$19.95 US

CAPCO Hydronics 2022

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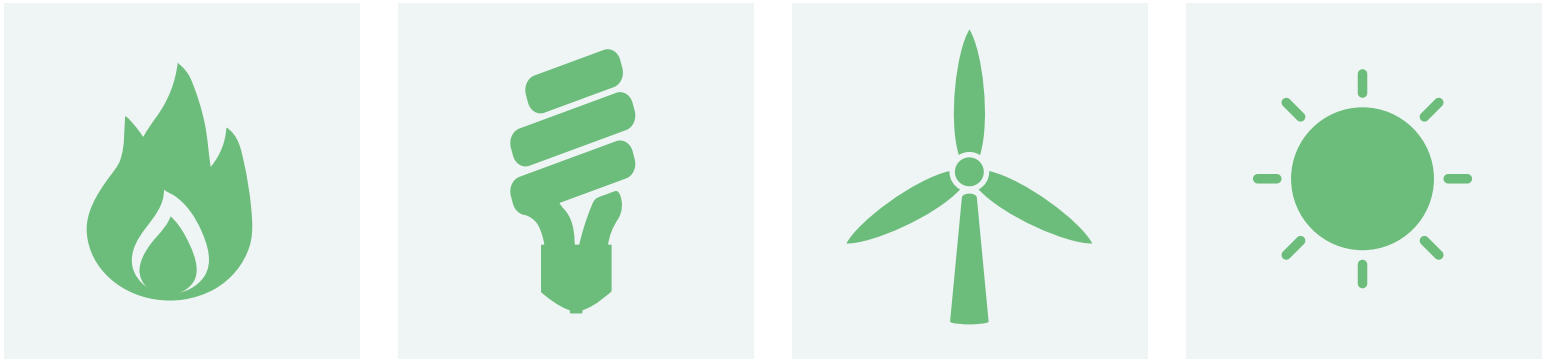
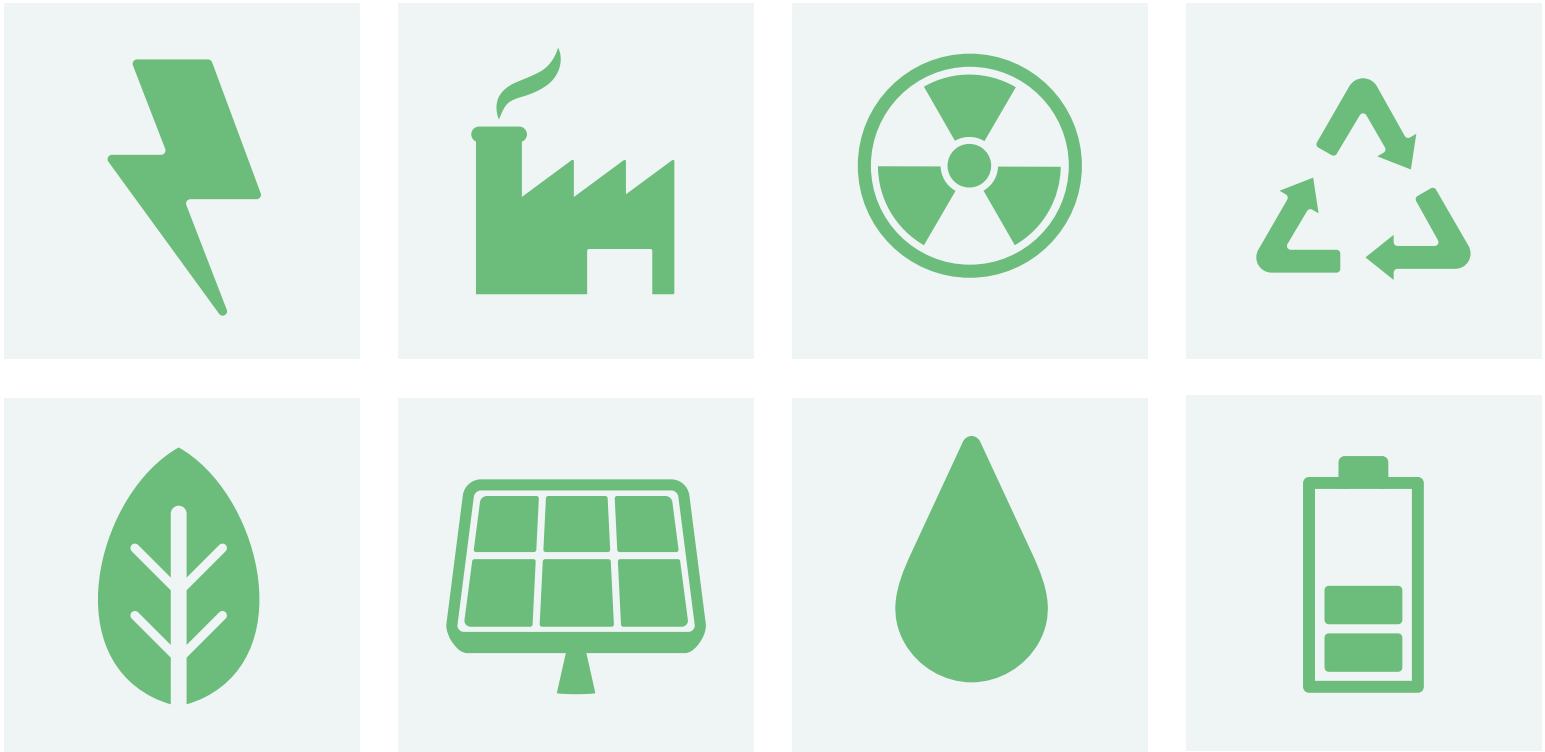


How will we power tomorrow's comfort?



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Application Drawings

Bosch

Lochinvar

Tekmar

Viega

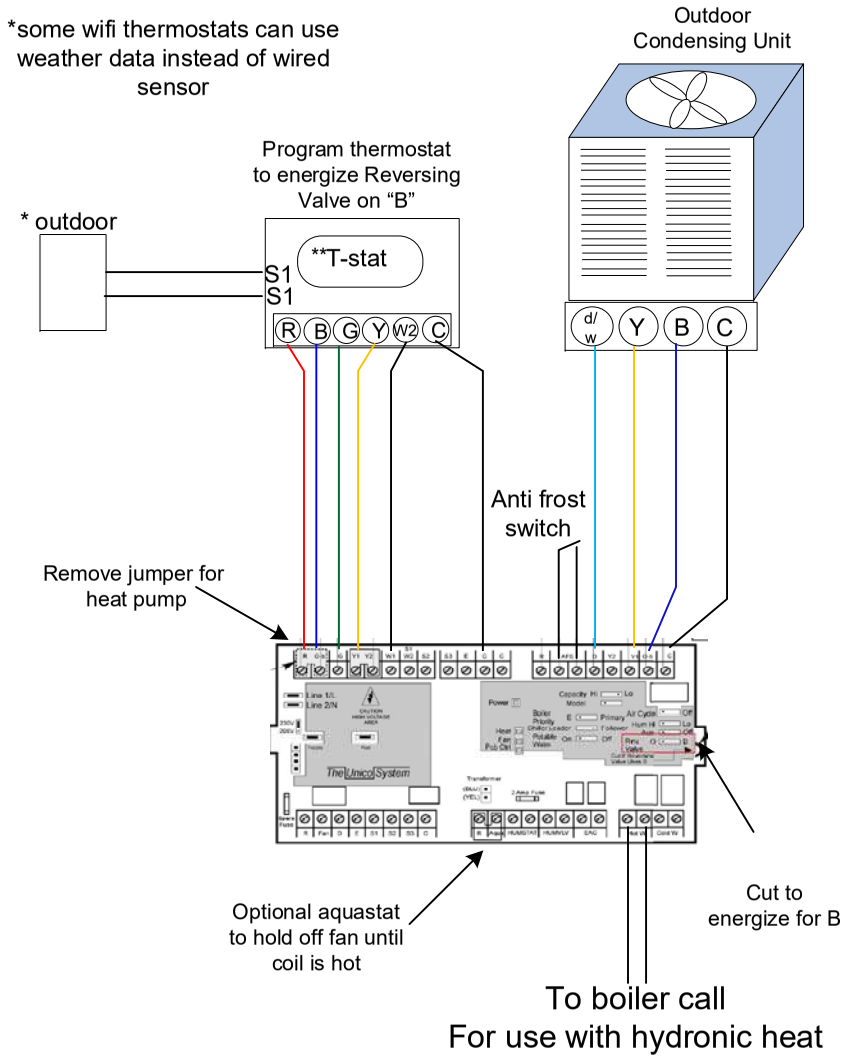
Viessmann

Reference Drawings

Product Specifications

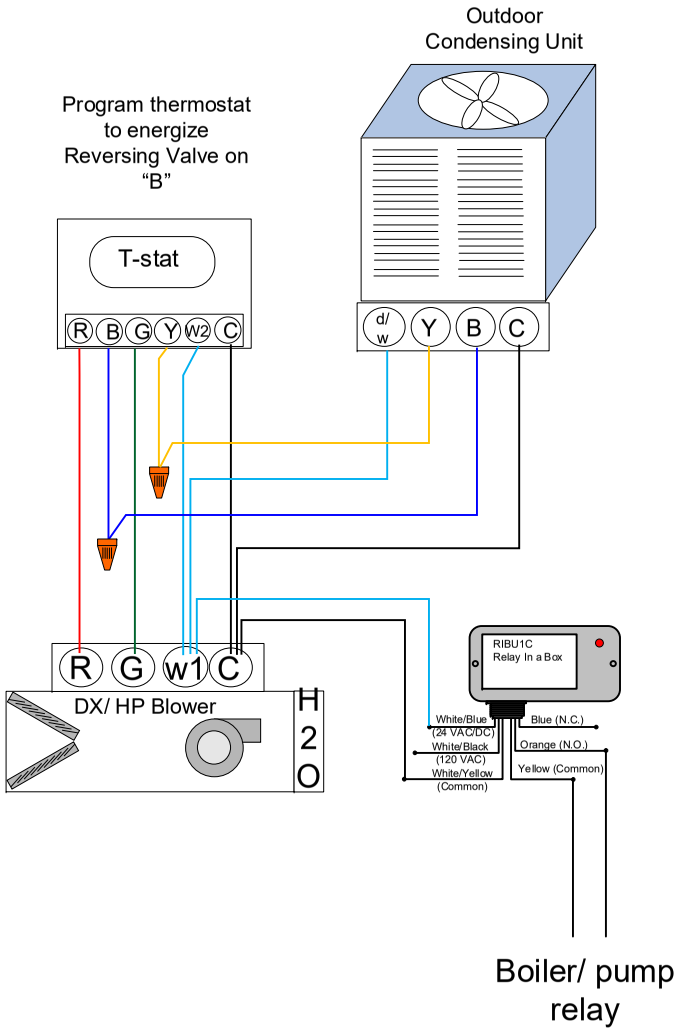
Quick Sheets

Bosch IDS with Unico and Hydronic Back-up



**Set Thermostat to Fossil Fuel application and set balance point to switch over from heat pump to hydronic at ## outdoor temperature if hot water coil is before DX coil as they cannot run simultaneously

Bosch IDS with Hydronic Back-up



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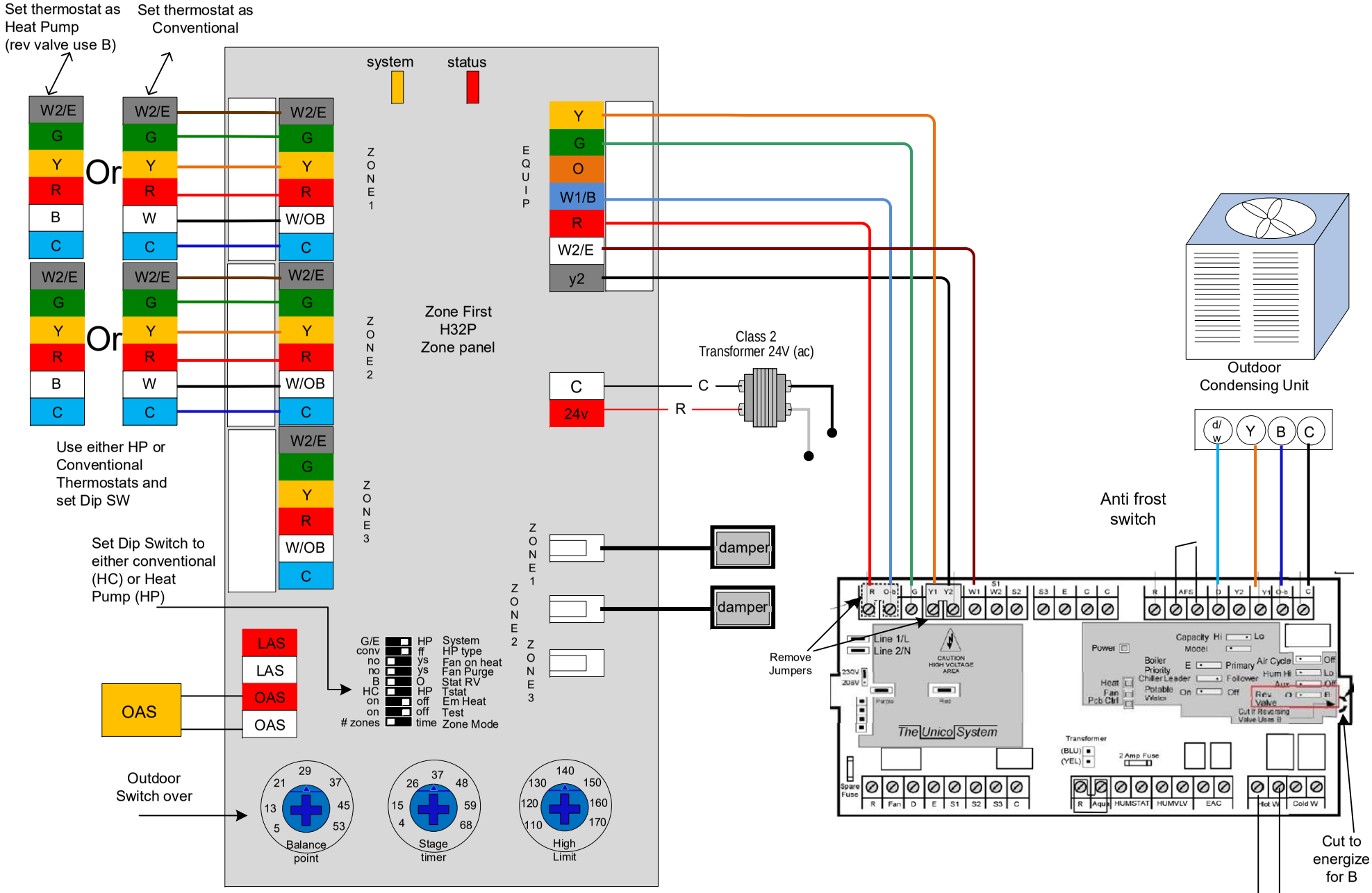
Bosch IDS 1.0

8.23.17 GP



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3 RATH RD WOBURN, MA 01801	Bosch & Unico zoned Conventional or Heat Pump	6.12.19 GP

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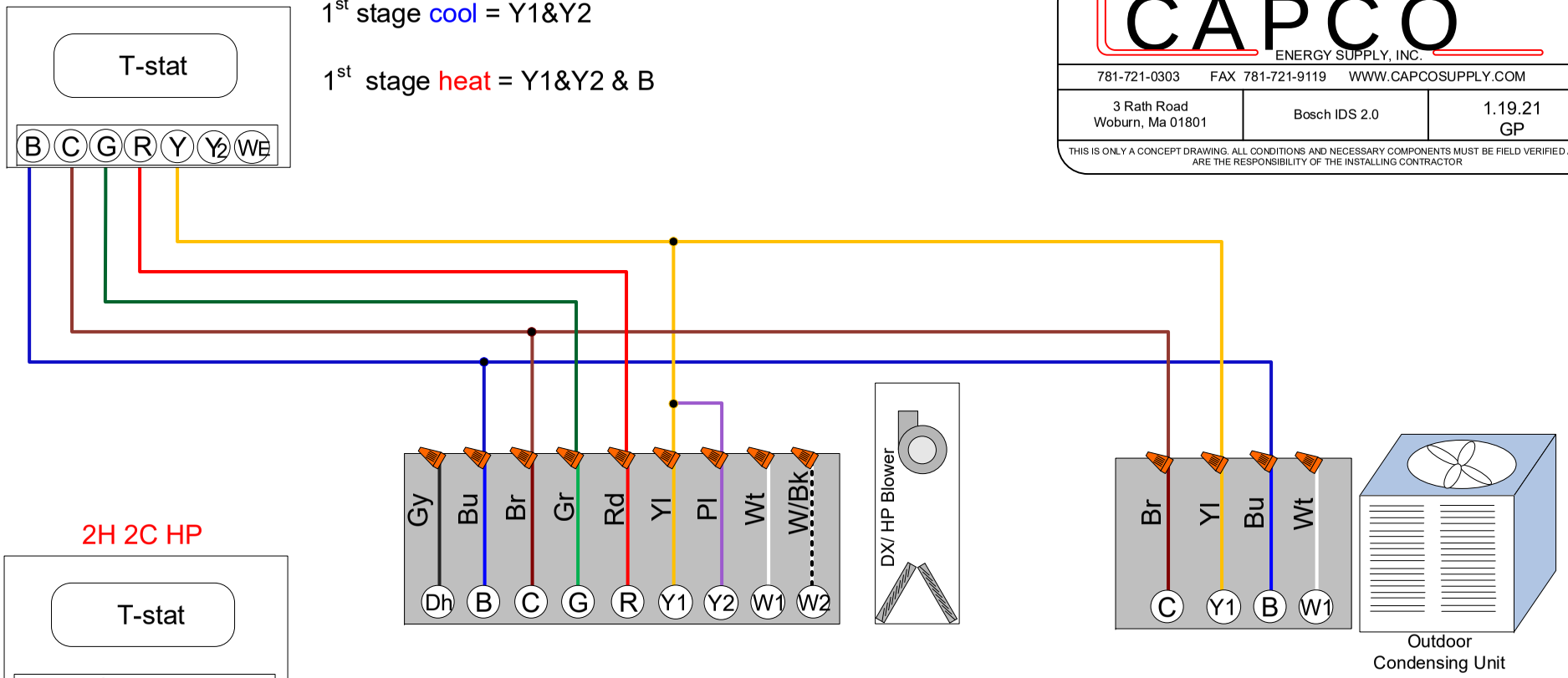
Bosch IDS 2.0

1.19.21
GP

1H 1C HP

1st stage cool = Y1&Y2

1st stage heat = Y1&Y2 & B



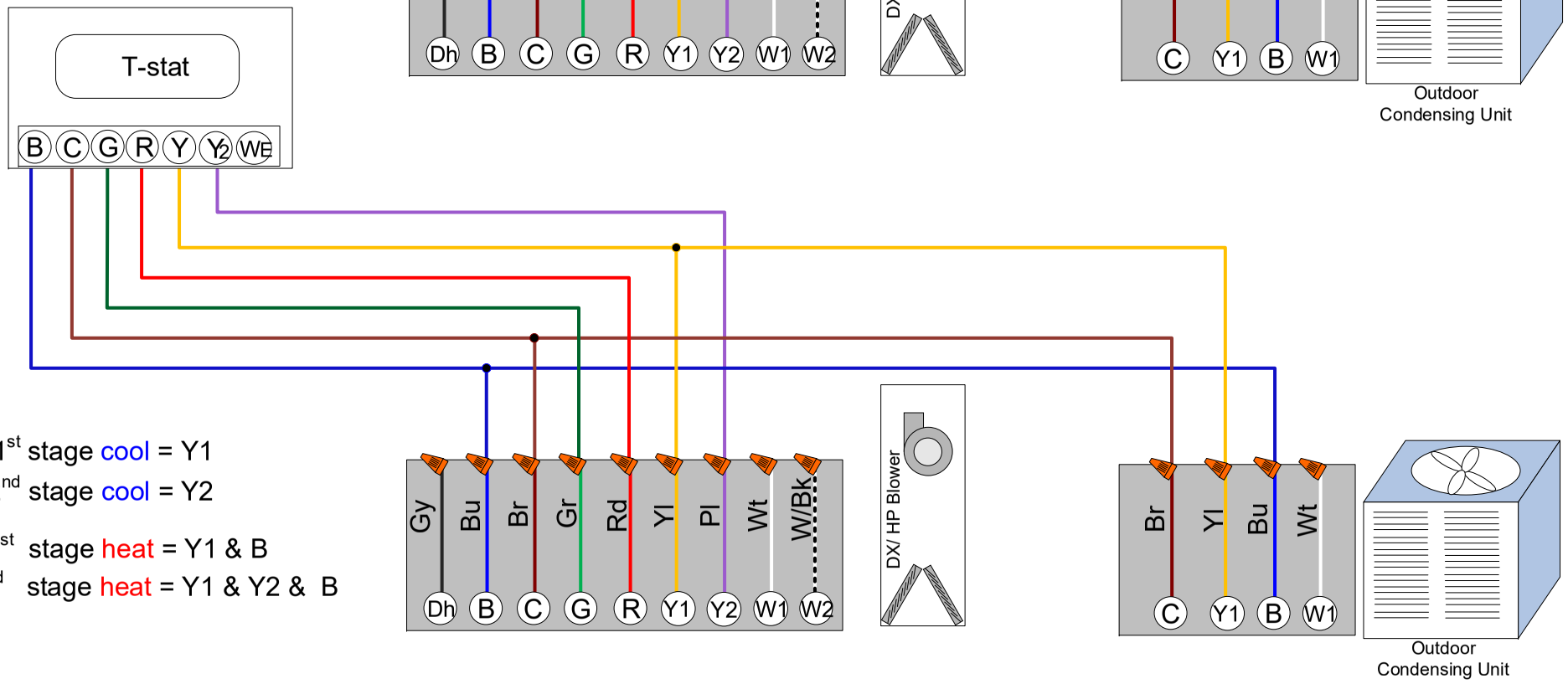
2H 2C HP

1st stage cool = Y1

2nd stage cool = Y2

1st stage heat = Y1 & B

2nd stage heat = Y1 & Y2 & B



3H 2C HP with hydronic or electric

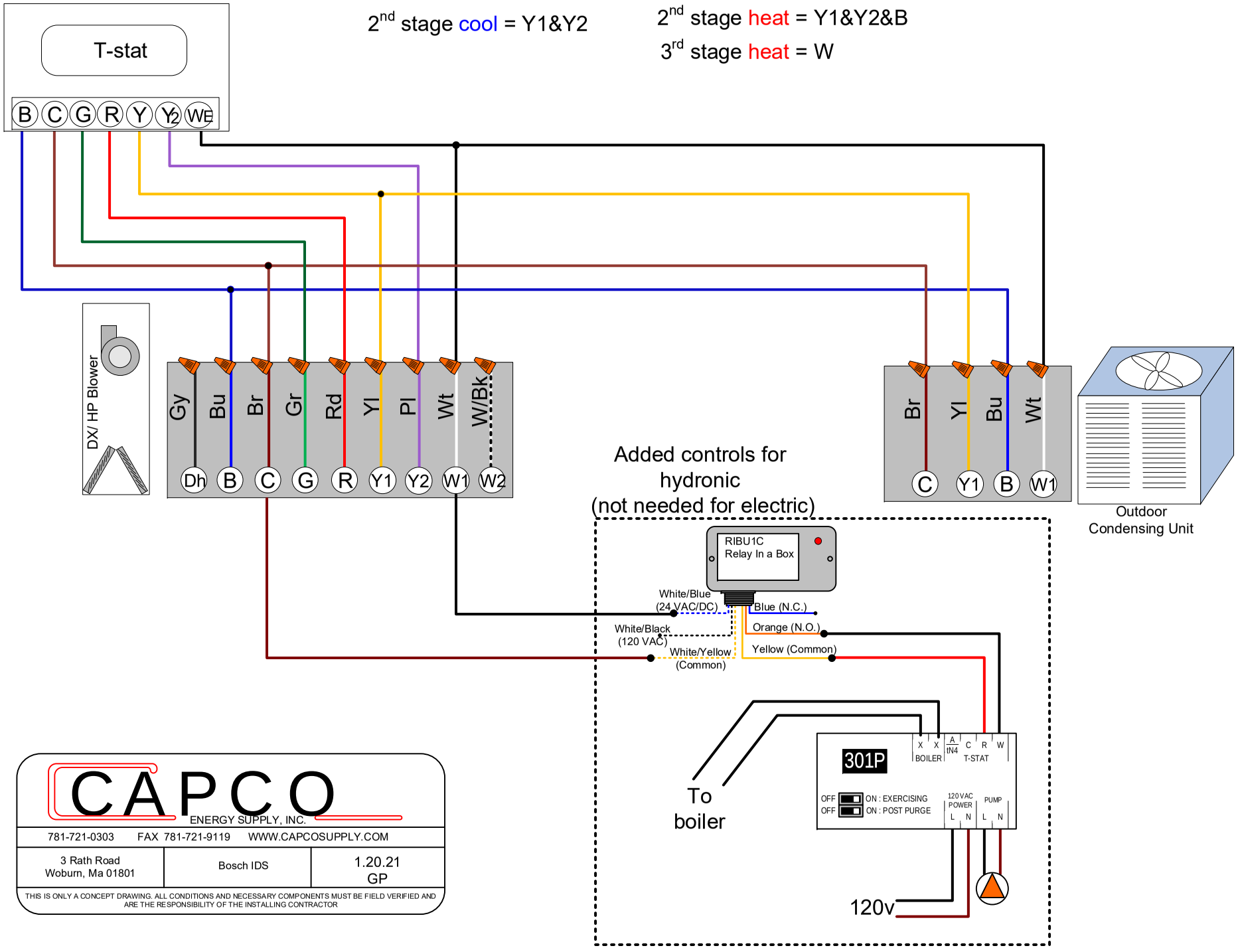
1st stage cool = Y1

2nd stage cool = Y1&Y2

1st stage heat = Y1& B

2nd stage heat = Y1&Y2&B

3rd stage heat = W



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3 Rath Road Woburn, Ma 01801	Bosch IDS	1.20.21 GP

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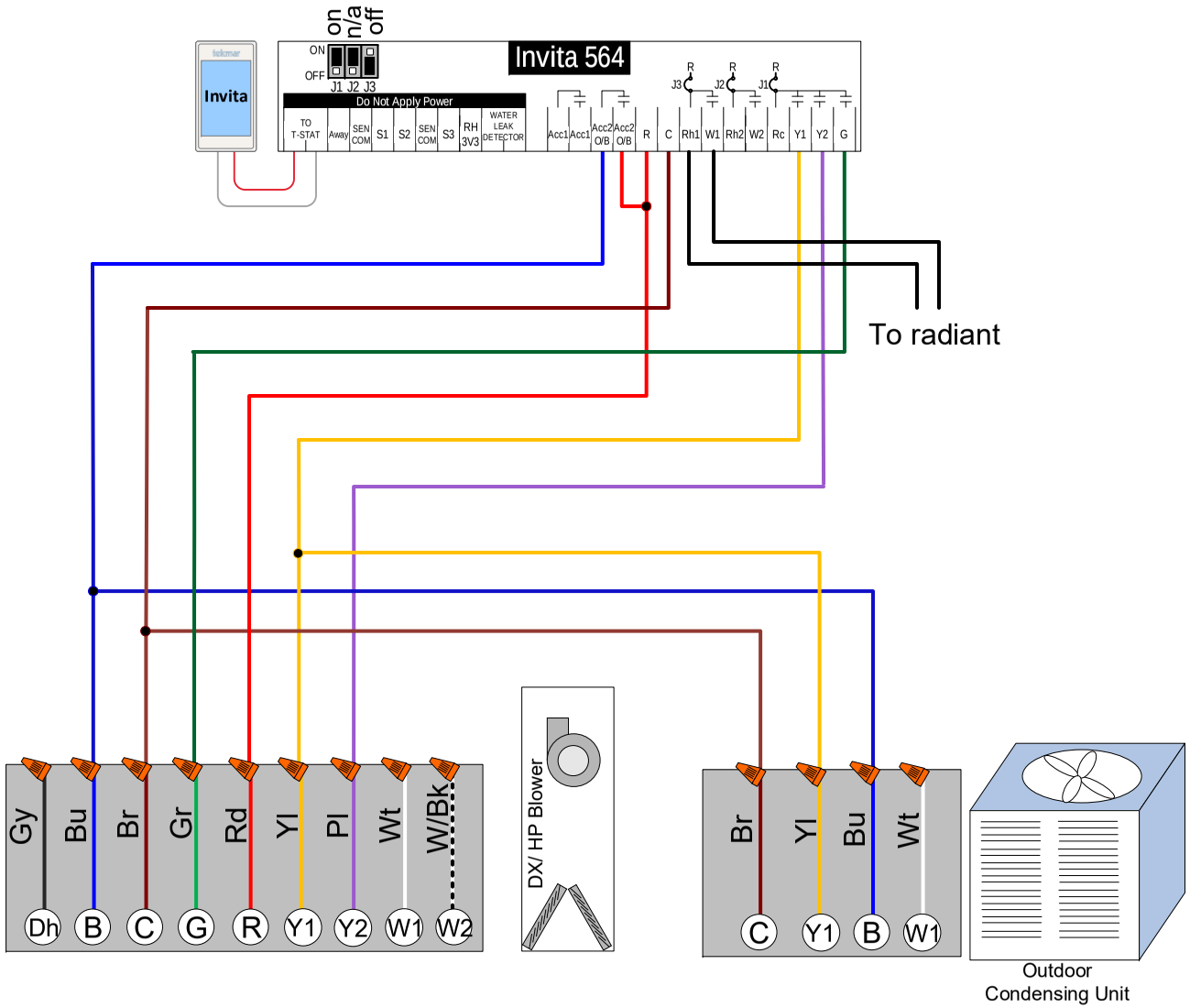

Conventional

Equipment Setting	1H/1C	1H/2C	2H/1C	2H/2C
First stage heating	W1	W1	W1	W1
Second stage heating	-	-	W2	W2
First stage cooling	Y1	Y1	Y1	Y1
Second stage cooling	-	Y2	-	Y2
Fan	G			
Accessory 1	Choice of: Humidifier, Dehumidifier, HRV/ERV			
Accessory 2	Choice of: Humidifier, Dehumidifier			

Heat Pump

Equipment Setting	1HP	1HP/ 1Aux	1HP/ 2Aux	2HP	2HP/ 1Aux	2HP/ 2Aux
First stage heating	Y1	W1	W1	Y1	W1	W1
Second stage heating	-	Y1	Y1	Y2	Y1	Y1
Third stage heating	-	-	W2	-	Y2	Y2
Fourth stage heating	-	-	-	-	-	W2
First stage cooling	Y1	Y1	Y1	Y1	Y1	Y1
Second stage cooling	-	-	-	Y2	Y2	Y2
Fan	G					
Accessory 1	Choice of: Humidifier, Dehumidifier, HRV/ERV ventilator					
Accessory 2	Reversing valve O or B. O relay remains closed during heating operation. B relay remains closed during cooling operation.					

Radiant Heat Pump

Equipment Setting	1HP	1HP/ 1Aux	1HP/ 2Aux	2HP	2HP/ 1Aux	2HP/ 2Aux
First stage heating	Y1	Y1	Y1	Y1	Y1	Y1
Second stage heating	-	W1	W1	Y2	Y2	Y2
Third stage heating	-	-	W2	-	W1	W1
Fourth stage heating	-	-	-	-	-	W2
First stage cooling	Y1	Y1	Y1	Y1	Y1	Y1
Second stage cooling	-	-	-	Y2	Y2	Y2
Fan	G					
Accessory 1	Choice of: Humidifier, Dehumidifier, HRV/ ERV ventilator					
Accessory 2	Reversing valve O relay remains closed during heating. Reversing valve B relay remains closed during cooling.					

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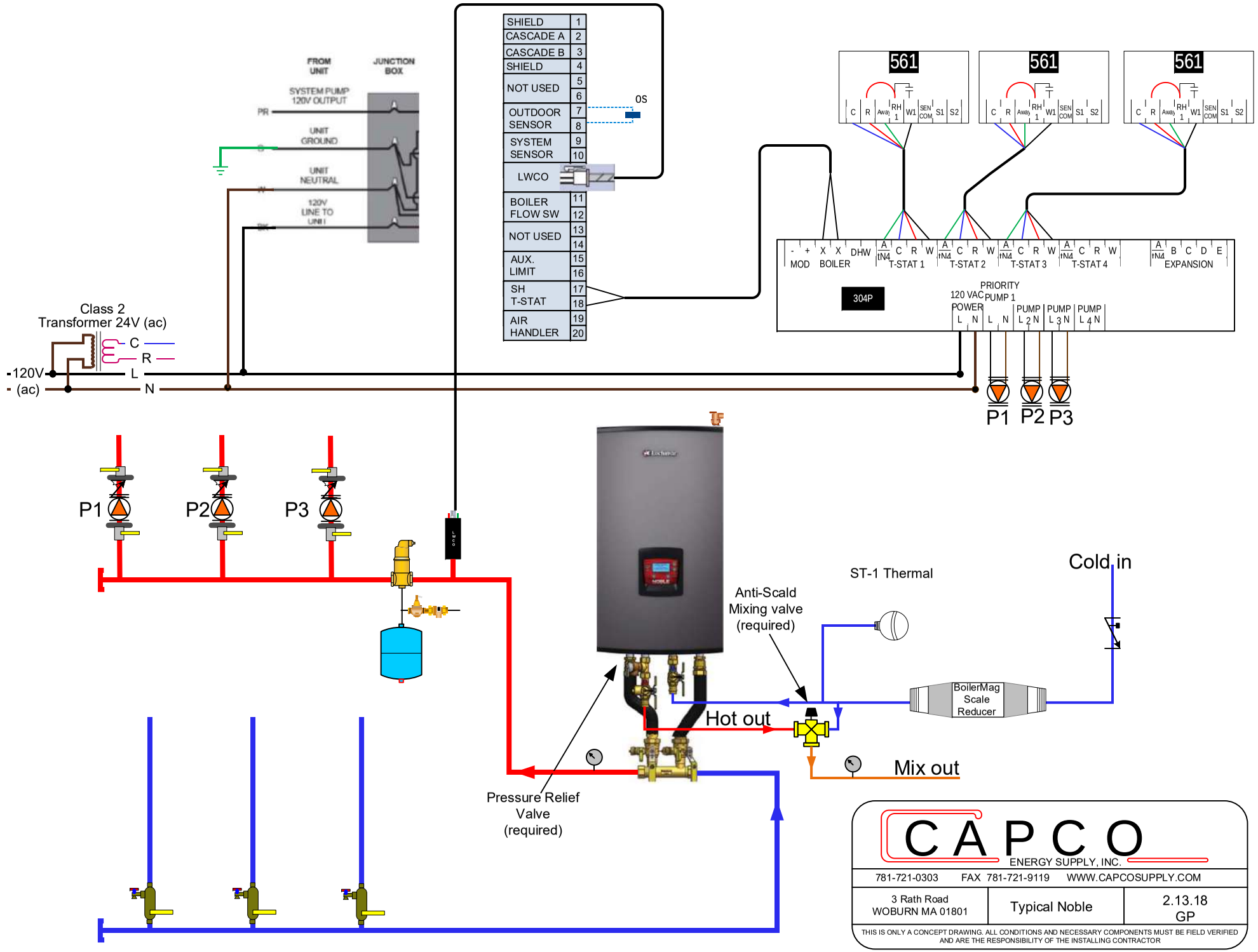
Bosch IDS 2.0
w/ radiant

1.19.21
GP



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Typical Noble

2.13.18
GP

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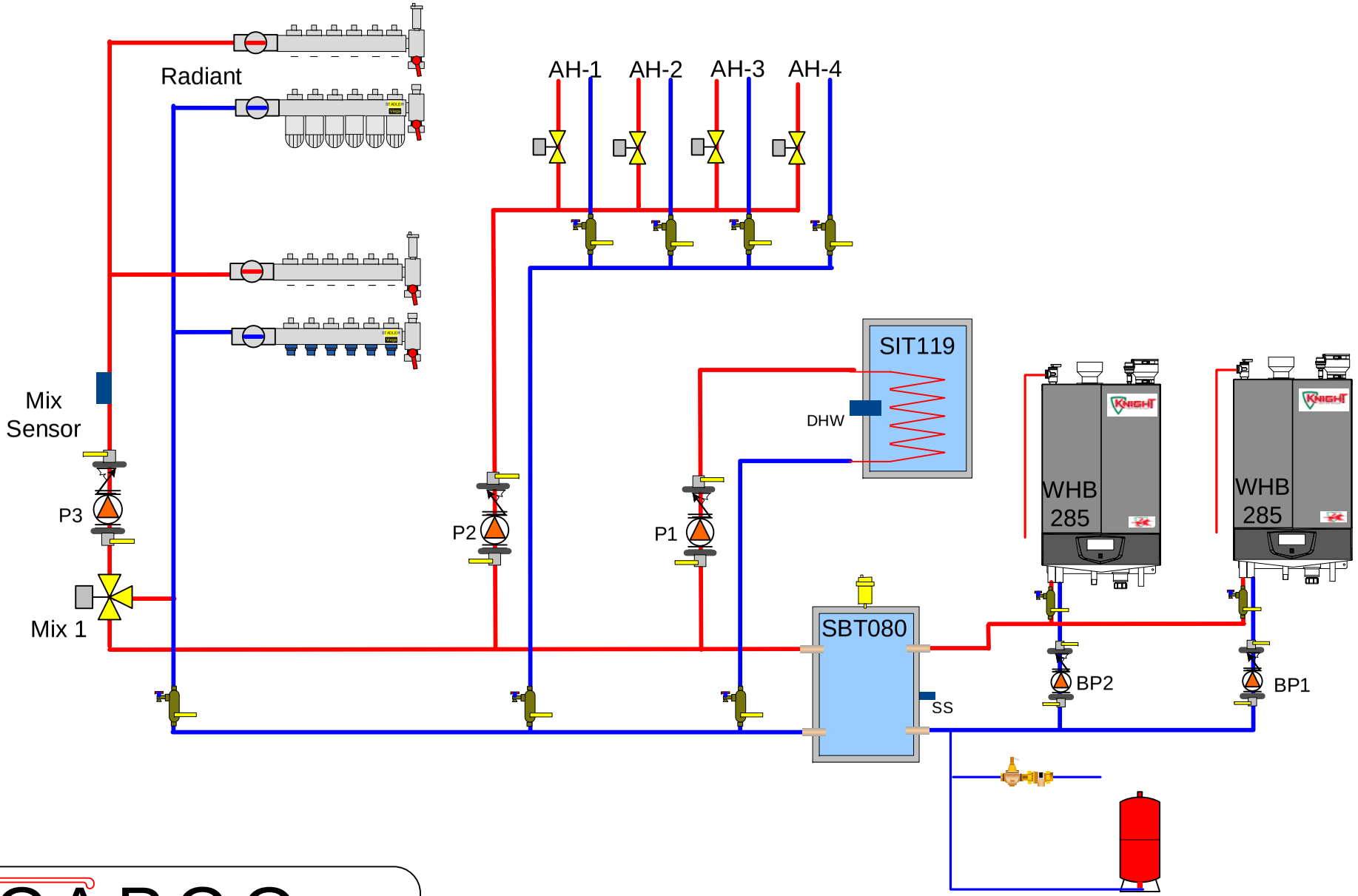

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3 Rath Road Woburn Ma 01801	2-WHNs with Buffer Tank	1.24.19 GP

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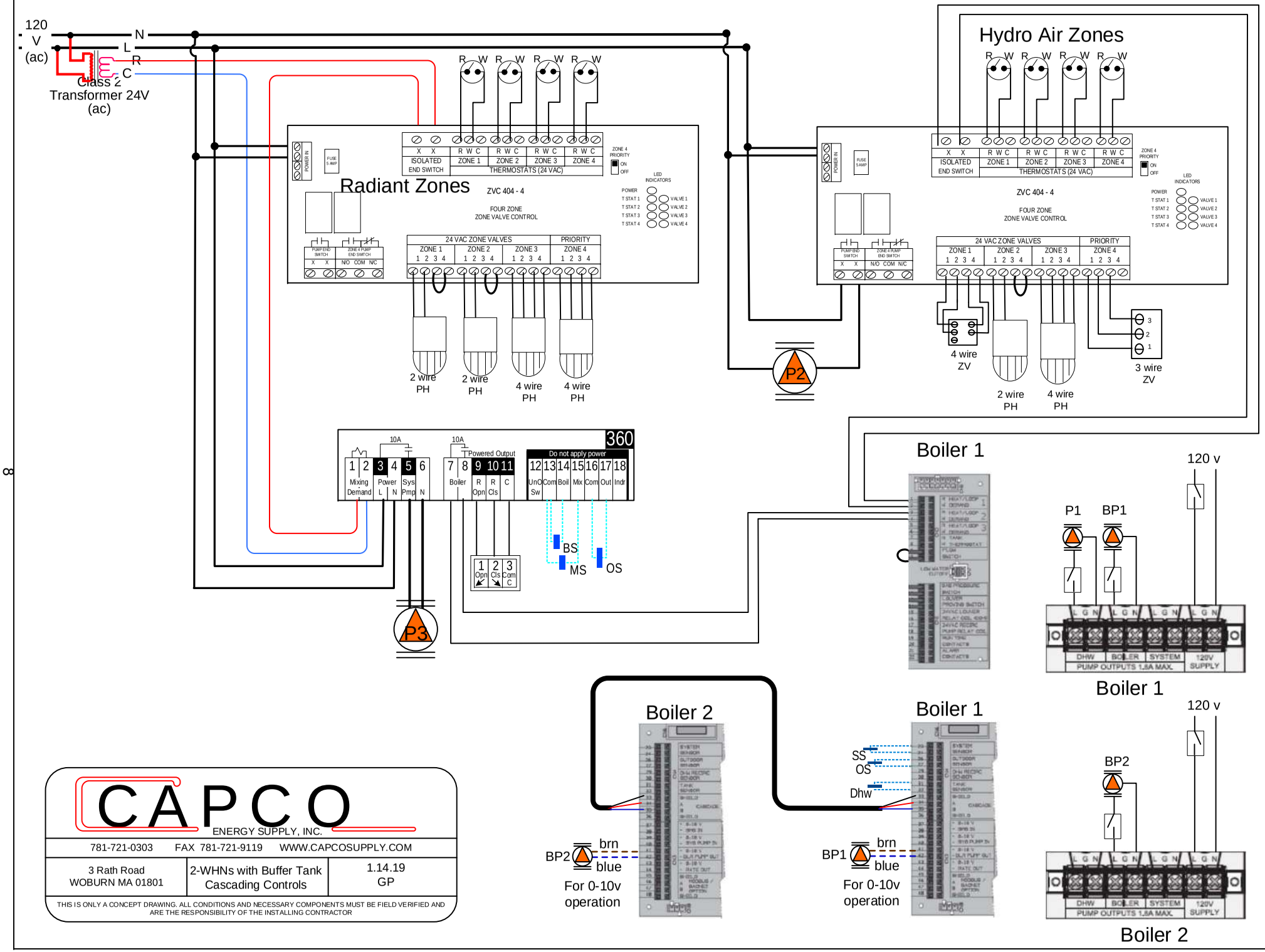

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3 Rath Road WOBURN MA 01801	2-WHNs with Buffer Tank Cascading Controls	1.14.19 GP

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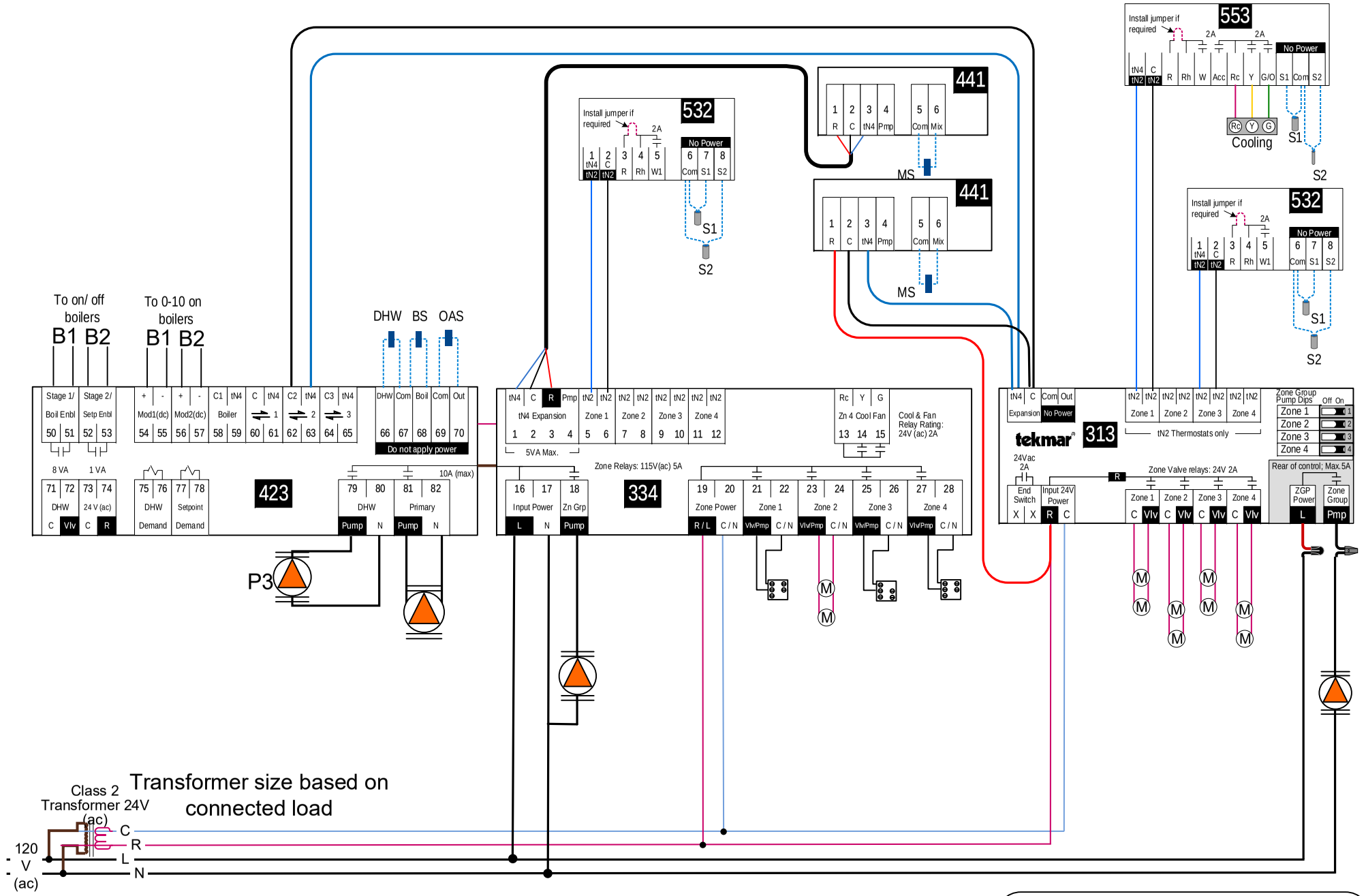

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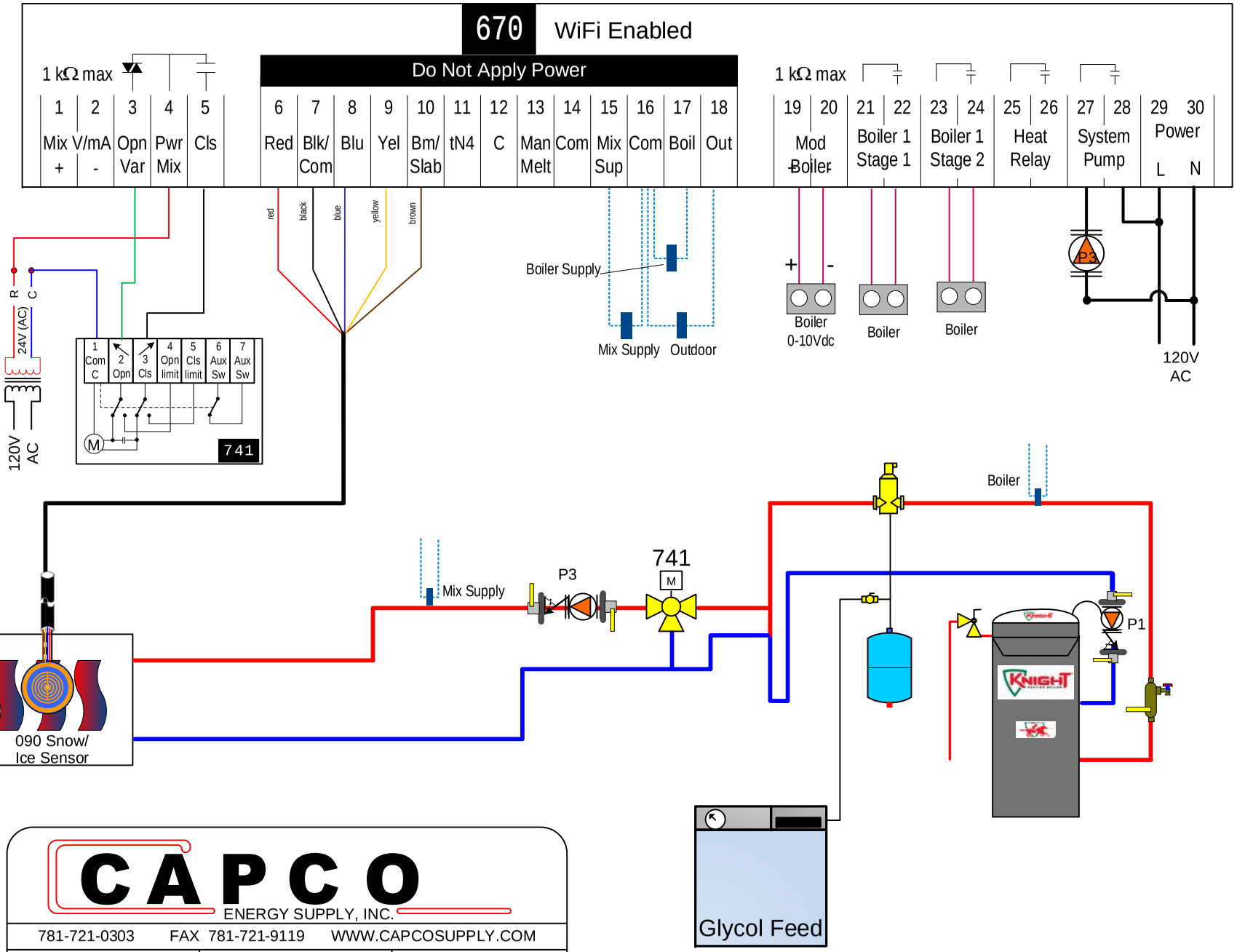
Tekmar TN2/TN4

1.6.22
GP



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3 Rath Rd WOBURN MA 01801	670 Snowmelt	GP 1.23.17

