

Rinnai®

EXPERIENCE OUR INNOVATION™

Boiler Applications Drawings



80000026 Rev D

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Rinnai is continually updating and improving products; therefore, drawings and specifications are subject to change without prior notice. Local, state, provincial and federal codes must be adhered to prior to installation.

Information

Training

Before installing the Rinnai Boiler, Rinnai recommends that the installer attend Installation and Service training classes. For further information on boiler programming and settings please contact Rinnai.

Low Limit Switch

When using a boiler and an air handler together it is advisable to use a low limit switch to prevent the air handler fan from energizing before the water temperature has increased sufficiently to ensure warm air delivery. A low limit switch which closes at 130°F to supply power to the fan and then opens again at 120°F to disconnect power from the fan should be selected. The low limit switch should be selected with a minimum amp rating sufficient to safely operate with the air handler. Refer to the table below for air handler model and amp rating information. This will ensure that the air handler will deliver comfortable air temperatures at all times.

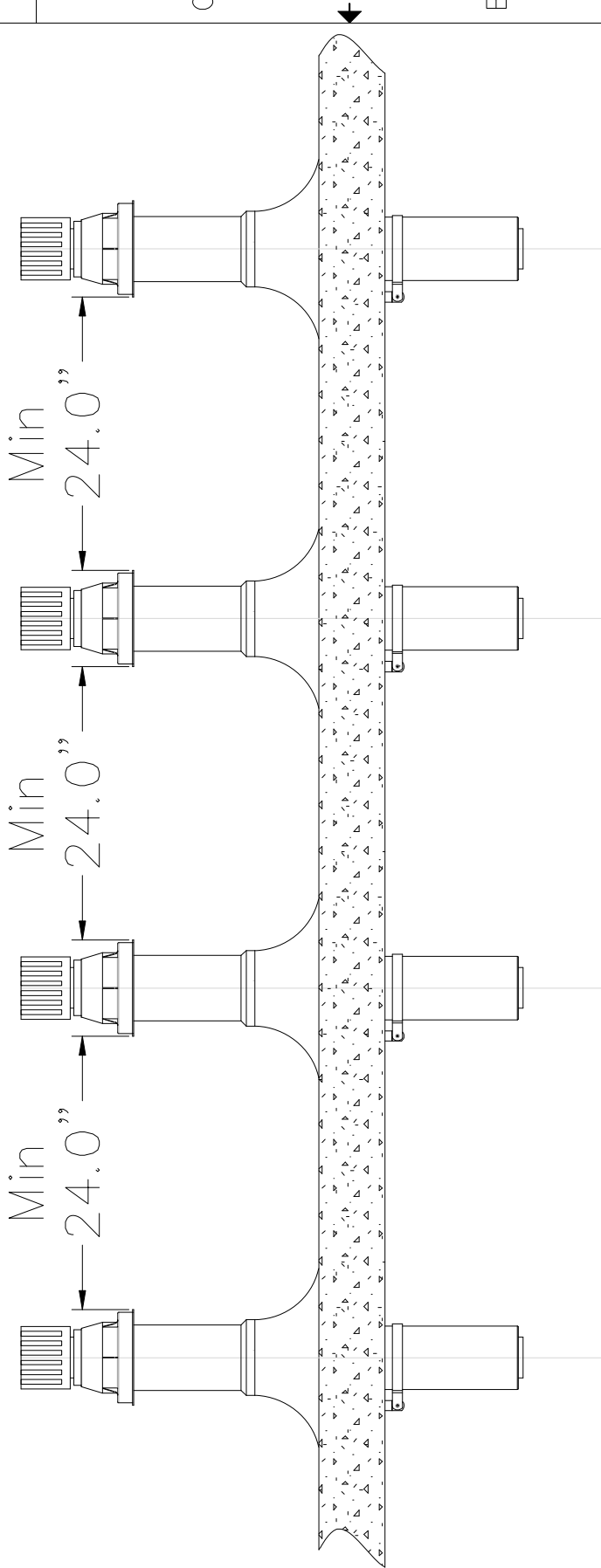
If a low limit switch is not used then the air handler may deliver cool air for a period of time until the boiler water temperature achieves its set point. The amount of time the boiler takes to achieve the set point can be changed by altering the gradient curve in the boiler. The gradient curve of the boiler parameter 14 can be adjusted 1°F to 28°F per minute. If the heating system is comprised of multiple types of heat emitters this curve should be left near the factory settings that are selected with parameter 2 for the highest temperature type of heat emitter in the system. Increasing the gradient to the maximum will decrease the overall efficiency of the boiler and the system and lead to shorter run times. When the boiler is being used with a system that has both radiant heat and an air handler it is highly recommend that the gradient not be increased to prevent short cycling of the boiler.

Air Handler Model	Low Limit Switch Minimum Rating (Amps)
AHB45	7
AHB60	7
AHB75	9
AHB90	12

Dirt Trap

A dirt trap is a device that is used in a closed loop hydronic system to separate out small particles of dirt, sand, solder, rust, and any other impurity that may be circulating through the system. The dirt trap removes these particles in much the same manner that air is separated from the system by a micro bubble air separation device. The particles then collect in the bottom of the dirt trap creating no pressure loss. A dirt trap is an improvement over a typical Y strainer because it will collect smaller particles as well as not creating a pressure drop as the particles fall out of solution. A dirt trap can easily be cleaned through the drain on the bottom of the trap. Both Spirotherm and Caleffi make dirt traps in a variety of sizes capable of suiting all systems.

**Q and E Series Boiler
Venting Multiple Terminations
Single Row**



Minimum spacing between vertical boiler terminations on a flat roof is 24" from the outside edge of the termination to the outside edge of the next termination. For more than four terminations in a given area please contact the engineering department.

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
Pecantries City, GA 30269
1-800-621-9419

Tolerance Fraction = $\pm \frac{1}{16}$ "
x.x = ± 0.030
x.xx = ± 0.015
x.xxx = ± 0.005

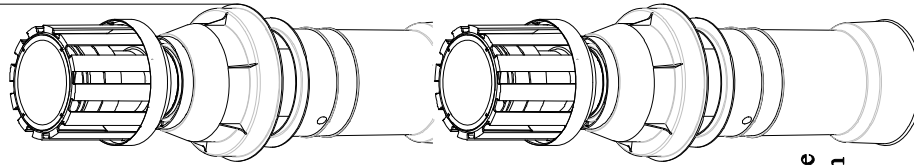
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Drawn By JG
Approved By SH

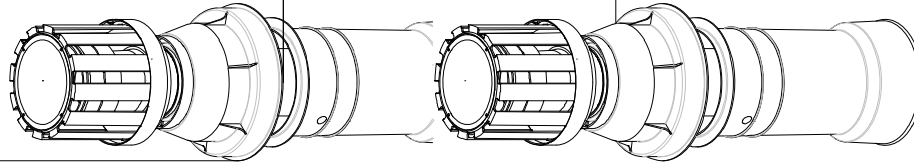
Boiler Flat Roof Multiple Termination Spacing Single Row	
SIZE	A
SCALE	NTS
DATE	03/02/10
DWG NO.	EVA-10-0001
REV	B
SHEET 1 of 1	

**Q and E Series Boiler
Venting**

Min
24"



Min
24"



Minimum spacing between vertical boiler terminations on a flat roof is 24" from the outside edge of the termination to the outside edge of the next termination. For more than four terminations in a given area please contact the engineering department.

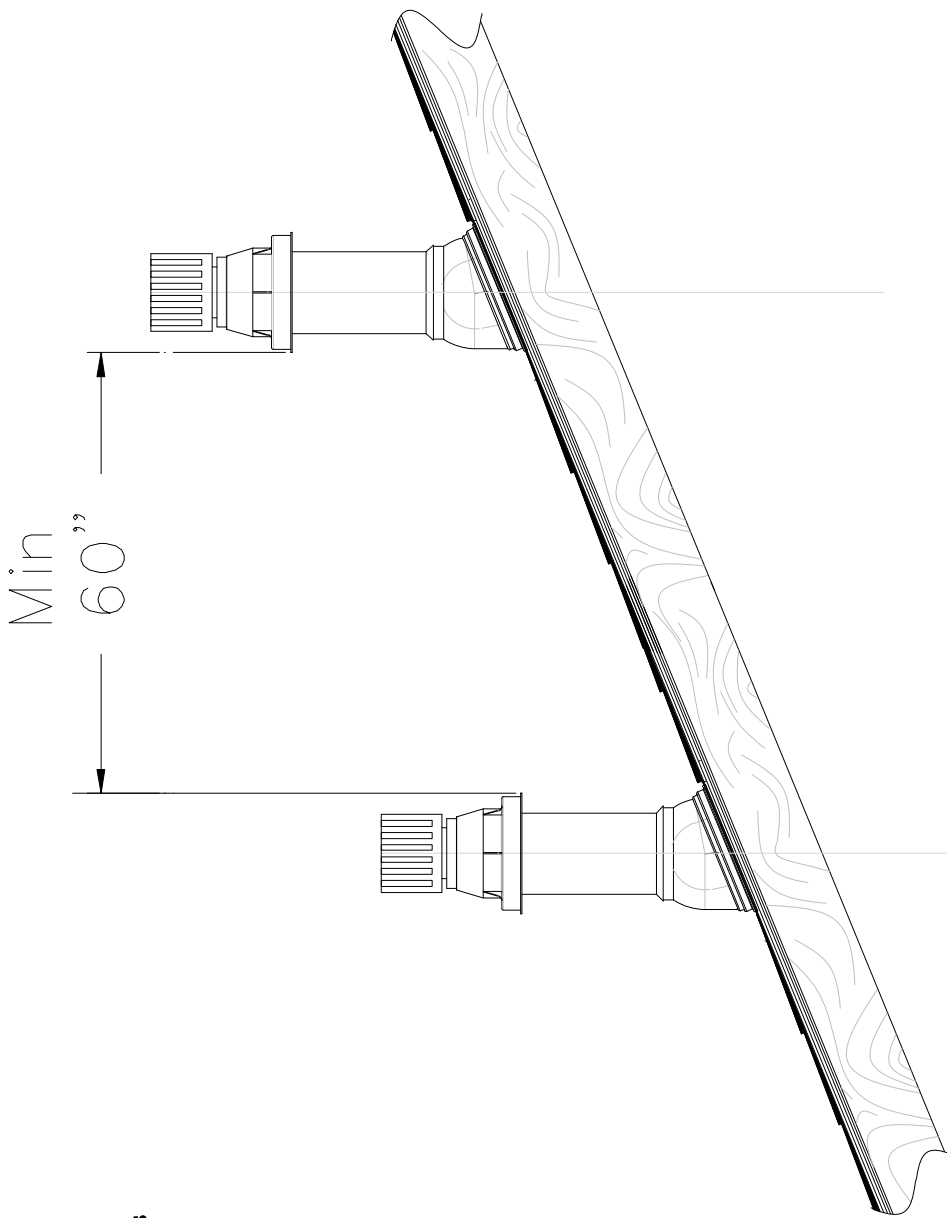
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Telephone
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X.XX = ± 0.015
X.XXX = ± 0.005

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Drawn By JJC
Approved By SH

Boiler Flat Roof
Multiple Termination Spacing
SIZE A SCALE NTS DWG. NO. EVA-10-0003 REV A
DATE 03/16/10 SHEET 1 of 1

**Q and E Series Boiler
Venting Multiple Terminations**



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

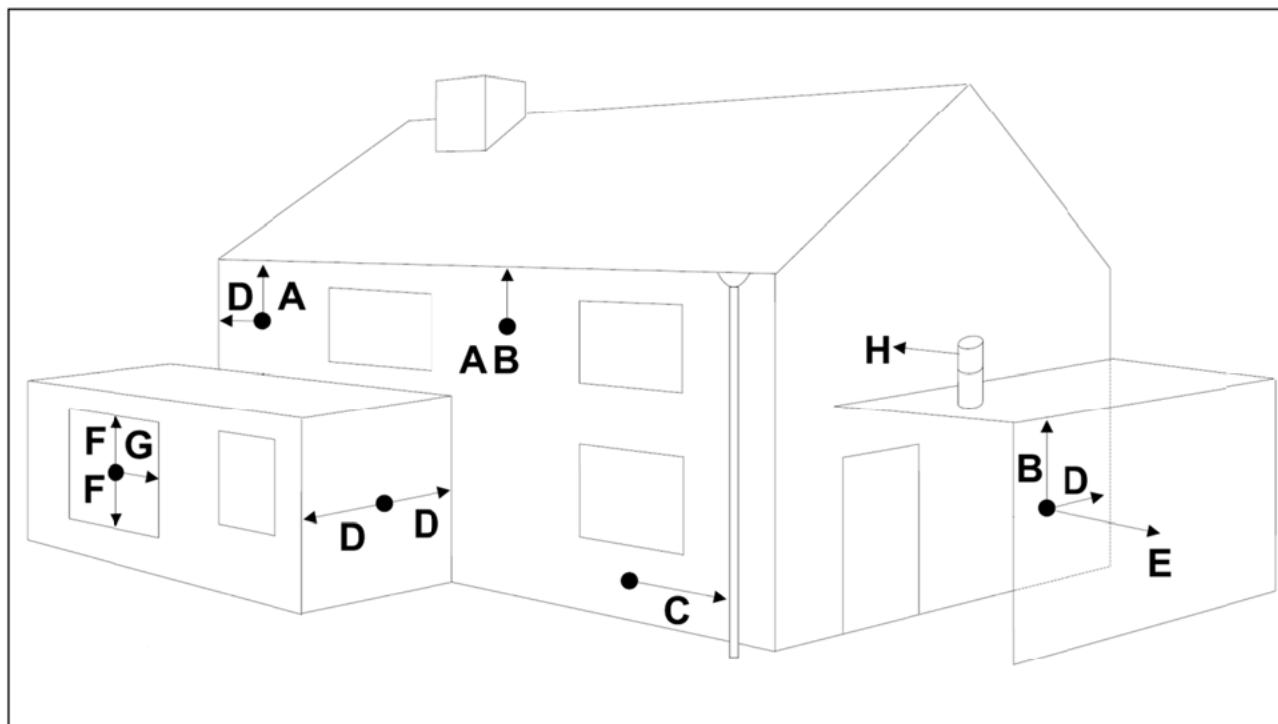
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Drawn By: JUC
Approved By: SH

Boiler Incline Roof
Multiple Termination Spacing

SIZE	SCALE	DWG. NO.	REV
A	NTS	EVA-10-0005	A
DATE 03/02/10			SHEET 1 of 1

Vent Termination Clearances



		For Direct Vent Installations	For Twin pipe systems or Single pipe (non-direct vent)
A	below gutters, soil pipes or drain pipes	36"	36"
B	below eaves, balconies, and porches *	36"	36"
C	from vertical drain pipes and soil pipes	6"	6"
D	from internal or external corners	12"	12"
E	from a terminal facing a terminal and from a terminal facing a wall	48"	60" for exhaust vents. Intake pipes must be horizontally offset from the opposing exhaust vent by a minimum of 24"
F	vertically from a terminal on the same wall	60"	60"
G	horizontally from a terminal on the same wall	12"	12"
H	horizontally from a vertical terminal to a wall or parapet	24"	24"

* must be open on a minimum of 2 sides

Boiler PVC Venting

A “T” (3” x 1 ½” x 3”) should be installed to drain condensate in order to maximize the life of the condensate tray in an installation with long runs of PVC venting.

Installation

The T should be installed as close as possible to the boiler to ensure most of the condensate from the venting drains back through it rather than the boiler. The T must be installed on a horizontal section of venting with the 1 ½” leg oriented towards the ground. Follow the drawing on the next page for the best location of the T and how to connect it to the boiler condensate drain. The condensate trap must be a minimum of 4” (see drawing on next page).

The condensation drain pipe should be connected to a drain in the building by means of an open connection (air gap, see drawing). An open connection prevents the possibility of drain gases affecting the boiler.

Install the condensation drain pipe according to the applicable rules and regulations.

If the condensate outlet of the boiler is lower than the public sewage system a condensate pump must be used.

The condensate produced by the boiler has a pH value between 3 and 4. Install a neutralization unit if required by the local code. It is recommended, but not required to install a condensate neutralizer.

