

Rinnai®

Hot Water System Design Manual

Plumbing schematics for single and multiple Rinnai water heaters in use with domestic systems, recirculation, and storage tanks.

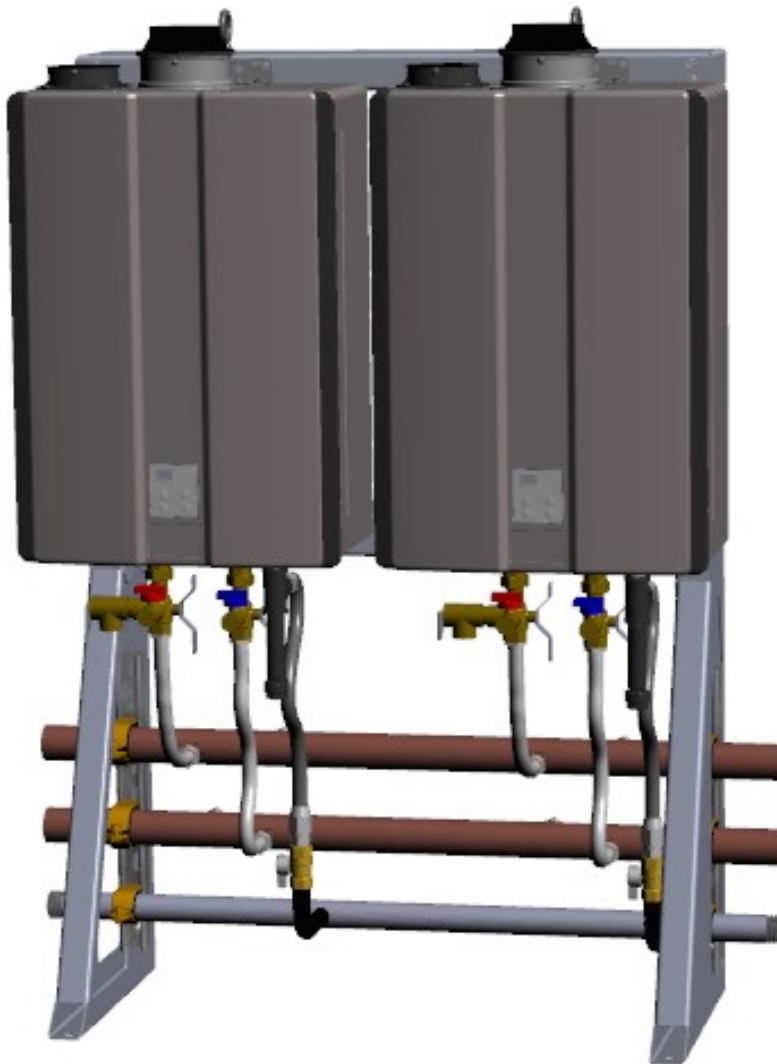
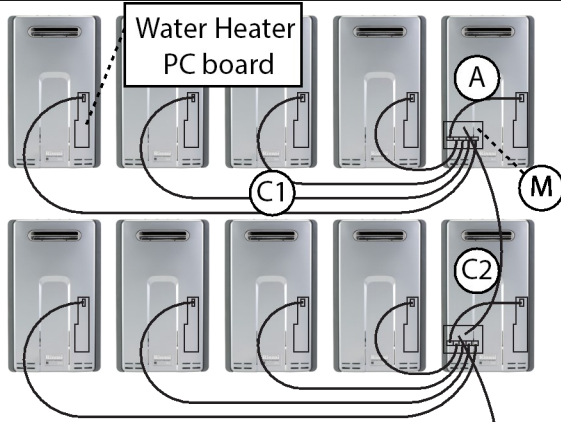


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MSB Kits for Connecting Multiple Water Heaters



Each bank is controlled by an MSB-M control board. These boards are connected to each other with MSB-C2 cables. One MSB-M is the controlling or master MSB-M for the entire system.

- (M) MSB-M control board
- (A) Connector cable A (part of MSB-M kit; replace with MSB-C3 cables for V Series)
- (C1) MSB-C1 cable for connecting water heaters within a banked system (up to 5), (use MSB-C3 cables for V Series)
- (C2) MSB-C2 cable for connecting MSB-M control boards (up to 5)

Number of Kits Required					
No. of water heaters	No. of water heaters for each bank	MSB-M	MSB-C1 See note *	MSB-C2	MSB-C3 See note *
2	2	1	NA	NA	1
3	3	1	1	NA	2
4	4	1	2	NA	3
5	5	1	3	NA	4
6	3/3	2	2	1	4
7	4/3	2	3	1	5
8	4/4	2	4	1	6
9	5/4	2	5	1	7
10	5/5	2	6	1	8
11	4/4/3	3	5	2	8
12	4/4/4	3	6	2	9
13	5/4/4	3	7	2	10
14	5/5/4	3	8	2	11
15	5/5/5	3	9	2	12
16	4/4/4/4	4	8	3	12
17	5/4/4/4	4	9	3	13
18	5/5/4/4	4	10	3	14
19	5/5/5/4	4	11	3	15
20	5/5/5/5	4	12	3	16
21	5/4/4/4/4	5	11	4	16
22	5/5/4/4/4	5	12	4	17
23	5/5/5/4/4	5	13	4	18
24	5/5/5/5/4	5	14	4	19
25	5/5/5/5/5	5	15	4	20

MSB Kits - Parts Needed

Use the table to determine the type and number of kits necessary for your system.

Up to 5 water heaters can be connected together using the MSB-M and MSB-C1 kits. When over 5 water heaters are connected together, MSB-M control boards are connected using MSB-C2 kits.

If multiple MSB-M control boards are used, then at least three water heaters should be connected to each MSB-M. Example: With 7 water heaters, one MSB-M should control 4 water heaters and the other MSB-M should control 3 water heaters.

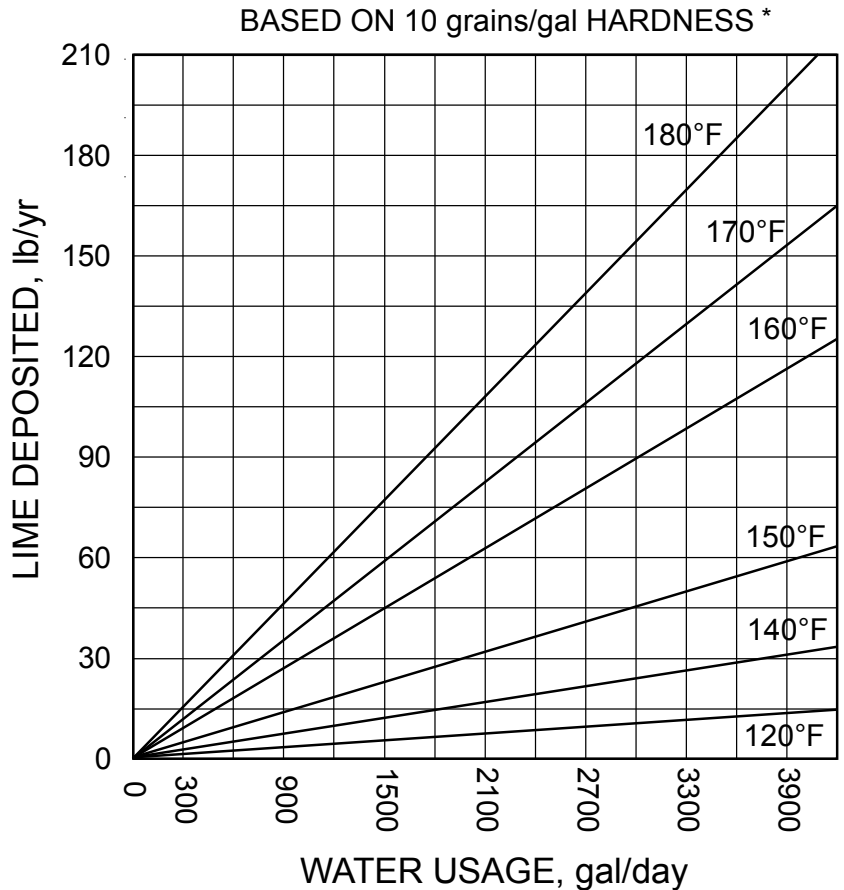
Detailed installation instructions are provided with each of the kits.

* V Series models use the MSB-M, MSB-C2, and MSB-C3 cables. V Series models must use the MSB-C3 cables instead of the MSB-C1 cables and the Cable A in the MSB-M.

Water Quality and Scale

A complete water analysis and an understanding of system requirements are needed to protect the Rinnai tankless water heaters and water heating systems from scale. Water analysis shows whether water is hard or soft. Hard water, unless treated, will cause scaling or liming of the Rinnai heat exchanger.

The rate of scaling increases with temperature and usage because calcium carbonate and other scaling compounds lose solubility (fall out of solution) at higher temperatures. For example, for every 20°F over 140°F, the rate of scale increases by a factor of 2 (See figure below). Reference target water quality levels below and treat the water if these levels are exceeded.



* Source 2015 ASHRAE Handbook HVAC Applications

Consideration of care for your water heater should include evaluation of water quality.

The water must be potable, free of corrosive chemicals, sand, dirt, or other contaminants. It is up to the installer to ensure the water does not contain corrosive chemicals, or elements that can affect or damage the heat exchanger. Water that contains chemicals exceeding the levels below affect and damage the heat exchanger. Replacement of the heat exchanger due to water quality damage is not covered by the warranty.

If you install this water heater in an area that is known to have hard water or that causes scale build-up the water must be treated and may require more frequent heat exchanger flushing schedule.

When scale build-up in the heat exchanger begins to affect the performance of the water heater, a diagnostic code "LC#" will display. Flush the heat exchanger to prevent damage to it. Scale build up is caused by hard water and can be accelerated if the unit is set at a high temperature.

	Maximum Level
Total Hardness	Up to 200 mg / L
Aluminum *	Up to 0.2 mg / L
Chlorides *	Up to 250 mg / L
Copper *	Up to 1.0 mg / L
Dissolved Carbon Dioxide (CO2)	Up to 15.0 mg / L or PPM
Iron *	Up to 0.3 mg / L
Manganese *	Up to 0.05 mg / L
pH *	6.5 to 8.5
TDS (Total Dissolved Solids) *	Up to 500 mg / L
Zinc *	Up to 5 mg / L

* Source: Part 143 National Secondary Drinking Water Regulations

Pump Sizing for Circulation

1. Use the chart below or one appropriate for your conditions to determine the heat loss in the length of the hot water supply and return piping. For example, 100 ft of 1-1/2 in bare copper tubing results in a heat loss of 5300 Btu/h.

Approximate Heat Loss from Piping at 140 °F Inlet, 70 °F Ambient *

Nominal Size, in.	Bare Copper Tubing, Btu/h-ft	1/2 in. Glass Fiber Insulated Copper Tubing, Btu/h-ft
3/4	30	17.7
1	38	20.3
1-1/4	45	23.4
1-1/2	53	25.4
2	66	29.6
2-1/2	80	33.8
3	94	39.5
4	120	48.4

* Source: 2015 ASHRAE Handbook HVAC Applications

2. Determine the acceptable temperature drop at the last fixture in the loop. For example, if the supply temperature from the water heater is 120 °F (49 °C) and an acceptable temperature at the last fixture is 100 °F (38 °C) then the acceptable temperature drop is 20 °F (7 °C).

3. Calculate the required pump flow rate using the following formula:

$$\text{FLOW RATE (gpm)} = \frac{\text{HEAT LOSS (BTU / h)}}{500 \times \text{ACCEPTABLE TEMPERATURE DROP (°F)}}$$

4. Based on the above calculations select a pump for the type of circulation system you will be utilizing:

B). Circulation system - Reference pump manufacturers flow vs. pressure specifications to select a pump that can provide 3 gpm of flow or the flow rate calculated above, whichever is greater, while overcoming the pressure loss through:

- Rinnai tankless water heater (reference flow vs. pressure curve of the Rinnai model being used)
- All building supply and return plumbing in the circulation loop (reference local plumbing codes, standards, or practices)

NOTE: Only use pumps of brass, bronze, or stainless steel construction. Do not use pumps of iron construction as they will oxidize and clog the inlet filter on the appliance. The pump should be controlled by an aquastat, timer, or combination of the two. A demand control (motion sensor, push button, or door contact) may also be used.

Additional Guidelines

Rinnai water heaters not recovering a storage tank: In applications involving a commercial dishwasher, a hot water circulation loop feeding the dishwasher is required.

Rinnai water heater recovering a storage tank: In applications involving a commercial dishwasher, a hot water circulation loop feeding the dishwasher may be required depending on the distance between the dishwasher and the storage tank. Refer to local codes when determining the need for circulation loops to dishwashers.

When using a Rinnai product as the heat source for a circulation loop, the piping systems should be designed with a hot water circulation loop having a minimum circulating flow rate of 3 gpm. You must also review pressure drop curves for the Rinnai when sizing circulators.

Rinnai water heaters cannot be used in applications requiring 180°-195° F water at a DISHWASHER, unless a booster heater capable of producing 180°-195° F water is provided at the dishwasher. The Rinnai water heater is not to be used as a booster water heater in these applications.

For beauty salon applications, a hot water circulation loop feeding the head wash stations is highly recommended. This provides instant hot water to the head wash stations and reduces the possibility of cold bursts at the stations. (Refer to the piping schematics in this manual.) Insulation of circulation piping is also recommended for heat retention.

Exhaust gases from beauty salon applications and fume hoods of commercial dish washers with chemical sanitizers can be highly corrosive and may cause premature failure of water heater components. Care must be taken to ensure that the water heater and vent termination are installed away from that area. An uncontaminated supply of combustible air must be maintained for optimum performance of the water heater.

If the intended installation is located in hard water area, a softener or similar water treatment system must be used. Always remember to perform routine maintenance.

Some models may require the use of the MCC-91-2 temperature controller (purchased separately) for applications requiring temperatures above 140° F. For further information refer to the tankless water heater installation and operation manual.

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Pump Sizing for Storage Tank Application

The following applies when using Rinnai tankless water heaters to recover a storage tank. Drawing WH1-BC is an example.

Rinnai Tankless water heaters have a pressure loss which must be considered in the system design. Reference the pressure loss curve for the Rinnai model being used to determine the pump size for the desired recovery rate.

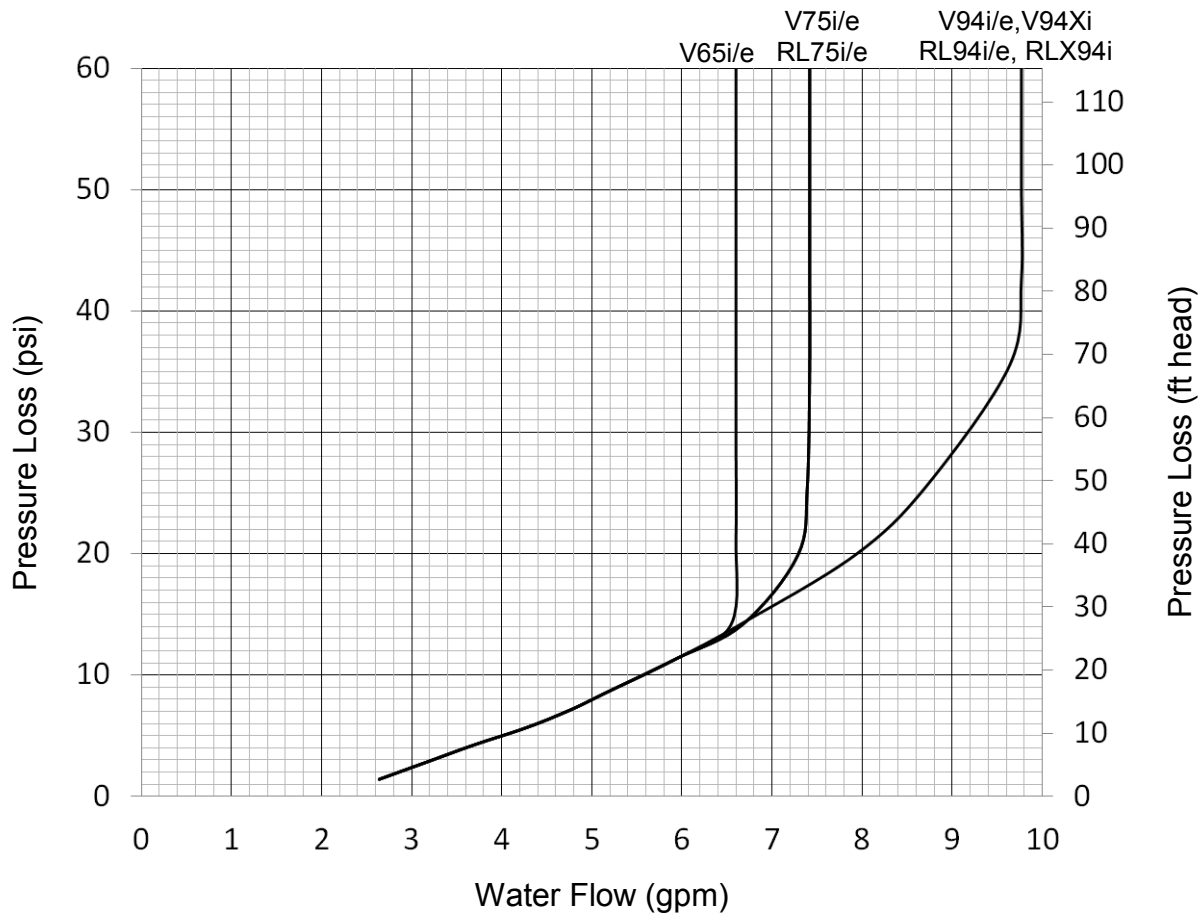
For recommended pump sizes use the table below. Additional pressure losses in plumbing between the Rinnai(s) and the storage tank must also be taken into consideration.

The specified pump size is to provide maximum recovery of the storage tank. A smaller pump size may be used, but could result in longer recovery time of the tank. Please contact the engineering department with any questions on pump sizing.

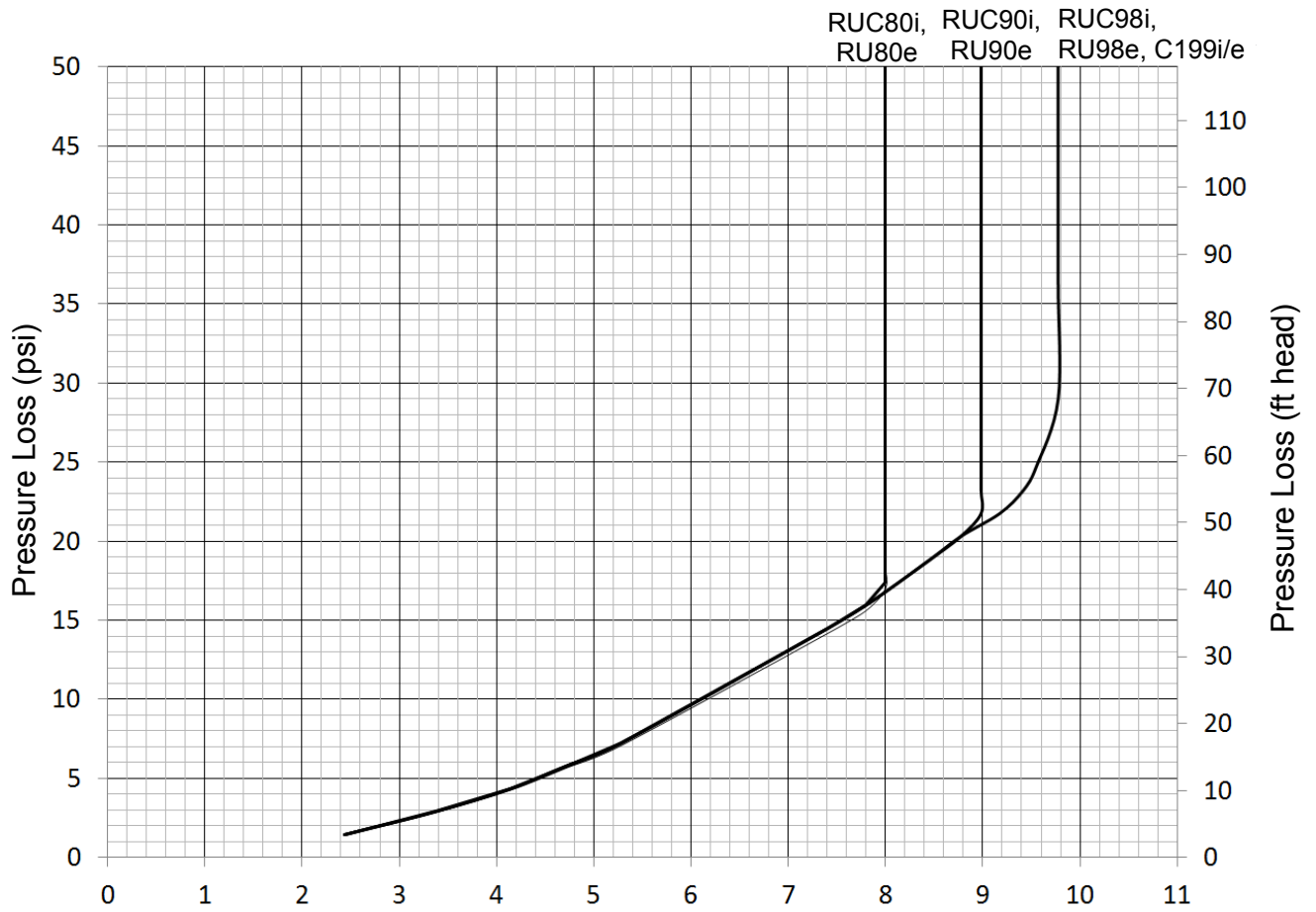
NOTE: Only use pumps of brass, bronze, or stainless steel construction. Do not use pumps of iron construction as they will oxidize and clog the inlet filter on the appliance. RUR series units are not to be used when recovering storage.

Pump Flow Requirements			
Number of Rinnai Water Heaters	RL94i/e, RLX94i, RUC98i, RU98e, RUC90i, RU90e, RUC80i, RU80e, C199i/e	RL75i/e, V75i/e,	V53e, V65i/e
1	5 gpm @ 30' head	5 gpm @ 25' head	4 gpm @ 25' head
2	10 gpm @ 30' head	10 gpm @ 25' head	8 gpm @ 25' head
3	15 gpm @ 30' head	15 gpm @ 25' head	12 gpm @ 25' head
4	20 gpm @ 30' head	20 gpm @ 25' head	16 gpm @ 25' head
5	25 gpm @ 30' head	25 gpm @ 25' head	20 gpm @ 25' head
6	30 gpm @ 30' head	30 gpm @ 25' head	24 gpm @ 25' head
7	35 gpm @ 30' head	35 gpm @ 25' head	28 gpm @ 25' head
8	40 gpm @ 30' head	40 gpm @ 25' head	32 gpm @ 25' head
9	45 gpm @ 30' head	45 gpm @ 25' head	36 gpm @ 25' head
10	50 gpm @ 30' head	50 gpm @ 25' head	40 gpm @ 25' head
11	55 gpm @ 30' head	55 gpm @ 25' head	44 gpm @ 25' head
12	60 gpm @ 30' head	60 gpm @ 25' head	48 gpm @ 25' head
13	65 gpm @ 30' head	65 gpm @ 25' head	52 gpm @ 25' head
14	70 gpm @ 30' head	70 gpm @ 25' head	56 gpm @ 25' head
15	75 gpm @ 30' head	75 gpm @ 25' head	60 gpm @ 25' head

Pressure Drop Curves-Non Condensing Models



Pressure Drop Curves-Condensing Models



1

2

3

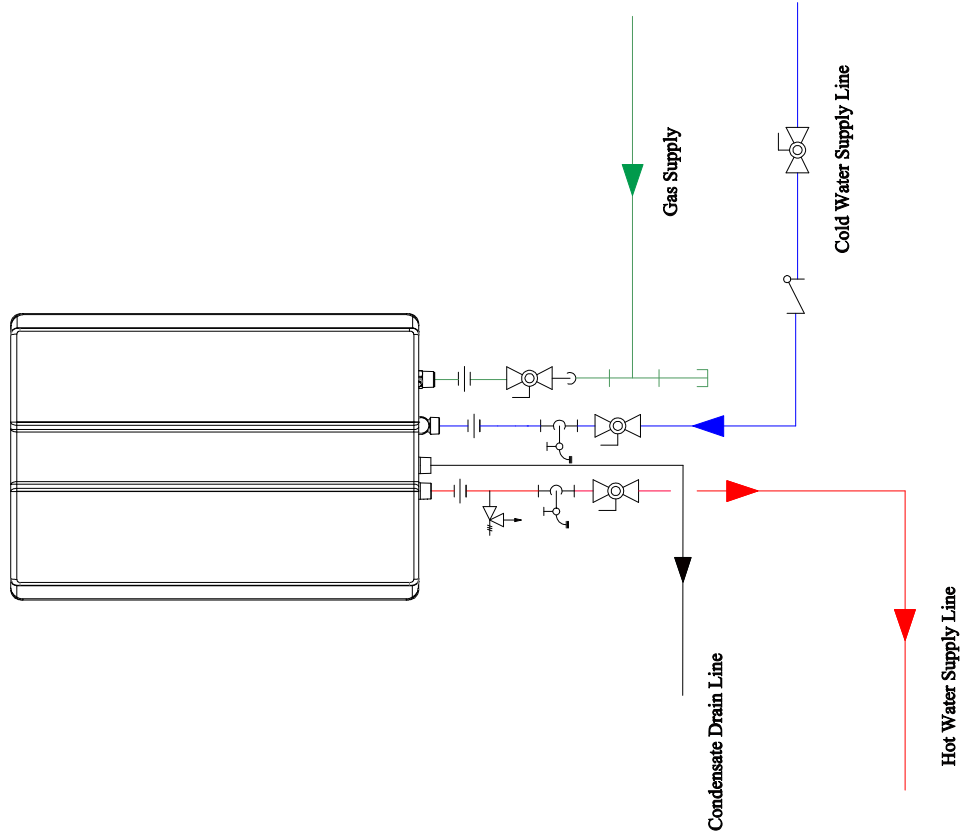
4

Condensing Tankless Single Unit

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.



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Rinnai America Corporation
103 International Drive
Peachtree City, GA 30269
1-800-621-9419
Tolerance
Fraction = ±1/16"
X.X=±0.030
X.XX=±0.015
X.XXX=±0.005

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Drawn By: RM
Approved By: JS

Rinnai Condensing Tankless Single Unit		DATE	8/21/2015	SHEET	1 of 1		
		SIZE	A	SCALE	NTS	DWG. NO.	CWH1

1

2

3

4

QTY

2

Rinnai Equipment List

Rinnai Condensing Water Heaters

Electronic Connection*

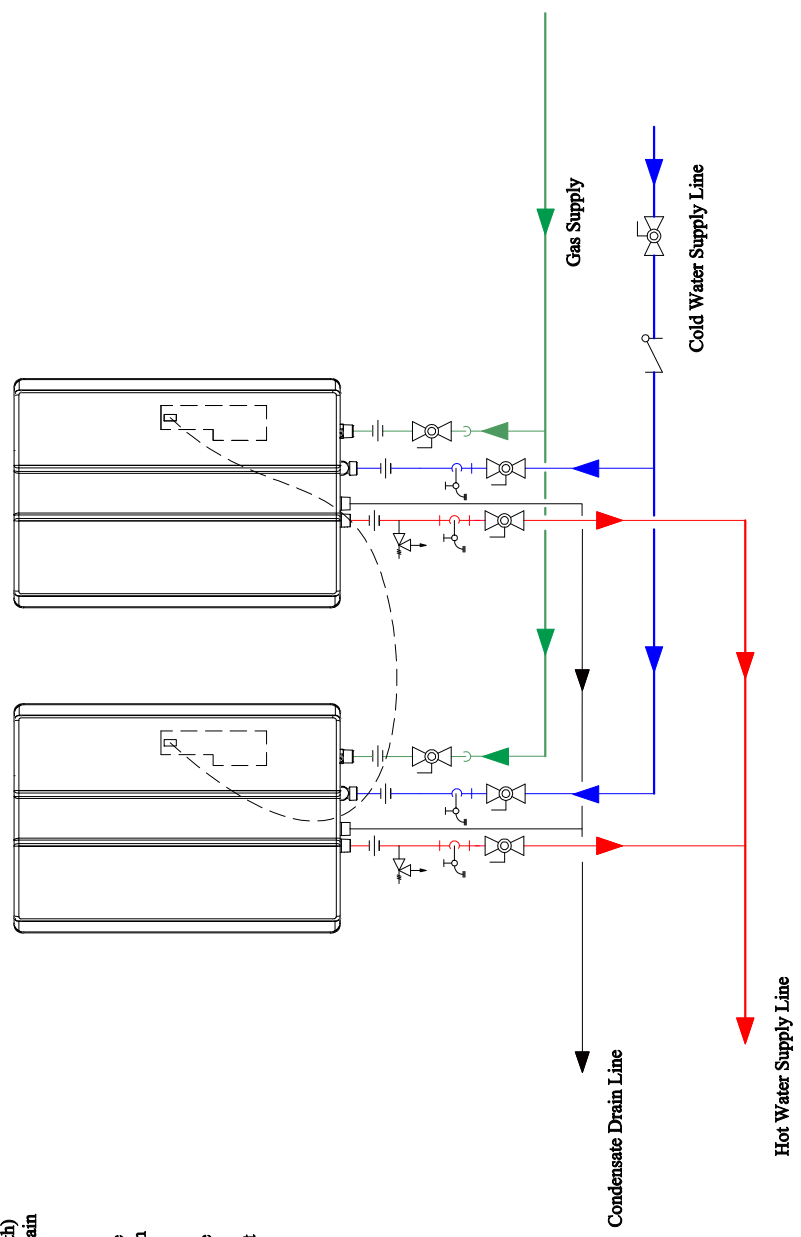
*Refer to Rinnai Accessories and Model Applicability for electronic connection details

Condensing Tankless Two Units

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.