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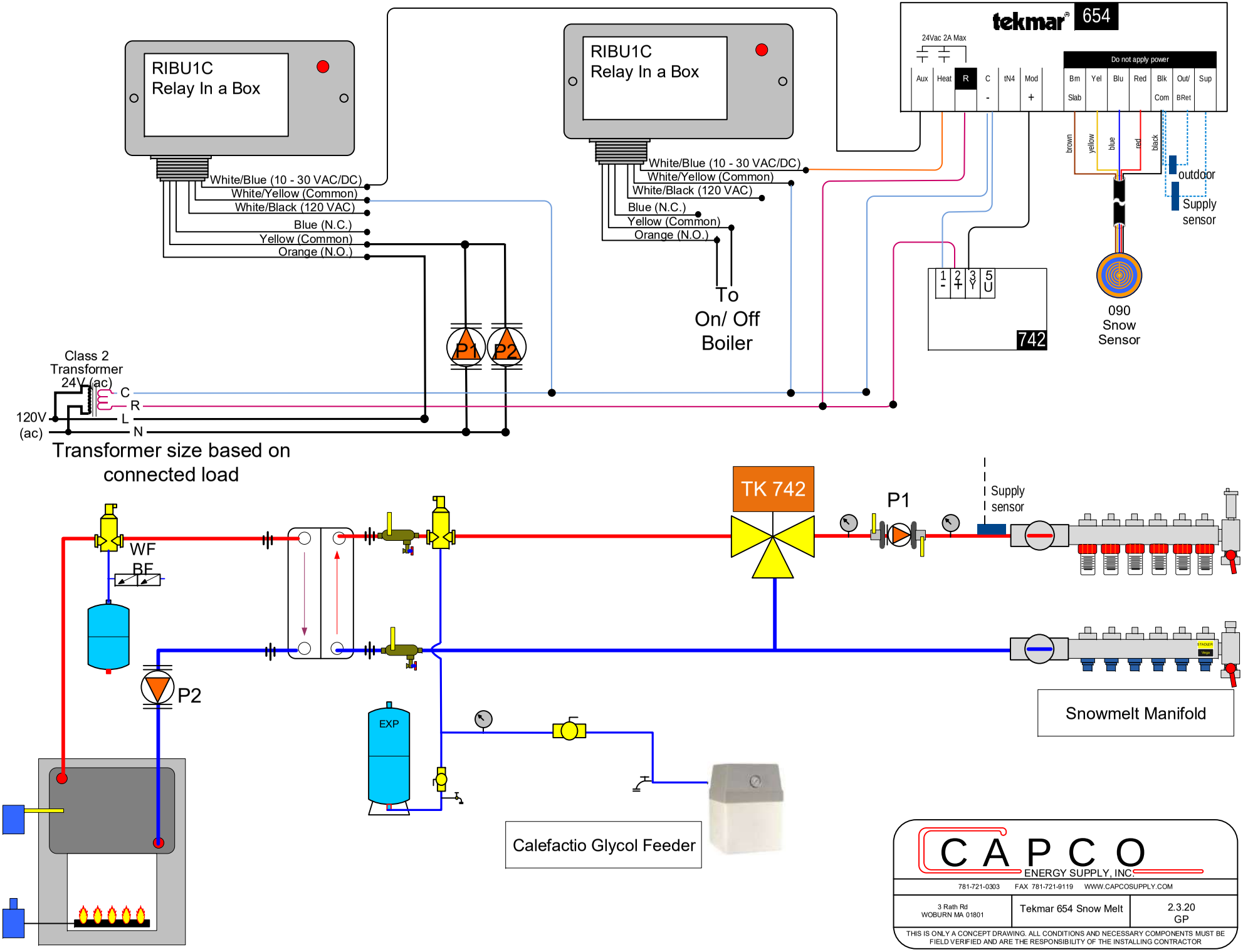
RIBU1C
Relay In a Box
RIBU1C
Relay In a Box
tekmar 654
24Vac 2A Max
Aux
Heat
R
C
tN4
Mod
Do not apply power
Bm
Slab
Yel
Blu
Red
Blk
Com
Out/
BRet
Sup
White/Blue (10 - 30 VAC/DC)
White/Yellow (Common)
White/Black (120 VAC)
Blue (N.C.)
Yellow (Common)
Orange (N.O.)
brown
yellow
blue
red
black
outdoor
Supply
sensor
To
On/ Off
Boiler
742
090
Snow
Sensor
P1
P2
Class 2
Transformer
24V (ac)
C
R
L
N
120V
(ac)
Transformer size based on
connected load
TK 742
P1
Supply
sensor
WF
BF
P2
EXP
Snowmelt Manifold
Calefactio Glycol Feeder
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Tekmar 654 Snow Melt
2.3.20
GP
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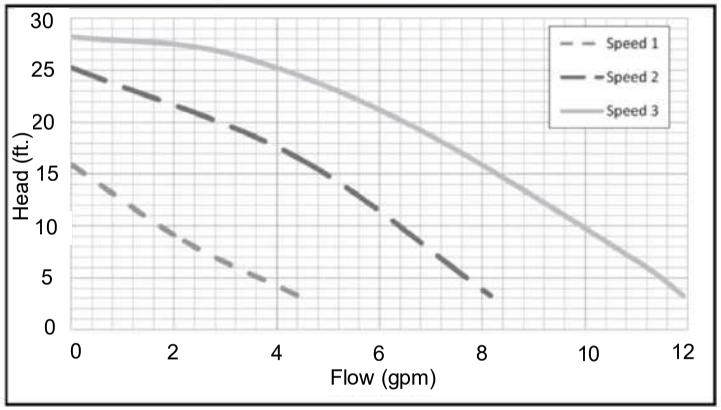
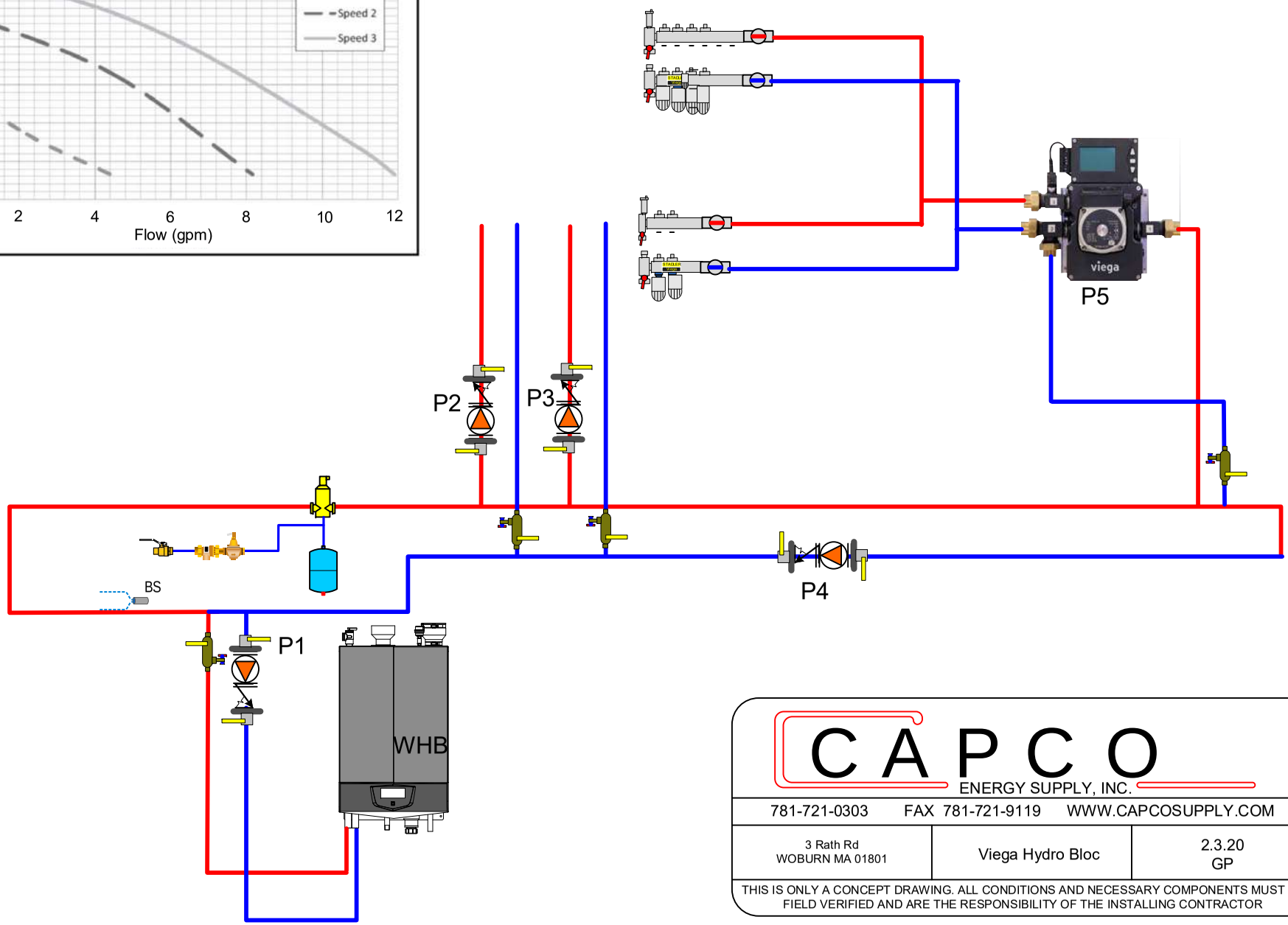
Pump Curve for Hydronic Mixing Block





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	Viega Hydro Bloc	2.3.20 GP

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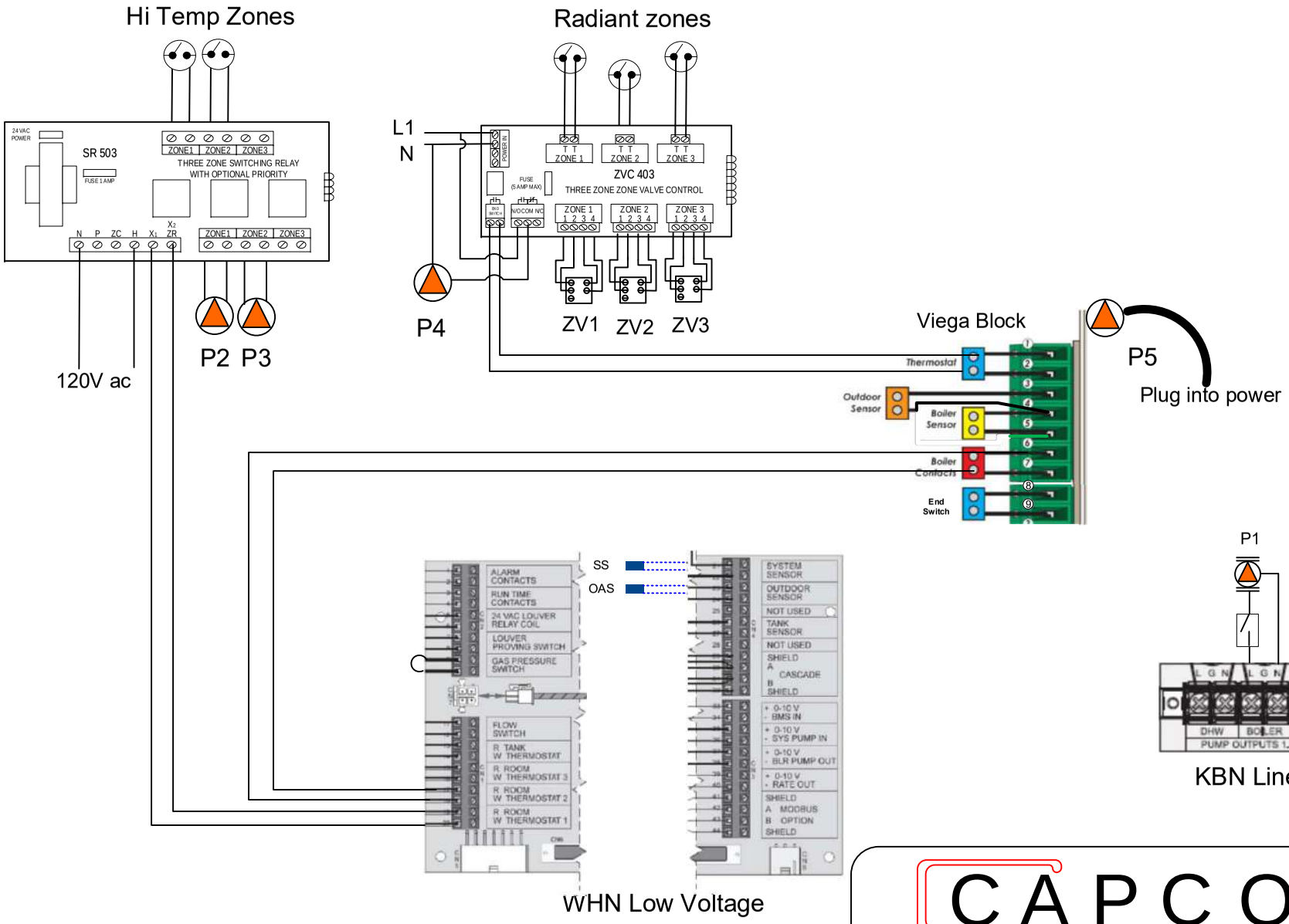

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Viega bloc

2.3.20
GP

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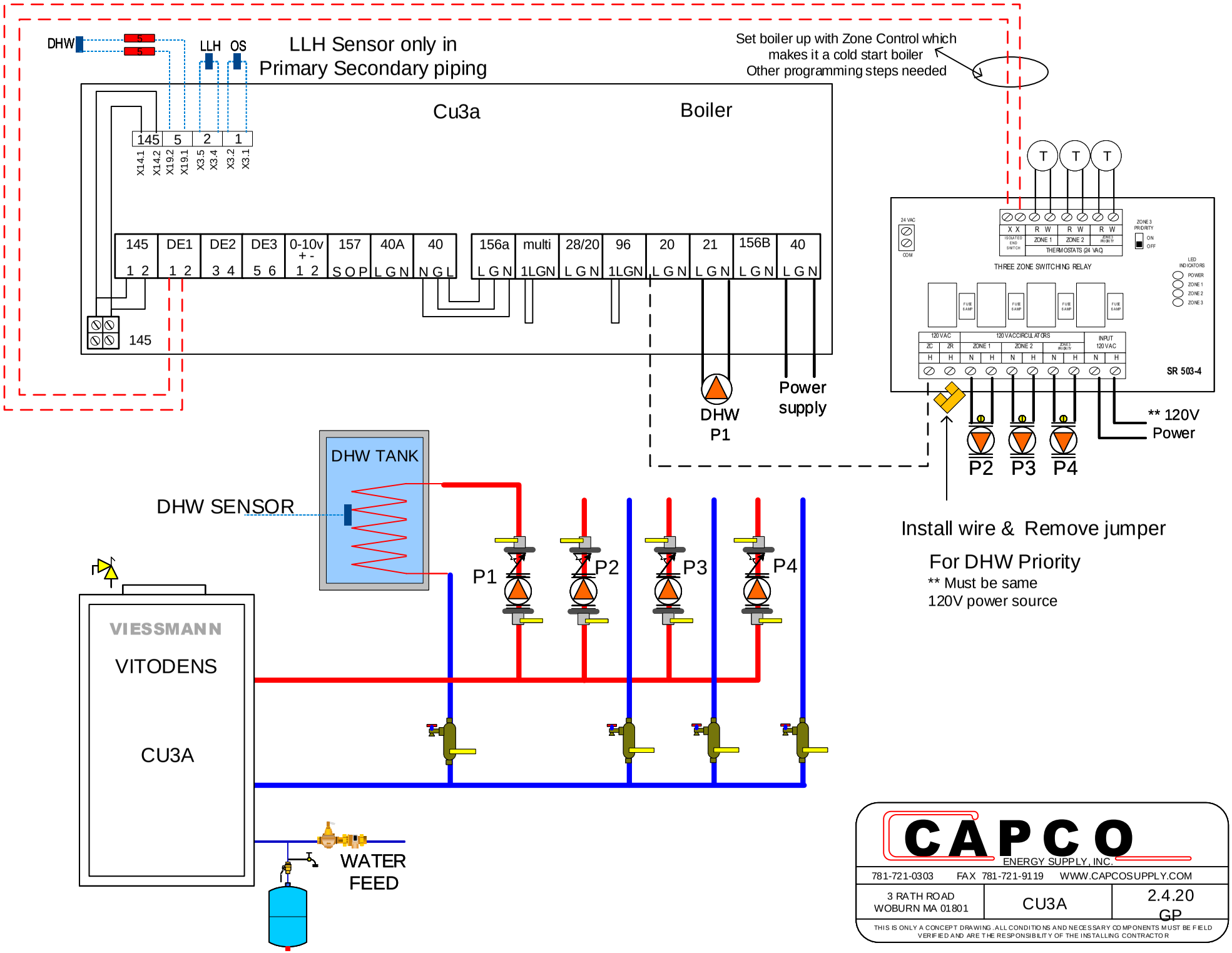

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3 RATH ROAD
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CU3A

2.4.20
GP

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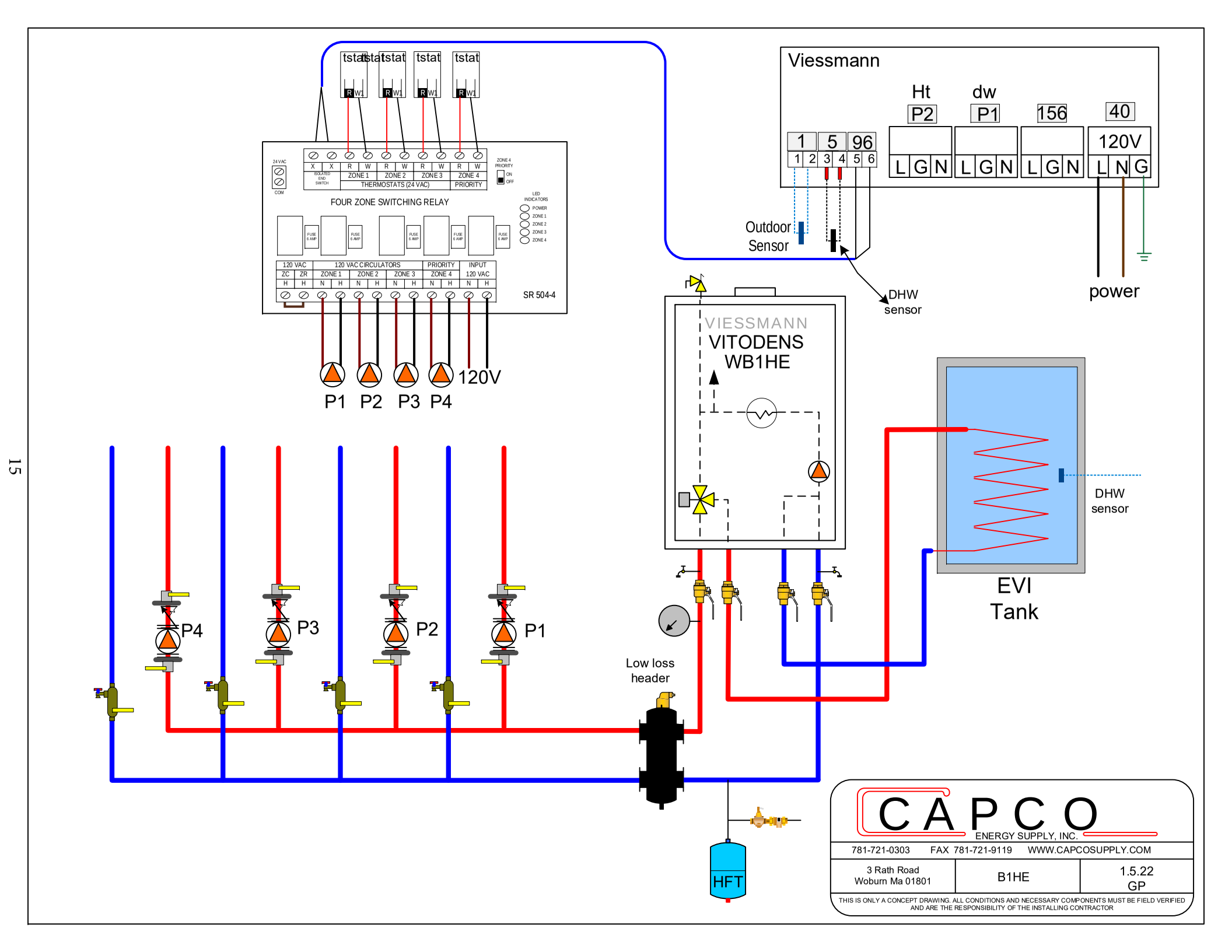

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3 Rath Road Woburn Ma 01801	B1HE	1.5.22 GP

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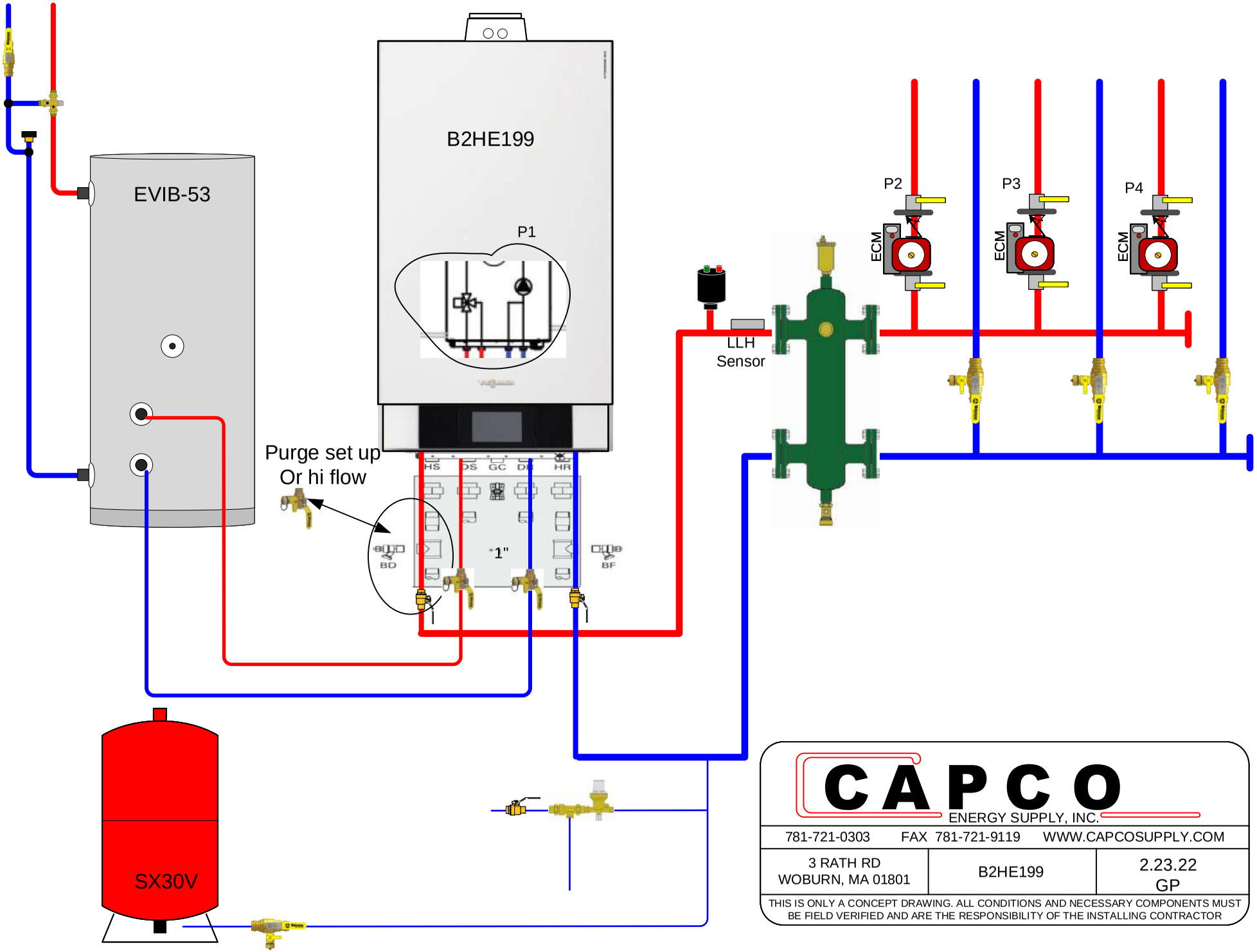

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3 RATH RD WOBURN, MA 01801	B2HE199	2.23.22 GP

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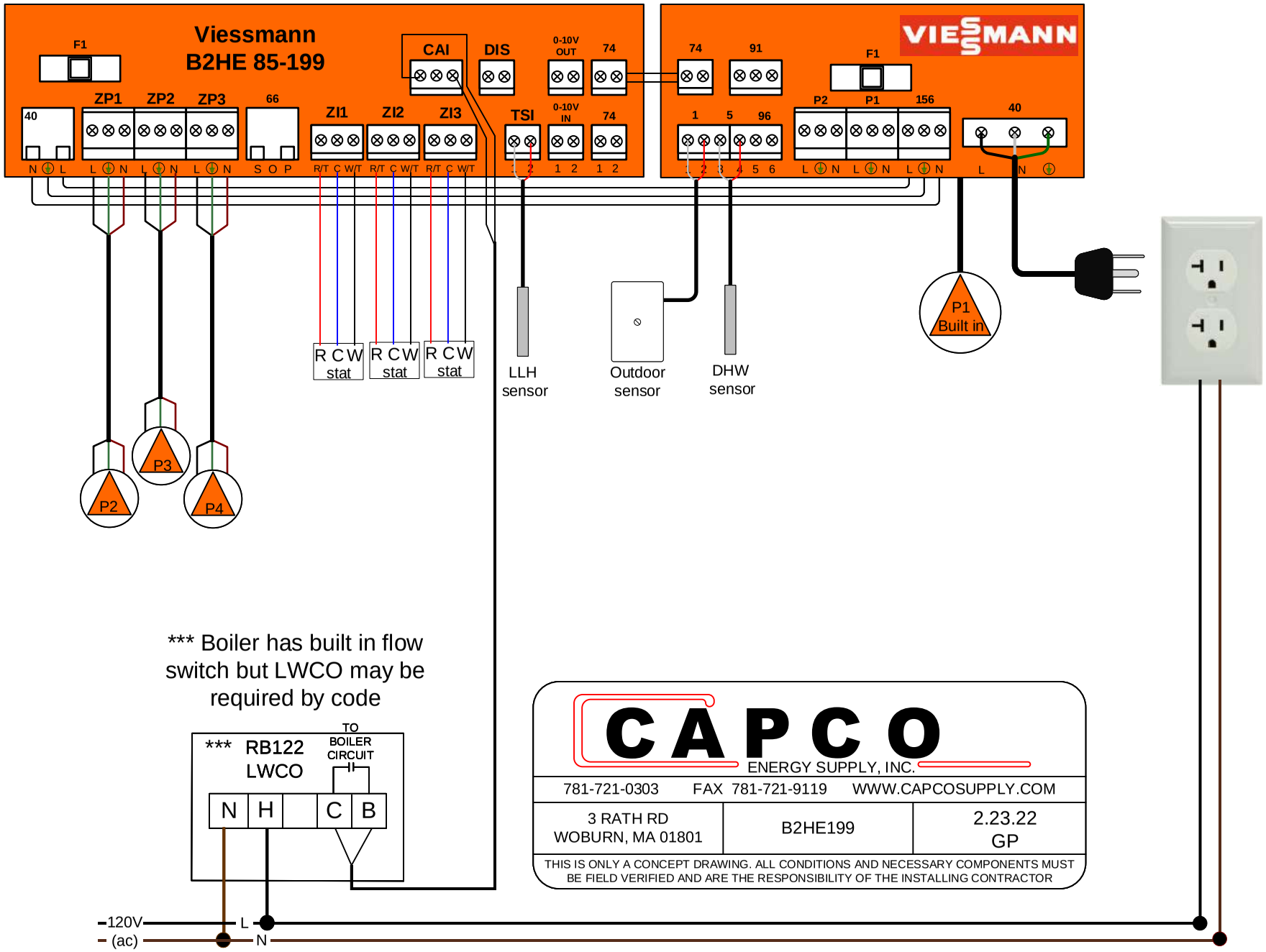

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3 RATH RD WOBURN, MA 01801	B2HE199	2.23.22 GP

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PDRYCB320 + CONVENTIONAL THERMOSTAT
(1 PER IDU)

2.17.22
WB

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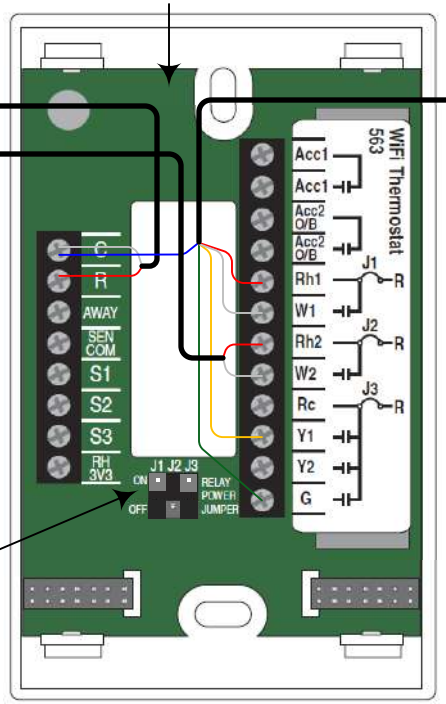
Tekmar 563 Wi-Fi T-stat



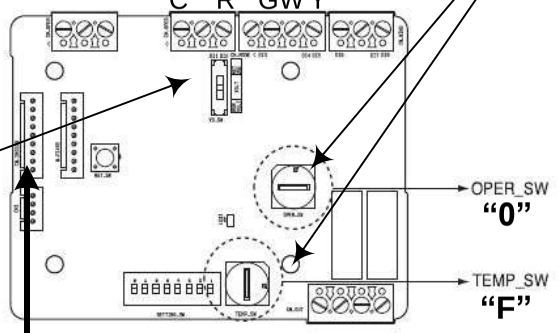
Set J1 and J3 to ON and set J2 to off

NOTE: set “SETTING SW” to 0 and set “TEMP SW” to F

C R GW Y

LG IDU PCB

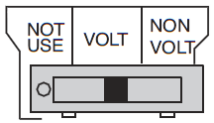
CN-CC

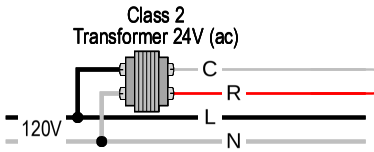


LG PDRYCB320

To 2nd stage heat source (electric coil, boiler or furnace)

NOTE: changeover switch to be set to “VOLT”, (***before power is applied)***





*LVN units provide 24v, transformer not required

ribbon cable

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PDRYCB320 + 24 V TRANS. + THERMOSTAT (1 PER IDU)

2.17.22
WB

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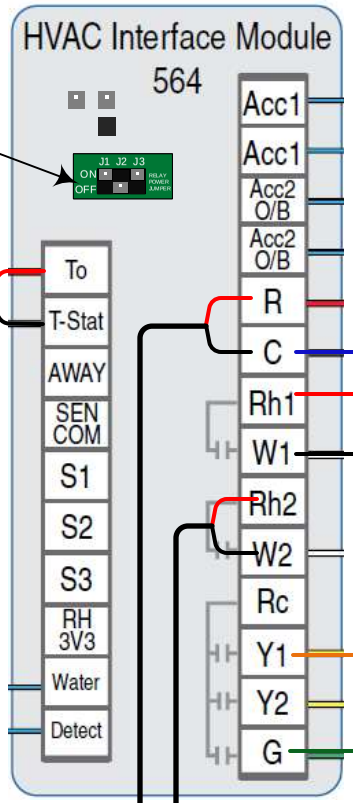
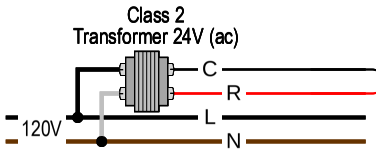
Tekmar Invita 564
Wi-Fi T-stat

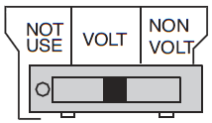
Set J1 and J3 to ON and set J2 to off



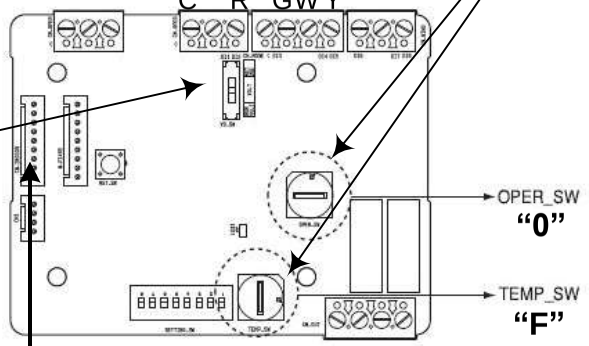
To 2nd stage heat source (electric coil, boiler or furnace)



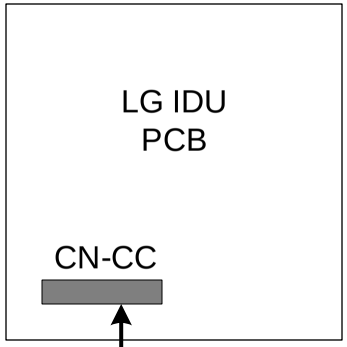
NOTE: changeover switch to be set to "VOLT", (***before power is applied)***



NOTE: set "SETTING SW" to 0 and set "TEMP SW" to F



LG PDRYCB320



ribbon cable

*LVN units provide 24v, transformer not needed

NOTES:

- Function code 25 must be set to 01 to enable the aux heat relay kit (PRARS1)
- PRARS1 operates as a single stage of back up heat (W1)
- Staging sequence is as shown on the diagram on the right. W1 engaged based on temperature more than 2 deg F from setpoint.
- Function Code 18, recommended to set “Value 1” to “01”. If you want to lock out the ODU based on outdoor air temp, use “Value 2” of Function 18 and set the corresponding temperature. Use “Value 3” to set whether the IDU fan should run during the AUX Heat (W1) operation.

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3 RATH RD WOBURN, MA 01801	WALL UNITS MULTI ZONE IDU AUX HTR RELAY PRARS1 (1 PER IDU)	2.18.21 GP

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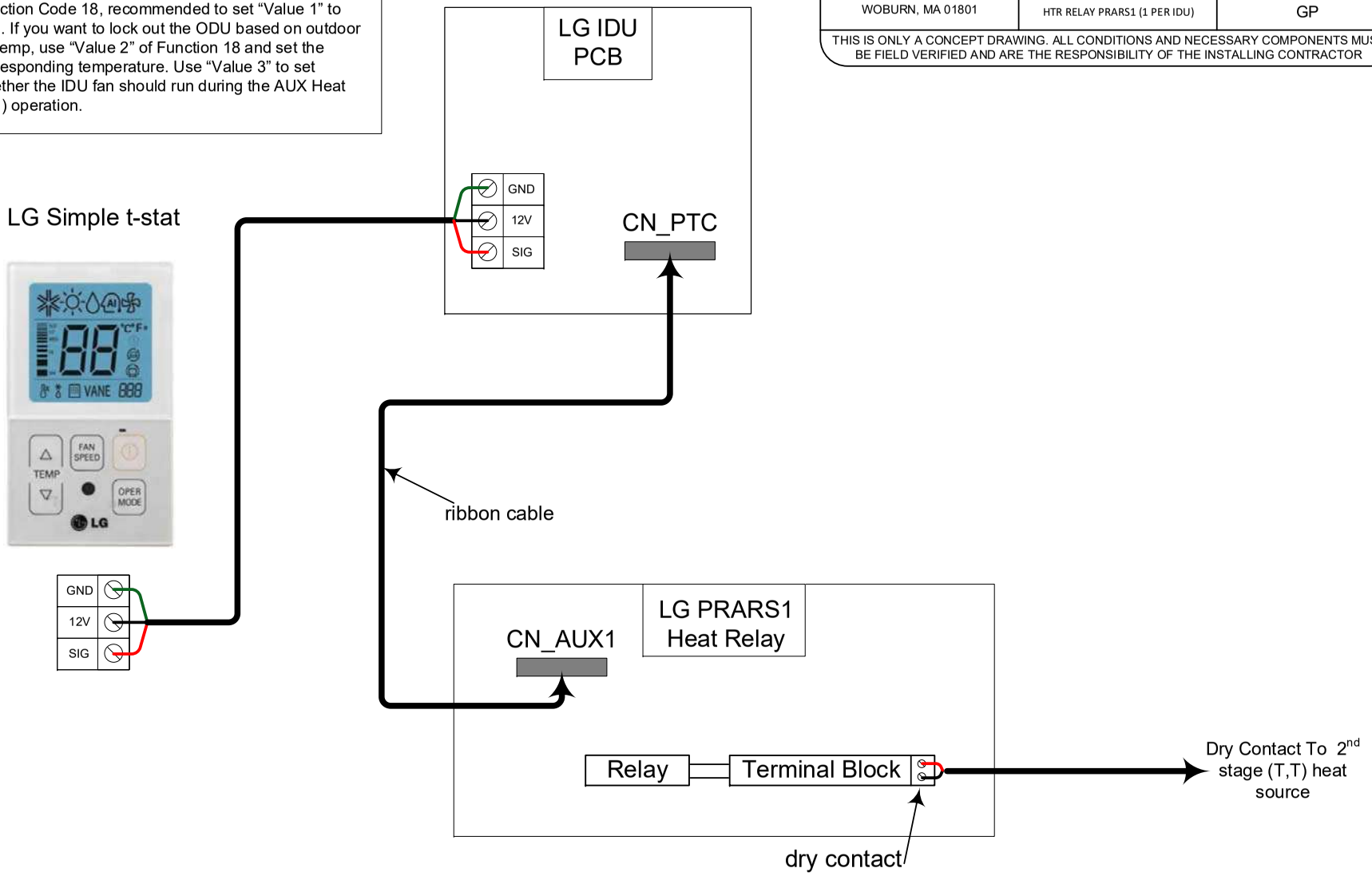


NOTES:

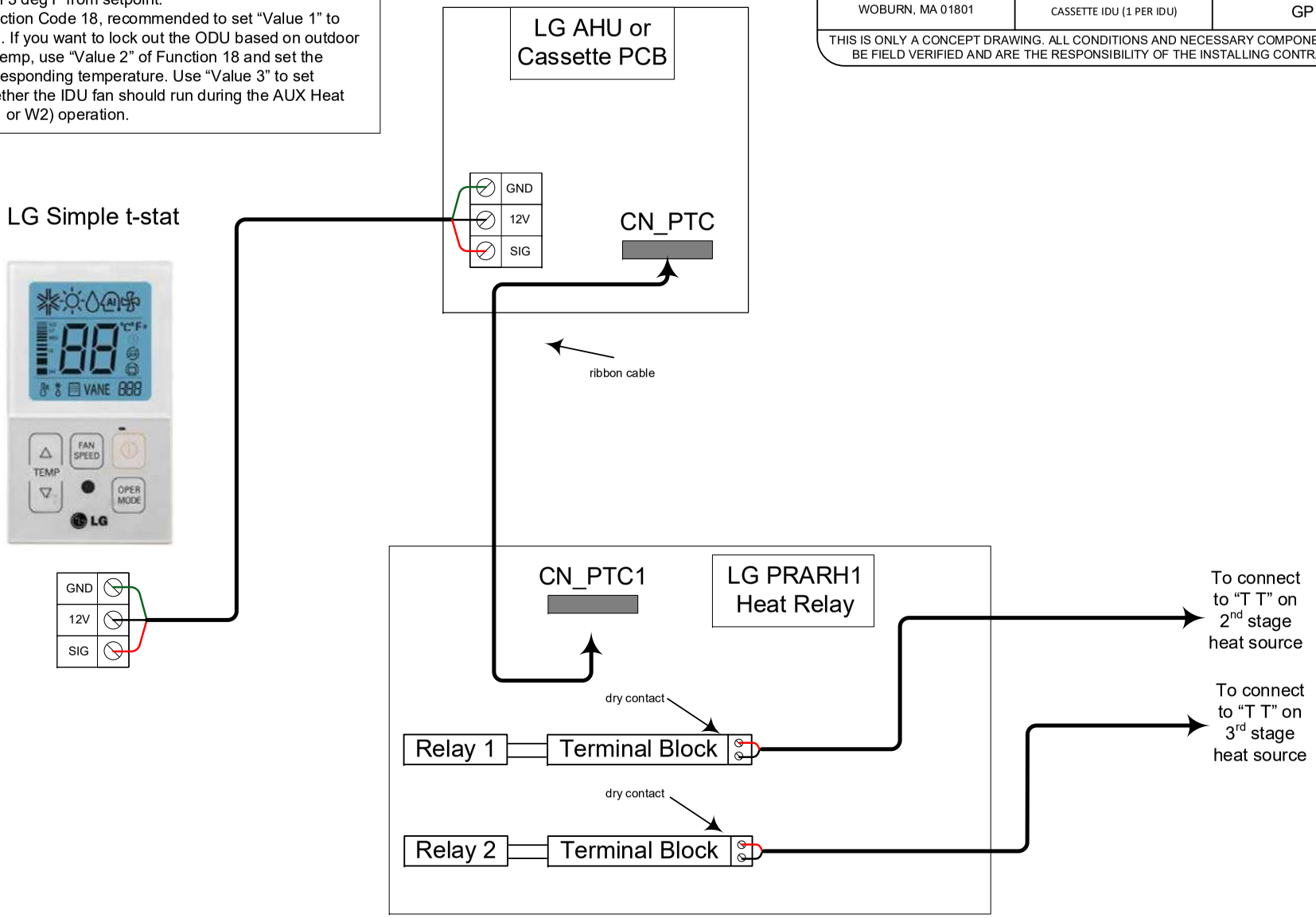
- Function code 25 must be set to “02” to enable the aux heat relay kit with a duct heater (hot water coil, electric duct heater). Set to “01” for other back up heat.
- PRARH1 operates as a two stages of back up heat (W1, W2)
- W1 engaged based on temperature more than 2 deg F from setpoint. W2 engaged based on temperature more than 3 deg F from setpoint.
- Function Code 18, recommended to set “Value 1” to “01”. If you want to lock out the ODU based on outdoor air temp, use “Value 2” of Function 18 and set the corresponding temperature. Use “Value 3” to set whether the IDU fan should run during the AUX Heat (W1 or W2) operation.

CAPCO
ENERGY SUPPLY, INC.
781-721-0303 FAX 781-721-9119 WWW.CAPCOSUPPLY.COM
3 RATH RD
WOBURN, MA 01801

AUX HTR RELAY PRARH0 DUCTED, CASSETTE IDU (1 PER IDU)

2.18.21
GP

THIS IS ONLY A CONCEPT DRAWING. ALL CONDITIONS AND NECESSARY COMPONENTS MUST BE FIELD VERIFIED AND ARE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR



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WOBURN, MA 01801

PDRYCB320 + 24 V TRANS.
ARNU
Heat Pump - Balance point

2.17.22
WB

THIS IS ONLY A CONCEPT DRAWING. ALL CONDITIONS AND NECESSARY COMPONENTS MUST BE FIELD VERIFIED AND ARE THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR

Tekmar Invita 564
Wi-Fi T-stat

Set J1 to ON and set J2 & J3 to off

HVAC Interface Module
564

J1 J2 J3
ON
OFF

To
T-Stat
AWAY
SEN COM
S1
S2
S3
RH 3V3
Water
Detect

Acc1
Acc1
Acc2 O/B
Acc2 O/B
R
C
Rh1
W1
Rh2
W2
Rc
Y1
Y2
G

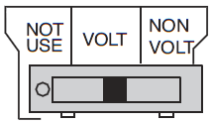
NOTE: set “SETTING SW” to 5
B= Reversing Valve

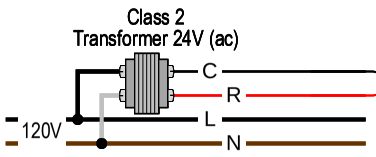
NOTE: Set Temp SW to F

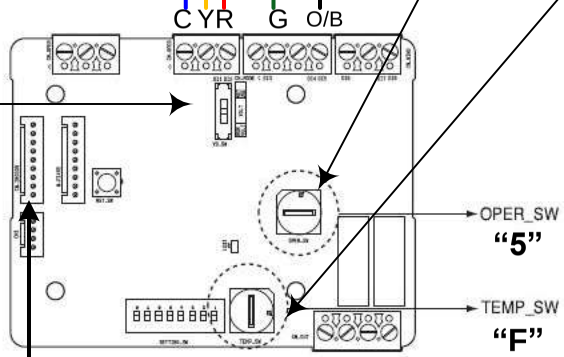
C Y R G O/B

To 2nd stage heat source (electric coil, boiler or furnace)

NOTE: changeover switch to be set to “VOLT”, (***before power is applied)***







LG PDRYCB320

LG IDU
PCB

CN-CC

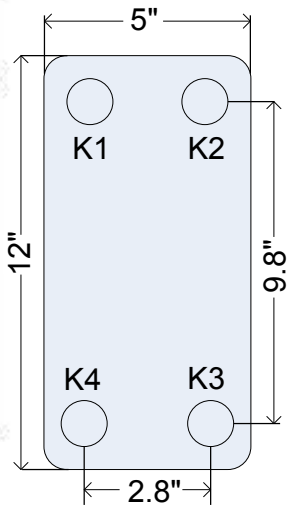
Ribbon Cable

Default Nozzle Placement
K1 – Hot Side INLET
K2 – Cold Side OUTLET
K3 – Cold Side INLET
K4 – Hot Side OUTLET

Domestic Water

Hot side	Boiler water	180*F to 160*F
Cold side	Domestic water	40*F to 140*F

Flow (gpm)		Model	No. of Plates	BTU/h	Connections	Pressure Drop (psi)	
Hot Side	Cold Side					Hot Side	Cold Side
9.3	1.8	LB31-20	20	90,000	1" FNPT	3.06	0.22
10.0	2.0	LB31-20	20	100,000	1" FNPT	3.71	0.27
12.9	2.5	LB31-20	20	125,000	1" FNPT	6.5	0.4
14.4	2.8	LB31-20	20	140,000	1" FNPT	8.1	0.5
15.5	3.0	LB31-20	20	150,000	1" FNPT	7.85	0.57
25.7	5.0	LB31-40	40	250,000	1" FNPT	6.16	0.39
30.9	6.0	LB31-40	40	300,000	1" FNPT	8.62	0.54
36.1	7.0	LB31-60	60	350,000	1" FNPT	6.29	0.36
46.4	9.0	LB31-80	80	400,000	1" FNPT	6.99	0.38



Radiant Floor

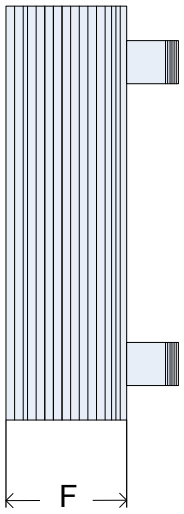
Hot side	Boiler water	180*F to 160*F
Cold side	Radiant floor water	100*F to 120*F

Flow (gpm)		Model	No. of Plates	BTU/h	Connections	Pressure Drop (psi)	
Hot Side	Cold Side					Hot Side	Cold Side
9.3	9.1	LB31-20	20	90,000	1" FNPT	3.06	4.04
10.3	10.1	LB31-20	20	100,000	1" FNPT	3.71	4.89
12.9	12.6	LB31-20	20	125,000	1" FNPT	5.57	7.34
20.6	20.2	LB31-40	40	200,000	1" FNPT	4.09	4.77
30.9	30.3	LB31-60	60	300,000	1" FNPT	4.72	5.24
41.2	40.4	LB31-80	80	400,000	1" FNPT	5.6	6.04

Snow Melt

Hot side	Boiler water	180*F to 160*F
Cold side	40% Ethylene glycol	100*F to 130*F

Flow (gpm)		Model	No. of Plates	BTU/h	Connections	Pressure Drop (psi)	
Hot Side	Cold Side					Hot Side	Cold Side
6.2	6.7	LB31-20	20	90,000	1" FNPT	1.47	2.83
6.9	7.4	LB31-20	20	100,000	1" FNPT	1.78	3.43
8.6	9.3	LB31-20	20	125,000	1" FNPT	2.68	5.15
9.6	10.4	LB31-20	20	140,000	1" FNPT	3.29	6.33
17.2	18.6	LB31-40	40	250,000	1" FNPT	2.94	4.96
24.1	26.0	LB31-60	60	350,000	1" FNPT	2.97	4.72
27.5	29.7	LB31-80	80	400,000	1" FNPT	2.62	4.00



F= .49 + .09(NP)

Support Hanging Intervals

aquatherm greenpipe® faser-composite pipe SDR 7.4
& **climatherm®** SDR 7.4 & 11 faser-composite pipe

These tables provide the support intervals based on pipe size and the difference between the operating fluid temperature and the ambient temperature.

ΔT Difference in temp.	Pipe diameter																
	½" 20 mm	¾" 25 mm	1" 32 mm	1 ¼" 40 mm	1 ½" 50 mm	2" 63 mm	2 ½" 75 mm	3" 90 mm	3 ½" 110 mm	4" 125 mm	6" 160 mm	8" 200 mm	10" 250 mm	12" 315 mm	14" 355 mm	16" 400 mm	18" 450 mm
	Support intervals (ft)																
0 °F (0 °C)	4	4.6	5.2	5.9	6.7	7.5	8	8.5	9.5	10.5	11.2	11.3	11.5	12.5	13.5	15	16
36 °F (20 °C)	4	4	4	4.4	5.1	5.7	6.1	6.4	7.1	7.9	8.9	9	9.2	10.1	11	14	15
54 °F (30 °C)	4	4	4	4.4	5.1	5.7	6.1	6.4	6.9	7.4	8	8.2	8.4	9.2	10	12	13
72 °F (40 °C)	4	4	4	4.1	4.8	5.4	5.7	6.1	6.6	7.1	7.7	7.9	8	8.7	9.5	11	12
90 °F (50 °C)	4	4	4	4.1	4.8	5.4	5.7	6.1	6.2	6.4	6.7	6.9	7.1	7.8	8.5	10	11
108 °F (60 °C)	4	4	4	4	4.4	5.1	5.4	5.7	5.9	6.1	6.4	6.6	6.7	7.1	7.5	9	10
126 °F (70 °C)	4	4	4	4	4.3	4.8	5.1	5.4	5.6	5.7	6.1	6.2	6.4	6.7	7	8	8

Socket Welding Times

Pipe Size		Welding Depth		Heating Times (sec.)		Welding Time (sec.)	Cooling Time (min.)
mm	in.	mm	in.	> 41 °F	< 41 °F		
16	3/8	13	.5	5	8	4	2
20	1/2	14	.5	5	8	4	2
25	3/4	15	.55	7	11	4	2
32	1	17	.6	8	12	6	4
40	1 1/4	18	.7	12	18	6	4
50	1 1/2	20	.8	18	27	6	4
63	2	24	.9	24	36	8	6
75	2 1/2	26	1	30	45	8	8
90	3	29	1.15	40	60	8	8
110	3 1/2	33	1.3	50	75	10	8
125	4	40	1.6	60	90	10	8
Saddles - All Sizes				30	45	15	10

Note: The best indication of sufficient heating time is a bead of plastic forming a ring around the tool head. Warranty void if installing plumber is not trained and registered.

CIRCULATORS ecocirc® XL

High efficiency large wet rotor pump for heating, cooling and potable water systems

3 Phase models coming soon

Description

The ecocirc XL is a high efficiency, variable speed, wet rotor pump with integrated drive. The circulator is available in cast iron or lead-free bronze and has a broad operating temperature range of 14°F to 230°F (-10°C to 110°C). The ecocirc XL is suitable for both hot and chilled water systems.

The ecocirc XL circulator is designed with a highly efficient electronically commutated permanent magnet motor (ECM/PM Technology). This circulator can enhance hydronics systems with superior quality and dependability. State-of-the-art hydraulics, advanced motor design, intelligent controls, and smart communication capabilities highlight expert engineering across a board range of HVAC and plumbing applications.