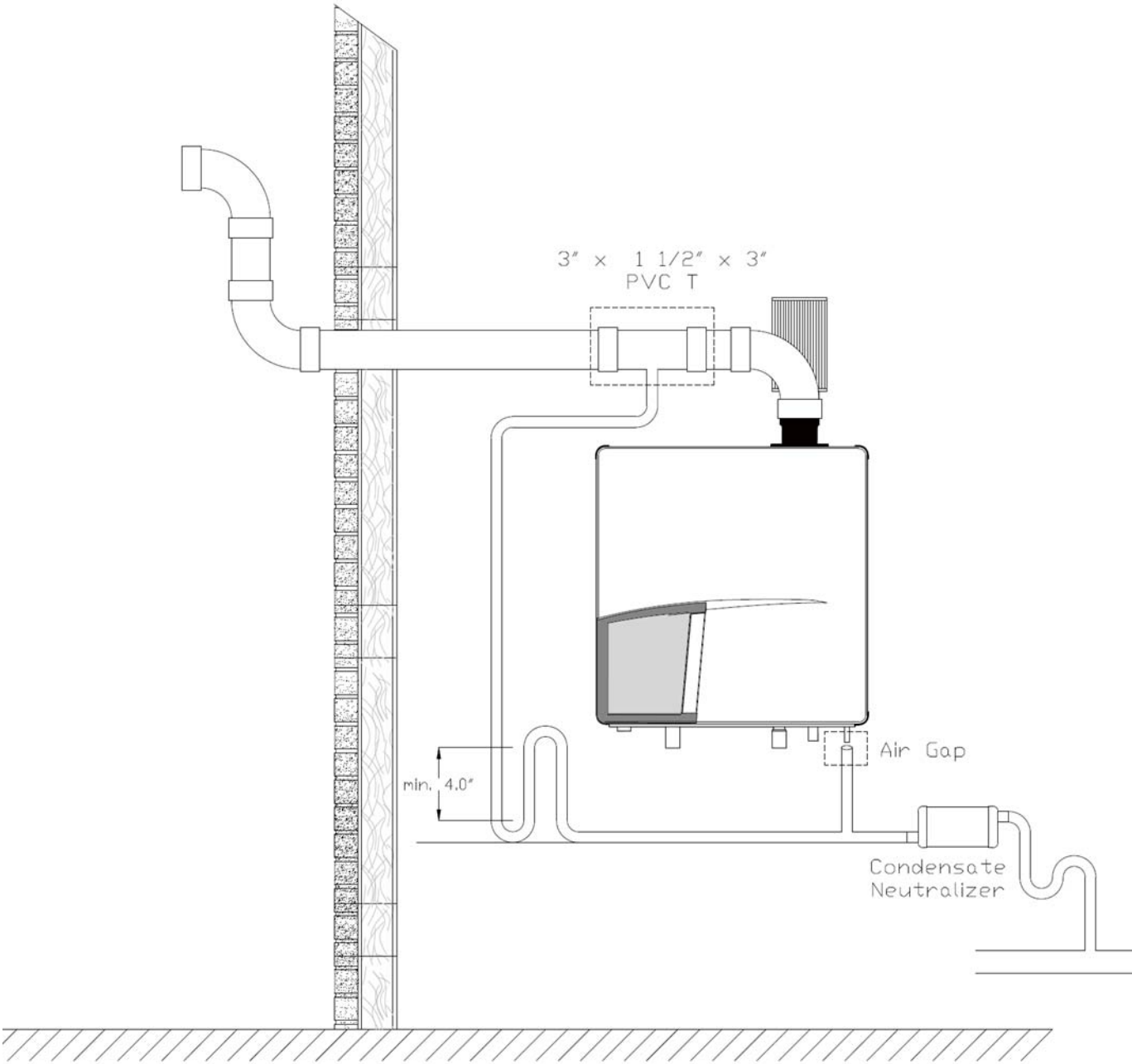
The exhaust must be pitched a minimum of a 1/4” inch per foot back to the boiler (to allow drainage of condensate).

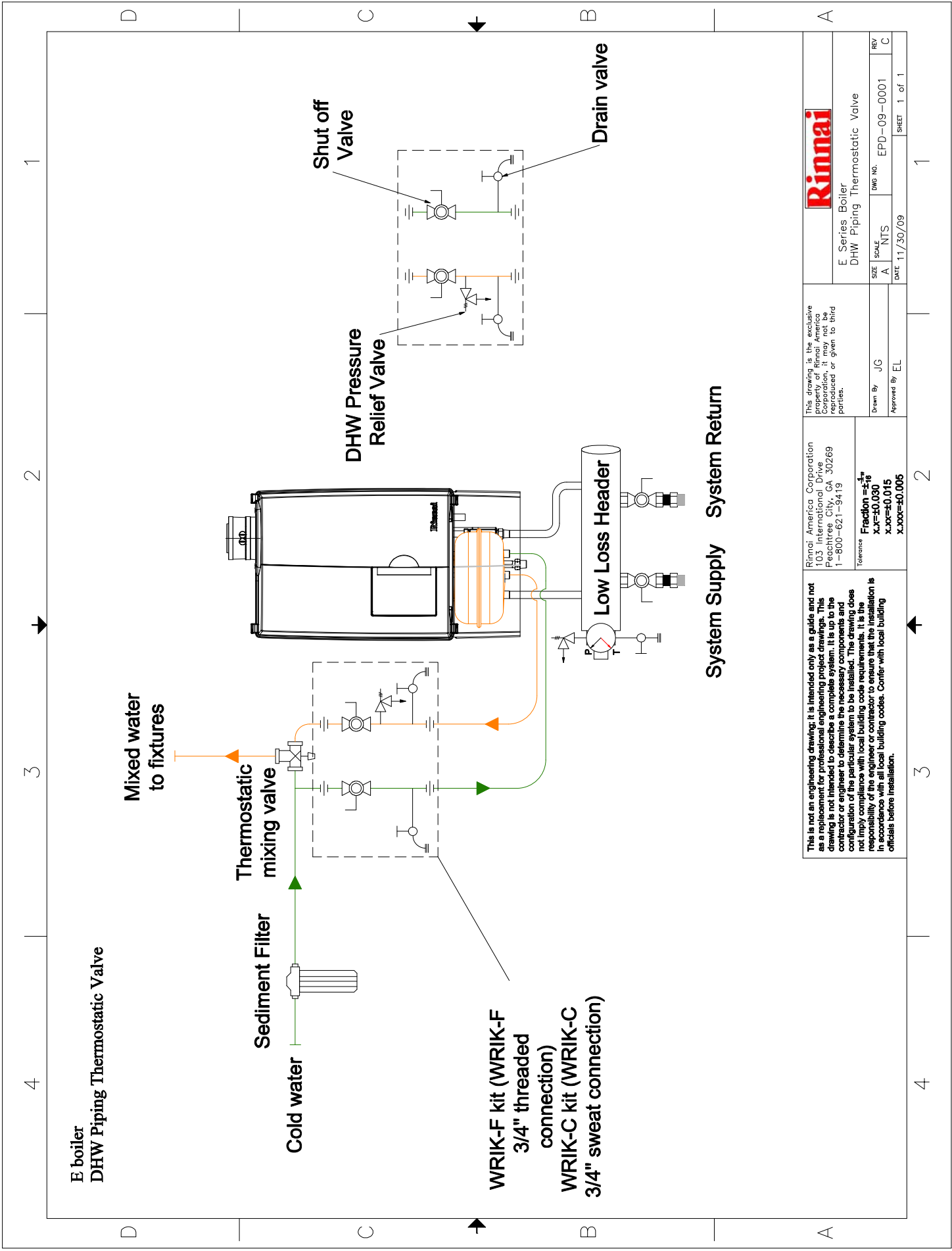
Contact Rinnai Engineering Department (1-800-621-9419, FAX 678-829-1666) if you have additional questions.

NOTICE	Before putting the boiler into operation the condensate trap on both the venting and the boiler must be filled. Please refer to the boiler installation manual for information on filling the boiler condensate trap. To fill the PVC venting condensate trap pour water into the trap until it begins to drain out of the trap. If the boiler will be installed in a high temperature installation such as baseboard, fill the condensate trap with mineral oil instead of water.
---------------	---

NOTICE	Do not drain the condensation water to the external rain gutter or drain because of the danger of freezing and blockage of the drain.
---------------	--

Boiler PVC Venting





E boiler
DHW Piping Thermostatic Valve

Mixed water
to fixtures

Thermostatic
mixing valve

Sediment Filter

Cold water

DHW Pressure
Relief Valve

Shut off
Valve

Drain valve

WRIK-F kit (WRIK-F
3/4" threaded
connection)
WRIK-C kit (WRIK-C
3/4" sweat connection)

System Supply System Return

This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering product 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.

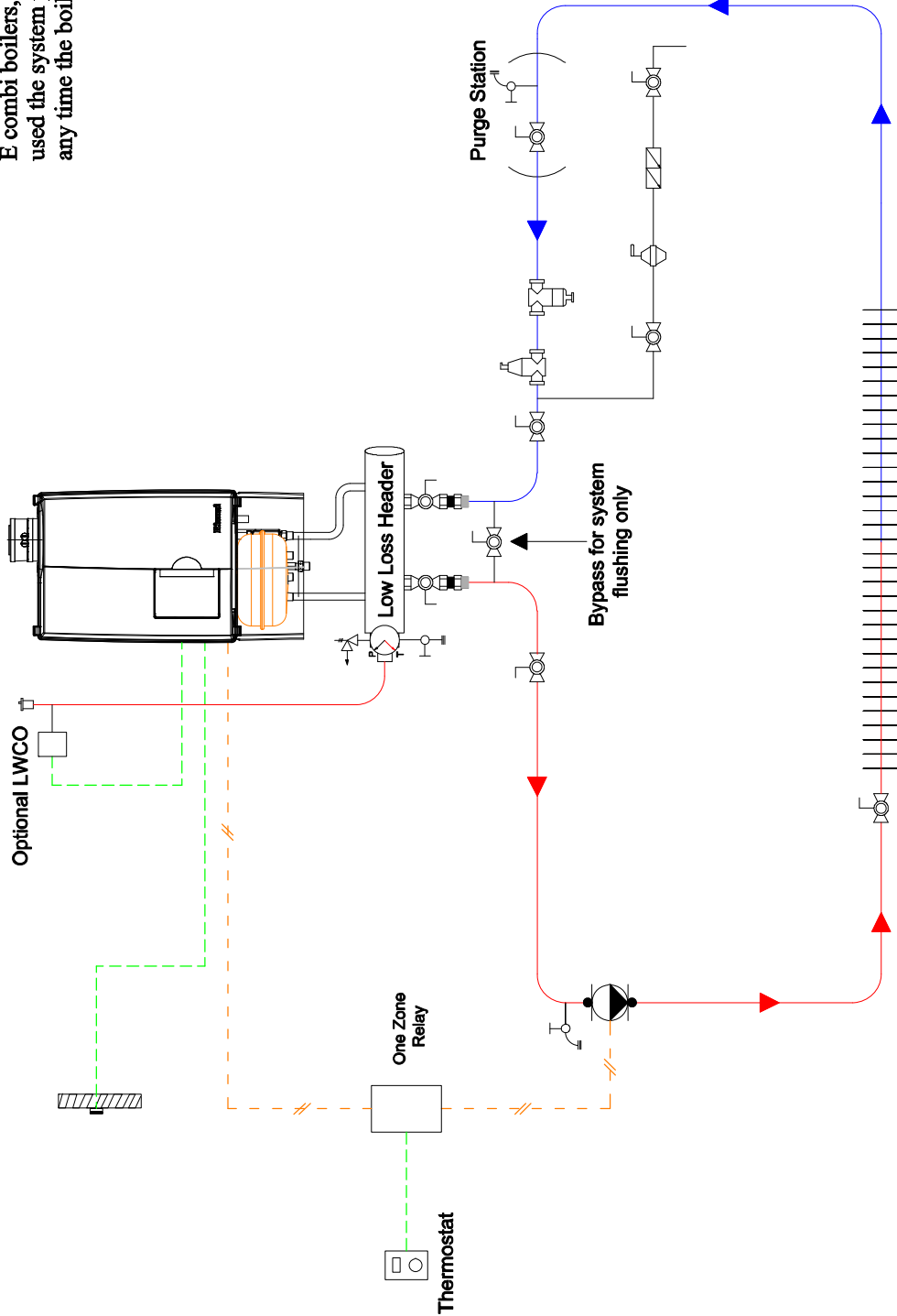
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		E Series Boiler DHW Piping Thermostatic Valve	
Drawn By	JC	Scale	INTS
Approved By	EL	Size	A
		DWG No.	EPD-09-0001
		DATE	11/30/09
		REV	C
		SHEET	1 of 1

E boiler
Single Zone

Note:
A single zone relay should be used with E combi boilers, if the the relay is not used the system pump will be activated any time the boiler fires for heat or DHW

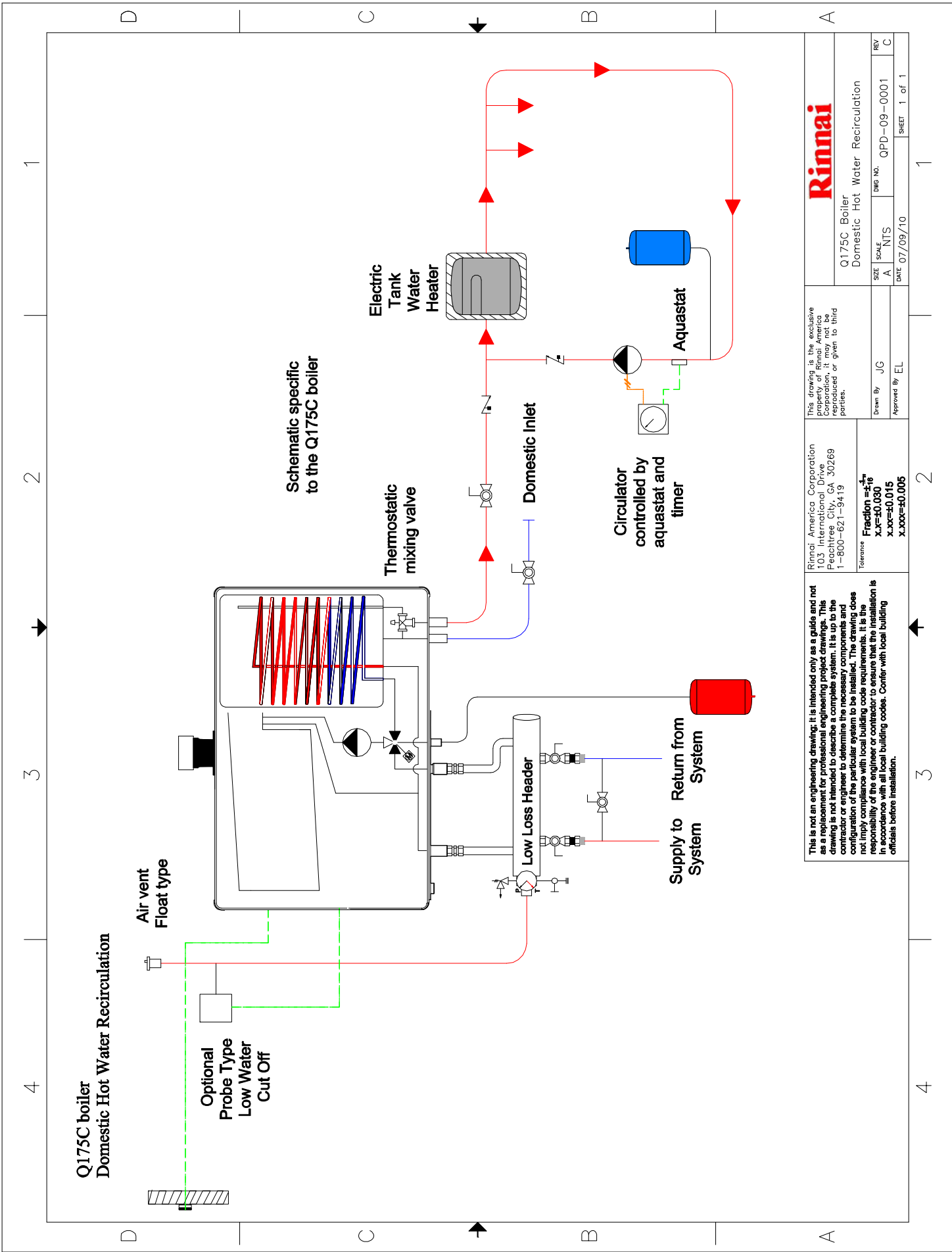


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1-800-621-9419
Tolerance
Fraction $\frac{3}{16}$
XX=±0.030
XXX=±0.015
XXXX=±0.005

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Approved By EL

Rinnai
E Series Boiler
Single Zone
SIZE A
SCALE NTS
DATE 07/09/10
EPA-09-0001
REV C
SHEET 1 of 1



Rinnai			
Q175C Boiler Domestic Hot Water Recirculation			
SIZE	SCALE	BWG NO.	REV
A	INTS	QPD-09-0001	C
DATE	07/09/10		SHEET 1 of 1

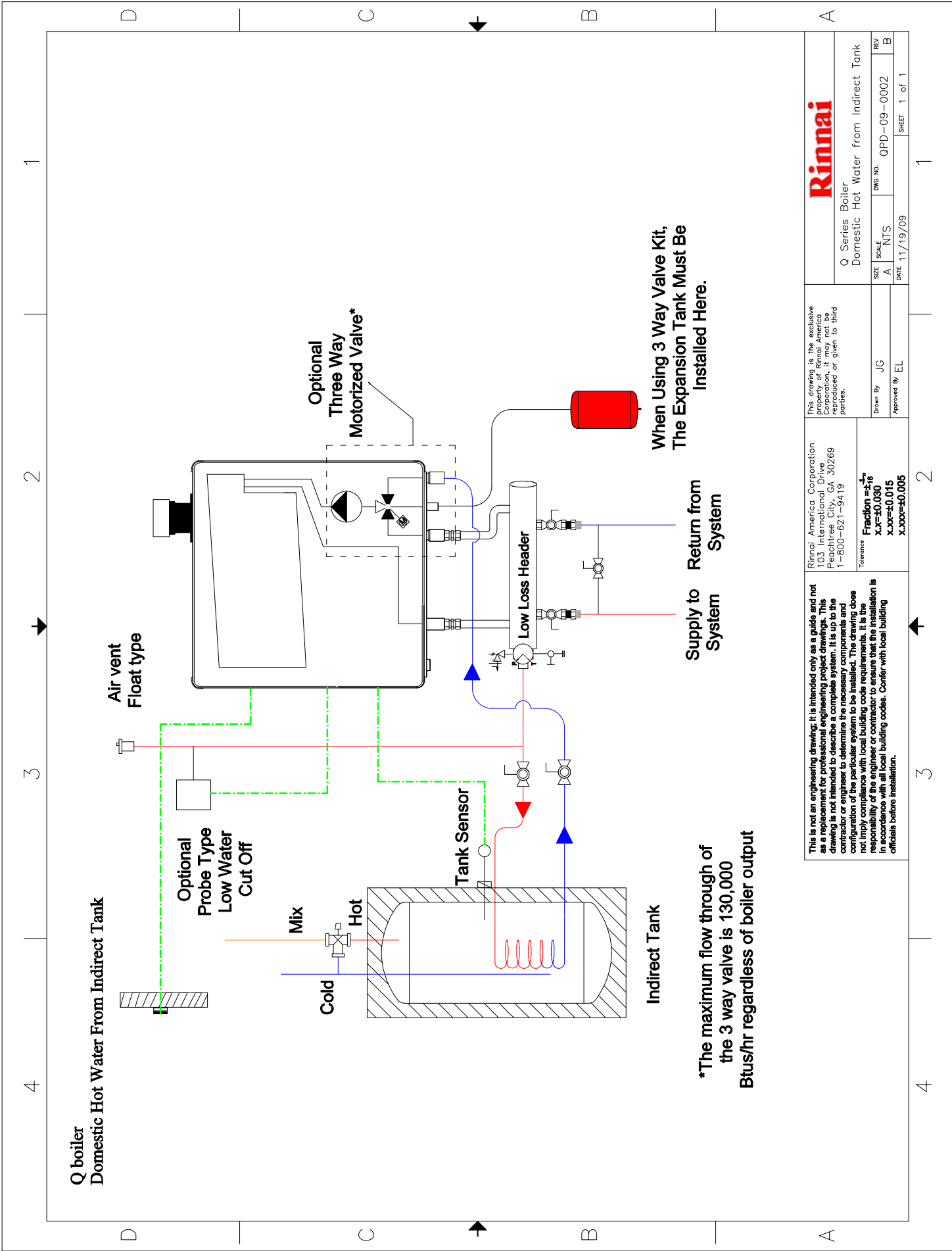
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Drawn By: JC
Approved By: EL

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1-800-621-9419

Tolerances
Fraction = $\frac{1}{16}$
x.x = ±0.030
x.xxx = ±0.015
x.xxxx = ±0.005

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**Q boiler
Domestic Hot Water From Indirect Tank**

Air vent
Float type

Optional
Probe Type
Low Water
Cut Off

Mix
Hot
Cold

Optional
Three Way
Motorized Valve*

Tank Sensor

Low Loss Header

Indirect Tank

*The maximum flow through of
the 3 way valve is 130,000
Btus/hr regardless of boiler output

When Using 3 Way Valve Kit,
The Expansion Tank Must Be
Installed Here.

