER CHANGEOVER SYSTEM, PRIMARY/SECONDARY



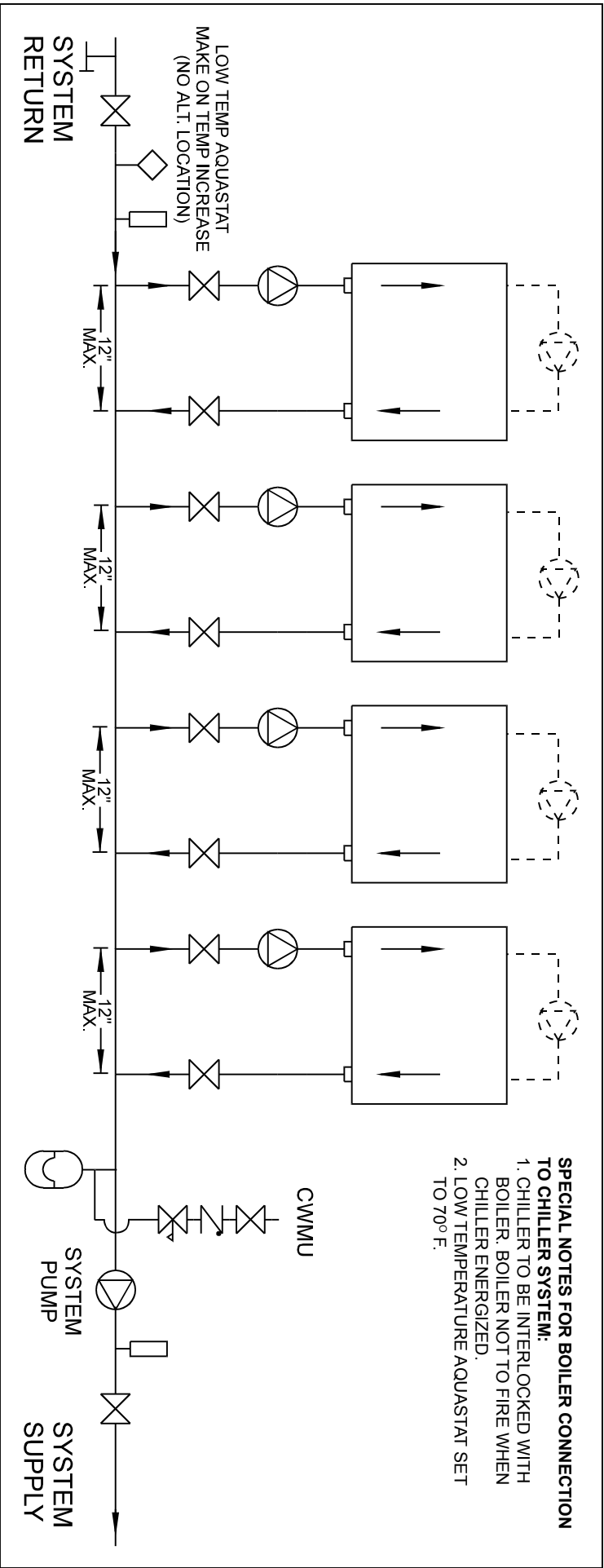
NOTES:

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Boiler water connections (inlet/outlet) vary per model. Verify connection orientation.

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PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

MULTIPLE BOILER/CHILLER CHANGEOVER SYSTEM, PRIMARY/SECONDARY



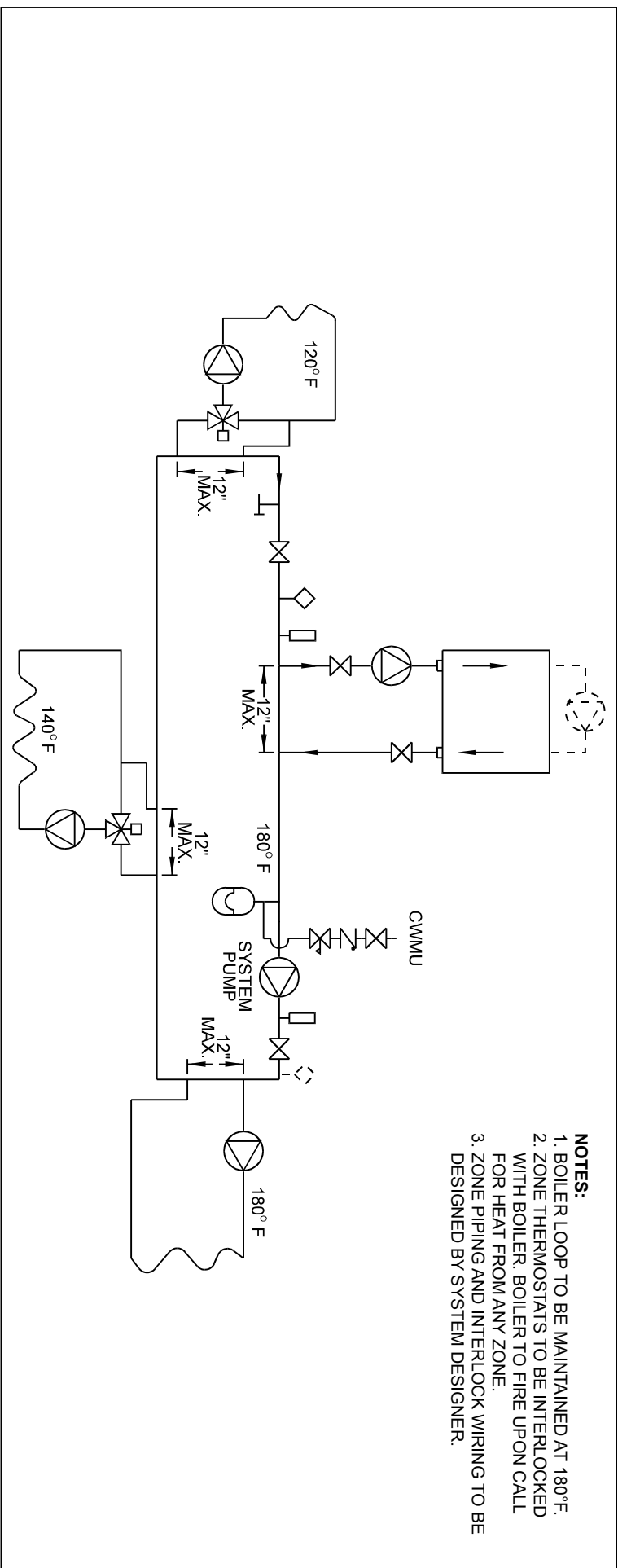
NOTES:

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SINGLE BOILER, MULTI-TEMPERATURE, PRIMARY/SECONDARY/TERTIARY ZONES



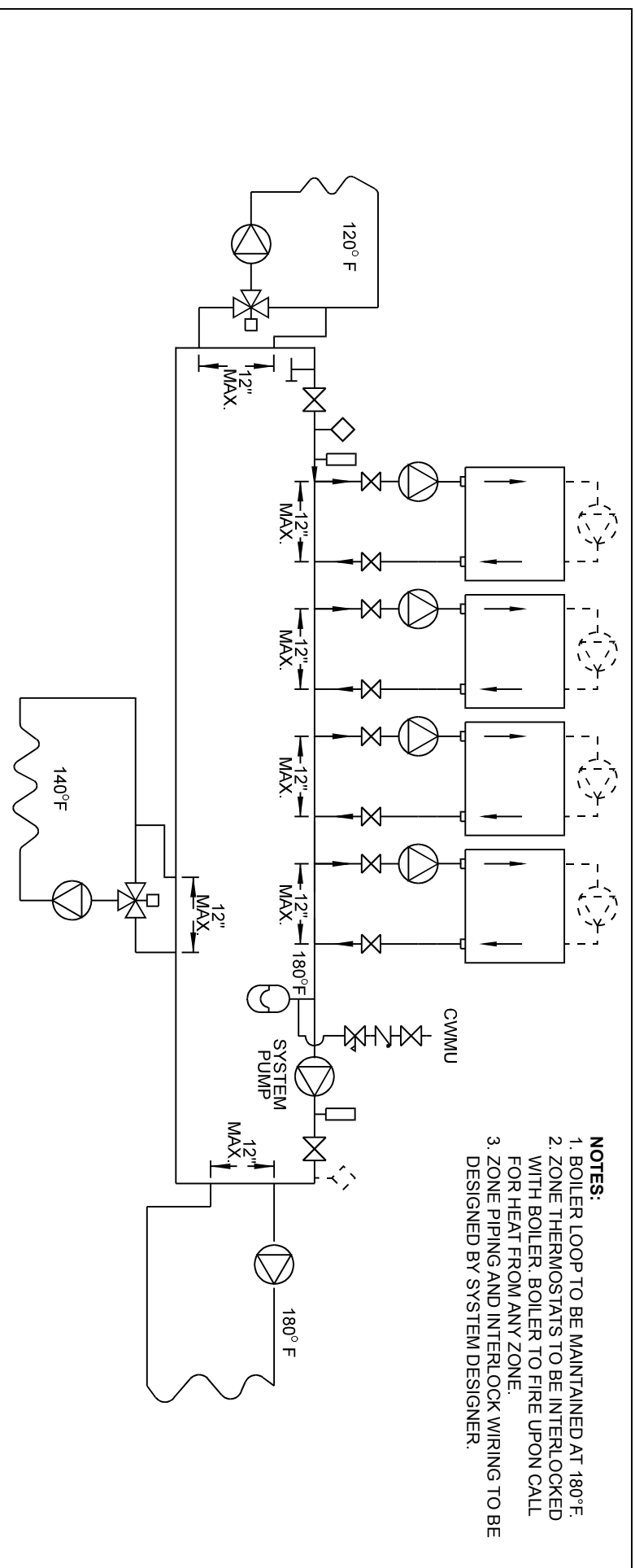
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MULTIPLE BOILERS, MULTI-TEMPERATURE, PRIMARY/SECONDARY/TERTIARY ZONES



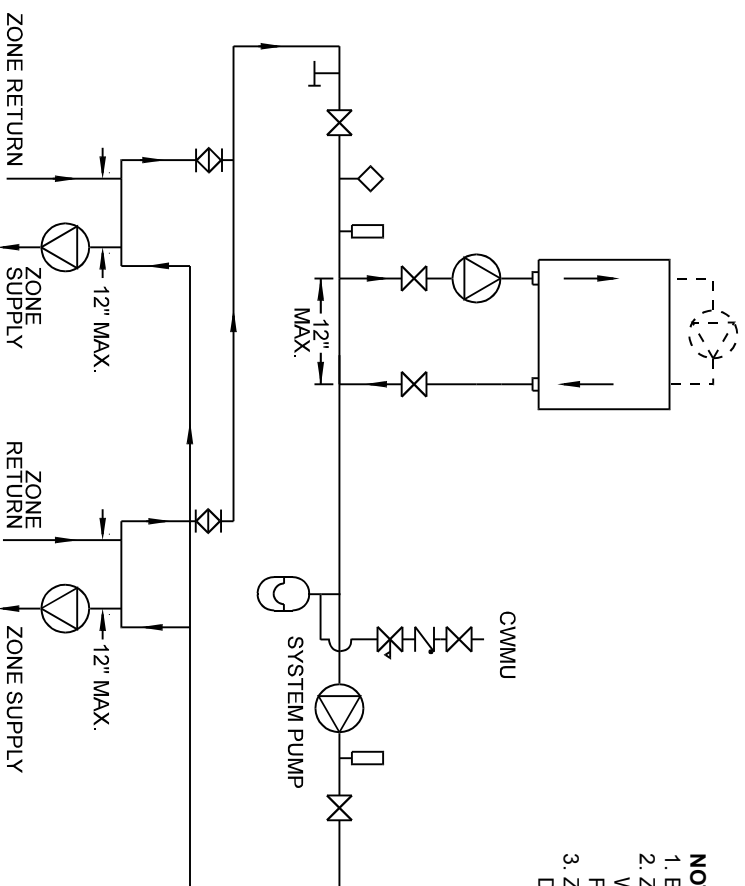
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SINGLE BOILER, CONSTANT TEMPERATURE, PRIMARY/SECONDARY/TERTIARY ZONES



- NOTES:**
1. BOILER LOOP TO BE MAINTAINED AT 180°F.
 2. ZONE THERMOSTATS TO BE INTERLOCKED WITH BOILER. BOILER TO FIRE UPON CALL FOR HEAT FROM ANY ZONE.
 3. ZONE PIPING AND INTERLOCK WIRING TO BE DESIGNED BY SYSTEM DESIGNER.

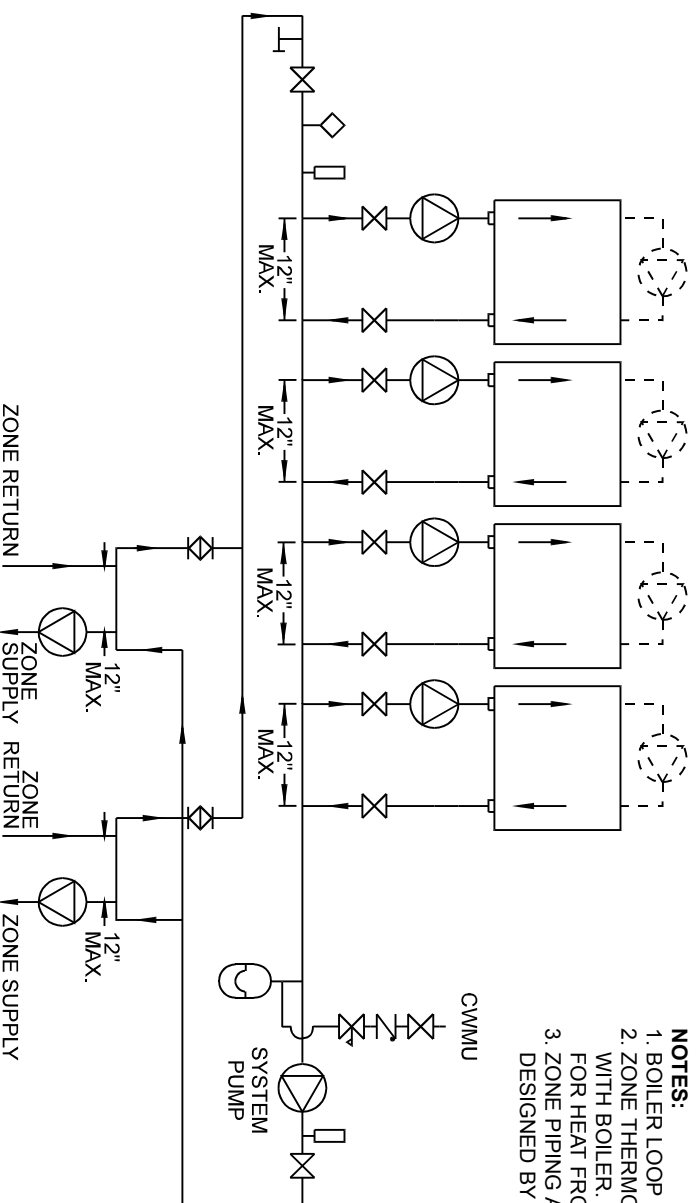
NOTES:

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Primary (Boiler) Pump sized to boiler design flow requirements.
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Temperature sensors require field interlock to boiler controls