Materials of Construction

Pump Body: Cast Iron or Lead-Free* Bronze
Impeller: Poly-phenylene Sulfide or Stainless Steel
Shaft: AISI 420 Stainless Steel
Rotor: Permanent Magnet
Bearing: Carbon Sleeve
Gasket/O-Ring: EPDM
All Other Wetted Parts: AISI 304 Stainless Steel
Motor Type: Electronically Commutated Motor /Permanent Magnet
Motor Insulation Class: F

Operating Data

Maximum Working Pressure: 175 PSI (12 Bar)
Minimum Working Temperature: 14°F (-10°C)
Maximum Working Temperature: 230°F (110°C)
Ambient Temperature Range: 32°F - 104°F (0°C - 40°C)

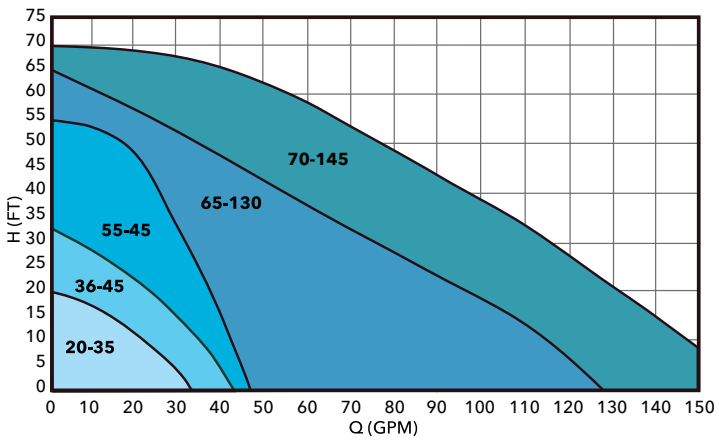
Safety Standards And Protection

- Enclosure: Class 2, IP44 (equivalent to NEMA Type 2)
- UL Listed to UL 778; UL 1004-1, 1004-7; and UL 60730-1
- cUL Listed to C22.2 #108
- Electronically Thermally Protected (Integrated Motor Protection)
- Motor Insulation Class: F
- CSA certified to NSF/ANSI 372 that product contains less than 0.25% lead content by weight on wetted surface

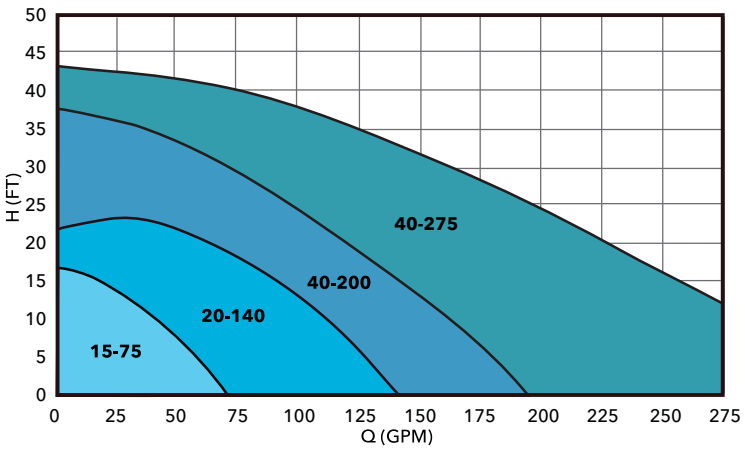
Cast Iron Body		Lead-Free Bronze Body*		Rated Motor Characteristics					
Model Number	Part Number	Model Number	Part Number	HP**	Voltage	Phase	Hz	Watts Range	AMP Range
ecocirc XL 20-35	104300	ecocirc XL B 20-35	104400LF	1/12	115	1	50/60	6-85	0.1 – 1.3
ecocirc XL 36-45	104301	ecocirc XL B 36-45	104401LF	1/6	115	1	50/60	20-200	0.1 – 3.0
ecocirc XL 36-45	104302	ecocirc XL B 36-45	104402LF	1/6	208-230	1	50/60	20-200	0.1 – 1.5
ecocirc XL 15-75	104303	ecocirc XL B 15-75	104403LF	1/6	115	1	50/60	30-150	0.1 – 2.3
ecocirc XL 15-75	104304	ecocirc XL B 15-75	104404LF	1/6	208-230	1	50/60	30-150	0.1 – 1.1
ecocirc XL 55-45	104306	ecocirc XL B 55-45	104406LF	1/2	208-230	1	50/60	30-500	0.2 – 2.0
ecocirc XL 20-140	104308	ecocirc XL B 20-140	104408LF	1/2	208-230	1	50/60	35-470	0.2 – 2.0
ecocirc XL 65-130	104309	ecocirc XL B 65-130	104409LF	1	208-230	1	50/60	45 - 825	0.5 – 3.5
ecocirc XL 40-200	104312	ecocirc XL B 40-200	104412LF	1	208-230	1	50/60	50 - 825	0.5 – 3.5
ecocirc XL 70-145	104315	ecocirc XL B 70-145	104415LF	2	208-230	1	50/60	55 - 1400	0.6 – 6.0
ecocirc XL 40-275	104318	ecocirc XL B 40-275	104418LF	2	208-230	1	50/60	50 - 1400	0.5 – 6.0

Note: Where potable water is pumped, use a lead-free bronze booster. ecocirc XL pumps are recommended for indoor use only.
*CSA certified to NSF/ANSI 372 that product contains less than 0.25% lead content by weight on wetted surface.
** Nominal HP

ecocirc XL High Head Performance Range



ecocirc XL High Flow Performance Range



CIRCULATORS ecocirc® XL

High efficiency large wet rotor pump for heating, cooling and potable water systems

STANDARD OPERATING MODES

Constant Speed

The pump maintains a constant speed at any flow rate. The desired speed is set on the interface panel of the pump.

Constant Pressure (Δp-c)

The pump maintains a constant differential pressure at any flow demand until the maximum speed is reached. The desired head of the pump can be set via user interface. Recommended for use in systems with small or constant pressure losses.

Proportional Pressure (Δp-v)

The differential pressure continuously increases or deceases based on the flow demand. The set point head can be set on the pump user interface. Use for systems with large pressure losses.

Night Mode

The pump will automatically reduce speed when there is an abrupt change in fluid temperature. The change in fluid temperature is from a boiler operating in night time setback mode. The built-in temperature sensor is used. (Fixed Speed, Constant Pressure, Proportional Pressure)

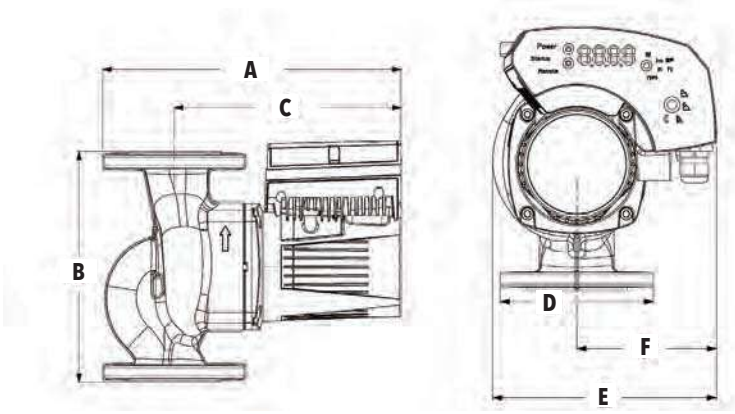
CONSTANT TEMPERATURE SPEED CONTROL

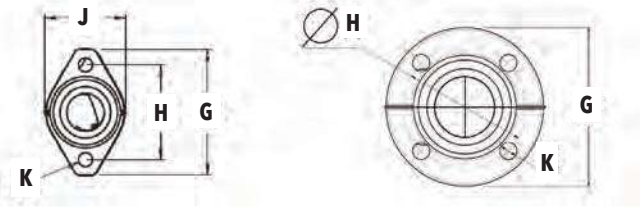
T- Constant Control

This control mode will use a PI algorithm to vary the speed of the pump in order to maintain a constant temperature of the fluid media.

ΔT-Constant Control

This control mode will use a PI algorithm to vary the speed of the pump in order to maintain a constant differential temperature between the built-in temperature sensor and external temperature sensor.





Model Number	Nominal Motor HP	Dimenstions - Inches (mm)						Approx. Shipping Weight Lbs. (kg)	
		A	B	C	D	E	F	Cast Iron	Bronze
ecocirc XL 20-35	1/12	9.94 (252)	6.38 (162)	8.20 (208)	4.19 (106)	7.20 (183)	4.72 (120)	19.8 (9)	22 (10)
ecocirc XL 36-45	1/6	9.94 (252)	6.38 (162)	8.20 (208)	4.19 (106)	7.20 (183)	4.72 (120)	19.8 (9)	22 (10)
ecocirc XL 15-75	1/6	11.04 (280)	8.5 (216)	8.39 (213)	5.19 (132)	7.57 (192)	4.72 (120)	26.4 (12)	28.6 (13)
ecocirc XL 55-45	1/2	11.89 (302)	6.38 (162)	10.18 (258)	4.19 (106)	8.12 (206)	5.02 (127)	26.4 (12)	28.6 (13)
ecocirc XL 20-140	1/2	13.39 (340)	11.5 (292)	10.41 (264)	5.19 (132)	8.20 (208)	5.02 (127)	35.2 (16)	39.6 (18)
ecocirc XL 65-130	1	14.84 (377)	11.5 (292)	11.80 (299)	4.62 (117)	9.53 (242)	5.77 (146)	39.6 (18)	44 (20)
ecocirc XL 40-200	1	15.17 (385)	11.5 (292)	11.80 (299)	5.19 (132)	9.53 (242)	5.77 (146)	41.8 (19)	46.2 (21)
ecocirc XL 70-145	2	14.84 (377)	11.5 (292)	11.80 (299)	4.62 (117)	9.53 (242)	5.77 (146)	38.4 (17)	44 (20)
ecocirc XL 40-275	2	16.04 (407)	12.0 (305)	12.57 (319)	6.00 (152)	10.07 (256)	5.77 (146)	49.6 (23)	55 (25)

Model Number	Flange Size Inches - NPT	# of Bolts	Dimenstions - Inches (mm)				B&G Companion Fange (Set of 2)	
			G	H	J	K	Cast Iron PN	Bronze PN
ecocirc XL 20-35	3/4, 1, 1-1/4, 1-1/2	2	4.19 (106)	3.16 (80)	2.62 (66)	0.47 (12)	101201 - 101204*	101208LF - 101211LF*
ecocirc XL 36-45	3/4, 1, 1-1/4, 1-1/2	2	4.19 (106)	3.16 (80)	2.62 (66)	0.47 (12)	101201 - 101204*	101208LF - 101211LF*
ecocirc XL 15-75	2	4	5.18 (132)	4.06 (103)	-	0.56 (14)	101215	10216LF
ecocirc XL 55-45	3/4, 1, 1-1/4, 1-1/2	2	4.19 (106)	3.16 (80)	2.62 (66)	0.47 (12)	101201 - 101204*	101208LF - 101211LF*
ecocirc XL 20-140	2	4	5.19 (132)	4.06 (103)	-	0.56 (14)	101215	10216LF
ecocirc XL 65-130	1, 1-1/4, 1-1/2	2	4.62 (117)	3.44 (87)	2.86 (73)	0.47 (12)	101205 - 101207*	101212LF - 101214LF*
ecocirc XL 40-200	2	4	5.19 (132)	4.06 (103)	4.06 (103)	0.56 (14)	101215	10216LF
ecocirc XL 70-145	1, 1-1/4, 1-1/2	2	4.62 (117)	3.44 (87)	2.86 (73)	0.47 (12)	101205 - 101207*	101212LF - 101214LF*
ecocirc XL 40-275	3	4	6.00 (152)	5.06 (129)	-	0.53 (13)	101217	10218LF

* Part numbers represent a Master Carton of 12 flanges with fasteners pack.
1-1/2" is the diameter of the suction and discharge for the 2-bolt models.

xylem
Let's Solve Water

ecocirc® 20-18

THE NEWEST GENERATION SMART CIRCULATOR

The newest generation variable speed ECM smart circulator, **ecocirc 20-18** from Bell & Gossett provides a superior product for both heating and cooling as well as potable water.

Taking it further than ever before is our new **ecocirc+ 20-18** model that allows for wireless connectivity directly to your phone for full control. Combine this pump with our incredible service network, and you have a winner.

ecocirc+ 20-18 Features

The ecocirc+ 20-18 comes with all of the standard features found on the ecocirc 20-18 plus the following premium features:

- Bluetooth communication+
- 0-10V input+
- Temperature control+
- eAdapt autolearn and Night Mode+
- Digital display+

ecocirc 20-18 Features

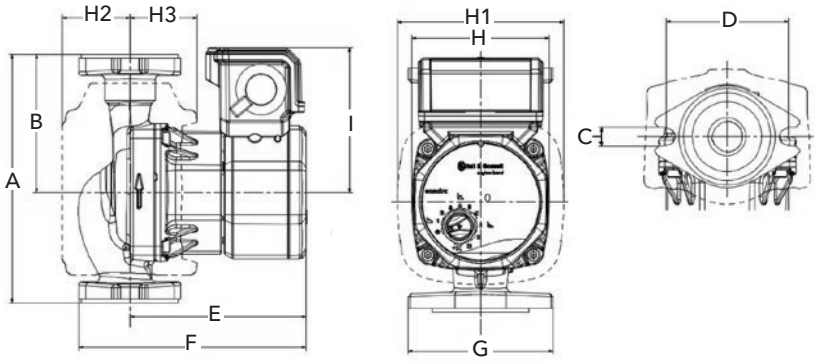
- Maximum of 20 feet of head or 18 GPM
- 70W maximum power
- 3 modes – proportional pressure, constant pressure, or adjustable speed control
- Fluid temperature: 14-230°F
- CircGuard™– complete integrated system protection
- Automatic air purge to remove any air trapped in the pump
- One turn knob and multicolor LED display for easy reading and setting of the pump
- Check valve included in box
- Insulation shell included

Bell & Gossett
a xylem brand

A-169

Dimensions and Weights

ecocirc / ecorcirc+ 20-18 (Flanged)			
A	6.38" (162 mm)	E	4.57" (116 mm)
B	3.54" (90 mm)	F	5.9" (150 mm)
C	0.47" (12 mm)	G	3.74" (95 mm)
D	3.15" (80 mm)	H	3.54" (90 mm)
I	3.74" (95 mm)	H1	4.29" (109 mm)
H2	1.73" (44 mm)	H3	1.73" (44 mm)
Weight	5.86 lb. (2.66 kg)		



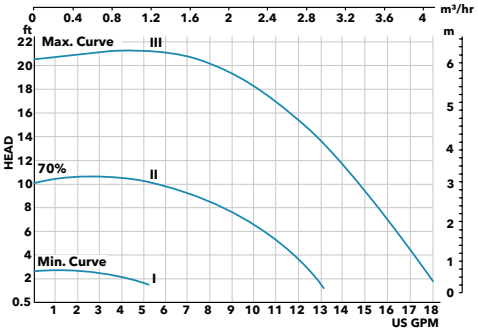
Part Numbers

ecocirc 20-18 Part Number	Description
60B0B1000	ecocirc Cast Iron Flanged
60B0B1001	ecocirc Stainless Steel Flanged
60B0B1002	ecocirc Stainless Steel Union

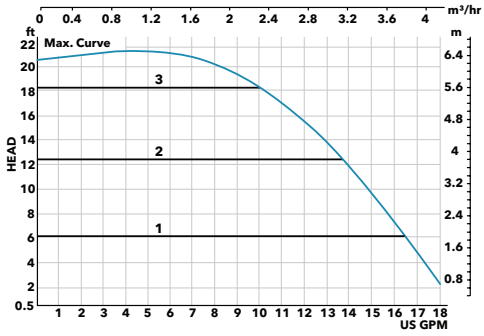
ecocirc+ 20-18 Part Number	Description
60B0B1003	ecocirc+ Cast Iron Flanged
60B0B1004	ecocirc+ Stainless Steel Flanged
60B0B1005	ecocirc+ Stainless Steel Union

Performance

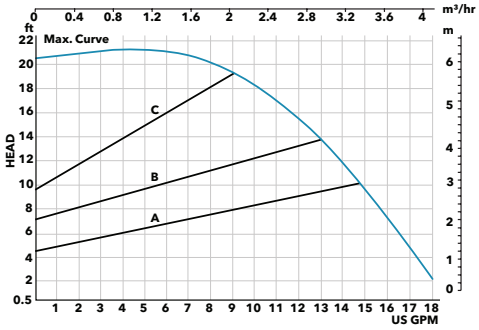
Fixed Speed Curve



Constant Pressure Curve



Proportional Pressure Curve



Cross Reference Chart

ecocirc 20-18 ecocirc+ 20-18	Bell & Gossett	Grundfos	Taco	Armstrong	Wilo
ecocirc 20-18 CI Flanged	ecocirc 19-16 CI, NRF-9L/W, NRF-22, NRF-33	Alpha2 15 55 (+), Alpha1 15-55, UPS 15-58, UP 15-42, UP 15-10	VT-2218 (+), VR-1816, 0018e (+), 0015e3, 007e, 006e3, 005-F, 007-F, 008-F, 0015-F	Compass H 20-20CI (+), Astro 2 210 CI, Astro 2 220 CI, Astro 2 230 CI, Astro 2 250 CI	Stratos ECO, Stratos 1.25 X 3- (+), 20 Star S-21
ecocirc 20-18 SS Flanged	ecocirc 19-16 SS, NBF-12F/LW, NBF-22, NBF-25, SSF-12F/LW, SSF-22	Alpha2 15-55 (+), Alpha1 15-55, UPS 15-55, UPS 15-35, UP 15-29	005-BF, 007-BF, 008-BF, 0015-SF	Compass H 20-20 (+), SSF Astro 2 210 SS, Astro 2 230 SS, Astro 2 250 SS	Star Z S-21
ecocirc 20-18 SS Union	NBF-8S/LW, NBF-9U/LW, NBF-10S/LW, NBF-12U/LW, NBF-18S/LW, NBF-22U, SSF-9U/LW, SSF-12U/LW, SSF-22U	UP 15-10B, UP 15-18B, UP 15-29SU	003-B, 003-BC, 006-B, 006-BC, 008-BC	Compass H 20-20 (+), SSU Astro 2 220, SSU Astro 2 225, SSU Astro 2 225, BS	N/A

Note: Stainless steel (SS) versions are NSF-61 certified. (+) designates the cross reference to the ecocirc+ 20-18.

Standard warranty of 24 months on all models. Extended warranty when registering the ecocirc 20-18 via iOS or Android app.

For more information please visit our website at http://bellgossett.com/pumps-circulators/circulator-pumps

xylem
Let's Solve Water

Xylem Inc.
8200 N. Austin Avenue
Morton Grove, IL 60053
Phone: (847) 966-3710
www.xylem.com/bellgossett

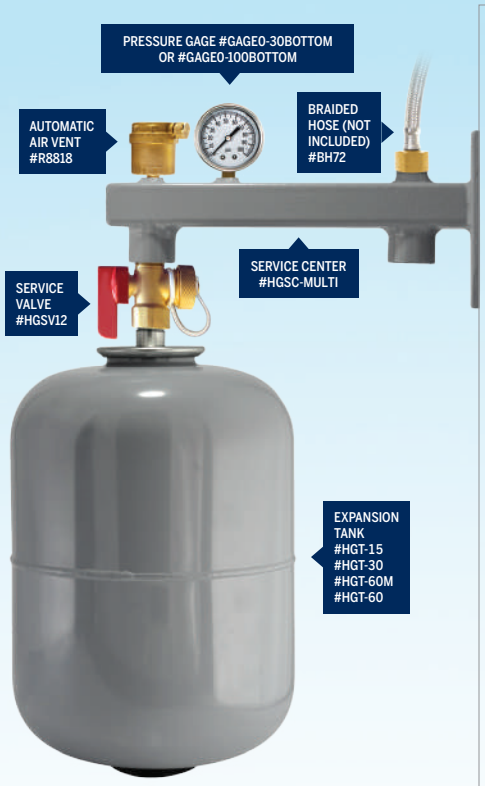
SERVICE KIT FOR HYDRONIC HEATING SYSTEM

QUALITY | INNOVATION | RELIABILITY

SERVICE KIT FOR HEATING SYSTEM

Calefactio's wall support for hydronic heating system allows for a safe, practical and easily accessible installation.

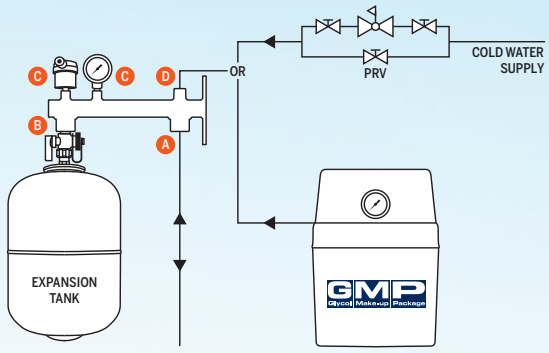
In addition to secure your installation in the event of a tank failure, the service center gives a complete overview of the system.



KIT	CONTAINS
#SERVICEKIT15	✚ HGT-15 ✚ HGSC-MULTI ✚ R8818 ✚ HGSV12 ✚ GAGE0-30BOTTOM OR GAGE0-100BOTTOM
#SERVICEKIT30	✚ HGT-30 ✚ HGSC-MULTI ✚ R8818 ✚ HGSV12 ✚ GAGE0-30BOTTOM OR GAGE0-100BOTTOM
#SERVICEKIT60M	✚ HGT-60M ✚ HGSC-MULTI ✚ R8818 ✚ HGSV12 ✚ GAGE0-30BOTTOM OR GAGE0-100BOTTOM
#SERVICEKIT60	✚ HGT-60 ✚ HGSC-MULTI ✚ R8818 ✚ HGSV12 ✚ GAGE0-30BOTTOM OR GAGE0-100BOTTOM

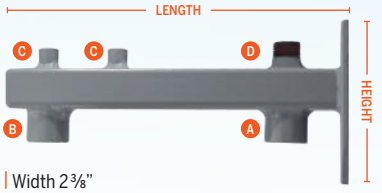
INSTALLATION

Link your heating system to the ½"FNPT connection (A). Connect directly a heating expansion tank (HGT-15, HGT-30, HGT-60M or HGT-60), with the Service valve (HGSV12) on the ½"FNPT connection (B). Then, on connections (C) (⅛"FNPT), connect an automatic air vent (R8818) and a pressure gage (GAGE0-30BOTTOM or GAGE0-100BOTTOM). On connection (D) (½"MNPT) you can either connect your GMP or simply the cold water supply.



DIMENSIONS

- (A) ½" FNPT
- (B) ½" FNPT
- (C) ⅛" FNPT
- (D) ½" MNPT



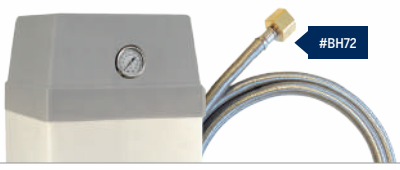
Length 10¾" | Height 4½" | Width 2⅜"

SERVICE VALVE
#HGSV12
½" FNPT

AUTOMATIC AIR VENT
#R8818
⅛" MNPT

PRESSURE GAGE
#GAGE0-30BOTTOM OR #GAGE0-100BOTTOM
⅛" MNPT

COMPLETE YOUR INSTALLATION WITH OUR GMP AND BRAIDED HOSE (#BH72)



GMP Glycol Make-up Package

calefactio.com

tech brochure 01076

548
Hydro Separator

Hydronic separator. Epoxy resin coated steel body. With pre-formed insulation.
Sweat & threaded union connections.
Complete with: automatic air vent valve with automatic check valve, drain valve.
Max. working pressure: 150 psi.
Working temperature range: 32 - 210°F.
Working temp. without insulation: 32 - 250°F.

Code	Description	Pk	Lbs
548006A	1" NPT unions	1	12.5
548096A	1' sweat unions	1	12.5
548007A	1-1/4" NPT unions	1	16.5
548097A	1-1/4" sweat unions	1	16.5
548008A	1-1/2" NPT unions	1	25.1
548009A	2" NPT unions	1	27.1

NEW

tech brochure 01076

548
Hydro Separator

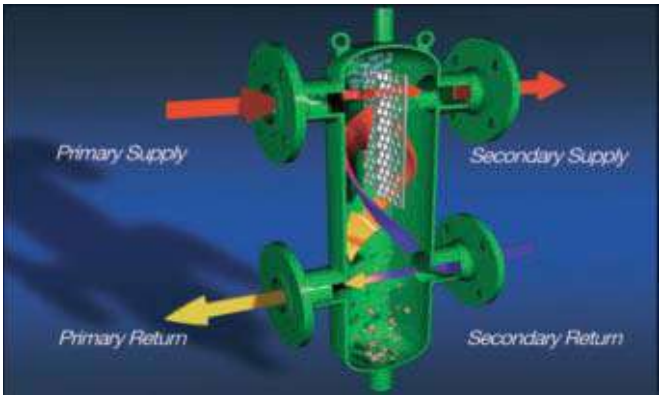
Hydronic separator. Epoxy resin coated steel body. With pre-formed insulation.
ANSI flanged connections. Complete with: automatic air vent valve with shutoff valve, drain valve.
Max. working pressure: 150 psi.
Working temperature range: 32 - 220°F.
Working temp. without insulation: 32 - 250°F.

Code	Description	Pk	Lbs
548052A	2" flanged	1	75.0
548062A	2-1/2" flanged	1	81.5
548082A	3" flanged	1	112.4
548102A	4" flanged	1	117.0

Code	Description	Pk	Lbs
NA548052A	2" flanged ASME	1	75.0
NA548062A	2-1/2" flanged ASME	1	81.5
NA548082A	3" flanged ASME	1	112.4
NA548102A	4" flanged ASME	1	117.0

*NA prefix indicates ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors.

Hydronic Separator



The hydronic separator creates a zone with a low pressure loss, which enables the primary and secondary circuits connected to it to be hydraulically independent of each other; the flow in one circuit does not create a flow in the other.

Maximum recommended flow rates in GPM and volume capacity in gallons.

	FLOW CAPACITY - UNION CONNECTIONS			
Size	1"	1 1/4"	1 1/2"	2"
GPM	11	18	26	37
Volume	0.5	0.7	1.3	3.5

	FLOW CAPACITY - FLANGED CONNECTIONS								
Size	2	2 1/2"	3	4"	5"	6"	8"	10"	12"
GPM	40	80	124	247	330	485	792	1320	1850
Vol.	4.0	4.0	8.0	8.0	22.5	23.2	95	175	255

tech brochure 01076

548
Hydro Separator ASME

Hydronic separator. Epoxy resin coated steel body. Without insulation.
Complete with: automatic air vent valve with shutoff valve, drain valve.
ANSI flanged connections.
Max. working pressure: 150 psi.
Working temperature range: 32 - 250°F.
ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors.

Code	Description	Pk	Lbs
NA548120A	5" flanged ASME	1	220.0
NA548150A	6" flanged ASME	1	231.0
NA548200A	8" flanged ASME	1	520.0
NA548250A	10" flanged ASME	1	725.0
NA548300A	12" flanged ASME	1	1,100

NEW

4-IN-1 HYDRAULIC SEPARATORS

5495 SEP4™

tech. broch. 01249

Combination 1. air, 2. hydraulic and 3. dirt separation, plus 4. magnetic separation.
Epoxy resin coated steel body.
HDPE internal coalescing element, removable for cleaning.
Pre-formed insulation.
Particle separation capacity: to 5 µm (0.2 mil).
Ferrous impurities separation efficiency: 100%.
Air separation efficiency: 100% to microbubble level.
Complete with union connections.
Thermowell tap: 1/2" straight female.
Max. working pressure: 150 psi.
Working temperature range: 32—210°F.
Working temp. w/o insulation: 32—230°F.

Code	Description	Lbs	USD
549596A	1" sweat union	15	**1,315.00**
549506A	1" NPT F union	15	**1,375.00**
549566A	1" Press F union	15	**1,455.00**
549597A	1 ¼" sweat union	19	**1,585.00**
549507A	1¼" NPT F union	19	**1,665.00**
549567A	1¼" Press F union	19	**1,833.00**
549598A	1½" sweat union	27	**2,080.00**
549508A	1½" NPT F union	27	**2,185.00**
549568A	1½" Press F union	27	**2,385.00**
549599A	2" sweat union	29	**2,425.00**
549509A	2" NPT F union	29	**2,545.00**
549569A	2" Press F union	29	**2,965.00**

549 SEP4™ ASME

tech. broch. 01249

Combination 1. air, 2. hydraulic and 3. dirt separation, plus 4. magnetic separation.
Epoxy resin coated steel body.
Stainless steel internal coalescing mesh.
Three neodymium magnets.
Complete with:
automatic air vent (code 501502A).
air vent shut-off valve (code NA39589).
drain valve (code NA59600).
ANSI 150 flange connections.
Thermometer pockets (NPT):
½" inlet/outlet flanges, ¾" front center
Max. working pressure: 150 psi.
Vessel temperature range: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).
ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN consult factory.

Code	Description	Lbs	USD
NA549200AM	8" ANSI flange ASME	530	**27,425.00**
NA549250AM	10" ANSI flange ASME	740	**37,158.00**
NA549300AM	12" ANSI flange ASME	1,110	**48,900.00**
NA549350AM	14" ANSI flange ASME	1,550	**57,650.00**

549 SEP4™

tech. broch. 01249

Combination 1. air, 2. hydraulic, 3. dirt separation, plus 4. magnetic separation.
Epoxy resin coated steel body.
Stainless steel internal coalescing mesh.
Pre-formed insulation on 2"— 4" sizes.
One neodymium magnet.
Complete with:
automatic air vent (code 501502A).
air vent shut-off valve (code NA39589).
drain valve (code NA39588).
ANSI 150 flange connections.
Max. working pressure: 150 psi.
Vessel temperature range: 32—220°F.
Working temp. w/o insulation: 32—270°F.
Particle separation capacity: to 5 µm (0.2 mil).

Code	Description	Lbs	USD
549552A	2" ANSI flange	76	**5,846.00**
549562A	2½" ANSI flange	82	**6,229.00**
549582A	3" ANSI flange	112	**7,795.00**
549510A	4" ANSI flange	120	**8,730.00**

Code	Description	Lbs	USD
NA549052AM	2" ANSI flange ASME & CRN	76	**6,805.00**
NA549062AM	2½" ANSI flange ASME & CRN	82	**7,305.00**
NA549082AM	3" ANSI flange ASME & CRN	112	**9,042.00**
NA549102AM	4" ANSI flange ASME & CRN	120	**9,535.00**
NA549120AM*	5" ANSI flange ASME & CRN	220	**13,138.00**
NA549150AM*	6" ANSI flange ASME & CRN	235	**15,845.00**

* without insulation
NA prefix indicates ASME U-stamp tagged and registered with the National Board of Boiler and Pressure Vessel Inspectors; CRN registered.

In the SEP4™ hydraulic separators ferrous impurities are captured by a concentrated magnetic field created by a stack of neodymium rare-earth magnets positioned inside a brass dry-well which is below the flow stream. Non-magnetic dirt particles are separated by colliding with an internal element in the flow stream and settling to the bottom. The deep collection chamber keeps the dirt from re-entering the flow stream. The dirt and ferrous impurities are flushed out while the system is operating, by removing the magnets and opening the purge valve.

	FLOW RATE - UNION CONNECTIONS			
Size	1"	1¼"	1½"	2"
GPM	11	18	26	37
Gallons	0.5	0.7	1.3	3.5

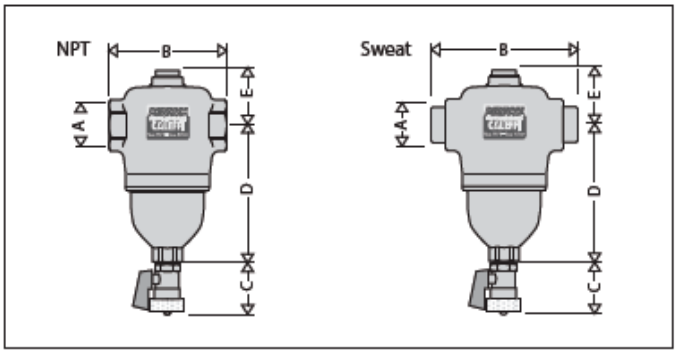
	FLOW RATE - FLANGED CONNECTIONS									
Size	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"
GPM	60	80	124	247	300	484	792	1330	1850	2500
Gallons	4.0	4.0	8.0	8.0	23	23	95	175	255	450

DIRTCAL® – DIRTMAG® dirt separator

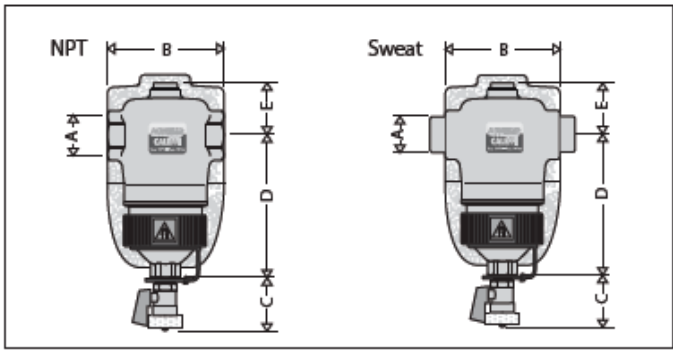
5462–5463–5465-5465M–NA5465-NA5465M series

01137/15 NA
Replaces 01137/13 NA

Dimensions

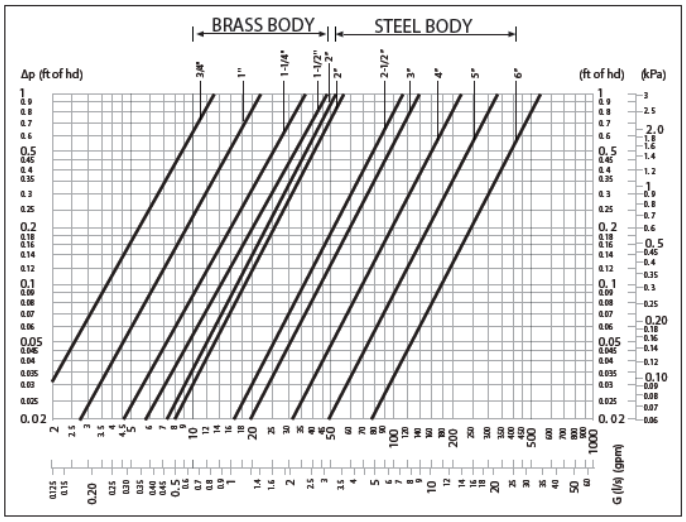


Code	A	B	C	D	E	Wt. lb (kg)
546205A	¾" NPT	4⅝"	1¼"	5"	2"	4.2 (1.9)
546206A	1" NPT	4⅝"	1¼"	5"	2"	4.2 (1.9)
546207A	1¼" NPT	4⅞"	1¼"	6"	2"	5.3 (2.4)
546208A	1½" NPT	4⅞"	1¼"	6"	2"	6.2 (2.8)
546209A	2" NPT	5⅛"	1¼"	6"	2"	6.2 (2.8)
546228A	1" SWT	5⅛"	1¼"	5"	2"	4.2 (1.9)
546235A	1¼" SWT	5⅜"	1¼"	6"	2"	4.2 (1.9)
546241A	1½" SWT	5¾"	1¼"	6"	2"	4.9 (2.2)
546254A	2" SWT	6⅛"	1¼"	6"	2"	5.5 (2.5)



Code	A	B	C	D	E	Wt. lb (kg)
546306A	1" NPT	4⅝"	1¼"	5"	2"	4.2 (1.9)
546328A	1" SWT	5⅛"	1¼"	5"	2"	4.2 (1.9)
546307A	1¼" NPT	4⅞"	1¼"	6"	2"	5.3 (2.8)
546335A	1¼" SWT	5⅜"	1¼"	6"	2"	4.2 (1.9)
546308A	1½" NPT	4⅞"	1¼"	6"	2"	6.2 (2.8)
546341A	1½" SWT	5¾"	1¼"	6"	2"	4.9 (2.2)
546309A	2" NPT	5⅛"	1¼"	6"	2"	6.2 (2.8)
546354A	2" SWT	6⅛"	1¼"	6"	2"	5.5 (2.5)

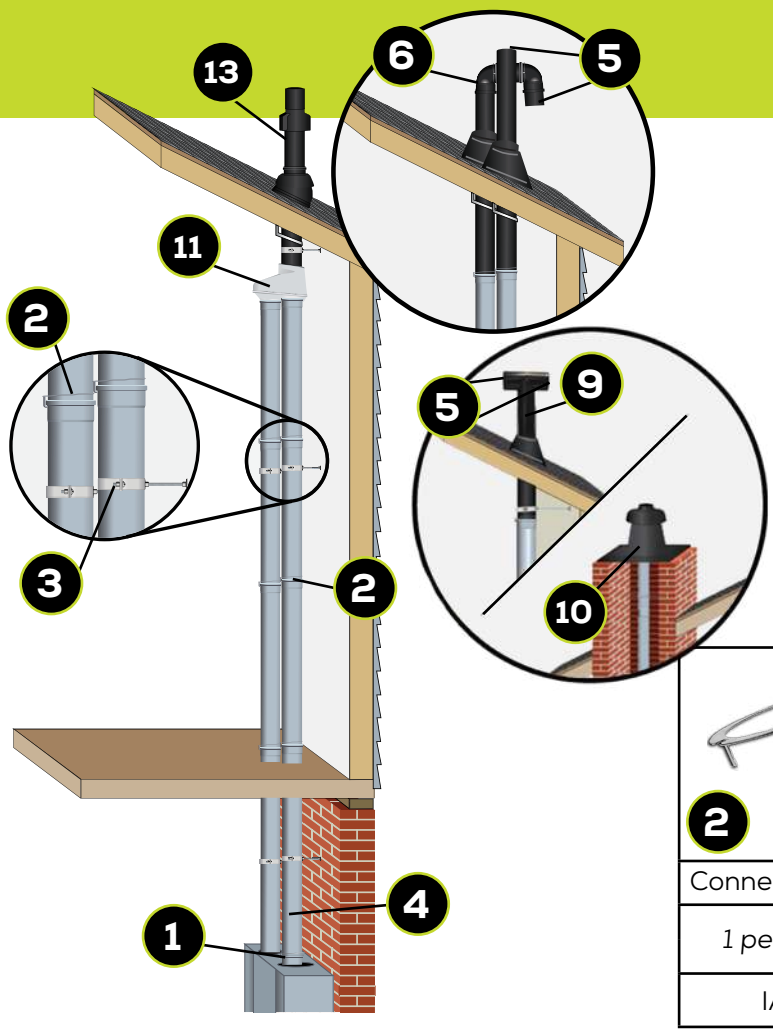
Hydraulic characteristics



		FLOW RATE (Brass body)				
	Size	¾"	1"	1¼"	1½"	2"
4.0 f/s	GPM	6	9	15	24	36
	Cv	19	32	56	73	81

		FLOW RATE (DIRTCAL® steel body)					
	Size	2"	2½"	3"	4"	5"	6"
4.0 f/s	GPM	37	63	95	149	259	380
10.0 f/s	GPM	89	150	227	355	816	904
	Cv	88	176	211	328	520	842

		FLOW RATE (DIRTMAG® steel body)					
	Size	2"	2½"	3"	4"	5"	6"
4.0 f/s	GPM	37	63	95	149	259	380
	Cv	88	176	211	328	520	842



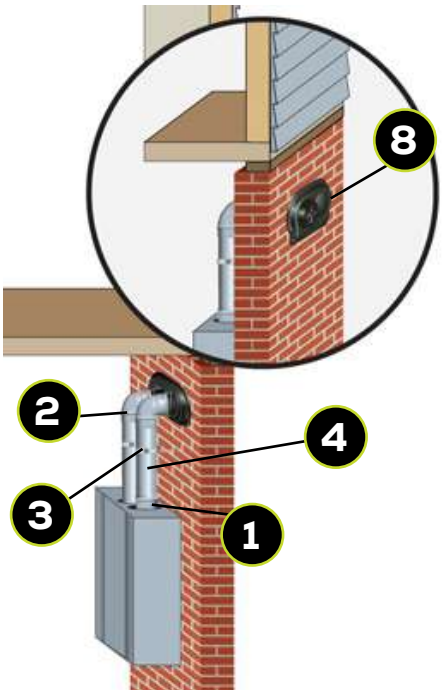
Adaptors

Consult InnoFlue OEM Matrix for correct fitting

1			
			
	PVC Adaptor	Gasketed	Steel Adaptor
	ISAAL	ISAGL	ISSA

Accessories

2 	3 	4 	5 
Connector Ring	Support Clamp		Recommended
1 per fitting	Vertical: Every 39"	Horizontal: Every 78"	Test Port	Bird Screen
IANS	IASCM		ISTP	IASPP

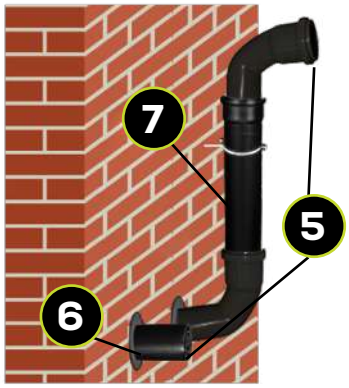


Termination Options

Consult local codes and OEM I&O manuals for snowline and other requirements

6 	7 	8 	9 	10 
End Pipe	Snorkel	Horizontal Wall	Term Tee	Chimney Cap
ISEP	*See Back*	ISLPT	ISTT	ISCP

Concentric Adaptor → Terminations



11	12	13
		
Required	Select One	
Adaptor	Wall Termination	Roof Term
ICTCR	ICWT	ICRT

InnoFlue Polypropylene Vent Systems

Centrotherm

NOTE: Both gray and black **InnoFlue** components <u>can be</u> used outdoors. All InnoFlue components have passed the UV stability test (ASTM G23-81) relevant to UL listing.

Two Minute Product Overview	Take the Factory Tour!
Full I&O Manual	Condensate Management Guide

InnoFlue Flex Product Overview

Vent Lengths

InnoFlue never requires glues, solvents or primers.
Each component has a socket, and a male/female fitting connection.
Apply Centrocerin lubricant and push together

	2"	3"	4"
1'	ISVL021	ISVL031	ISVL041
2'	ISVL022	ISVL032	ISVL042
2' UV	ISVL022UV	ISVL032UV	ISVL042UV
3'	ISVL023	ISVL033	ISVL043
6'	ISVL026	ISVL036	ISVL046
10'	ISVL0210	ISVL0310	ISVL0410

Elbows

	2"	3"	4"
45°	ISELS0245	ISELS0345	ISELS0445
87°	ISELS0287	ISELS0387	ISELS0487
87° Long Sweep	ISELL0287	ISELL0387	ISELL0487
45° UV	ISELS0245UV	ISELS0345UV	ISELS0445UV
87° UV	ISELS0287UV	ISELS0387UV	ISELS0487UV

Lubricant

Centrocerin
IACE50

Condensate Management

Siphon	Drain Fitting	Tee	Cap w/ Drain
IASJVBS	ISHDT	IST	ISTCD

Other Useful Components

Wall Plate	Increaser	Reducer
IAWP	ISIA	ISRD

C US LISTED

Intertek

FIRST LISTED

InnoFlue® is the first polymeric vent system tested and listed to **ULC-S636** and **UL-1738** in North America

FasNSeal

Best practices for installing FasNseal single wall vent pipe

The Must Do's:

- Fully seat male end into female gasketed end (see Fig. 1)
- Properly pitch vent pipe a minimum ¼" per foot, noting appliance manufacturers' requirements, whichever is greater
- Support vent pipe at intervals of no greater than 6' spacing

The Should Do's:

- Lubricate and Twist – Use Spray Silicone or WD-40 lubricant on male pipe end prior to fitting into female gasketed end (See Fig. 2)
- Push and twist to fully seat connection
- Use adjustable lengths to avoid cutting straight length pieces
- Use Adjustable lengths on vertical and horizontal run to limit pitch issues (See Fig. 3). Adjustable lengths must penetrate a minimum of 4" to assure proper seal and structural integrety
- Cut ends must be squared; deburred and seated a minimum 2" into female gasketed end

FasNFlex Note:

- When attaching to FasFlex flexible liner, be sure to note the liner is directional. The arrow on the liner indicates flue gas direction. Failure to install in the correct orientation will result in condensate issues within the venting system
- FasNFlex is approved for vertical installation only

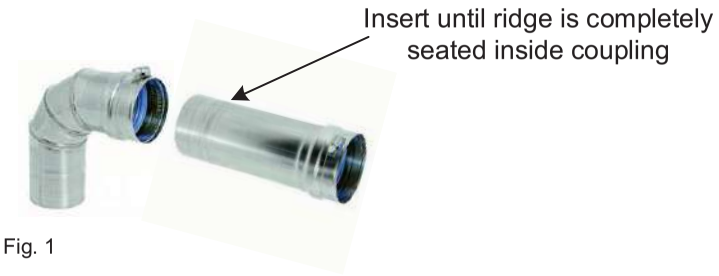


Fig. 1

Fig. 2

Fig. 3

CAPCO
ENERGY SUPPLY, INC.
781-721-0303 FAX 781-721-9119 WWW.CAPCOSUPPLY.COM
3 RATH ROAD
WOBURN, MA 01801

	FASNSEAL BEST PRACTICE	3.2017 WB

Grundfos Flanges

Flange Type	Fits Pumps:	Sizes	Material Number
GF 15/26 Flange	All UPS 15 & 26 Series	3/4"	519601
2-bolt	Alpha, 15/58, 26/99	1"	519602
	26/150	1-1/4"	519603
		1-1/2"	519604
GF 40/43 Flange	UPS 43/44, 43/75	1-1/2"	539605
2-bolt HV	43/100, 43/110		
GF 50 Flange	UPS 50/44, 50-60	2"	96409354
4-bolt	50/75		
GF 53 Flange		2"	91584910
		2-1/2"	91584911
		3"	91584912
GF 65 Flange		2-1/2"	559601
GF 80 Flange		3"	569601
GF 100 Flange		4"	579801

Magna 3 40-80 Through 40-180 excepts GF 15/26 or GF 40/43 Flanges
Magna 3 50-80 Through 65-120 excepts GF53 Flanges
Magna 3 65-150 Excepts GF65 Flange
Magna 3 80-100 Excepts GF80 Flange
Magna 3 100-120 Excepts GF100 Flange
Magna 3 65-150 D Excepts GF65 Flange
Magna 3 80-100 D Excepts GF80 Flange
Magna 3 100-120 D Excepts GF100 Flange

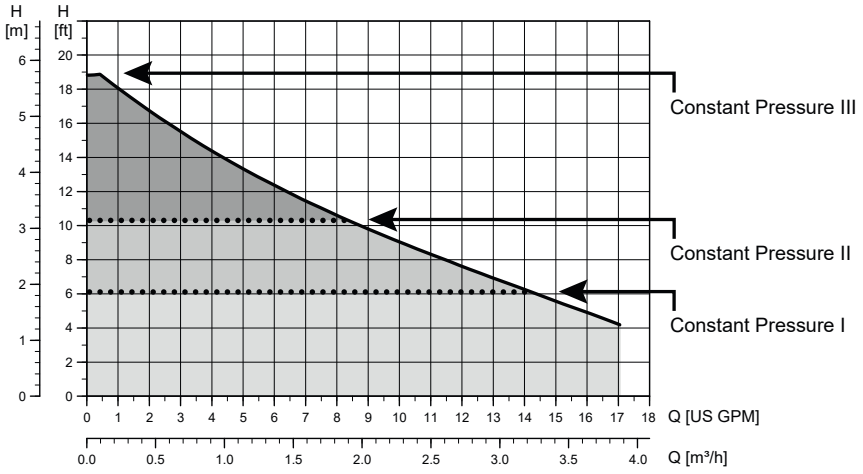
ALPHA1 Technical Data

ALPHA1	
Flow, Q:	max. 21 gpm (80 lpm)
Head, H:	max. 19 ft. (5.8 m)
Motor:	1 x 115V
Liquid temp.:	36°F to 230°F (2°C to 110°C)
Working Pressure:	max. 150 PSI
Watts:	5-45 W
Amps:	0.65 A
Approvals:	ETL, NSF 61, NSF 372 Canadian ICES-003

Product Offering

Product Number	Model	Description
99287256	ALPHA1 15-55 F	Cast iron flange with terminal box
99287259	ALPHA1 15-55 FR	Cast iron rotated flange with terminal box
99287262	ALPHA1 15-55 SF	Stainless flange with terminal box
99285998	ALPHA1 15-55 F/LC	Cast iron flange with line cord
99287244	ALPHA1 15-55 FR/LC	Cast iron rotated flange with line cord
99287250	ALPHA1 15-55 SF/LC	Stainless flange with line cord

Performance Data



- Push-button for selection of pump setting
- Every time the push-button is pressed, the circulator pump setting is changed.

III **Constant Pressure III**
- The duty point of the pump will move left and right along the highest constant-pressure curve depending on the water demand in the system.

II **Constant Pressure II**
- The duty point of the pump will move left and right along the middle constant-pressure curve depending on the water demand in the system.

I **Constant Pressure I**
- The duty point of the pump will move left and right along the lowest constant-pressure curve depending on the water demand in the system.