<p>This drawing is the exclusive property of Rinnai America Corporation, it may not be reproduced or given to third parties.</p> <p>Drawn By: RM Approved By: JS</p>	<p>Rinnai Condensing Tankless Two Units</p>		<p>DATE: 8/21/15</p>	<p>SHEET: 1 of 1</p>
	<p>Rinnai America Corporation 103 International Drive Peachtree City, GA 30269 1-800-621-9419</p>	<p>Scale: NTS DWG. NO.: CWH2</p>	<p>REV: E</p>	
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<p>Tolerance: FRACTION = ± 1/16" X.XX = ± 0.030 X.XXX = ± 0.015 X.XXXX = ± 0.005</p>		<p>Drawn By: RM Approved By: JS</p>		

1

2

3

4

4 3 2 1

Condensing Tankless
Three Units

Rinnai Equipment List

Rinnai Condensing Water Heaters

Electronic Connection*

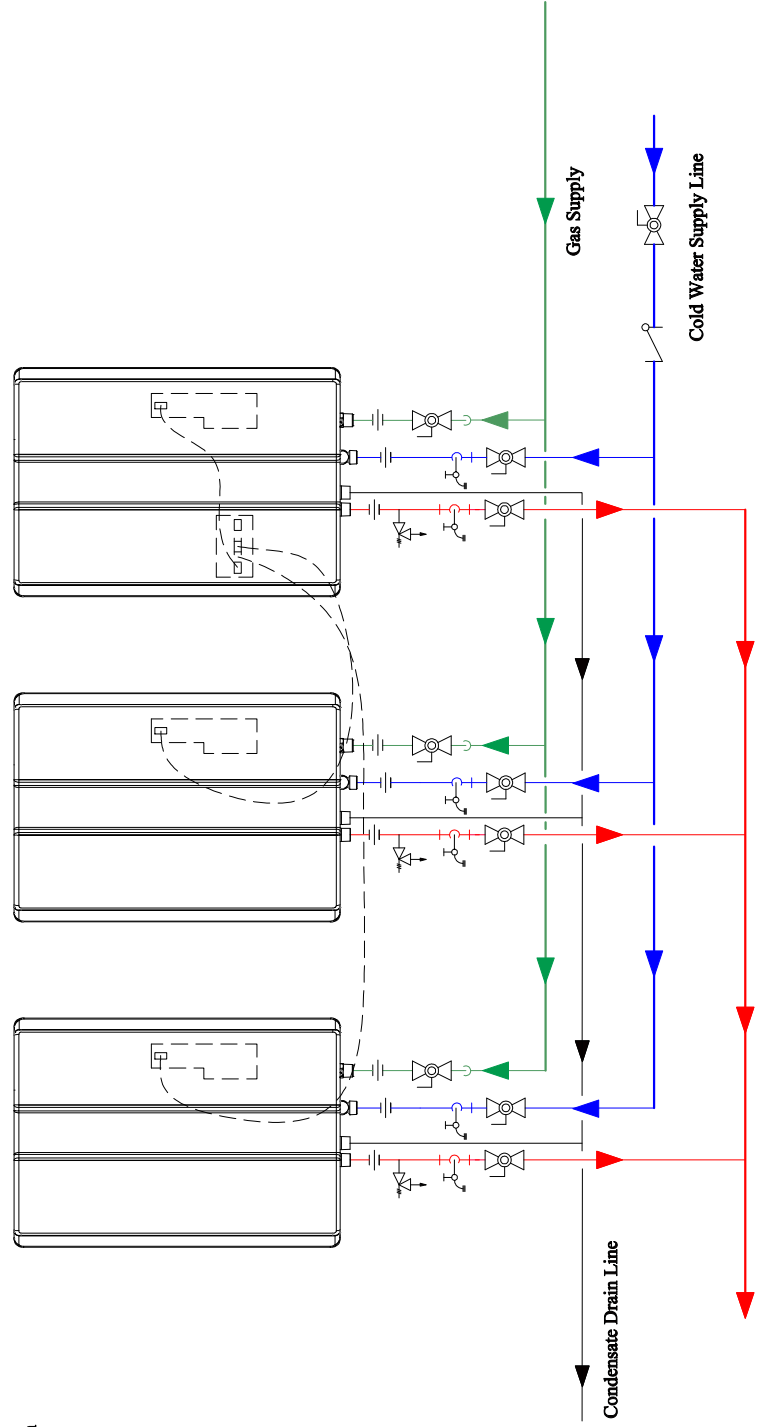
QTY

3

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.



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Tolerance
F: ±0.030, ±1/16"
X: ±0.015
X: ±0.015
X: ±0.005

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Approved By: JS

Rinnai		Condensing Tankless Three Units	
SIZE	SCALE	DWG. NO.	REV
A	NTS	CWH3	E
DATE 8/21/15			SHEET 1 of 1

4 | 3 | 2 | 1

Condensing Tankless Single Unit Circulation

Rinnai Equipment List

Rinnai Condensing Water Heaters	1
---------------------------------	---

QTY

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

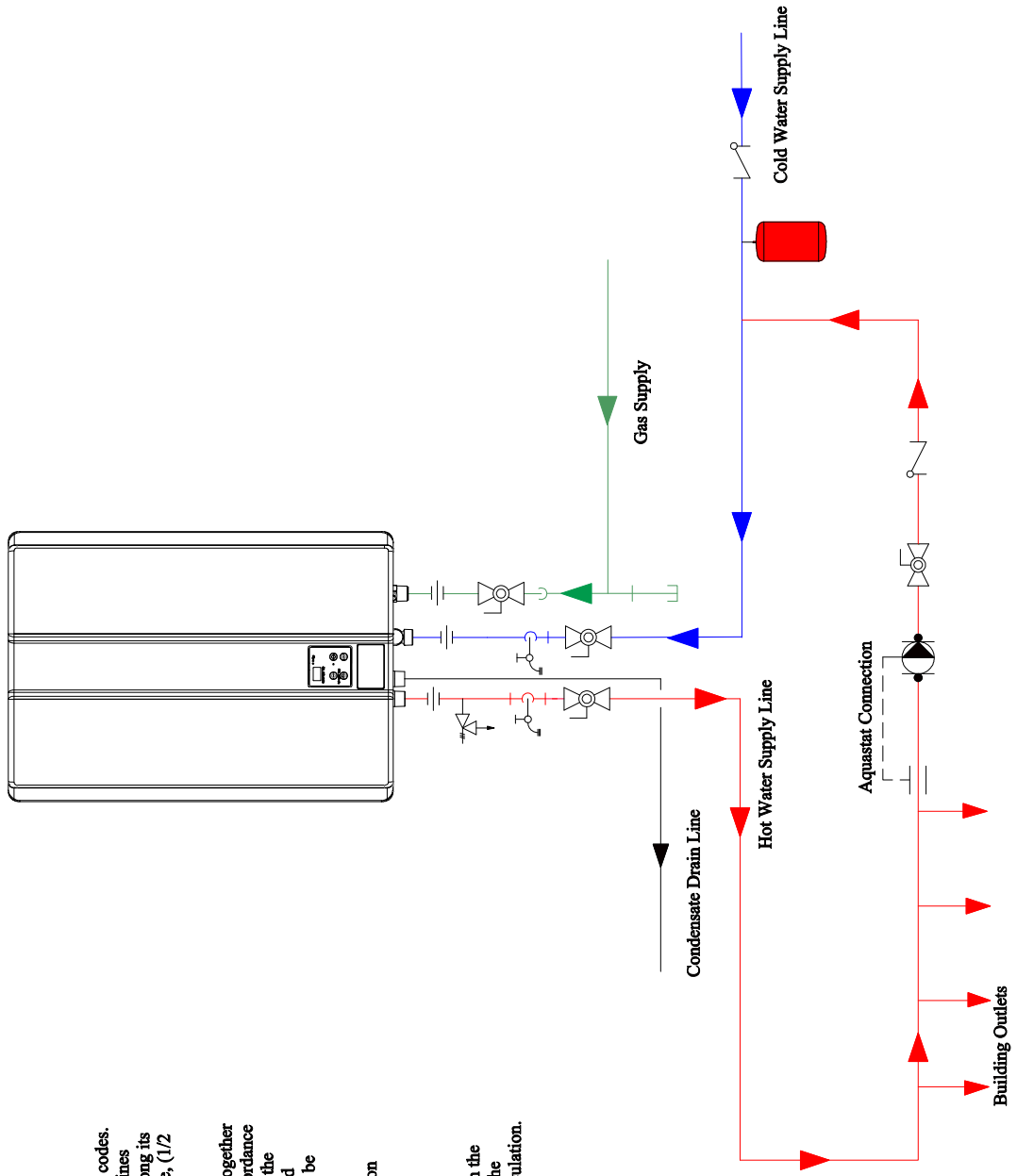
Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.

Pump should be sized to maintain circulation loop temperature.

The pump should be sized to overcome the pressure loss through the tankless water heater, supply, and return plumbing. Reference the Rinnai Hot Water System Design Manual, Pump Sizing for Circulation.

Pump should be of bronze or stainless construction.



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1-800-621-9419

Tolerance
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X-X = ±0.030
X-X-X = ±0.015
X-X-X-X = ±0.005

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Drawn By: RM
Approved By: JS

Rinnai
Condensing Tankless Single Unit Circulation

SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: CWH1-C
REV: E
SHEET: 1 of 1

4 | 3 | 2 | 1

Condensing Tankless Single Unit Circulation

Rinnai Equipment List

Rinnai Condensing Water Heaters	1
---------------------------------	---

QTY

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

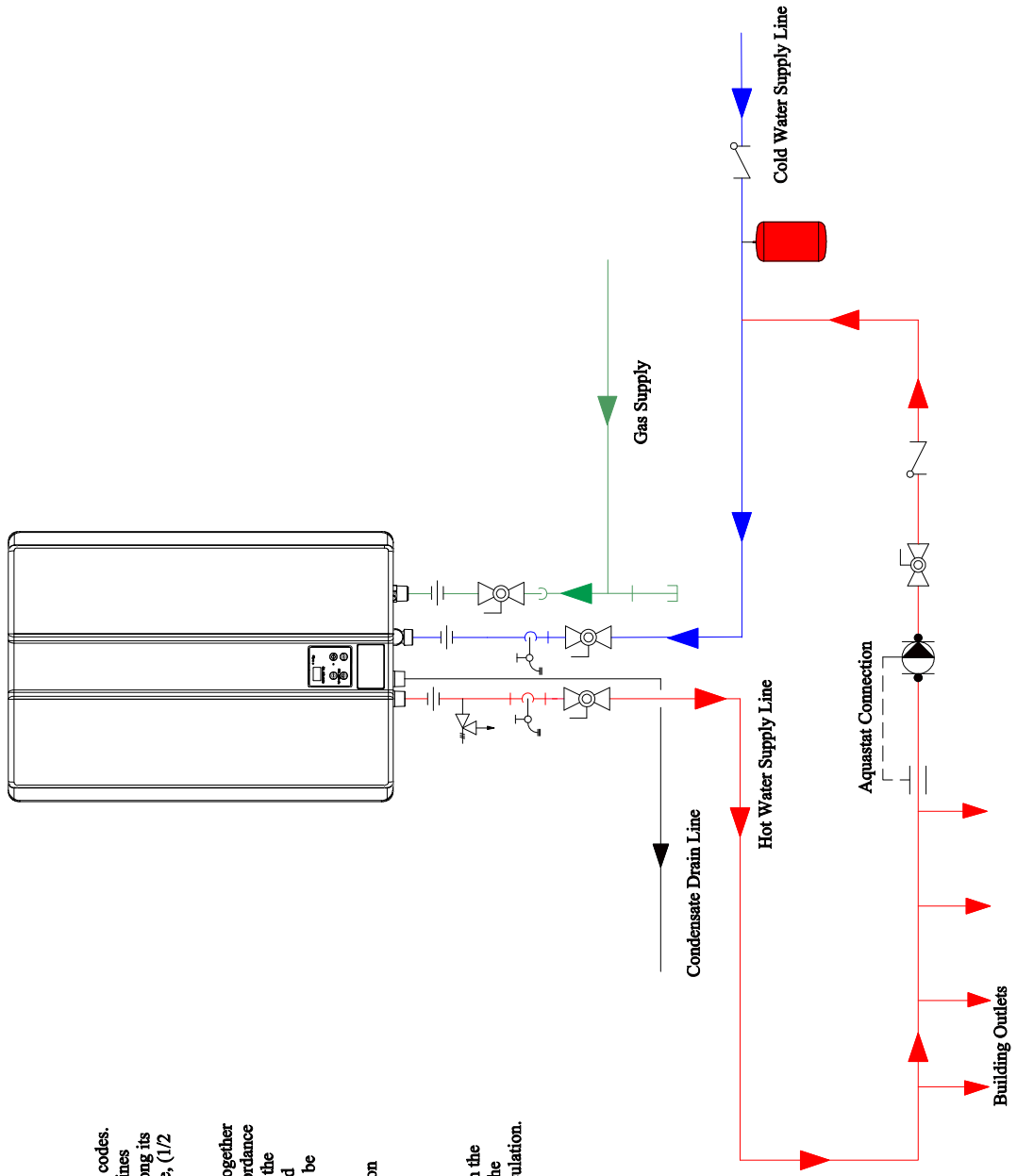
Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.

Pump should be sized to maintain circulation loop temperature.

The pump should be sized to overcome the pressure loss through the tankless water heater, supply, and return plumbing. Reference the Rinnai Hot Water System Design Manual, Pump Sizing for Circulation.

Pump should be of bronze or stainless construction.



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1-800-621-9419

Tolerance
Fraction = ±1/16"
X-X = ±0.030
X-X-X = ±0.015
X-X-X-X = ±0.005

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Drawn By: RM
Approved By: JS

Rinnai
Condensing Tankless Single Unit Circulation

SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: CWH1-C
REV: E
SHEET: 1 of 1

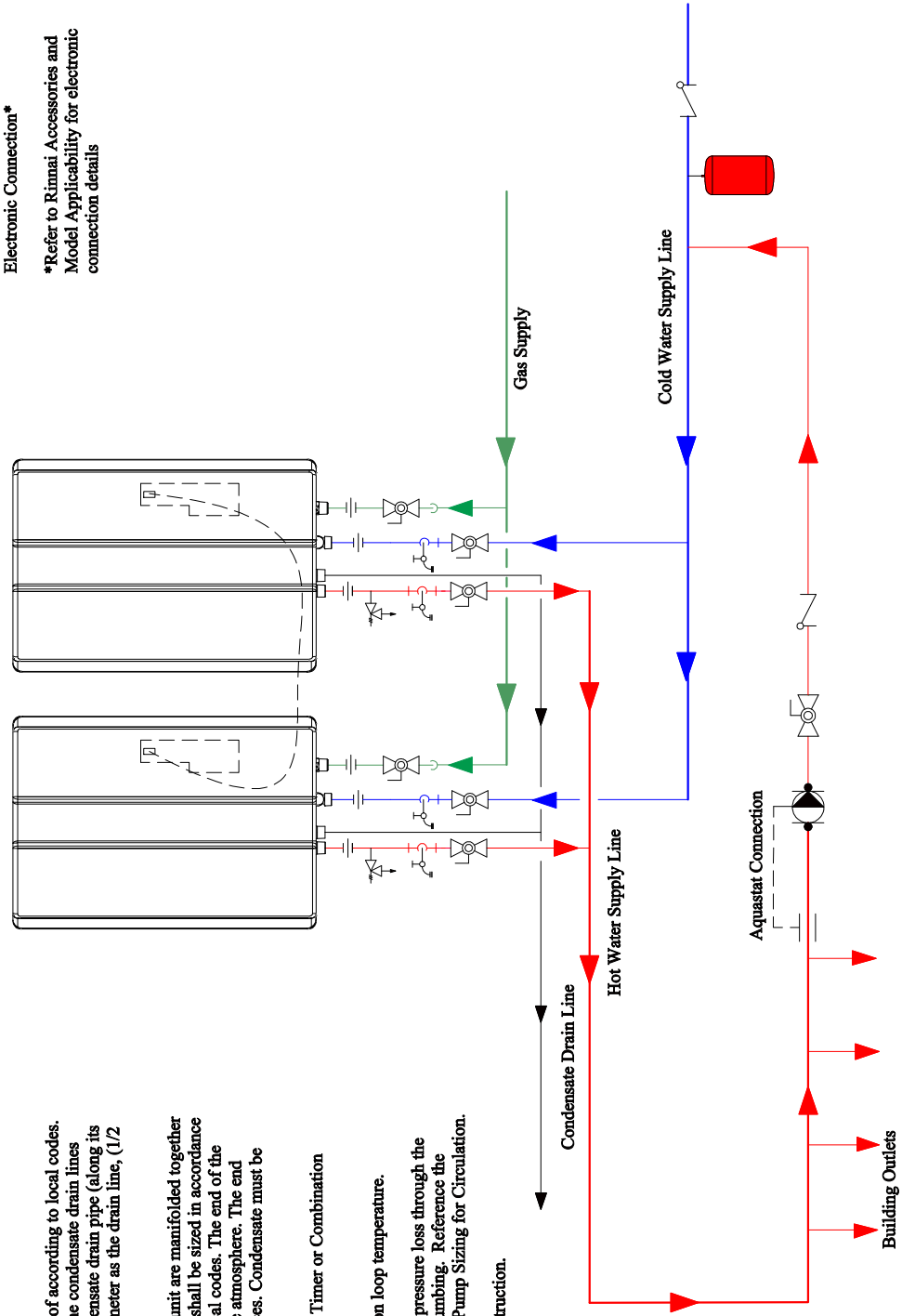
4 3 2 1

Condensing Tankless Two Unit Circulation

Rinnai Equipment List	QTY
Rinnai Condensing Water Heaters	2
Electronic Connection*	

Note:

- All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).
- Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.
- Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.
- Pump should be sized to maintain circulation loop temperature.
- The pump should be sized to overcome the pressure loss through the tankless water heater, supply, and return plumbing. Reference the Rinnai Hot Water System Design Manual, Pump Sizing for Circulation.
- Pump should be of bronze or stainless construction.



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1-800-621-9419
Tolerance
F: ±.0030, ±.16"
X: ±.0030
Y: ±.0015
Z: ±.0005

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Drawn By: RM
Approved By: JS

Rinnai
Condensing Tankless Two Unit Circulation
SIZE: A
SCALE: NTS
DWG. NO.: CWH2-C
DATE: 8/21/15
SHEET: 1 of 1

4 3 2 1

4 | 3 | 2 | 1

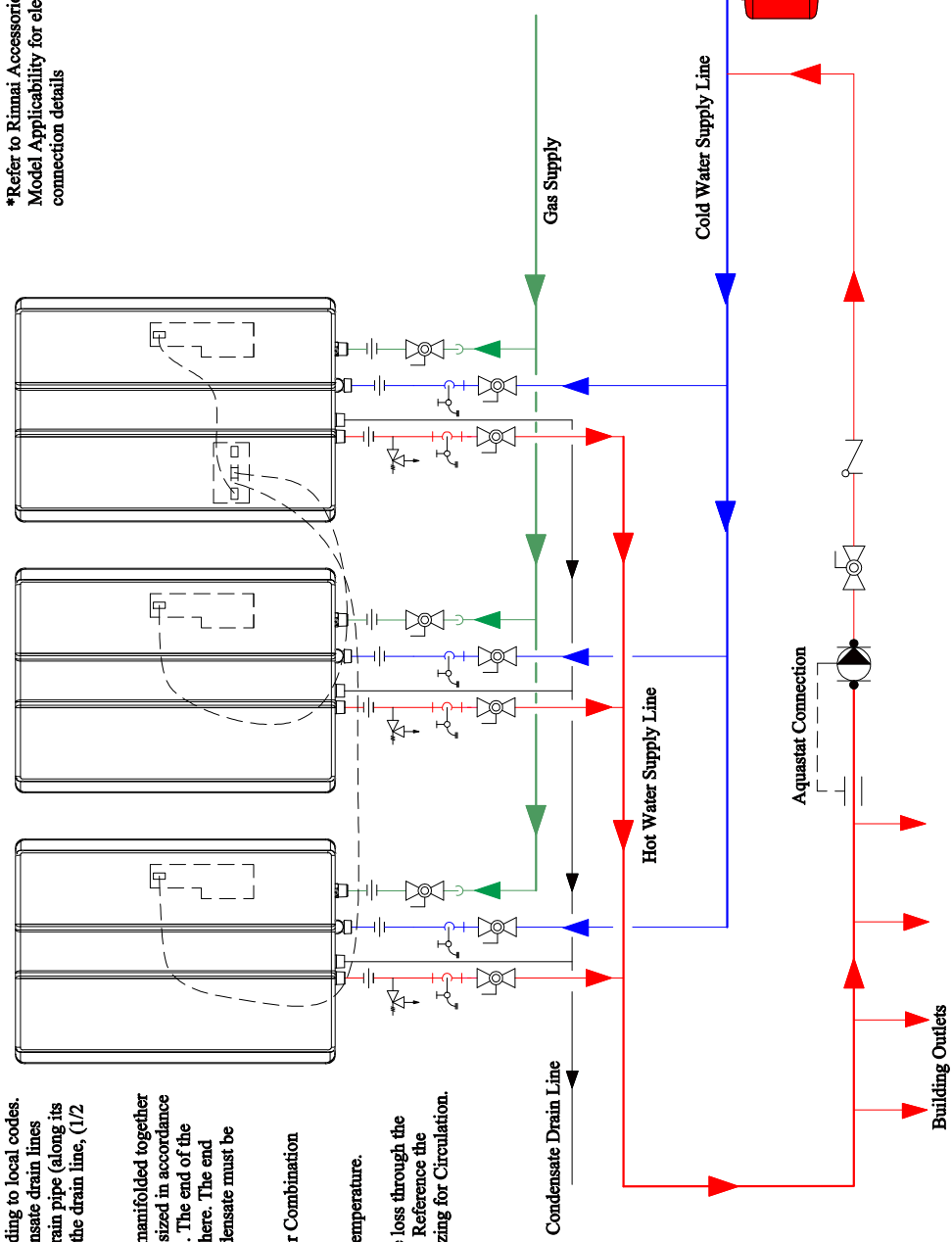
Condensing Tankless Three Unit Circulation

Rinnai Equipment List	QTY
Rinnai Condensing Water Heaters	3
Electronic Connection*	

Note:

- All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).
- Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.
- Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.
- Pump should be sized to maintain circulation loop temperature.
- The pump should be sized to overcome the pressure loss through the tankless water heater, supply, and return plumbing. Reference the Rinnai Hot Water System Design Manual, Pump Sizing for Circulation.
- Pump should be of bronze or stainless construction.

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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Rinnai	
Condensing Tankless Three Unit Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: CWH3-C	REV: E
DATE: 8/21/15	SHEET: 1 of 1

4 | 3 | 2 | 1

Condensing Tankless Six Unit Circulation

Rinnai Equipment List	QTY
Rinnai Condensing Water Heaters	6
Electronic Connection*	

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

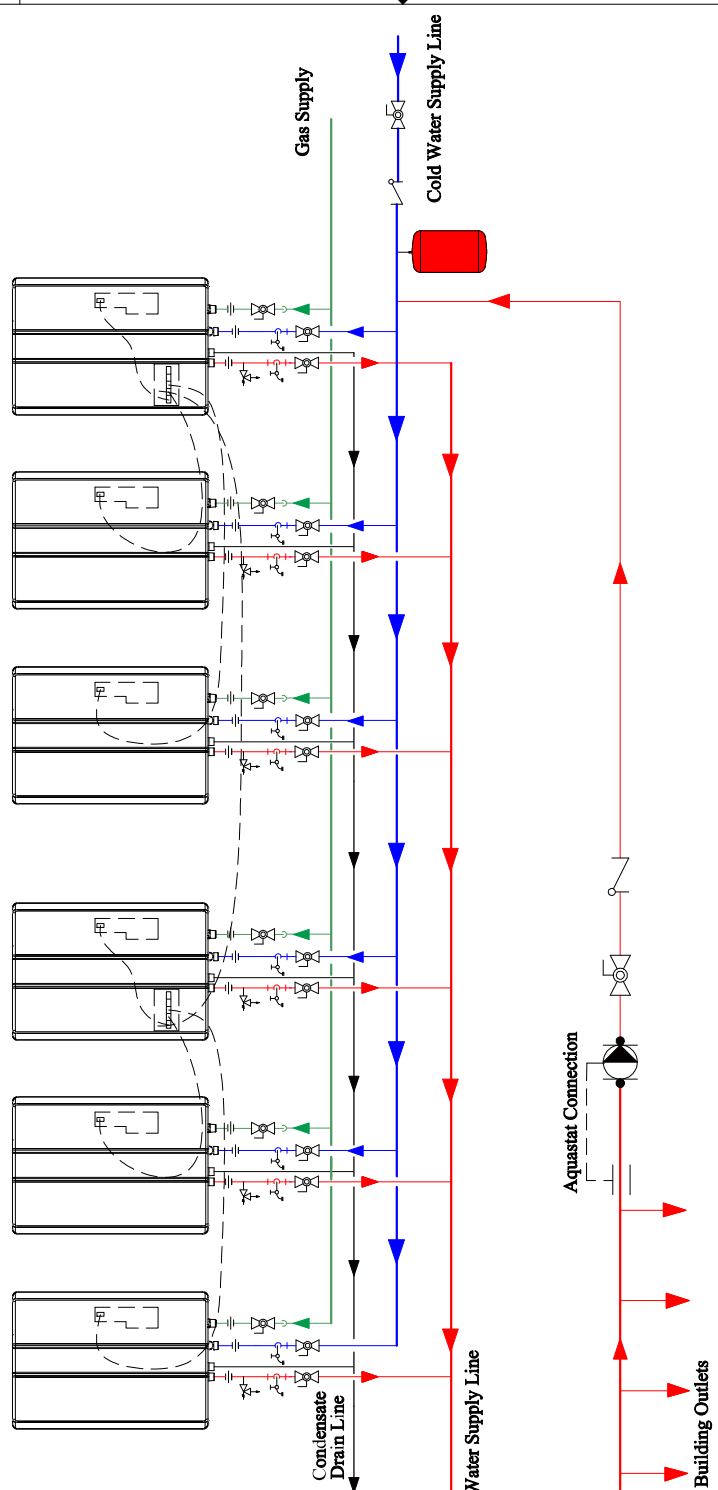
Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.

Pump should be sized to maintain circulation loop temperature.

The pump should be sized to overcome the pressure loss through the tankless water heater, supply, and return plumbing. Reference the Rinnai Hot Water System Design Manual, Pump Sizing for Circulation.

Pump should be of bronze or stainless construction.