PUMP	VALVE	BALANCING VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	PURGE VALVE	EXP. TANK & AIR ELIMINATION DEVICE	UNIT MOUNTED PUMP

MULTIPLE BOILERS, CONSTANT TEMPERATURE, PRIMARY/SECONDARY/TERTIARY ZONES



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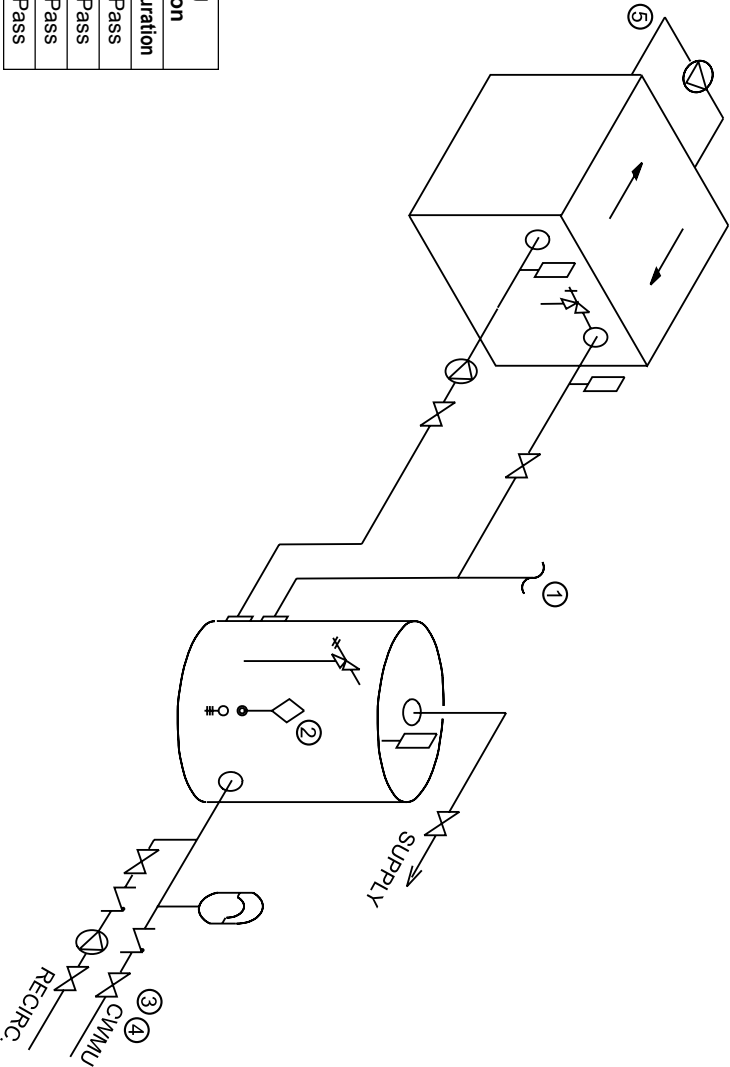
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PUMP		VALVE		BALANCING VALVE		CHECK VALVE		PRESSURE REDUCING VALVE		3-WAY VALVE		TEMPERATURE SENSOR		THERMOMETER		PURGE VALVE		EXP. TANK & AIR ELIMINATION DEVICE		UNIT MOUNTED PUMP	
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ONE HEATER, TWO PASS WITH VERTICAL TANK



NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
3. Back flow preventer may be required, check local codes.
4. Thermal expansion tank may be required, check local codes.
5. When using optional factory mounted pump, max pipe length 30' total, 6-90° elbows, full pipe size.

6. This drawing depicts a two-pass heat exchanger.
7. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

⚠ WARNING

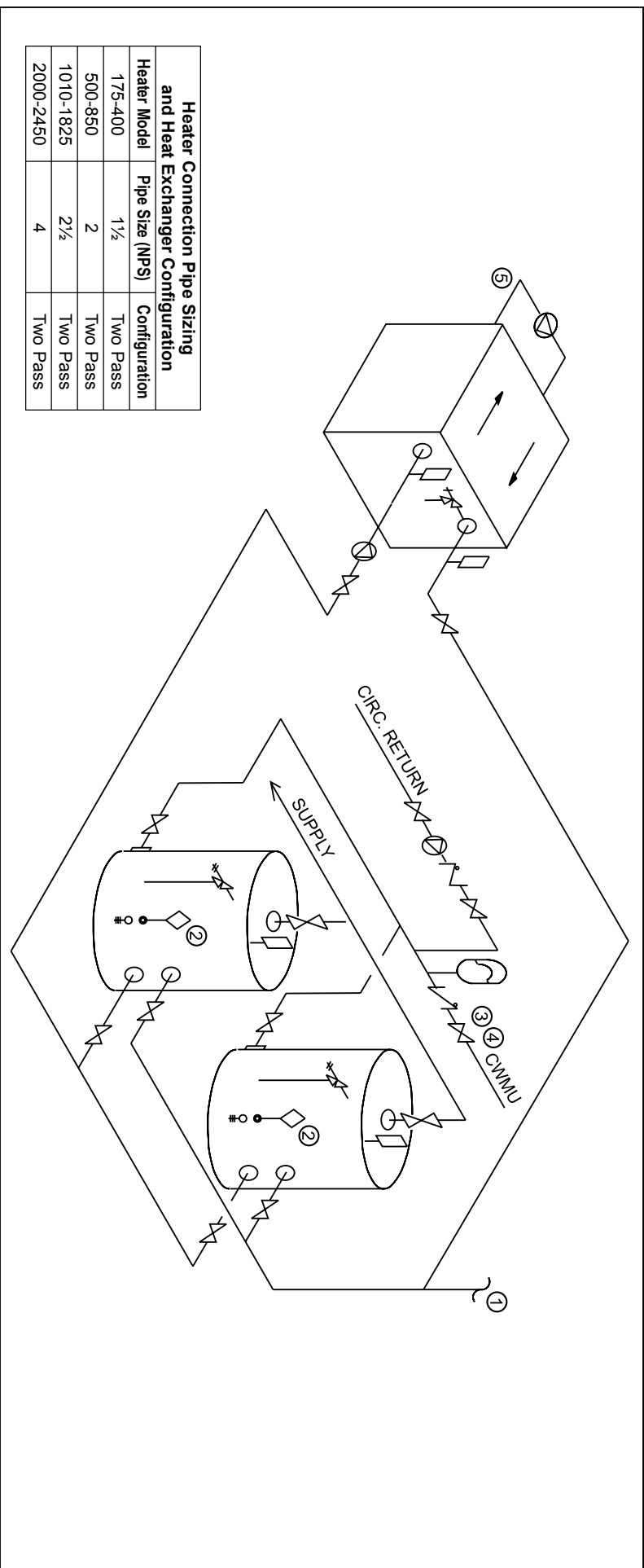
This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

KEY

Water Category Grain Hardness Per Gallon
S = Soft 1 Through 7.5
N = Normal 7.6 Through 17
H = Hard Over 18
P.P.M. 17.1 = Grains Hardness Per Gallon

										
PUMP	VALVE	GLOBE VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	EXPANSION TANK	PRV	TPRV