Cross Reference Chart

The Grundfos ALPHA1 can replace the pump models listed below:

GRUNDFOS	TACO	B&G	Armstrong	WILO
UP 15-10F	005-F2-3	NRF-9F/LW	Astro 20	Star S 16FX
UP 15-42F	006-F7	NRF-22	Astro 25	Star S 21FX
UPS 15-42F	007-F5-5	NRF-25	Astro 30	Star S 21RFC
UPS 15-58FC	008-F6-1	NRF-9F/LW	Astro 230CI-R	Stratos ECO 16 RFC
	008-F6-3	Ecocirc 19-14 vario	Astro 250CI-R	
	00R-F6-1	Ecocirc 19-14 auto	Compass 20-20	
	00R-MSF			
	0015-MSF3-1			
	007e			
	0015e			

Intertek

CLASSIFIED C UL US WATER QUALITY
Drinking Water System Component
NSF / ANSI 61
NSF / ANSI 372

Grundfos
2001 Butterfield Rd, Ste 1700
Downers Grove, IL 60515

www.grundfos.us
www.grundfos.ca
www.grundfos.mx

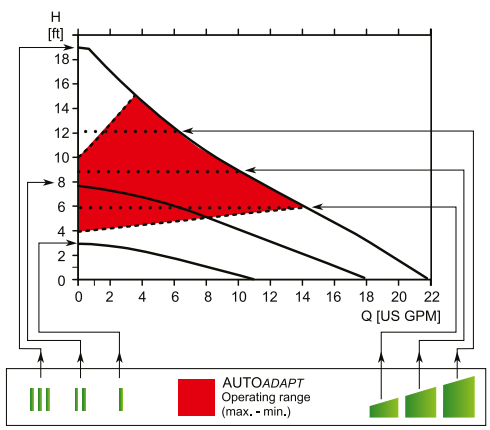
ALPHA2 Technical Data

ALPHA2	
Flow, Q:	max. 21 gpm
Head, H:	max. 19 ft.
Motor:	1 x 115V
Liquid temp.:	36°F to 230°F
Working Pressure:	max. 150 PSI
Watts:	5-45W
Amps:	0.65A
Approvals:	ETL, NSF 61, NSF 372

Product Offering

Model	Description
ALPHA2 15-55F	Cast iron flange with terminal box
ALPHA2 15-55FR	Cast iron rotated flange with terminal box
ALPHA2 15-55SF	Stainless flange with terminal box
ALPHA2 15-55F/LC	Cast iron flange with line cord
ALPHA2 15-55FR/LC	Cast iron rotated flange with line cord
ALPHA2 15-55SF/LC	Stainless flange with line cord

Performance Data



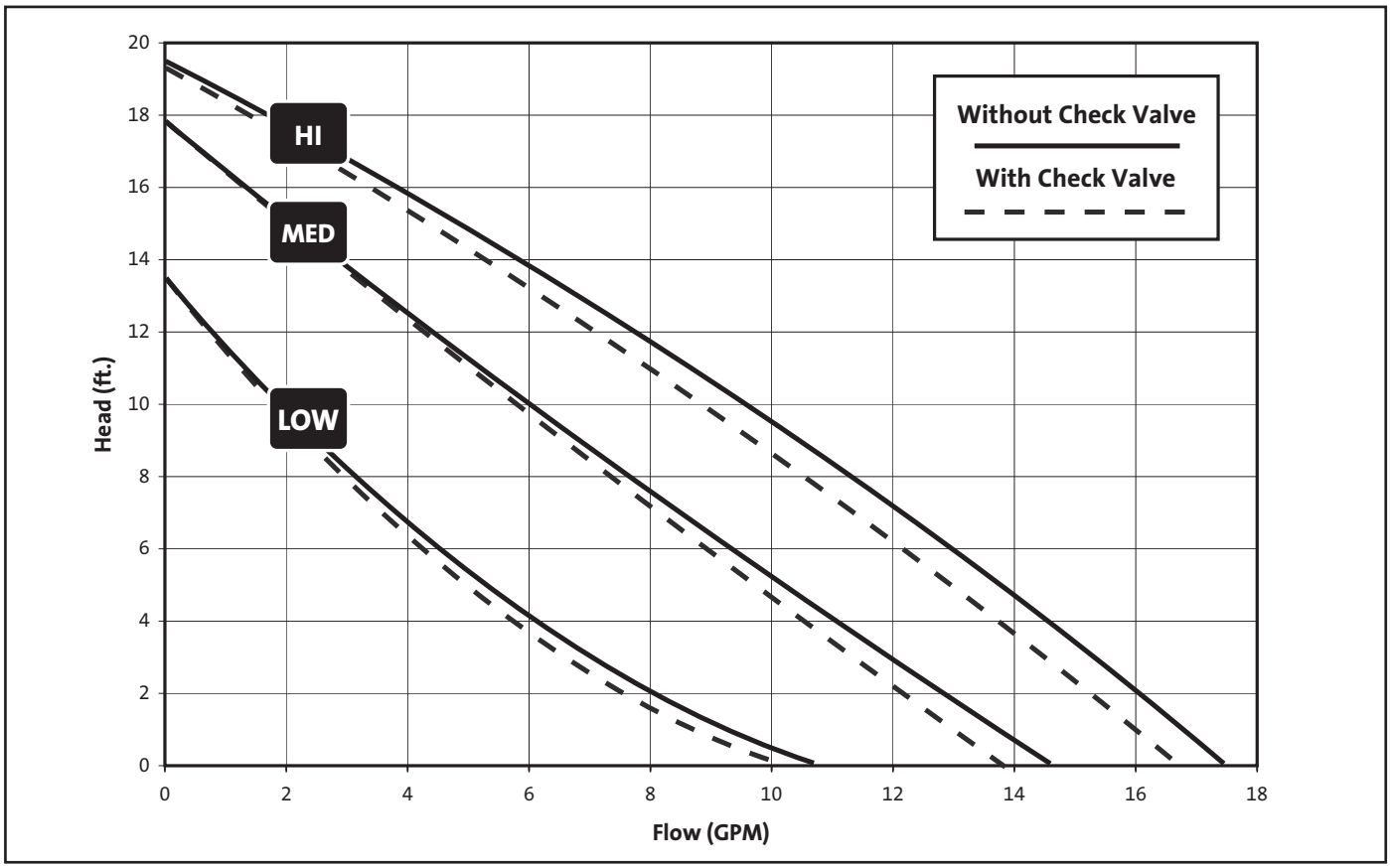
ALPHA **APPROXIMATE POWER USAGE**

Speed setting		Min.	Max.
High fixed speed	III	39W	45W
Medium fixed speed	II	15W	30W
Low fixed speed	I	5W	8W
Constant pressure		8W	45W
Constant pressure		14W	45W
Constant pressure		22W	45W
AUTOADAPT	AUTO ADAPT	5W	45W

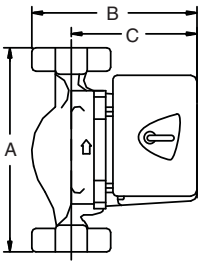
Cross Reference Chart

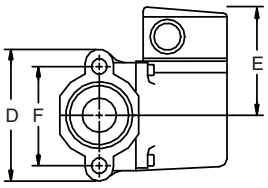
ALPHA2	GRUNDFOS	TACO	B&G	Armstrong	WILO
ALPHA2 15-55F (LC)	UP 15-10F UP 15-42F UPS 15-42F UPS 15-58FC ALPHA 15-55F	005-F2-3 006-F7 007-F5-5 008-F6-1 008-F6-3 00R-F6-1 0015-MSF3-1	NRF-25 NRF-9F/LW Ecocirc 19-14 vario Ecocirc 19-14 auto	Astro 230CI-R Astro 250CI-R Compass 20-20	Star S 16FX Star S 21FX Star S 21RFC Stratos ECO 16 RFC
ALPHA2 15-55FR (LC)	UP 15-10FR UP 15-42FR UPS15-58FRC ALPHA 15-55FR	005-F2-2 007-F5 008-F6 00R-MSF 0015-MSF3	NRF-22 NRF-9F/LW	Astro 230CI Astro 250CI Astro 20 Astro 25 Astro 30	Star S 16F Star S 21F Star S 21RFC Stratos ECO 16 RFC

UPS 15-58FC/FRC SUPERBRUTE



Flow range:	0 - 17.5 U.S. GPM
Head range:	0 - 19 FEET
Motors:	2 Pole, Single Phase
Maximum fluid temperature:	230°F (110°C)
Min. fluid temperature:	36°F (2°C)
Maximum working pressure:	145 PSI





UPS15-58FC/FRC		AMPS	WATTS	HP	CAPACITOR
115V	Spd. 3	0.75	87	1/25	10mF/180V
	Spd. 2	0.66	80	1/25	10mF/180V
	Spd. 1	0.55	60	1/25	10mF/180V

Model Type	A	B	C	D	E	F	Connection Type and Size	Shipping Wt. (Lbs.)
UPS15-58FC/FRC	6 1/2	5 1/4	4	4 3/16	3	3 5/32	GF 15/26 Flange – (2) 1/2" Dia. Bolt Holes	7 1/4

ALPHA2 26-99 Technical Data

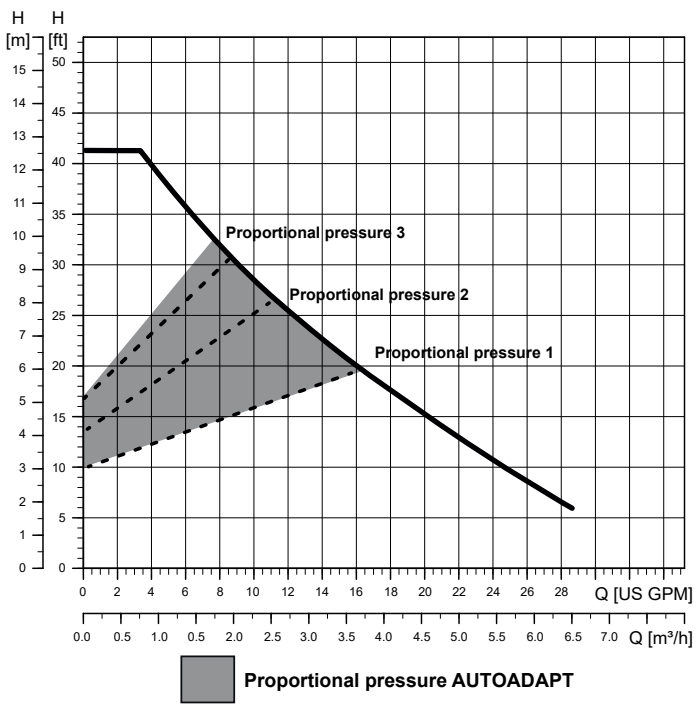
ALPHA2 26-99 INFORMATION

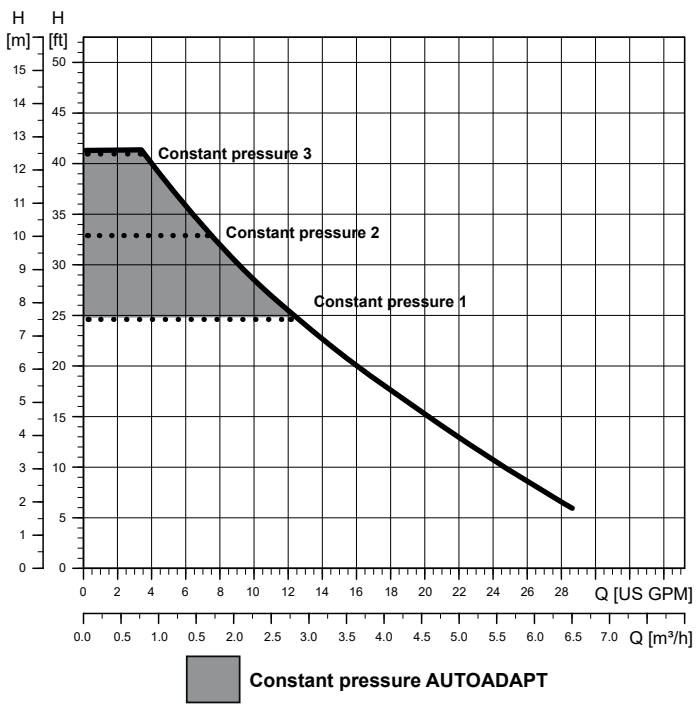
Flow, Q:	max. 26 gpm
Head, H:	max. 42 ft
Watts:	10-125 W
Voltage:	1 x 115V
Liquid Temperature:	14° F to 230° F
Flange to Flange Length	6.5”
Pump Housing:	Cast-iron
Connection Type:	Flanged Connection

Product Offering

Model	Part Number	Description
ALPHA2 26-99 F	99490916	Cast-iron flange with terminal box and user interface

Performance Data

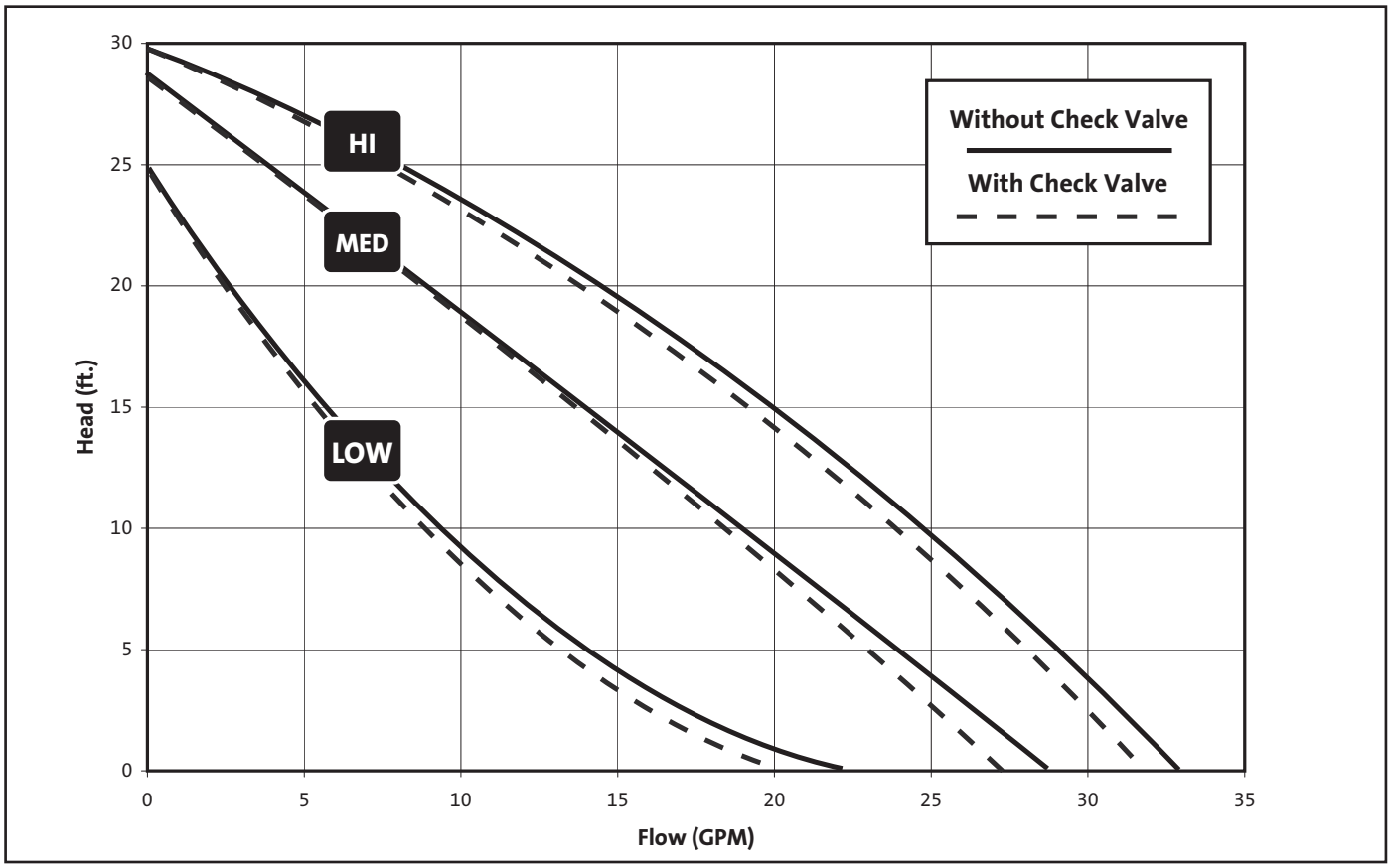




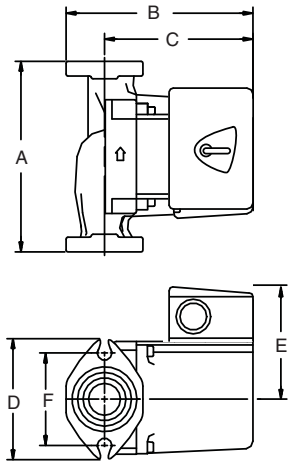
Grundfos
2001 Butterfield Rd, Ste 1700
Downers Grove, IL 60515

www.grundfos.us
www.grundfos.ca
www.grundfos.mx

UPS 26-99FC/BFC SUPERBRUTE



Flow range:	0 - 34 U.S. GPM
Head range:	0 - 30 FEET
Motors:	2 Pole, Single Phase
Maximum fluid temperature:	230°F (110°C)
Min. fluid temperature:	36°F (2°C)
Maximum working pressure:	145 PSI



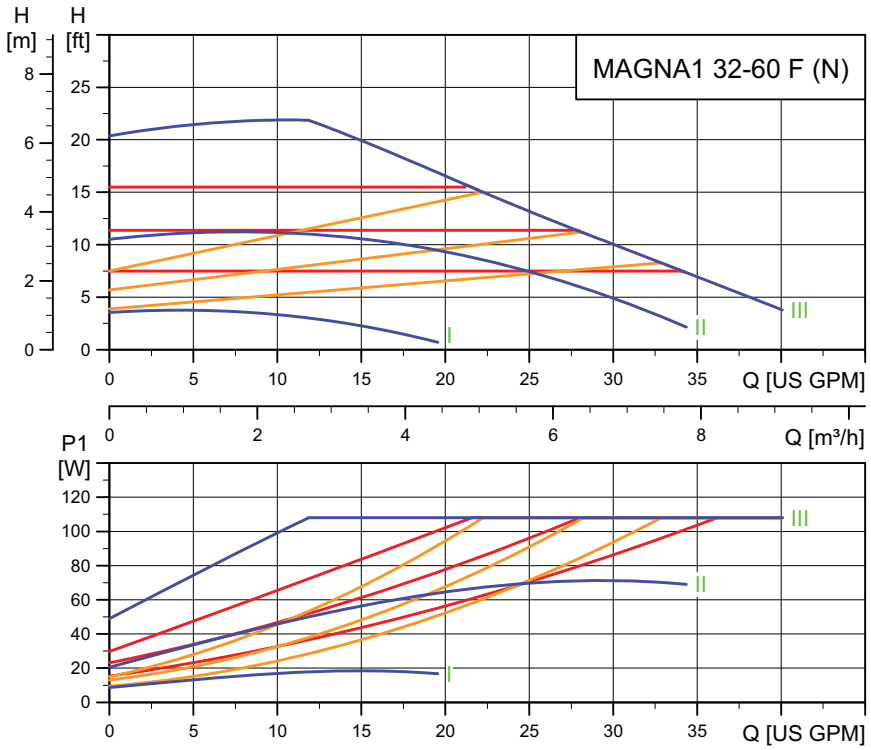
MODEL	VOLTS	AMPS	WATTS	HP	CAPACITOR
115V	Spd. 3	1.8	197	1/6	20mF/180V
	Spd. 2	1.5	179	1/6	20mF/180V
	Spd. 1	1.3	150	1/6	20mF/180V
230V	Spd. 3	0.9	196	1/6	5mF/400V
	Spd. 2	0.8	179	1/6	5mF/400V
	Spd. 1	0.7	150	1/6	5mF/400V

Model Type	A	B	C	D	E	F	Connection Type and Size	Approximate Shipping Wt. (lbs)
UPS26-99FC/BFC	6 1/2	6	4 7/8	3 1/2	3 7/16	3 5/32	GF 15/26 Flange - (2) 1/2" Dia. Bolt Holes	10.3

10. Performance curves and technical data

MAGNA1 32-60 F (N)

1 x 115-230 V, 50/60 Hz



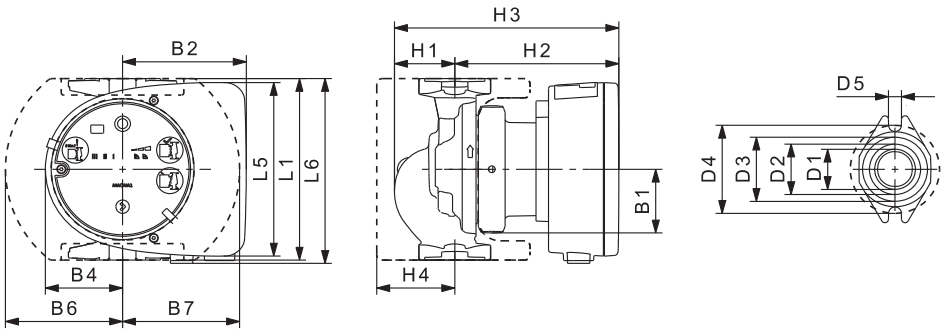
TM06 0661 0714

Speed	$I_{1/1}$ [A]	P1 [W]
Min.	0.28	8.70
Max.	1.01	107.00

The pump incorporates overload protection.

System pressure:	Max. 175 psi (12 bar).
Liquid temperature:	+14 to +230 °F (-10 °C to +110 °C).
Also available with:	Stainless-steel pump housing, type N.
Specific EEI:	0.20

Net weights [lbs (kg)]	Gross weights [lbs (kg)]	Ship. vol. [ft^3 (m^3)]
11.0 (5.0)	13.2 (6.0)	0.46 (0.014)



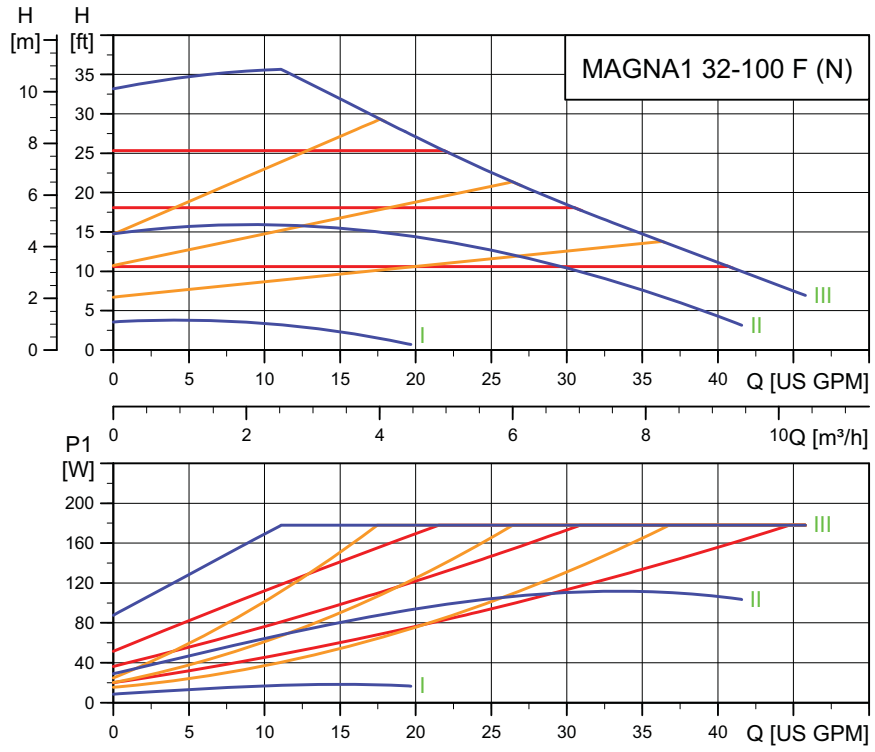
TM06 0732 0814

Pump type	Dimensions [in (mm)]								
	L1	**L5**	**L6**	**B1**	**B2**	**B4**	**B6**	**B7**	**D1**
MAGNA1 32-60 F (N)	6.50 (165)	6.23 (158)	6.62 (168)	2.29 (58)	4.38 (111)	2.72 (69)	4.18 (106)	4.18 (106)	1.26 (32)
	D2	**D3**	**D4**	**D5**	**H1**	**H2**	**H3**	**H4**	
	1.82 (46)	2.29 (58)	3.15 (80)	0.46 (11.5)	2.13 (54)	5.79 (147)	7.92 (201)	2.76 (70)	

For product numbers, see page 6.

MAGNA1 32-100 F (N)

1 x 115-230 V, 50/60 Hz



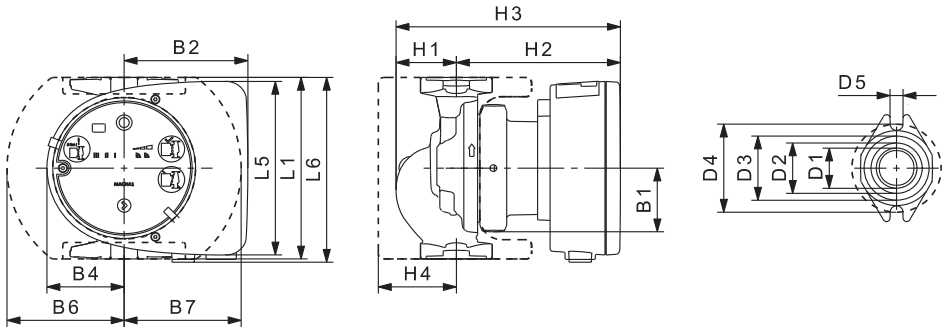
TM06 0663 0714

Speed	$I_{1/1}$ [A]	P1 [W]
Min.	0.28	8.62
Max.	1.61	178.00

The pump incorporates overload protection.

System pressure:	Max. 175 psi (12 bar).
Liquid temperature:	+14 to +230 °F (-10 °C to +110 °C).
Also available with:	Stainless-steel pump housing, type N.
Specific EEI:	0.19

Net weights [lbs (kg)]	Gross weights [lbs (kg)]	Ship. vol. [ft³ (m³)]
11.0 (5.0)	13.2 (6.0)	0.46 (0.014)



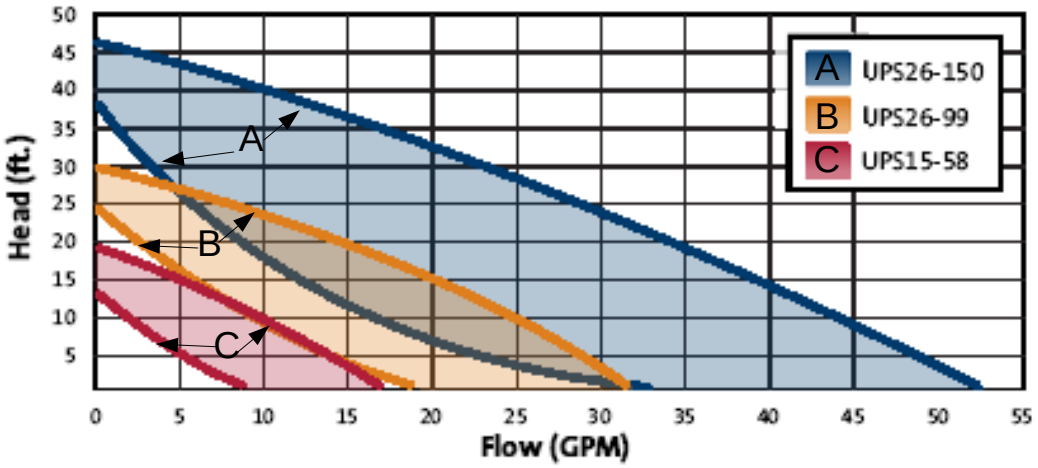
TM06 0732 0814

Pump type	Dimensions [in (mm)]								
	L1	**L5**	**L6**	**B1**	**B2**	**B4**	**B6**	**B7**	**D1**
MAGNA1 32-100 F (N)	6.50 (165)	6.23 (158)	6.62 (168)	2.29 (58)	4.38 (111)	2.72 (69)	4.18 (106)	4.18 (106)	1.26 (32)
	D2	**D3**	**D4**	**D5**	**H1**	**H2**	**H3**	**H4**	
	1.82 (46)	2.29 (58)	3.15 (80)	0.46 (11.5)	2.13 (54)	5.79 (147)	7.92 (201)	2.76 (70)	

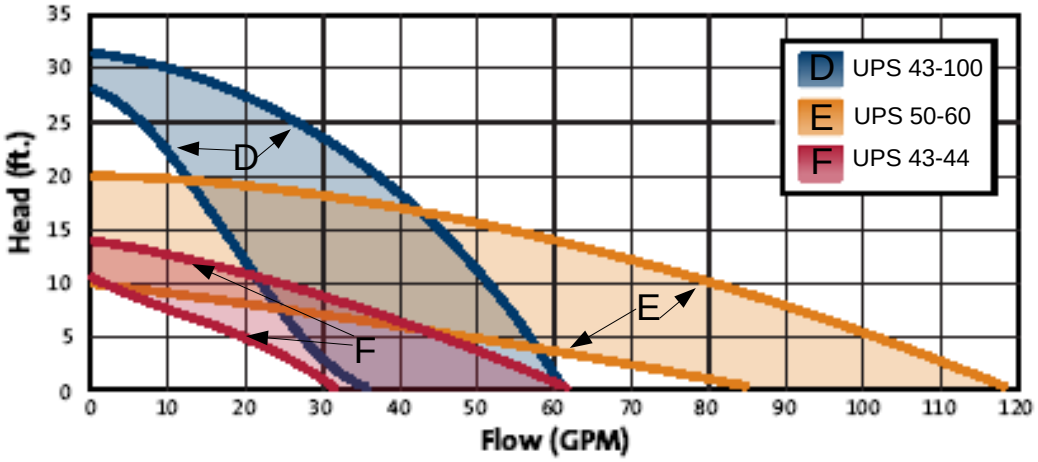
For product numbers, see page 6.

– SuperBrute 3-speed performance curves – 60 Hz

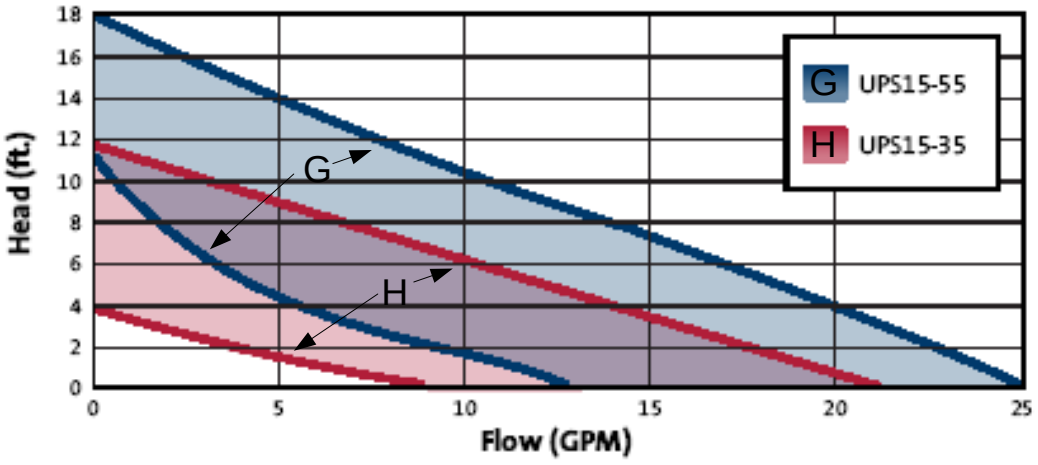
High Head Curves



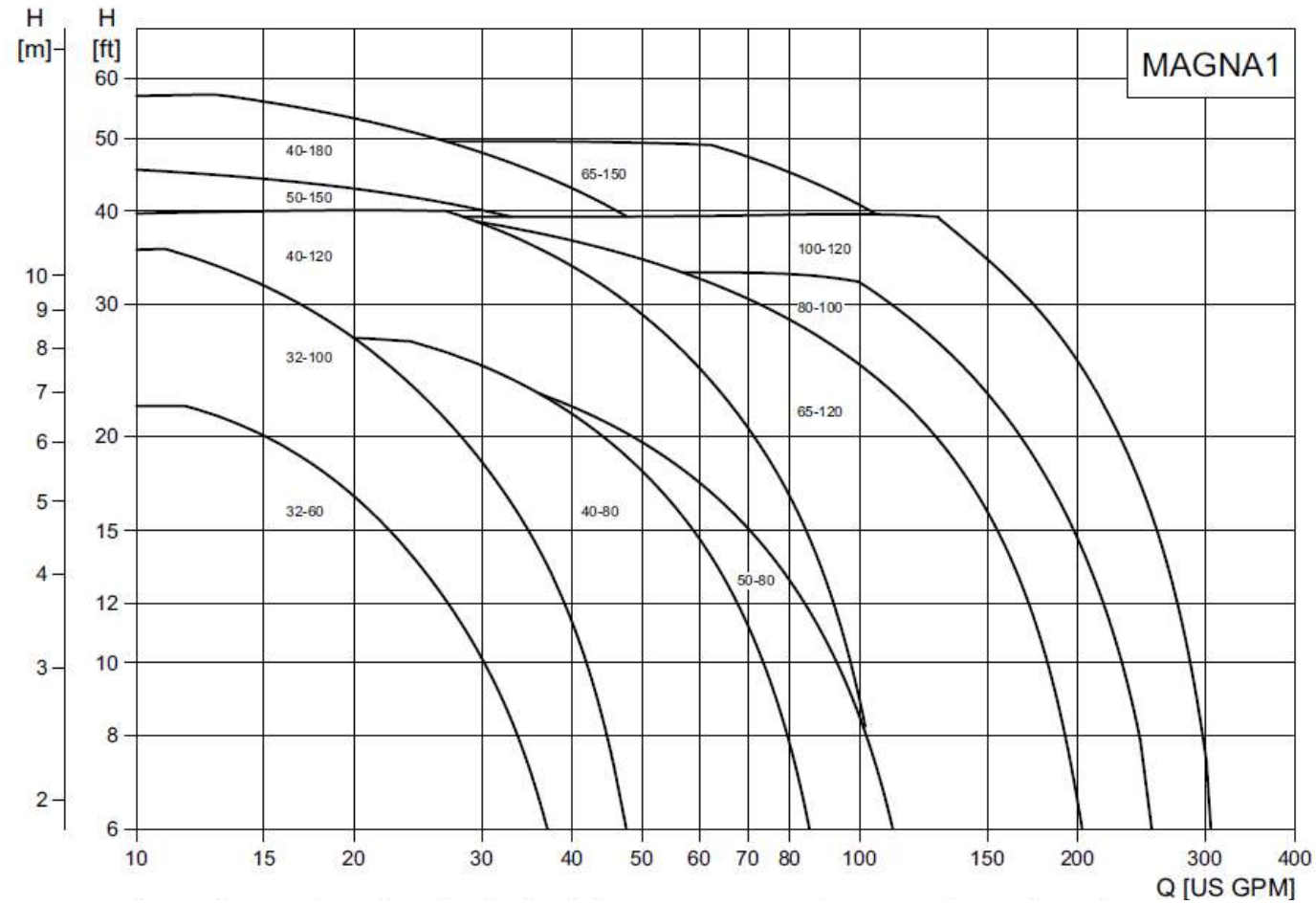
High Flow Curves

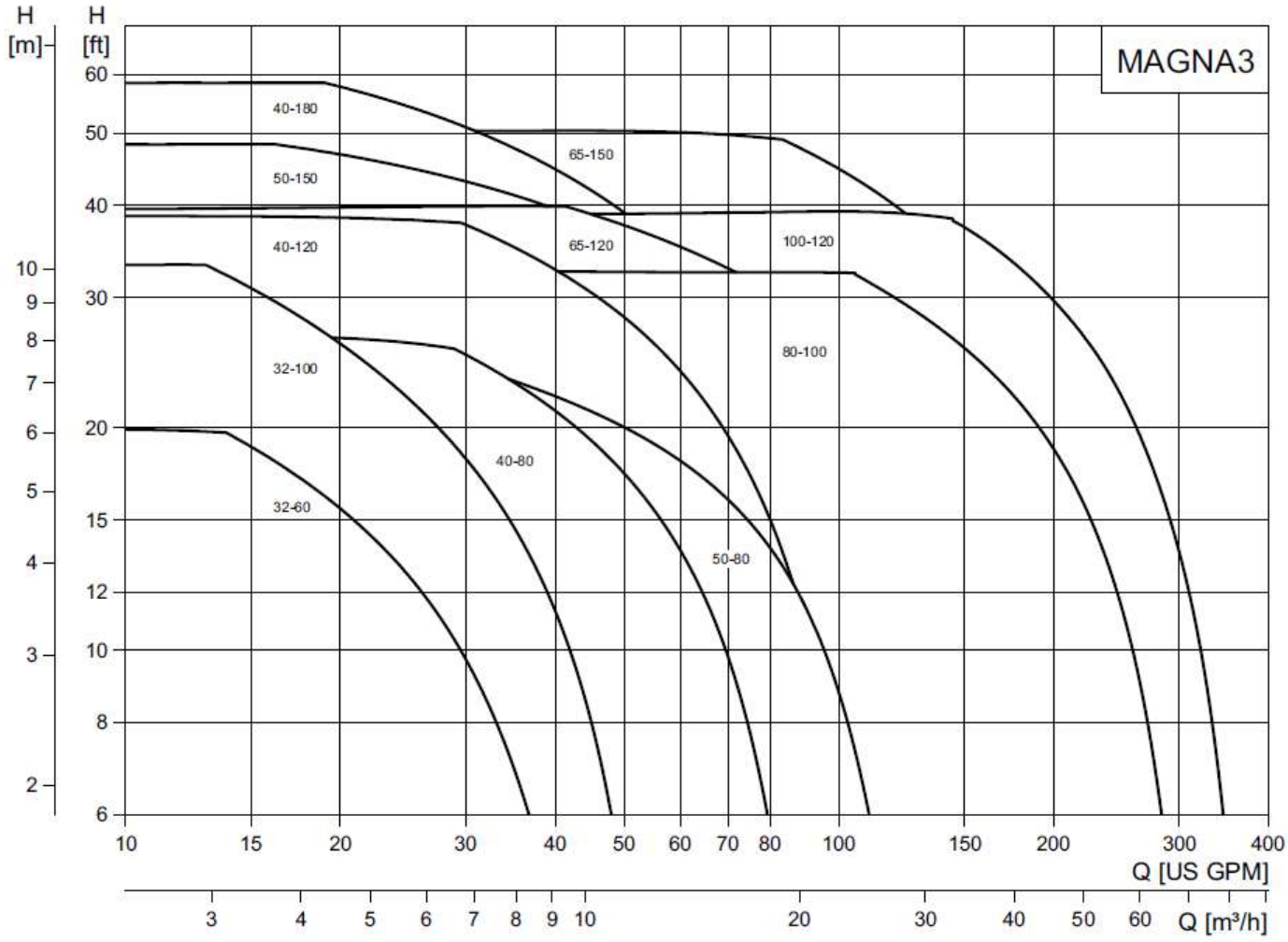


Additional Stainless Steel Curves



Magna 1 & Magna 3 Performance Curves

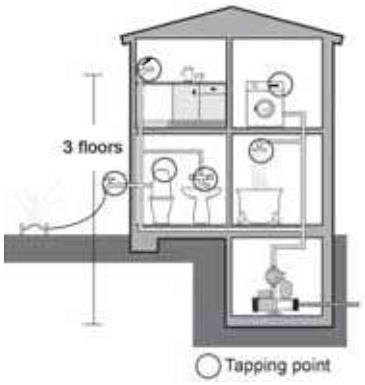




Selection guide

This is a quick and easy tool to show you which product is ideal for your needs. Just follow the charts and instructions on this page, and you will be sure to get a perfect fit.

Example: sizing and selection



A: Required comfort level
- Adjustable constant pressure.

B: Find the right booster
- How many taps? 6.
- How many floors? 3.

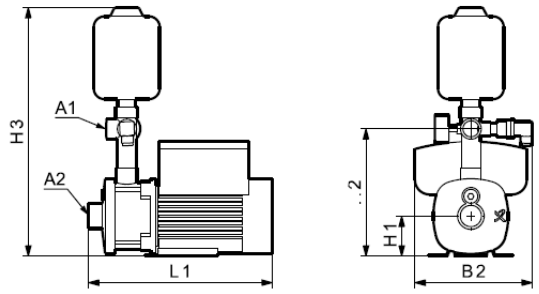
Result: CMBE 1-75

TM064160 0415

Number of floors	Number of taps: 1-5	6-10	11-20	21-50
4	CMBE 1-75	CMBE 1-75	CMBE 3-62	CMBE 3-93
3	CMBE 1-44	CMBE 1-75	CMBE 3-62	CMBE 3-62
2	CMBE 1-44	CMBE 1-44	CMBE 3-62	CMBE 3-62
1	CMBE 1-44	CMBE 1-44	CMBE 3-30	CMBE 3-62

Fig. 3 Sizing and selection

Dimensional drawings



Booster sizing and selection

Variable speed control

- Adjustable constant pressure
- Dry-running protection
- Low-noise

CMBE Booster

Number of floors	Number of taps: 1-5	6-10	11-20	21-50
4	CMBE 1-75	CMBE 1-75	CMBE 3-62	CMBE 3-93
3	CMBE 1-44	CMBE 1-75	CMBE 3-62	CMBE 3-62
2	CMBE 1-44	CMBE 1-44	CMBE 3-62	CMBE 3-62
1	CMBE 1-44	CMBE 1-44	CMBE 3-30	CMBE 3-62

Pump type	H1 [in. (mm)]	H2 [in. (mm)]	H3 [in. (mm)]
CMBE 1-44	2.95 (75)	7.87 (200)	17.32 (440)
	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 1-75	2.95 (75)	7.87 (200)	17.32 (440)
	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 1-99	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 3-30	2.95 (75)	7.87 (200)	17.32 (440)
	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 3-51	2.95 (75)	7.87 (200)	17.32 (440)
CMBE 3-62	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 3-93	17.91 (455)	8.46 (215)	3.54 (90)
CMBE 5-31	17.32 (440)	7.87 (200)	2.95 (75)
CMBE 5-62	17.91 (455)	8.46 (215)	3.54 (90)
CMBE 10-54	20.07 (510)	9.96 (253)	3.62 (92)

Pump type	L1 [in. (mm)]	B2 (L2) [in. (mm)]	A1 [NPT]	A2 [NPT]
CMBE 1-44	12.83 (326)	8.54 (217)	1"	1"
	12.83 (326)	8.54 (217)	1"	1"
CMBE 1-75	12.83 (326)	8.54 (217)	1"	1"
	14.25 (362)	8.54 (217)	1"	1"
CMBE 1-99	15.66 (398)	8.54 (217)	1"	1"
CMBE 3-30	12.83 (326)	8.54 (217)	1"	1"
	12.83 (326)	8.54 (217)	1"	1"
CMBE 3-51	12.83 (326)	8.54 (217)	1"	1"
CMBE 3-62	13.54 (344)	8.54 (217)	1"	1"
CMBE 3-93	15.90 (404)	8.54 (217)	1"	1"
CMBE 5-31	12.83 (326)	8.54 (217)	1"	1 1/4"
CMBE 5-62	13.77 (350)	8.54 (217)	1"	1 1/4"
CMBE 10-54	14.84 (377)	9.13 (232)	1 1/2"	1 1/2"

CMBE 1 x 115 V Input Power

Number of floors	Number of taps: 1-5	6-10	11-20	21-50
4	CMBE 1-75	CMBE 1-75	–	–
3	CMBE 1-44	CMBE 1-75	CMBE 3-51	–
2	CMBE 1-44	CMBE 1-44	CMBE 3-51	CMBE 3-51
1	CMBE 1-44	CMBE 1-44	CMBE 3-30	CMBE 3-51

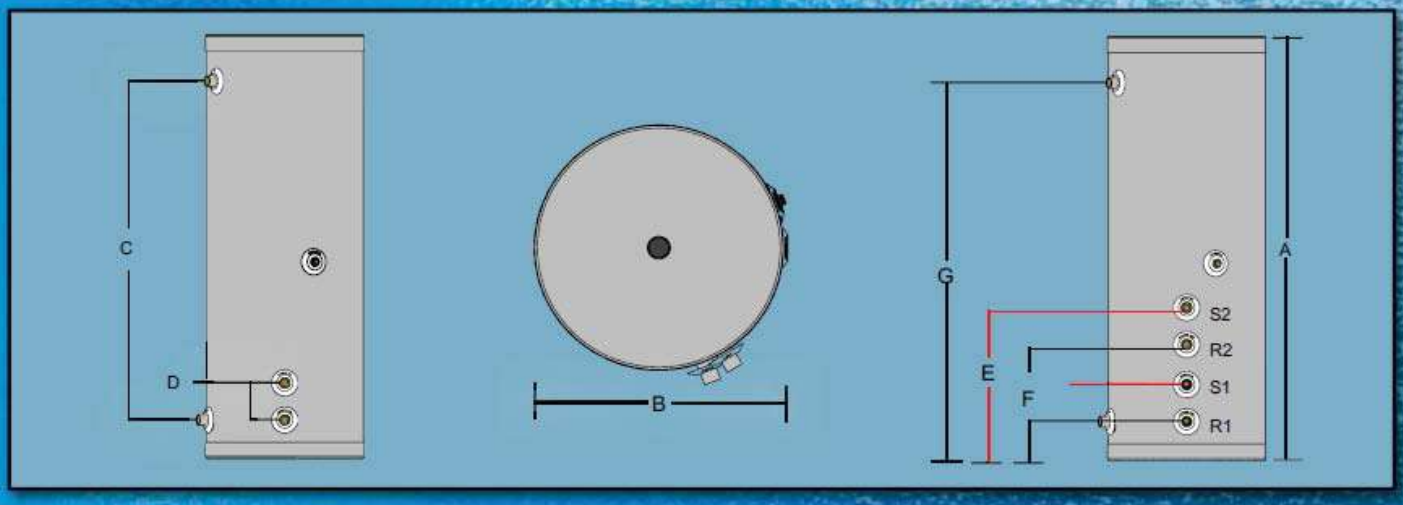
CMBE 1 x 230 V Input Power

Number of floors	Number of taps: 1-5	6-10	11-20	21-50
4	CMBE 1-75	CMBE 1-75	CMBE 3-62	CMBE 3-93
3	CMBE 1-44	CMBE 1-75	CMBE 3-62	CMBE 3-62
2	CMBE 1-44	CMBE 1-44	CMBE 3-62	CMBE 3-62
1	CMBE 1-44	CMBE 1-44	CMBE 3-30	CMBE 3-62

Preconditions:
- A tap pressure of 45 psi is considered, to achieve a pressure of 60 psi, add two floors.
- Flooded suction: Add more floors to compensate for low suction pressure.
- 7.9 gpm per tap average usage pattern is taken into account.

Grundfos cannot be held responsible for wrong sizing based on this guide.

SuperStor Ultra
Dimensions and Specifications



Model	A Dimensions Ht	B Diameter	C Domestic Connections	D Boiler Connections	E Floor to Boiler Supply	F Floor to Boiler Return	G Floor to Domestic Out	Capacity	Heat Exchanger Surface	Shipping Weight
SSU-20	27"	19 1/4"	3/4"	1" NPT	S1- 9"	R1- 4 1/2"	22"	20	15 SQ FT	60 LBS
SSU-30	39 1/2"	19 1/4"	3/4"	1" NPT	S1- 9"	R1- 4 1/2"	34"	30	15 SQ FT	72 LBS
SSU-30LB	28 1/2"	23 1/4"	3/4"	1" NPT	S1- 9"	R1- 4 1/2"	22"	30	15 SQ FT	79 LBS
SSU-45**	52 1/2"	19 1/4"	3/4"	1" NPT	S1- 9"	R1- 4 1/2"	46"	45	20 SQ FT	88 LBS
SSU-60**	52 1/2"	23 1/4"	1"	1" NPT	S1- 9"	R1- 4 1/2"	46"	60	20 SQ FT	110 LBS
SSU-80**	72"	23 1/4"	1 1/2"	1" NPT	S1- 29"	R1- 6"	64 3/4"	80	34 SQ FT	141 LBS
SSU-119**	73 1/4"	27"	1 1/2"	1" NPT	S1- 30 1/4"	R1- 7 1/4"	66"	119	34 SQ FT	210 LBS
SSU-45C	42	23 1/4"	1 3/4"	1" NPT	S1- 6 1/2" S2- 15 1/2"	R1- 2" R2- 11"	32"	45	40 SQ FT	99 LBS
SSU-60C	52 1/2"	23 1/4"	1"	1" NPT	S1- 6 1/2" S2- 15 1/2"	R1- 2" R2- 11"	43 1/4"	60	40 SQ FT	115 LBS
SSU-80C	72"	23 1/4"	1 1/2"	1" NPT	S2- 25 5/8"	R2- 2 5/8"	61 3/8"	80	68 SQ FT	141 LBS
SSU-119C	74"	27"	1 1/2"	1" NPT	S2- 25 5/8"	R2- 2 5/8"	61 3/8"	119	68 SQ FT	210 LBS

*DOE test method based on 90°F. Temperature rise, 50°/140° w/boiler water at 180°/200°F
** Residential Double Wall Indirect available. Stainless steel tank w/ high efficiency cupronickel double wall heat exchanger.
NOTE: TANK RECOVERY FROM COLD START WILL BE BETWEEN 10-13 MINUTES WHEN SIZED WITH CORRECT FLOW RATE, BOILER SIZE, AND PRESSURE DROP RATINGS FROM INSTALLATION INSTRUCTIONS. THE MASS OF THE BOILER WILL AFFECT RECOVERY TIME, MORE BOILER MASS EQUALS LONGER RECOVERY TIME.

MODEL	180 DEG F BOILER WATER FIRST HOUR RATING 140 DEG F	115 DEG F	CIRCULATOR GPM	PRESSURE DROP (FEET)
SSU-20	121 GPH	168 GPH	8	6.0
SSU-30	154 GPH	212 GPH	8	6.0
SSU-30LB	169 GPH	234 GPH	8	6.0
SSU-45	212 GPH	292 GPH	10	7.9
SSU-60	266 GPH	370 GPH	10	7.9
SSU-80	330 GPH	440 GPH	12	9.1
SSU-119	423 GPH	564 GPH	14	11.3

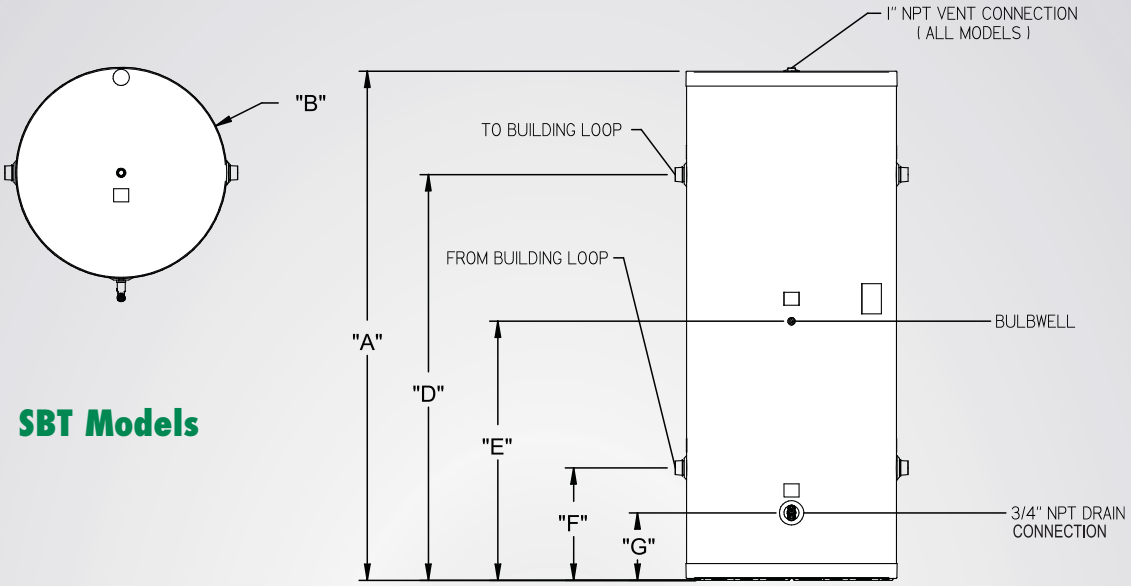
HTP

STANDARD FEATURES

- 316L Stainless Steel
- Finned 90/10 Cupronickel Heat Exchanger
- Aquastat Control

www.htproducts.com 120 Braley Road, East Freetown, MA 02717

Stainless Steel Hydronic Buffer Tank Dimensions and Specifications



SBT Models

Model Number	Gallon Capacity	A	B	D	E	F	G	Supply/Return Connections	Shipping Wt. (lbs.)
SBT030	30	39-1/2"	20	28-3/4"	20-1/4"	11-3/4"	7-3/4"	1-1/2" NPT	70
SBT050	50	47	24	33-3/4"	24-1/4"	14-3/4"	8-3/4"	1-1/2" NPT	120
SBT080	80	69-1/2"	24	55-3/4"	35-1/4"	14-3/4"	8-3/4"	2" NPT	153
SBT119	119	68-1/4"	28	54-3/4"	34-1/4"	15	9	2" NPT	198

Standard Features

- R-13.4 insulation for minimal heat loss
- Textured, impact resistant polymer jacket
- Light-weight 316L stainless steel tank construction
- Bulbwell
- Drain and air vent connections
- 5 year tank warranty

All models standard with a 5 Year Limited Warranty Against Tank Failure.

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High Efficiency Water Heaters, Boilers and Pool Heaters
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SBT-02 (replaces SBT-01 9/10)
FG-10M-10/11–Printed in U.S.A.