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Rinnai	
Condensing Tankless Six Unit Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: CWH6-C	REV: E
DATE: 8/21/15	SHEET: 1 of 1

Condensing Tankless Single Unit with Backup Storage

Rinnai Equipment List
Rinnai Condensing Water Heaters

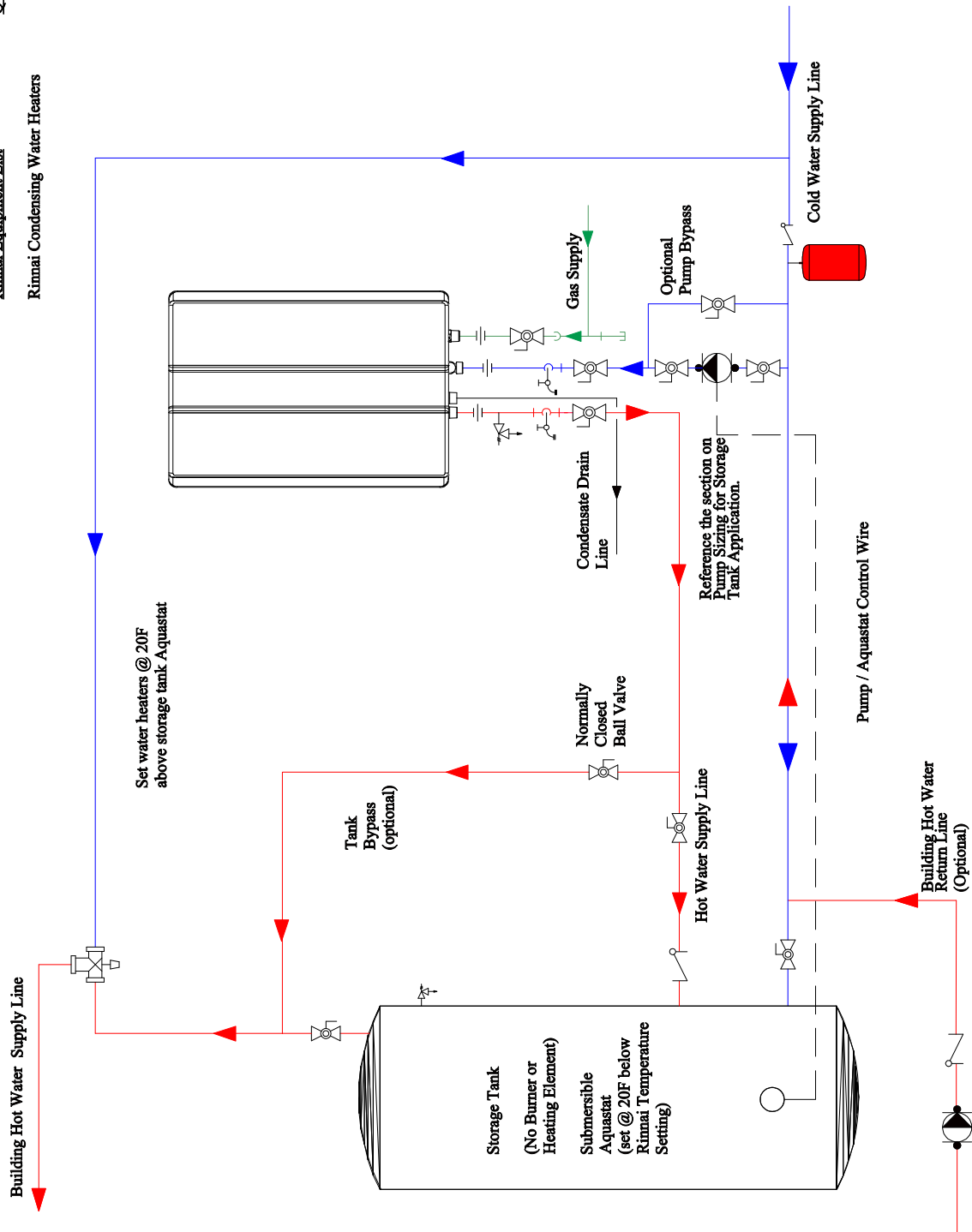
QTY 1

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Do not use manifold electronic controls with storage tank applications



Set water heaters @ 20F above storage tank Aquastat

Reference the section on Pump Sizing for Storage Tank Application.

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Drawn By RM
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DATE 8/21/15
SHEET 1 of 1

Rinnai
Condensing Tankless
Single Unit with Backup Storage

4

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1

**Condensing Tankless
Two Units with Backup Storage**

Rinnai Equipment List

Rinnai Condensing Water Heaters

QTY

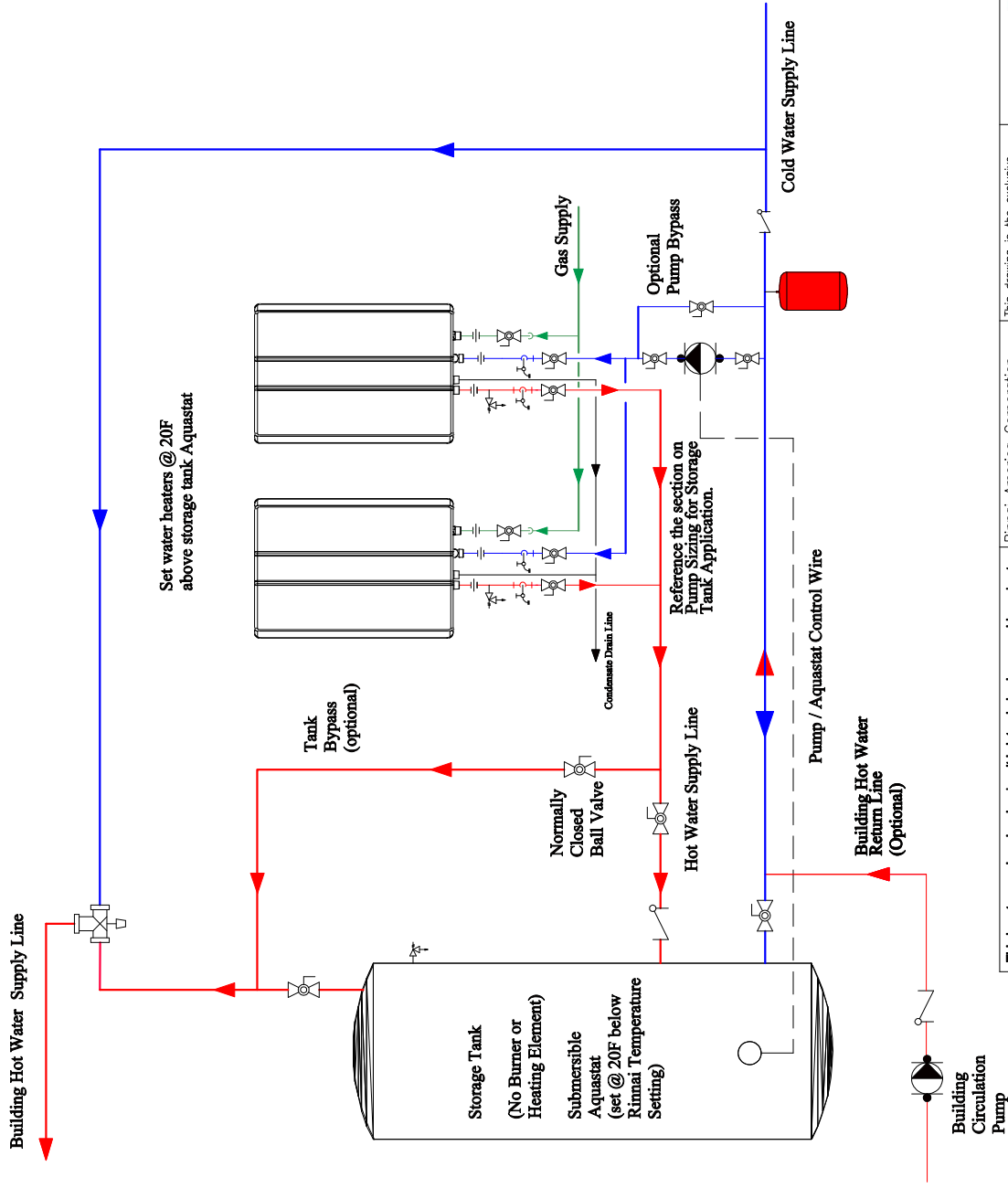
2

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Do not use manifold electronic controls with storage tank applications



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Rinnai		Condensing Tankless Two Units with Backup Storage	
SIZE A	SCALE NTS	DWG. NO. CWH2-BC	REV E
DATE 8/21/15			SHEET 1 of 1

4

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2

1

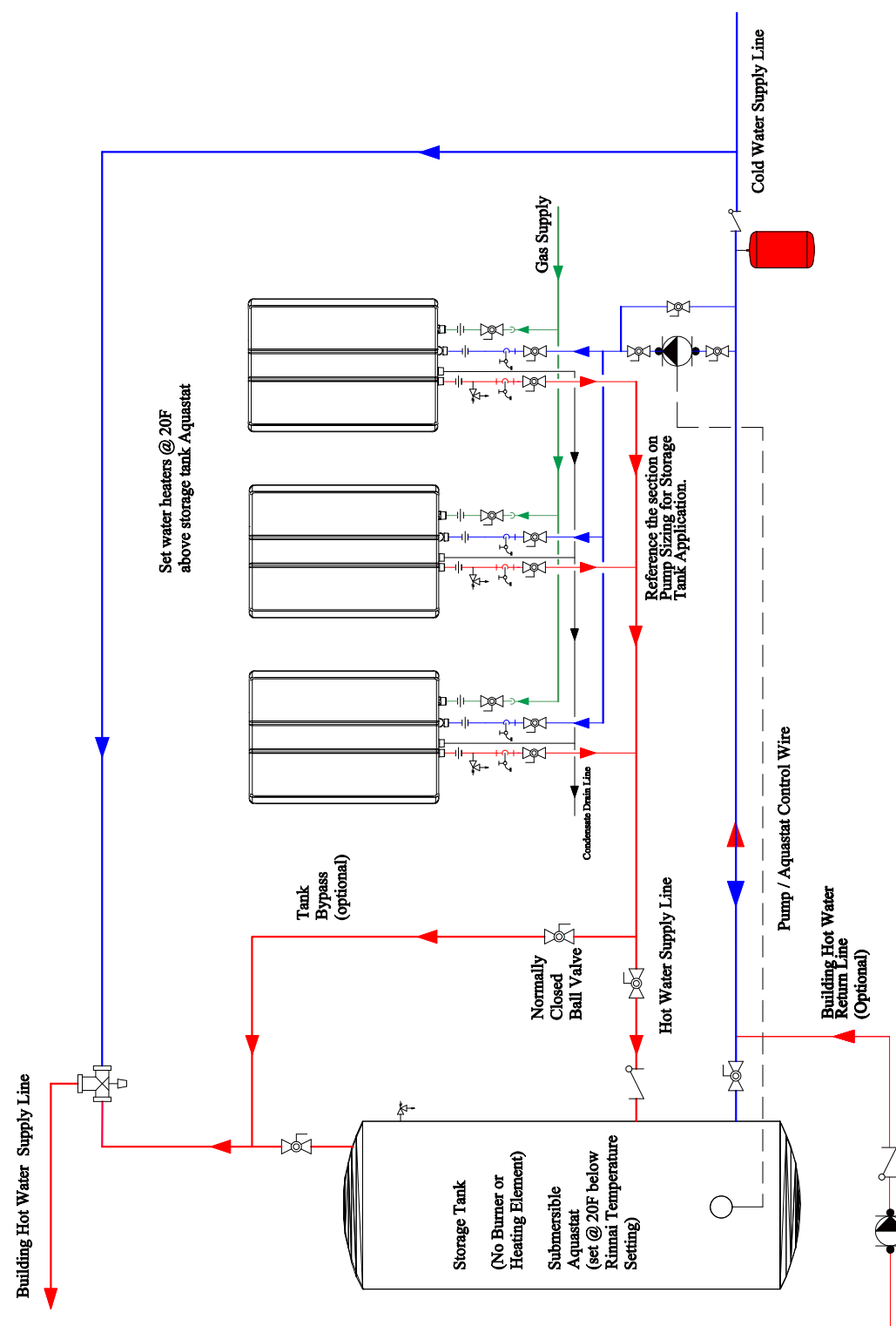
Rinnai Equipment List
 Rinnai Condensing Water Heaters 3

Condensing Tankless
 Three Units with Backup Storage

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).
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Do not use manifold electronic controls with storage tank applications



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Rinnai		Condensing Tankless Three Units with Backup Storage	
SIZE	SCALE	DWG. NO.	REV
A	NTS	CWH3-BC	E
DATE: 8/21/15			SHEET 1 of 1

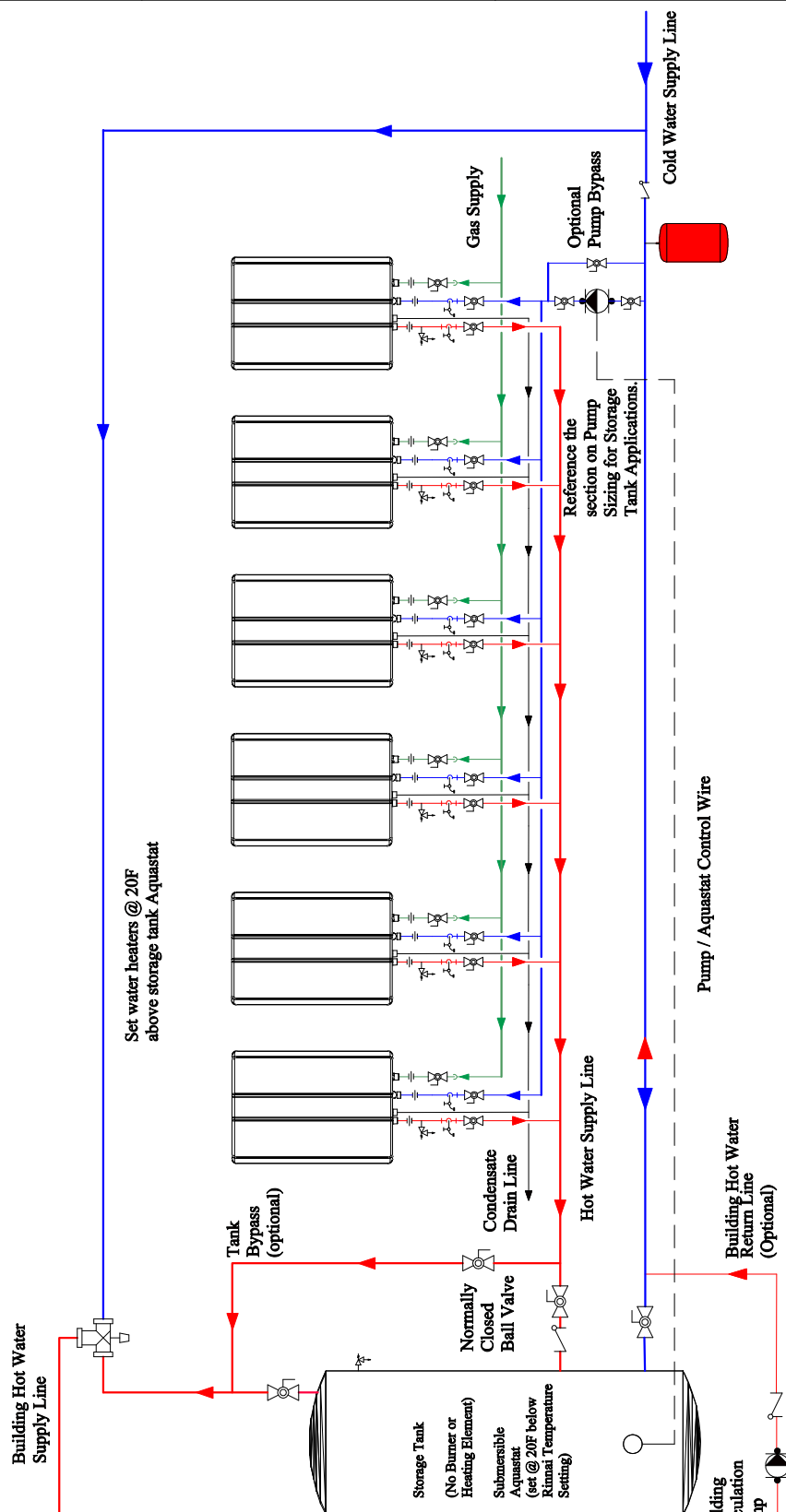
Condensing Tankless
 Six Units with Backup Storage

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Do not use electronic manifold controls with storage tank applications



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Drawn By: RM
 Approved By: JS
 DATE: 8/21/2015

Rinnai
 Condensing Tankless
 Six Units with Backup Storage
 SCALE: NTS
 DWG. NO.: CWHG-BC
 SHEET: 1 of 1

4 3 2 1

RUR Condensing Tankless
One Unit Circulation

Rinnai Equipment List
Rinnai RUR Condensing Water Heaters 1

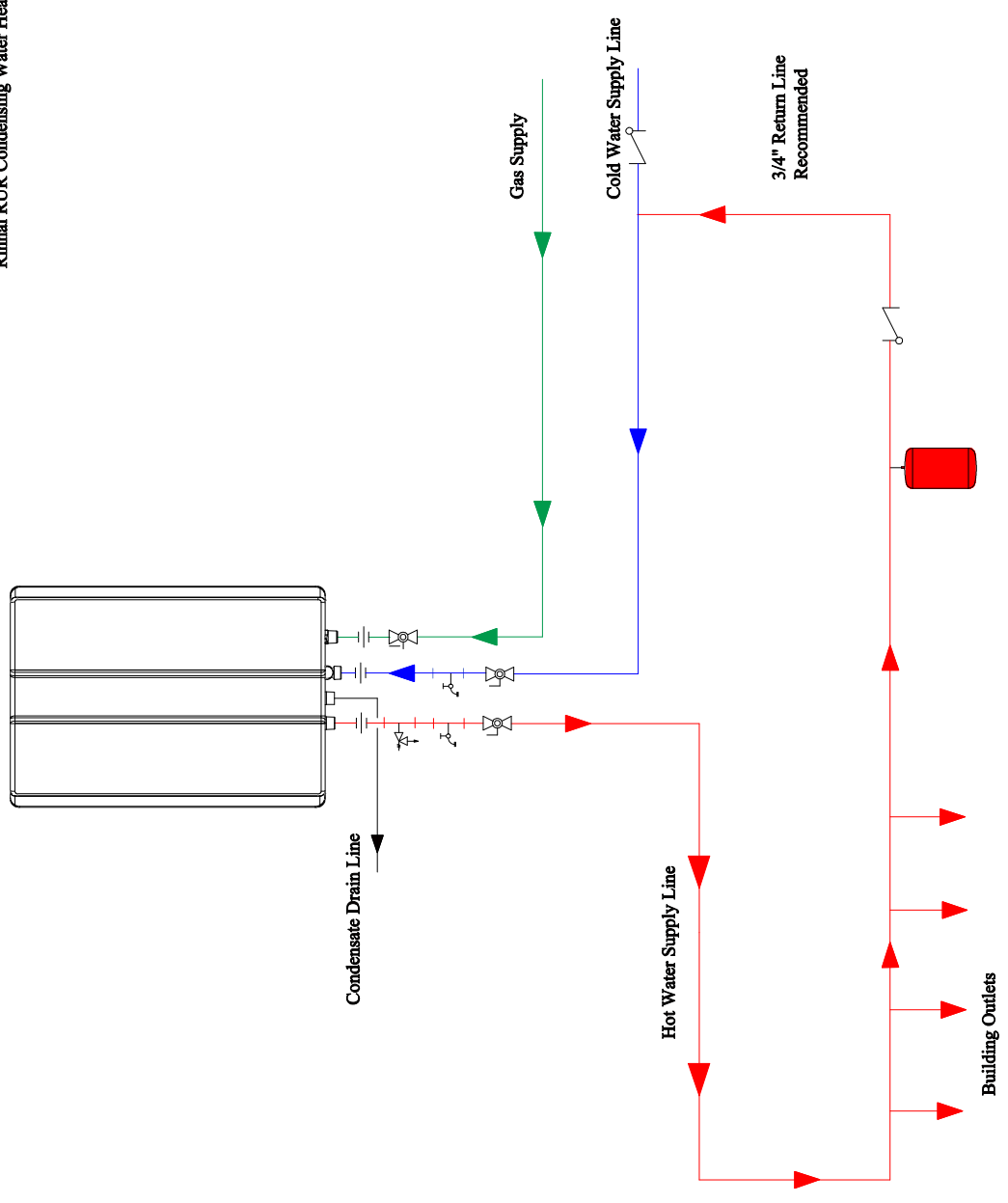
Note:

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Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft



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Approved By JS

Rinnai RUR Condensing Tankless One Unit Circulation		SIZE	SCALE	DWG. NO.	REV
		A	NTS	CWH1-RUR	E
DATE 8/21/2015				SHEET 1 of 1	

D C B A

**Condensing Tankless
RUR Crossover Circulation**

Rinnai Equipment List	QTY
Rinnai RUR Condensing Water Heater	1

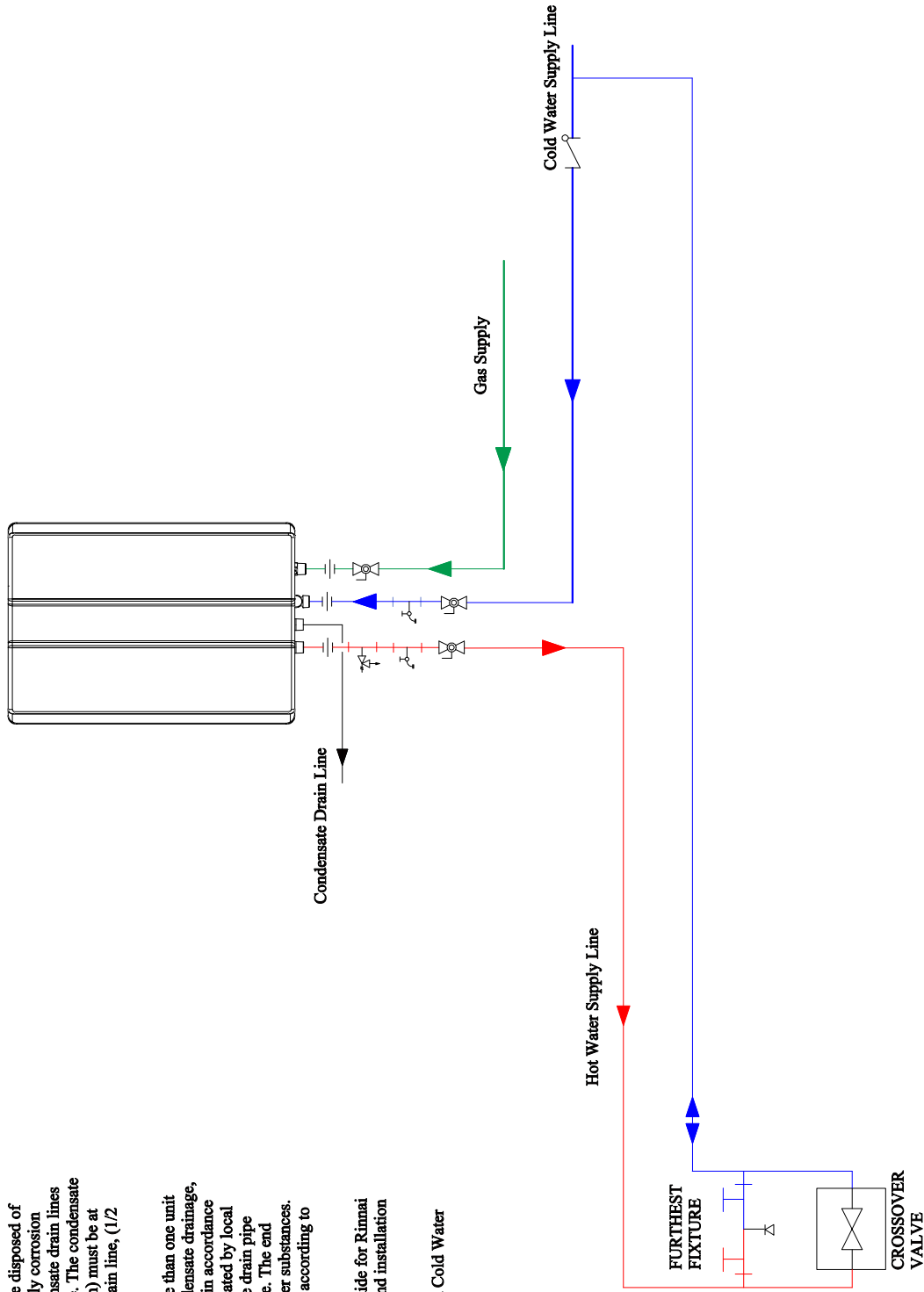
Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft



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Rinnai	
Condensing Tankless RUR Crossover Circulation	
SIZE A	SCALE NTS
DWG. NO. CWH1-RUR-CO	REV E
DATE 8/21/2015 SHEET 1 of 1	

4 | 3 | 2 | 1

**Condensing Tankless
Two Units RUR Circulation**

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

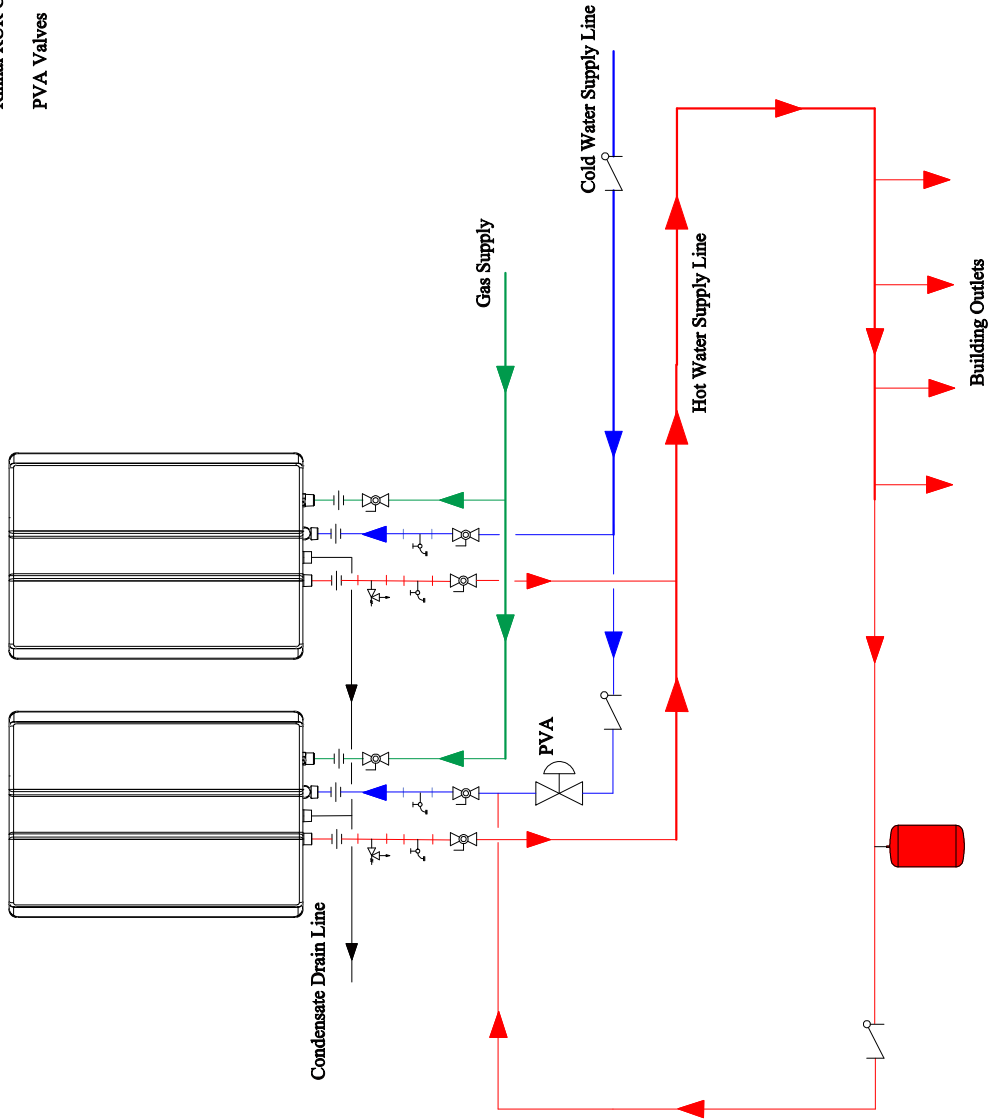
Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft

Rinnai Equipment List

Item	QTY
Rinnai Condensing Water Heaters	1
Rinnai RUR Condensing Water Heater	1
PVA Valves	1

RUR Circulation Unit (KBP Unit)

RUR/RUC Unit (KB/KBD Unit)



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Rinnai	
Condensing Tankless Two Unit RUR Circulation	
SIZE A	SCALE NTS
DWG. NO. CH2-RUR	REV E
DATE 8/21/15	
SHEET 1 of 1	