ONE HEATER, TWO PASS WITH VERTICAL TANKS



NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
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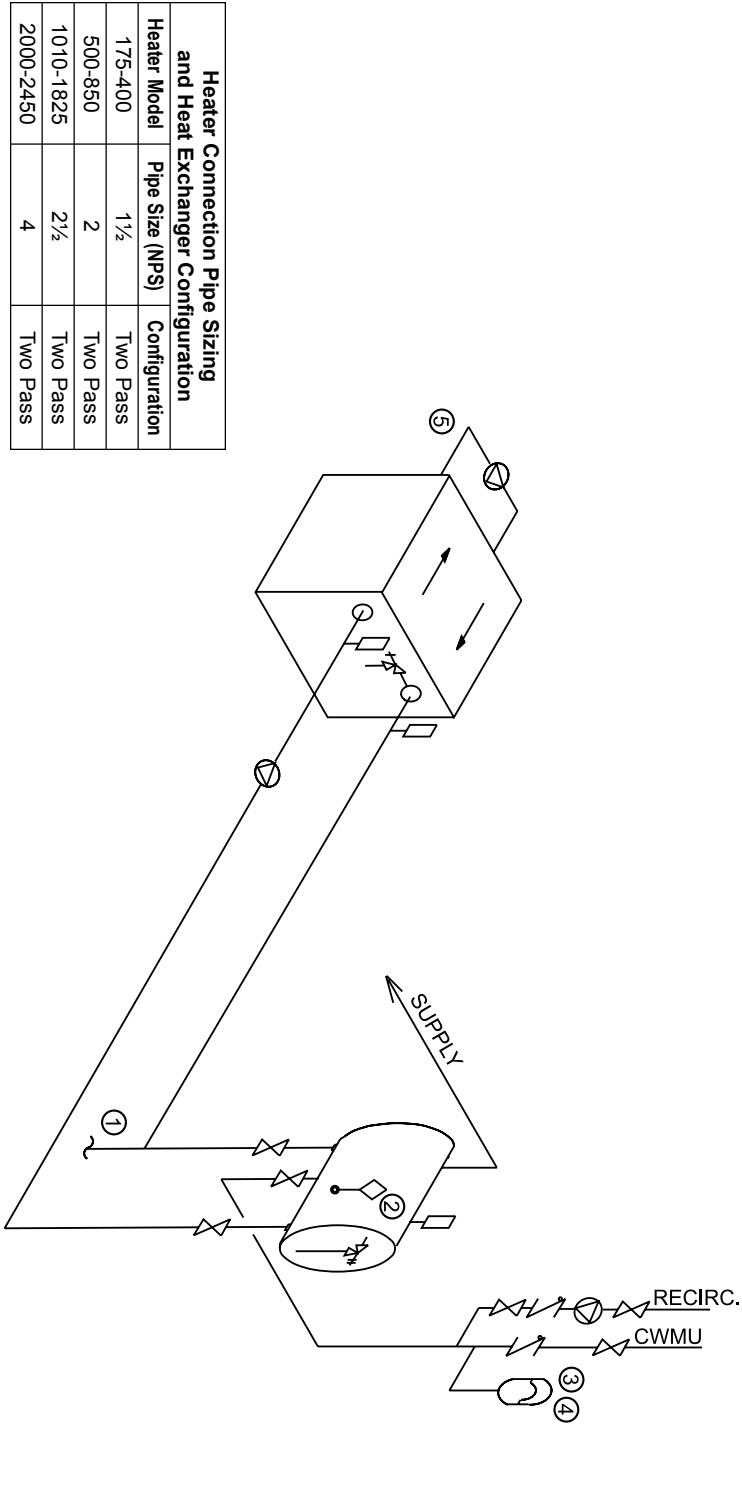
6. This drawing depicts a two-pass heat exchanger.
7. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

⚠WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

PUMP	VALVE	GLOBE VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	EXPANSION TANK	PRV	TPRV

ONE HEATER, TWO PASS WITH HORIZONTAL TANK



NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EIM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
3. Back flow preventer may be required, check local codes.
4. Thermal expansion tank may be required, check local codes.
5. When using optional factory mounted pump, max pipe length 30' total, 6-90° elbows, full pipe size.

6. This drawing depicts a two-pass heat exchanger.
7. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

⚠ WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

KEY

Water Category Grain Hardness Per Gallon
S = Soft 1 Through 7.5
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H = Hard Over 18
P.P.M. 17.1 = Grains Hardness Per Gallon



PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK

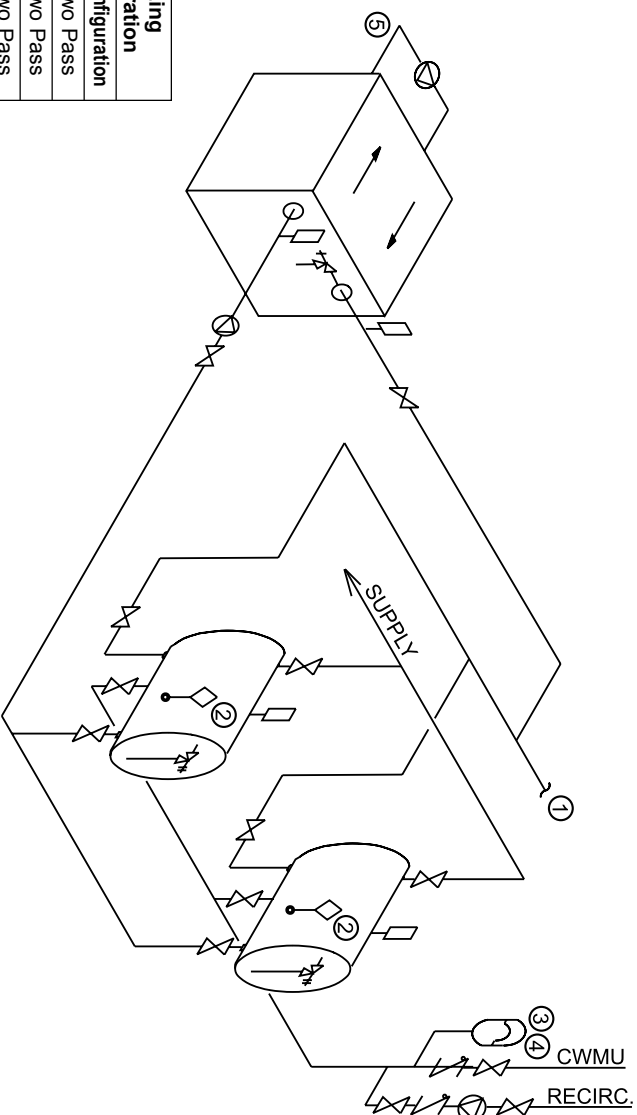


PRV



TPRV

ONE HEATER, TWO PASS WITH HORIZONTAL TANKS



Heater Connection Pipe Sizing and Heat Exchanger Configuration		
Heater Model	Pipe Size (NPS)	Configuration
175-400	1½	Two Pass
500-850	2	Two Pass
1010-1825	2½	Two Pass
2000-2450	4	Two Pass

NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EIM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
3. Back flow preventer may be required, check local codes.
4. Thermal expansion tank may be required, check local codes.
5. When using optional factory mounted pump, max pipe length 30' total, 6-90° elbows, full pipe size.