Squire®
Stainless Steel Indirect Water Heater

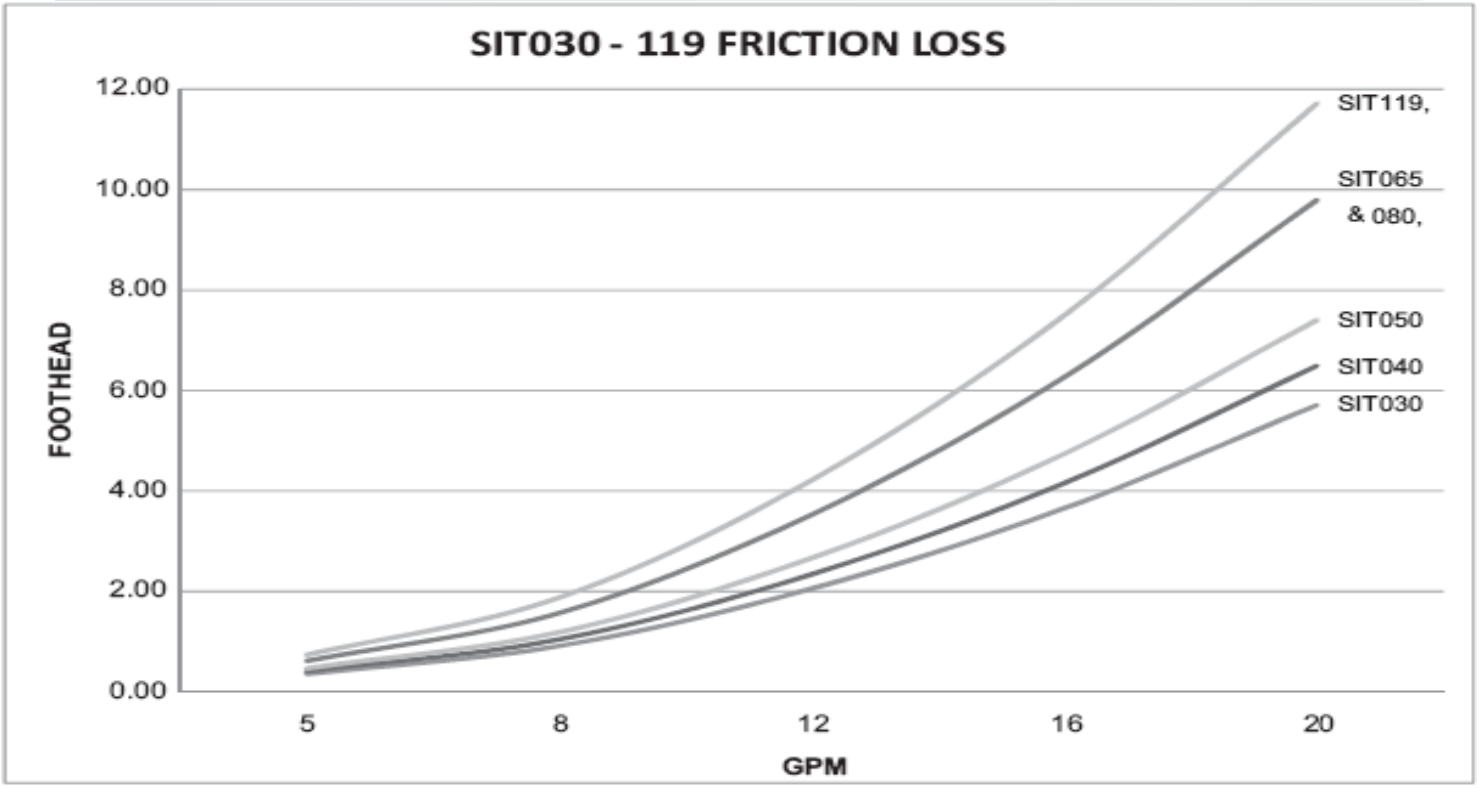
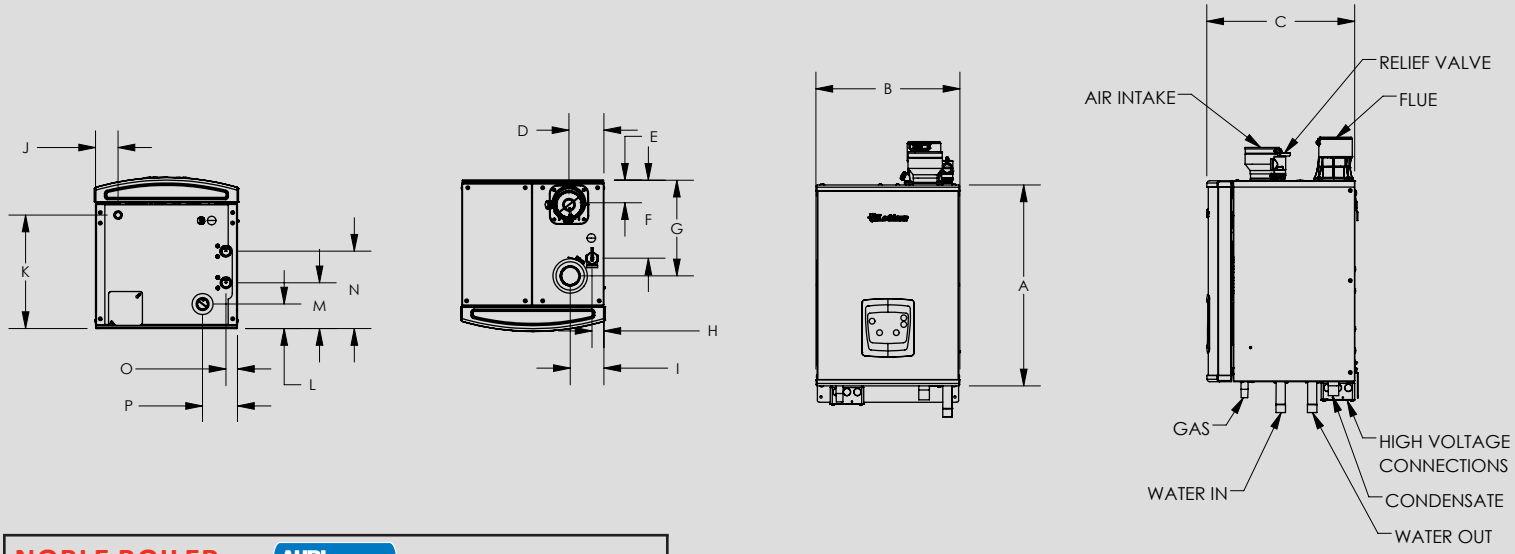


Table 3B
Pressure Drop Values

MODEL	WATER INLET (NPT) male	WATER OUTLET (NPT) Female	COIL CONNECTION (NPT) male	COIL LENGTH (FT)	SQ FT SURFACE AREA	PRESSURE DROP (FT/HD)				
						5 GPM	8 GPM	12 GPM	16 GPM	20 GPM
SIT030	1	1	1	24	8.0	.36	.91	2.06	3.66	5.71
SIT040	1	1	1	30.8	10.0	.41	1.04	2.34	4.16	6.49
SIT050	1	1	1	36.5	12.0	.46	1.18	2.67	4.74	7.4
SIT065	1.5	1.5	1	41.5	13.5	.61	1.57	3.53	6.27	9.8
SIT080	1.5	1.5	1	41.5	13.5	.61	1.57	3.53	6.27	9.8
SIT119	1.5	1.5	1	67.3	22.0	.73	1.87	4.22	7.5	11.71

NOBLE BOILER DIMENSIONS AND SPECIFICATIONS

NKB Boiler



NOBLE BOILER

Model Number	Input MBH Max	Input MBH Min	AFUE%	Heating Capacity MBH	Net AHRI Rating MBH	A	B	C	D	E	F	G	H
NKB080N	80	8.3	95.0	74	64	24"	17-1/4"	17-1/4"	2-1/4"	5-1/8"	8-1/2"	5-1/8"	1-1/2"
NKB110N	110	11.0	95.0	102	89	24"	17-1/4"	18"	2-3/4"	2-7/8"	9"	5-1/2"	2-7/8"
NKB150N	150	15.0	95.0	139	121	24"	17-1/4"	18"	4-1/2"	2-3/4"	9-1/8"	11-3/4"	4-1/2"
NKB199N	199	19.9	95.0	185	161	24	17 1/4	18	4 1/8	2 3/4	9 3/8	11 1/2	4

Model Number	I	J	K	L	M	N	O	P	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
NKB080N	1-1/2"	6-3/8"	12-5/8"	5-1/8"	4-5/8"	8-1/2"	1-1/2"	2-1/2"	1/2"	1"	2"	2"	120
NKB110N	2-7/8"	7-3/4"	13-1/8"	2-7/8"	5-1/2"	9"	2"	3"	1/2"	1"	3"	3"	126
NKB150N	4-1/2"	2-7/8"	13-1/8"	3"	5-3/8"	9-1/8"	1-7/8"	4-5/8"	1/2"	1"	3"	3"	132
NKB199N	4	2 3/4	13 1/2	2 7/8	5 1/2	9 1/4	1 3/8	1 3/8	1/2	1	3	3	140

Information subject to change without notice. Change "N" to "L" for LP gas models. The Net AHRI Water Ratings shown are based on a piping and pickup allowance of 1.15. Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. The ratings have been determined under the provisions governing forced draft burners.

SMART CONTROL™ FUNCTIONS AND FEATURES

SMART CONTROL™ FEATURES

- **SMART CONTROL Digital Operating Control**
  - LCD Display with words not codes
- **Outdoor Reset Control with Outdoor Air Sensor**
- **Domestic Hot Water Prioritization**
  - Separately Adjustable Space Heat/DHW Switching Times
- **Programmable System Efficiency Optimizers**
  - Space Heating Max Rate Limiting
  - Anti Cycling
  - Outdoor Air Reset Curve
- **Three Pump Control**
  - System Pump
  - Boiler Pump
  - DHW Pump
- **High-Voltage Junction Box**
  - 120 VAC / 60 Hertz / 1 Phase Power Supply
- **Low Voltage Terminal Strip**
  - Flow Switch Contacts
  - Tank Sensor Contacts
  - SH Thermostat Contacts
  - DHW Thermostat Contacts
  - Low-Water Cutoff Connection
  - System Sensor Contacts
  - Outdoor Air Sensor Contacts
  - Cascade Contacts
- **Time Clock for Data Logging**
  - Last 10 Lockouts
- **Low-Water Flow Safety Control & Indication**
- **Password Security**
- **Built-in Cascading Sequencer for up to 8 units**
  - Multiple Size Boiler Cascade

STANDARD FEATURES

- **Modulating Burner with 10:1 Turndown**
  - Direct-Spark Ignition
  - Low-NOx Operation
- **ASME Stainless Steel Heat Exchanger**
- **Vertical & Horizontal Direct-Vent**
  - **PVC, CPVC, Polypropylene or SS Venting up to 100 feet**
- **Condensate Trap**
- **California Code Compliant**
- **Other Features**
  - Automatic Reset High Limit
  - Adjustable High Limit w/Manual Reset
  - Wall-Mount Bracket
  - Zero Clearances to Combustible Materials
  - 10-Year HEX Warranty (See Warranty for Details)
  - 5-Year Parts Warranty

OPTIONAL EQUIPMENT

- Low-Water Cutoff w/Manual Reset & Test
- Concentric Vent Kit
- Condensate Neutralization Kit
- Sidewall Vent Termination
- Floor Stand
- Wireless Outdoor Sensor
- Nat to LP Gas Conversion Kit

Lochinvar®

Lochinvar, LLC
300 Maddox Simpson Parkway
Lebanon, Tennessee 37090
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Lochinvar.com

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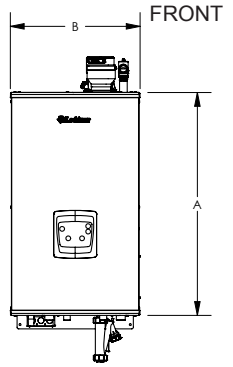
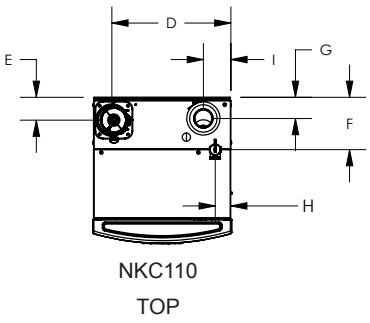
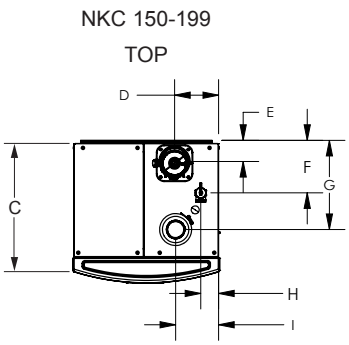
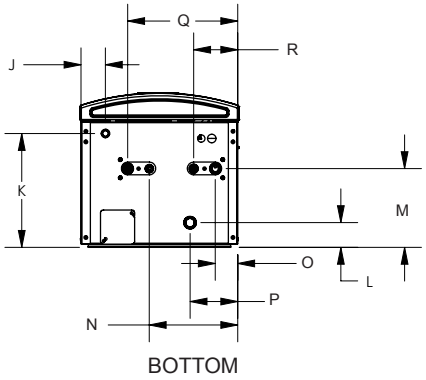
NOBLE Dimensions and Specifications









NOBLE Combi Boiler

AHRI CERTIFIED

Dimensions and Specifications

Model Number	Input (MBH) Max.	Input (MBH) Min.	AFUE%	Heating Capacity MBH	Net AHRI Rating MBH	A	B	C	D	E	F	G
NKC110N	110	11	95.0	102	89	32-1/2"	17-1/4"	18"	14-3/4"	2-3/4"	6-1/2"	2-3/4"
NKC150N	150	15	95.0	139	121	32-1/2"	18-3/4"	18"	6-3/4"	2-3/4"	6-3/4"	11-3/4"
NKC199N	199	19.9	95.0	185	161	32-1/2"	18-3/4"	18"	5-1/2"	2-3/4"	6-3/4"	11-1/2"

Dimensions and Specifications

H	I	J	K	L	M	N	O	P	Q	R	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Weight
2"	3-1/2"	8-3/4"	13-1/2"	2-3/4"	9"	10-1/2"	5"	14-1/2"	12-3/4"	5"	1/2"	1"	3"	3"	139
2-1/2"	6-1/4"	2-3/4"	13-1/2"	3"	9"	11-1/2"	5"	6-1/4"	13-3/4"	6"	1/2"	1"	3"	3"	142
2-1/4"	5-1/2"	2-3/4"	13-1/2"	2-3/4"	9-1/2"	10-1/2"	2-3/4"	5-1/2"	13"	5-1/4"	1/2"	1"	3"	3"	159

Notes: Indoor installation only. All information subject to change. Change "N" to "L" for LP gas models. *The Net AHRI Water Ratings shown are based on a piping and pickup allowance of 1.15.

Model	DHW Delivery (GPM)*
NKC110N	2.6
NKC150N	3.6
NKC199N	4.8

* 77°F Temperature Rise

Smart Control™ Features

- **SMART CONTROL Digital Operating Control**
  - LCD Display with words not codes
- **Outdoor Reset Control with Outdoor Air Sensor**
- **Programmable System Efficiency Optimizers**
  - DHW Response Time
  - DHW Pre Heat
  - Outdoor Air Reset Curve
- **Two Pump Control**
  - System Pump
  - Boiler Pump
- **High-Voltage Junction Box**
  - 120 VAC / 60 Hertz / 1 Phase Power Supply
- **Low Voltage Terminal Strip**
  - Air Handler Interlock
  - Flow Switch Contacts
  - Low-Water Cutoff Connection
  - System Sensor Contacts
  - Outdoor Air Sensor Contacts
  - Cascade Contacts
- **Time Clock for Data Logging**
  - Last 10 Lockouts
- **Low-Water Flow Safety Control & Indication**
- **Password Security**
- **Built-in Cascading Sequencer for up to 8 units**

Standard Features

- **ENERGY STAR Most Efficient Recognition**
- **95% DOE AFUE Efficiency**
- **Modulating Burner with 10:1 Turndown**
  - Direct-Spark Ignition
  - Low-NOx Operation
- **ASME Stainless Steel Heat Exchanger**
  - 50 psi Working Pressure w/ASME Relief Valve
- **Vertical & Horizontal Direct-Vent**
  - PVC, CPVC, Polypropylene or SS Venting up to 100 feet
- **Condensate Trap**
- **Other Features**
  - Automatic Reset High Limit
  - Adjustable High Limit w/Manual Reset
  - Built-in Circulating Pump
  - Wall-Mount Bracket
  - Zero Clearances to Combustible Materials
  - 10-Year Warranty (See Warranty for Details)
  - 5-Year Parts Warranty

Optional Equipment

- Flow Switch
- Low-Water Cutoff w/Manual Reset & Test
- Concentric Vent Kit
- Condensate Neutralization Kit
- Sidewall Vent Termination
- Floor Stand
- Wireless Outdoor Sensor
- Nat to LP Gas Conversion Kit
- Isolation/Flush Valves

Firing Codes

- M9 Standard Construction/California Code

*Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc.
*The ratings have been determined under the provisions governing forced draft burners.

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HIGH EFFICIENCY BOILERS & WATER HEATERS

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300 Maddox Simpson Parkway
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LOW LEAD CONTENT

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

NOBLE™ COMBI PRODUCT SUMMARY
(NKC) 110,000-199,999 BTU/HR

	NKC110	NKC150	NKC199
BOILER			
GALLON CAPACITY	1.4	2.0	2.7
HEATING SURFACE (SQ. FT.)	7.33	11.40	15.02
WATER CONNECTIONS	1"	1"	1"
MAX. WORKING PRESSURE (PSI)	50	50	50
# OF RELIEF VALVES	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	3/4"
RELIEF VALVE RATING (MBH)	535	535	535
RELIEF VALVE PRESSURE RATING (PSI)	50	50	50
DOMESTIC WATER			
WATER CONNECTIONS	3/4"	3/4"	3/4"
77°F ΔT DHW DELIVERY @ (GPM)	2.6	3.6	4.8
MAX. WORKING PRESSURE (PSI)	150	150	150
GAS			
INLET CONNECTION	1/2"	1/2"	1/2"
MAX. INLET PRESSURE, NAT	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, NAT	4.0" w.c.	4.0" w.c.	4.0" w.c.
MAX. INLET PRESSURE, LP	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, LP	8.0" w.c.	8.0" w.c.	8.0" w.c.
BTU/HR INPUT	110,000	150,000	199,999
BTU/HR OUTPUT (HIGH FIRE)	102,000	139,000	185,000
BTU/HR OUTPUT (LOW FIRE)	10,200	13,900	18,500
ELECTRICAL			
VOLTAGE/HEATER	120	120	120
VOLTAGE/CONTROL	24	24	24
TOTAL AMPS	2.2	2.2	2.2
# OF ELECTRICAL CONNECTIONS	1	1	1
DIMENSIONS			
HEIGHT	32-1/2"	32-1/2"	32-1/2"
WIDTH	17-1/4"	18-3/4"	18-3/4"
DEPTH	18"	18"	18"
SERVICE CLEARANCES			
FRONT	24"	24"	24"
BOTTOM	24"	24"	24"
RIGHT SIDE	12"	12"	12"
LEFT SIDE	12"	12"	12"
TOP	6"	6"	6"
DIRECT VENTING			
SIZE	3"	3"	3"
VENT CATEGORY	IV	IV	IV
VENT MATERIAL	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP

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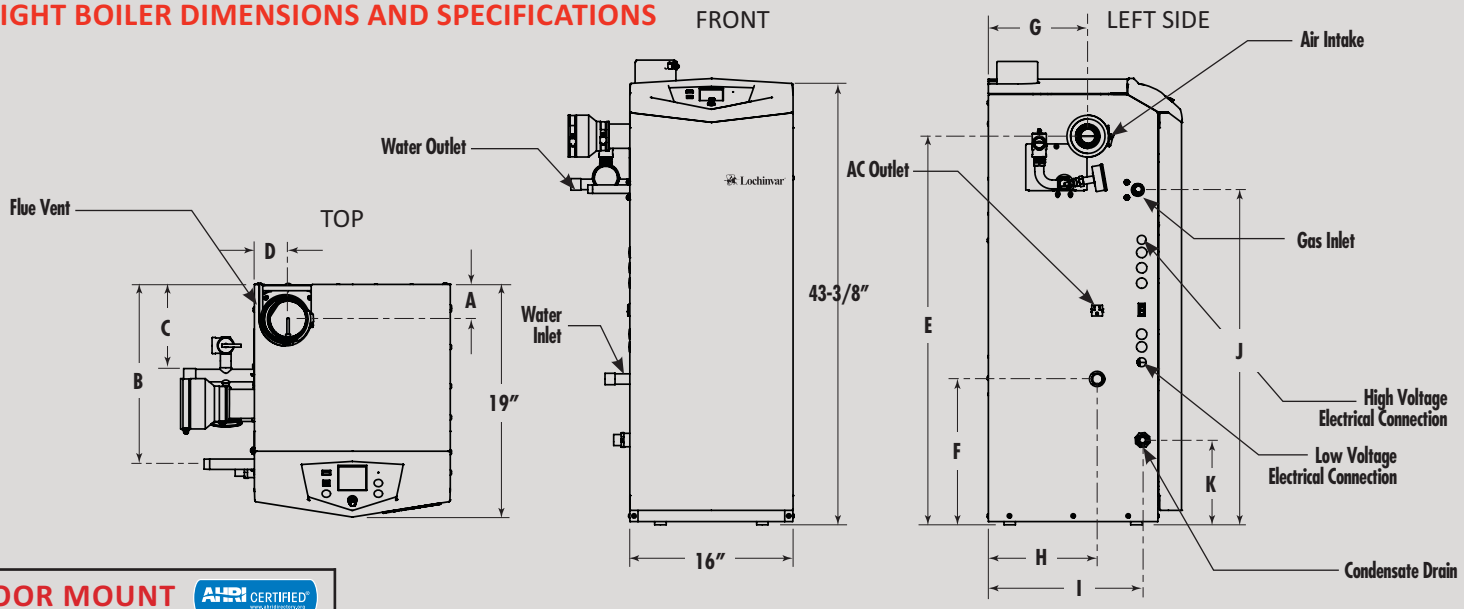
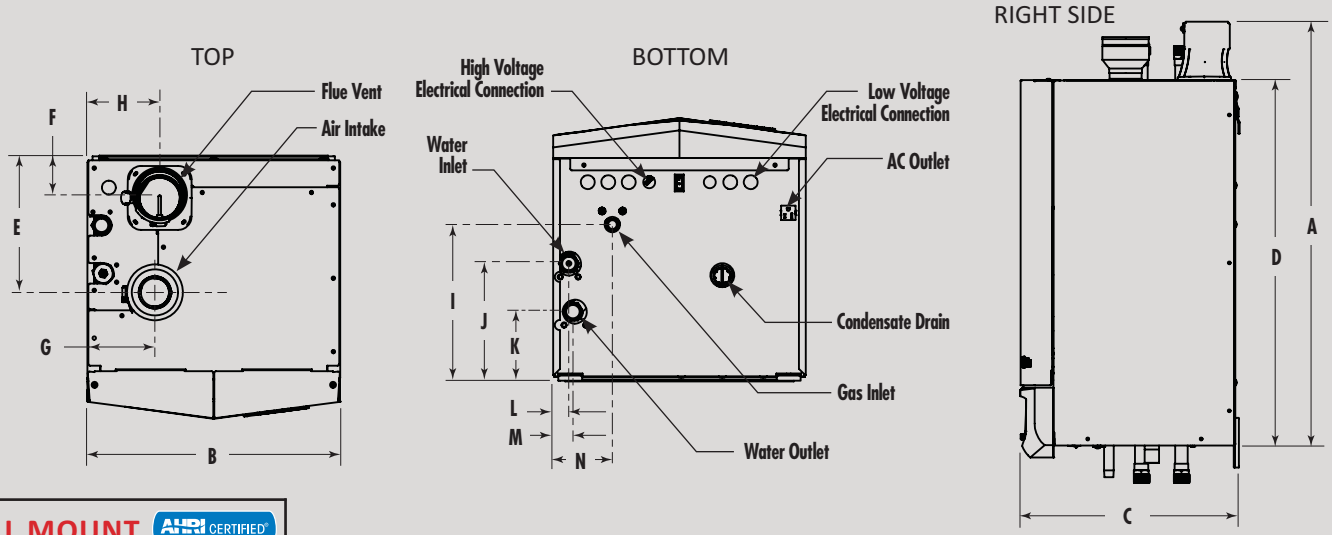
KNIGHT BOILER DIMENSIONS AND SPECIFICATIONS



FLOOR MOUNT

Model Number	Input MBH Max	Input MBH Min	AFUE%	Heating Capacity MBH	Net MBH	A	B	C	D	E	F	G	H	I	J	K	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
KHB055N	55	8.3	95.0	51	44	3-1/2"	13-/4"	6"	2-3/4"	37-2/3"	13-1/2"	8-1/3"	10-1/2"	15"	32-1/2"	8-1/3"	1/2"	1"	2"	2"	160
KHB085N	85	8.5	95.0	79	69	3-1/2"	13-1/4"	6"	2-3/4"	37-2/3"	13-1/2"	8-1/3"	10-1/2"	15"	32-1/2"	8-1/3"	1/2"	1"	2"	2"	165
KHB110N	110	11	95.0	102	89	2-3/4"	14-3/4"	7-1/2"	2-3/4"	38"	14-1/3"	9-3/4"	10-1/2"	15"	33"	8-1/3"	1/2"	1"	3"	3"	170
KHB155N	155	15.5	95.0	144	125	2-3/4"	14-3/4"	7-1/2"	2-1/2"	38"	14-1/3"	9-3/4"	10-1/2"	15"	33"	8-1/3"	1/2"	1"	3"	3"	175
KHB199N	199.9	19.9	95.0	185	161	3"	15-1/2"	7-1/2"	2-1/2"	38-1/3"	14-1/3"	10-1/2"	11-1/2"	15"	33"	8-1/3"	1/2"	1-1/"4	3"	3"	195
KHB285N	285	28.5	95.0	264	229	3"	15-1/2'	7-1/2"	2-1/2"	38-1/3"	14-1/3"	10-1/2"	11-1/2"	15"	33"	8-1/3"	1/2"	1-1/4"	3"	3"	205



WALL MOUNT

Model Number	Input MBH Max	Input MBH Min	AFUE%	Heating Capacity MBH	Net MBH	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Shipping Wt. (lbs.)
WHB055N	55	8.3	95.0	51	44	40"	18-3/4"	16"	31-1/8"	8-1/2"	3-3/4"	4-1/2"	6-1/2"	7-1/4"	8-7/8"	3-1/2"	1-1/2"	1-1/2"	6"	1/2"	1"	2"	2"	139
WHB085N	85	8.5	95.0	79	69	39-3/4"	18-3/4"	16"	31-1/8"	8-1/2"	3-3/4"	4-1/2"	6-1/2"	7-1/4"	8-7/8"	3-1/2"	1-1/2"	1-1/2"	6"	1/2"	1"	2"	2"	142
WHB110N	110	11	95.0	102	89	41-1/4"	18-3/4"	19"	31-1/8"	10"	2-3/4"	5"	5-1/4"	11-1/2"	8-1/2"	5"	1"	1"	4-1/2"	1/2"	1"	3"	3"	159
WHB155N	155	15.5	95.0	144	125	41-1/4"	18-3/4"	19-1/8"	31-1/8"	10"	2-3/4"	5"	5-1/4"	11-1/2"	8-1/2"	5"	1"	1"	4-1/2"	1/2"	1"	3"	3"	166
WHB199N	199.9	19.9	95.0	185	161	41-1/4"	18-3/4"	19-1/8"	31-1/8"	10-1/2"	3"	5-1/4"	6"	11"	9-1/2"	6-1/4"	1-1/2"	1-1/2"	4-1/2"	1/2"	1-1/4"	3"	3"	175
WHB285N	285	28.5	95.0	264	229	41-3/4"	18-3/4"	21-1/8"	31-1/8"	15"	3"	3-3/4"	5-1/4"	12-1/4"	11"	6-1/4"	1-1/2"	1-1/2"	6-1/2"	1/2"	1-1/4"	3"	3"	184
WHB399N**	399	80	94.0*	377#	328	43-1/4"	25-1/4"	21-7/8"	34"	3-1/2"	4-1/4"	22-1/2"	3-7/8"	8-7/8"	12-1/2"	9-1/4"	2"	2"	21-1/2"	3/4"	1-1/2"	4"	4"	213

*Thermal Efficiency%
Gross Output MBH

Information subject to change without notice. Change "N" to "L" for LP gas models. The Net AHRI Water Ratings shown are based on a piping and pickup allowance of 1.15. Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. The ratings have been determined under the provisions governing forced draft burners.

**10:1 Turndown ratio and top and bottom water connections are not included on WHB399. WHB399 operates with a 5:1 turndown.

Lochinvar®

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Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

KNIGHT® FIRE TUBE BOILER PRODUCT SUMMARY
(KHB) 55,000 - 285,000 BTU/HR

	KHB-055	KHB-085	KHB-110	KHB-155	KHB-199	KHB- 285
WATER						
GALLON CAPACITY	2.3	2.2	3.2	3.2	5.0	4.9
HEATING SURFACE (SQ. FT.)	5.92	8.33	10.00	14.07	15.66	21.60
WATER CONNECTIONS	1"	1"	1"	1"	1-1/4"	1-1/4"
20°F ΔT WATER FLOW (GPM)	5	8	10	15	19	27
HEAD LOSS (FT. OF HD.)	0.27	0.94	1.53	3.50	1.13	2.42
35°F ΔT WATER FLOW (GPM)	3	5	6	9	11	16
HEAD LOSS (FT. OF HD.)	0.10	0.37	0.55	1.45	0.38	0.85
MAX. WORKING PRESSURE (PSI)	80	80	80	80	80	80
# OF RELIEF VALVES	1	1	1	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
RELIEF VALVE RATING (MBH)	535	535	535	535	535	535
RELIEF VALVE PRESSURE RATING (PSI)	30	30	30	30	30	30
GAS						
INLET CONNECTION	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"
MAX. INLET PRESSURE, NAT	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, NAT	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.
MAX. INLET PRESSURE, LP	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, LP	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.
BTU/HR INPUT	55,000	85,000	110,000	155,000	199,999	285,000
BTU/HR OUTPUT (HIGH FIRE)	52,250	80,750	104,500	147,250	189,999	270,750
BTU/HR OUTPUT (LOW FIRE)	7,790	8,075	10,450	14,725	18,999	27,075
ELECTRICAL (Boiler and Pump Only)						
VOLTAGE/HEATER	120	120	120	120	120	120
VOLTAGE/CONTROL	24	24	24	24	24	24
FLA	1.8	2.1	2.1	2.2	3.3	3.6
MCA	2.3	2.7	2.7	2.8	4.2	4.5
DIMENSIONS						
HEIGHT	43-1/2"	43-1/2"	43-1/2"	43-1/2"	43-1/2"	43-1/2"
WIDTH	16"	16"	16"	16"	16"	16"
DEPTH	19"	19"	19"	19"	19"	19"
SERVICE CLEARANCES						
FRONT	24"	24"	24"	24"	24"	24"
REAR	0"	0"	0"	0"	0"	0"
RIGHT SIDE	0"	0"	0"	0"	0"	0"
LEFT SIDE	24"	24"	24"	24"	24"	24"
TOP	24"	24"	24"	24"	24"	24"
DIRECT VENTING						
SIZE	2"	2"	3"	3"	3"	3"
VENT CATEGORY	IV	IV	IV	IV	IV	IV
VENT MATERIAL	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C

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KHB-PS-01 **06/18-Printed in U.S.A.**

Lochinvar
HIGH EFFICIENCY BOILERS & WATER HEATERS

KNIGHT® FIRE TUBE BOILER PRODUCT SUMMARY
(WHB) 55,000 - 399,999 BTU/HR

	WHB055	WHB085	WHB110	WHB155	WHB199	WHB285	WHB399
WATER							
GALLON CAPACITY	2.3	2.2	3.2	3.2	5.0	4.9	6.5
HEATING SURFACE (SQ. FT.)	5.92	8.33	10.00	14.07	15.66	21.60	36.58
WATER CONNECTIONS	1"	1"	1"	1"	1-1/4"	1-1/4"	1-1/2"
20°F ΔT WATER FLOW (GPM)	5	8	10	15	19	27	38
HEAD LOSS (FT. OF HD.)	0.27	0.94	1.53	3.50	1.13	2.42	1.42
35°F ΔT WATER FLOW (GPM)	3	5	6	9	11	16	22
HEAD LOSS (FT. OF HD.)	0.10	0.37	0.55	1.45	0.38	0.85	0.48
MAX. WORKING PRESSURE (PSI)	80	80	80	80	80	80	80
# OF RELIEF VALVES	1	1	1	1	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
RELIEF VALVE RATING (MBH)	535	535	535	535	535	535	535
RELIEF VALVE PRESSURE RATING (PSI)	30	30	30	30	30	30	30
GAS							
INLET CONNECTION	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	3/4"
MAX. INLET PRESSURE, NAT	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, NAT	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.
MAX. INLET PRESSURE, LP	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, LP	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.
BTU/HR INPUT	55,000	85,000	110,000	155,000	199,999	285,000	399,999
BTU/HR OUTPUT (HIGH FIRE)	52,250	80,750	104,500	147,250	189,999	270,750	379,999
BTU/HR OUTPUT (LOW FIRE)	7,790	8,075	10,450	14,725	18,999	27,075	76,000
ELECTRICAL							
VOLTAGE/HEATER	120	120	120	120	120	120	120
VOLTAGE/CONTROL	24	24	24	24	24	24	24
FLA	1.8	2.1	2.1	2.2	3.3	3.6	4
MCA	2.3	2.7	2.7	2.8	4.2	4.5	4.5
DIMENSIONS							
HEIGHT	33-1/4"	33-1/4"	33-1/4"	33-1/4"	33-1/4"	33-1/4"	35-1/2"
WIDTH	18-1/2"	18-1/2"	18-1/2"	18-1/2"	18-1/2"	18-1/2"	25"
DEPTH	16"	16"	19"	19"	19"	19"	21-3/4"
SERVICE CLEARANCES							
FRONT	24"	24"	24"	24"	24"	24"	24"
BOTTOM	24"	24"	24"	24"	24"	24"	24"
RIGHT SIDE	0"	0"	0"	0"	0"	0"	0"
LEFT SIDE	12"	12"	12"	12"	12"	12"	12"
TOP	24"	24"	24"	24"	24"	24"	24"
DIRECT VENTING							
SIZE	2"	2"	3"	3"	3"	3"	4"
VENT CATEGORY	IV	IV	IV	IV	IV	IV	IV
VENT MATERIAL	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP	PVC/CPVC/SS/PP

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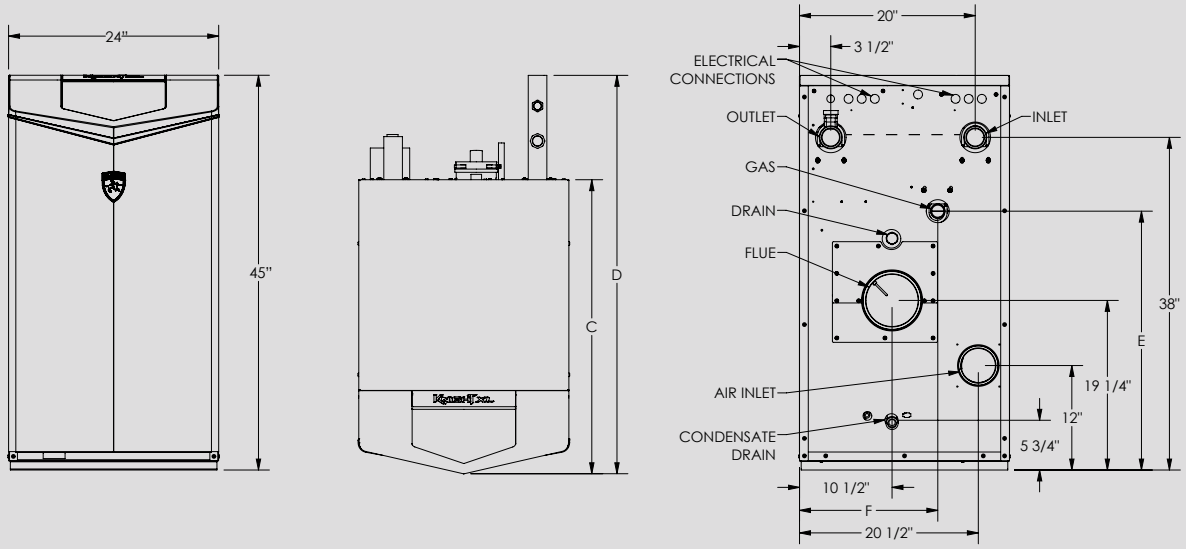
KNIGHT XL COMMERCIAL GAS BOILER DIMENSIONS & SPECIFICATIONS



KNIGHT XL HEATING BOILER — DIMENSIONS & SPECIFICATIONS

Model Number	Input MBH Max Btu/Hr	Input MBH Min Btu/Hr	Thermal Efficiency	Gross Output MBH	Net AHRI Rating MBH	C	D	E	F	Gas Conn.	Water Conn.	Air Inlet	Vent Size	Ship. Weight (lbs.)
KBX0400N	399,000	39,900	97%	387	337	33-1/2"	42-1/2"	29-3/4"	20-1/4"	1"	2"	4"	4"	365
KBX0500N	500,000	50,000	97%	485	422	33-1/2"	42-1/2"	29-3/4"	20-1/4"	1"	2"	4"	4"	377
KBX0650N	650,000	65,000	97%	631	549	42-1/2"	53"	30-1/2"	15-1/4"	1-1/4"	2"	4"	6"	456
KBX0800N	800,000	80,000	97%	776	675	42-1/2"	53"	30-1/2"	15-1/4"	1-1/4"	2"	4"	6"	484
KBX1000N	999,000	99,900	97%	969	843	50"	62"	30-1/2"	15-3/4"	1-1/4"	2-1/2"	6"	6"	567

Change 'N' to 'L' for LP Gas models. No derate for LP models. Performance data is based on manufacturer test results. All information is subject to change.

**The Net AHRI Water Ratings shown are based on a piping and pickup allowance of 1.15. *Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. *The ratings have been determined under the provisions governing forced draft burners.*

STANDARD FEATURES

- **› 97% Thermal Efficiency**
- **› Modulating Burner with 10:1 Turndown**
  - Direct Spark Ignition
  - Low NOx Operation
  - Sealed Combustion
  - Low Gas Pressure Operation
- **› Stainless Steel Water Tube Heat Exchanger**
  - ASME-Certified, "H" Stamped
  - 160 psi Working Pressure
  - 50 psi Relief Valve
  - Combustion Analyzer Test Port
  - Fully Welded Design
- **› Vertical and Horizontal Direct Vent**
  - Direct Vent up to 150 feet
  - PVC, CPVC, Polypropylene or AL29-4C
- **› Smart System Control**
- **› Other Features**
  - On/Off Switch
  - Adjustable High Limit with Manual Reset
  - Automatic Reset High Limit
  - Flow Switch
  - Flue Temperature Sensor
  - Low Air Pressure Switch
  - Temperature and Pressure Gauge
  - Condensate Trap
  - 10-Year Limited Warranty (See Warranty)

SMART SYSTEM FEATURES

- **› CON·X·US Remote Connect**
- **› Smart Touch Touchscreen Operating Control**
- **› Full Color 7" Touchscreen LCD Display**
- **› Loch-N-Link® USB Thumb Drive Port for Easy Programming**
- **› Cascading Sequencer with Built-in Redundancy**
  - Selectable Cascade Type: Lead Lag/Efficiency Optimization
  - Multiple Size Boilers
  - Front-End Loading
- **› 3 Reset Temperatures Inputs w/Independent Outdoor Reset Curves for Each**
  - Outdoor Sensor
- **› Four-Pump Control**
  - System Pump with Parameter for Continuous Operation
  - Boiler Pump with Variable-Speed Control
  - Domestic Hot Water Boiler Pump
  - Domestic Hot Water Recirculation Pump Control with Sensor
- **› Building Management System Integration**
  - 0-10 VDC Input to Control Modulation or Setpoint
  - 0-10 VDC Input from Variable-Speed System Pump
  - 0-10 VDC Modulation Rate Output Signal
  - 0-10 VDC Enable/Disable Signal
- **› Programmable System Efficiency Optimizers**
  - Space Heating Night Setback
  - DHW Night Setback
  - Anti-Cycling
  - Ramp Delay
  - Boost Time and Temperature
- **› High-Voltage Terminal Strip**
  - 120 VAC/60 Hertz/1 Phase
  - Pump Contacts for 3 Pumps
- **› Low-Voltage Terminal Strip**
  - Building Recirculation Pump Start/Stop
  - Proving Switch Contacts
  - Alarm Contacts
  - Runtime Contacts
  - 3 Space Heat Thermostat Contacts
  - Tank Thermostat Contacts
  - System Sensor Contacts
  - Tank Sensor Contacts
  - Cascade Contacts
  - 0-10 VDC BMS Contacts
  - 0-10 VDC Boiler Rate Output Contacts
  - 0-10 VDC Boiler Pump Speed Contacts
  - 0-10 VDC System Pump Speed Contacts
  - ModBus/BACnet Contacts
- **› Time Clock**
- **› Data Logging**
  - Ignition Attempts
  - Last 10 Lockouts
  - Space Heat Run Hours
  - Domestic Hot Water Run Hours
  - Custom Maintenance Reminder with Contact Info
  - Password Security
  - Customizable Freeze Protection Parameters

OPTIONAL EQUIPMENT

- Wireless Outdoor Temperature Sensor
- Multi-Temperature Loop Control
- Variable-Speed Boiler Circulator
- Constant-Speed Boiler Circulator
- Common Vent Damper Kit
- ModBus Communication
- BMS Gateway to BACnet or LonWorks
- BACnet MSTP
- Alarm Bell
- Condensate Neutralization Kit
- Concentric Vent Kit (KBX0400-KBX650)
- High and Low Gas Pressure Switches w/Manual Reset (KBX0500-KBX1000)
- **› Firing Controls**
  - M9-Standard Construction
  - M13-CSD-1/FM/GE Gap (KBX0500-KBX1000)

For technical information call 800-722-2101. Lochinvar, LLC reserves the right to make product changes or improvements without prior notice.

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Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

KNIGHT XL® HEATING BOILER PRODUCT SUMMARY
(KBX) 399,000 - 999,000 BTU/HR

	KBX-0400	KBX-0500	KBX-0650	KBX-0800	KBX-1000
WATER					
GALLON CAPACITY	4.4	4.9	6.2	7.3	8.8
HEATING SURFACE (SQ. FT.)	34.80	39.10	52.20	60.90	75.40
WATER CONNECTIONS	2"	2"	2"	2"	2-1/2"
20°F ΔT WATER FLOW (GPM)	38	48	62	76	96
HEAD LOSS (FT. OF HD.)	10.00	14.00	16.00	17.00	18.00
35°F ΔT WATER FLOW (GPM)	22	27	36	44	54
HEAD LOSS (FT. OF HD.)	4.00	8.00	7.00	9.00	6.00
MAX. WORKING PRESSURE (PSI)	160	160	160	160	160
# OF RELIEF VALVES	1	1	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	3/4"	3/4"	3/4"
RELIEF VALVE RATING (MBH)	697	697	697	1352	1352
RELIEF VALVE PRESSURE RATING (PSI)	50	50	50	50	50
GAS					
INLET CONNECTION	1"	1"	1-1/4"	1-1/4"	1-1/4"
MAX. INLET PRESSURE, NAT	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, NAT	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.	4.0" w.c.
MAX. INLET PRESSURE, LP	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.	14.0" w.c.
MIN. INLET PRESSURE, LP	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.	8.0" w.c.
BTU/HR INPUT	399,000	500,000	650,000	800,000	999,000
BTU/HR OUTPUT (HIGH FIRE)	387,030	485,000	630,500	776,000	969,030
BTU/HR OUTPUT (LOW FIRE)	38,703	48,500	63,050	77,600	96,903
ELECTRICAL (Boiler and Pump Only)					
VOLTAGE/HEATER	120	120	120	120	120
VOLTAGE/CONTROL	24	24	24	24	24
FLA	3.0	3.1	3.3	4.3	6.6
MCA	3.8	3.9	4.1	5.4	8.3
DIMENSIONS					
HEIGHT	45"	45"	45"	45"	45"
WIDTH	24"	24"	24"	24"	24"
DEPTH	33-1/2"	33-1/2"	42-1/2"	42-1/2"	50"
SERVICE CLEARANCES					
FRONT	24"	24"	24"	24"	24"
REAR	24"	24"	24"	24"	24"
RIGHT SIDE	0"	0"	0"	0"	0"
LEFT SIDE	0"	0"	0"	0"	0"
TOP	24"	24"	24"	24"	24"
DIRECT VENTING					
SIZE	4"	4"	6"	6"	6"
VENT CATEGORY	IV	IV	IV	IV	IV
VENT MATERIAL	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C	PVC/CPVC/PP/ AL29-4C

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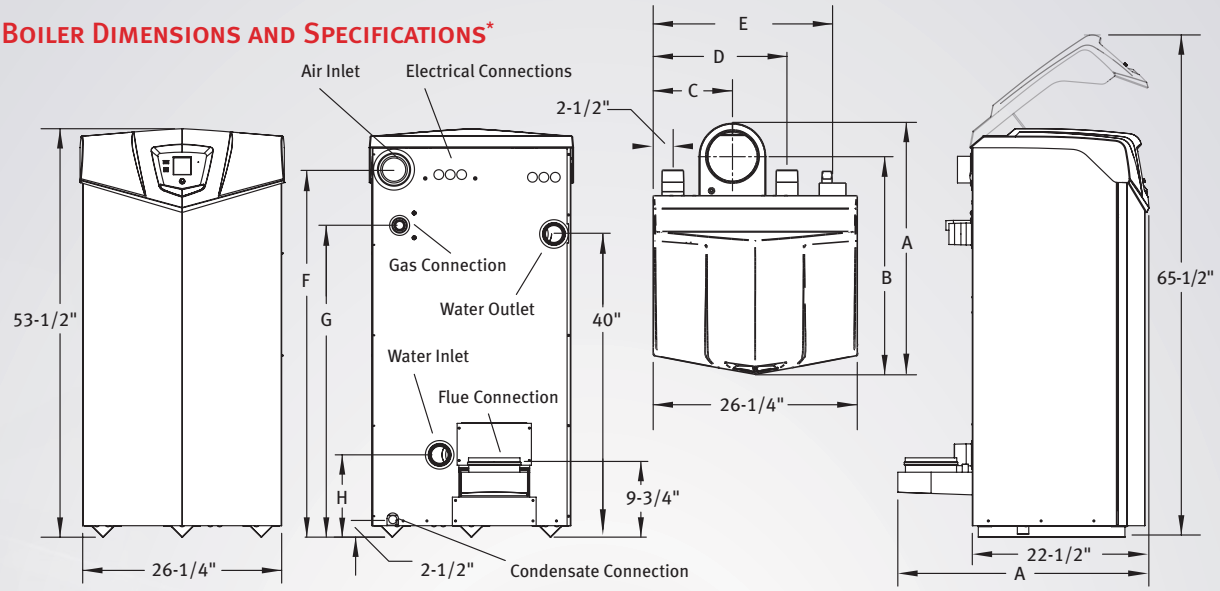
KBX-PS-01 **12/20-Printed in U.S.A.**

FTXL™ Boiler Dimensions and Specifications*



FTXL Boiler

AHRI CERTIFIED

Dimensions and Specifications

Model Number	Input Min MBH	Input Max MBH	Thermal Efficiency	Gross Output MBH	NET AHRI Rating MBH	Turn down	Flow (GPM) Min	Flow (GPM) Max	HEX Water Volume	A	B	C	D	E	F	G	H	Water Conn.	Vent Size	Air Intake	Gas Conn.	Shipping Wt. (lbs.)
FTX400(N,L)	40.0	399.9	98.0%	392	341	10:1	10	105	13	30-1/2"	27-1/2"	10-1/4"	17"	23-1/4"	46-1/4"	39-1/2"	10-3/4"	2"	4"	4"	1"	435
FTX500(N,L)	50.0	500.0	97.7%	489	425	10:1	15	105	12	30-1/2"	27-1/2"	10-1/4"	17"	23-1/4"	46-1/4"	39-1/2"	10-3/4"	2"	4"	4"	1"	460
FTX600(N,L)	85.0	600.0	97.5%	585	509	7:1	15	105	12	30-1/2"	27-1/2"	10-1/4"	17"	23-1/4"	46-1/4"	39-1/2"	10-3/4"	2"	4"	4"	1"	470
FTX725(N,L)	103.5	725.0	97.2%	705	613	7:1	20	150	17	33"	28-1/2"	10-1/2"	17-1/2"	23-1/2"	48-1/2"	41-1/4"	11"	2-1/2"	6"	4"	1"	510
FTX850(N,L)	121.5	850.0	97.0%	825	717	7:1	25	150	16	33"	28-1/2"	10-1/2"	17-1/2"	23-1/2"	48-1/2"	41-1/4"	11"	2-1/2"	6"	4"	1"	535

*Information subject to change without notice Dimensions are in inches. Select "N" or "L" for Natural or LP gas. *The Net AHRI Water Ratings shown are based on a piping and pickup allowancof 1.15. *Lochinvar should be consulted before selecting a boiler for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc. *The ratings have been determined under the provisions governing forced draft burners.

Smart System Features

- **Smart System Digital Operating Control**
  - Multi-Color Graphic LCD Display w/Navigation Dial
- **Loch-N-Link™ USB Thumb Drive Port for Easy Programming**
- **Cascading Sequencer with Built-in Redundancy**
  - Selectable Cascade Type: Lead Lag/Efficiency Optimization
  - Multiple Size Boilers
  - Front-End Loading
- **3 Reset Temperatures Inputs w/Independent Outdoor Reset Curves for Each**
  - Outdoor Sensor
- **Four-Pump Control**
  - System Pump with Parameter for Continuous Operation
  - Boiler Pump with Variable-Speed Control
  - Domestic Hot Water Boiler Pump
  - Domestic Hot Water Recirculation Pump Control with Sensor
- **Building Management System Integration**
  - 0-10 VDC Input to Control Modulation or Setpoint
  - 0-10 VDC Input from Variable-Speed System Pump
  - 0-10 VDC Modulation Rate Output Signal
  - 0-10 VDC Enable/Disable Signal
- **Programmable System Efficiency Optimizers**
  - Space Heating Night Setback
  - DHW Night Setback
  - Anti-Cycling
  - Ramp Delay
  - Boost Time and Temperature
- **High-Voltage Terminal Strip**
  - 120 VAC/60 Hertz/1 Phase
  - Pump Contacts for 3 Pumps
- **Low-Voltage Terminal Strip**
  - Building Recirculation Pump Start/Stop
  - Proving Switch Contacts
  - Flow Switch Contacts
  - Alarm Contacts
  - Runtime Contacts
  - 3 Space Heat Thermostat Contacts
  - Tank Thermostat Contacts
  - System Sensor Contacts
  - Tank Sensor Contacts
  - Cascade Contacts
  - 0-10 VDC BMS Contacts
  - 0-10 VDC Boiler Rate Output Contacts
  - 0-10 VDC Boiler Pump Speed Contacts
  - 0-10 VDC System Pump Speed Contacts
  - ModBus Contacts
- **Time Clock**
- **Data Logging**
  - Ignition Attempts
  - Last 10 Lockouts
  - Space Heat Run Hours
  - Domestic Hot Water Run Hours

Standard Features

- **97%-98% Thermal Efficiency**
- **Modulating Burner with up to 10:1 Turndown**
  - Direct Spark Ignition
  - Low NOx Operation
  - Sealed Combustion
  - Low Gas Pressure Operation
- **Stainless Steel Fire-Tube Heat Exchanger**
  - ASME-Certified, "H" Stamped
  - 160 psi Working Pressure
  - 50 psi Relief Valve
  - Combustion Analyzer Test Port
  - Fully Welded Design
- **Vertical and Horizontal Direct Vent**
  - Direct Vent up to 100 feet
  - PVC, CPVC, Polypropylene or AL29-4C
  - Factory Supplied Sidewall Vent Termination
- **Smart System Control**
- **Other Features**
  - On/Off Switch
  - Adjustable High Limit with Manual Reset
  - Automatic Reset High Limit
  - Manual Reset Low Water Cutoff
  - Flue Temperature Sensor
  - Low Air Pressure Switch
  - Temperature and Pressure Gauge
  - Condensate Trap
  - Zero Service Clearances
  - 10-Year Limited Warranty (See Warranty)
  - Custom Maintenance Reminder with Contact Info
  - Password Security
  - Customizable Freeze Protection Parameters

Optional Equipment

- CON·X·US® Remote Connectivity
- Motorized Isolation Valve
- Wireless Outdoor Temperature Sensor
- Multi-Temperature Loop Control
- Variable-Speed Boiler Circulator
- Constant-Speed Boiler Circulator
- ModBus Communication
- Alarm Bell
- Condensate Neutralization Kit
- Concentric Vent Kit (FTX400-FTX600)
- BMS Gateway to BACnet or LonWorks
- High and Low Gas Pressure Switches w/Manual Reset (FTX500-FTX850)
- **Firing Controls**
  - M9-Standard Construction
  - M13-CSD-1/FM/GE Gap (FTX500-FTX850)

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

Lochinvar, LLC
300 Maddox Simpson Parkway
Lebanon, Tennessee 37090
P: 615.889.8900 / F: 615.547.1000
Lochinvar.com

Lochinvar®
HIGH EFFICIENCY BOILERS & WATER HEATERS

FTXL Boiler Product Summary
399,999- 850,000 BTU/HR

	FTX400	FTX500	FTX600	FTX725	FTX850
WATER					
GALLON CAPACITY	13	12	12	17	16
HEATING SURFACE (SQ. FT.)	55.31	73.02	73.02	84.60	99.88
INLET WATER CONNECTION	2" NPT Thread	2" NPT Thread	2" NPT Thread	2.5" NPT Thread	2.5" NPT Thread
OUTLET WATER CONNECTION	2" NPT Thread	2" NPT Thread	2" NPT Thread	2.5" NPT Thread	2.5" NPT Thread
DRAIN	1" NPT	1" NPT	1" NPT	1"NPT	1" NPT
MAXIMUM FLOW RATE	105	105	105	150	150
MINIMUM FLOW RATE	10	15	15	20	25
20°F ΔT WATER FLOW (GPM)	39	49	59	71	83
HEAD LOSS (FT. OF HD.)	3.5	4.8	4.4	4.9	5.7
40°F ΔT WATER FLOW (GPM)	20	24	29	35	41
HEAD LOSS (FT. OF HD.)	2.5	2.9	2.8	3.0	3.3
MAX. WORKING PRESSURE (PSI)	160	160	160	160	160
# OF RELIEF VALVES	1	1	1	1	1
RELIEF VALVE SIZE	3/4"	3/4"	3/4"	3/4"	3/4"
RELIEF VALVE RATING (MBH)	697	697	697	1,352	1,352
RELIEF VALVE PRESSURE RATING (PSI)	50	50	50	50	50
GAS					
BTU/HR INPUT	399,999	500,000	600,000	725,000	850,000
BTU/HR OUTPUT (HIGH FIRE)	392,000	489,000	585,000	705,000	825,000
BTU/HR OUTPUT (LOW FIRE)	39,200	48,900	83,571	100,714	117,857
BOILER HORSE POWER (INPUT)	11.9	14.9	17.9	21.7	23.9
INLET CONNECTION	1"	1"	1"	1"	1"
MAX. INLET PRESSURE, NAT (w.c.)	14"	14"	14"	14"	14"
MIN. INLET PRESSURE, NAT (w.c.)	4"	4"	4"	4"	4"
MAX. INLET PRESSURE, LP (w.c.)	14"	14"	14"	14"	14"
MIN. INLET PRESSURE, LP (w.c.)	8"	8"	8"	8"	8"
ELECTRICAL *					
VOLTAGE/HEATER (VAC)	120	120	120	120	120
VOLTAGE/CONTROL (VAC)	24	24	24	24	24
AMP DRAW	<12	<12	<12	<12	<12
# OF ELECTRICAL CONNECTIONS	1	1	1	1	1
DIMENSIONS					
HEIGHT	53- 5/8"	53-5/8"	53- 5/8"	53-5/8"	53- 5/8"
WIDTH	26-1/8"	26-1/8"	26-1/8"	26-1/8"	26-1/8"
DEPTH	22-5/8"	22-5/8"	22-5/8"	22-5/8"	22-5/8"
SHIPPING WEIGHT (lbs.)	478	504	504	575	604
OPERATING WEIGHT (lbs.)	542	560	560	672	693
SERVICE CLEARANCES (RECOMMENDED)					
FRONT	30"	30"	30"	30"	30"
REAR	24"	24"	24"	24"	24"
RIGHT SIDE	0"	0"	0"	0"	0"
LEFT SIDE	0"	0"	0"	0"	0"
TOP	24"	24"	24"	24"	24"
DIRECT VENTING					
VENT SIZE	4"	4"	4"	6"	6"
AIR INLET SIZE	4"	4"	4"	4"	4"
VENT CATEGORY	IV	IV	IV	IV	IV
VENT MATERIAL	PVC/CPVC/PP/AL29-4C	PVC/CPVC/PP/AL29-4C	PVC/CPVC/PP/AL29-4C	PVC/CPVC/PP/AL29-4C	PVC/CPVC/PP/AL29-4C

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www.Lochinvar.com

FTX-PS-01 7/14-Printed in U.S.A.