Supply to
System
Return from
System

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1-800-621-9419

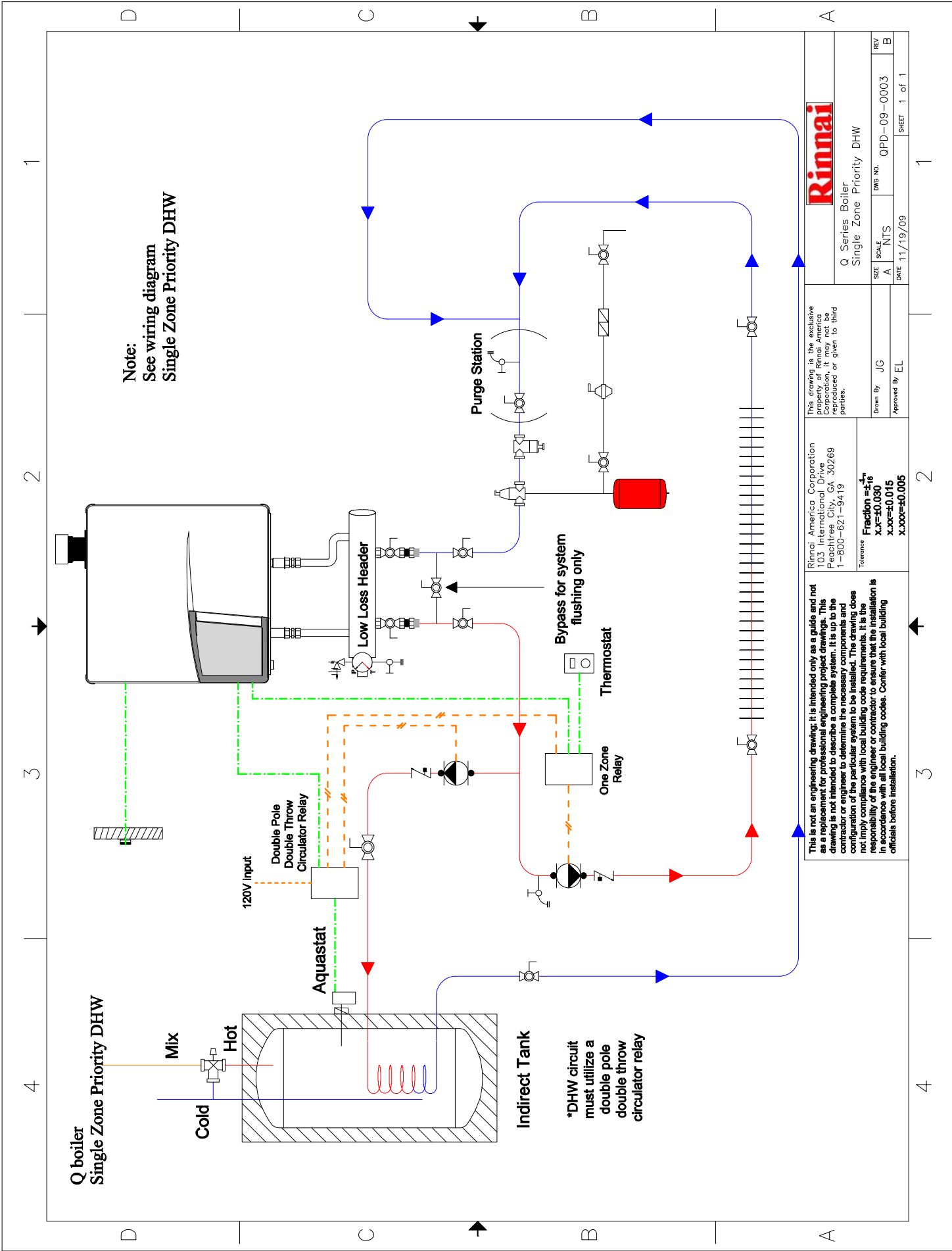
Tolerances
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x.x = ±0.030
x.xxx = ±0.015
x.xxxx = ±0.005

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Drawn By: JG
Approved By: EL

Q Series Boiler Domestic Hot Water from Indirect Tank	
SIZE	SCALE
A	NTS
DATE	REV
11/19/09	QPD-09-0002
SHEET 1 of 1	

Rinnai



Q Series Boiler
Single Zone Priority DHW

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SIZE	SCALE	BWG NO.	REV
A	INTS	QPD-09-0003	B
DATE 11/19/09			SHEET 1 of 1

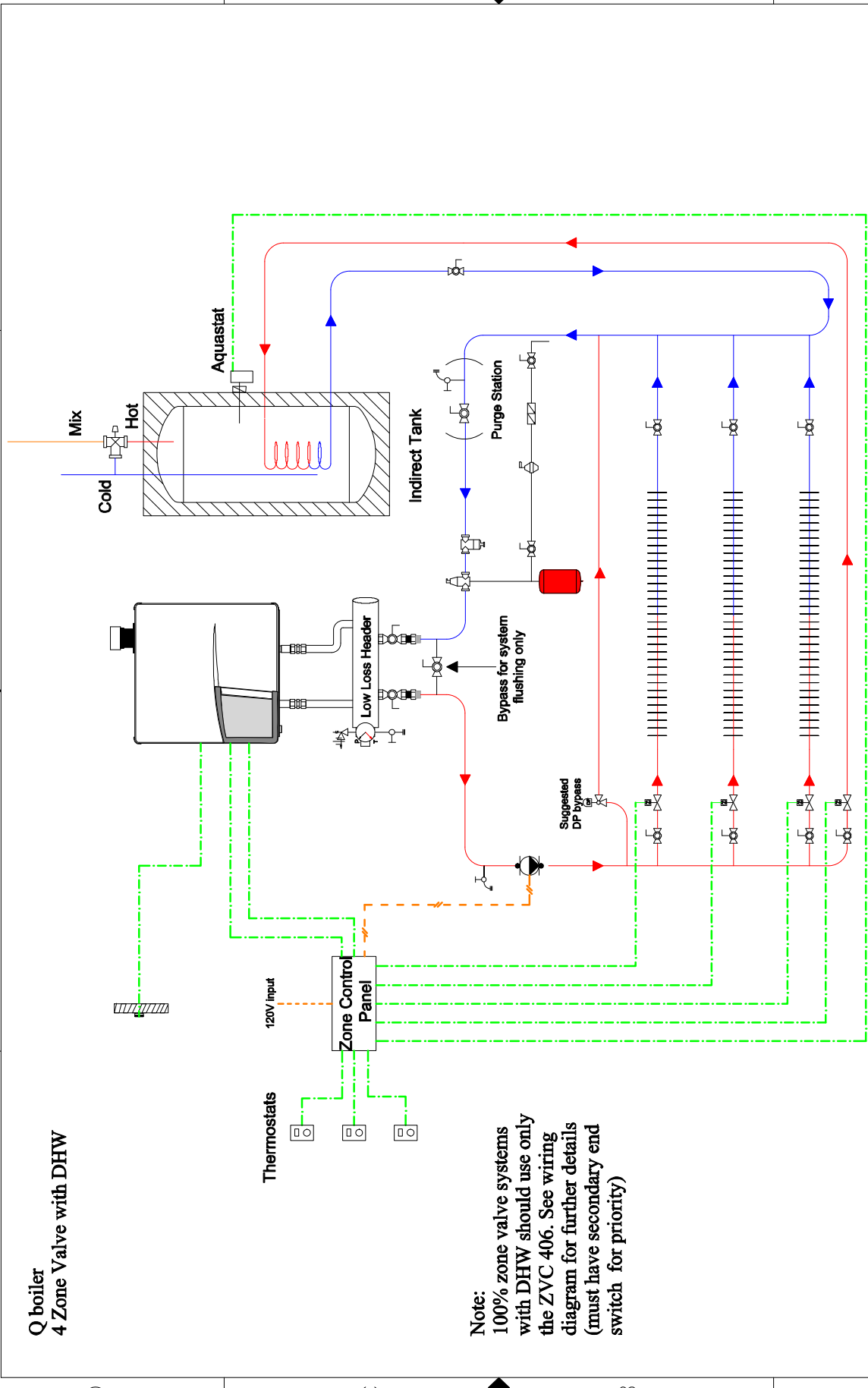
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103 Infield Drive
Peachtree City, GA 30269
1-800-621-9419

Drawn By JG
Approved By EL

Tolerances	Fraction = $\frac{1}{16}$
	x.xxx=±0.030
	x.xx=±0.015
	x.xxx=±0.005

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**Q boiler
4 Zone Valve with DHW**



Note:
100% zone valve systems with DHW should use only the ZVC 406. See wiring diagram for further details (must have secondary end switch for priority)

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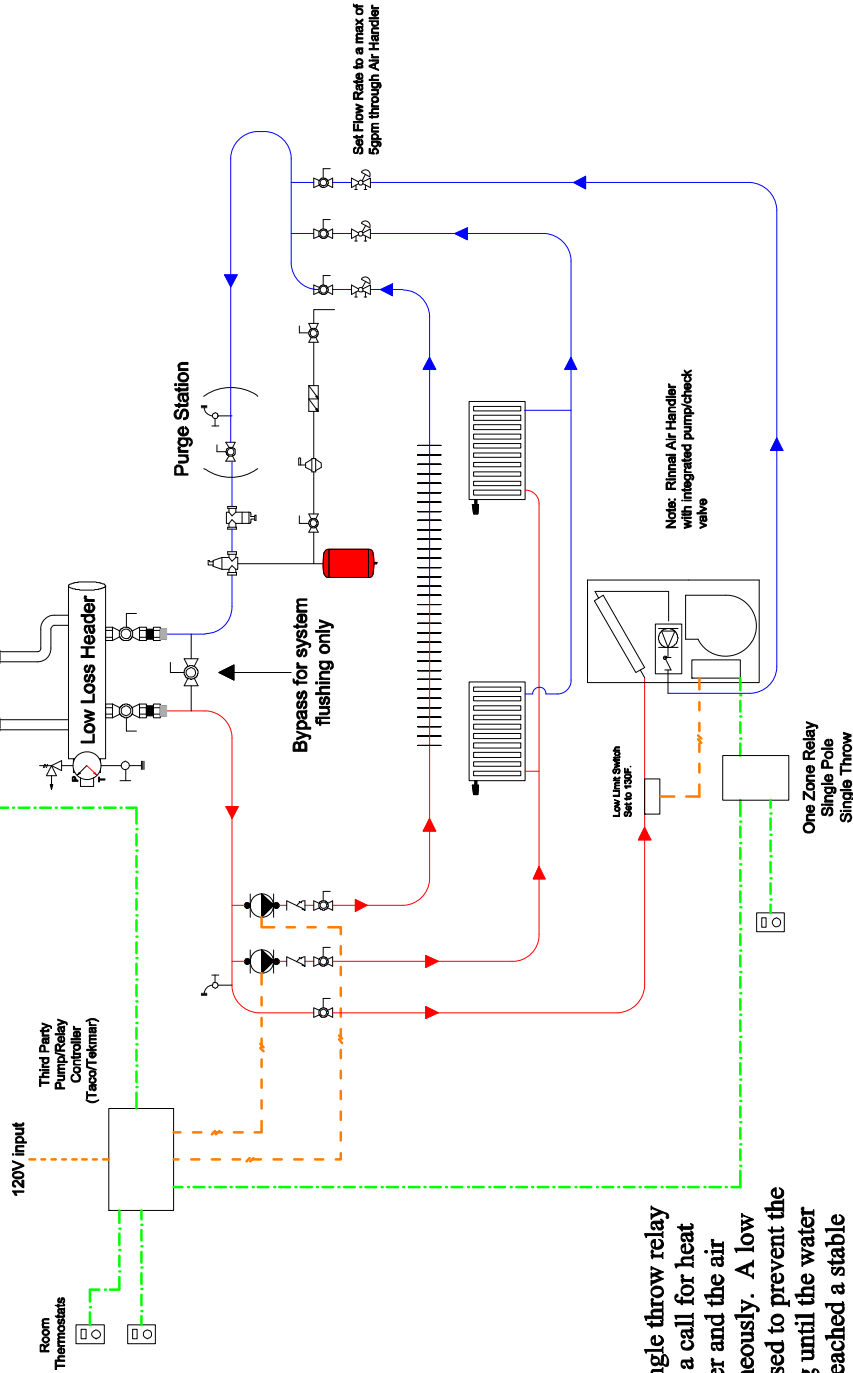
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<p>Rinnai</p> <p>Q Series Boiler with DHW 4 Zone Valve with DHW</p>	
<p>Drawn By: JC</p> <p>Approved By: EL</p>	<p>DATE: 11/19/09</p> <p>SHEET: 1 of 1</p>
<p>SIZE: A</p> <p>SCALE: INTS</p>	<p>DWG NO.: QPD-09-0004</p> <p>REV: B</p>
<p>Tolerance</p> <p>Fraction = 1/16</p> <p>X.X=±0.030</p> <p>X.XX=±0.015</p> <p>X.XXX=±0.005</p>	

**Q boiler
3 On-Off High Temperature Zones**

**Note:
See wiring diagram**



Note:
A single pole single throw relay is used to create a call for heat on both the boiler and the air handler simultaneously. A low limit switch is used to prevent the fan from starting until the water temperature has reached a stable temperature. This prevents cold air from being circulated through the building. The low limit switch should be placed on the supply line to the air handler as close to the air handler as possible.

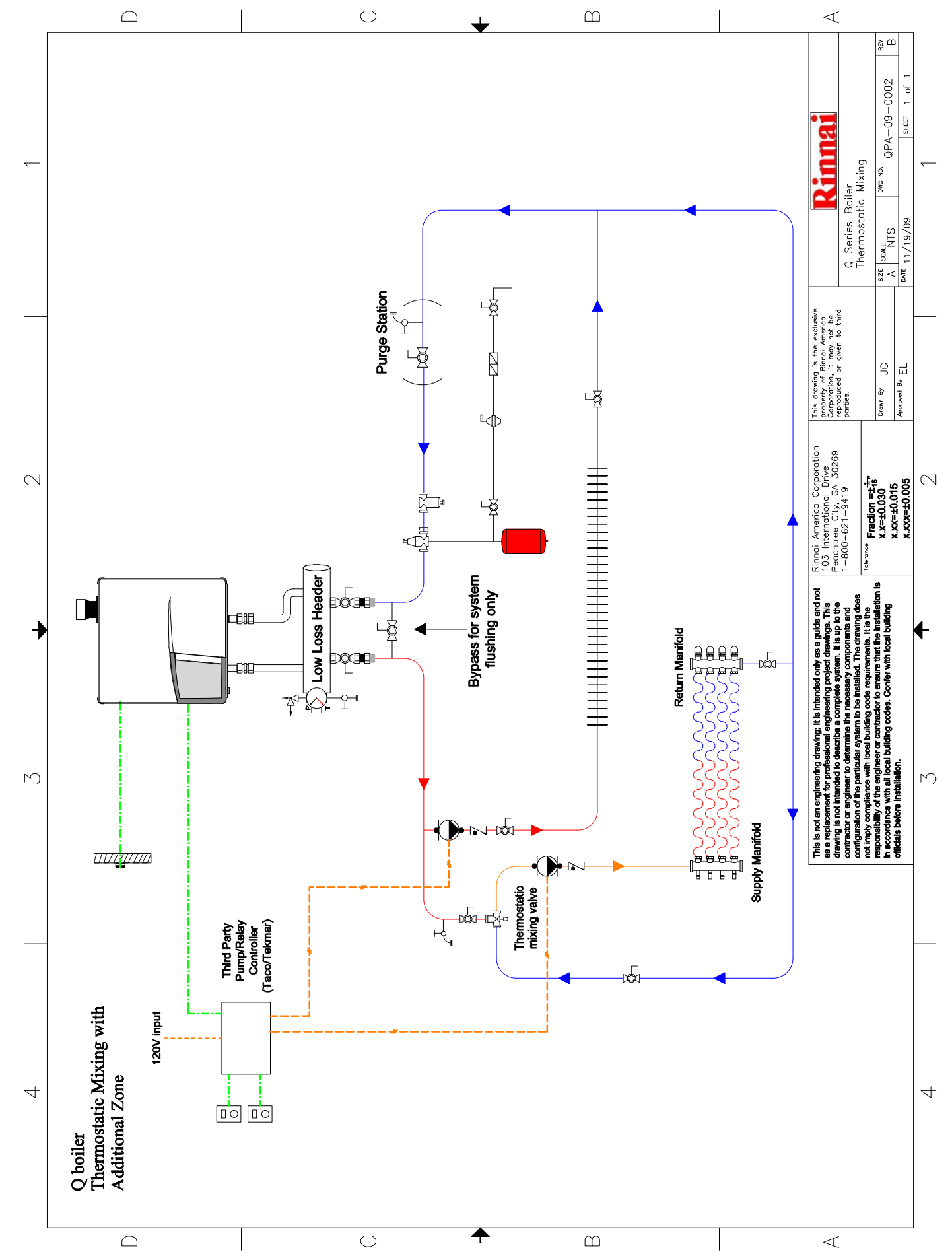
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Drawn By	JC	Scale	INTS	REV	F
Approved By	EL	SIZE	A	DWG No.	QPA-09-0001
DATE			11/19/09	SHEET 1 of 1	