6. This drawing depicts a two-pass heat exchanger.
7. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

▲WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

KEY

Water Category Grain Hardness Per Gallon
S = Soft 1 Through 7.5
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P.P.M. 17.1 = Grains Hardness Per Gallon



PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK

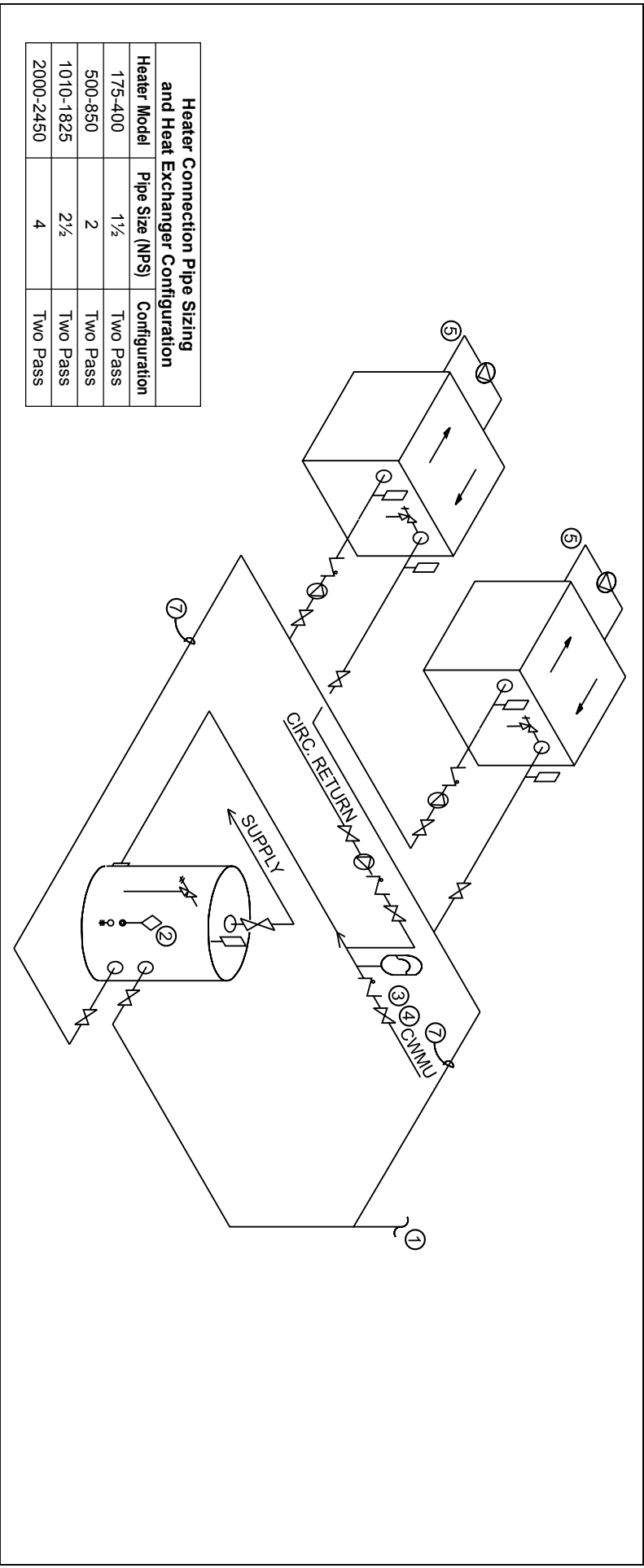


PRV



TPRV

TWO HEATERS, TWO PASS WITH VERTICAL TANK

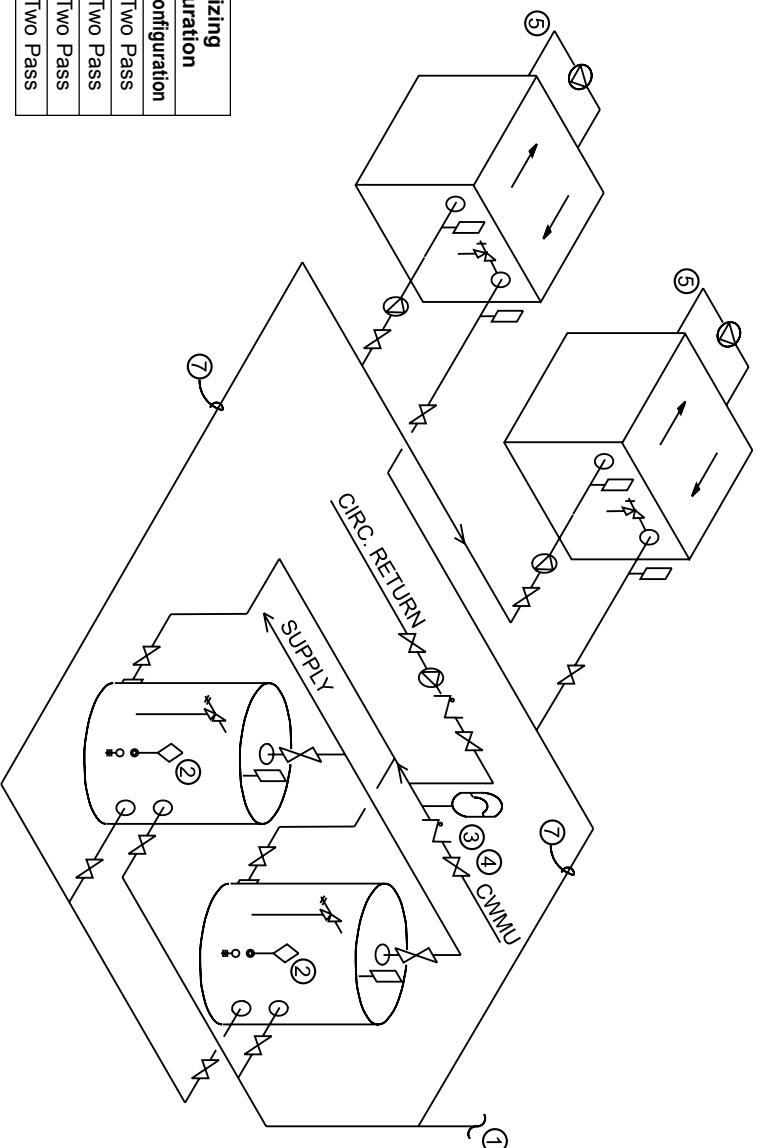


NOTES:

- Optional CWMU & Recirc. line location
 - When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
 - Back flow preventer may be required, check local codes.
 - Thermal expansion tank may be required, check local codes.
 - When using optional factory mounted pump, max pipe length 30' total, 6-90° elbows, full pipe size.
 - This drawing depicts a two-pass heat exchanger.
 - Common piping must be sized for maximum combined heater flow.
 - CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**
- ▲ WARNING**
- This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

PUMP	VALVE	GLOBE VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	EXPANSION TANK	PRV	TPRV

TWO HEATERS, TWO PASS WITH VERTICAL TANKS



Heater Connection Pipe Sizing and Heat Exchanger Configuration		
Heater Model	Pipe Size (NPS)	Configuration
175-400	1½	Two Pass
500-850	2	Two Pass
1010-1825	2½	Two Pass
2000-2450	4	Two Pass

NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EW² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
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6. This drawing depicts a two-pass heat exchanger.
7. Common piping must be sized for maximum combined heater flow.
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KEY

Water Category Grain Hardness Per Gallon

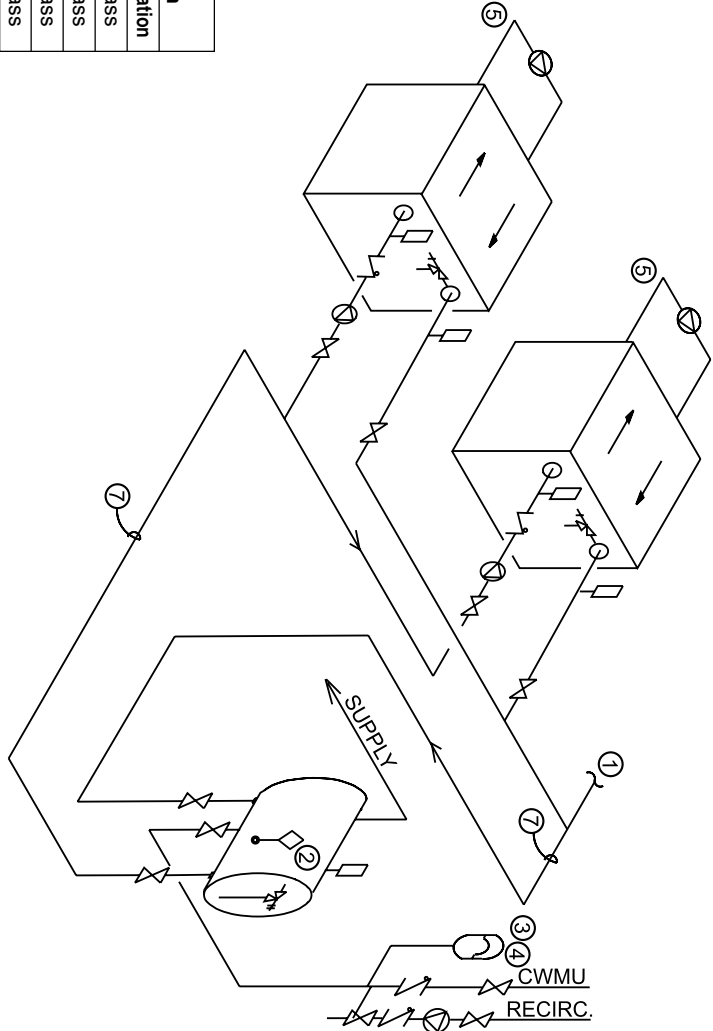
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P.P.M. 17.1 = Grains Hardness Per Gallon