4 | 3 | 2 | 1

4 3 2 1

**Condensing Tankless
Two Units RUR Circulation**

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

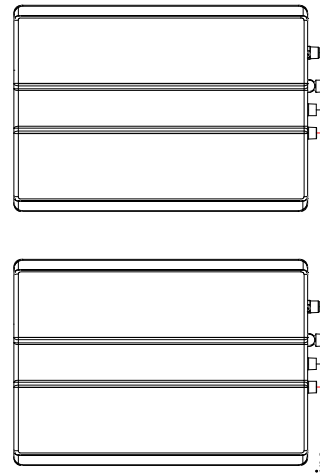
Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft

Rinnai Equipment List

Item	QTY
Rinnai Condensing Water Heaters	1
Rinnai RUR Condensing Water Heater	1
PVA Valves	1

**RUR Circulation Unit
(KBP Unit)**



Condensate Drain Line

Gas Supply

Hot Water Supply Line

PVA

Cold Water Supply Line

FURTHEST
FITURE

CROSSOVER
VALVE

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Rinnai	
Condensing Tankless Two Unit RUR Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: CH2-RUR-CO	REV: E
DATE: 8/21/15	SHEET: 1 of 1

4 3 2 1

4

3

2

1

Condensing Tankless Three Units RUR Circulation

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

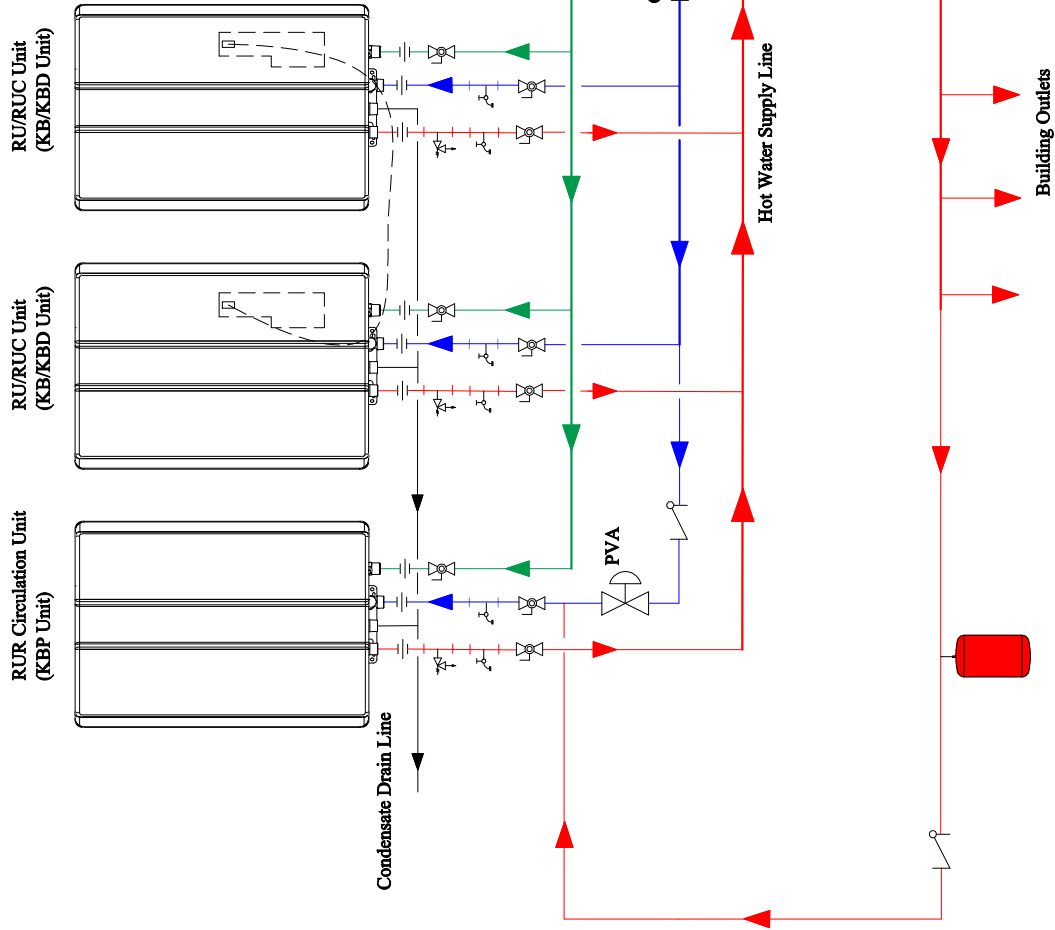
Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft

Rinnai Equipment List

Item	QTY
Rinnai Condensing Water Heaters	2
Rinnai RUR Condensing Water Heater	1
PVA Valves	1



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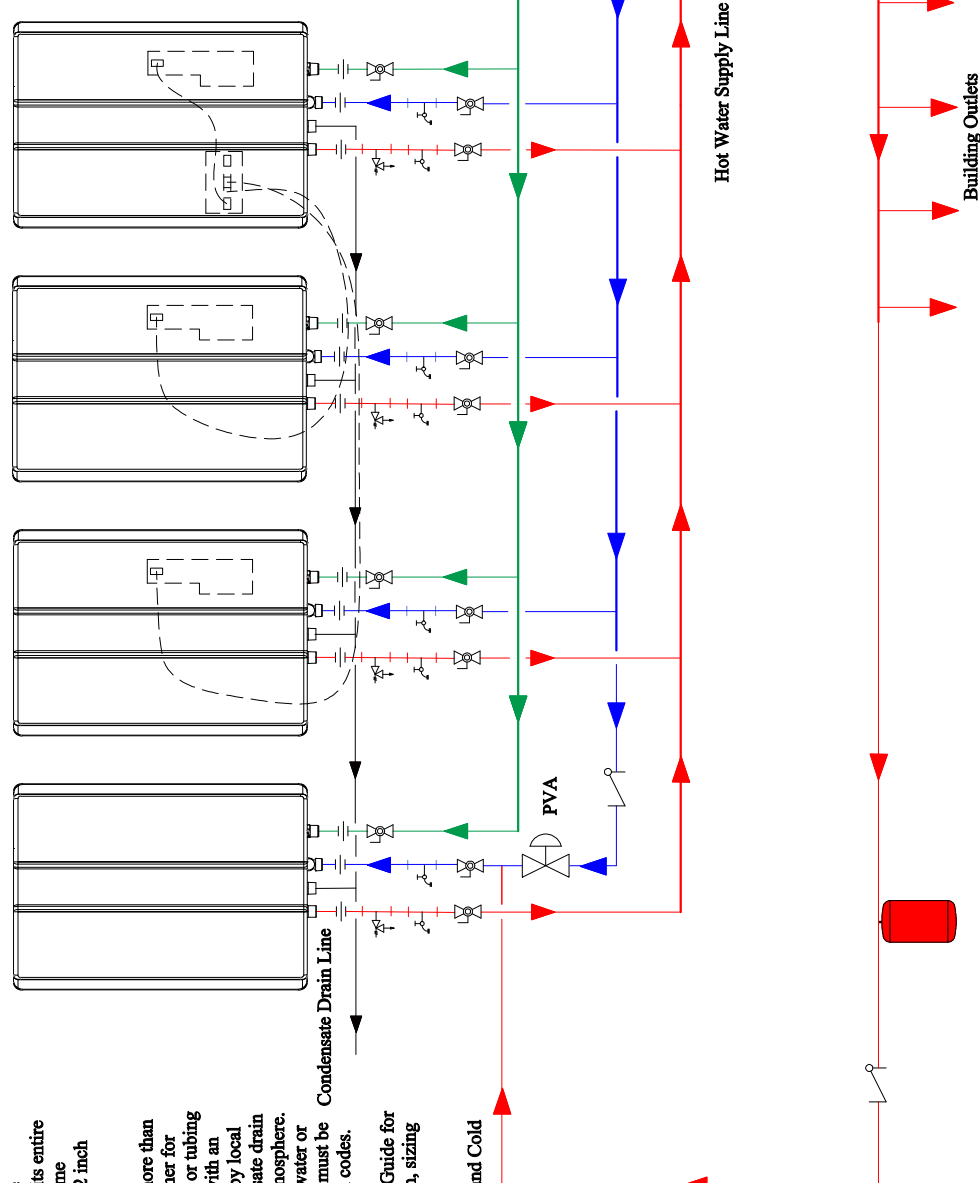
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Rinnai	
Condensing Tankless Three Unit RUR Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: CH3-RUR	REV: E
DATE: 8/21/2015	SHEET: 1 of 1

4 3 2 1

Condensing Tankless Four Units RUR Circulation

Rinnai Equipment List	QTY
Rinnai Condensing Water Heaters	3
Rinnai RUR Condensing Water Heater	1
PVA Valves	1
Electronic Connection*	



Note:
 All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2" inch NPT).
 Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.
 Maximum Pipe Length (Hot and Cold Water Supply Lines)
 3/4" - 400ft
 1/2" - 100ft

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Rinnai	
Condensing Tankless Four Unit RUR Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: CWH4-RUR	REV: E
DATE: 8/21/15	SHEET: 1 of 1

4 3 2 1

Condensing Tankless Five Units RUR Circulation

Note:

All condensate must drain and be disposed of according to local codes. Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose. The condensate drain pipe (along its entire length) must be at least the same diameter as the drain line, (1/2 inch NPT).

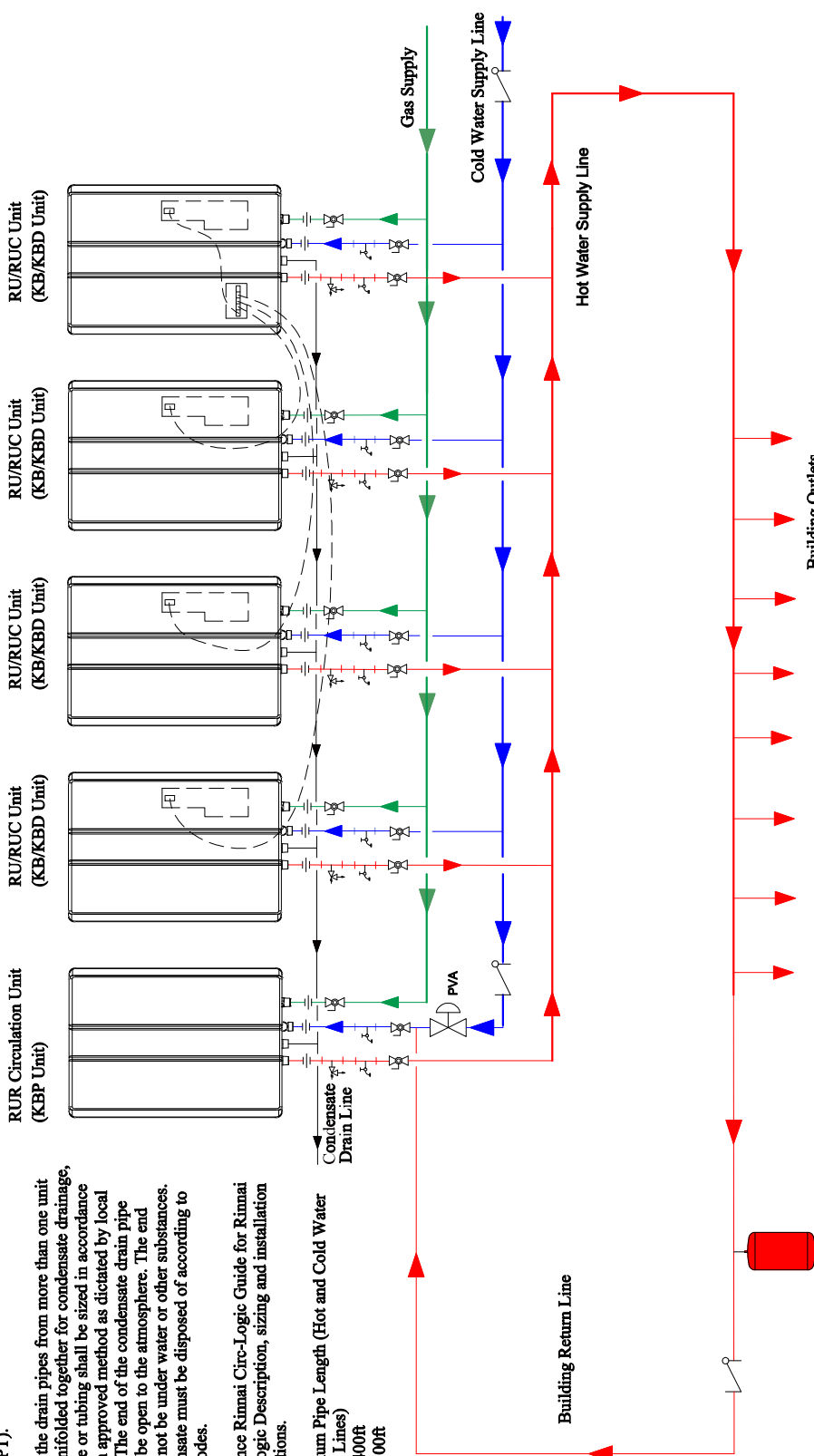
Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method as dictated by local codes. The end of the condensate drain pipe should be open to the atmosphere. The end should not be under water or other substances. Condensate must be disposed of according to local codes.

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Maximum Pipe Length (Hot and Cold Water Supply Lines)
3/4" - 400ft
1/2" - 100ft

Rinnai Equipment List	QTY
Rinnai Condensing Water Heaters	4
Rinnai RUR Condensing Water Heater	1
PVA Valves	1
Electronic Connection*	

*Refer to Rinnai Accessories and Model Applicability for electronic connection details.



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Approved By: JS

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Tolerance: Fraction = ±1/16"
X.XX=±0.030
X.XXX=±0.015
X.XXXX=±0.005

Rinnai

Condensing Tankless
Five Units Circulation

DATE: 8/21/15
SHEET: 1 of 1

Building Outlets

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1

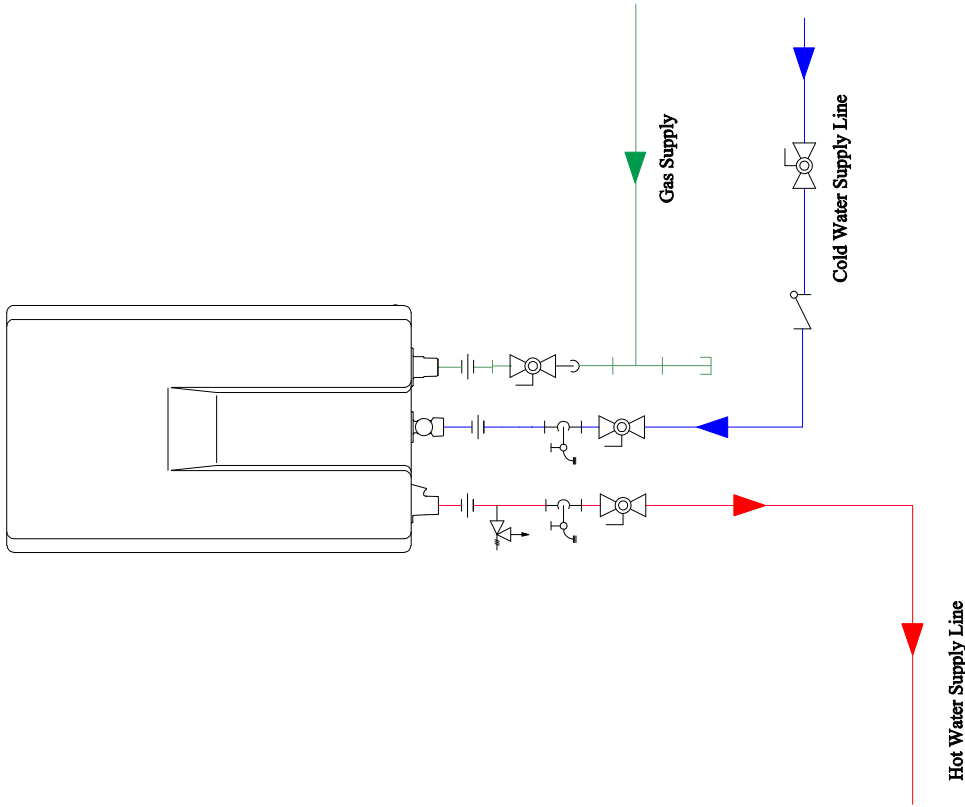
2

3

4

Rinnai Equipment List

Item	QTY
Rinnai Non-Condensing Water Heaters	1



**Non-Condensing Tankless
Single Unit**

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X: ±0.0030
X: ±0.0015
X: ±0.005

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Rinnai

Non-Condensing Tankless
Single Unit

SIZE	SCALE	DWG. NO.	REV
A	NTS	WH1	E

DATE 8/21/15 SHEET 1 of 1

1

2

3

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1

2

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4

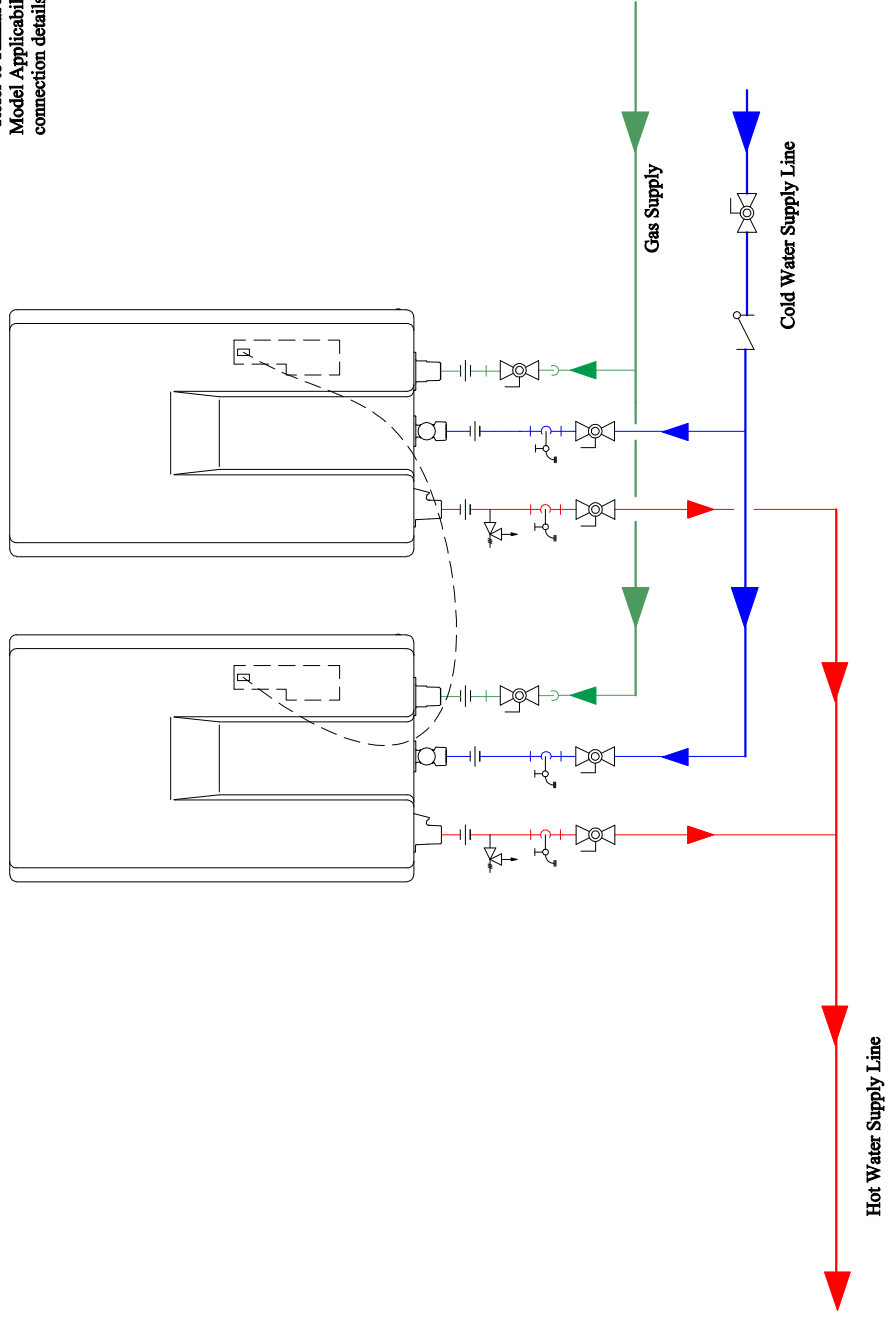
Rinnai Equipment List

Rinnai Non-Condensing Water Heaters **QTY** 2

Electronic Connection*

*Refer to Rinnai Accessories and Model Applicability for electronic connection details

Non-Condensing Tankless Two Units



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Tolerance
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X:XX = ±0.015
X:XXX = ±0.005

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Rinnai
Non-Condensing Tankless Two Units

SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: WH2
REV: E
SHEET: 1 of 1

1

2

3

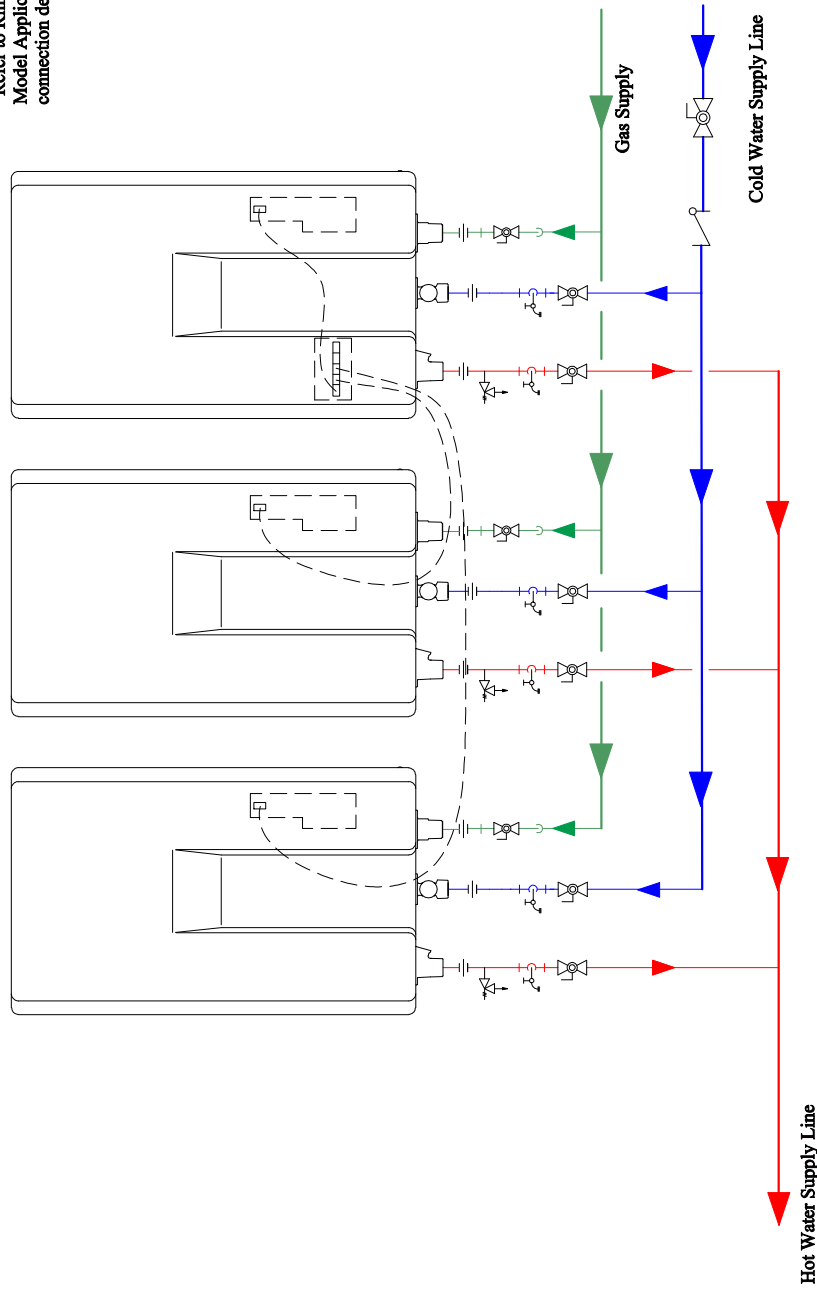
4

Rinnai Equipment List

Rinnai Non-Condensing Water Heaters **QTY** **3**

Electronic Connection*

***Refer to Rinnai Accessories and Model Applicability for electronic connection details**



**Non-Condensing Tankless
Three Units**

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Tolerance
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X: X ±0.030
X: X X ±0.015
X: X X X ±0.005

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Rinnai
Non-Condensing Tankless
Three Units

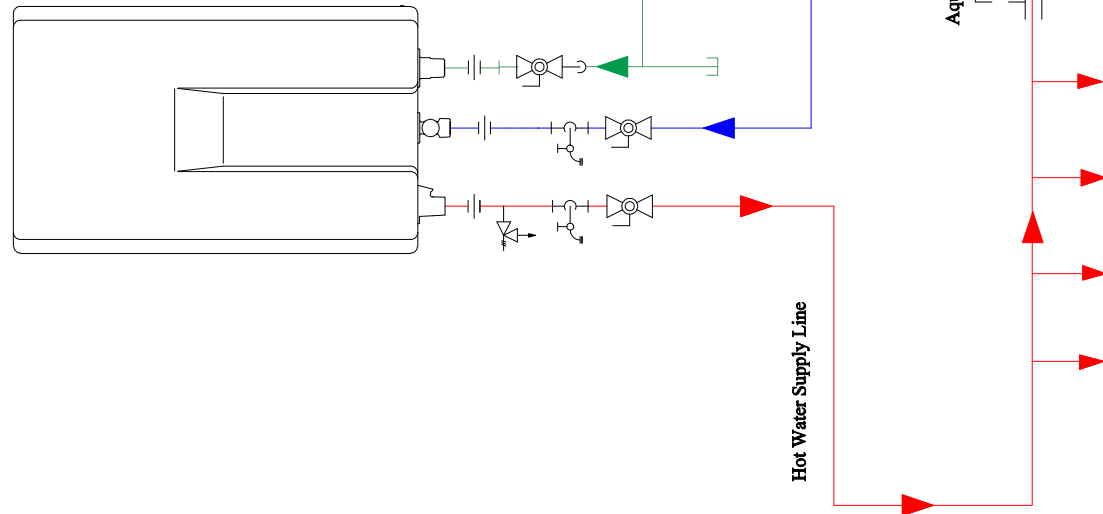
SIZE: A SCALE: NTS DWG. NO.: WH3 REV: E

DATE: 8/21/15 SHEET: 1 of 1

Non-Condensing Tankless Single Unit Circulation

Note:

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.
 Pump should be sized to maintain circulation loop temperature.
 The pump should be sized to overcome the pressure loss through the tankless water heater and supply and return plumbing in the circulation loop.
 Reference the section Pump Sizing for Circulation.
 Pump should be of bronze or stainless construction.
 Reference warranty section of Installation Manual for this configuration



Rinnai Equipment List

Rinnai Non-Condensing Water Heaters	1
-------------------------------------	---

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Rinnai	
Non-Condensing Tankless Single Unit Circulation	
SIZE A	SCALE NTS
DWG. NO. WH1-C	REV E
DATE 8/21/15	
SHEET 1 of 1	