Rinnai
Q Series Boiler
3 On-Off High Temperature Zones



		Q Series Boiler Thermostatic Mixing	
		SIZE A	SCALE NTS
DATE 11/19/09	Drawn By JC	DWG NO. QPA-09-0002	REV B
Approved By EL		SHEET 1 of 1	

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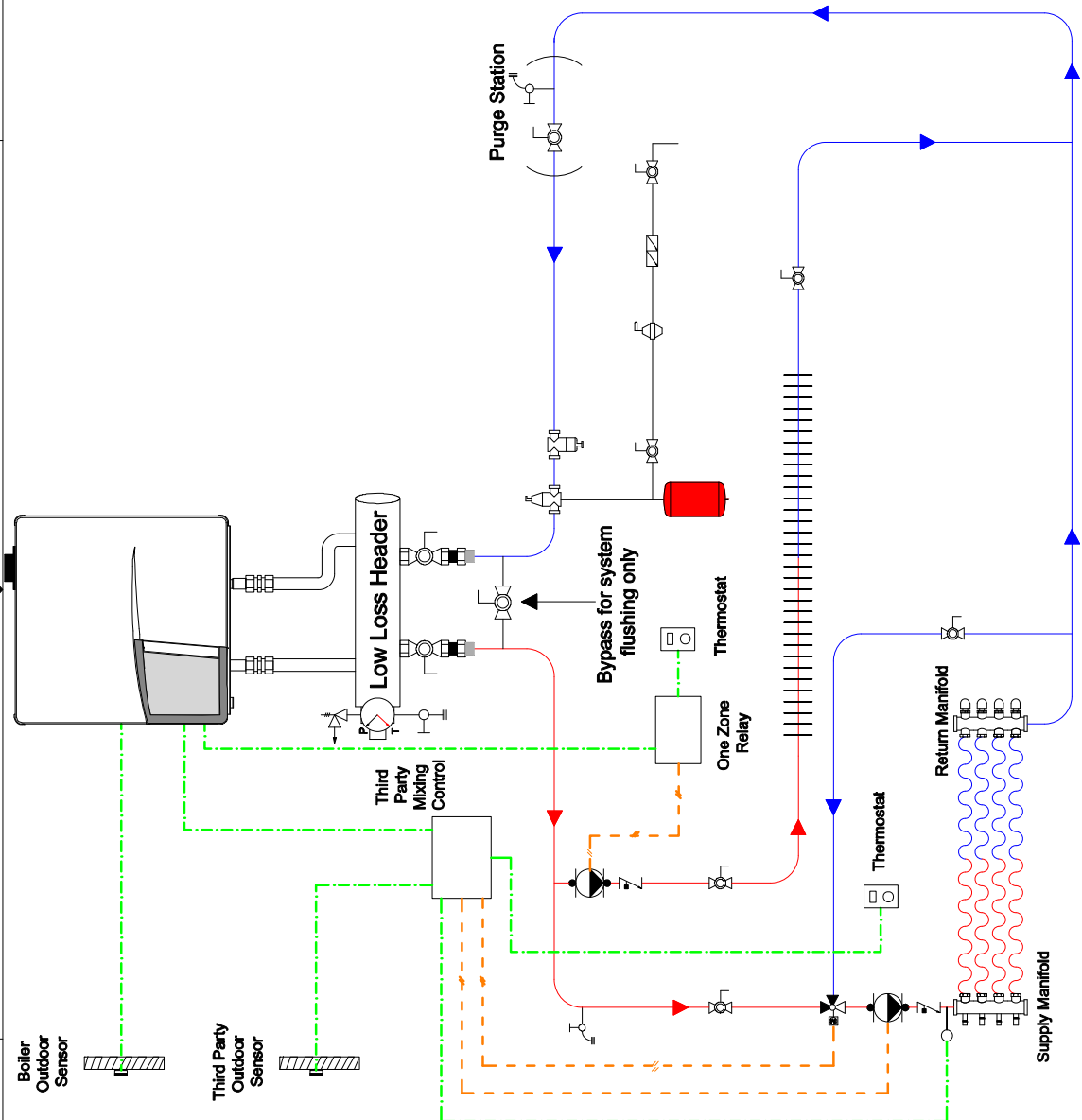
Rinnai America Corporation
1033 Terminal Drive
Pacifica, CA 94026
1-800-621-9419

Tolerance
Fraction $\frac{1}{16}$
x.x=±0.030
x.xx=±0.015
x.xxx=±0.005

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1 2 3 4

**Q boiler
3 Way Motorized Mixing**



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Pacifica, CA 94026
1-800-621-9419

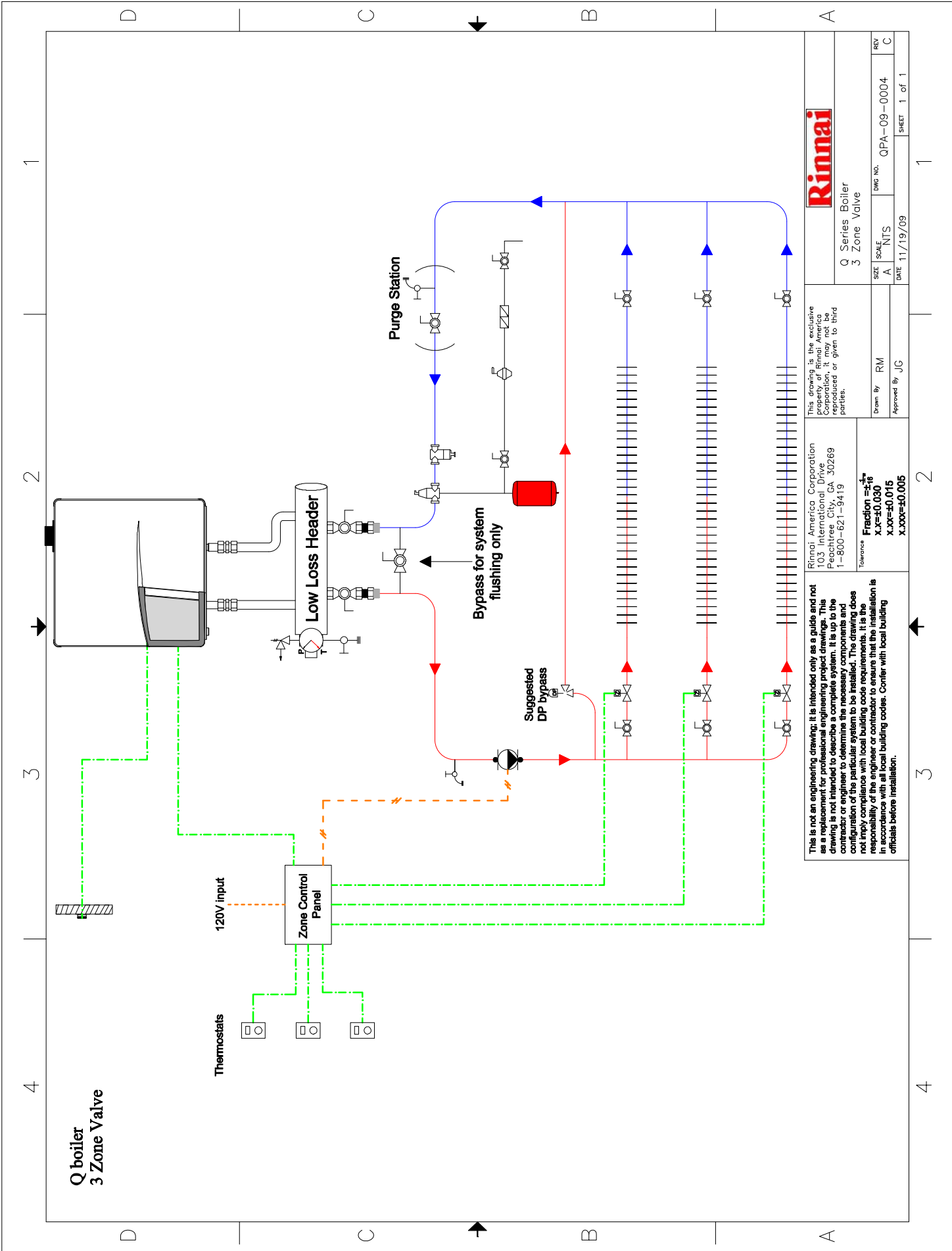
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Rinnai		Q Series Boiler 3 Way Motorized Mixing	
SIZE	SCALE	BWG NO.	REV
A	NTS	QPA-09-0003	C
DATE 11/19/09		SHEET 1 of 1	

Drawn By JC
Approved By EL

Fraction = $\frac{1}{16}$
x.x=±0.030
x.xxx=±0.015
x.xxxx=±0.005

1 2 3 4



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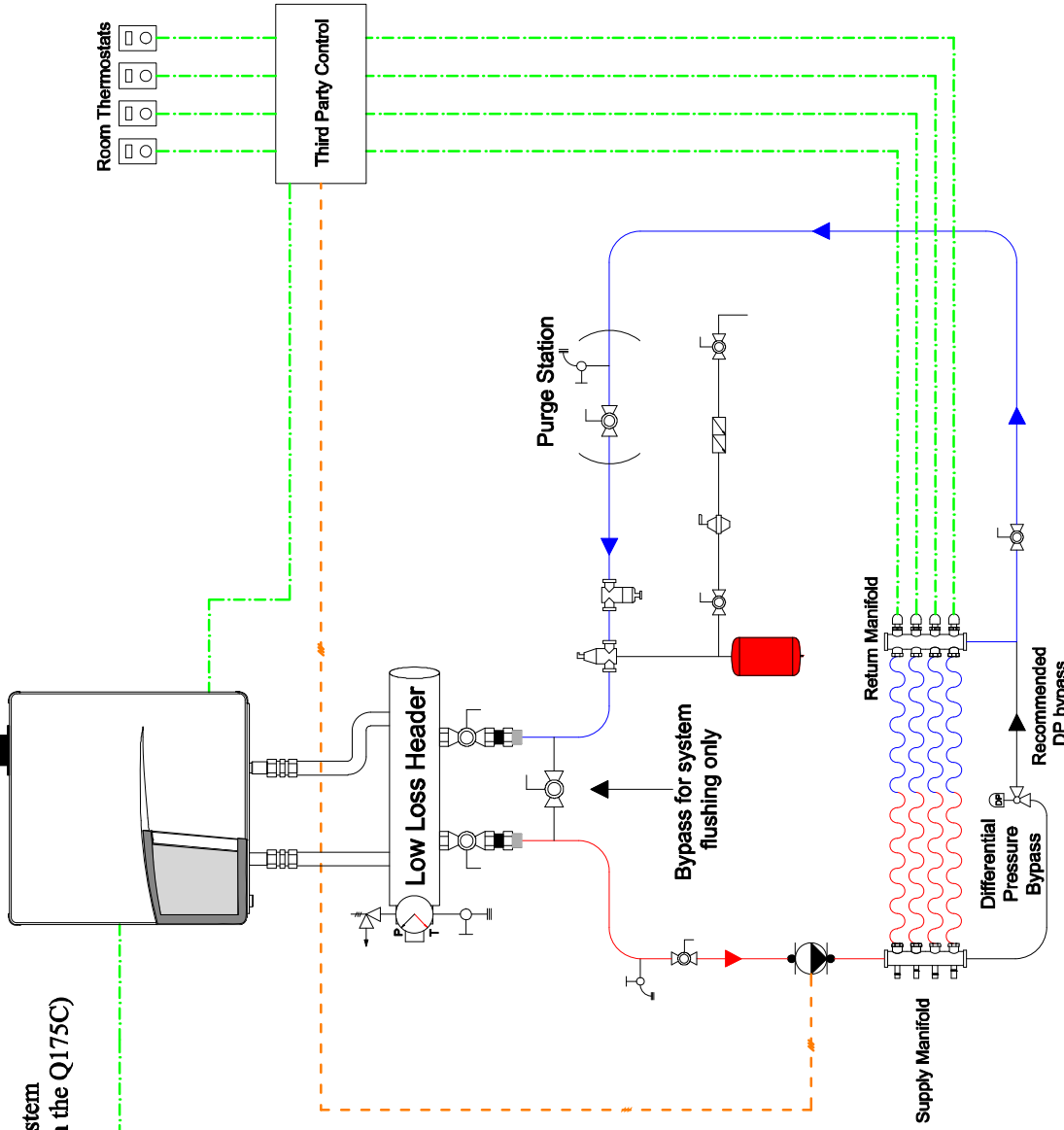
Tolerances
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 X.XX=±0.030
 X.XXX=±0.015
 X.XXXX=±0.005

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Drawn By: RM
 Approved By: JG

Rinnai		Q Series Boiler	SIZE	SCALE	SWG No.	QPA-09-0004	REV
		3 Zone Valve	A	INTS			C
						DATE	11/19/09
						SHEET	1 of 1

Q boiler
Direct Coupled Radiant System
 (Not suggested for use with the Q175C)



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Tolerance
 Fraction = $\frac{1}{16}$
 X.XX=±0.030
 X.XXX=±0.015
 X.XXXX=±0.005

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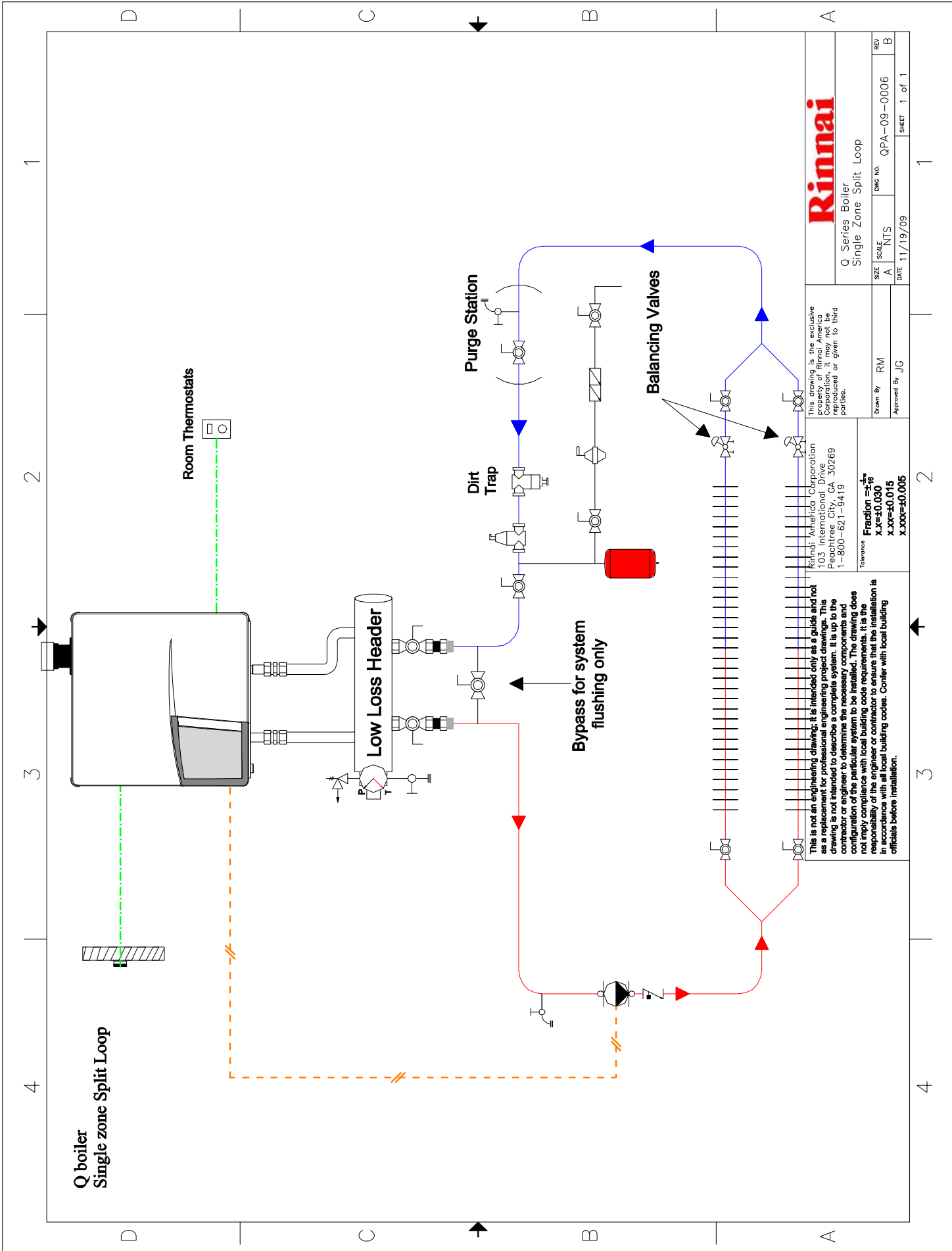
Drawn By: JC
 Approved By: EL