TWO HEATERS, TWO PASS WITH HORIZONTAL TANK

Heater Connection Pipe Sizing and Heat Exchanger Configuration		
Heater Model	Pipe Size (NPS)	Configuration
175-400	1½	Two Pass
500-850	2	Two Pass
1010-1825	2½	Two Pass
2000-2450	4	Two Pass



NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
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⚠ WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

KEY

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P.P.M. 17.1 = Grains Hardness Per Gallon



PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK

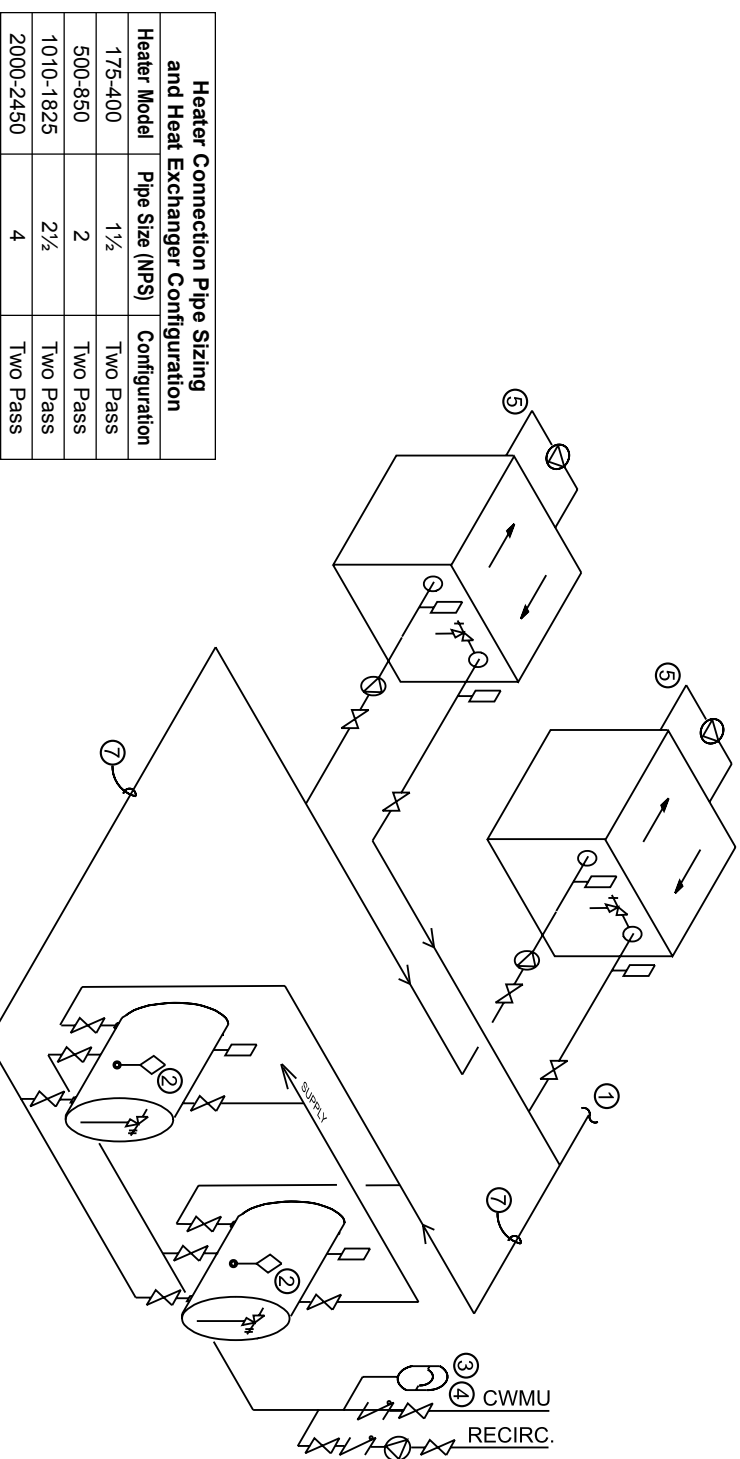


PRV



TPRV

TWO HEATERS, TWO PASS WITH HORIZONTAL TANKS



NOTES:

1. Optional CWMU & Recirc. line location
2. When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
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6. This drawing depicts a two-pass heat exchanger.

7. Common piping must be sized for maximum combined heater flow.
8. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

⚠ WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.



PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK



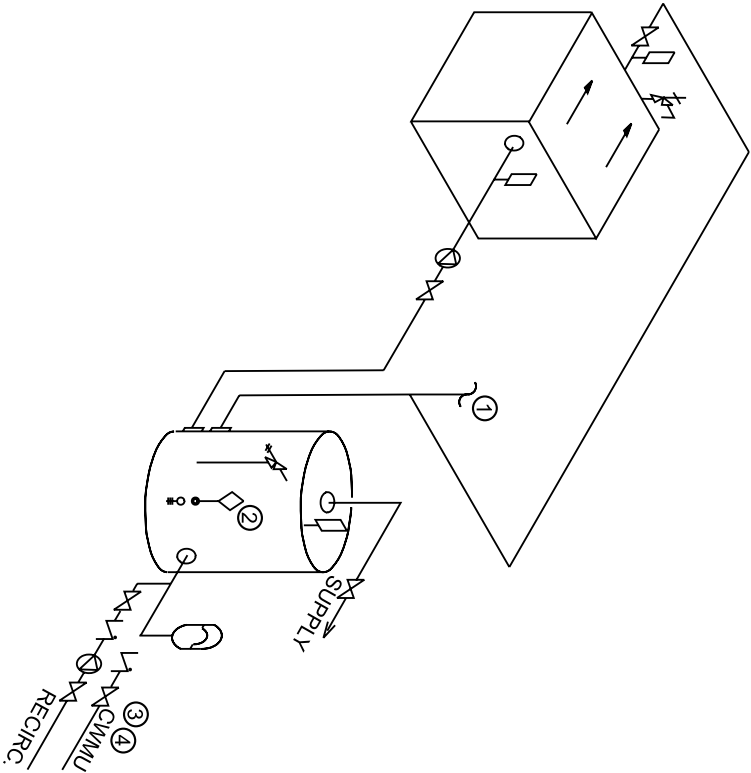
PRV



TPRV

ONE HEATER, SINGLE PASS WITH VERTICAL TANK

Heater Connection Pipe Sizing and Heat Exchanger Configuration		
Heater Model	Pipe Size (NPS)	Configuration
2800-5000	4	Single Pass



- NOTES:**
- Optional CWMU & Recirc. line location
 - When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
 - Back flow preventer may be required, check local codes.
 - Thermal expansion tank may be required, check local codes.
 - This drawing depicts a one-pass heat exchanger.

6. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

⚠WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

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PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK

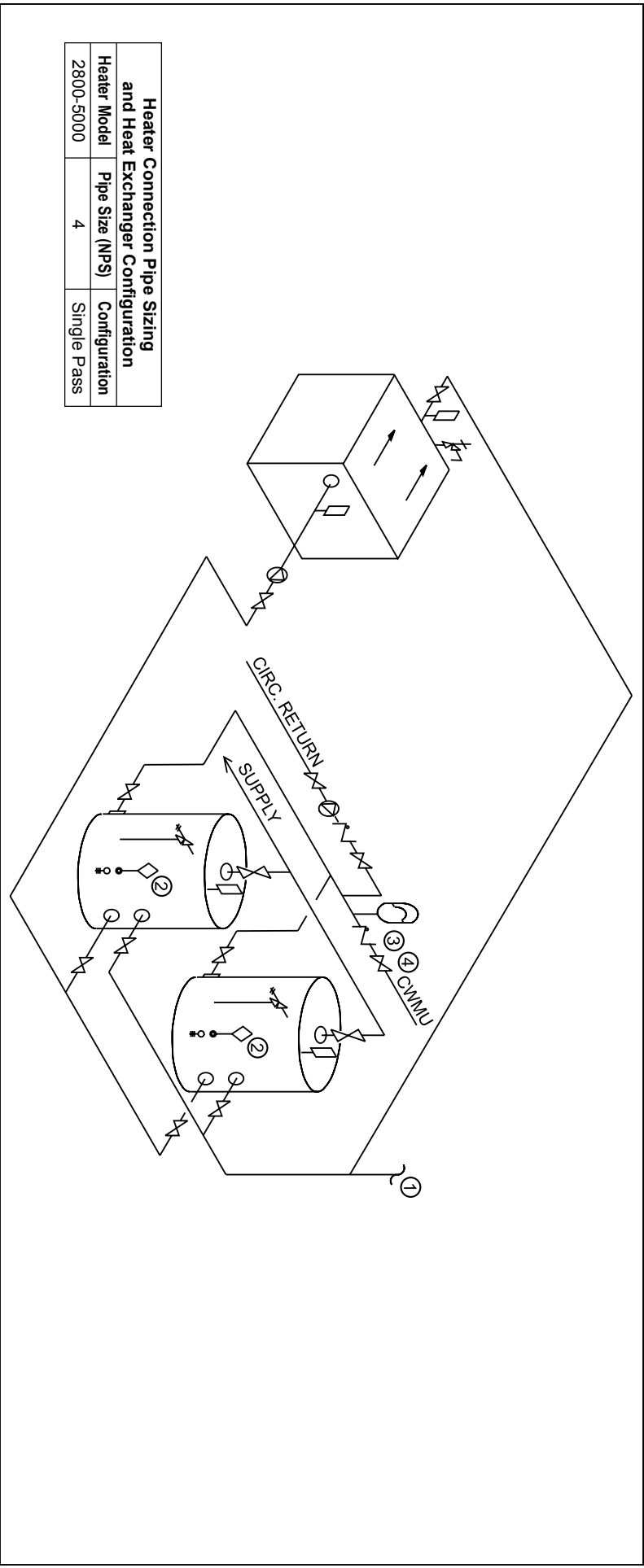


PRV



TPRV

ONE HEATER, SINGLE PASS WITH VERTICAL TANKS



- NOTES:**
1. Optional CWMU & Recirc. line location
 2. When using intermittent pump and EM² locate remote aquastat well in lower 1/3 of tank with heat sensing compound.
 3. Back flow preventer may be required, check local codes.
 4. Thermal expansion tank may be required, check local codes.
 5. This drawing depicts a one-pass heat exchanger.

6. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**

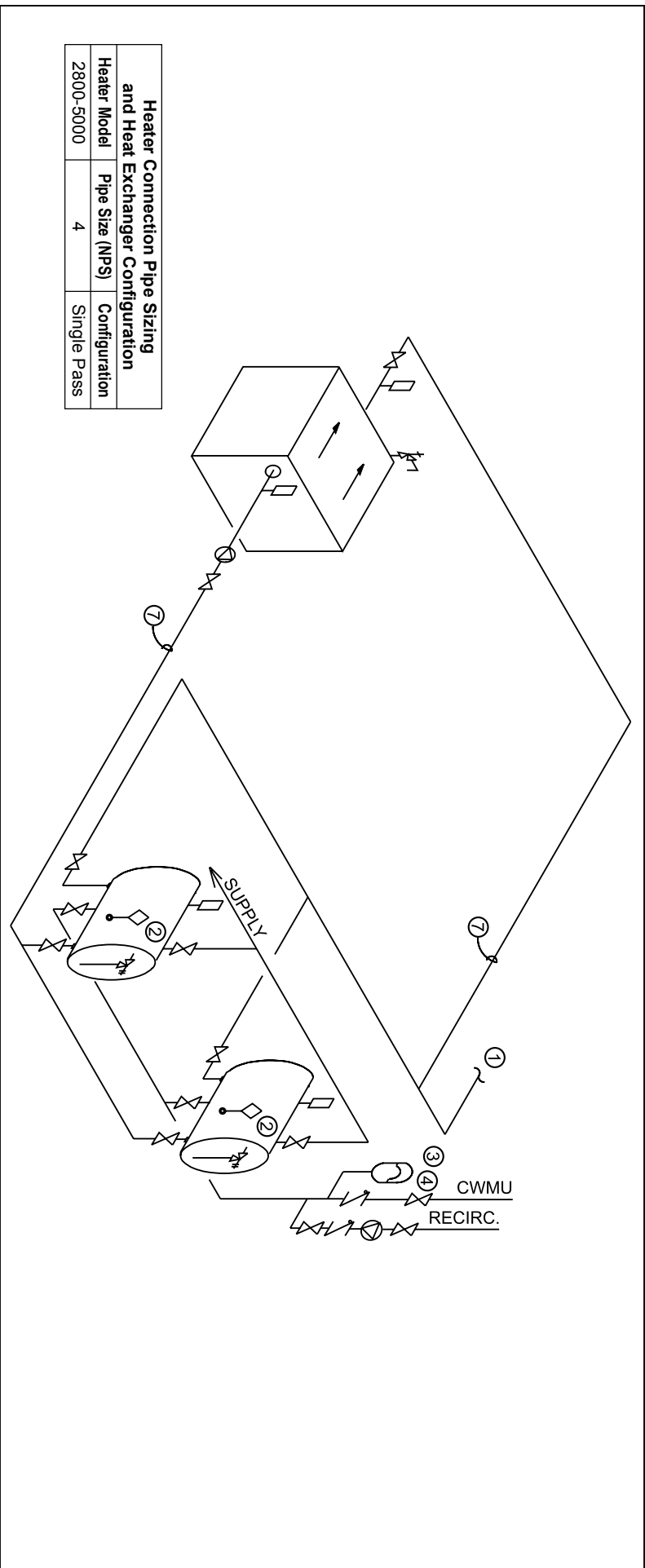
WARNING

This drawing shows suggested piping configuration and valving. Check with local codes and ordinances for additional requirements.