4 3 2 1

**Non-Condensing Tankless
Two Unit Circulation**

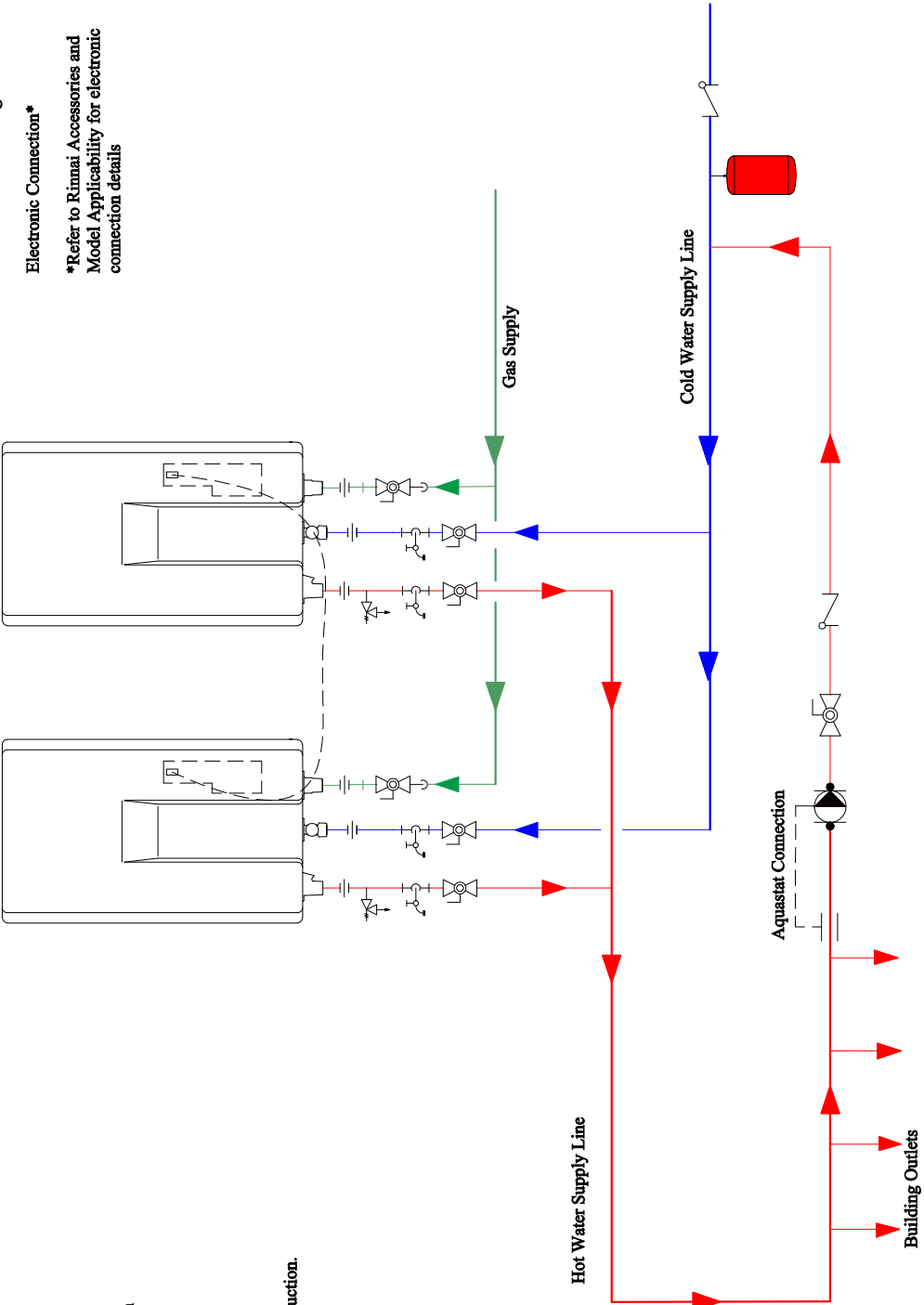
Note:

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer. Pump should be sized to maintain circulation loop temperature. The pump should be sized to overcome the pressure loss through the tankless water heater and supply and return plumbing in the circulation loop. Reference the section Pump Sizing for Circulation. Pump should be of bronze or stainless construction. Reference warranty section of Installation Manual for this configuration

Rinnai Equipment List

	QTY
Rinnai Non-Condensing Water Heaters	2
Electronic Connection*	

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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Tolerance
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X.XXX = ± 0.005

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Approved By: JS

Rinnai		Non-Condensing Tankless	Scale	DWG. No.	REV
		Two Unit Circulation	A NTS	WH2-C	E
DATE 8/21/15		SHEET 1 of 1			

4 3 2 1

4 | 3 | 2 | 1

**Non-Condensing Tankless
Three Unit Circulation**

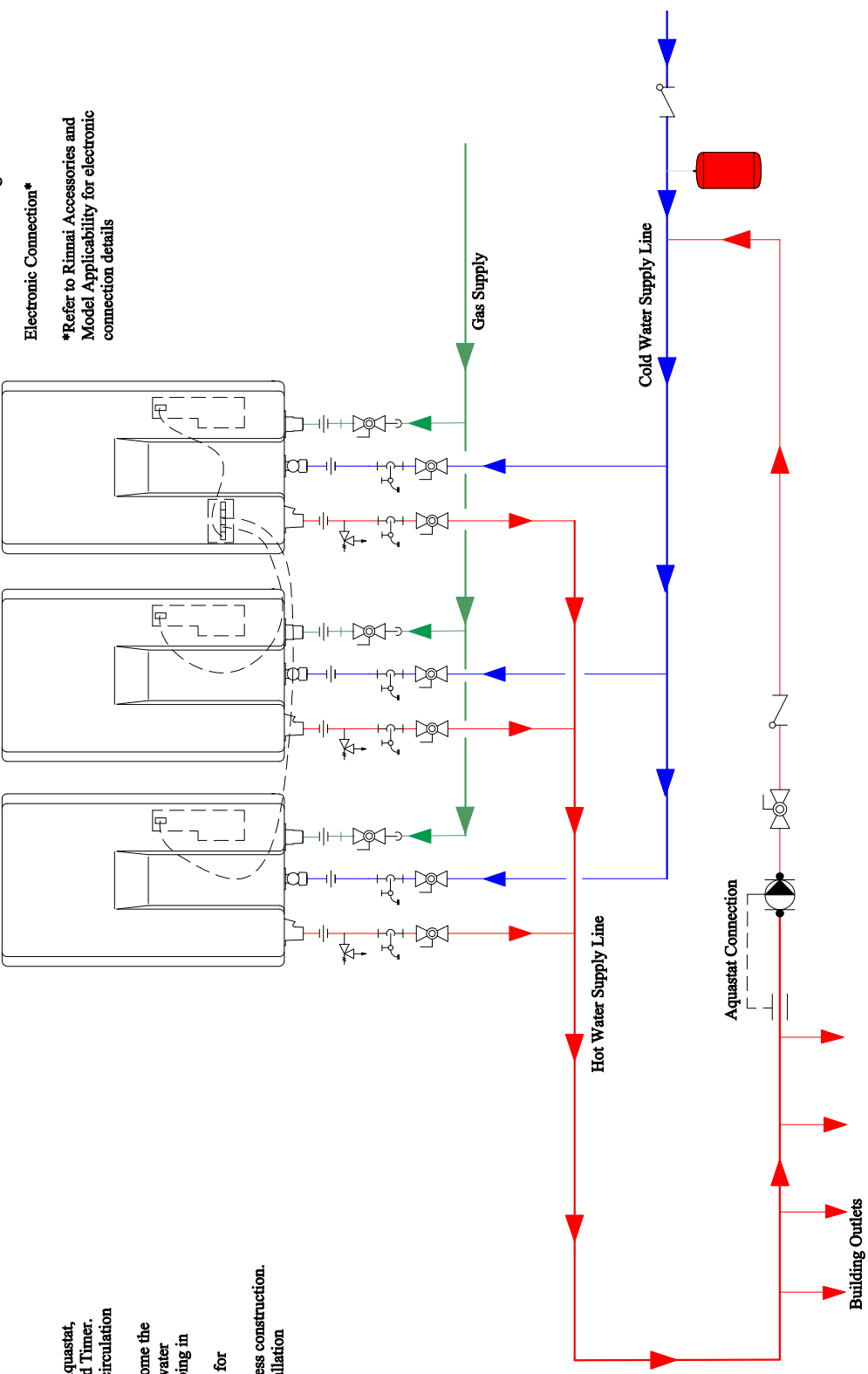
Note:

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.
 Pump should be sized to maintain circulation loop temperature.
 The pump should be sized to overcome the pressure loss through the tankless water heater and supply and return plumbing in the circulation loop.
 Reference the section Pump Sizing for Circulation.
 Pump should be of bronze or stainless construction.
 Reference warranty section of Installation Manual for this configuration

Rinnai Equipment List

Rinnai Non-Condensing Water Heaters	3
Electronic Connection*	

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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Rinnai	
Non-Condensing Tankless Three Unit Circulation	
SIZE: A	SCALE: NTS
DWG. NO.: WH3-C	REV: E
DATE: 8/21/15	SHEET: 1 of 1

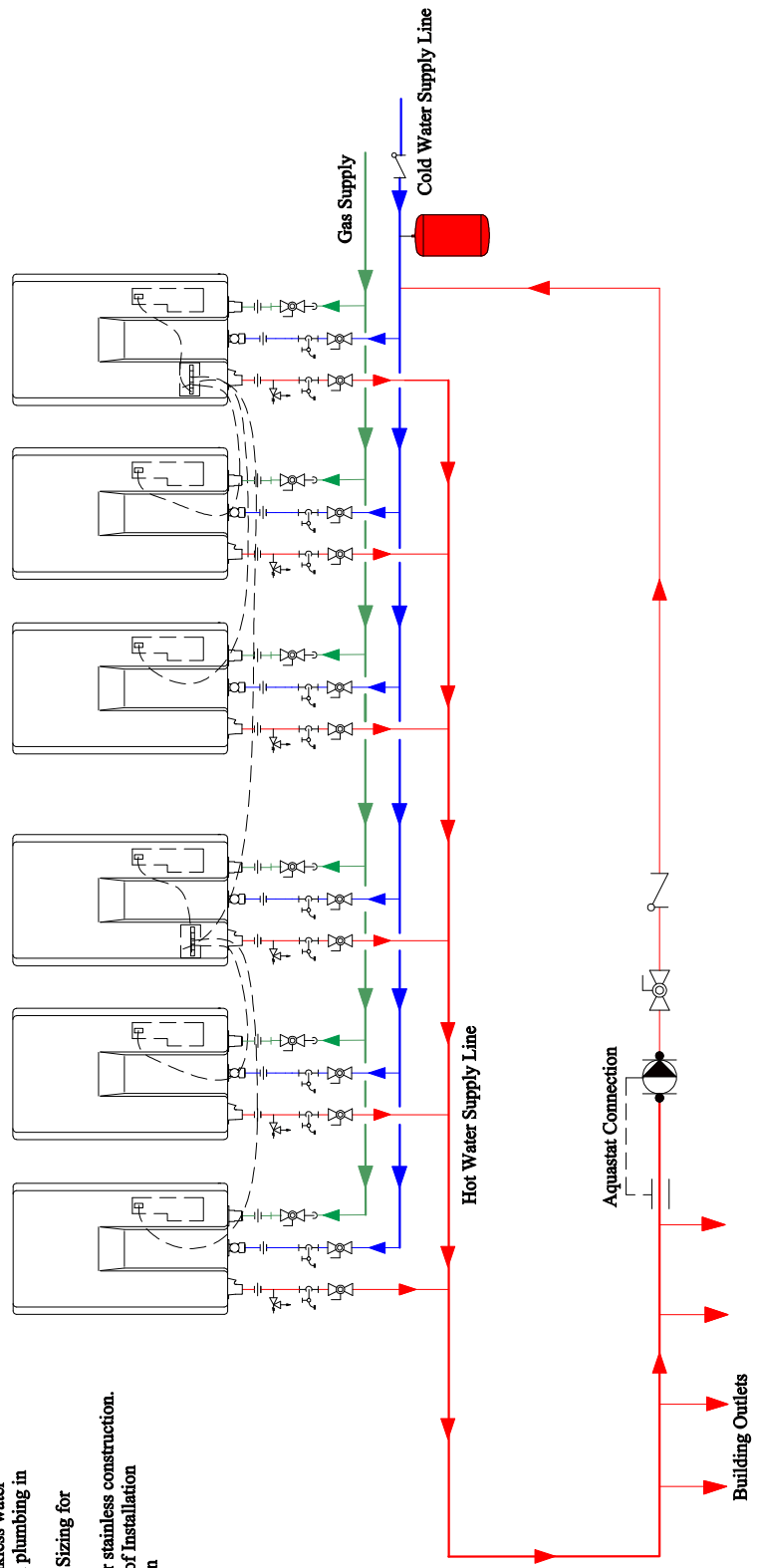
**Non-Condensing Tankless
Six Unit Circulation**

Rinnai Equipment List	QTY
Rinnai Non-Condensing Water Heaters	6
Electronic Connection*	

Note:

Pump should be controlled by an Aquastat, Timer or Combination Aquastat and Timer.
 Pump should be sized to maintain circulation loop temperature.
 The pump should be sized to overcome the pressure loss through the tankless water heater and supply and return plumbing in the circulation loop.
 Reference the section Pump Sizing for Circulation.
 Pump should be of bronze or stainless construction.
 Reference warranty section of Installation Manual for this configuration

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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 DATE: 8/21/15

Rinnai
 Non-Condensing Tankless
 Six Unit Circulation
 SIZE: A SCALE: NTS DWG. NO.: WH6-C REV: E
 DATE: 8/21/15 SHEET: 1 of 1

**Non-Condensing Tankless
Single Unit Freeze Protection**

Rinnai Equipment List	QTY
Rinnai Non-Condensing Water Heaters	1

Notice:

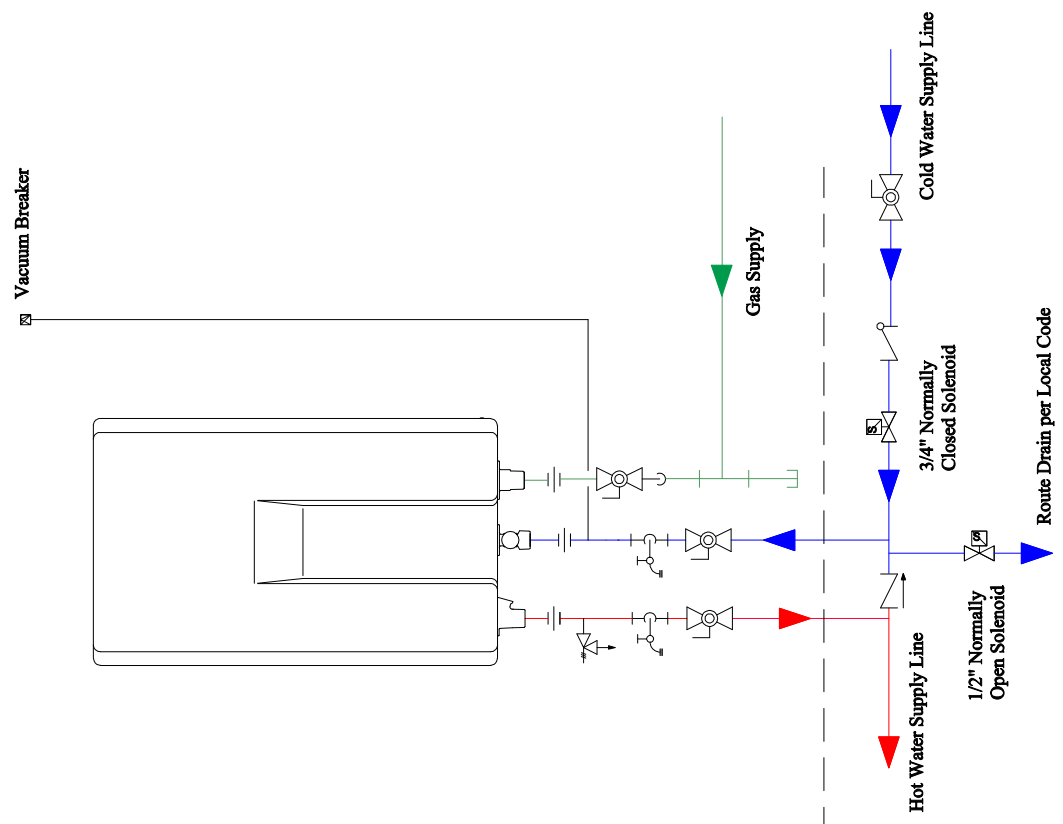
Warranty does not cover damage due to freezing. The unit may be drained manually. However, Rinnai highly recommends that drain down solenoid valves be installed that will automatically drain the unit if power is lost. Rinnai also recommends the installation of a surge protector with terminals that attaches to the PC board in the unit and allows the solenoid valves to operate if the unit is disabled due to an error code. When the electrical power to the water heater fails, the normally closed solenoid valve closes (stopping the flow of water into the heater) and the normally open solenoid valve opens (allowing the water heater and associated piping to drain. Ensure that you run the drain for the solenoids to the outside environment to prevent discharging water inside the building causing water damage.

NOTE:

Heat trace ALL water pipe and fittings located outside home (attic, crawl space) or building structure. (ALL water pipe and fittings shown above the dashed line in the drawing.)

NOTE:

ALL pipe and fittings shown below dashed line should be located inside home or building structure. The vacuum breaker line should be located inside the building structure.



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X.XXXX=±0.0005

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DATE: 8/21/15

Rinnai	
Non-Condensing Tankless Single Unit Freeze Protection	
SIZE A	SCALE NTS
DWG. NO. WH1-D	REV E
DATE 8/21/15 SHEET 1 of 1	

**Non-Condensing Tankless
Two Unit Freeze Protection**

Notice:

Warranty does not cover damage due to freezing. The unit may be drained manually. However, Rinnai highly recommends that drain down solenoid valves be installed that will automatically drain the unit if power is lost. Rinnai also recommends the installation of a surge protector with terminals that attaches to the PC board in the unit and allows the solenoid valves to operate if the unit is disabled due to an error code. When the electrical power to the water heater fails, the normally closed solenoid valve closes (stopping the flow of water into the heater) and the normally open solenoid valve opens (allowing the water heater and associated piping to drain. Ensure that you run the drain for the solenoids to the outside environment to prevent discharging water inside the building causing water damage.

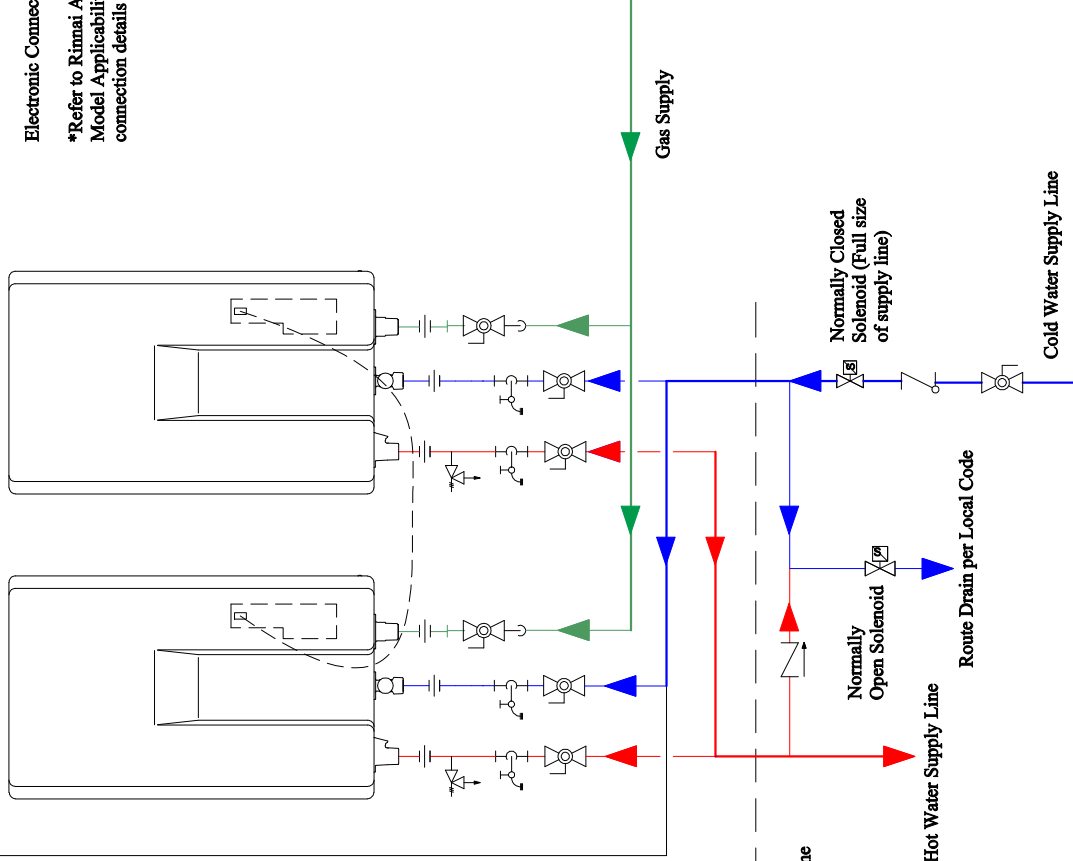
Rinnai Equipment List

Rinnai Non-Condensing Water Heaters 2

Electronic Connection*

*Refer to Rinnai Accessories and Model Applicability for electronic connection details

☒ Vacuum Breaker



NOTE:
Heat trace ALL water pipe and fittings located outside home (attic, crawlspace) or building structure. (ALL water pipe and fittings shown above the dashed line in the drawing.)

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Rinnai
Non-Condensing Tankless
Two Units Freeze Protection
SIZE A SCALE NTS DWG. NO. WH2-D
DATE 8/21/15 SHEET 1 of 1

**Non-Condensing Tankless
Three Unit Freeze Protection**

Notice:

Warranty does not cover damage due to freezing. The unit may be drained manually. However, Rinnai highly recommends that drain down solenoid valves be installed that will automatically drain the unit if power is lost. Rinnai also recommends the installation of a surge protector with terminals that attaches to the PC board in the unit and allows the solenoid valves to operate if the unit is disabled due to an error code. When the electrical power to the water heater fails, the normally closed solenoid valve closes (stopping the flow of water into the heater) and the normally open solenoid valve opens (allowing the water heater and associated piping to drain. Ensure that you run the drain for the solenoids to the outside environment to prevent discharging water inside the building causing water damage.)

NOTE:

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NOTE:

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Vacuum Breaker

Rinnai Equipment List

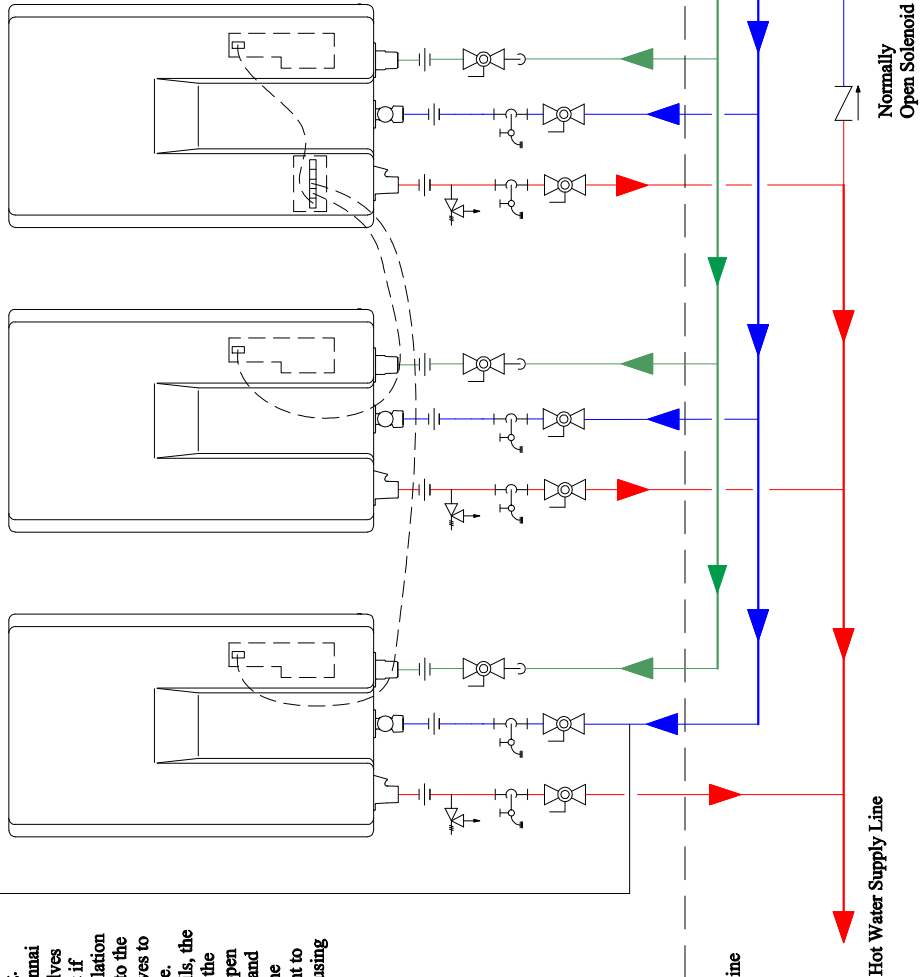
Rinnai Non-Condensing Water Heaters

QTY

3

Electronic Connection*

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



Route Drain per Local Code

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DATE: 8/21/15

Rinnai
Non-Condensing Tankless
Three Units Freeze Protection

SIZE: A
SCALE: NTS
DWG. NO.: WH3-D
REV: E
DATE: 8/21/15
SHEET: 1 of 1

**Non-Condensing Tankless
Six Unit Freeze Protection**

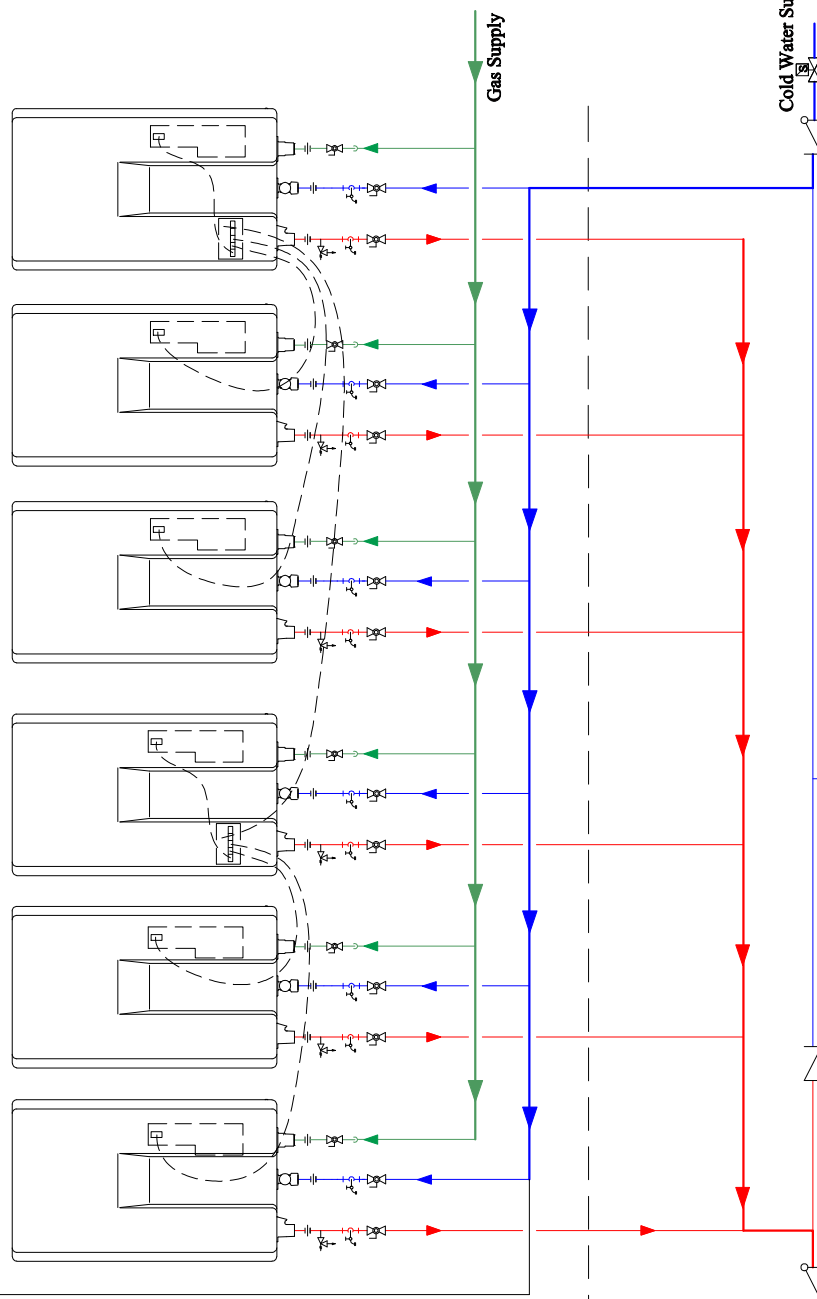
Rinnai Equipment List
Rinnai Non-Condensing Water Heaters
Electronic Connection*
QTY 6

Notice:

Warranty does not cover damage due to freezing. The unit may be drained manually. However, Rinnai highly recommends that drain down solenoid valves be installed that will automatically drain the unit if power is lost. Rinnai also recommends the installation of a surge protector with terminals that attaches to the PC board in the unit and allows the solenoid valves to operate if the unit is disabled due to an error code. When the electrical power to the water heater fails, the normally closed solenoid valve closes (stopping the flow of water into the heater) and the normally open solenoid valve opens (allowing the water heater and associated piping to drain. Ensure that you run the drain for the solenoids to the outside environment to prevent discharging water inside the building causing water damage.