Rinnai

Q Series Boiler
 Direct Coupled Radiant

SIZE: A
 SCALE: INTS
 DATE: 11/19/09

BWG NO.: QPA-09-0005
 SHEET: 1 of 1



Q boiler
Single zone Split Loop

Room Thermostats

Low Loss Header

Purge Station

Dirt Trap

Bypass for system
flushing only

Balancing Valves

Rinnai

Q Series Boiler
Single Zone Split Loop

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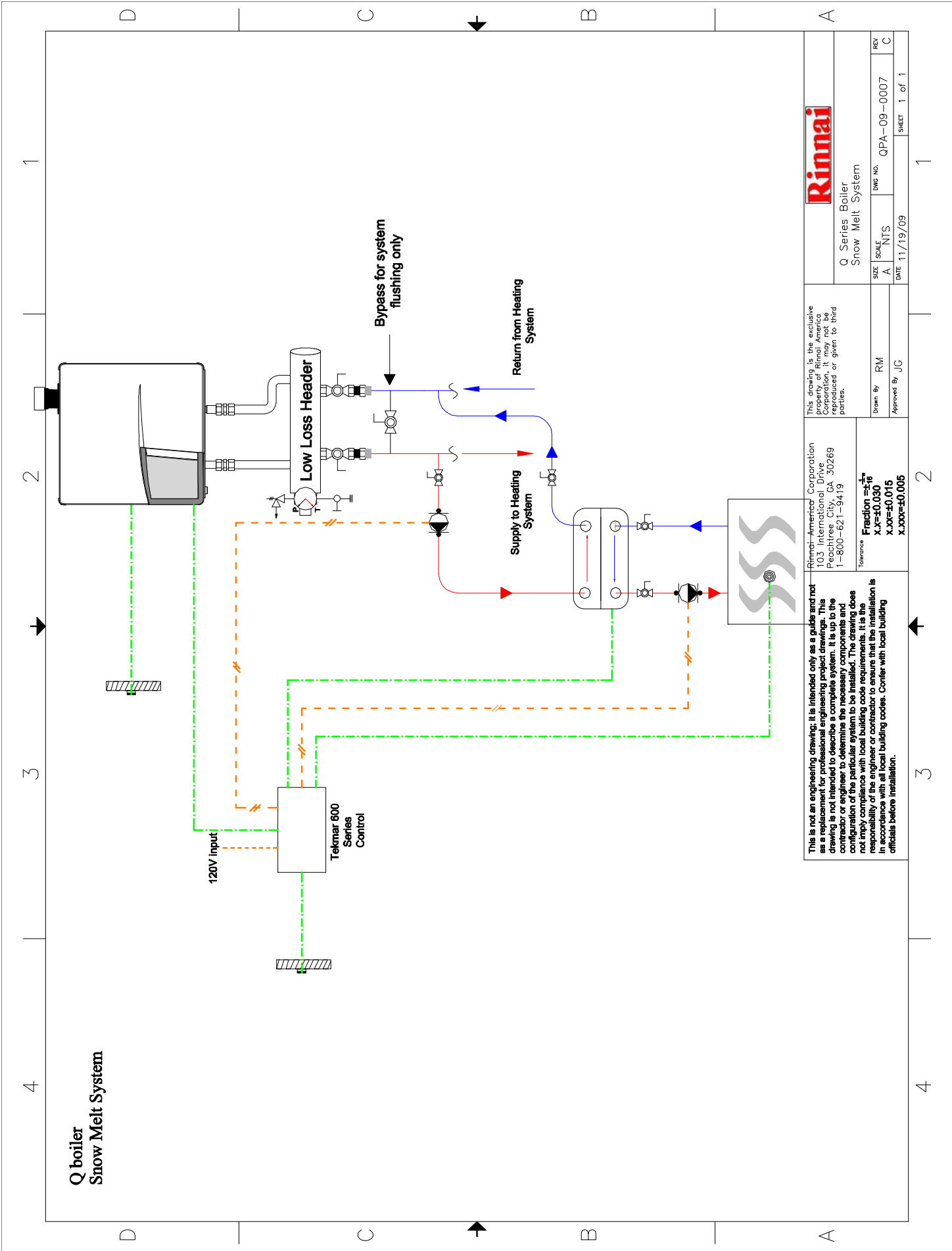
Tolerance
Fraction $\frac{1}{16}$
x.x=±0.030
x.xxx=±0.015
x.xxxx=±0.005

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Drawn By	RM
Approved By	JC

SIZE	SCALE	DWG NO.	QPA-09-0006
A	NITS		

DATE	11/19/09
SHEET	1 of 1



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Drawn By: R/M
Approved By: J/C

DATE: 11/19/09

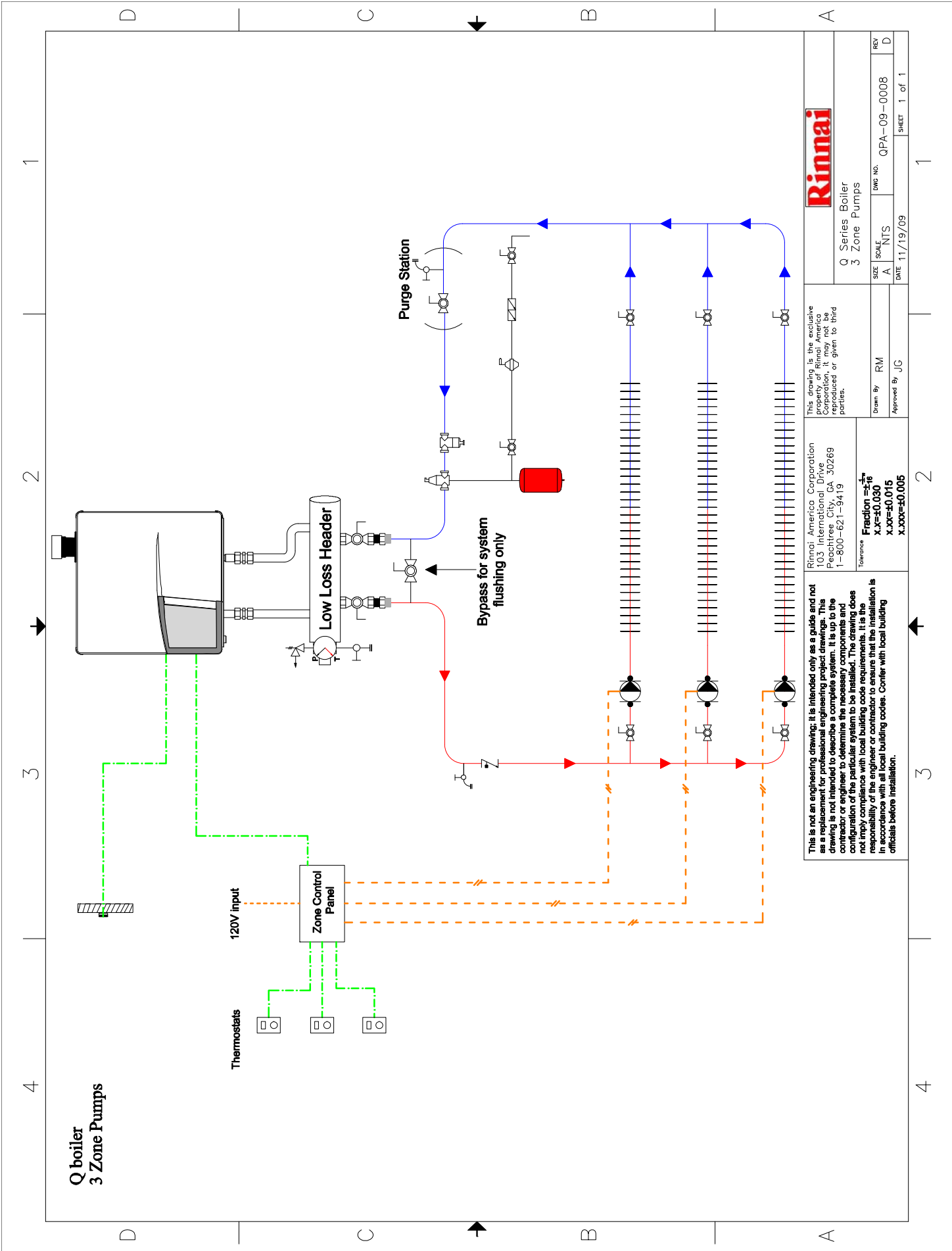
SIZE: A
SCALE: INTS

Q Series Boiler Snow Melt System

DWG NO.: QPA-09-0007

REV: C

SHEET: 1 of 1

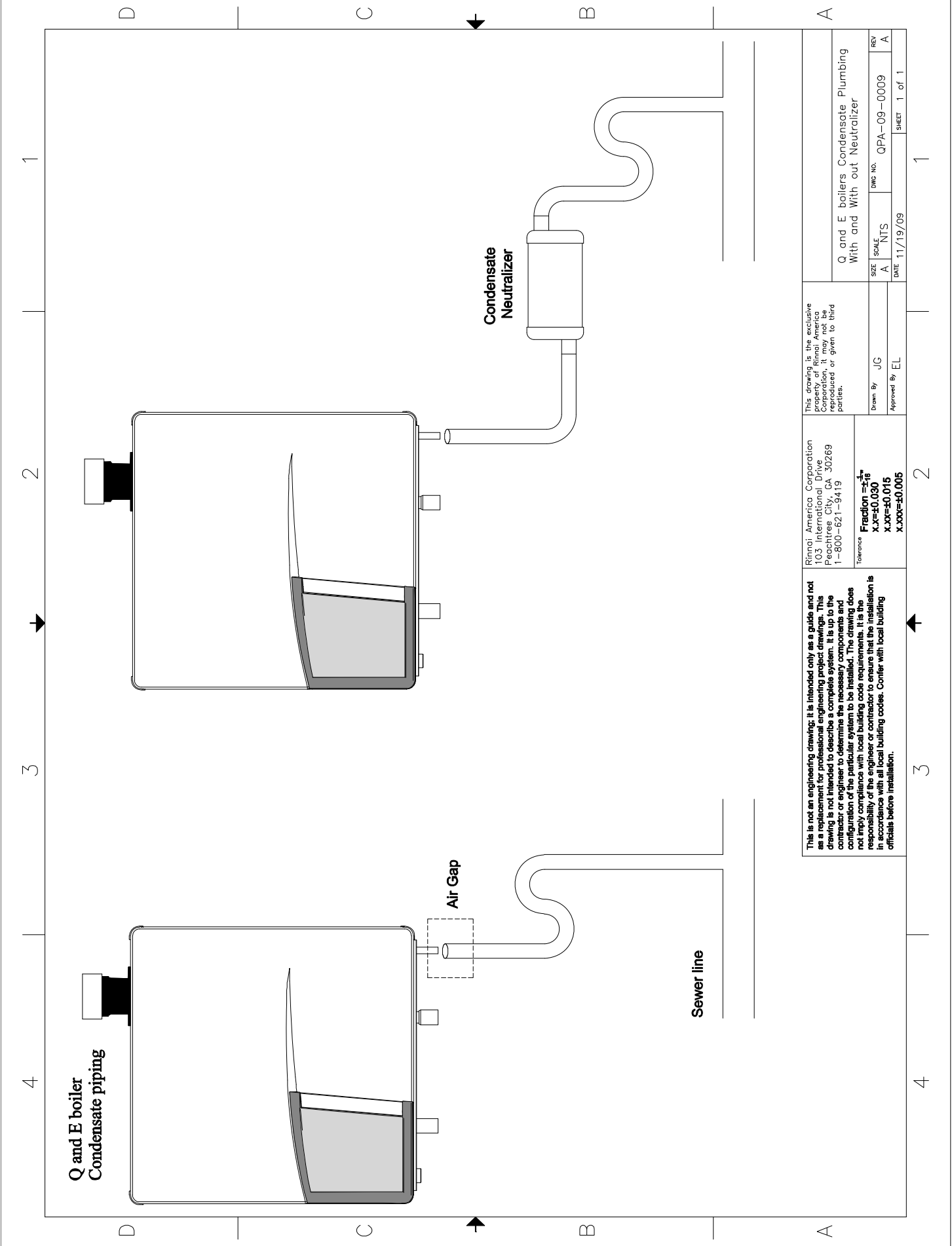


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Q Series Boiler 3 Zone Pumps		SIZE A	SCALE N.T.S.	DWG NO. QPA-09-0008	REV D
Drawn By RM	Approved By JG	DATE 11/19/09		SHEET 1 of 1	



Q and E boiler
Condensate piping

Air Gap

Sewer line

Condensate
Neutralizer

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Fraction $\frac{1}{16}$
X.XX=0.030
X.XXX=0.015
X.XXXX=0.005

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Drawn By: JG

Approved By: EL

DATE: 11/19/09

SIZE: A

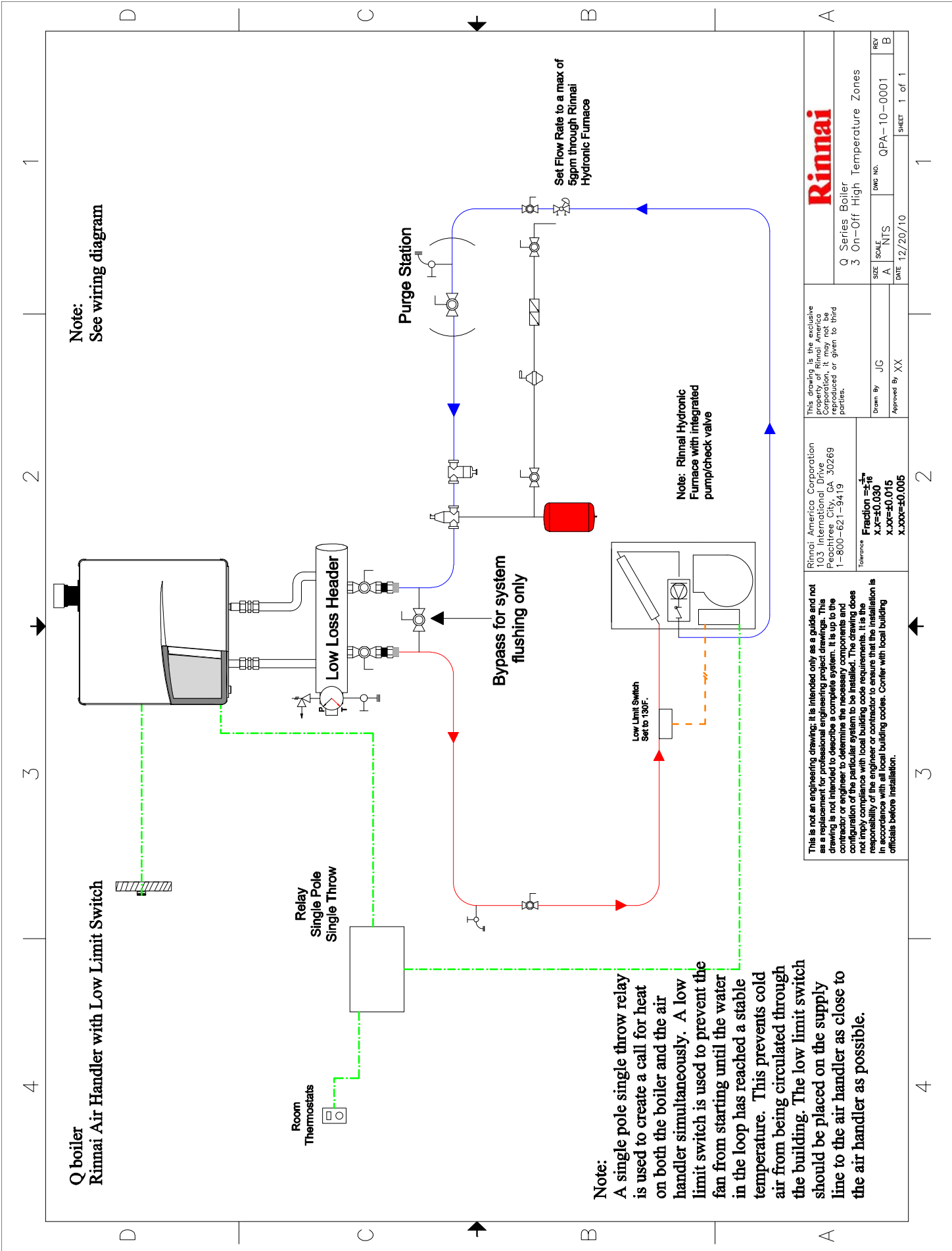
SCALE: NTS

DWG NO. QPA-09-0009

REV: A

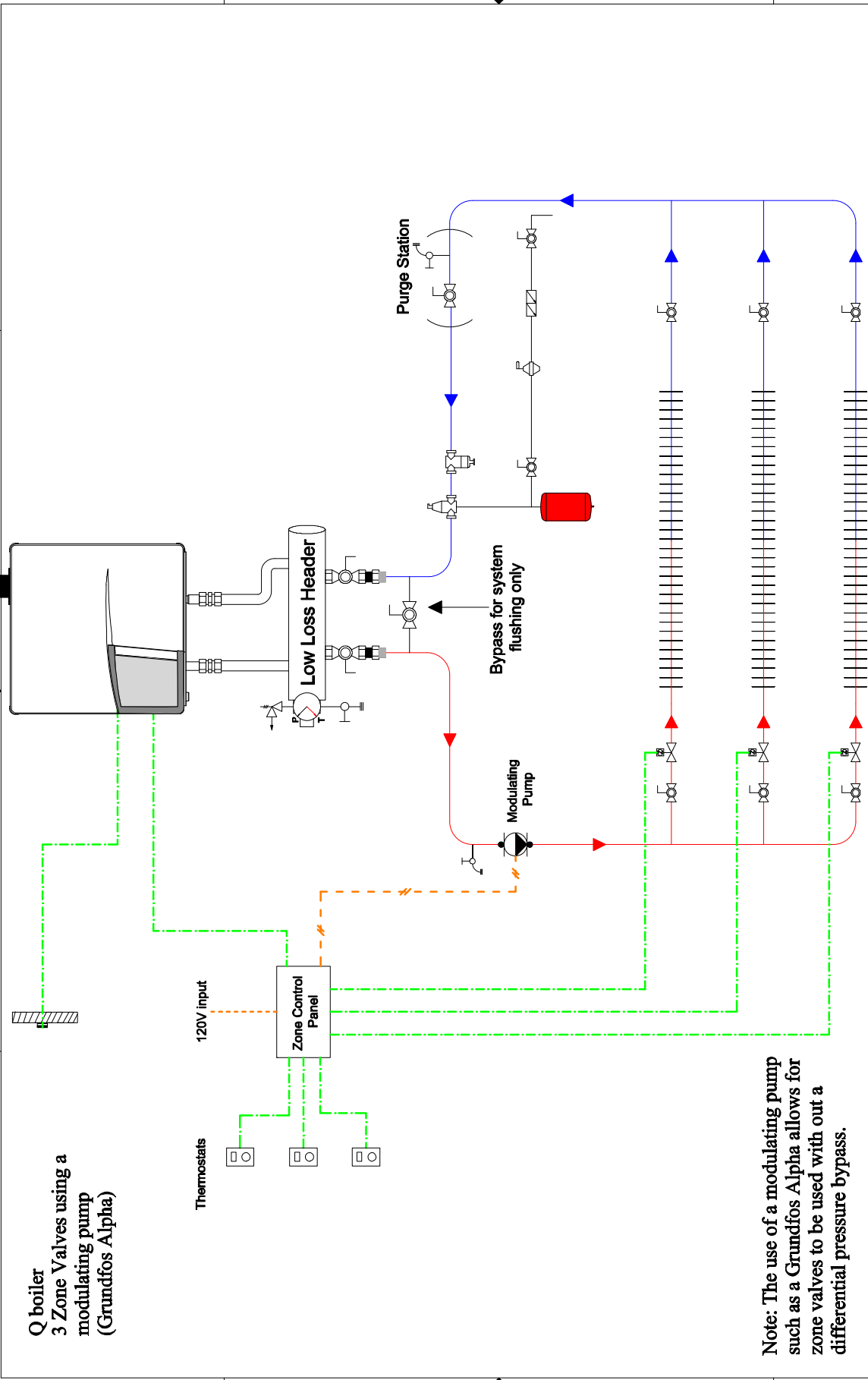
Q and E boilers Condensate Plumbing
With and With out Neutralizer