KEY	
Water Category Grain Hardness Per Gallon	
S = Soft	1 Through 7.5
N = Normal	7.6 Through 17
H = Hard	Over 18
P.P.M. 17.1 = Grains Hardness Per Gallon	

PUMP	VALVE	GLOBE VALVE	CHECK VALVE	PRESSURE REDUCING VALVE	3-WAY VALVE	TEMPERATURE SENSOR	THERMOMETER	EXPANSION TANK	PRV	TPRV

ONE HEATER, SINGLE PASS WITH HORIZONTAL TANKS



- NOTES:**
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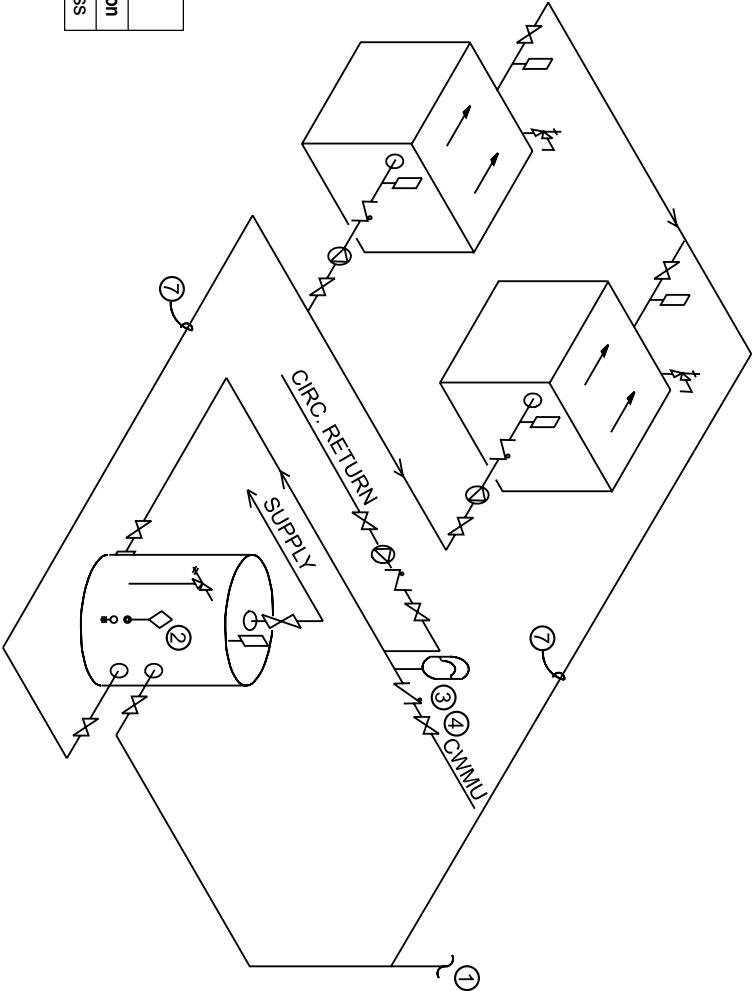
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TWO HEATERS, SINGLE PASS WITH VERTICAL TANK

Heater Connection Pipe Sizing and Heat Exchanger Configuration		
Heater Model	Pipe Size (NPS)	Configuration
2800-5000	4	Single Pass



- NOTES:**
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6. **CAUTION: PUMP SIZING MUST BE BASED UPON WATER HARDNESS AT JOB SITE.**
7. Common piping must be sized for maximum combined heater flow.

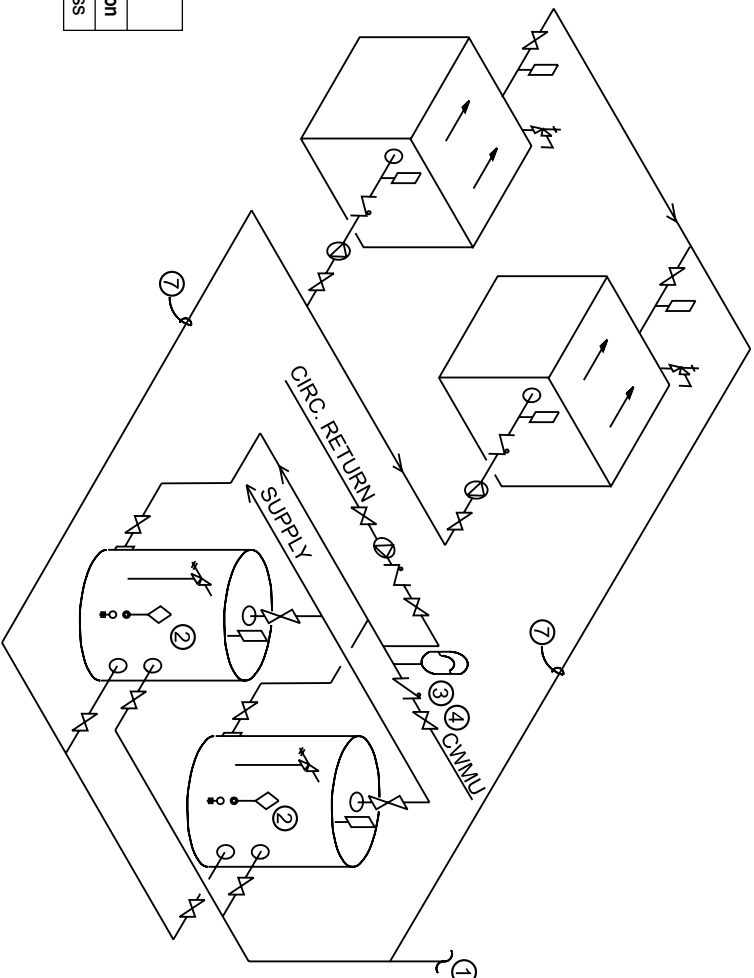
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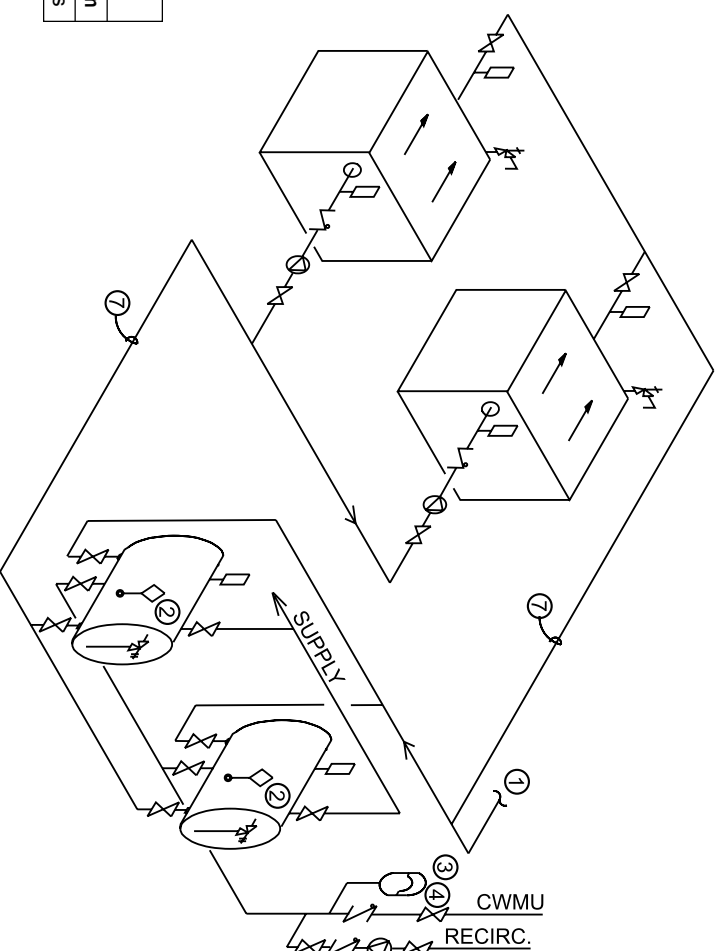
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PUMP



VALVE



GLOBE VALVE



CHECK VALVE



PRESSURE REDUCING VALVE



3-WAY VALVE



TEMPERATURE SENSOR



THERMOMETER



EXPANSION TANK



PRV



TPRV