Vacuum Breaker

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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Rinnai
Non-Condensing Tankless
Six Units Freeze Protection
SCALE: NTS
DATE: 8/21/15
DWG. NO.: WH6-D
REV: E
SHEET: 1 of 1

Rinnai Equipment List
Rinnai Non-Condensing Water Heaters 1

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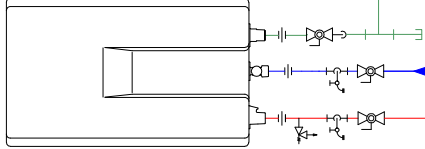
**Non-Condensing Tankless
 Single Unit with Backup Storage**

For this application:
 Do not use electronic manifold
 controls with storage tank
 applications

**Building Hot Water
 Supply Line**

**Set water heaters @ 20F
 above storage tank Aquastat**

Gas Supply



**Tank
 Bypass
 (optional)**

**Normally
 Closed
 Ball Valve**

Hot Water Supply Line

**Reference the section on
 Pump Sizing for Storage
 Tank Application.**

**Optional
 Tank Bypass**

Cold Water Supply Line

Pump / Aquastat Control Wire

**Building Hot Water
 Return Line
 (Optional)**

**Building
 Circulation
 Pump**

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SIZE	SCALE	DWG. NO.	REV
A	NTS	WH1-BC	E
DATE 8/21/15			SHEET 1 of 1

Rinnai
 Non-Condensing Tankless
 Single Unit with Backup Storage

Drawn By RM
 Approved By JS

Tolerance
 Fraction = ± 1/16"
 X.XX = ± 0.0030
 X.XXX = ± 0.0015
 X.XXXX = ± 0.0005

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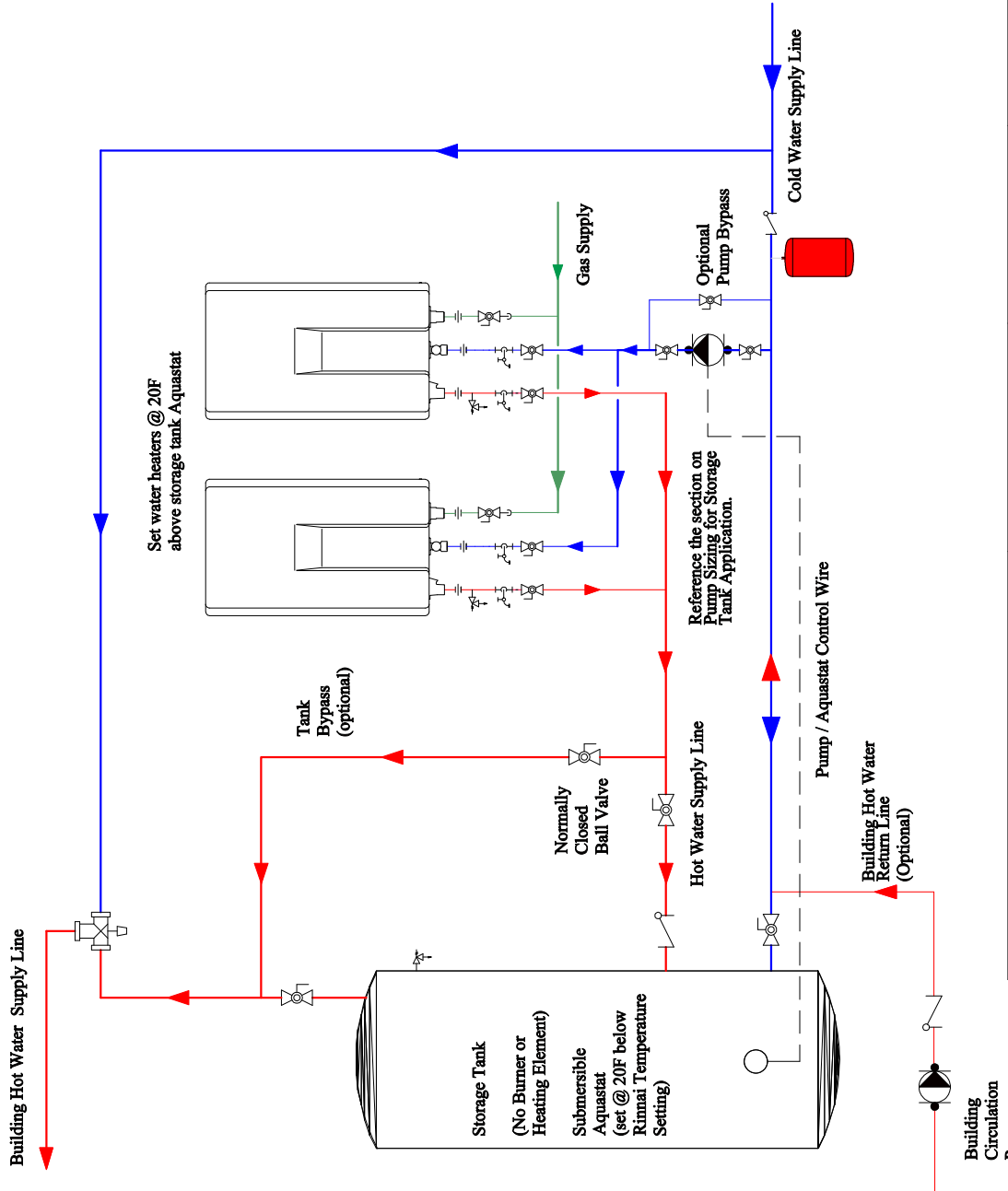
4

Non-Condensing Tankless
Two Units with Backup Storage

Rinnai Equipment List
Rinnai Non-Condensing Water Heaters 2

For this application:

Do not use manifold electronic controls with storage tank applications



Reference the section on Pump Sizing for Storage Tank Application.

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Tolerance
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X: ±0.030
X: ±0.015
X: ±0.005

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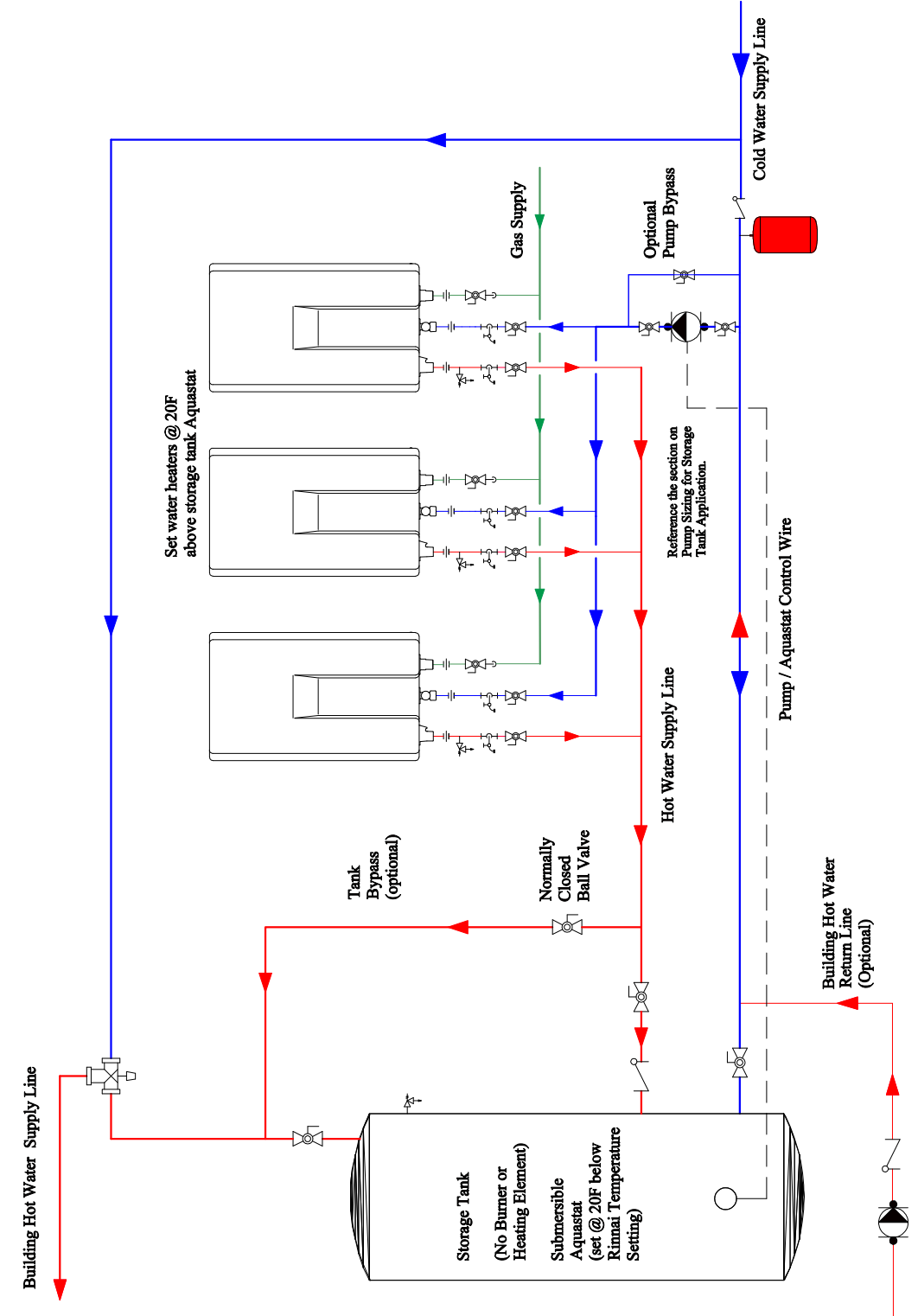
Drawn By: RM
Approved By: JS

Rinnai
Non-Condensing Tankless
Two Units with Backup Storage

SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: WH2-BC
REV: E
SHEET: 1 of 1

**Non-Condensing Tankless
 Three Units with Backup Storage**

For this application:
 Do not use manifold electronic
 controls with storage tank
 applications



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Tolerance
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 X.XX = ± 0.0030
 X.XXX = ± 0.0015
 X.XXXX = ± 0.0005

Drawn By: RM
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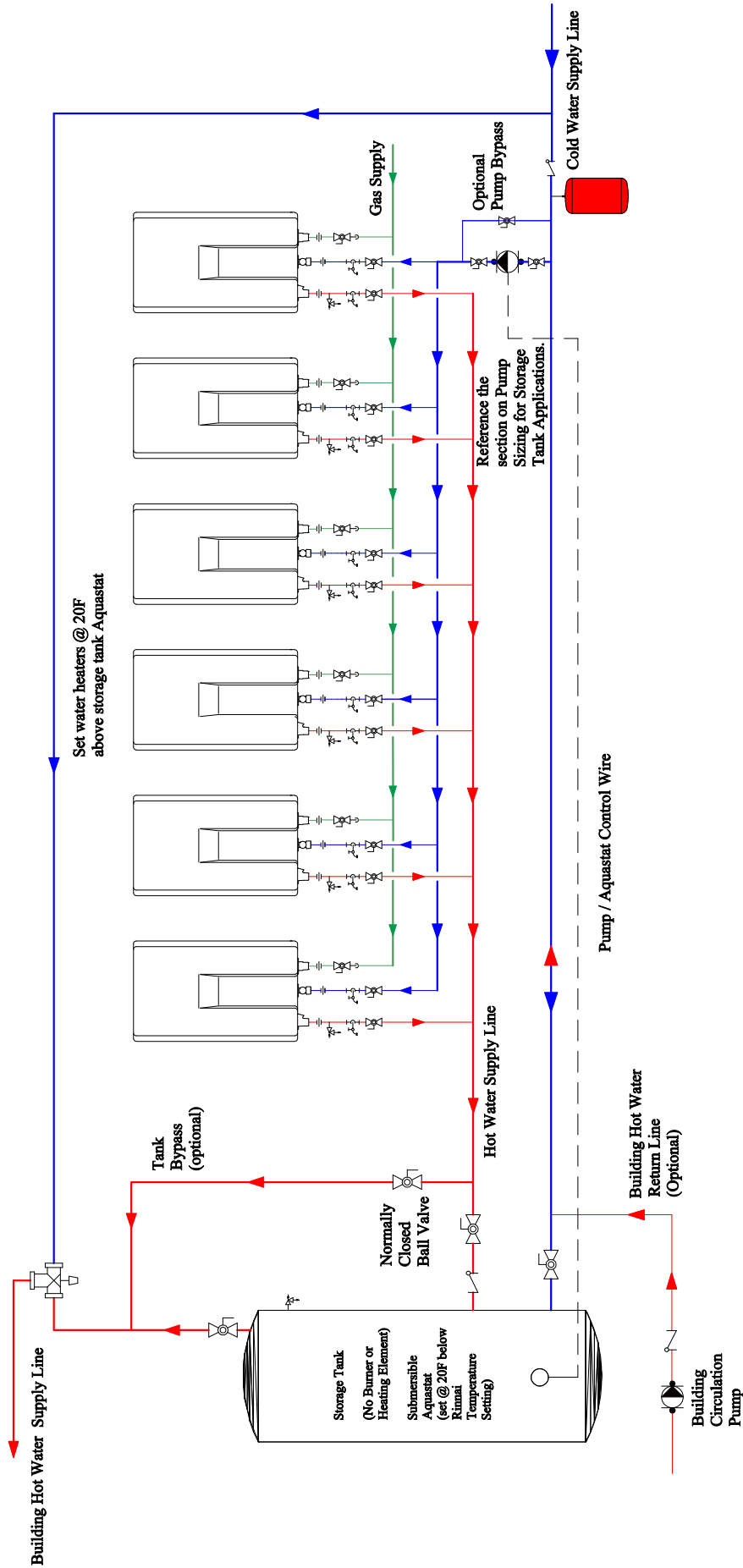
Rinnai
 Non-Condensing Tankless
 Three Units with Backup Storage

DATE: 8/21/15
 SHEET: 1 of 1

Non-Condensing Tankless
 Six Units with Backup Storage

For this application:

Do not use manifold electronic controls with storage tank applications



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Tolerance
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 X.XXX = ± 0.015
 X.XXXX = ± 0.005

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 Approved By: JS

Rinnai
 Non-Condensing Tankless
 Six Units with Backup Storage

SIZE: A
 SCALE: NTS
 DWG. NO.: WH6-BC
 REV: E

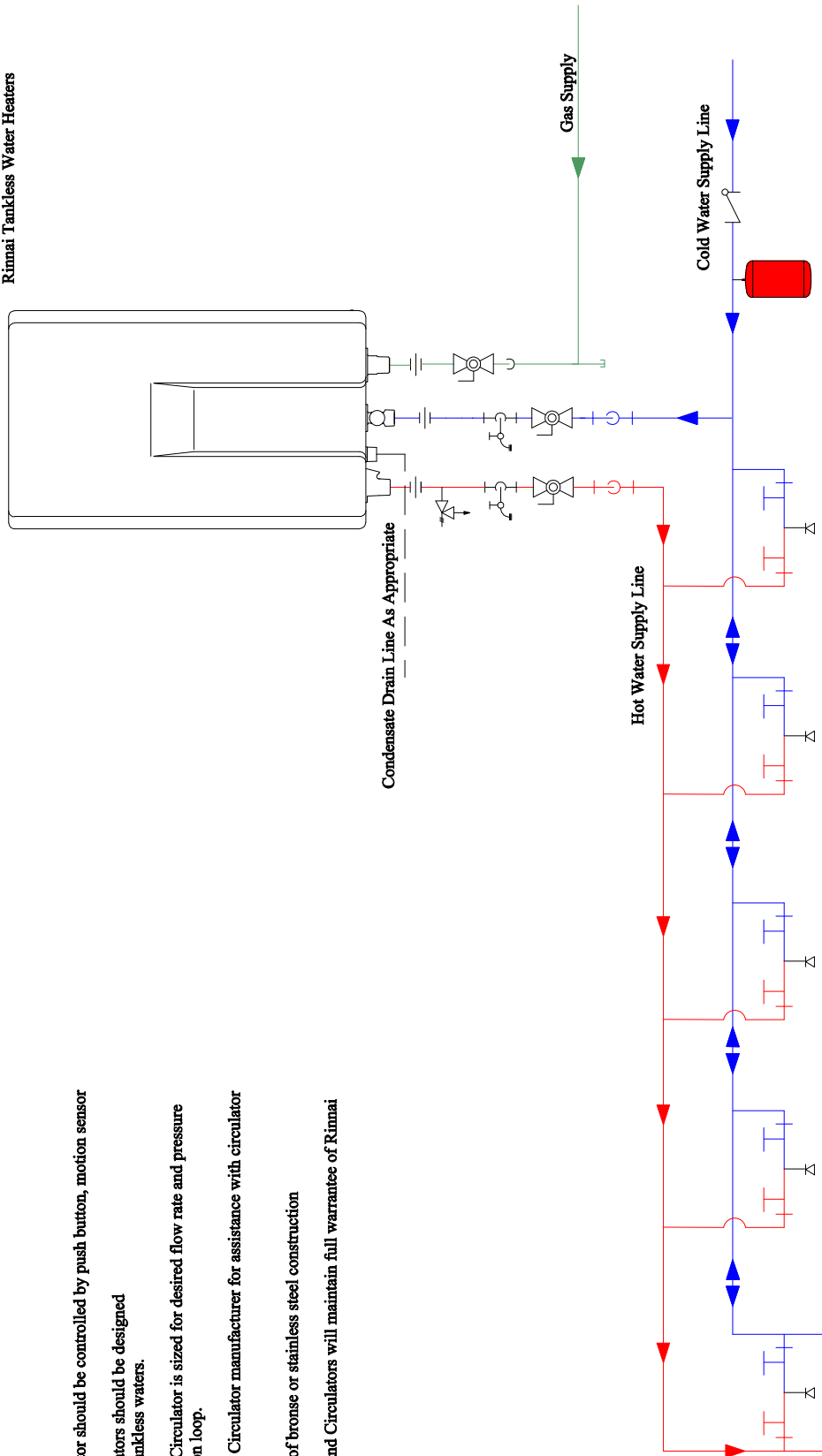
DATE: 8/21/15
 SHEET: 1 of 1

Rinnai Tankless Single Unit D'MAND Circulation

Rinnai Equipment List	QTY
Rinnai Tankless Water Heaters	1

Note:

- Demand Circulator should be controlled by push button, motion sensor or door contacts.
- Demand Circulators should be designed specifically for tankless waters.
- Ensure Demand Circulator is sized for desired flow rate and pressure drop of circulation loop.
- Contact Demand Circulator manufacturer for assistance with circulator sizing.
- Pump should be of bronze or stainless steel construction
- The use of Demand Circulators will maintain full warranty of Rinnai water heaters.



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1-800-621-9419

Tolerance
F: ±.16"
X: ±0.030
X: ±0.015
X: ±0.005

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Drawn By: RM
Approved By: JS

Rinnai
Rinnai Tankless
Single Unit D'MAND Circulation

SIZE: A
SCALE: NTS
DATE: 8/21/15

REV: E
DWG. NO.: WH1-CD
SHEET: 1 of 1

4 3 2 1

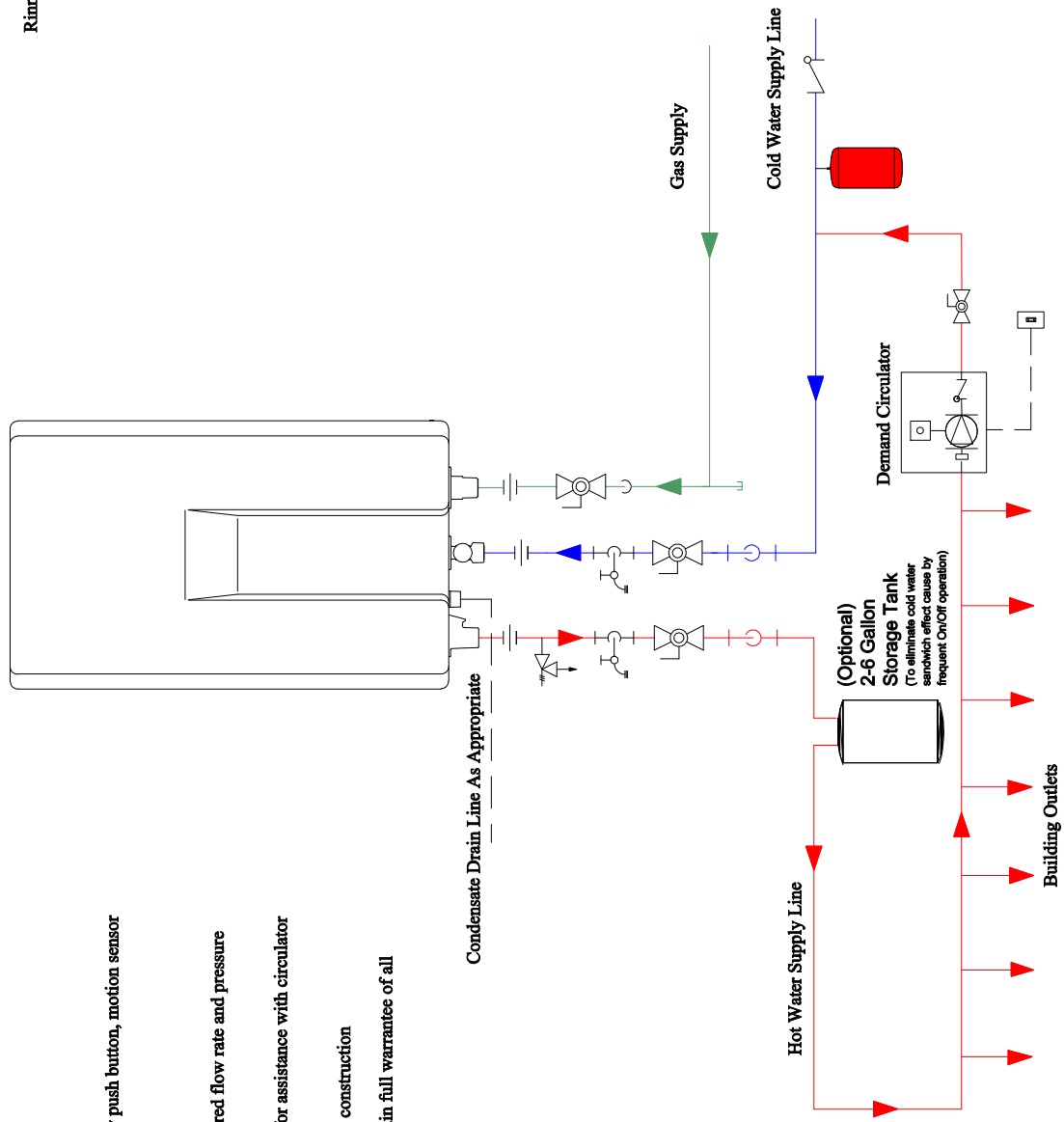
Rinnai Tankless Single Unit D'MAND Dedicated Return

Rinnai Equipment List
Rinnai Tankless Water Heaters

QTY
1

Note:

- Demand Circulator should be controlled by push button, motion sensor or door contacts.
- Demand Circulators should be designed specifically for tankless waters.
- Ensure Demand Circulator is sized for desired flow rate and pressure drop of circulation loop.
- Contact Demand Circulator manufacturer for assistance with circulator sizing.
- Pump should be of bronze or stainless steel construction
- The use of Demand Circulators will maintain full warranty of all Rinnai water heaters.



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Rinnai
Rinnai Tankless
Single Unit D'MAND Dedicated Return
SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: WH1-CD-O
REV: E
SHEET: 1 of 1

4 3 2 1

Rinnai Tankless One Unit Circ Logic

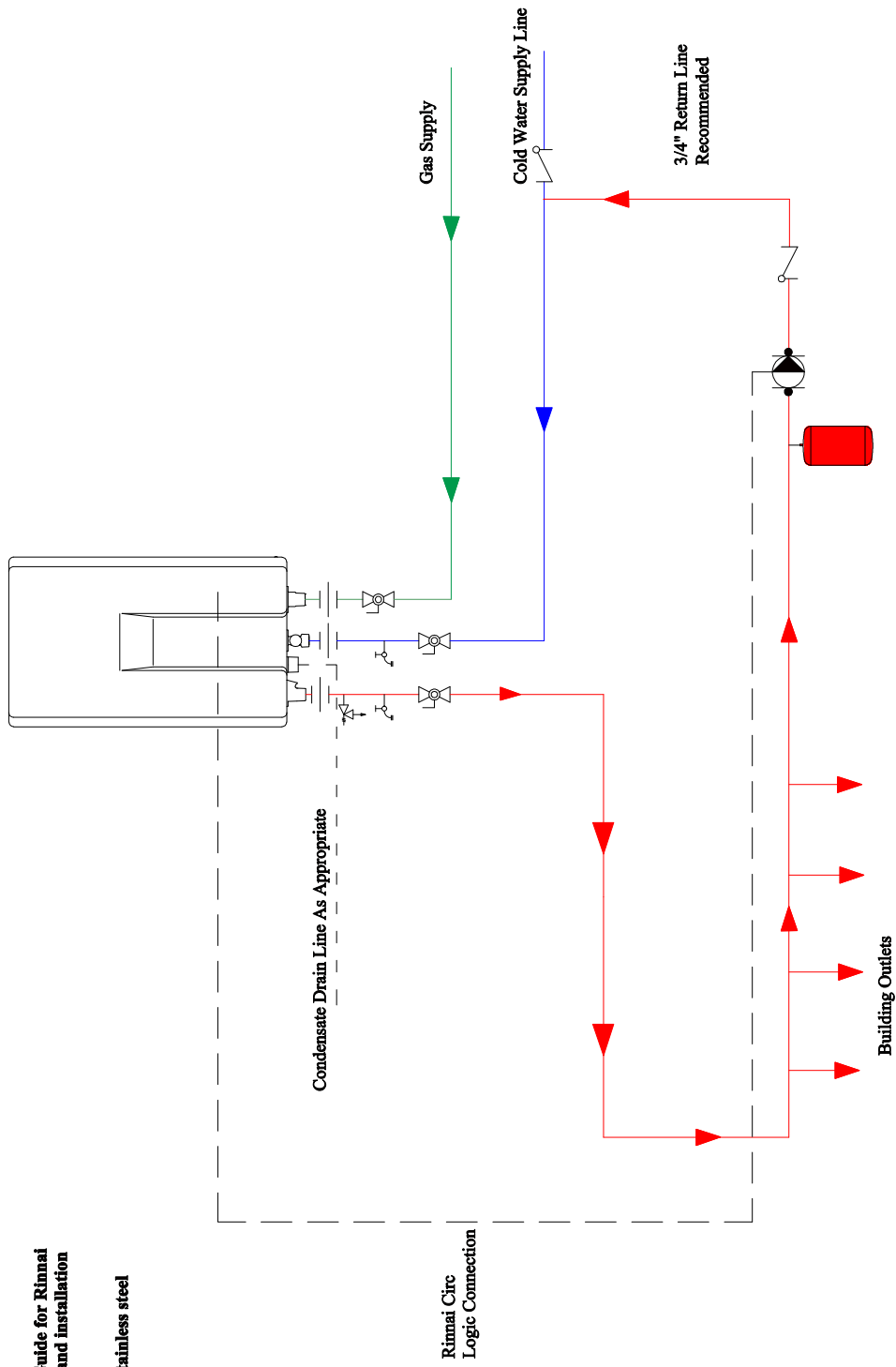
Rinnai Equipment List
Rinnai Tankless Water Heaters

QTY
1

For this application:

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Pump should be of bronze or stainless steel construction



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Tolerance
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X.XX = ± 0.015
X.XXX = ± 0.005

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Rinnai

Condensing Tankless One Unit Circ Logic

SIZE: A
SCALE: NTS
DATE: 8/21/15
DWG. NO.: WH1-CL
REV: E
SHEET: 1 of 1

4 3 2 1

Rinnai Tankless Two Units Circ Logic

Rinnai Equipment List

Rinnai Tankless Water Heaters	QTY	2
PVA Valves		1

For this application:

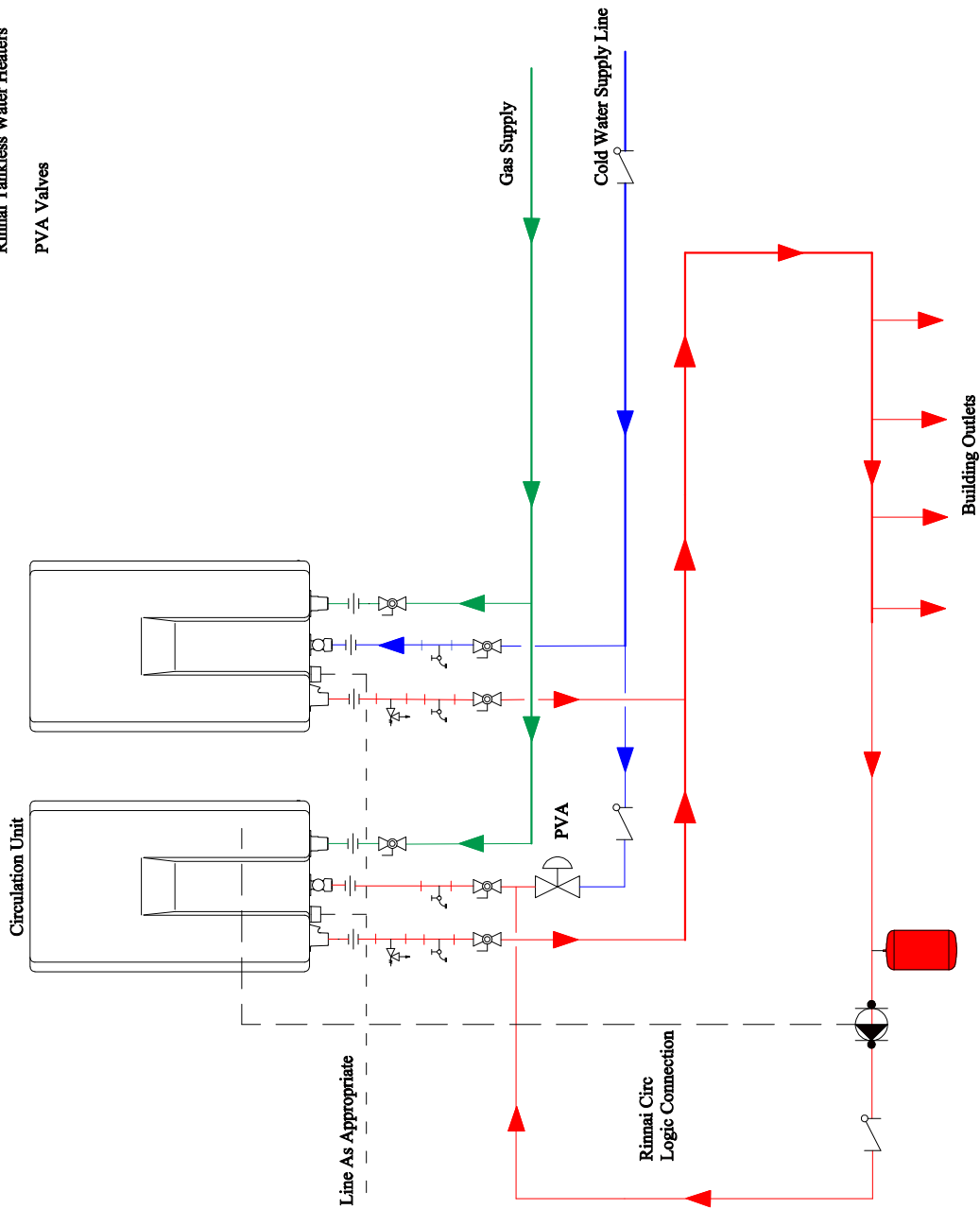
Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Pump should be of bronze or stainless steel construction

PVA to remain at factory default setting. Circulation unit should not be connected electronically to MSB Controller or EZ Connect Cord.