SHEET 1 of 1

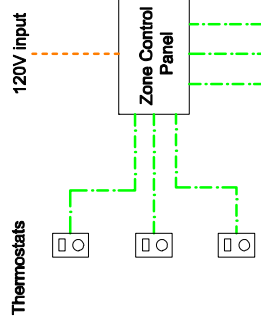


<p>This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering project drawings. This drawing is not intended to be used for design, construction, or installation of the particular system to be installed. The drawing does not imply compliance 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.</p>	<p>Rinnai America Corporation 103 International Drive Peachtree City, GA 30269 1-800-621-9419</p>	<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: JC Approved By: XX</p>	<p>DATE: 12/20/10</p>
<p>Rinnai America Corporation 103 International Drive Peachtree City, GA 30269 1-800-621-9419</p>		<p>Q Series Boiler 3 On-Off High Temperature Zones</p>	<p>REV: B</p>
<p>Tolerance Fraction = $\frac{1}{16}$ X.X = ±0.030 X.XX = ±0.015 X.XXX = ±0.005</p>		<p>SIZE: A SCALE: INTS</p>	<p>DWG NO.: QPA-10-0001 SHEET: 1 of 1</p>

4 3 2 1



Q boiler
3 Zone Valves using a modulating pump (Grundfos Alpha)



Note: The use of a modulating pump such as a Grundfos Alpha allows for zone valves to be used with out a differential pressure bypass.

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Drawn By: RM
 Approved By: JG

Size: A
 Scale: INTS
 Date: 02/17/11

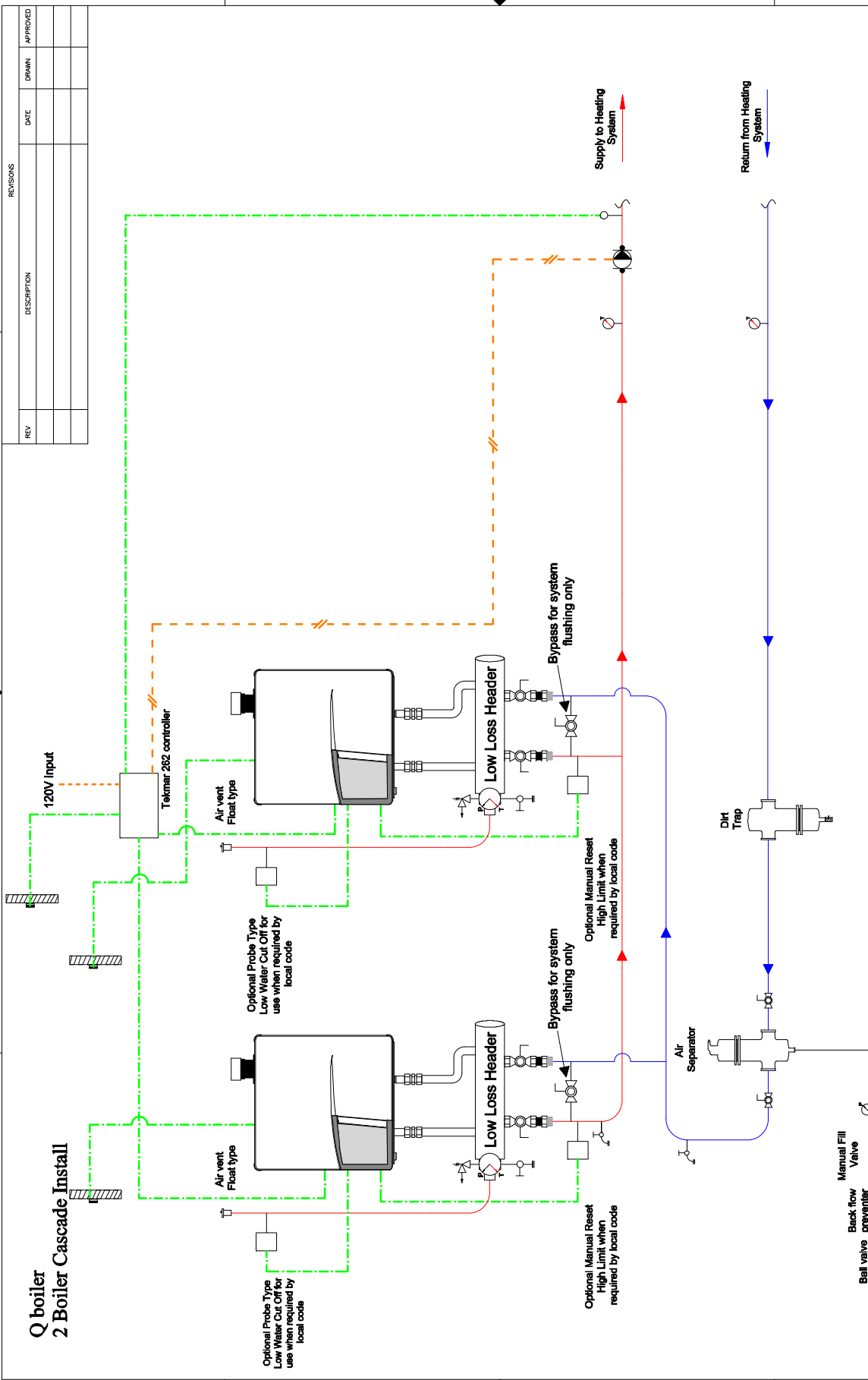
Q Series Boiler
 3 Zone Valves with Modulating Pump

Tolerance:
 Fraction: $\pm \frac{1}{16}$
 X.XX=±0.030
 X.XXX=±0.015
 X.XXXX=±0.005

DWG NO.: QPA-11-0001
 SHEET: 1 of 1

1 2 3 4

Q boiler 2 Boiler Cascade Install



REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

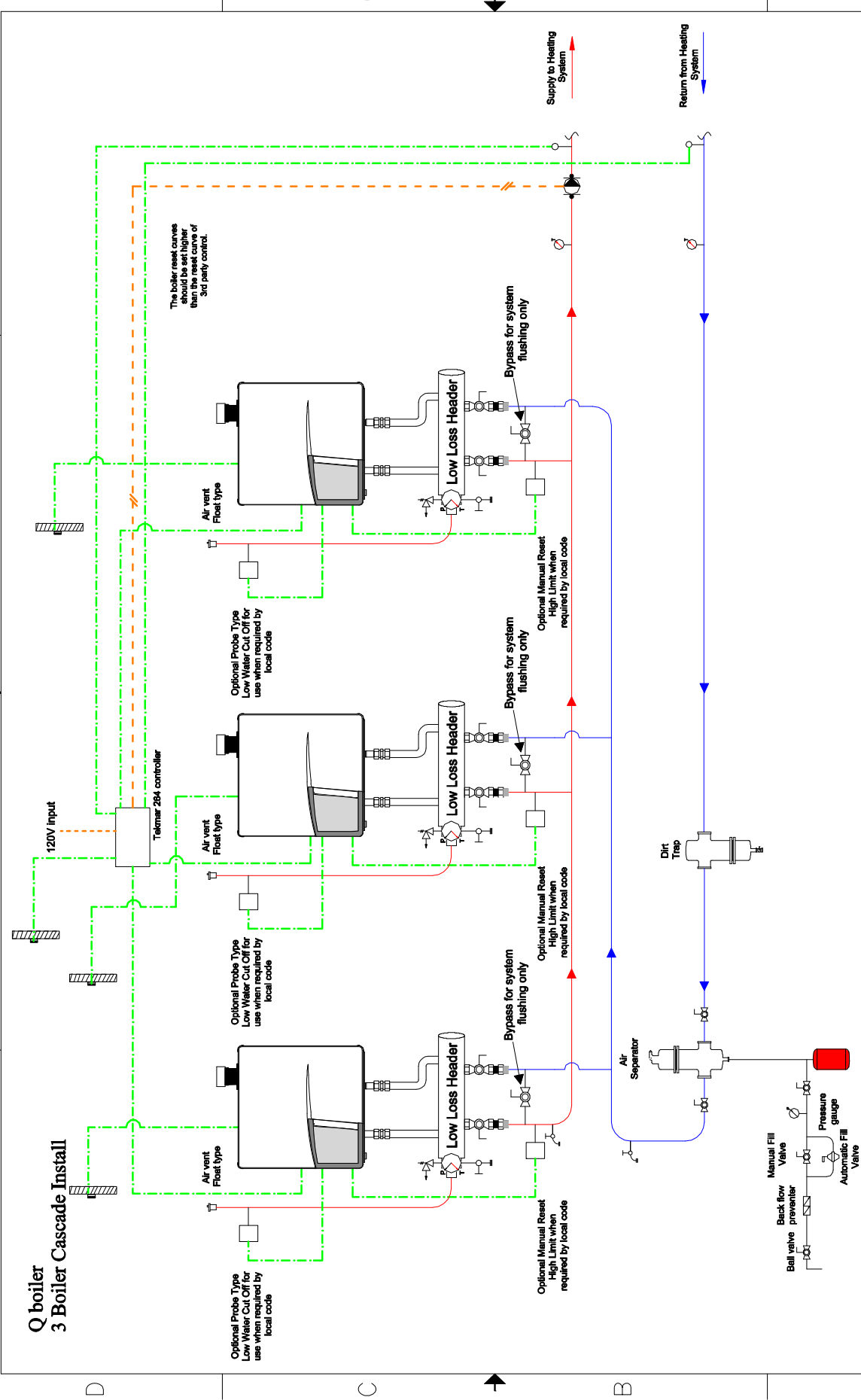
This is not an engineering drawing; it is intended only as a guide and not as a replacement for professional engineering project drawings. This drawing is not intended to describe a complete system. It is up to the contractor or engineer to determine the feasibility, requirements and compliance of the system with local building codes. This drawing does not imply compliance with local building codes 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.

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Tolerances
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 X.XXXX=±0.005

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Drawn By	JC	Q Series Boiler	REV
Approved By	EL	2 Boiler Install	C
DATE	11/19/09	SIZE	A
		SCALE	N.T.S.
		DWG NO.	QPC-09-0001
			SHEET 1 of 1

Q boiler 3 Boiler Cascade Install



The boiler reset curves should be set higher than the reset curve of 3rd party control.

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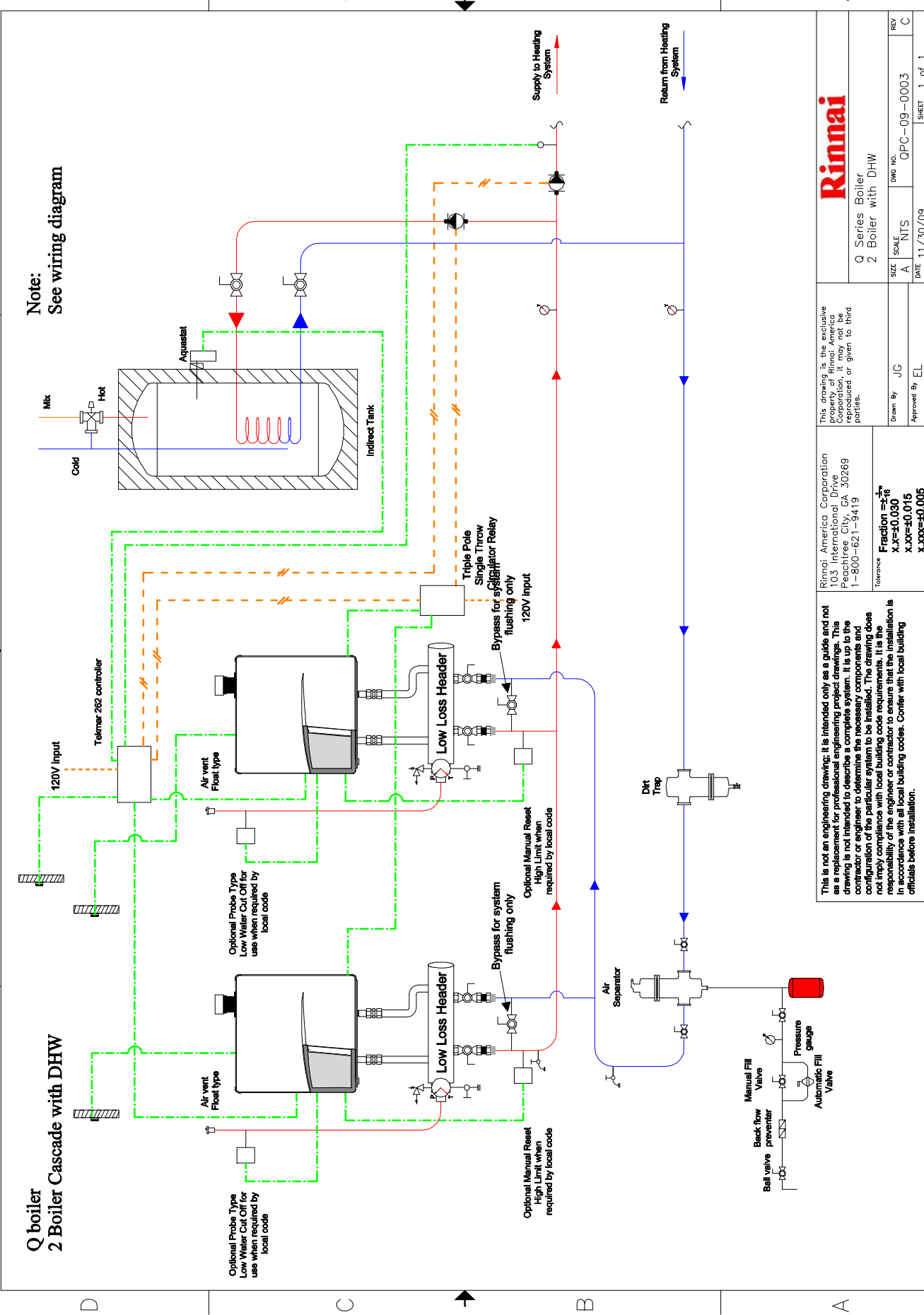
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Rinnai
Q Series Boiler
3 Boiler Install

Drawn By	JC	SIZE	A	SCALE	INTS	DWG NO.	QPC-09-0002	REV	C
Approved By	EL	DATE	11/19/09					SHEET 1 of 1	