Lochinvar Electrodes

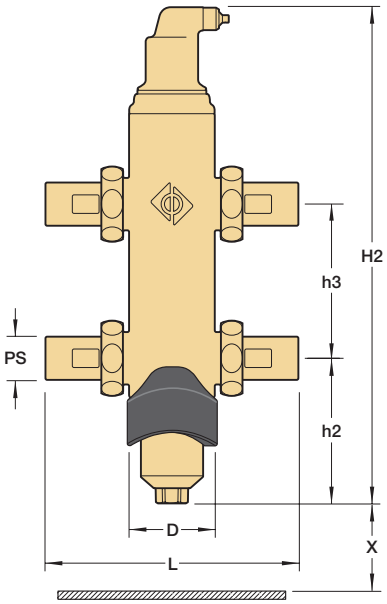
Boiler Model	Ignition electrode	Flame Sensor
Noble NKB/NKC	100275562	
WHN, WHB, KHN,KHB	PLT30005 100165925	PLT3022 100165930
KBN , WBN	PLT3021 100165929	PLT3022 100165930
KBN XL 399,400,500,501	PLT3021 100165929	PLT3022 100165930
KBN XL 600,601,700,701,800,801	PLT30000 100165920	PLT3023 100165931
KBX ALL	100297132	100330200
Armor AW151-501 WA125-200	PLT3021 100165929	PLT3022 100165930
Armor AW601-801	PLT30000 100165920	PLT3023 100165931
Shield SN 126-501	PLT3021 100165929	PLT3022 100165930
FTXL 400-850	PLT30004 100165924	PLT30003 100165923
Sync FB 1000-1500	PLT30000 (2) 100165920	PLT3023 (2) 100165931

	Ignition	Flame Sense	Flame Sense Rear
Crest FB 751-1251 Prior to S#3515	100073342	100073343 (QTY 2)	X
Crest FB 751-1251 Begin S# 3515	100073342	100073343 (QTY 1)	100279407
Crest FB 1501-2001 Prior to S#3515	100265150	100073343	X
Crest FB 1501-2001 Begin S#3515	100265150	100073343	100279407

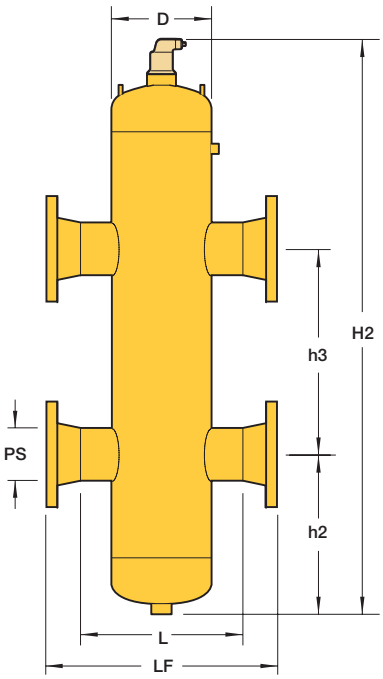
CAPCO
ENERGY SUPPLY, INC.
781-721-0303 FAX 781-721-9119 WWW.CAPCOSUPPLY.COM
3 Rath Road
WOBURN MA 01801

Lochinvar

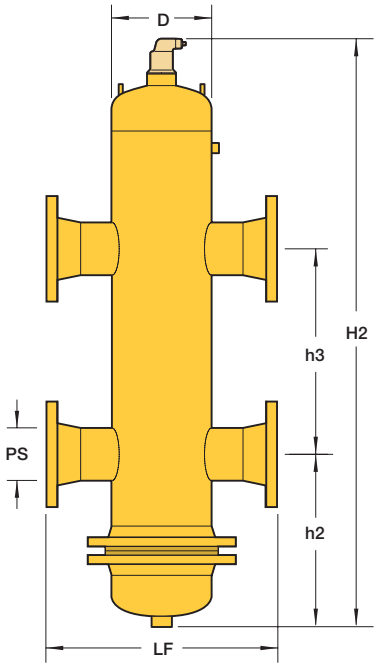
8.19.21



VDX Brass 1″-2″
Threaded, Sweat or Press Fit



VDX Steel 2″-12″
Threaded or Flanged ASME



VXN Steel 2″-12″
Flanged ASME with Removable Head

Steel

Male Threaded		VDX200MT	VDX250MT	VDX300MT	VDX400MT					
Flanged ASME		VDX200FA	VDX250FA	VDX300FA	VDX400FA	VDX500FA	VDX600FA	VDX800FA	VDX1000FA	VDX1200FA
Flanged ASME with Removable Head		VXN200FA	VXN250FA	VXN300FA	VXN400FA	VXN500FA	VXN600FA	VXN800FA	VXN1000FA	VXN1200FA
Pipe Size	inch	2	2½	3	4	5	6	8	10	12
D	inch	6.6	6.6	8.6	8.6	12.8	12.8	16.0	20.0	24.0
H2	inch	32.0	36.0	39.0	50.0	61.0	70.0	91.0	113.0	133.0
h2	inch	9.4	9.9	10.6	13.8	17.4	19.9	26.6	32.9	39.2
h3	inch	9.5	12.0	14.0	18.0	22.0	26.0	34.0	42.0	50.0
L (Threaded)	inch	12.0	12.0	15.0	15.0	—	—	—	—	—
LF (Flanged)	inch	15.0	15.0	20.0	20.0	26.0	26.0	32.0	36.0	42.0
Volume	gal.	3.2	3.7	7.1	9.4	27	32	67	134	231
Weight (lbs)	MT	56	64	106	137	—	—	—	—	—
	FA	80	96	146	197	273	323	622	978	1747
	VXN	142	160	242	281	433	518	848	1380	2127
Recom. Flow*	GPM	60	90	140	240	370	540	940	1470	2090

Brass with Magnet (except 2″)

Threaded		VDX100FTM	VDX125FTM	VDX150FTM	VDX200FT**
Sweat		VDX100SWM	VDX125SWM	VDX150SWM	VDX200SW**
Press Fit		VDX100PFM	VDX125PFM	VDX150PFM	VDX200PF**
Pipe Size	inch	1	1¼	1½	2
D	inch	3½	3½	3½	4
H2	inch	20¼	20¼	20¼	30¼
h2	inch	7⅜	7⅜	7⅜	8¼
h3	inch	5⅜	5⅜	5⅜	10¼
L (Threaded)	inch	8⅝	8⅝	8⅝	10⅛
X	inch	4	4	4	4
Weight	lbs	13.2	14.3	15.4	26.4
Recom. Flow*	GPM	10	15	30	40

* Recommended Flow based on 6 ft./sec. Entering Velocity.

** Magnet not available.

All models designed as standard for 150 psig and 270°F.
Consult local sales office for higher ratings.

SPIROTHERM

Spirotherm, Inc.
462 Camden Drive
Bloomingdale, IL 60108

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www.spirotherm.com
E-mail: info@spirotherm.com

Summit™ Residential Products

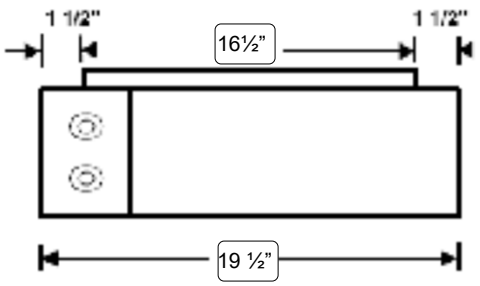
CCWC CASED HYDRONIC COIL
TO FIT OEM AIR HANDLERS
2 ROW

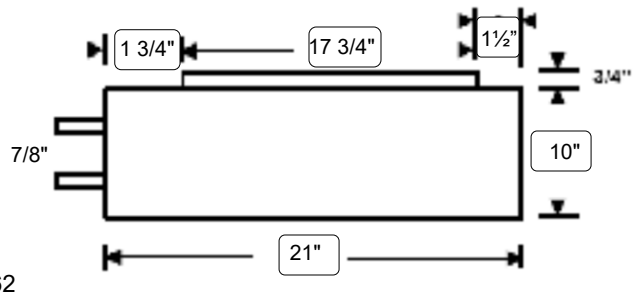
CCWC Series Performance Data

CCWC19521-2

CFM	GPM	Water Press. Drop FT.	Air Press. Drop IN.	140° F EWT			160° F EWT			180° F EWT		
				Total Capacity BTUH	Leaving Water °F	Leaving Air °F	Total Capacity BTUH	Leaving Water °F	Leaving Air °F	Total Capacity BTUH	Leaving Water °F	Leaving Air °F
800	6	3.2	0.08	36,252	127.7	101.9	45,512	144.5	112.6	54,812	161.2	123.4
	7	4.2		36,870	129.3	102.6	46,267	146.5	113.5	55,702	163.6	124.4
	8	5.4		37,348	130.5	103.2	46,851	148.0	114.2	56,388	165.5	125.2
900	6	3.2	0.10	38,768	126.9	99.9	48,686	143.4	110.0	58,650	159.9	120.3
	7	4.2		39,485	128.5	100.6	49,564	145.5	110.9	59,685	162.4	121.4
	8	5.4		40,042	129.8	101.2	50,244	147.2	111.6	60,487	164.4	122.2
1000	6	3.2	0.11	41,090	126.1	98.0	51,617	142.4	107.8	62,196	158.7	117.5
	7	4.2		41,907	127.8	98.8	52,618	144.6	108.7	63,377	161.4	118.6
	8	5.4		42,542	129.2	99.4	53,395	146.4	109.4	64,294	163.5	119.5
1100	6	3.2	0.13	43,246	125.4	96.4	54,340	141.5	105.7	65,491	157.5	115.1
	7	4.2		44,161	127.2	97.1	55,462	143.8	106.6	66,817	160.3	116.2
	8	5.4		44,875	128.6	97.7	56,337	145.6	107.4	67,848	162.5	117.1
1200	6	3.2	0.15	45,257	124.8	94.9	56,882	140.6	103.9	68,569	156.5	112.9
	7	4.2		46,269	126.6	95.8	58,125	143.0	104.8	70,038	159.4	113.9
	8	5.4		47,061	128.0	96.3	59,094	144.9	185.6	71,182	161.7	114.9
1300	6	3.2	0.18	47,142	124.0	93.5	59,763	139.8	102.2	71,454	155.5	110.8
	7	4.2		48,249	125.9	94.3	60,625	142.3	103.1	73,065	158.5	111.9
	8	5.4		49,118	127.5	94.9	61,690	144.2	103.9	74,321	160.9	112.9
1400	6	3.2	0.20	48,913	123.4	92.3	61,504	139.0	100.6	74,168	154.4	109.0
	7	4.2		50,116	125.5	93.1	62,903	141.6	101.6	75,919	157.7	110.2
	8	5.4		51,060	127.0	93.7	64,141	143.6	102.4	77,287	160.1	111.1
1500	6	3.2	0.22	50,584	122.9	91.2	63,617	138.3	99.2	76,730	153.7	107.3
	7	4.2		51,880	124.9	91.9	65,212	140.9	100.2	78,619	156.9	108.5
	8	5.4		52,898	126.6	62.6	66,463	143.0	100.9	80,097	159.4	109.4
1600	6	3.2	0.25	52,165	122.3	90.2	65,618	137.6	97.9	79,156	152.8	105.7
	7	4.2		53,553	124.5	90.6	67,327	140.3	98.8	81,181	156.1	106.9
	8	5.4		54,645	126.1	91.6	68,669	142.4	99.7	82,768	158.7	107.9
1700	6	3.2	0.27	53,665	121.8	89.2	67,516	136.9	96.7	81,458	152.0	104.3
	7	4.2		55,142	123.9	90.0	69,337	139.7	97.7	83,617	155.4	105.5
	8	5.4		56,307	125.7	90.6	70,769	141.9	98.5	85,311	158.0	106.4
1800	6	3.2	0.30	55,090	121.3	88.3	69,321	136.4	95.6	83,648	151.3	102.9
	7	4.2		56,656	123.6	89.1	71,252	139.2	96.6	85,938	154.7	104.2
	8	5.4		87,893	125.3	89.8	72,774	141.4	97.4	87,738	157.4	105.1
1900	6	3.2	0.33	56,448	120.9	87.5	71,042	135.8	94.6	85,735	150.6	101.7
	7	4.2		58,101	123.1	88.3	73,082	138.7	95.6	88,155	154.1	102.9
	8	5.4		59,408	124.9	88.9	74,690	140.9	96.4	90,060	156.8	103.9
2000	6	3.2	0.36	57,745	120.4	86.7	72,686	135.2	93.6	87,730	149.9	100.6
	7	4.2		59,483	122.7	87.5	74,931	138.1	94.6	90,277	153.4	101.8
	8	5.4		60,860	124.5	88.2	76,525	140.4	95.4	92,284	156.3	102.7

60°F entering air temperature.





Summit™ Residential Products

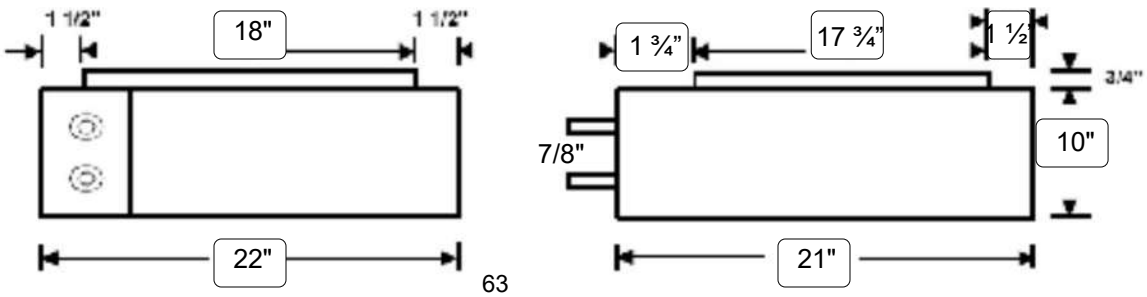
CCWC CASED HYDRONIC COIL
TO FIT OEM AIR HANDLERS
2 ROW

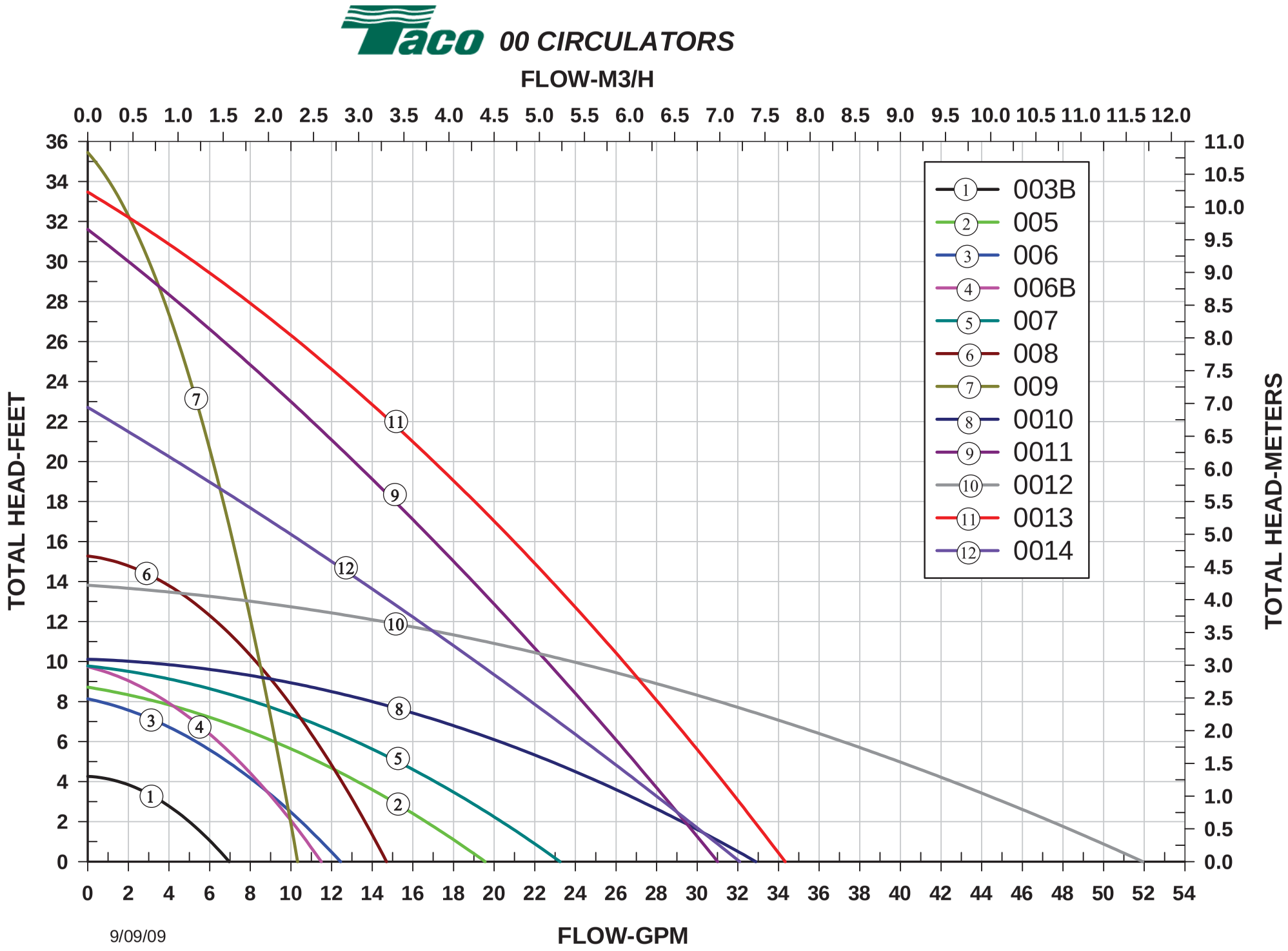
CCWC Series Performance Data

CCWC22021- 2

CFM	GPM	Water Press. Drop FT.	Air Press. Drop IN.	140°F EWT			160°F EWT			180°F EWT		
				Total Capacity BTUH	Leaving Water °F	Leaving Air °F	Total Capacity BTUH	Leaving Water °F	Leaving Air °F	Total Capacity BTUH	Leaving Water °F	Leaving Air °F
1000	7	1.9	0.07	37,199	127.4	103.0	46,716	144.1	114.0	56,278	160.7	125.1
	8	2.6		37,860	129.0	103.8	47,523	146.1	114.9	57,228	163.2	126.2
	9	3.3		38,371	130.3	104.4	48,148	147.7	115.7	57,963	165.1	127.0
1100	7	1.9	0.08	39,801	126.5	100.9	50,001	142.9	111.4	60,253	159.3	121.9
	8	2.6		40,570	128.2	101.7	50,942	145.1	112.4	61,361	161.9	123.1
	9	3.3		41,167	129.5	102.3	51,672	146.8	113.1	62,220	163.9	123.9
1200	7	1.9	0.10	42,203	125.7	99.0	53,035	141.9	109.1	63,926	158.1	119.1
	8	2.6		43,079	127.5	99.9	54,109	144.2	110.1	65,193	160.8	120.3
	9	3.3		43,762	128.9	100.5	54,944	145.9	110.8	66,176	162.9	121.2
1300	7	1.9	0.11	44,432	124.9	97.4	55,853	140.9	106.9	67,339	156.9	116.6
	8	2.6		45,416	126.8	98.2	57,059	143.3	107.9	68,762	159.8	117.8
	9	3.3		46,183	128.3	98.8	57,799	145.2	108.8	69,871	162.0	118.8
1400	7	1.9	0.13	46,511	124.2	95.9	58,482	140.1	105.1	70,525	155.8	114.4
	8	2.6		47,600	126.2	96.7	59,819	142.5	106.1	72,104	158.8	115.6
	9	3.3		48,452	127.7	97.4	60,864	144.4	106.9	73,336	161.1	116.5
1500	7	1.9	0.15	48,458	123.6	94.5	60,946	139.2	103.4	73,570	154.8	112.3
	8	2.6		49,651	125.6	95.3	62,411	141.8	104.4	75,245	157.9	113.5
	9	3.3		50,587	127.2	95.9	63,559	143.8	105.2	76,599	160.3	114.5
1600	7	1.9	0.17	50,287	122.9	93.2	63,262	138.4	101.8	76,320	153.8	110.4
	8	2.6		51,584	125.0	94.1	64,856	141.1	102.9	78,205	156.9	111.7
	9	3.3		52,603	126.6	94.8	66,105	143.1	103.7	79,681	159.5	112.7
1700	7	1.9	0.19	52,013	122.4	92.1	65,447	137.7	100.4	78,970	152.9	108.7
	8	2.6		53,411	124.5	92.9	97,166	140.4	101.4	81,005	156.2	109.9
	9	3.3		54,510	126.2	93.6	68,517	142.5	102.3	82,602	158.7	110.9
1800	7	1.9	0.21	53,645	121.8	91.0	67,513	136.9	99.0	81,479	152.0	107.1
	8	2.6		55,141	123.9	91.9	69,357	139.7	100.1	83,661	155.4	108.4
	9	3.3		56,322	125.7	92.6	70,807	141.9	100.9	85,377	158.0	109.4
1900	7	1.9	0.23	55,192	121.3	90.3	69,474	136.3	97.8	83,859	151.2	105.6
	8	2.6		56,786	123.5	90.9	71,439	139.1	98.9	86,187	154.7	106.9
	9	3.3		58,046	125.3	91.6	72,987	141.3	99.7	88,018	157.3	107.9
2000	7	1.9	0.26	56,663	120.8	89.1	71,338	135.7	96.7	86,121	150.4	104.3
	8	2.6		58,353	123.1	89.9	73,422	138.6	97.9	88,593	153.9	105.5
	9	3.3		59,691	124.0	90.7	75,068	140.8	98.6	90,540	156.7	106.5
2100	7	1.9	0.28	58,062	120.3	88.3	73,114	135.1	95.6	88,277	149.7	102.9
	8	2.6		59,848	122.6	89.1	75,317	138.0	96.7	90,890	153.3	104.3
	9	3.3		61,262	124.4	89.8	77,056	140.3	97.5	92,951	156.1	105.3
2200	7	1.9	0.30	59,399	119.9	87.5	74,809	134.5	94.6	90,337	149.0	101.8
	8	2.6		61,277	122.2	88.3	77,126	137.5	95.7	93,088	152.6	103.1
	9	3.3		62,766	124.1	89.0	78,961	139.8	96.5	95,261	155.5	104.1

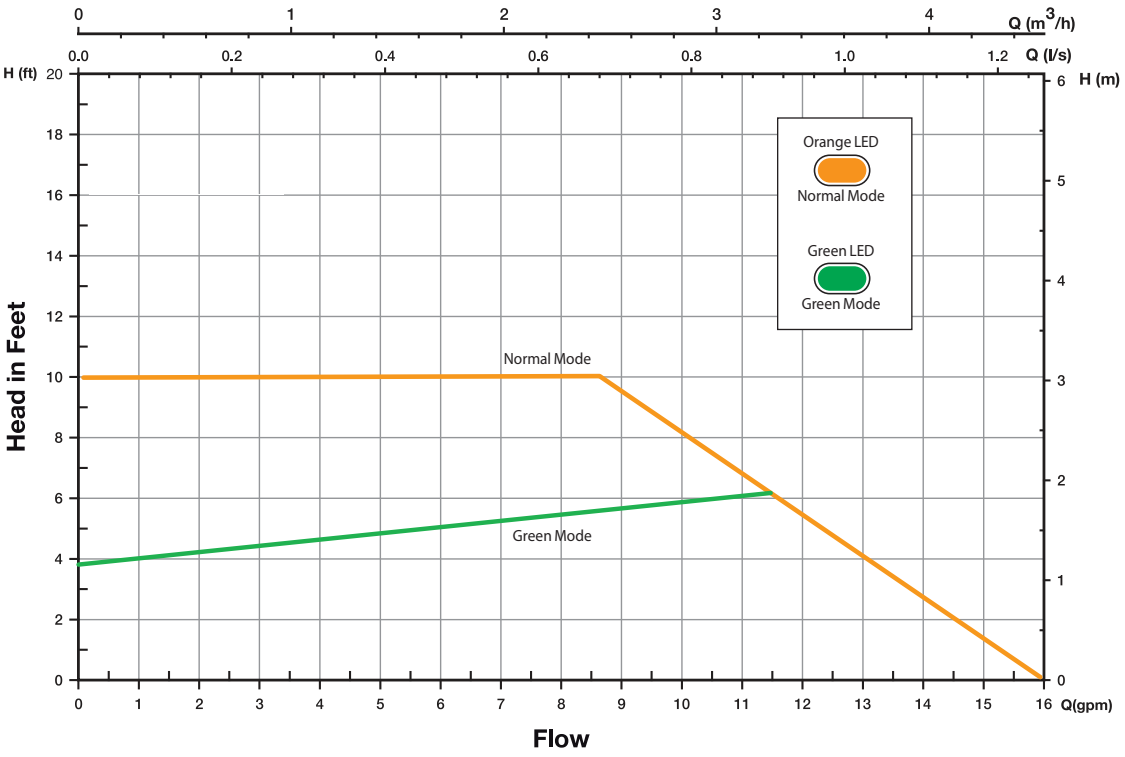
60°F entering air temperature.




Taco
00 CIRCULATORS
FLOW-M3/H
0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0
TOTAL HEAD-FEET
36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
TOTAL HEAD-METERS
11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54
FLOW-GPM
1 003B
2 005
3 006
4 006B
5 007
6 008
7 009
8 0010
9 0011
10 0012
11 0013
12 0014
9/09/09

Performance Curves

007e® Performance Curves



The 007e performance is ideal for hydronic zoning to reduce velocity noise or banging of zone valves closing against high head pressure circulators.

The 007e has an additional Green Mode operating curve that will self-adjust automatically.

Green Mode: After 7 days of constant running, the 007e will adjust its curve to Low Proportional Pressure curve for power optimization. (See Green Mode curve above) LED will change to green. The 007e will reset to the original normal mode curve every time it cycles OFF.

tekmar® - Data Brochure

3-Way Mixing Valves 710 - 714

D710
05/05

The 3-Way Brass Mixing Valves 710, 711, 712, 713, and 714 are used to mix supply water from a heat source with water returning from a system. They are designed for use in either closed loop or open loop hydronic systems. All valves have standard female NPT threads. The valve provides a maximum leak through rate of 1% to allow for water expansion during temperature changes. The valve position can be manually set using the handle. An Actuating Motor 741 can be used to automatically operate the valve.

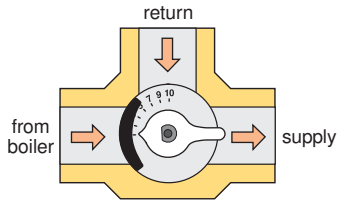
Sequence of Operation

When the flap is in the fully closed position, 100% of the heating system return water is supplied to the system. When the valve flap is in the fully open position, 100% of the boiler supply water enters the heating system. Mixing of the water takes place when the valve flap is in an intermediate position.

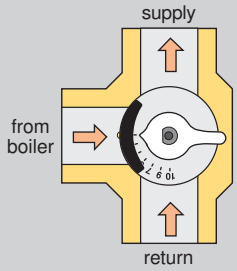
Installation

Check the contents of the package. If any of the items listed below are missing or damaged, please refer to the Limited Warranty and Product Return Procedure on the back of this brochure and contact your wholesaler or local tekmar representative.

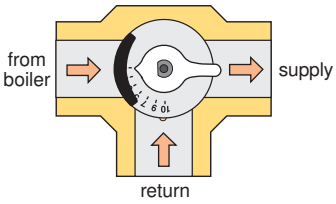
Types 710 - 714 include • One Mixing Valve & One Data Brochure D 710



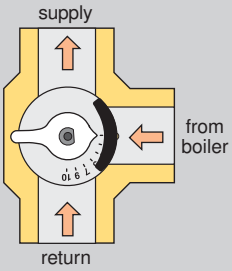
• Factory postion
• No changes required



• Rotate handle 1/4 turn
• Flip face plate over



• Rotate handle 1/2 turn
• Flip face plate over

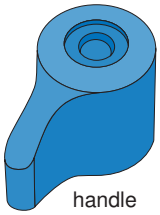


• Rotate handle 1/4 turn

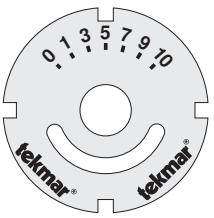
Replacement Parts

The Mixing Valve Handle Kit M3047 contains a replacement manual valve handle, a brass screw, a “C” clip, and a position indicator plate.


brass screw


handle


“C” clip



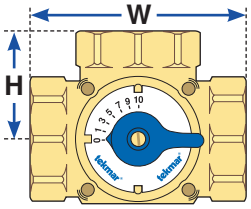
indicator plate

Pointer and flat of shaft point to the closed off port. It should only ever travel between "from boiler" and "return" ports.
Set pointer to "from boiler" which is closed position then set actuator to close position and mount it to valve. Check proper rotation on startup.

Technical Data

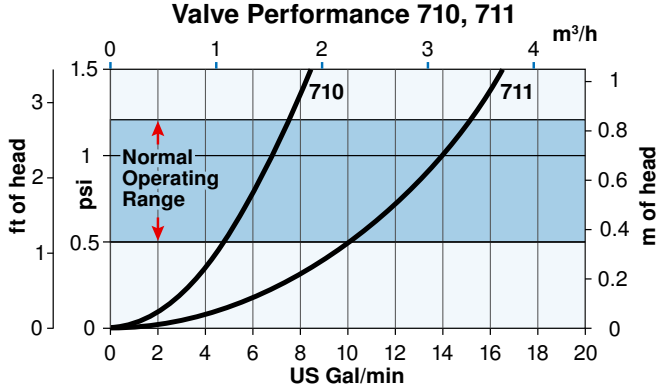
3-Way Mixing Valves 710 - 714 *Brass*

Literature	—	D710
Maximum Operating Pressure	—	146 psi (10 bar)
Operating Temperature Range	—	-20 to 248°F (-28 to 120°C)
Valve Body and Vane	—	CW 617N - EN 12165 Brass
Shaft Seal	—	Viton “O” ring
Main Seal	—	EPDM Perioxide “O” ring
Acceptable Fluid Media	—	Chilled and hot water with antifreeze and anticorrosive compounds (max 60%), glycol, ethyl alcohol glycol, propylene dichloride alcohol, mono ethyl alcohol, ethyl methyl alcohol, glycerine. *Not for use with media based on mineral oil components or chlorinated pool water.*

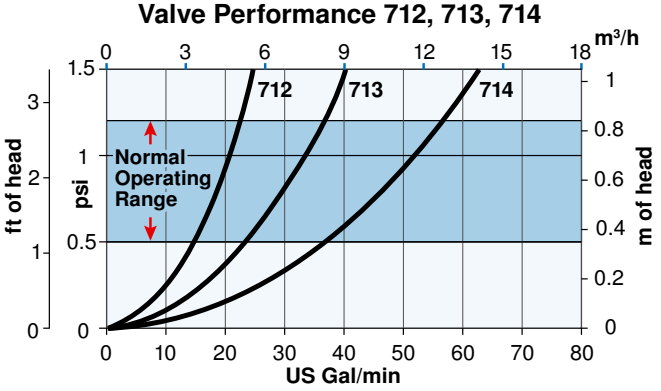


Type	Pipe Size	CV Value	Dimension H	Dimension W	Packaged Weight
710	3/4”	7	1-1/2” (38 mm)	3” (76 mm)	1.9 lbs (860 g)
711	1”	14	1-1/2” (38 mm)	3” (76 mm)	1.6 lbs (730 g)
712	1-1/4”	21	1-5/8” (41 mm)	3-1/4” (82 mm)	1.8 lbs (800 g)
713	1-1/2”	32	2-3/16” (56 mm)	4-3/8” (111 mm)	6.7 lbs (3020 g)
714	2”	51	2-5/16” (60 mm)	4-5/8” (119 mm)	5.6 lbs (2520 g)

Valve Performance 710, 711



Valve Performance 712, 713, 714



Limited Warranty and Product Return Procedure

Limited Warranty ***The liability of tekmar under this warranty is limited. The Purchaser, by taking receipt of any tekmar product (“Product”), acknowledges the terms of the Limited Warranty in effect at the time of such Product sale and acknowledges that it has read and understands same.***

The tekmar Limited Warranty to the Purchaser on the Products sold hereunder is a manufacturer’s pass-through warranty which the Purchaser is authorized to pass through to its customers. Under the Limited Warranty, each tekmar Product is warranted against defects in workmanship and materials if the Product is installed and used in compliance with tekmar’s instructions, ordinary wear and tear excepted. The pass-through warranty period is for a period of twenty-four (24) months from the production date if the Product is not installed during that period, or twelve (12) months from the documented date of installation if installed within twenty-four (24) months from the production date.

The liability of tekmar under the Limited Warranty shall be limited to, at tekmar’s sole discretion: the cost of parts and labor provided by tekmar to repair defects in materials and/or workmanship of the defective product; or to the exchange of the defective product for a warranty replacement product; or to the granting of credit limited to the original cost of the defective product, and such repair, exchange or credit shall be the sole remedy available from tekmar, and, without limiting the foregoing in any way, tekmar is not responsible, in contract, tort or strict product liability, for any other losses, costs, expenses, inconveniences, or damages, whether direct, indirect, special, secondary, incidental or consequential, arising from ownership or use of the product, or from defects in workmanship or materials, including any liability for fundamental breach of contract.

The pass-through Limited Warranty applies only to those defective Products returned to tekmar during the warranty period. This Limited Warranty does not cover the cost of the parts or labor to remove or transport the defective Product, or to reinstall the repaired or replacement Product, all such costs and expenses being subject to Purchaser’s agreement and warranty with its customers.

Any representations or warranties about the Products made by Purchaser to its customers which are different from or in excess of the tekmar Limited Warranty are the Purchaser’s sole responsibility and obligation. Purchaser shall indemnify and hold tekmar harmless from and against any and all claims, liabilities and damages of any kind or nature which arise out of or are related to any such representations or warranties by Purchaser to its customers.

The pass-through Limited Warranty does not apply if the returned Product has been damaged by negligence by persons other than tekmar, accident, fire, Act of God, abuse or misuse; or has been damaged by modifications, alterations or attachments made subsequent to purchase which have not been authorized by tekmar; or if the Product was not installed in compliance with tekmar’s instructions and/or the local codes and ordinances; or if due to defective installation of the Product; or if the Product was not used in compliance with tekmar’s instructions.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH THE GOVERNING LAW ALLOWS PARTIES TO CONTRACTUALLY EXCLUDE, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, DURABILITY OR DESCRIPTION OF THE PRODUCT, ITS NON-INFRINGEMENT OF ANY RELEVANT PATENTS OR TRADEMARKS, AND ITS COMPLIANCE WITH OR NON-VIOLATION OF ANY APPLICABLE ENVIRONMENTAL, HEALTH OR SAFETY LEGISLATION; THE TERM OF ANY OTHER WARRANTY NOT HEREBY CONTRACTUALLY EXCLUDED IS LIMITED SUCH THAT IT SHALL NOT EXTEND BEYOND TWENTY-FOUR (24) MONTHS FROM THE PRODUCTION DATE, TO THE EXTENT THAT SUCH LIMITATION IS ALLOWED BY THE GOVERNING LAW.

Product Warranty Return Procedure All Products that are believed to have defects in workmanship or materials must be returned, together with a written description of the defect, to the tekmar Representative assigned to the territory in which such Product is located. If tekmar receives an inquiry from someone other than a tekmar Representative, including an inquiry from Purchaser (if not a tekmar Representative) or Purchaser’s customers, regarding a potential warranty claim, tekmar’s sole obligation shall be to provide the address and other contact information regarding the appropriate Representative.

tekmar® Control Systems

tekmar Control Systems Ltd., Canada
tekmar Control Systems, Inc., U.S.A.
Head Office: 5100 Silver Star Road
Vernon, B.C. Canada V1B 3K4
(250) 545-7749 Fax. (250) 545-0650
Web Site: www.tekmarcontrols.com

All specifications are subject to change without notice.
Printed in Canada. D710 - 05/05.

TURBOMAX® INDIRECT WATER HEATERS

TURBOMAX® 109

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
400 000	117	807	531	363	687	483	346
500 000	146	979	651	450	859	603	436
600 000	176	1151	772	536	1031	724	516
700 000	205	1323	893		1202	845	
800 000	234	1494	1013		1374	965	
900 000	264	1666			1546		

TURBOMAX® 45

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
200 000	59	392	261	180	344	241	173
250 000	73	477	321	223	429	302	216
300 000	88	563	381	266	515	362	260
350 000	103	649	442		601	422	
400 000	117	735	502		687	483	
450 000	132	821	562		773	543	
500 000	146	907			859		

TURBOMAX® 34

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
50 000	15	126	76	49	88	60	43
100 000	29	211	137	92	172	121	87
150 000	44	297	197	135	258	181	130
200 000	59	383	257	179	344	241	173
250 000	73	469	318	222	429	302	216
300 000	88	555	378		515	362	
350 000	103	641	438		601	422	
400 000	117	727			687		

TURBOMAX® 24

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
50 000	15	112	71	47	88	60	43
100 000	29	198	131	90	172	121	87
150 000	44	284	192	134	258	181	130
200 000	59	370	252	177	344	241	173
250 000	73	455	312	220	429	302	216
300 000	88	542	373		515	362	
350 000	103	628	433		601	422	
400 000	117	714			687		

† Based on ASHRAE (D.O.E.) test method performed by CRIQ. Domestic cold water at 40°F and boiler water at 180°F.

Technical Information

Standby loss <1/2°F per hour
Heat Transfer Efficiency = 99%
Output Temperature up to 200°F
Tube Max. Allowed ASME = 150 PSI at 250°F Working Pressure
Shell Max. Allowed ASME = 150 PSI at 250°F Working Pressure

TURBOMAX® 65

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
200 000	59	416	270	183	344	241	173
250 000	73	501	331	227	429	302	216
300 000	88	587	391	270	515	362	260
350 000	103	673	451		601	422	
400 000	117	759	512		687	483	
450 000	132	845	572		773	543	
500 000	146	931			859		

TURBOMAX® 44

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
50 000	15	134	80	50	86	60	43
100 000	29	220	140	93	172	121	87
150 000	44	306	200	137	258	181	130
200 000	59	392	261	180	344	241	173
250 000	73	477	321	223	429	302	216
300 000	88	563	381		515	362	
350 000	103	649	442		601	422	
400 000	117	735			687		

TURBOMAX® 33

Domestic hot water produced per hour in U.S. gallons†

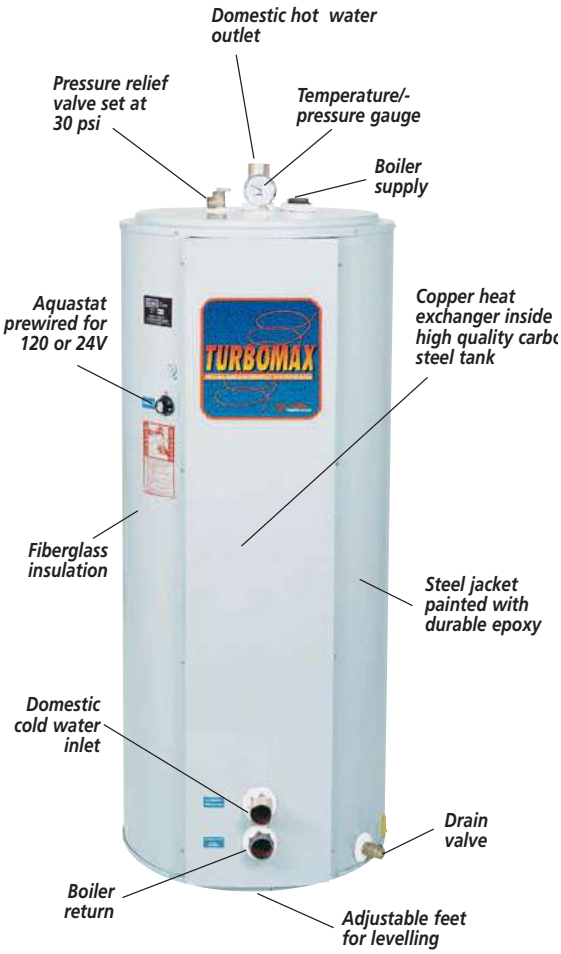
Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
50 000	15	126	76	49	86	60	43
100 000	29	211	137	92	172	121	87
150 000	44	297	197	135	258	181	130
200 000	59	383	257	179	344	241	
250 000	73	469	318	222	429	302	
300 000	88	555	378		515		

TURBOMAX® 23

Domestic hot water produced per hour in U.S. gallons†

Net BTUH	kW	First hour 110°F	140°F	180°F	Continuous 110°F	140°F	180°F
50 000	15	112	71	47	86	60	43
100 000	29	198	131	90	172	121	87
150 000	44	284	192	134	258	181	130
200 000	59	370	252		344	241	
250 000	73	456	312		429	302	
300 000	88	542			515		

Standard Equipment



Specifications

Model	Tank volume	Heat transfer area (sq.ft.)	Utility connection	Boiler connection	Hgt.	Diam.	Shipping weight
TURBOMAX 109	119 US gal.	58.9 ft^2	2" Sweat M	2" NPTM	74"	29"	555 lbs
TURBOMAX 65	72 US gal.	32.7 ft^2	1 1/2" Sweat M	1 1/2" NPTM	67"	24"	250 lbs
TURBOMAX 45	48 US gal.	32.7 ft^2	1 1/2" Sweat M	1 1/4" NPTM	55"	22"	235 lbs
TURBOMAX 44	48 US gal.	26.2 ft^2	1 1/2" Sweat M	1 1/4" NPTM	55"	22"	210 lbs
TURBOMAX 34	36 US gal.	26.2 ft^2	1 1/2" Sweat M	1 1/4" NPTM	65"	18"	195 lbs
TURBOMAX 33	36 US gal.	19.6 ft^2	1 1/4" Sweat M	1 1/4" NPTM	65"	18"	170 lbs
TURBOMAX 24	26 US gal.	26.2 ft^2	1 1/2" Sweat M	1 1/4" NPTM	49"	18"	175 lbs
TURBOMAX 23	26 US gal.	19.6 ft^2	1 1/4" Sweat M	1 1/4' NPTM	49"	18"	150 lbs

ASME Models Specifications

Model	Tank volume	Heat transfer area (sq.ft.)	Utility connection	Boiler connection	Hgt.	Diam.	Shipping weight
TURBOMAX 109A	110 US gal.	58.9 ft^2	2^1/$_2$" Sweat M	2" NPTM	74"	29"	755 lbs
TURBOMAX 65A	70 US gal.	32.7 ft^2	2" Sweat M	1^1/$_2$" NPTM	67"	24"	340 lbs

Metric PEX Tubing Cross Reference

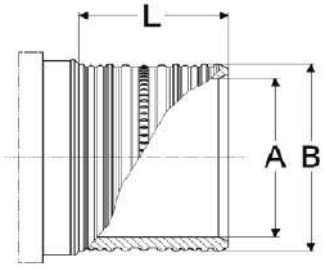
Metric tube size	Fitting Options
10mm	10mm x 1/2" MNPT (H/A PN-3038) 10mm coupling (H/A PN-CC10) 5/16 coupling (Viega PN 19013)
12mm	12mm x 3/4" cop sweat (H/A PN-3030 or SA-12) 12mm coupling (H/A PN-CC-12)
14mm	14mm x 1/2" MNPT (H/A PN-3044) 14mm coupling (H/A PN-3037) 14mm x 3/4" cop sweat (H/A PN-SA-14)
16mm	16mm SVC adapter (Viega PN 19412) 1/2" comp coupling (Viega PN 19015) Any 1/2" PEX press poly (Viega)* Any 1/2" PEX press bronze (Viega)* 16mm coupling (H/A PN 3031) 1/2" PEX x 1/2" MNPT (H/A PN 3032) 1/2" PEX x 1/2" cop (H/A PN 3033B) 1/2" PEX x 3/4" cop (H/A PN 3033)
19mm	5/8" coupling (Viega PN 19016) 19mm coupling (H/A PN 3029) 5/8" x 3/4" cop (H/A PN 3028)
25mm	25mm coupling (needs to be ordered from H/A)

*may need to shave tubing with FostaPEX prep tool when using PEX press fittings

	Outer Diameter		Inner Diameter	
	in	mm	in	mm
PEXTRON® 10 (1/4" NOMINAL)	7/16	10.5	1/4	7
PEXTRON® 12 (3/8" NOMINAL)	1/2	12	3/8	8
PEXTRON® 14 (7/16" NOMINAL)	9/16	14	7/16	10
PEXTRON® 16 (1/2" NOMINAL)	5/8	16	1/2	12
PEXTRON® 19 (5/8" NOMINAL)	3/4	19	5/8	15
PEXTRON® 25 (3/4" NOMINAL)	1	25	3/4	20

PureFlow Bronze Zero Lead PEX Press Fittings
Typical Fitting Insert Dimensions

SIZE	A	B	L
5/16"	0.169	0.281±.002	0.496
3/8"	0.236	0.344±.002	0.496
1/2"	0.362	0.473±.002	0.496
5/8"	0.457	0.571±.002	0.496
3/4"	0.559	0.667±.003	0.496
1"	0.728	0.858±.004	0.618
1-1/4"	0.957	1.047±.004	0.866
1-1/2"	1.083	1.232±.004	0.866
2"	1.417	1.606±.004	1.260



RADIANT

TechData

PRODUCT SPECIFICATION SHEET

viega

ProRadiant SYSTEMS

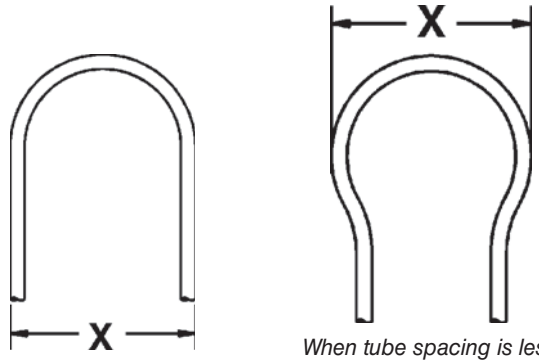
ViegaPEX Barrier

Quality Assurance

ViegaPEX Barrier tubing is manufactured and tested to the requirements of ASTM F876 and F877. The degree of cross-linking of finished tubing is determined by method ASTM D2765.

Certifications

NSF-pw - tested for health effects to ANSI/NSF 61 and performance to ANSI/NSF standard 14.



When tube spacing is less than minimum bend dimension.

When the tube spacing is less than the minimum recommended bending dimension, the loop ends should be swept out to at least the dimensions shown.

Otherwise, if tube spacing is equal or greater than "X", a standard loop may be used.

Tubing Size	Dimension X With the Coil
5/16"	7"
3/8"	8"
1/2"	10"
5/8"	12"
3/4"	14"
1"	18"
1-1/4"	22"
1-1/2"	26"

ViegaPEX Barrier Oxygen Permeation:
All sizes have less than 0.1 grams/m^3/day

Note: ViegaPEX Barrier tubing meets DIN 4726 requirement for oxygen tight pipes.

PRESSURE DROP TABLE

Expressed per/ft.

	SIZE													
	5/16"		3/8"		1/2"		5/8"		3/4"		1"		1-1/4"		1-1/2"	
GPM	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss	PSI	Head Loss
.1	.002	.005	.001	.001												
.2	.009	.021	.004	.008	.001	.002										
.3	.018	.042	.008	.017	.002	.004	.001	.002								
.4	.031	.072	.013	.030	.003	.007	.001	.002								
.5	.047	.109	.020	.045	.004	.010	.002	.004								
.6	.066	.152	.027	.063	.006	.014	.003	.006	.001	.003						
.7	.088	.203	.036	.084	.008	.019	.003	.008	.002	.004						
.8			.047	.108	.011	.024	.004	.010	.002	.005						
.9			.058	.134	.013	.030	.005	.012	.002	.006						
1			.070	.1626	.016	.037	.007	.015	.003	.007	.001	.002				
1.5					.034	.078	.014	.032	.006	.015	.002	.004				
2					.058	.133	.024	.055	.011	.025	.003	.007				
3							.050	.116	.023	.052	.007	.015				
4							.085	.197	.039	.089	.011	.026				
6							.181	.417	.082	.189	.024	.056				
8									.140	.322	.041	.095				
10									.211	.487	.062	.143	.023	.054		
12									.296	.683	.087	.201	.032	.075		
14													.042	.098		
16													.053	.123	.022	.052
18													.065	.151	.027	.063
20													.078	.182	.033	.077
22													.093	.217	.039	.091
24													.108	.252	.045	.105
26															.052	.121
28															.060	.140
30															.067	.156
32															.075	.175

SDR-9 PEX Tubing

ASTM F876/F877/CTS-OD SDR-9

TUBING SIZE	O.D.	WALL THICKNESS	NOM. I.D.	WEIGHT PER FT	VOLUME (GAL)/ 100 ft
5/16"	.430±.003	.064+.010	0.292	.0340	0.34
3/8"	.500±.003	.070+.010	0.350	.0413	0.50
1/2"	.625±.004	.070+.010	0.475	.0535	0.92
5/8"	.750±.004	.083+.010	0.574	.0752	1.34
3/4"	.875±.004	.097+.010	0.671	.1023	1.82
1"	1.125±.005	.125+.010	0.863	.1689	3.04
1-1/4"	1.375±.005	.153+.015	1.053	.2523	4.52
1-1/2"	1.625±.006	.181+.019	1.243	.3536	6.30

NOTE: Dimensions are in English units. Tolerances shown are ASTM requirements. ViegaPEX Barrier is manufactured to within these specifications.