Condensate Drain Line As Appropriate

3/4" Return Line
Minimum Recommended



Building Outlets

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Rinnai	
Rinnai Tankless Two Units Circ Logic	
SIZE: A	SCALE: NTS
DWG. NO.: WH2-CL	REV: E
DATE: 8/21/15	SHEET: 1 of 1

4 3 2 1

Rinnai Tankless
Three Units Circ Logic

Rinnai Equipment List

Rinnai Tankless Water Heaters 3

PVA Valves 1

QTY

3

1

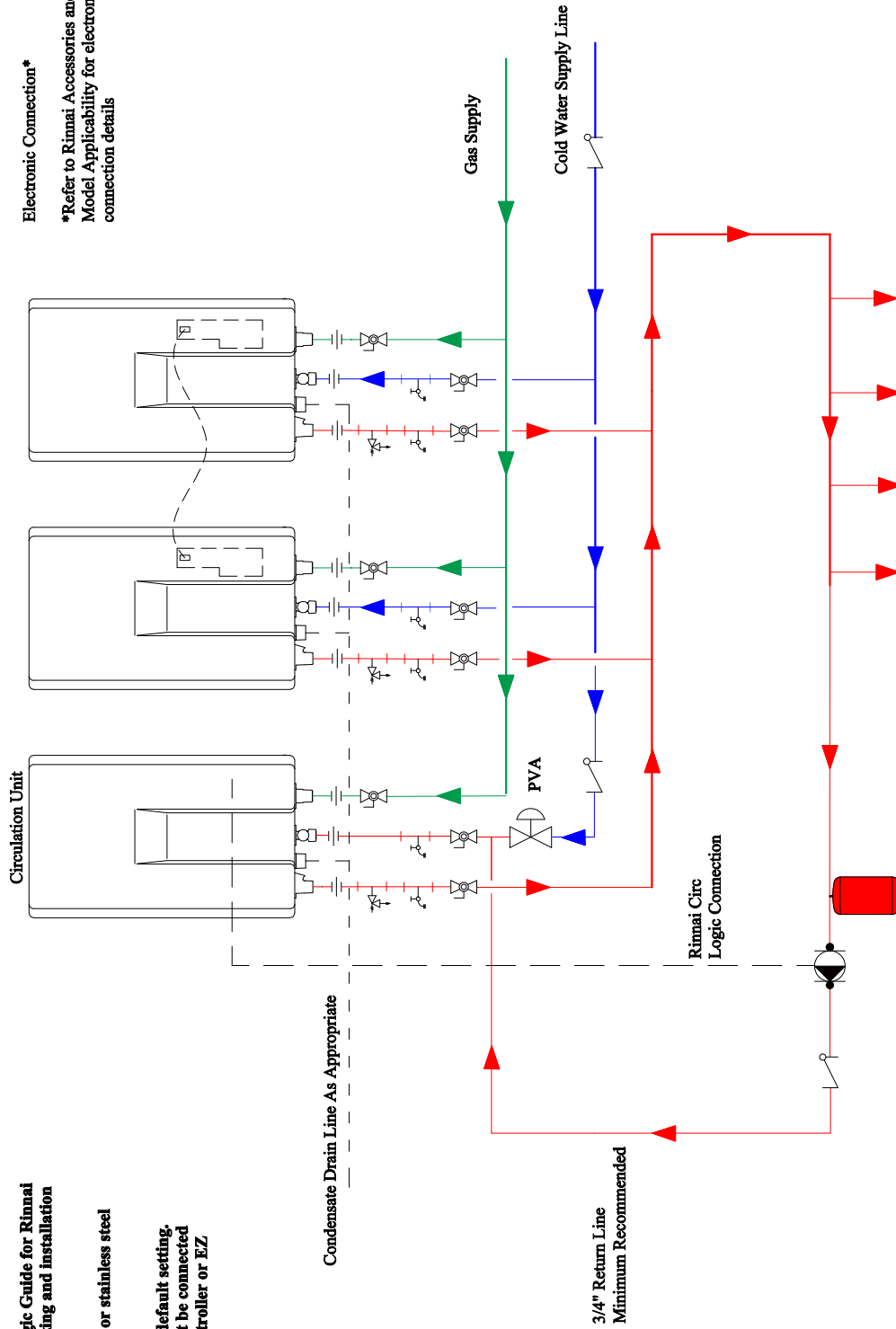
For this application:
Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Electronic Connection*

*Refer to Rinnai Accessories and Model Applicability for electronic connection details

Pump should be of bronze or stainless steel construction

PVA to remain at factory default setting. Circulation unit should not be connected electronically to MSB Controller or EZ Connect Cord.



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Tolerance
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X:XX=±0.015
X:XXX=±0.005

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Rinnai	
Rinnai Tankless Three Units Circ Logic	
SIZE A	SCALE NTS
DATE 8/21/15	DWG. NO. WH3-CL
SHEET 1 of 1	REV E

4 3 2 1

Rinnai Tankless
Four Units Circ Logic

Rinnai Equipment List
Rinnai Tankless Water Heaters 4
PVA Valves 1

For this application:

Reference Rinnai Circ-Logic Guide for Rinnai Circ-Logic Description, sizing and installation instructions.

Pump should be of bronze or stainless steel construction

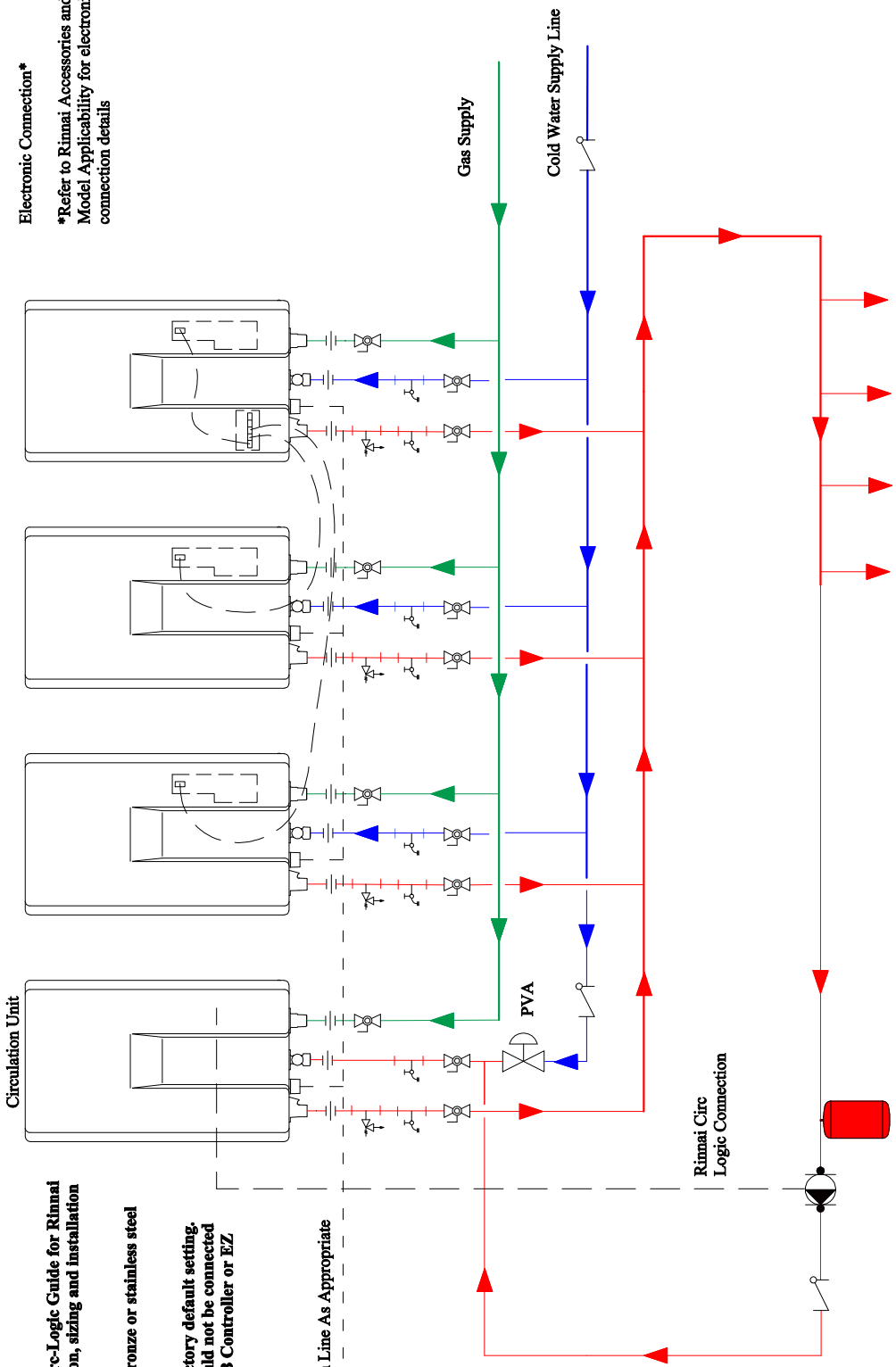
PVA to remain at factory default setting. Circulation unit should not be connected electronically to MSB Controller or EZ Connect Cord.

Condensate Drain Line As Appropriate

3/4" Return Line
Minimum Recommended

Electronic Connection*

*Refer to Rinnai Accessories and Model Applicability for electronic connection details



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X.XXXX=±0.0005

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Rinnai
Rinnai Tankless
Four Units Circ Logic
SIZE A SCALE NTS DWG NO. WH4-CL REV E
DATE 8/21/15 SHEET 1 of 1

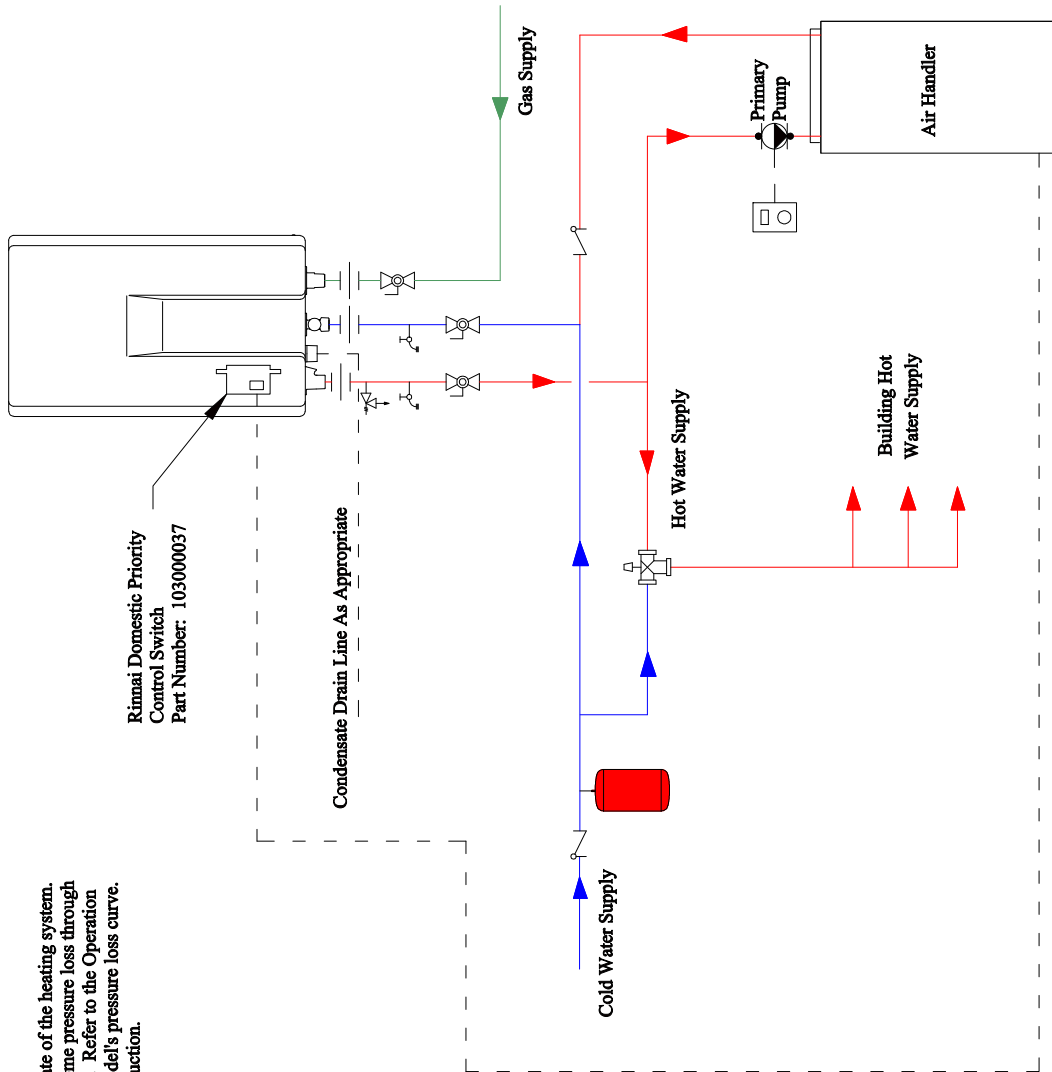
**Rinnai Tankless
Generic Air Handler**

Primary Pump
Pump must be sized for the flow rate of the heating system. Pump must also be sized to overcome pressure loss through the system at the desired flow rate. Refer to the Operation and Installation Manual for the model's pressure loss curve. To be of bronze or stainless construction.

Rinnai Equipment List

Rinnai Tankless Water Heaters

QTY 1



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Tolerance
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Rinnai
Rinnai Tankless
Generic Air Handler

SIZE: A
SCALE: NTS
DATE: 8/21/15

DWG. NO.: WH1-AH
SHEET: 1 of 1

Rinnai Tankless Hydronic Heating

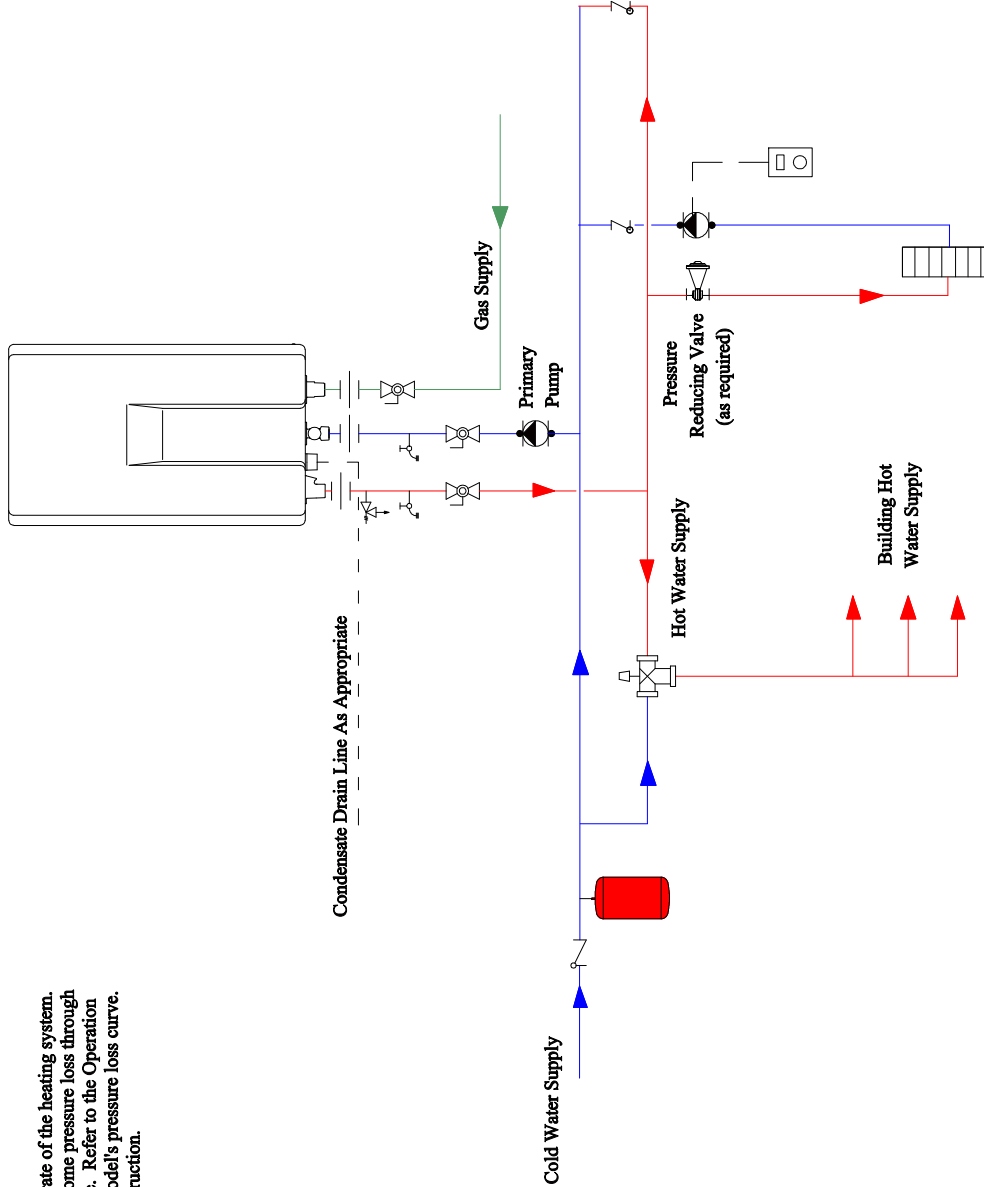
Primary Pump
 Pump must be sized for the flow rate of the heating system. Pump must also be sized to overcome pressure loss through the system at the desired flow rate. Refer to the Operation and Installation Manual for the model's pressure loss curve. To be of bronze or stainless construction.

Rinnai Equipment List

Rinnai Tankless Water Heaters

QTY

1



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Tolerance
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 X: ±0.015
 X: ±0.015

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Rinnai
 Rinnai Tankless Hydronic Heating

SIZE: A
 SCALE: NTS
 DATE: 8/21/15

DWG. NO.: WH1-SH
 SHEET: 1 of 1

1

2

3

4

Rinnai Tankless Hydronic Heating via Heat Exchanger

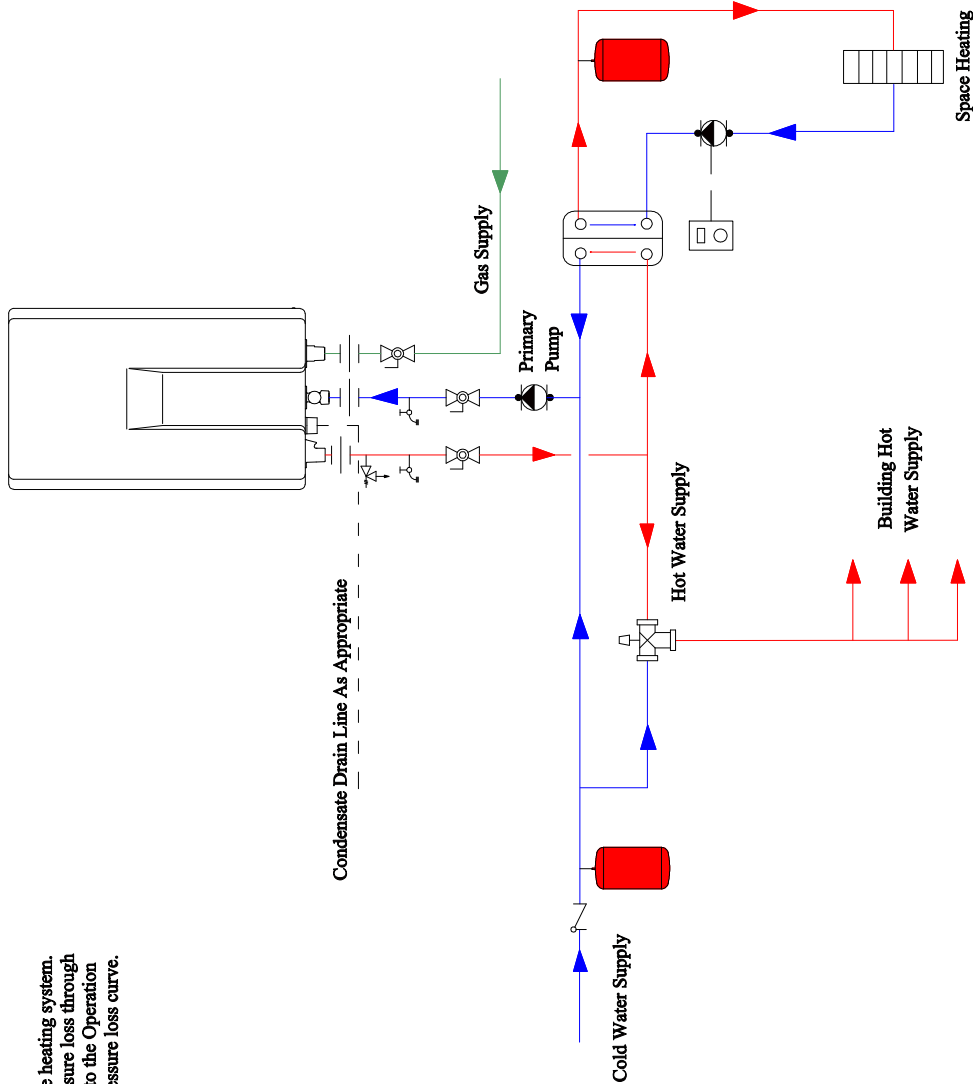
Primary Pump
Pump must be sized for the flow rate of the heating system. Pump must also be sized to overcome pressure loss through the system at the desired flow rate. Refer to the Operation and Installation Manual for the model's pressure loss curve. To be of bronze or stainless construction.

Rinnai Equipment List

Rinnai Tankless Water Heaters

QTY

1



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Tolerance
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X.XXX: ± 0.005

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Rinnai
Rinnai Tankless Hydronic Heating via Heat Exchanger

SIZE: A
SCALE: NTS
DATE: 8/21/15

DWG. NO.: WH1-HX
SHEET: 1 of 1

1

2

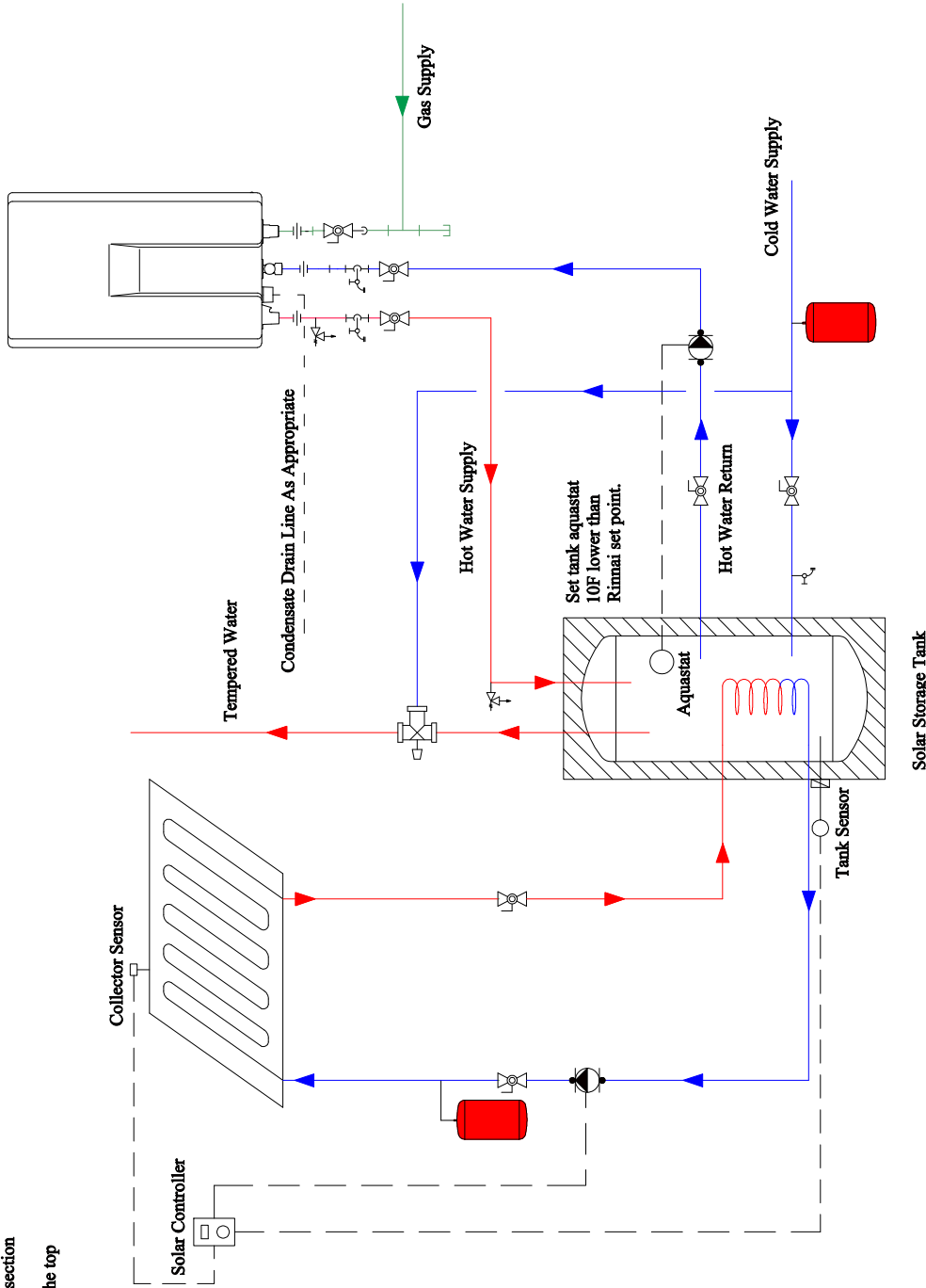
3

4

Rinnai Tankless Solar Backup Option 1

Rinnai Equipment List
Rinnai Tankless Water Heaters 1

- Notes:
1. Ensure tank aquastat is in top 1/3 section of the tank.
 2. Ensure the hot water return is in the top 1/2 section of the tank.