Q boiler 2 Boiler Cascade with DHW

Note:
See wiring diagram



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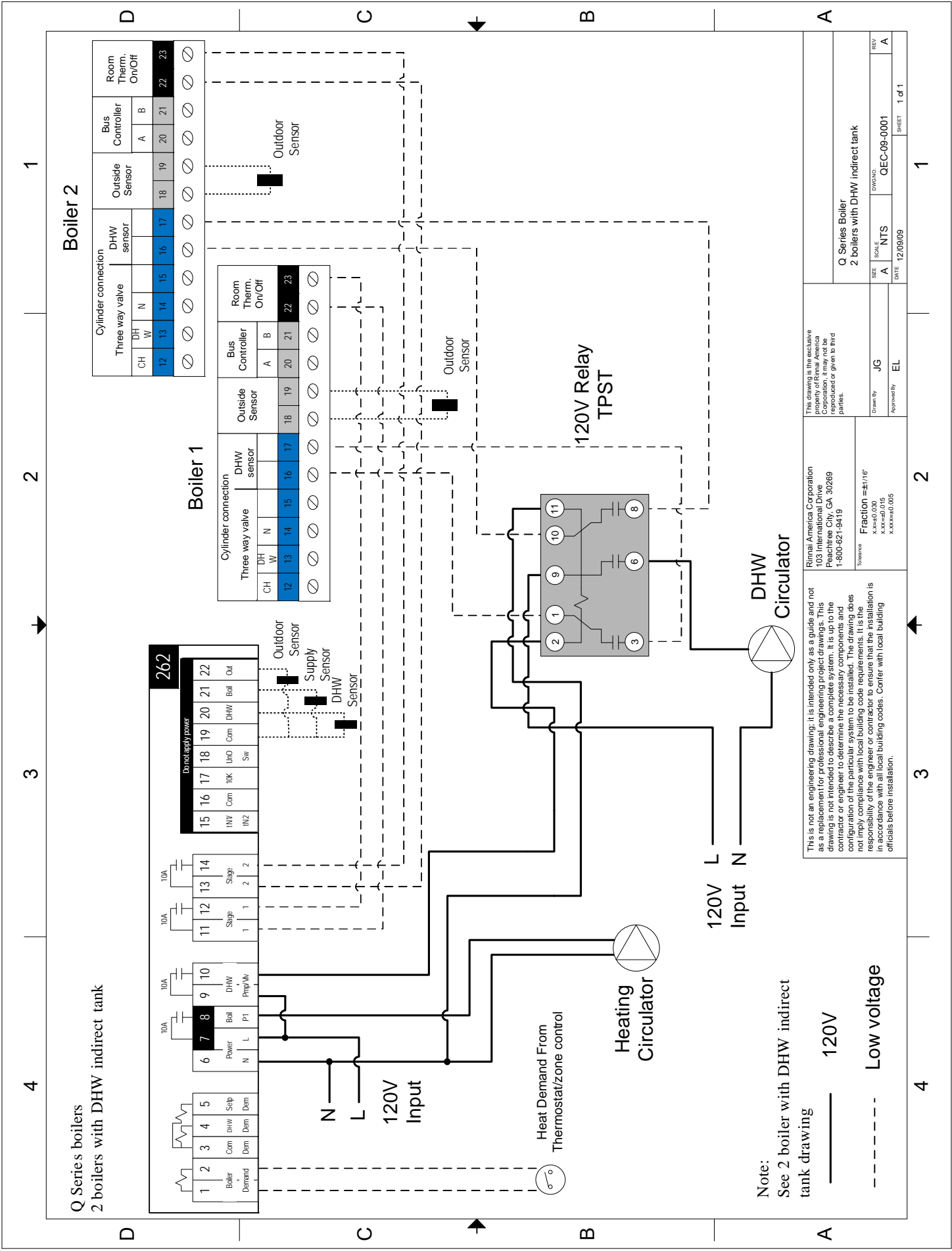
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Tolerance
Fraction = $\frac{1}{16}$
X.X = ±0.030
X.XXX = ±0.015
X.XXXX = ±0.005

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Drawn By JC
Approved By EL

Rinnai		Q Series Boiler 2 Boiler with DHW	REV C
DATE	SCALE	DWG NO.	SHEET
11/30/09	INTS	QFC-09-0003	1 of 1



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Drawn By: **JG**
Checked By: **EL**
Approved By: **EL**

Scale: **A**
Date: **12/09/09**

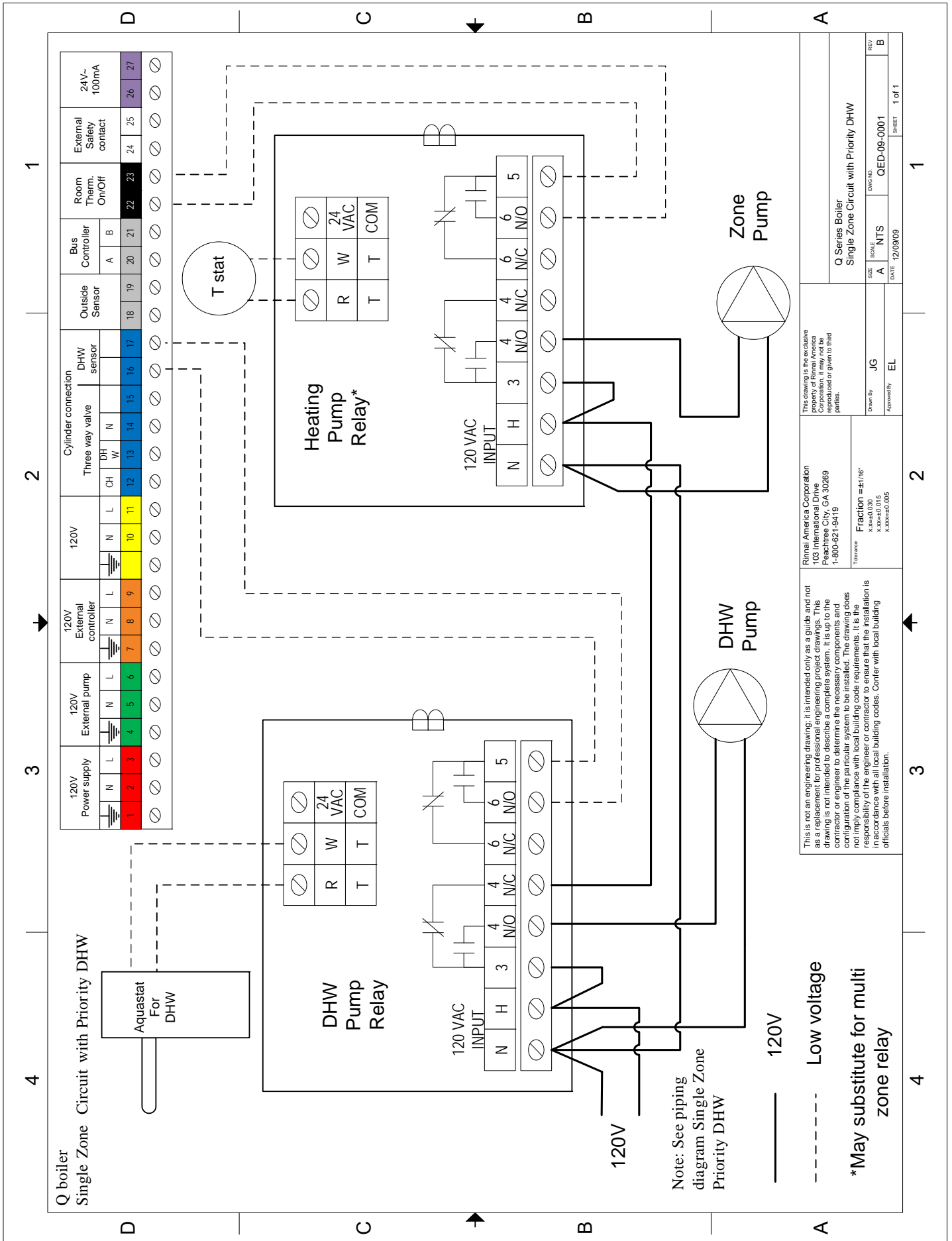
Project: **Q Series Boiler**
Description: **2 boilers with DHW indirect tank**

Sheet: **1 of 1**

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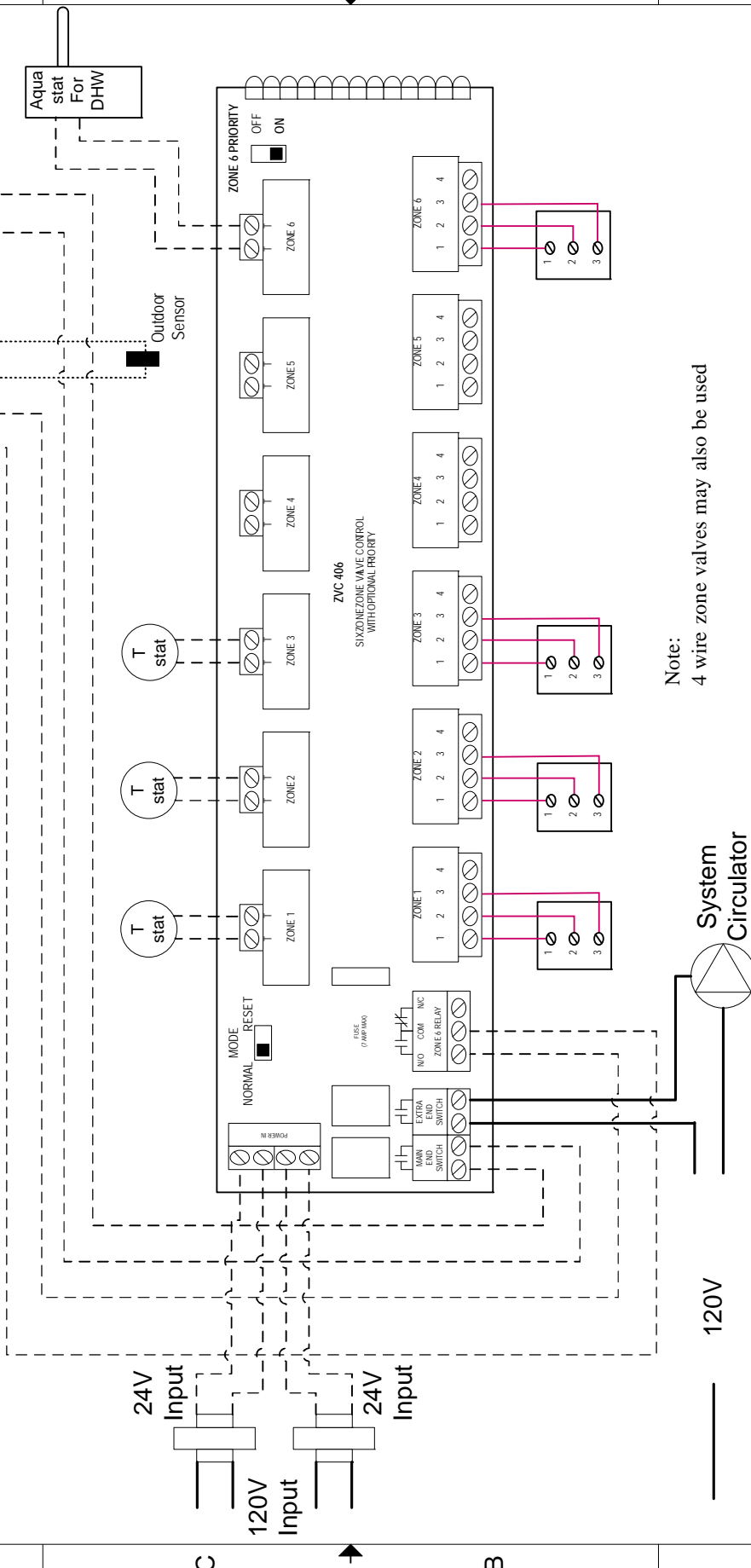
Fraction: 1/16
X.XX=0.015
X.XXX=0.005



**Q boiler
4 Zone Valves with Priority DHW**

Note: 100% zone valve systems with DHW should use only the ZVC 406

120V Power supply		120V External pump		120V External controller		120V		Three way valve				DHW sensor		Cylinder connection		Outside Sensor		Bus Controller		Room Therm. On/Off		External Safety contact		24V~ 100mA			
N	L	N	L	N	L	N	L	N	L	N	L	N	L	N	L	N	L	A	B	A	B	24	25	26	27		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	

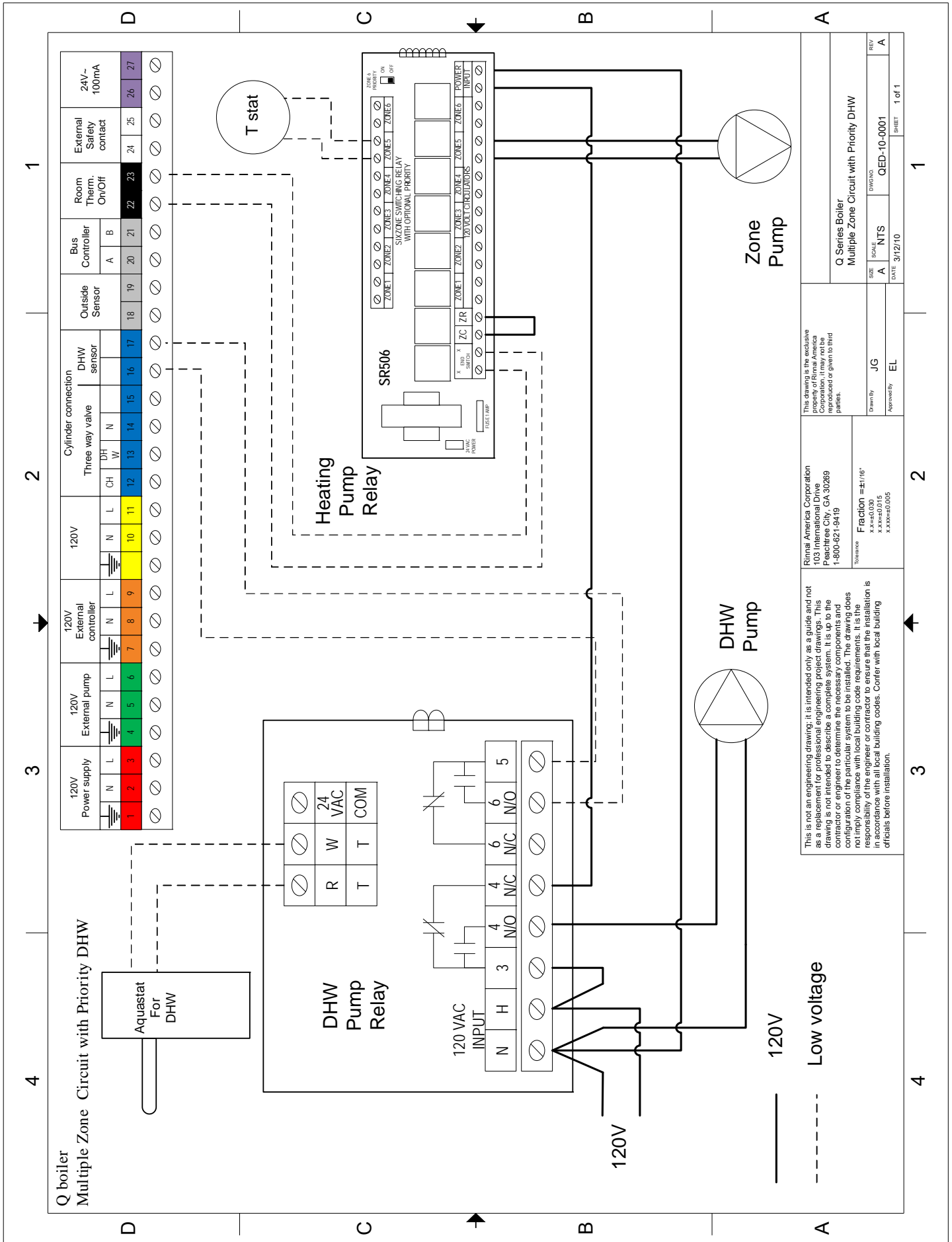


Note:
4 wire zone valves may also be used

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Note:
Switch positions and jumpers

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Drawn By JG	Scale AS SHOWN	Checked By EL	Rev A
Approved By EL	DATE 12/17/09	Q Series Boiler 4 Zone Valves with Priority/DHW QED-09-0002	



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Drawn by: JG
 Approved by: EL

DATE: 3/12/10

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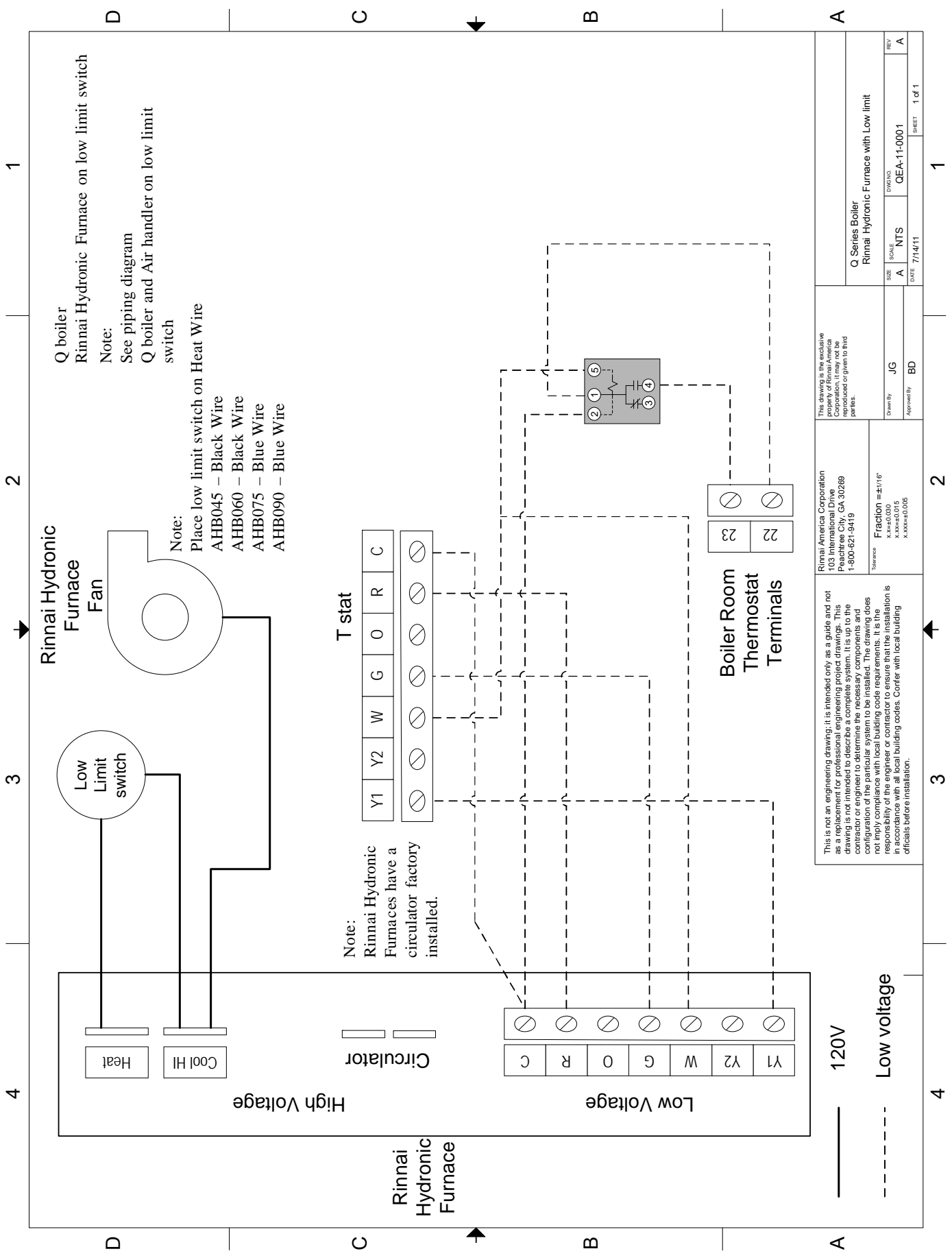
Revision: Fraction = ±1/16"
 X.XX=±0.030"
 X.XXX=±0.005