ViegaPEX Barrier tubing is available in both straight lengths and coils.

VIEGA
301 N. Main, Floor 9
Wichita, KS 67202
Phone: 1-877-VIEGA-NA
Fax: 1-800-976-9817

service@viega.com
www.viega-na.com

Application	Location	On-Center Spacing (in., typical)	Nominal Tubing Size (in., typical)
In-Slab	On or Above Grade Living Areas	9"	½" or ⅝"*
	Below Grade	9" – 12"	½" or ⅝"*
	Bathrooms and High Output Areas	6" – 9"	⅜" or ½"
	Gypsum-concrete (thin-slab)	6" – 9"	½"
	Garages and Workshops, Interior Zones of Large Commercial Buildings or Warehouses	12"	½", ⅝", or ¾"
Dry Mass	Above Sub-Floor Panels	7" – 10"	5/16"
	Below Sub-Floor (Residential Only)	8"	⅜" or ½"
	Wall Panels	7" – 10"	5/16"

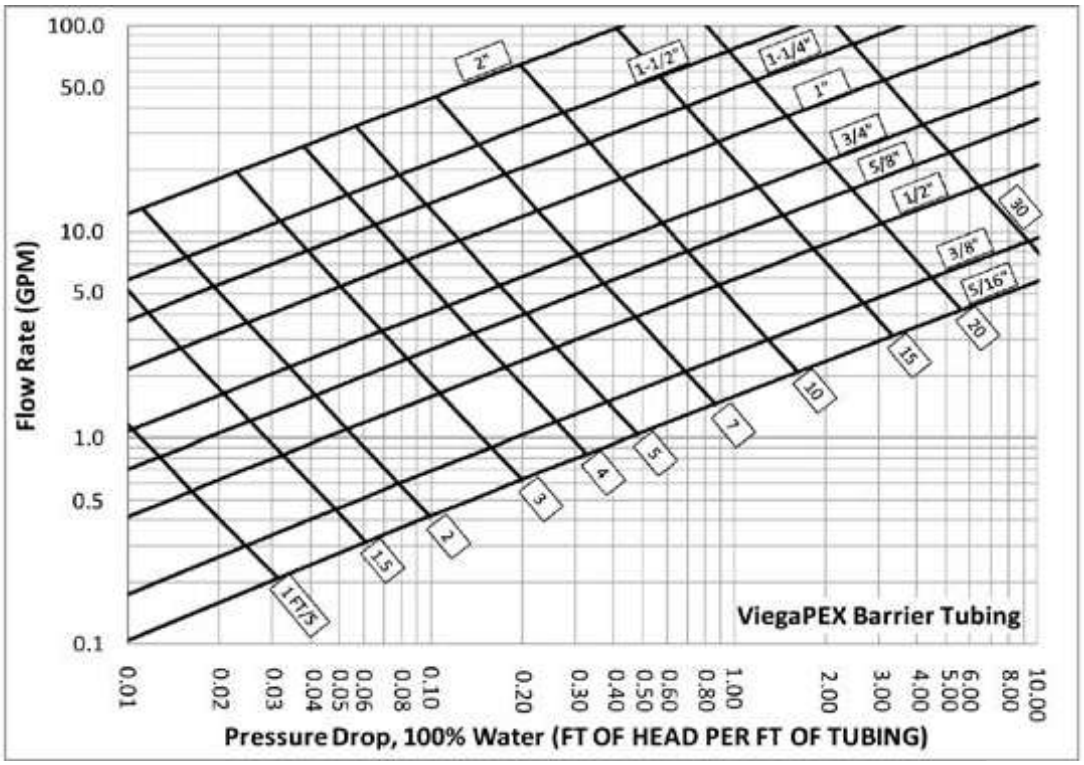
Table 1-5. Typical spacing and nominal tubing size, by application.
**Used more commonly in commercial applications.*

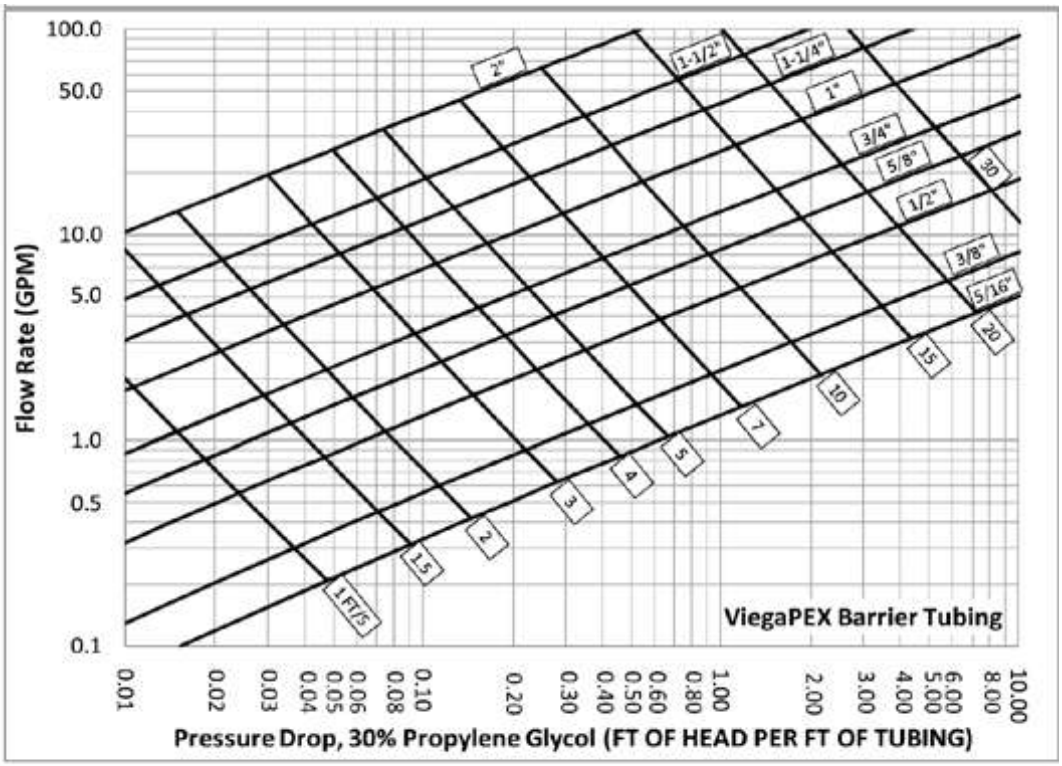
Tubing	≤ 25 Btu/hr/ft2	>25 Btu/hr/ft2
5/16"	250	200
⅜"	300	250
½"	400	350
⅝"	500	450
¾"	800	750

Table 1-6. Maximum recommended circuit lengths in feet, assuming a temperature drop of ≥ 20°F, 100% water, and air temperature of 68°F.

This is for Radiant Applications only, not snowmelt!

Pressure Drop





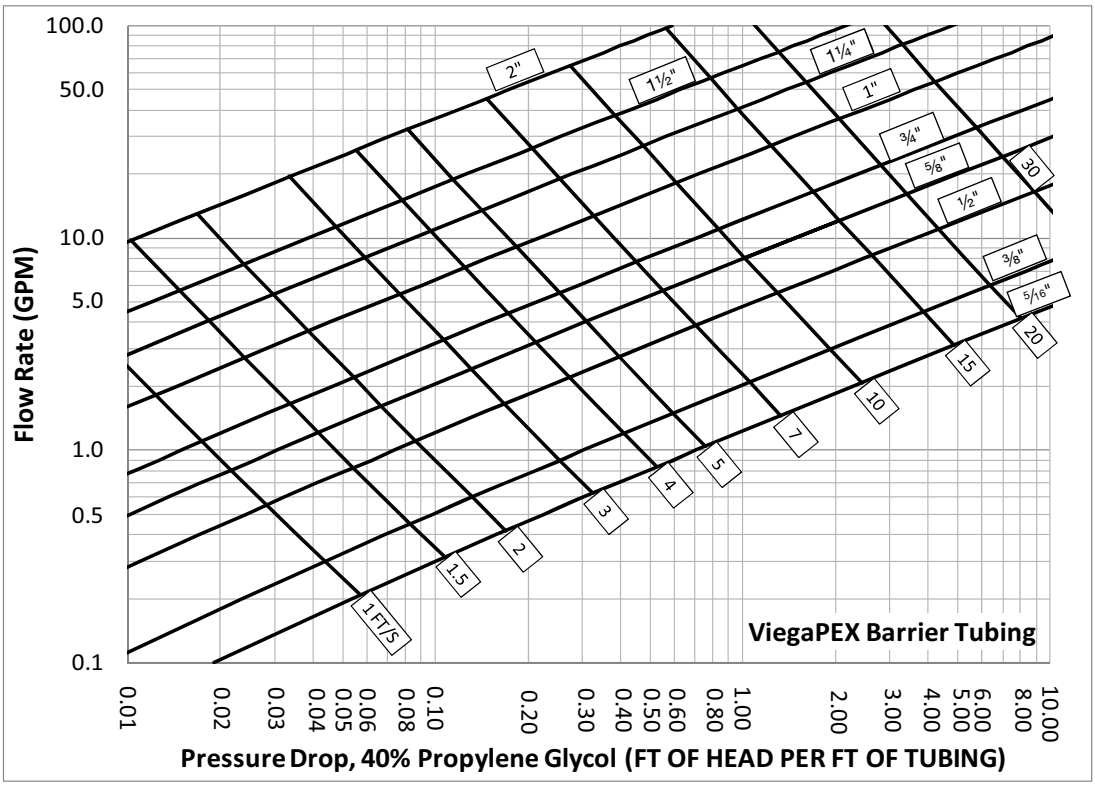


Table 1-17. Forty percent propylene glycol pressure drop table for ViegaPEX Barrier tubing.

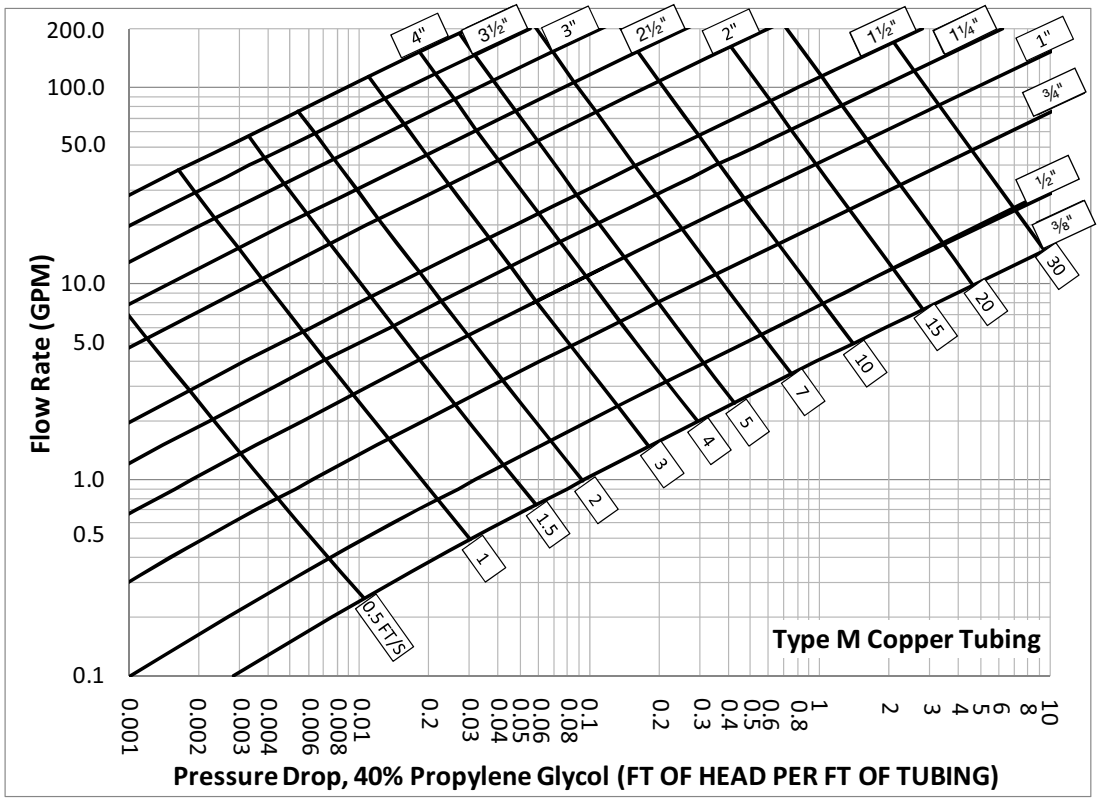


Table 1-18. Forty percent propylene glycol pressure drop table for Type M copper tubing.

3.3 Calculating the Tube Spacing:

Decreasing the tube spacing will allow the snow melting system to operate at lower fluid temperatures while meeting the heat output requirements. Use table 3.3 to the right to calculate the proper tube spacing.

Procedure:
1. Find the tube size in the first column.

2. Follow to the right and read the recommended tube spacing under the column representing the heat load.

Example:
Tube size: 5/8”
Snow melting load: 200 Btu/h*ft
Recommended tube spacing: 9”

		Recommended Tube Spacing in Concrete				
		Snow Melting Load (Btu/h*ft²)				
Tube Size	**Max. Circuit Length**	100	150	200	250	300
1/2"	150 ft	9"	9"	6"	6"	6"
5/8"	250 ft	9"	9"	9"	6"	6"
3/4"	400 ft	12"	12"	9"	9"	6"

Table 3.3

Notes:
- Space tubing 1 inch closer for each inch of concrete cover over 2 inches.
- Space tubing 2 inches closer for each additional inch of pavers > 2-3/8” pavers.
- Space tubing 1 inch closer for asphalt applications.

3.4 Calculating the Fluid Supply Temperature:

Use table 3.4 to calculate the fluid (antifreeze solution) supply temperature.

Procedure:
1. Find the snow melting load in the first column.

2. Follow to the right and read the recommended fluid supply temperature under the column representing the selected tube spacing.

Example:
Snow melting load: 200 Btu/h*ft
Tube spacing: 9 inches
Fluid supply temperature: 131°F

Note:
Fluid supply temperature of 130°F is typical for snow melting applications.

	Fluid Supply Temperature (°F)*		
Snow Melting Load (Btu/h*ft²)	Tube Spacing (inches)		
	6	9	12
100	100	100	103
150	100	106	128
200	108	131	153
250	133	156	
300	158		

Table 3.4

* Based on a 30 F° temperature drop

3.6 Water/ Glycol Mixture:

Selecting the percentage of Glycol Mixture:
Freeze protection is essential to the snow melting system. For typical applications, Viega recommends using 40% Propylene Glycol. Ethylene Glycol is accepted. Use the table to determine the freezing point of the water/ glycol mixture based on % glycol by volume.

Note:
Automotive antifreeze is not recommended; the silicates in automotive antifreeze can coat and foul heat transfer surfaces and plug the system, reducing energy efficiency.

	Freezing Point (°F)	
Glycol Mixture	**Ethylene Glycol**	**Propylene Glycol**
30%	3.7	8.4
40%	-12.6	-6.7
50%	-35.0	-30.0

Table 3.6A

Glycol effects on the system:
The material properties change according to the % glycol mixture. Use the table to adjust the flow rate and pressure drop calculated through the tubing (refer to 3.7 and 3.8 for values).

Glycol Effects on the System		
Glycol Mixture	**Flow Rate % Increase Multiplier**	**Pressure Drop % Increase Multiplier**
30%	5% (1.05)	20% (1.20)
40%	8.5% (1.085)	25% (1.25)
50%	12.5% (1.125)	31% (1.31)

Table 3.6B

Procedure:
1. Use the table to find the % increase multiplier (based on the % glycol mixture).

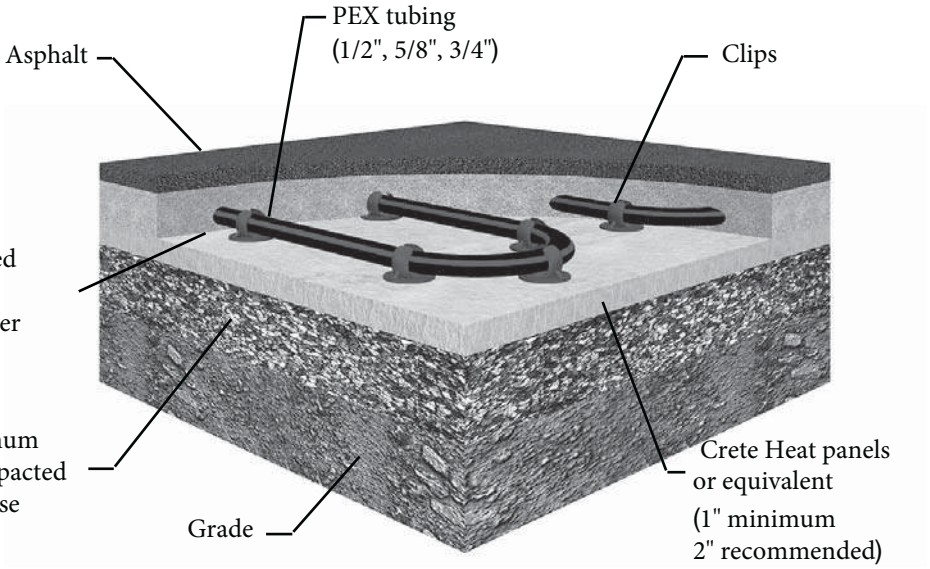
2. Multiply the flow rate and pressure drop figures by the multiplier.

Example:
Glycol mixture: 40%
Calculated flow rate: 7 gpm
Flow rate multiplier: 8.5% (1.085)
Adjusted flow rate calculation:
7 gpm x 1.085 = 7.6 gpm
Calculated pressure drop: 20 ft of hd
Pressure drop multiplier: 25% (1.25)
Adjusted pressure drop calculation:
20 ft of hd x 1.25 = 25 ft of hd

SNOW MELT INSTALLATION EXAMPLES

Section through Asphalt over compacted stone dust bed with insulation

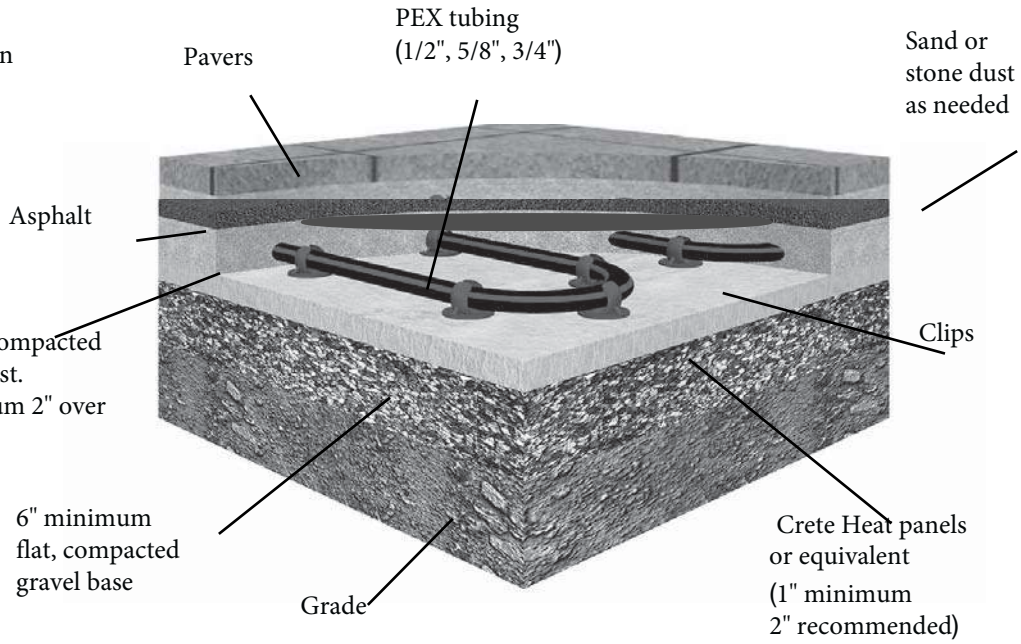
- Pressurize PEX tubing with water and bleed some off while asphalt is being applied.
- Make sure binder coat is put down by hand so no equipment drives on compacted stone dust base.
- Finish Coat can be applied by machine.



- Place Sensor where snow will last the longest to prevent premature shut down of system. Sensor should be placed equal distance between tubing.
- Gravel base must be flat and compacted to prevent movement of rigid insulation.
- Tube size and spacing determined by application. Review your design criteria with Capco before proceeding.

Section through Pavers over Asphalt

- Pressurize PEX tubing with water and bleed some off while asphalt is being applied.
- Make sure binder coat is put down by hand so no equipment drives on compacted stone dust base.
- Finish Coat can be applied by machine.
- Pavers require a fixed boarder on all sides so that the pavers cannot spread in any direction. This fixed boarder should be repeated on inclines.



- Place Sensor where snow will last the longest to prevent premature shut down of system. Sensor should be placed equal distance between tubing.
- Gravel base must be flat and compacted to prevent movement of rigid insulation.
- Tube size and spacing determined by application. Review your design criteria with Capco before proceeding.

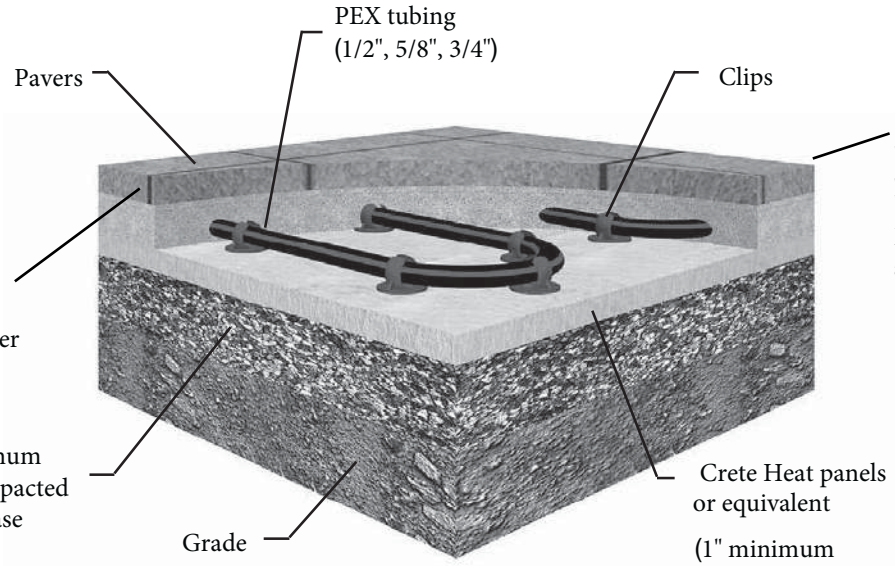
CAPCO ENERGY SUPPLY, INC.
Wholesale Distributors of Energy Equipment

SNOW MELT INSTALLATION EXAMPLES

Section through Pavers over concrete with insulation

- Add a sand "setting base" on top of concrete if needed.

- Pavers require a fixed boarder on all sides so that the pavers cannot spread in any direction. This fixed boarder should be repeated on inclines.



- Place Sensor where snow will last the longest to prevent premature shut down of system. Sensor should be placed equal distance between tubing.

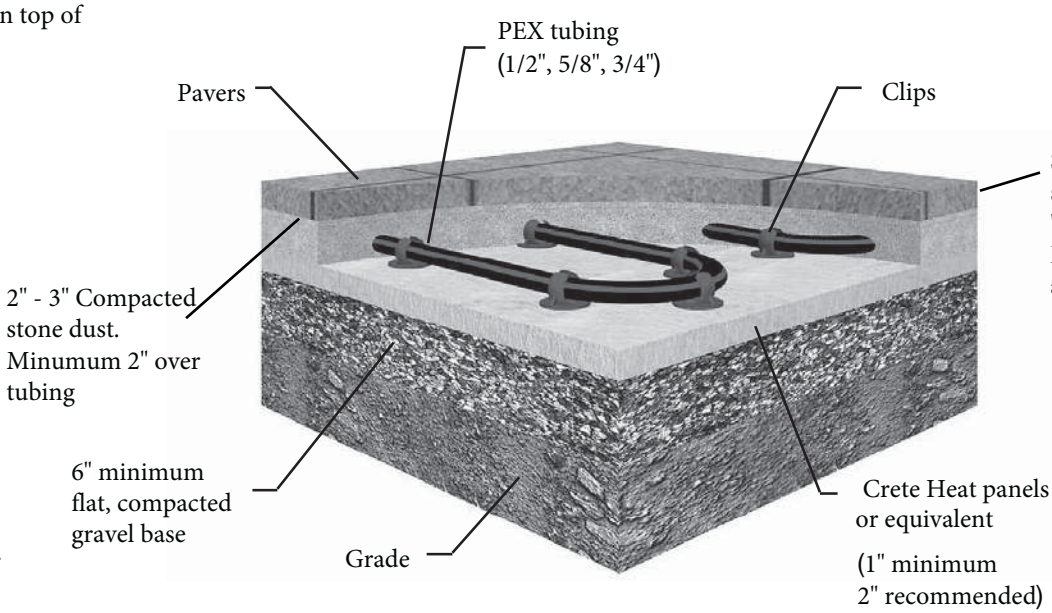
- Gravel base must be flat and compacted to prevent movement of rigid insulation.

- Tube size and spacing determined by application. Review your design criteria with Capco before proceeding.

Section through Pavers over compacted stone dust bed with insulation

- Add a sand "setting base" on top of compacted stone dust if needed.

- Pavers require a fixed boarder on all sides so that the pavers cannot spread in any direction. This fixed boarder should be repeated on inclines.



- Place Sensor where snow will last the longest to prevent premature shut down of system. Sensor should be placed equal distance between tubing.

- Gravel base must be flat and compacted to prevent movement of rigid insulation.

- Tube size and spacing determined by application. Review your design criteria with Capco before proceeding.

CAPCO ENERGY SUPPLY, INC.
Wholesale Distributors of Energy Equipment

Viessmann Electrodes

Boiler Model	Ignition electrode	Ionization electrode
WB1B(c) 26, WB1B(c) 35,	7828-718	
B1H/KA 26 (94) , 35(125)	7828-718	
WB1A 24, WB1A 30	7823-837	
WB2HB 26 (94) WB2HB 35 (125)	7826-516	7839-451
WB2HA/B 19	7826-515	7836-449
WB2HA 28, WB2HA 35	7826-516	7839-451
WB2HA/B45 (160), WB2HA60/B57(199), WB2HA80(285), WB2HA88(311), WB2HA100(352)	7829-798	7836-489
WB2HA 112 (399), WB2HA 150 (530)	7836-815	7835-169
WB2B 19, WB2B 26, WB2B 35	7826-516	7834-234
WB2B 45, WB2B 60, WB2B 80, WB2B 105	7829-798	7834-235
WB2A 6-24, WB2A 6-24c, WB2A 8-32	7819-627	7819-628
WB2A 11-44, WB2A 15-60,	7818-363	7818-364
WB2TA/B 19	7826-515	7836-449
WB2TA/B 35(125)	7826-516	7839-451
CU3A 26(94), CU3A 35(125) Old part # / New part #	7826-504 7834-312	7844-121 7834-233
CU3A 45(160), CU3A 57(199) Old part # / New part #	7826-504 7834-312	7844-123 7834-392
B1HE B1KE	7868-995	7868-997
B2HE	7868-890	7868-997

NEW Vitodens 100 B1KE

Vitodens 222-F

COMBI BOILERS (NG/LP) For venting information see page 10

Model	Vitodens 100-W, B1KE 120	Vitodens 100-W, B1KE 199	Vitodens 222-F, B2TB 125
Part Number	7722776	7722777	B2TB004
MBH Input	12-120	19.9-199	19-125
MBH Output	11-113	18.5-187	18-117
Turn Down	10:1	10:1	6.5:1
AFUE	95%	95%	95%
Connections	3/4″ GAS (MNPT) 3/4″ S/R (MNPT)	3/4″ GAS (MNPT) 1″ S/R (MNPT)	3/4″ GAS (MNPT) 3/4″ S/R (MNPT) 3/4″ DHW (MNPT)
Vent	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	60/100 mm COAX 2″ PPS
LLH	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT
Boiler Pump	Installed in boiler	Installed in boiler	Installed in boiler
Neutralizer	7740946	7740946	7740946
Min./Max. Gas Supply Pressure			
Natural Gas (″w.c.)	4-14	4-14	4-14
Liquid Propane Gas (″w.c.)	10-14	10-14	10-14
Dimensions: Weight (L, W, H)	110 lbs 19 3/4″, 17 3/4″, 33 3/4″	190 lbs 21 3/4″, 17 3/4″, 39″	248 lbs 23 1/2″, 23 5/8″, 64″
Max Draw Rate (GPM)	3.3 @ 77°F Δt	4.7 @ 77°F Δt	5.45 @ 77°F Δt **

MBH Input/Output based upon NG.
* DHW Booster
** Vitodens 222-F, B2TB 35,125 includes a 26.5 gallon stainless steel storage tank. Maximum 10 min. draw.

NEW Vitodens 100 B1HE

VITODENS 100 (NG/LP) For venting information see page 10

Model	B1HE 85	B1HE 120	B1HE 150	B1HE 199
Part Number	7722772	7722773	7722774	7722775
MBH Input	8.5-85	12-120	15.5-150	19.9-199
MBH Output	8-80	11-113	14-141	18.5-187
Turn Down	10:1	10:1	10:1	10:1
AFUE	95%	95%	95%	95%
Connections	3/4″ GAS (MNPT) 3/4″ S/R (MNPT)	3/4″ GAS (MNPT) 3/4″ S/R (MNPT)	3/4″ GAS (MNPT) 1″ S/R (MNPT)	3/4″ GAS (MNPT) 1″ S/R (MNPT)
Vent	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)
LLH	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT
Boiler Pump	Installed in boiler	Installed in boiler	Installed in boiler	Installed in boiler
Neutralizer	7740946	7740946	7740946	7740946
Min./Max. Gas Supply Pressure				
Natural Gas (″w.c.)	4-14	4-14	4-14	4-14
Liquid Propane Gas (″w.c.)	10-14	10-14	10-14	10-14
Dimensions: Weight (L, W, H)	108 lbs 19 3/4″, 17 3/4″, 33 3/4″	108 lbs 19 3/4″, 17 3/4″, 33 3/4″	179 lbs 21 3/4″, 17 3/4″, 39″	179 lbs 21 3/4″, 17 3/4″, 39″

MBH Input/Output based upon NG.

Vitocrossal 300 CU3A

VITOCROSSAL 300 CU3A (NG/LP) For venting information see page 10

Model	CU3A 94	CU3A 125	CU3A 160	CU3A 199
Part Number	CU3A350	CU3A351	CU3A352	CU3A353
MBH Input	19-94	25-125	43-160	43-199
MBH Output	17.7-87	23.3-116	40-149	40-185
Turn Down	5:1	5:1	3.7:1	5:1
AFUE	95%	95%	95%	95%
Connections	3/4" GAS (MNPT) 1 1/4" S/R (MNPT)	3/4" GAS (MNPT) 1 1/4" S/R (MNPT)	3/4" GAS (MNPT) 1 1/4" S/R (MNPT)	3/4" GAS (MNPT) 1 1/4" S/R (MNPT)
Vent	FLUE 3" PPS INTAKE 3" PPS/PVC	FLUE 3" PPS INTAKE 3" PPS/PVC	FLUE 4" PPS INTAKE 3" PPS/PVC	FLUE 4" PPS INTAKE 3" PPS/PVC
LLH	Not Needed	Not Needed	Not Needed	Not Needed
Boiler Pump	Not Needed	Not Needed	Not Needed	Not Needed
Neutralizer	7740946	7740946	7740946	7740946
Min./Max. Gas Supply Pressure				
Natural Gas ("w.c.)	4-14	4-14	4-14	4-14
Liquid Propane Gas ("w.c.)	10-14	10-14	10-14	10-14
Dimensions: Weight (L, W, H)	269 lbs 27", 26", 61 1/2"	275 lbs 27", 26", 61 1/2"	352 lbs 31 1/2", 26", 61 1/2"	352 lbs 31 1/2", 26", 61 1/2"

MBH Input/Output based upon NG.

Maximum Venting Length

COMBIS
(VITODENS 100 B1HE AND VITODENS 222-F)

VITODENS 100

Model		B1KE 120	B1KE 199	B2TB 125	B1HE 85	B1HE 120	B1HE 150	B1HE 199
Boiler Vent Connection Coaxial		80/125 mm	80/125 mm	60/100 mm	80/125 mm	80/125 mm	80/125 mm	80/125 mm
Boiler Vent Connection PPS		3″	3″	2″	3″	3″	3″	3″
Coaxial Vent	60/100mm	43′ *1	-	33'	43′ *1	43′ *1	-	-
	80/125mm	98′	33′	40'1	98′	98′	33′	33′
	100/150mm or 100/160mm	118′ *2	43′ *2	50' *2	118′ *2	118′ *2	43′ *2	43′ *2
PPS/CPVC Vent	2″	41′ *3	-	98'	41′ *3	98′ *3	-	-
	3″	164′	98′	164'	164′	164′	98′	98′
	4″	198 *4	148 *4	200'	198′ *4	198′ *4	148′ *4	148′ *4
Double Pipe Adapter Included		Not Included	Not Included	N/A†	Not Included	Not Included	Not Included	Not Included
CPVC Adapter		7134770 80 mm to 3″	7134770 80 mm to 3″	7134769 60 mm to 2″	7134770 80 mm to 3″	7134770 80 mm to 3″	7134770 80 mm to 3″	7134770 80 mm to 3″

*1 Requires 80/125 to 60/100 reducer bushing 7494888
*2 Requires 80/125 to 100/150 (7664163) or 110/160 (7424113) increaser.
*3 Requires 3″ to 2″ reducer 9697921
*4 Requires 3″ to 4″ increaser. Field Supplied.
† 2-pipe option included with boiler.

VITOCROSSAL CU3A

Model (kW, MBH)		CU3A 26, 94	CU3A 35, 125	CU3A 45, 160	CU3A 57, 199
Boiler Vent Connection Coaxial		80 mm/125 mm4	80 mm/125 mm4	110 mm/160 mm5	110 mm/160 mm5
Boiler Vent Connection PPS		3″	3″	4″6	4″6
Coaxial Vent	60/100	–	–	–	–
	80/125	98'	98'	–	–
	100/150	110'3	110'3	98'	98'
PPS/CPVC Vent	2″	–	–	–	–
	3″	198'	198'	–	–
	4″	–	–	198'	198'
Double Pipe Adapter Included		N/A**	N/A**	N/A**	N/A**
CPVC Adapter		7134770 80 mm to 3″	7134770 80 mm to 3″	7134771 110 mm to 4″	7134771 110 mm to 4″

** Boiler is preset for 2-pipe venting. Coaxial adapters are available.

1 - REQUIRED 60/100 TO 80/125 ADAPTER 7664161
2 - REQUIRED 60/100 TO 110/160 ADAPTER 7664162
3 - REQUIRED 80/125 TO 110/160 ADAPTER 7664163
4 - TO VENT COAX ON CU3A 26 AND 35 ORDER COAXIAL ADAPTER 7664165
5 - TO VENT COAX ON CU3A 45 AND 57 ORDER COAXIAL ADAPTER 7664166
6 - INTAKE IS SETUP FOR 3″ PPS ALSO INCLUDES ADAPTER FOR PVC/CPVC

VITODENS 200 (NG/LP) Residential For venting information see page 11

All Vitodens 200 B2HA models are available in a Low NOx version.[1]

Model	B2HE 85	B2HE 120	B2HE 150	B2HE 199	B2HA 285[2]
Part Number	7722778	7722779	7722780	7722781	B2HAH12 (Low NOx: B2HAN29)
MBH Input	8.5-85	8.5-120	14-150	14-199	71-285
MBH Output	8-80	8-113	13-141	13-187	65-260
Turn Down	10:1	14:1	10:1	14:1	4:1
AFUE	95%	95%	95%	95%	92%
Connections	3/4″ GAS (MNPT) 3/4″ S/R (MNPT)	3/4″ GAS (MNPT) 3/4″ S/R (MNPT)	3/4″ GAS (MNPT) 1″ S/R (MNPT)	3/4″ GAS (MNPT) 1″ S/R (MNPT)	1″ GAS (MNPT) 1 1/2″ S/R (MNPT)
Vent	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	3 / 5 (in) 80 / 125 (mm)	4 / 6 (in) 110 / 150 (mm)
LLH	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498529 1 1/4″ MNPT	7498530 2″ MNPT
Boiler Pump	Installed in boiler	Installed in boiler	Installed in boiler	Installed in boiler	7248585 UPS 26-99 FC
Neutralizer	7740946	7740946	7740946	7740946	7740946
Min./Max. Gas Supply Pressure					
Natural Gas (″w.c.)	4-14	4-14	4-14	4-14	4-14
Liquid Propane Gas (″w.c.)	10-14	10-14	10-14	10-14	10-14
Dimensions: Weight (L, W, H)	108 lbs 19 3/4″, 17 3/4″, 33 3/4″	108 lbs 19 3/4″, 17 3/4″, 33 3/4″	179 lbs 21 3/4″, 17 3/4″, 39″	179 lbs 21 3/4″, 17 3/4″, 39″	194 lbs 21″, 19″, 43 1/2″

MBH Input/Output based upon NG.

[1] All NEW Vitodens 200-W B2HE boilers are Low NOx, no separate version is required. All B2HA models are available in a separate Low NOx version (see table below).

[2] B2HA 285 (see product image on page 4): Double pipe adapter included with boiler in separate box (PN: 7373253)

NEW Vitodens 200 (B2HE)

VITODENS 200 (NG/LP) Commercial For venting information see page 10

Model	B2HA 311	B2HA 352	B2HA 399	B2HA 530
Part Number	B2HAH13	B2HAH14	B2HAA94	B2HAA95
Low NOx Part Number	B2HAN30	B2HAN31	B2HAN32	B2HAN33
MBH Input	71-311	71-352	113-399	113-530
MBH Output	67-294	67-333	103-375	103-495
Turn Down	4:1	5:1	3.5:1	4.7:1
Thermal Efficiency[1]	94%	93.5%	93%	92.5%
Connections	1″ GAS (MNPT) 1 1/2″ S/R (MNPT)	1″ GAS (MNPT) 1 1/2″ S/R (MNPT)	1″ GAS (MNPT) 2″ S/R (MNPT)	1″ GAS (MNPT) 2″ S/R (MNPT)
Vent	4 / 6 (in) 110 / 150 (mm)	4 / 6 (in) 110 / 150 (mm)	4 / 6 (in) 110 / 150 (mm)	4 / 6 (in) 110 / 150 (mm)
LLH	7498530 2″ MNPT	7498530 2″ MNPT	7498530 2″ MNPT	7498530 2″ MNPT
Boiler Pump	7248585 UPS 26-99 FC	7248585 UPS 26-99 FC	7441596 UPS 26-150 FC	7441596 UPS 26-150 FC
Neutralizer	7740947	7740947	7740947	7740947
Min./Max. Min. Gas Supply Pressure				
Natural Gas (″w.c.)	4-14	4-14	4-14	4-14
Liquid Propane Gas (″w.c.)	10-14	10-14	10-14	10-14
Dimensions: Weight (L, W, H)	194 lbs 21″, 19″, 43 1/2″	194 lbs 21″, 19″, 43 1/2″	298 lbs 27″, 23 5/8″, 44 1/2″	298 lbs 27″, 23 5/8″, 44 1/2″

MBH Input/Output based upon NG.

Vitodens 200 (B2HA)

viessmann-us.com

Maximum Venting Length

VITODENS 200 (Residential)

Model		B2HE 85	B2HE 120	B2HE 150	B2HE 199	B2HA 285
Boiler Vent Connection Coaxial		80/125 mm	80/125 mm	80/125 mm	80/125 mm	110/150mm
Boiler Vent Connection PPS		3″	3″	3″	3″	4″
Coaxial Vent	60/100	43′ *1	43′ *1	-	-	-
	80/125	98′	98′	33′	33′	-
	100/150 or 100/160	118′ *2	118′ *2	43′ *2	43′ *2	43′
PPS/CPVC Vent	2″	98′ *3	98′ *3	-	-	-
	3″	164′	164′	98′	98′	-
	4″	198′ *4	198′ *4	148′ *4	148′ *4	131′
Double Pipe Adapter Included		Not Included	Not Included	Not Included	Not Included	YES 7373253
CPVC Adapter		7134770 80 mm to 3″	7134770 80 mm to 3″	7134770 80 mm to 3″	7134770 80 mm to 3″	7134771 110mm to 4″

*1 Requires 80/125 to 60/100 reducer 7494888
*2 Requires 80/125 to 100/150 (7664163) or 110/160 (7424113) increaser.
*3 Requires 3″ to 2″ reducer 9697921
*4 Requires 3″ to 4″ increaser. Field Supplied.
† 2-pipe option included with boiler.

VITODENS 200 (Commercial)

Model (kW, MBH)		B2HA 311	B2HA 352	B2HA 399	B2HA 530
Boiler Vent Connection Coaxial		110MM/150 mm	110MM/150 mm	110MM/150 mm	110MM/150 mm
Boiler Vent Connection PPS		4″	4″	4″	4″
Coaxial Vent	60/100	–	–	–	–
	80/125	–	–	–	–
	100/150	50'	50'	26'	16'
PPS/CPVC Vent	2″	–	–	–	–
	3″	–	–	–	–
	4″	131'	131'	131'	131'*
Double Pipe Adapter Included		YES 7373253	YES 7373253	YES 7373253	YES 7373253
CPVC Adapter		7134771 110 mm to 4″	7134771 110 mm to 4″	7134771 110 mm to 4″	7134771 110 mm to 4″

** 5 in. venting needed to get 530 MBH at 131 ft.

*A 10% BOILER INPUT REDUCTION @ 99 FT. FOR ALL SIZES AND ALL CONFIGURATIONS

*1ST ELBOW IS EXCLUDED FROM IN EQUIVALENT VENT CALCULATIONS

*ALWAYS INCLUDE VENT TERMINATION LENGTH IN CALCULATIONS

VITOROND 100 (Oil)

Single Boiler; BOILER AND INSULATION ONLY
PLEASE NOTE THERE ARE NO BURNERS INCLUDED IN THE PART NUMBERS LISTED BELOW

Vitorond 100

Boiler Options	VR1-22, 91	VR1-27, 105	VR1-33, 140	VR1-40, 161	VR1-50, 196	VR1-63, 245
Part Number	7249048	7249049	7249050	VR10325	VR10326	VR10327

Control Options- Choose 1 Option

Control Option	VR1-22, 91	VR1-27, 105	VR1-33, 140	VR1-40, 161	VR1-50,196	VR1-63, 245
HydroLevel	Z015259	Z015259	Z015259	Z015260	Z015260	Z015260
Vitotronic, 100 KW10B	Z015255	Z015255	Z015255	Z015256	Z015256	Z015256
Vitotronic, 200 KW2	Z015257	Z015257	Z015257	Z015258	Z015258	Z015258

Please note that the packages include installation fittings, control and technical literature. The boiler jacket is installed for the VR1-22, VR1-27, and VR1-33 and is shipped separately for the VR1-40, VR1-50, and VR1-63.
For KW2, the Power Pump Module will also be included.

Burner Options- Choose 1 Option

Burner Option	VR1-22, 91	VR1-27, 105	VR1-33, 140	VR1-40, 161	VR1-50, 196	VR1-63, 245
Riello Chimney Vent	7311 316	7311 316	7311 317	7311 317	7311 317	7311 318
Beckett Chimney Vent	7452 064	7452 065	7452 066	7452 067	7452 068	7452 068
Carlin Chimney Vent	7749 024	7749 025	7749 026	7749 027	7749 028	7749 029
Riello Direct Vent	ZK02854	ZK02854	ZK02855	N/A	N/A	N/A
Beckett Direct Vent	ZK02856	ZK02857	ZK02858	N/A	N/A	N/A
Carlin Direct Vent	ZK03208	ZK03209	ZK03210	N/A	N/A	N/A

Please note that the direct vent burners include the burner, the direct vent system, and the fresh air kit (for Beckett only).

Specifications

	VR1-22, 91	VR1-27, 105	VR1-33, 140	VR1-40, 161	VR1-50, 196	VR1-63, 245
MBH Input	91	105	140	161	196	245
MBH Output	80	92	122	140	172	215
A.F.U.E.	87%	87%	87%	87%	87.1%	87.1%
Dimensions Weight (L, W, H)	363 lbs 38 1/2″ 19 3/4″ 33″	445 lbs 44″ 19 3/4″ 33″	447 lbs 44″ 19 3/4″ 33″	492 lbs 36″ 22 1/4″ 39 3/4″	608 lbs 37 1/2″ 22 1/4 39 3/4″	725 lbs 42 1/2″ 22 1/4 39 3/4″
Boiler Water Content (USG)	9.2	11.6	11.6	12.7	16.1	19.3
S/R Connection	1 1/2″	1 1/2″	1 1/2″	2″	2″	2″
Boiler Vent Connection	5″	5″	5″	6″	6″	6″

MBH Input/Output based upon NG.

Boiler Accessories

Boiler Stand	VR1-22, 91	VR1-27, 105	VR1-33, 140	VR1-40, 161	VR1-50, 196	VR1-63, 245
for Vitorond 100 9 3/4″ height	7133073	7133074	7133074	7133075	7133076	7133076

VITOCELL 300-V (Indirect Water Heater)

Actual product appearance may vary

NEW Vitocell 300-V

	42 Gal.	53 Gal.	79 Gal.	119 Gal.
Model	**EVIB 42**	**EVIB 53**	**EVIB 79**	**EVIB 119**
Series	300-W	300-V		
Part Number	7720348	7720343	7720338	ZK04122
Connections	1″ MNPT HTG S/R 3/4″ MNPT Domestic H/C 3/4″ MNPT Recirc.	1″ MNPT HTG S/R 3/4" MNPT Domestic H/C 3/4″ MNPT Recirc.	1″ MNPT HTG S/R 1" MNPT Domestic H/C 1″ MNPT Recirc.	1″MNPT HTG S/R 1 1/4" MNPT Domestic H/C 1″ MNPT Recirc.
Dimensions: Weight (L, W, H)[1]	126 lbs 25″, 26″, 47″	143 lbs 25″, 26″, 55 1/2″	231 lbs 26 1/4″, 28″, 68 1/2″	187 lbs 32 3/4″, 35 1/2″, 77″
Insulation	PUR Foam	PUR Foam	PUR Foam	Soft PET
Continuous Draw Rating (GPH)	189	190	269	301

All Viessmann 300 Series Indirect Tanks come with a lifetime warranty for residential applications and an 8 year warranty for commercial applications.
[1] Adjustable feet can be adjusted up to 2 in. (50mm).

VITOCELL 300-B (Dual Coil Indirect Water Heater)

Actual product appearance may vary

Vitocell 300-B

	79 Gal.	119 Gal.
Model	**EVBB 79**	**EVBB 119**
Part Number	7720336	ZK04123
Connections	1″ MNPT HTG S/R 1″ MNPT Domestic H/C 1″ MNPT Recirc.	1″ MNPT HTG S/R 1 1/4″ MNPT Domestic H/C 1″ MNPT Recirc.
Dimensions: Weight (L, W, H)	249 lbs 26 1/4″, 28″, 68 1/2″	220 lbs 32 3/4″, 35 1/2″, 77″
Insulation	PUR Foam	Soft PET
Continuous Draw Rating (GPH)	393-429[1]	461-516[1]

Dual Coil DHW Tank
[1] Coils in Series - Coils in Parallel. See the Technical Data Manual at viessmann-us.com.

VITOCELL 300-H (Indirect Water Heater)

Vitocell 300-H

	53 Gal.	92 Gal.	119 Gal.
Model	**EHA 53**	**EHA 92**	**EHA 119**
Part Number	Z014848	Z014849[1]	Z014850[2]
Connections	1″ MNPT HTG S/R 3/4″ MNPT Domestic H/C 1″ MNPT Temp. and pressure relief valve	1 1/4″ MNPT HTG S/R 1 1/4″ MNPT Domestic H/C 1″ MNPT Temp. and pressure relief valve	1″ MNPT HTG S/R 1 1/4″ MNPT Domestic H/C 1 1/4″ MNPT Temp. and pressure relief valve
Dimensions: Weight (L, W, H)	185 lbs 48 3/4″, 25 1/4″, 25 3/4″	379 lbs 62 1/2″, 32 3/4″, 31″	421 lbs 65″, 35 3/4″, 35″
Insulation	PUR Foam	PUR Foam	PUR Foam
Heat Exchanger Surface Area (ft²)	9.7	18.3	22.6

Note: EHA 53 cannot be stacked. A max of 2 EHA- 92 tanks may be stacked or a max of 3 EHA-119 tanks.
[1] W/ anode rod: Z015178
[2] W/ anode rod: Z015179

Bell & Gossett
a xylem brand

ecocirc XL

QUICK STARTUP GUIDE

WARNING
This guide does not replace the instruction and operating manual
Read the manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property and may void the warranty.