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Tolerance
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X.XX = ± 0.015
X.XXX = ± 0.005

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Rinnai
Rinnai Tankless Solar Backup Option 1

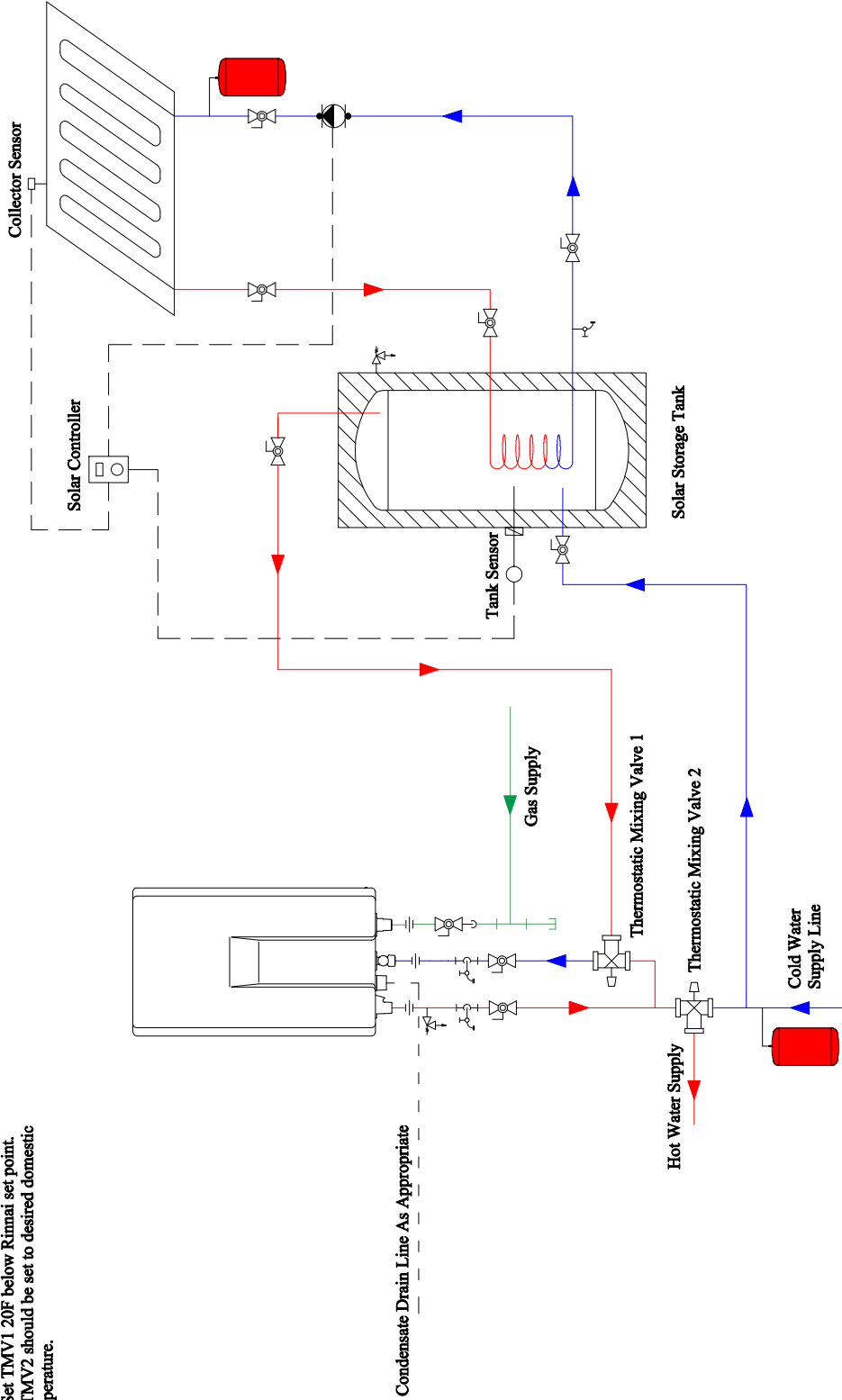
SIZE: A
SCALE: NTS
DATE: 8/21/15

REV: E
DWG. NO.: WH1-S-1
SHEET: 1 of 1

Rinnai Tankless Solar Backup Option 2

Rinnai Tankless Solar Backup Option 2

- Notes:**
1. Ensure TMV1 check valves are removed. (This will be the diverter valve)
 2. Set TMV1 20F below Rinnai set point.
 3. TMV2 should be set to desired domestic temperature.



Rinnai Tankless Solar Backup Option 2

Rinnai Tankless Water Heaters

QTY 1

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4 3 2 1

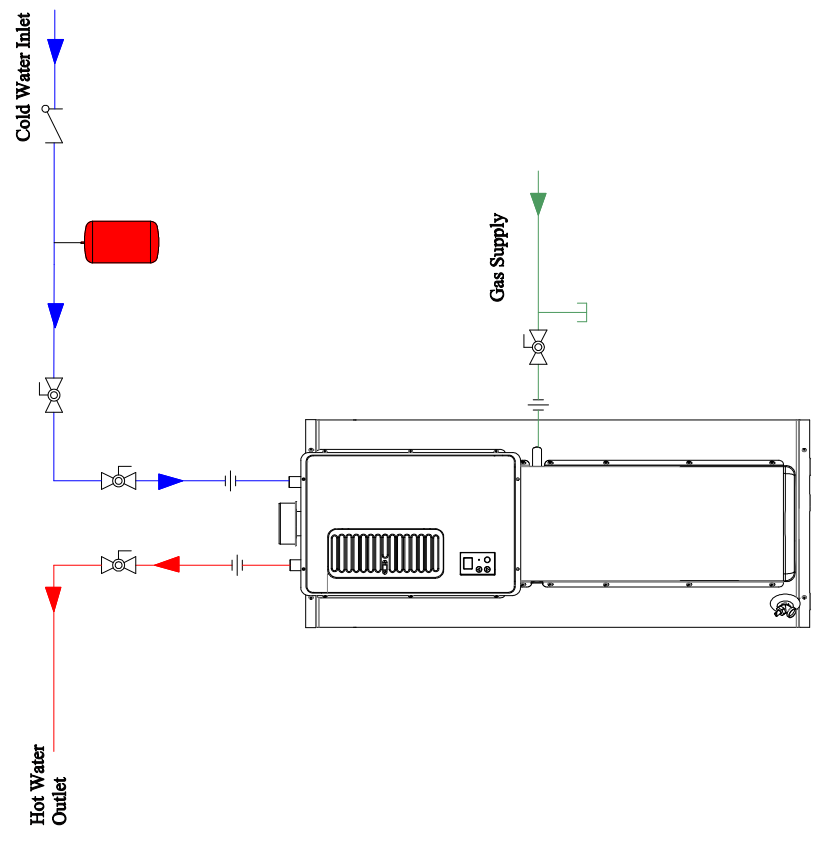
Hybrid Tank-Tankless
1 Unit System

Rinnai Equipment List
RH180

QTY
1

Note:

Installation must conform to applicable code and all requirements listed in the installation manual. Balancing valves, equivalent piping, pressure gages, and temperature gages are to be used as necessary to ensure proper flow between units.



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Tolerance
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		Hybrid Tank-Tankless 1 Unit System	
		DATE 8/21/15	SHEET 1 of 1
SIZE A	SCALE NTS	DWG. NO. HTT1	REV E

4 3 2 1

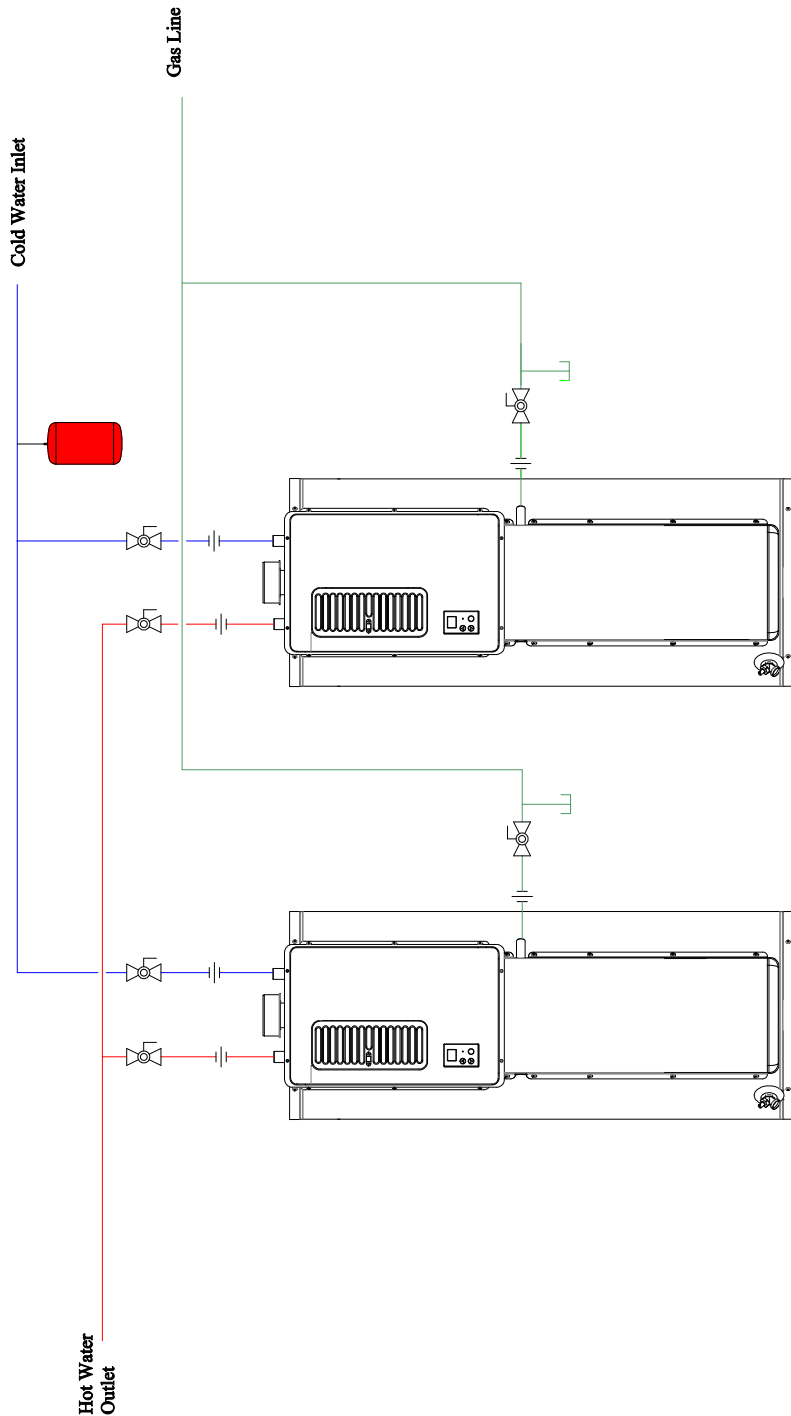
Hybrid Tank-Tankless
2 Unit System

Rinnai Equipment List
RH180

QTY
2

Note:

Installation must conform to applicable code and all requirements listed in the installation manual. Balancing valves, equivalent piping, pressure gages, and temperature gages are to be used as necessary to ensure proper flow between units.



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X:XXX=±0.015
X:XXXX=±0.005

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Rinnai
Tank-Tankless
2 Unit System

SIZE	SCALE	DWG. NO.	REV
A	NTS	HIT2	E

DATE 8/21/15 SHEET 1 of 1

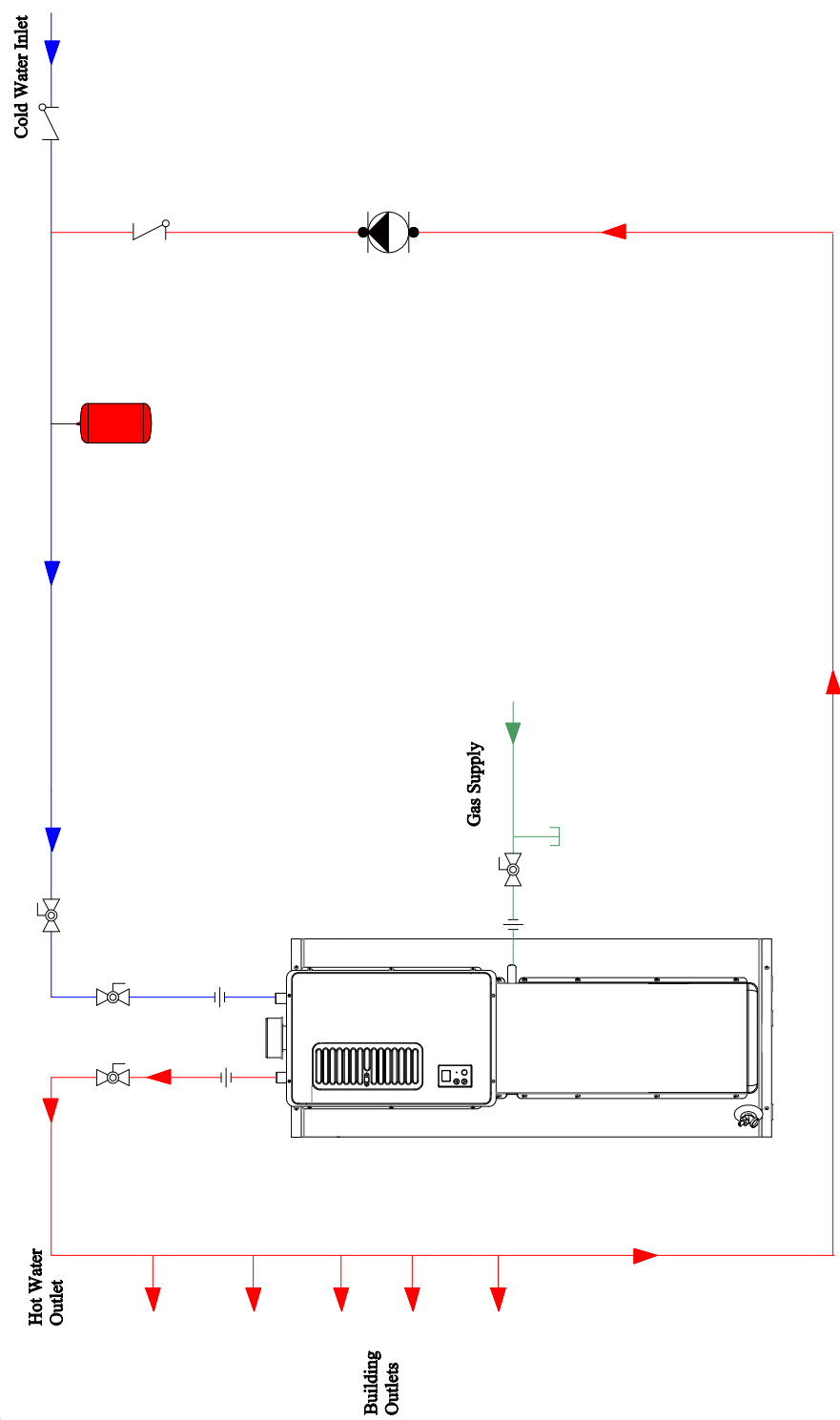
4 3 2 1

Rinnai Equipment List	QTY
RH180	1

Hybrid Tank-Tankless
1 Unit System with Circulation

Note:

Installation must conform to applicable code and all requirements listed in the installation manual. Balancing valves, equivalent piping, pressure gages, and temperature gages are to be used as necessary to ensure proper flow between units.



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Tolerance
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Approved By: JS

Rinnai	
Tank-Tankless 1 Unit System with Circulation	
SIZE A	SCALE NTS
DWG. NO. HTT1-C	REV E
DATE 8/21/15	SHEET 1 of 1

4 3 2 1

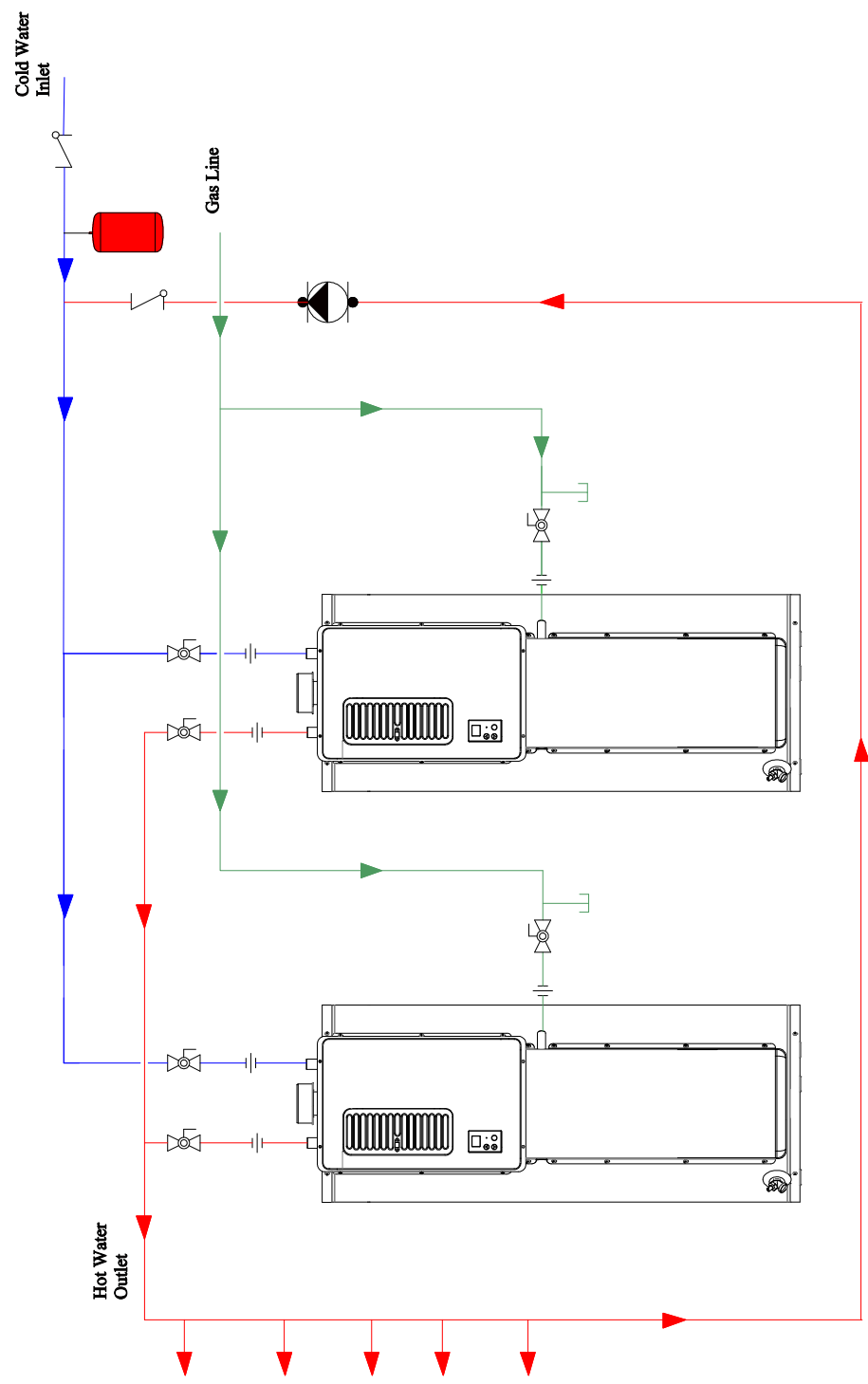
4 3 2 1

Rinnai Equipment List	QTY
RH180	2

**Hybrid Tank-Tankless
2 Unit System with Circulation**

Note:

Installation must conform to applicable code and all requirements listed in the installation manual. Balancing valves, equivalent piping, pressure gages, and temperature gages are to be used as necessary to ensure proper flow between units.



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Tolerance
F: ±0.030 = ±1/32"
X: ±0.015
X: ±0.005

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Drawn By: RM
Approved By: JS

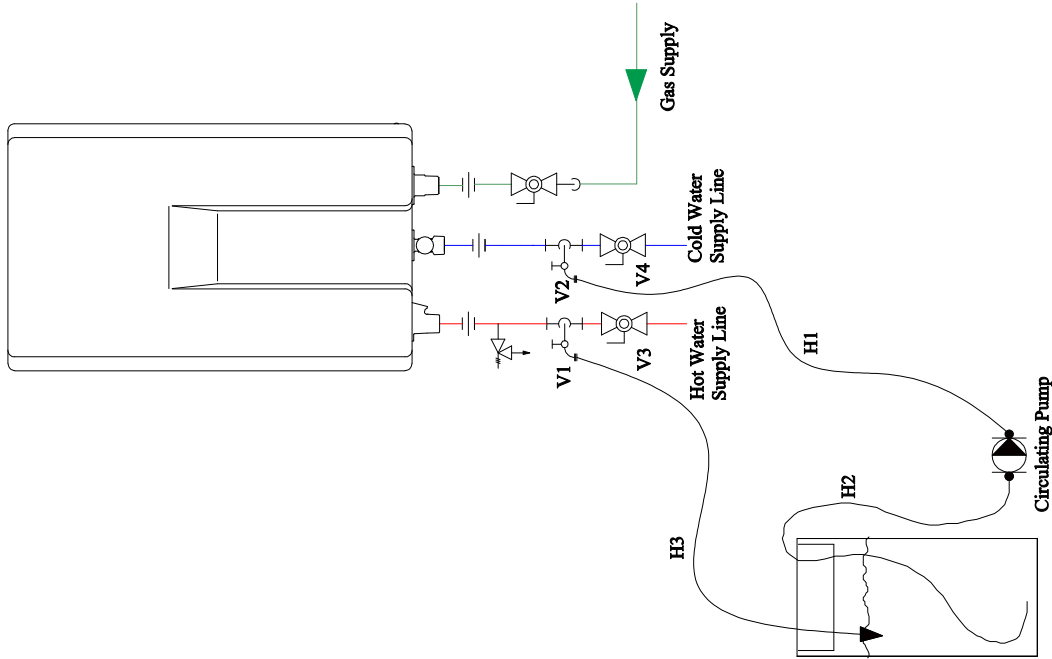
Rinnai	
Hybrid Tank-Tankless 2 Unit System with Circulation	
SIZE: A	SCALE: NTS
DATE: 8/21/15	DWG. NO.: HIT2-C
SHEET: 1 of 1	REV: E

4 3 2 1

Rinnai Tankless
Single Unit Flush Procedure

Flush Procedure

1. Disconnect electrical power to the water heater.
2. Close the shutoff valves on both the hot water heater and the cold water lines (V3 and V4).
3. Connect pump outlet hose (H1) to the cold water line at service valve V2.
4. Connect drain hose (H3) to service valve V1.
5. Pour approximately 4 gallons of virgin, food grade, white vinegar or citric acid into pail.
6. Place the drain hose (H3) and the hose (H2) to the pump inlet into the cleaning solution.
7. Open both service valves (V1 and V2) on the hot water and cold water lines.
8. Operate the pump and allow the cleaning solution to circulate through the water heater for at least 45 minutes.
9. Turn off the pump.
10. Rinse the cleaning solution from the water heater by:
 - a. Remove the free end of the drain hose (H3) from the pail.
 - b. Close service valve, V2, and open shutoff valve, V4. Do not open shutoff valve V3.
 - c. Allow water to flow through the water heater for 5 minutes.
 - d. Close service valve, V1, and open shutoff valve, V3.
11. Disconnect all hoses.
12. remove the in-line filter at the cold water inlet and clean out any residue. Place filter back into the unit.
13. Restore electrical power to the water heater.



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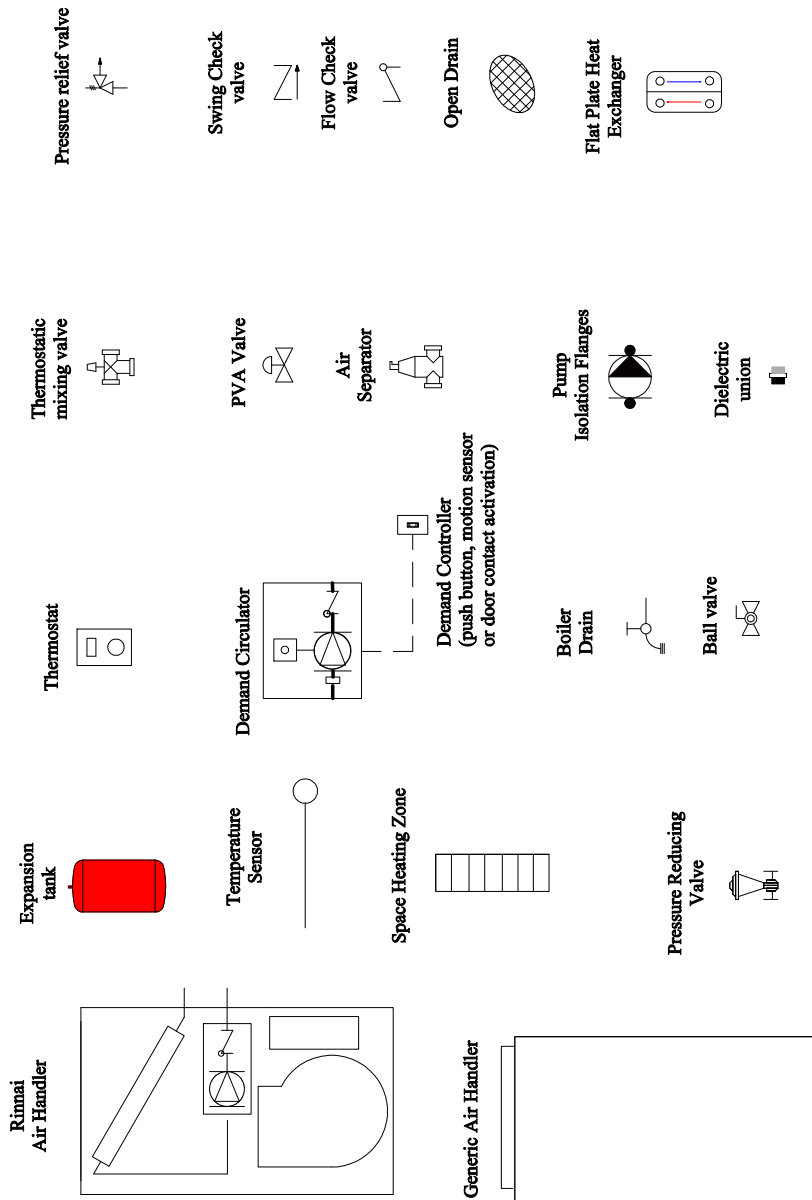
Drawn By RM

Approved By JS

Rinnai
Rinnai Tankless
Single Unit Flush Procedure

SIZE A SCALE NTS DWG. NO. WH1-F REV E
DATE 8/21/15 SHEET 1 of 1

**Tankless Water Heaters
LEGEND**



This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering project drawings. This drawing is not intended to describe a complete system. It is up to the contractor or engineer to determine the necessary components and configuration of the particular system to be installed. The drawing does not imply compliance with local building code requirements. It is the responsibility of the engineer or contractor to ensure that the installation is in accordance with all local building codes. Confer with local building officials before installation.

Rinnai America Corporation
103 International Drive
Peachtree City, GA 30269
1-800-621-9419

Tolerance
FRACTION = ± 1/16"
X.X = ± 0.030
X.XX = ± 0.015
X.XXX = ± 0.005

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Drawn By: RM
Approved By: JS

Rinnai Tankless Water Heaters LEGEND		SCALE	DWG. NO.	REV
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DATE	SHEET		1 of 1	
8/13/15	13		1	

A tradition of

TRUE RELIABILITY.

For nearly 100 years, we at Rinnai have been fiercely committed to delivering nothing less than a superior experience at every touch point.

Beyond manufacturing the highest quality products, our people stand behind all that we make—before, during and long after installation. From the 24/7/365 technical support for professionals, to our national network of independent installers for homeowners, to on-staff engineers who can assist with choosing the right products and sizes—we're inspiring confidence right along with the comfort our solutions provide.



Learn more about Rinnai high-performance Tankless Water Heaters, Hybrid Tank-Tankless Water Heaters, Boilers, Vent-Free Fan Convectors and Direct Vent Wall Furnaces at www.rinnai.us

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