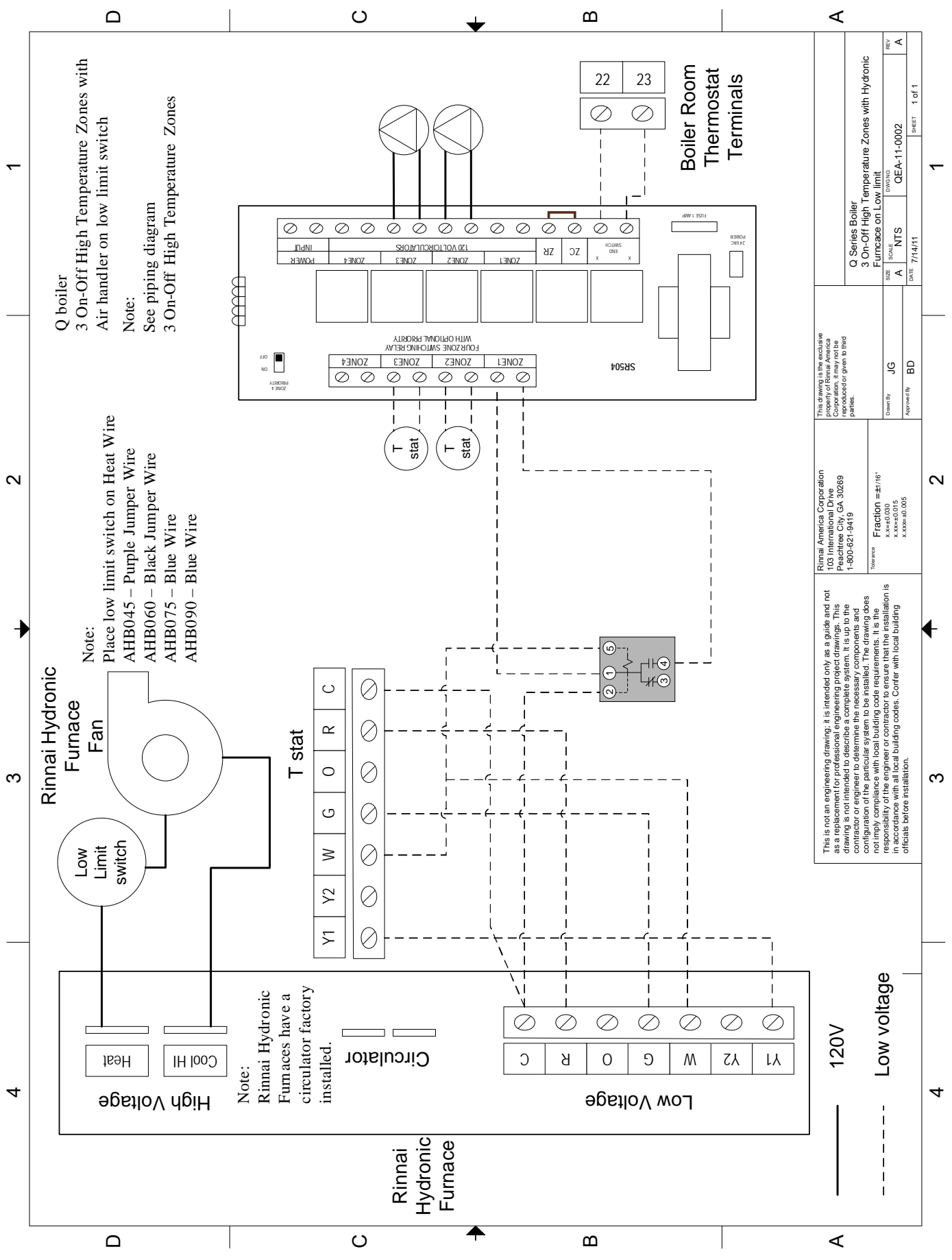
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Q Series Boiler Multiple Zone Circuit with Priority DHW

SIZE: A
 SCALE: NTS
 DATE: 3/12/10

REV: A
 SHEET: 1 of 1





Q boiler
3 On-Off High Temperature Zones with Air handler on low limit switch
Note:
See piping diagram
3 On-Off High Temperature Zones

Note:
Place low limit switch on Heat Wire
AHB045 – Purple Jumper Wire
AHB060 – Black Jumper Wire
AHB075 – Blue Wire
AHB090 – Blue Wire

Note:
Rinnai Hydronic Furnaces have a circulator factory installed.

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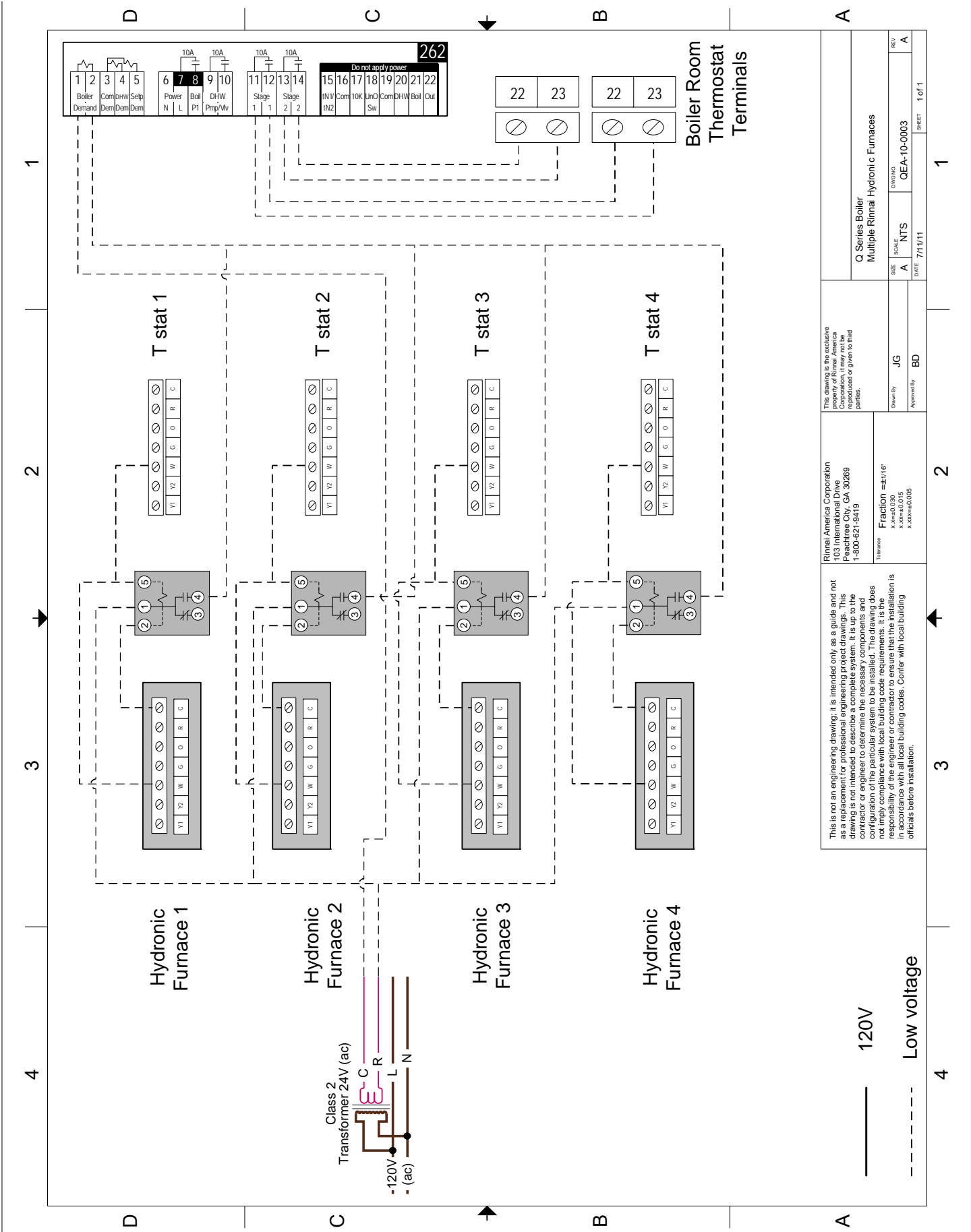
Drawn By: JG
Approved By: BD

Q Series Boiler
3 On-Off High Temperature Zones with Hydronic Furnace on Low limit

DATE: 7/14/11
DWG NO.: QEA-11-0002
SCALE: NTS
SHEET: 1 of 1

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Fraction = ±1/16"
X.X.X=0.000
X.XX=0.005
X.XXX=0.005



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Fraction = ±11/6"
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 X.XXX ±0.015
 X.XXXX ±0.005

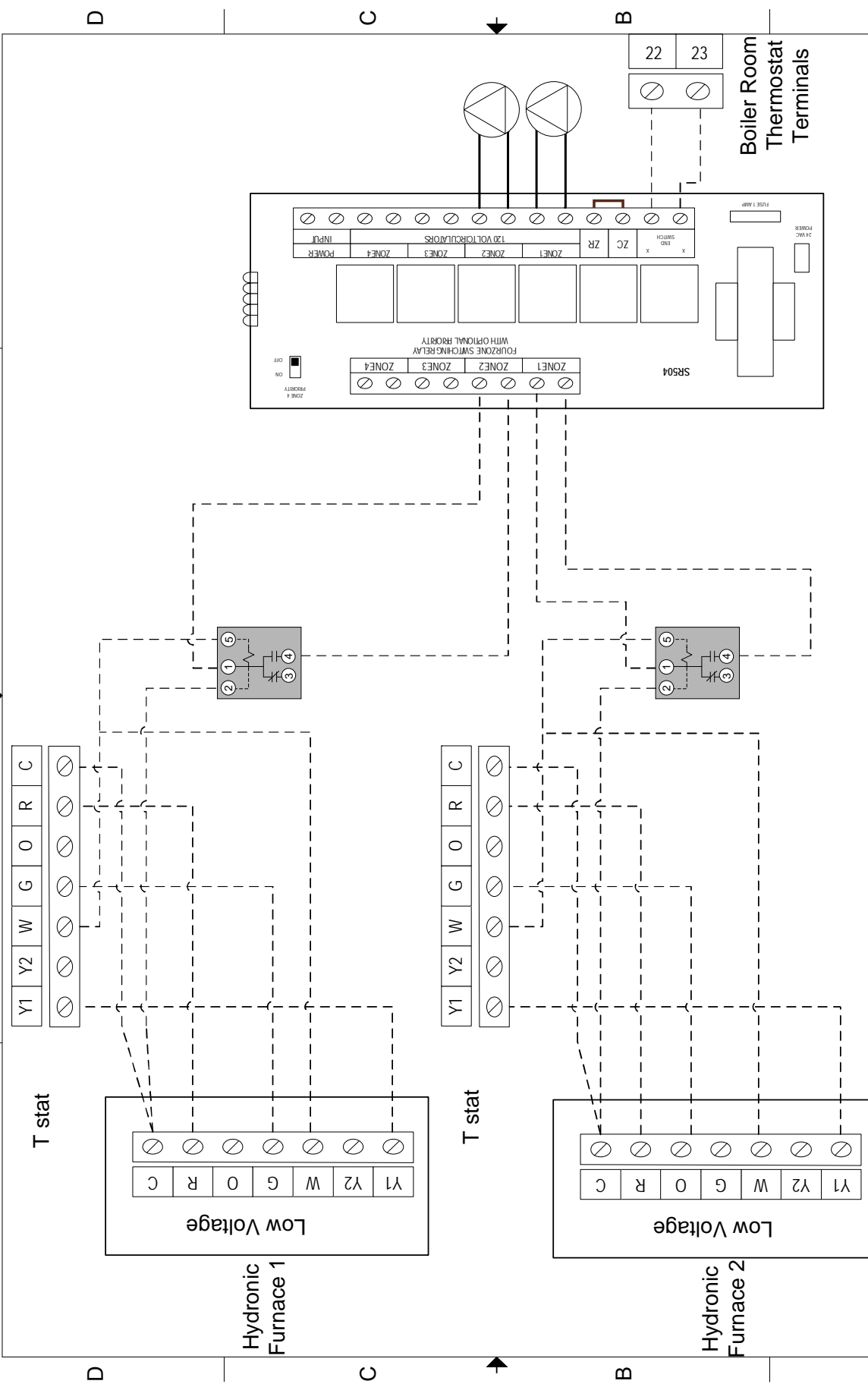
Q Series Boiler
 Multiple Rinnai Hydronic Furnaces

Drawn By: JG
 Approved By: BD

DATE: 7/11/11
 SCALE: A
 SIZE: NTS
 DWG NO: QEA-10-0003
 REV: A

SHEET 1 of 1

1 2 3 4



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Drawn By: JG
Approved By: BD

Size: A
Scale: NTS
Date: 7/14/11

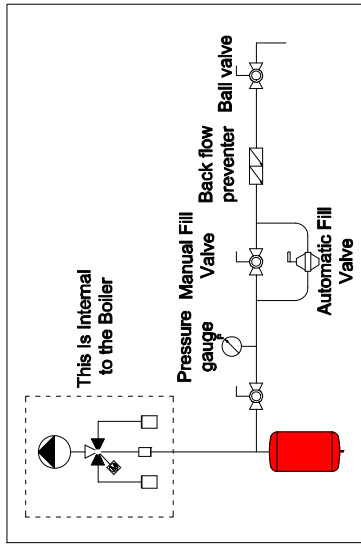
Q Series Boiler
2 On-Off High Temperature Hydronic Furnaces

Draw No: QEA-11-0004
Rev: A

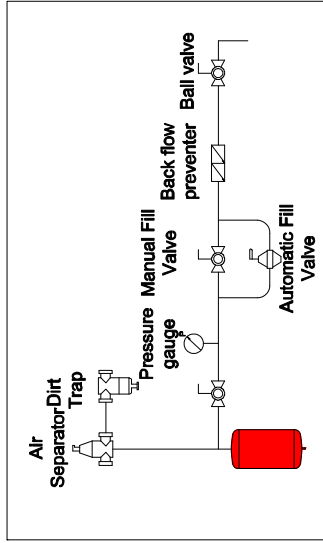
Sheet: 1 of 1

Rinnai Boilers Legend

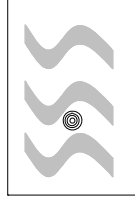
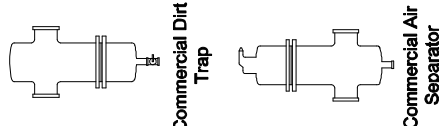
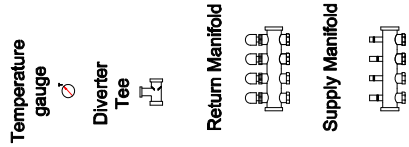
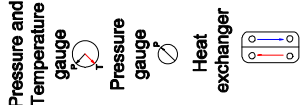
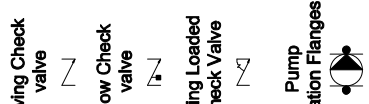
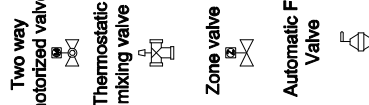
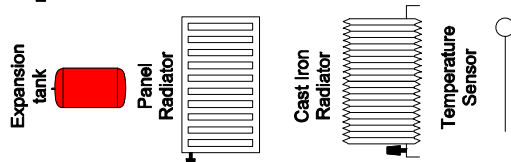
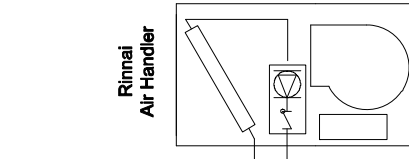
The following picture illustrates a suggested arrangement. Some of the fittings are optional.



The following picture illustrates a suggested arrangement. Some of the fittings are optional.



Baseboard Convectors



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Drawn By	JC	DWG NO.	LEGEND	REV
Approved By	EL	DATE	11/19/09	A
SIZE	A	SCALE	NTS	
Rinnai Boilers Legend				SHEET 1 of 1

Notes

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EXPERIENCE OUR INNOVATION™



Tankless Water Heaters

- Residential and Commercial Applications
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- ENERGY STAR® qualified models
- Up to 9.8 GPM
- Internal or External Installation
- Digital Temperature Control



Direct Vent Furnaces

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- Vent Terminal A Included
- Blower Included



Direct-Vent Fireplace, RHFE-750ETRA

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- Zero-Clearance Installation
- Available in Four Options of Fronts
- Remotes and Fan Included
- Gas Conversion Kit Available



Hydronic Air Handler

- Designed for Use with Rinnai Systems
- Domestic Hot Water Priority
- Optional Programmable Thermostat
- Zero Clearance to Combustibles
- Accommodates Standard Cased-Coils



Boilers

- Residential and Commercial Applications
- ENERGY STAR® qualified models
- Up to 96.5% AFUE efficiency
- Compact wall mounted design
- ASME accredited models



Condensing Tankless Water Heaters

- Residential and Commercial Applications
- ENERGY STAR® qualified models
- Up to 95% thermal efficiency
- Internal or External Installation
- Pair up with the Rinnai Air Handler for efficient home heating



Rinnai Impression - Outdoor Fireplace

- Options include one-sided open, two-sided open, and freestanding.
- No electrical requirements
- Propane or convertible to natural gas with conversion kit provided
- Modular construction offers design flexibility

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For information on Rinnai's products contact
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Peachtree City, GA 30269
TOLL FREE: 1-800-621-9419
FAX: 678-829-1666
www.rinnai.us

Boiler Applications Manual
800000026 Rev D
8/2011