Startup checklist

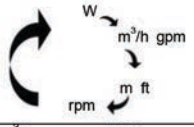
	Operation	Pump Display
1	Mount the pump in the system according to the flow direction indicated on pump housing and with motor housing in one of the allowed orientations shown in figure 1. Make sure the pump is aligned with the system piping.	-
2	Connect the pump to power supply. See figure 3 Make sure that the nameplate electrical ratings match the power supply.	-
3	Connect all the needed auxiliary input/output signal wires to the pump. See figure 3. Power and control wiring must be run in separate channels.	-
4	Fill the system and vent the air	-
5	Open all valves in the system to facilitate proper air venting	-
6	Power the pump and wait (refer to the advanced functions manual in case of errors and alarm codes on display)	The display and all the LEDs switch-on for 1 second and then a sequence of submenus for advanced functions will be shown.
7	Wait: (refer to the advanced functions manual in case of error and alarm code on display)	The display shows: 5DEG 4DEG 3DEG 2DEG 1DEG
8	Wait: (refer to the instruction manual and/or the advanced functions manual in case of error code on display or for excessive noise and any abnormality within the system) In case of residual air inside the system creating noise or high vibration: 1. vent the system again 2. recall the automatic air venting procedure by pressing the up and down arrows on settings button ❺ for 2 seconds (see fig. 2)	At the end of the air venting procedure, the pump starts to run with default settings
9	Set the control mode of the pump, by short pressing button ❶ (see figure 2).	On control panel, the chosen mode LED will switch-on:  **Constant pressure mode**  **Proportional pressure mode**  **Constant speed mode**  **Night setback mode**
10	Short press the button ❺ (see figure 2) to display the actual setpoint	On display the actual setpoint starts to blink
11	Change values as desired with button ❺ (see fig. 2)	On display the setpoint changes
12	Change values as desired with button ❺ (see fig. 2)	The setpoint stops blinking on display and the previous parameter will be displayed
13	To change the displayed unit of measurement, press the button ❸ (see fig.2)	
14	To change the unit of measurement of head or flow, press the button ❸ for more than 1sec. (see fig. 2)	• Flow: $m^3/h \leftrightarrow$ gpm (US) . Head: $m \leftrightarrow$ ft
15	The user interface can be locked/unlocked by simultaneously pressing and holding the setting button ❺ and the parameter button ❸ for two seconds. The user interface will be automatically locked after ten minutes of pressing the last button.	By pressing any button when the user interface is locked, the display shows Unlocking the user interface the display shows:

Fig. 1 – Allowed pump installation positions

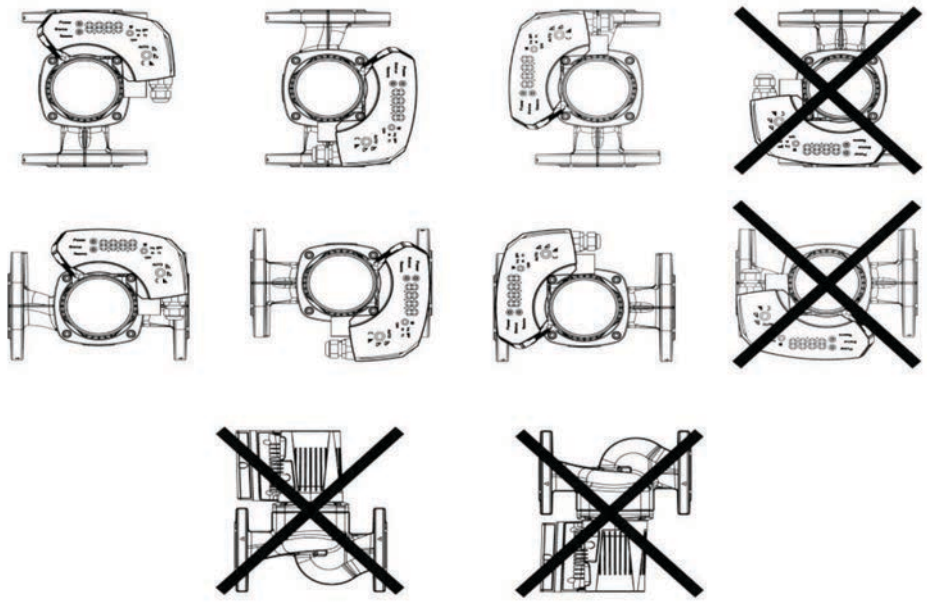


Fig. 2 – User interface description

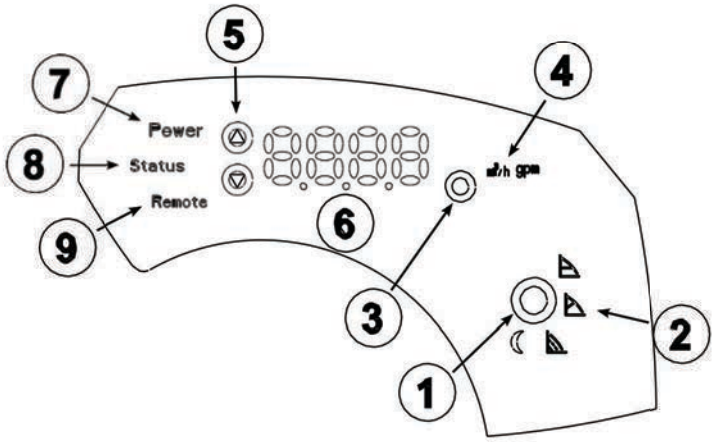
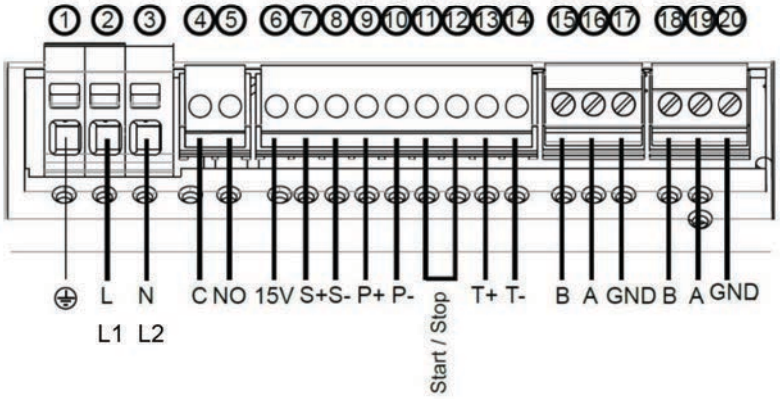


Fig. 3 – Terminal block description

Terminal No.	Description
1-2-3	Power Supply
4-5	Fault Signal dry contact (max 250VAC – 2A)
6	Auxiliary DC supply +15V (max 40 mA)
7-8	Analog input 0-10V DC
9-10	External pressure sensor input 4-20mA
11-12	Start/Stop input
13-14	External temperature probe input
15-16-17	Primary RS-485 channel
18-19-20	Secondary RS-485 channel

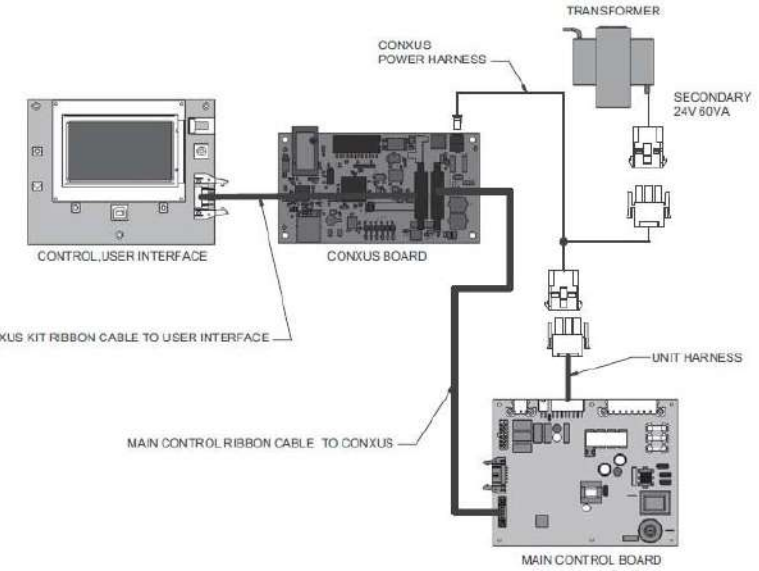


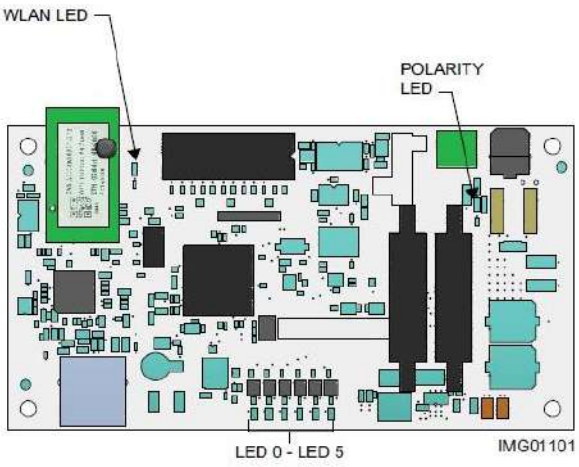
Basic Setup Guide

Installation

1) Remove user interface panel
2) Disconnect bracket from panel
3) Insert CON·X·US board to bracket, use retrofit board if manufactured prior to May 4, 2015 (serial number beginning “1915”)
4) Connect CON·X·US Kit Ribbon Cable to User Interface, connect Main Control Ribbon Cable to CON·X·US, connect CON·X·US Power Harness to 24V transformer and Unit Harness

Note: Before reassembling, complete the connection, and log in step.





Wi-Fi Connection

Note: Wi-Fi connection steps are not required if connected via wired internet connection (LAN)

1) Using a phone or tablet, open the list of Wi-Fi networks.
2) Select the network named “ConXus”
3) Within 10 seconds, you should be prompted to select the Wi-Fi network you would like the CON·X·US to pair to. If you are not asked to select a network, open Internet Explorer or Safari and enter 192.168.0.1 into the address bar. Now select the network you would like the CON·X·US to pair to.
4) LED #2 should now be lit—this confirms the Wi-Fi pairing was successful

Log in to CONXUS app

1) Download the CONXUS app
2) Select “Create Account”
3) Confirm account via confirmation email – From Ayla Networks
4) Log in
5) Select “Register New Device”
6) Enter required information--if difficulty is found with the scan items, they may also be manually entered. When manually entering the DNS from the CON·X·US board, input the code after “DNS”.

Your installation is now complete!

FIA INC.
FLUID INDUSTRIAL ASSOCIATES, INC.
PHONE: (781) 938-8900 · FAX: (781) 933-3965

SHUT OFF BOILER
Press Right Select Key
Confirm Shutdown "Yes" - Press Left Select Key

ACCESS INSTALLER MODE
Hold Left Select Key until Password shows
Enter Installer Access Code (5309) using the Scroll Dial, pressing the Scroll to move to the next number

INSTALLER MODE
Press Scroll Knob = SELECT
Turn Scroll Knob = ADJUST SETTING
EXIT = BACK
HOME = EXIT INSTALLER MODE (Do not select HOME until programming is complete)

Menu		Description	High Temp (Baseboard/Radiators)	Hydroair	See Page
GENERAL	A	Date and Time	Today's Date	Today's Date	19
TEMPERATURE SETTINGS	B	SH1 Set Point	180ºF	170ºF	20
		Minimum SH Set Point	100ºF	150ºF	20
		Maximum SH Set Point	185ºF	185ºF	20
		SH1 Offset Set Point	10ºF	10ºF	20
		SH1 Differential Set Point	20ºF	20ºF	20
DHW SETTINGS	E	DHW Boiler Set Point	175ºF	Same	21
		DHW Tank Set Point	125ºF - 140ºF (Mixing Valve)		21
		Tank Set Point Differential	6ºF		21
		Boiler Set Point Offset	10ºF		21
		Boiler Set Point Differential	20ºF		21
		SH/DHW Switching Time	30 Min		21
		DHW/SH Switching Time	30 Min		21
		Tank Minimum Set Point	115ºF		21
		Tank Maximum Set Point	125ºF - 140ºF		21
		DHW Type (Normal, Zone)	Normal = Boiler Loop Zone = System Loop		21
OUTDOOR RESET	F	Low Outdoor Temperature	0ºF	10ºF	22
		High Outdoor Temperature	70ºF	70ºF	22
		SH1 Set Point at Low Outdoor Temp	180ºF	170ºF	22
		SH1 Set Point at High Outdoor Temp	115ºF	150ºF	22
		Outdoor Air Shutdown SH1	70ºF	70ºF	22
		Outdoor Air Shutdown Differential SH1	0ºF	0ºF	23
		Shift Reset Curve SH1	0ºF	0ºF	23

OUTDOOR RESET	F	SH2 Set Point at Low Outdoor Temp	Used only if using multiple heat demands	Used only if using multiple heat demands	22
		SH2 Set Point at High Outdoor Temp			22
		Outdoor Air Shutdown SH2			22
		Outdoor Air Shutdown Differential SH2			23
		Shift Reset Curve SH2			23
		SH3 Set Point at Low Outdoor Temp			22
		SH3 Set Point at High Outdoor Temp			22
		Outdoor Air Shutdown SH3			22
		Outdoor Air Shutdown Differential SH3			23
		Shift Reset Curve SH3			23
		Boost Temperature	0ºF	0ºF	23
		Boost Time	0:00	0:00	23
ANTI-CYCLING	G	Anti-Cycling Time	1:00	1:00	23
		Anti-Cycling Override Differential	10ºF	10ºF	23
		Ramp Delay (Enable, Disable)	Enable	Enable	23
		SH Ramp Delay	Leave	Leave	24
CIRC PUMPS	I	DHW Blocks Sys Pump	Yes for Priority	No for no Priority	26
		DHW Forces Sys Pump	Yes for DHW off System Circ	No if DHW has own Circ	26
SERVICE NOTIFICATION	K	Service Notification Months	12	12	27
		Service Notification Running Time	10,000	10,000	27
		Service Notification Cycles	10,000	10,000	27
		Reset Maintenance Reminder	Press Left Select Key (Yes)	Press Left Select Key (Yes)	27
		Installer Name and Phone Number	Contractor Contact Info. (Optional	Contractor Contact Info. (Optional	27

THIS SET-UP GUIDE IS FOR BASIC PROGRAMING ONLY

CONTACT CUSTOMER SERVICE @ FIA FOR SUPPORT (781) 938-8900

Lochinvar
HIGH EFFICIENCY BOILERS & WATER HEATERS

SMART CONTROL™

SETUP WIZARD The Setup Wizard is automatically accessed the first time the unit is powered up from the factory and will allow setting of certain parameters without the need to enter the installer password. Once the Setup Wizard is completed or canceled, it can only be accessed again by going through the Installer Menu.

INSTALLER Press the ► button until the password menu appears. Use the ▲ and ▼ buttons to change the value of the first digit to 5, and then press ► to move to the next digit. Repeat this process to fill in the remaining digits and enter the password 5309. Once the final digit has been entered, press the ► button .

BUTTON FUNCTIONS

▲/▼ - Change value of current parameter.
► - Move to the next parameter.
◄ - Save changes and exit the menu.

MENU	DESCRIPTION	RECOMMENDED
SETUP WIZARD	TIME/DATE	-
	SPACE HEAT SETPT (COLDEST DAY)	170°
	MAX SH SETPT	185°
	OUTDOOR TEMP COLDEST DAY	10°
	OUTDOOR TEMP - WARM WEATHER SHUTDOWN	75°
	AUTO RESET HI LIMIT	200°
	MAN. RESET HI LIMIT	210°
	DHW SETPT (MIXING VALVE REQUIRED)	*140°
	SPACE HEAT RATE LIMITING	BOILER % REQUIRED
	COMBI PRE-HEAT (MAINTAINS 130°)	ENABLED

	MENU	DESCRIPTION	RECOMMENDED
INSTALLER ACCESS	GENERAL	MAX SH SETPT	185°
		MAX DHW SETPT	150°
		AUTO RESET HI LIMIT	200°
		MAN. RESET HI LIMIT	210°
		SH MAX RATE LIMITING	SH BOILER % REQUIRED
	OUTDOOR RESET	SH SETPT (COLDEST DAY)	170°
		MAX SH SETPT	185°
		OUTDOOR TEMP COLDEST	10°
		WARM WEATHER SHUTDOWN	75°
		SHIFT RESET	0
		OUTDOOR TEMP - WARM	75°
		SH SETPT (WARM DAY)	BASEBOARD=100°, HYDROAIR=135°
	TIME/DATE	-	-
	FAULT LOG	-	-
	SETPOINTS	SH SETPT (COLDEST DAY)	170°
		DHW SETPT (MIXING VALVE REQUIRED)	*140°
		TEMPERATURE UNITS	°F
	CASCADE	CASCADE ADDRESS	LEADER ADDRESS = 0
		CASCADE TYPE	Appears when address is 0
		BOILER SIZE SETTINGS	Appears when address is 0
	ADVANCED COMBI	DHW RESPONSE TIME	2:00 MINUTES
		PRE-HEAT (MAINTAINS 130°)	ENABLED

KNIGHT & KNIGHT XL *START-UP* CHECKLIST

Job Name: _____ Model Number: _____

Address: _____ Serial Number: _____

City: _____ ST: _____ Zip: _____ Start-up Date: _____

OVERVIEW

Retrofit ○ New Project ○

How many units are installed at this location?

Boiler(s): _____

Water Heater(s): _____

Inspect gas pipe, regulator and meter sizing.

Is it sized correctly for the Btu/Hr requirement? ○ Y ○ N

GAS SUPPLY

Gas Pipe Dia. *(in.)*: _____

Is there an inlet gas lockup regulator on the supply? ○ Y ○ N

If Yes, is it ten feet upstream from the appliance? ○ Y ○ N

Record in. of water column -

Static Pressure: _____

Dynamic Pressure: _____

WATER & ELECTRICAL

Water Pipe Dia. *(in.)*: _____

At full fire, read and record -

Inlet Temp: _____

Outlet Temp: _____

Delta T: _____

Supply VAC: _____

Ttl Amp draw: _____

COMBUSTION

Low Fire:

O_2 _____

CO ppm _____

CO_2 _____

High Fire:

O_2 _____

CO ppm _____

CO_2 _____

Comments/Corrections needed for gas supply, water or electricity:

_____

_____

_____

WARNING ! ***This Startup Sheet is for use only by a qualified heating installer/service technician. Refer to the Installation and Operation Manual for your reference. Have this unit serviced/inspected by a qualified service technician, at least annually. Failure to comply with the above could result in severe personal injury, death, or substantial property damage.***

VENTING *(Select the venting option being used)*:

- ○ Vertical Direct Vent - *two pipe vertical termination*
- ○ Horizontal Direct Vent – *two pipe sidewall termination*
- ○ Concentric Vent Vertical – *single pipe vertical termination*
- ○ Concentric Vent Horizontal – *single pipe sidewall termination*
- ○ Vertical Vent w/ Sidewall Air – *single pipe vertical termination w/ single pipe combustion air supply*
- ○ Vertical Vent w/ Room Air – *single pipe vertical termination*
- ○ Horizontal Vent w/ Room Air – *single pipe sidewall termination*

Air Inlet Dia. *(in.):*	Air Inlet Material:	Total Eqv. Length *(ft.):*

Flue Dia. *(in.):*	Flue Material:	Total Eqv. Length *(ft.):*

Comments/Corrections needed for air inlet or vent piping:

_____

_____

CLEARANCES *Measure and record (inches) the service clearances from the nearest obstruction (min. 24" required for service):*

Front: _____ L Side: _____ Top: _____

Rear: _____ R Side: _____

Comments/Corrections needed for service clearances:

_____

_____

General Job Notes: _____

_____

START-UP PERFORMED BY:

Company: _____

Name: _____

Phone: _____

START-UP APPROVED BY:

Company: _____

Name: _____

Phone: _____

Send completed form to:

Email: 2tech@Lochinvar.com

Fax: (615) 882-2963

Mail: Service Dept/Lochinvar
300 Maddox Simpson Pkwy.
Lebanon, TN 37090

Lochinvar®
High Efficiency Water Heaters and Boilers

— The information on this form verifies operation of the Lochinvar product only. —

This does not imply other system components or overall system operation is certified. Component and system verification should be performed by the designated commissioning agent or installing contractor.

Internal Use:

S/O #: _____

Routed: _____

Tech: _____

App: ☐ Denied: ☐

Save Then Submit Form

KB-STARTUP REV A

COMBUSTION ANALYSIS PROCEDURE

Model: _____ Contractor: _____

Serial:_____ Location: _____

Take 2 gas pressure readings Static (boiler off) Dynamic (boiler running)

Static _____ Natural (4-14”) LP (8-14”)

Dynamic _____ drop no larger than 1-2” at ignition

Run boiler to high fire and record the CO2 and CO

CO2 _____ 8-10% natural 9-11% LP

CO _____ lower the better never more than 150PPM

Run boiler to low fire and record the CO2 and CO

CO2 _____ 8-10% natural 9-11% LP

CO _____ lower the better never more than 150PPM

Adjust the high fire combustion to your desired CO2, then adjust your low fire combustion to a CO2 that is close to but lower than high fire.

Example:

High fire CO2 9.3%

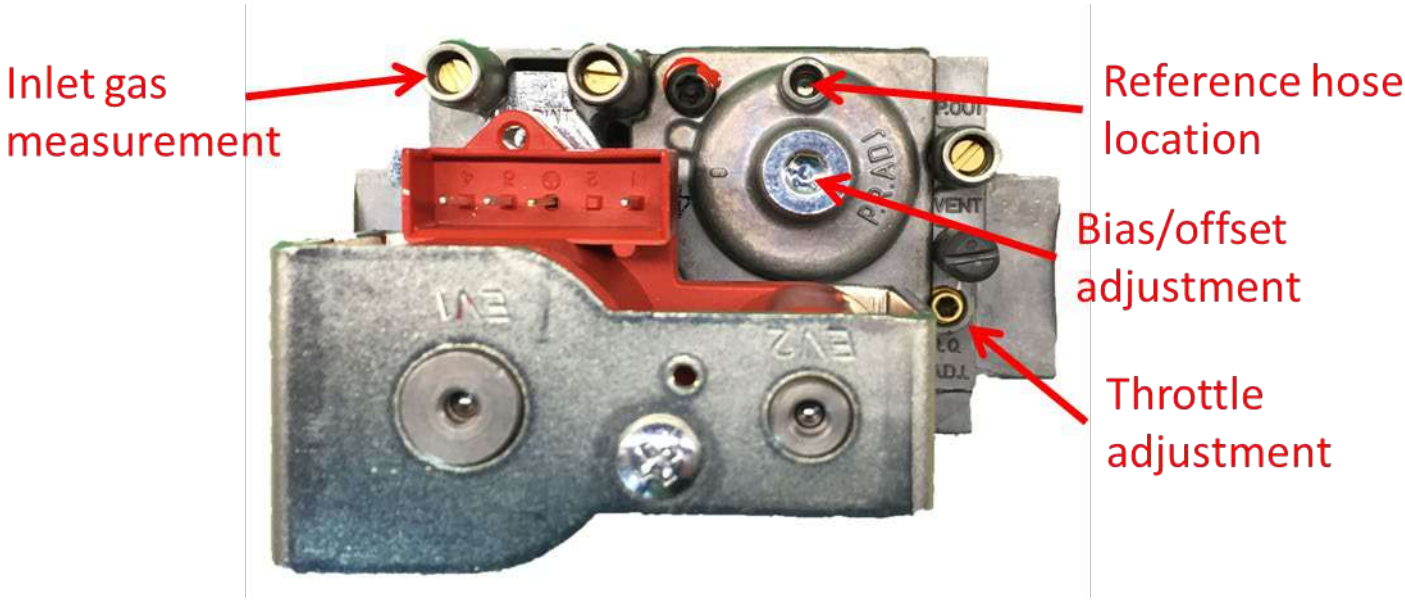
Low Fire CO2 9.1%

Once completed cycle the boiler up and down and few times and recheck your combustion at high and low and watch how it changes during ramping watch your analyzer to be sure the combustion never drops out of range.

FIA FLUID HANDLING PRODUCTS INC.

KH/WH/NK 10:1 procedure

Sweet spot for these is low to mid 9's on natural and mid 10's on LP, if they can't get there that's okay as long as operation is smooth and light off is quiet. In these the light off should be very quiet, listen for shuddering or a stutter if so you may need to richen the boiler up, Ideally the high and low fire will be near each other with the low fire slightly below.



Adjustment

High Fire use 2.5mm allen wrench to turn throttle counterclockwise to increase and clockwise to decrease.

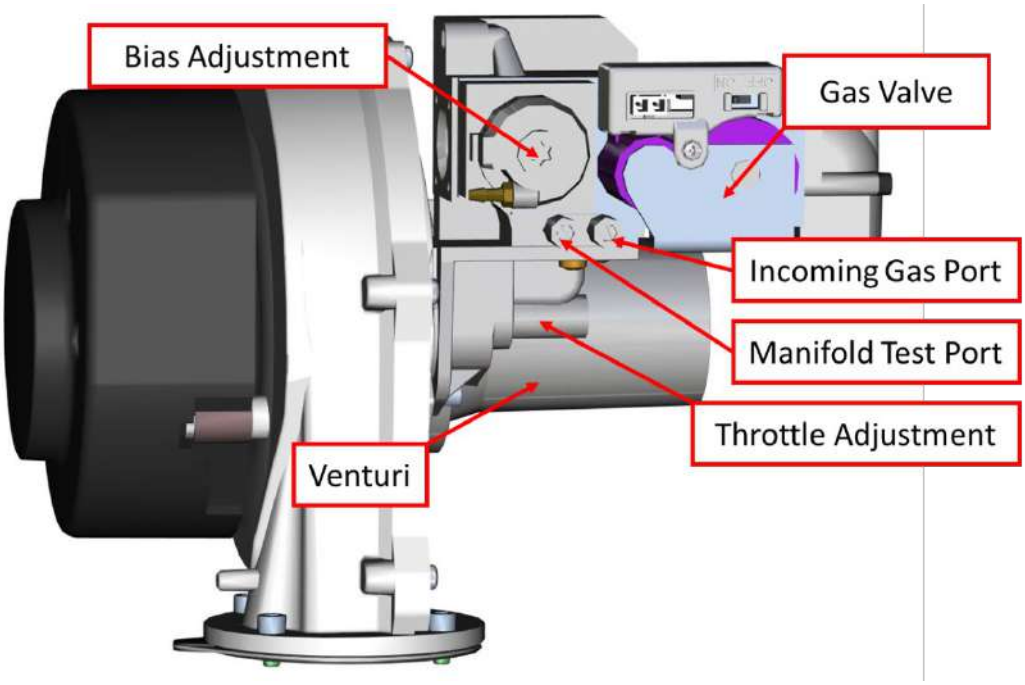
Low Fire use 4mm allen wrench to turn bias clockwise to increase and counterclockwise to decrease.

The low fire adjustment tends to respond slowly so take your time, let the boiler run for a minute or two.

NOTE WHEN SETTING COMBUSTION WITH THIS GAS VALVE START WITH A LOW FIRE COMBUSTION.

KB/WH/WB 5:1 procedure

Sweet spot for these is mid 8's to low 9's on natural and high 9's to mid-10's on LP, if they can't get there that's okay as long as operation is smooth and light off is quiet. Ideally the high and low fire will be near each other with the low fire slightly below.



Adjustment

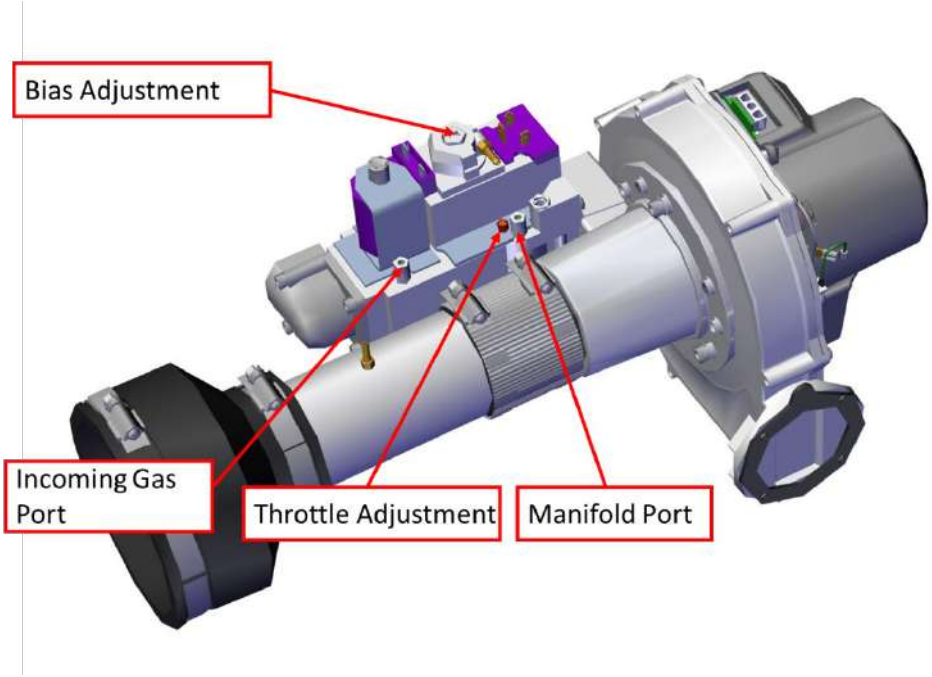
High Fire use 4mm allen wrench to turn throttle counterclockwise to increase and clockwise to decrease.

Low Fire use T40 torx drive to turn bias clockwise to increase and counterclockwise to decrease.

The low fire adjustment tends to respond quickly so be gentle and take your time.

KBX/AWN/FTX/WH400 procedure

Sweet spot for these is mid 8's to 9's on natural and high 9's to mid-10's on LP, if they can't get there that's okay as long as operation is smooth and light off is quiet. Ideally the high and low fire will be near each other with the low fire slightly below.



Adjustment

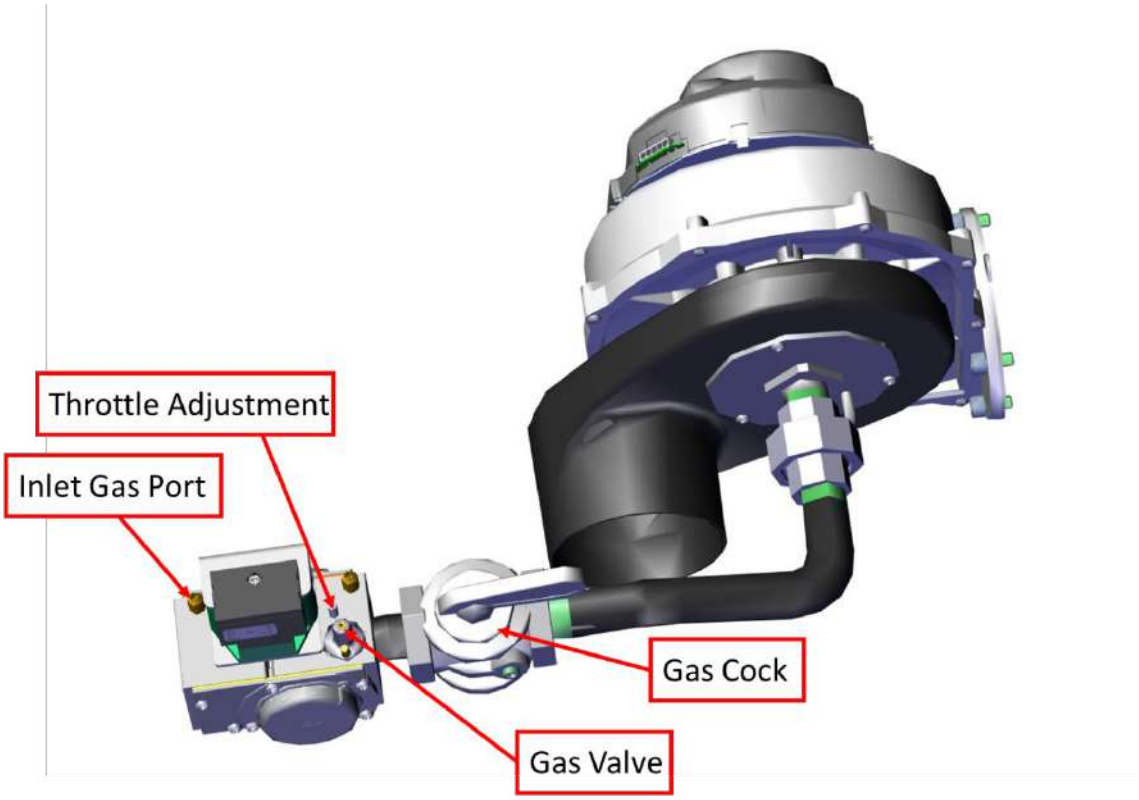
High Fire use small screw driver to turn throttle counterclockwise to increase and clockwise to decrease.

Low Fire use T40 torx drive to turn bias clockwise to increase and counterclockwise to decrease.

The high fire adjustment is a C-cup and tends to respond quickly so be gentle so take your time.

KBX/AWN/FTX/WH 500/501 SBN1000 procedure

Sweet spot for these is mid 8's to 9's on natural and high 9's to mid-10's on LP, if they can't get there that's okay as long as operation is smooth and light off is quiet. Ideally the high and low fire will be near each other with the low fire slightly below.



Adjustment

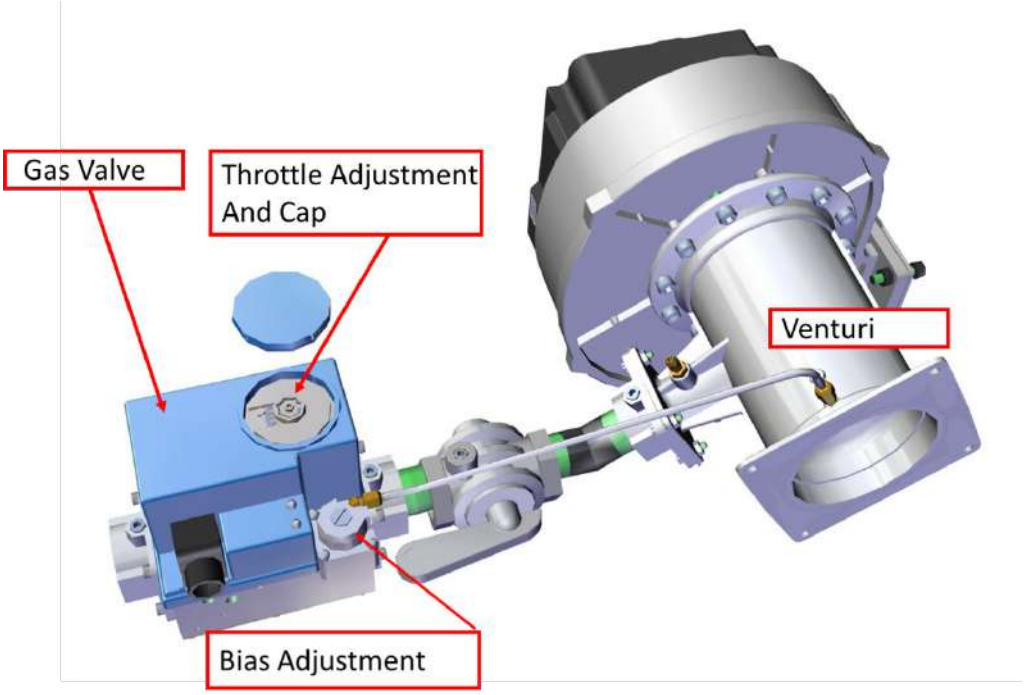
High Fire use small screw driver to turn throttle counterclockwise to increase and clockwise to decrease.

Low Fire use T40 torx drive to turn bias clockwise to increase and counterclockwise to decrease.

This gas valve tends to respond slowly initially and then will take off quickly so take your time.

KBX/AWN/FTX/600/850 SBN1300/1500 procedure

Sweet spot for these is mid 8's to 9's on natural and high 9's to mid-10's on LP, if they can't get there that's okay as long as operation is smooth and light off is quiet. Ideally the high and low fire will be near each other with the low fire slightly below.



Adjustment

High Fire use 3mm allen wrench to turn throttle counterclockwise to increase and clockwise to decrease.

Low Fire use T40 torx drive to turn bias clockwise to increase and counterclockwise to decrease.

This valve operates across a wide range of firing rates so we want to be cautious when adjusting that we don't over fire the boiler, evidence of over firing can be elevated CO2 and CO levels.

User Interface - Indicator LED

Power
- On when 115 V (ac) is applied.
- Off when power disconnected or transformer fuse is blown.

Priority
- On when zone 1 has priority over zones 2 to 6.

RoomResponse™
- On when modulating condensing boiler is operating below maximum setting.

Zone 1
- On when thermostat 1 calls for heat.

Zones 2 to 6
- On when the corresponding thermostat calls for heat.
- Off during priority operation.
- Off when corresponding thermostat stops calling for heat.

Sequence of Operation

Zone Operation

When a thermostat calls for heat by closing the R and W terminals:
- 115 V (ac) is applied to the corresponding circulator pump.
- The corresponding zone indicator LED is turned on.

Boiler Operation

When a thermostat calls for heat by closing the R and W terminals:
- The boiler end switch XX is closed to fire the boiler.
- The RoomResponse™ 0-10 V (dc) or 4-20 mA signal is sent to a modulating-condensing boiler.

DHW Operation

Many modulating-condensing boilers have multiple temperature call inputs. Wire the DHW end switch to input recommended in the boiler's manual.

When a zone 1 calls for heat by closing the R and W terminals:
- The DHW end switch is closed to fire the boiler at the DHW temperature.
- The Mod Boiler output is changed to 10 V (dc) or 20 mA.

Master / Member DIP Switch
- Allows for unlimited expansion using additional Switching Relays and/or Zone Valve Controls.
- The Master Switching Relay is wired and operates the boiler.
- If using a single Switching Relay set to Master.
- When using multiple Switching Relays and/or Zone Valve Controls, set one control to Master and set all other controls to Member.

T-Stat 1 Priority DIP Switch

When T-Stat 1 is calling for heat by closing the R and W terminals:
- 115 V (ac) is applied to the zone 1 circulator pump.
- Zone 1 indicator LED is turned on.
- Priority indicator LED is turned on.
- Zones 2 to 6 circulator pumps and LEDs are turned off.
- Expansion Member controls shut off their zones.
- After 60 minutes of continuous zone 1 call for DHW heating, zones 2 to 6 and all Expansion Member control zones are able to turn back on. This prevents building freeze up if the DHW tank aquastat fails in the closed position.

Exercising DIP Switch

ON: Each circulator pump is energized for 30 seconds every 72 hours.

OFF: Circulator pump exercising disabled.

Post Purge DIP Switch

ON: After the last thermostat stops calling for heat, the last circulator pump remains on for 2 minutes to purge heat from the boiler to the zone.

OFF: Post purge disabled.

Mod Boiler DIP Switch

Select either 0-10 V (dc) or 4-20 mA signal to the modulating condensing boiler. Consult the boiler manual to determine the signal type. The DIP switch position does not matter if the modulating boiler output is not used.

Fuses
- All fuses are T5A 250V slow blow.
- Fuses 1 to 6 correspond to the zone 1 to 6 circulator pump output. If a fuse is blown, first check that the pump is not seized and the wiring is not shorted. Then replace the fuse.
- Fuse 7 and 8 correspond to the 24 V (ac) transformer power supply. If a fuse is blown, first check that the thermostat wiring is not shorted. Then replace the fuse.

Expansion Terminals

Connect the five wires of the expansion bus from the master to the member controls.

Terminal	Description
A/tN4	Away signal connecting tekmar thermostats
B	RoomResponse™ signal from member controls
C	Power common
D	Demand signal. 0 Vdc = demand. 2 Vdc = no demand
E	Priority signal. 0 Vdc = priority. 2 Vdc = no priority

RoomResponse™ Signal

The RoomResponse™ signal adjusts the temperature of a modulating condensing boiler that accepts a 0-10 V(dc) or 4-20 mA signal input. It works by continually adjusting boiler water temperatures to the lowest possible value to meet comfort without wasting energy. This is done by monitoring each thermostat's on and off time pattern and determines the ideal water temperature for each zone. The control then chooses the highest water temperature requirement of all the thermostats and provides a 0-10 V (dc) or 4-20 mA signal proportional to the boiler operating temperature. The RoomResponse™ signal is a DOE compliant method of controlling boiler temperature to building load. The RoomResponse™ signal is not available to on/off boilers.

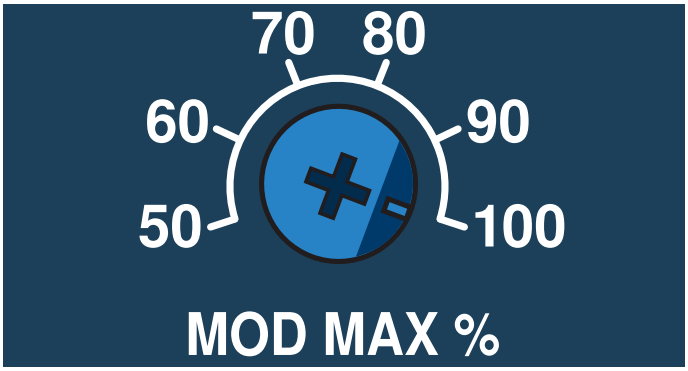
Benefits of the RoomResponse™ signal include:

- Increase in boiler efficiency
- Reduction in room temperature swing
- Reduction in expansion noises from heating pipes

Mod Max % Dial

The upper limit of the 0-10 V (dc) or 4 -20 mA signal to the modulating condensing boiler can be set using the Mod Max % Dial.

This sets the upper temperature limit for the boiler.



Mod Max % dial set to 100% in the illustration.

The dial is only applicable to controls set as the Master.

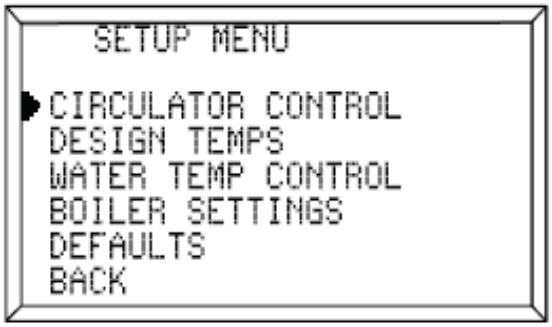
Mod Max %	Max Voltage	Max mA
50	5	12
60	6	13.6
70	7	15.2
80	8	16.8
90	9	18.4
100	10	20

Setting the Max Mod % Dial

Boiler Make/Model	Required Adapter (Supplied by boiler manufacturer)	0-10 V (dc) / 4-20 mA DIP Switch	Mod Max % Dial for Boiler Design Temperature			
			120°F	140°F	160°F	180°F
Aerco AM series	Not required	0-10 V	50%	65%	80%	100%
Bosch Greenstar	ICM Module	0-10 V	55%	70%	80%	100%
Buderus GB142, GB162	EM10 Module	0-10 V	50%	60%	75%	90%
Burnham® Alpine™*	Not required	4-20 mA	50%	70%	85%	100%
Camus® Modulating Micoflame®	Not required	0-10 V	50%	60%	70%	85%
HTP Elite	Not required	0-10 V	50%	65%	80%	90%
IBC VFC and SL series*	Not required	0-10 V	65%	75%	85%	100%
Laars® Mascot LX	Not required	0-10 V	55%	70%	85%	100%
Laars® Mascot FT	Not required	0-10 V	50%	65%	80%	100%
Lochinvar® Knight™	Not required	0-10 V	55%	70%	85%	100%
Lochinvar® FTXL*	Not required	0-10 V	55%	70%	85%	100%
NTI Trinity Fire Tube and LX	Not required	4-20 mA	55%	65%	75%	90%
Peerless PureFire	PFA-1 Adapter	0-10 V	55%	65%	75%	90%
Raypak Xfyre, Xtherm, MVB, XPakFT	Not required	0-10 V	55%	65%	80%	90%
Riverside HeatStation*	Not required	0-10 V	50%	65%	85%	100%
Viessmann 100-W, WB1B	OpenTherm Module	0-10 V	55%	70%	85%	100%
Viessmann 200-W, B2HB and 300 CU3A	Not required	0-10 V	50%	60%	70%	80%
Weil-McLain® Evergreen*	Not required	0-10 V	50%	70%	85%	100%

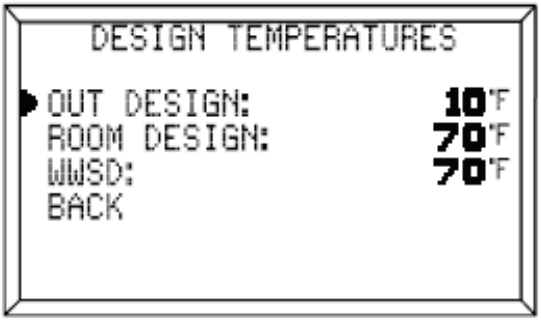
* Requires changes to boiler's settings

Hydronic Mixing Block Programming



On/Off- When using a thermostat

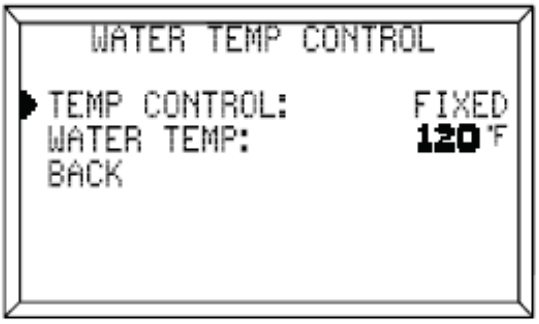
Constant- Circulator will run 24/7 and shut off during WWSD



OUT DESIGN- Coldest day in your area.

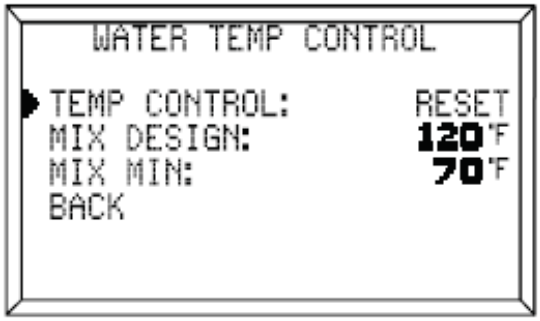
ROOM DESIGN- Desired indoor temp.

WWSD- Outdoor temp @ which control shuts down



FIXED- Constant Water temperature- no outdoor reset

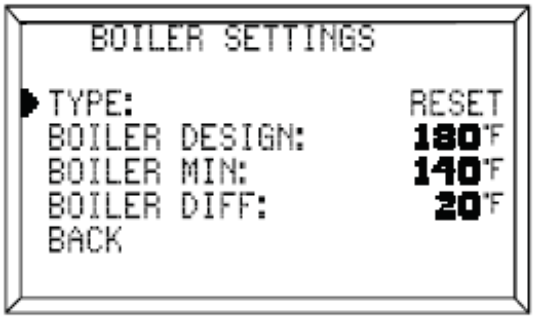
WATER TEMP- Desired Water setpoint



RESET- Mix Water temp adjusts based on outdoor temperature, as outdoor temp decreases water temp increases.

MIX DESIGN- Water temp on coldest day (set by OUT DESIGN).
140 F staple up
125 F climate panel
100 F concrete slab

MIX MIN- Minimum water temperature in mix.
OFF no floor minimum IF warm floor Always required:
100 F staple up
85 F climate panel
75 F concrete



RESET- Boiler Water temp adjust based on outdoor temperature, as outdoor temp decreases water temp increases.

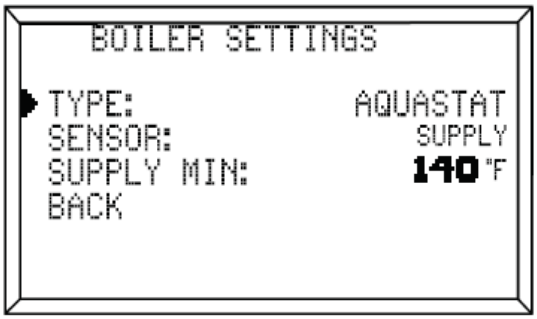
BOILER DESIGN- Boiler Water temp needed on Coldest day. Set at least 20 F above Mix Design setting above.

BOILER MIN- Lowest Water temp allowed at boiler.
Condensing Boiler- set to off
Non-Condensing set to 130-140 F

BOILER MIN- Set to 20, (10 above 10 below boiler target)

Hydronic Mixing Block Programming

Cont.



AQUASTAT- Used for non-condensing boiler that maintains its own temperature.

SENSOR- On Supply or Return boiler pipe

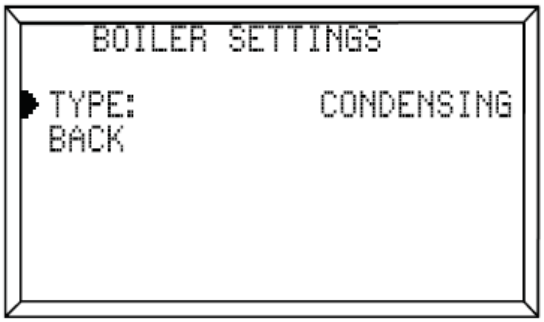
SUPPLY MIN RETURN MIN- Boiler supply or return Minimum to protect from condensation Typical 140F Supply

NOTE- When Boiler is below Minimum setting the mix valve will close resulting in No Heat until Minimum is met. PROTECT will show in status screen

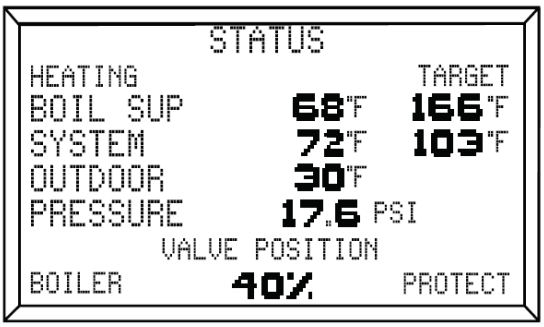
F or C- Select Fahrenheit or Celcius

OVERWRITE DEFAULTS- Leave as is.

RESTORE DEFAULTS- Use to Restore to the defaults



CONDENSING- Set when boiler is condensing



STATUS- All Real Time Values can be read

Screen Color Indicator	Status
Light Blue/ Gray	No Heat Demand
Solid Red	Heat Demand, boiler running
Yellow/ Green	Heat Demand, boiler running but in boiler protection mode
Dark Blue	Heat Demand, boiler satisfied
Blinking Red	Failed boiler sensor or wire Control supplies 80F until error is resolved

VITOCROSSAL 300 CU3A CONNECTION QUICK START GUIDE

This Quick Start Guide is designed to provide an overview to an experienced licensed professional heating contractor with the a general wiring and operational knowledge of the Vitocrossal 300 CU3A boiler. It is NOT a substitute for the technical support literature supplied with the Vitocrossal 300 CU3A boiler and its accessories. The technical support literature of each product contains the necessary safety and national/local code requirements which, if not followed exactly, will lead to property damages, personal injuries and/or loss of life. Viessmann Manufacturing assumes no responsibility for damage(s) of any kind caused by inappropriate use of this Quick Start-up Guide and/or failure to read the technical literature provided.

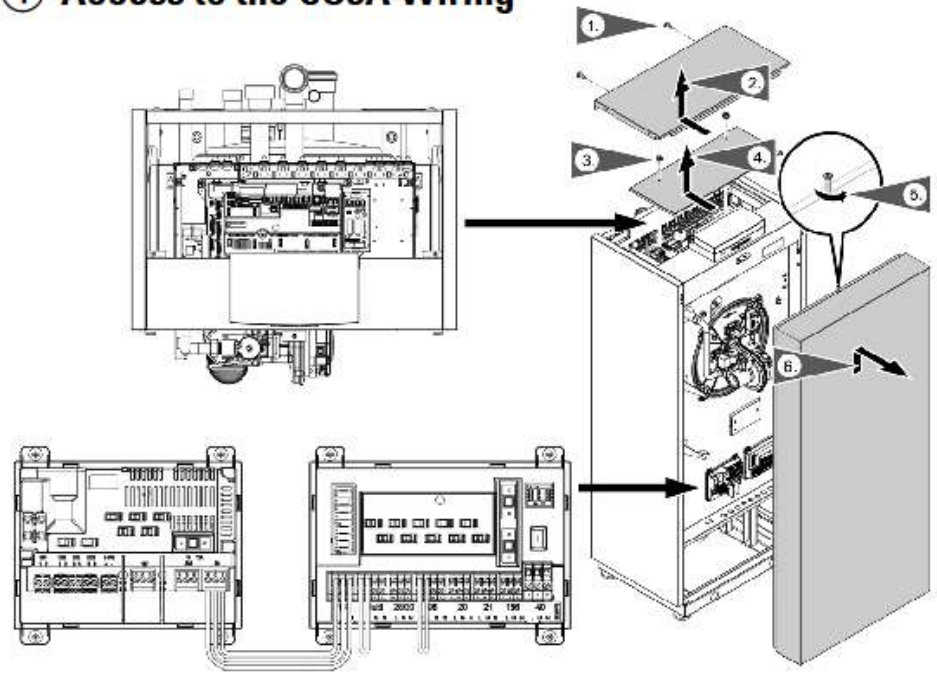
Before wiring the boiler...

- Connect fuel supply and all hydronic piping.
- Ensure gas pressure matches rating plate.
- Verify that the venting is installed according to the Installation Instructions.
- Perform leak tests on the gas supply, heating system and venting, using approved methods.

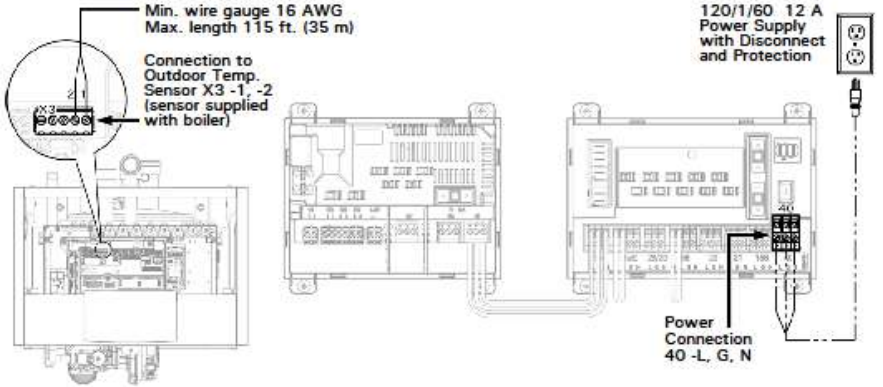
What you need to know about wiring the boiler

- For detailed installation information of the Vitocrossal 300 CU3A boiler refer to the appropriate documentation.
- Refer to boiler wiring diagram for electrical requirements of boiler.
- 120VAC wiring! The boiler can only be connected to a 120/1/60 power supply.
- Proper polarity must be maintained for 120VAC wiring.
- The control unit requires an earth ground for proper operation.
- Use shielded wire for sensor wiring to prevent electromagnetic interference.

① Access to the CU3A Wiring

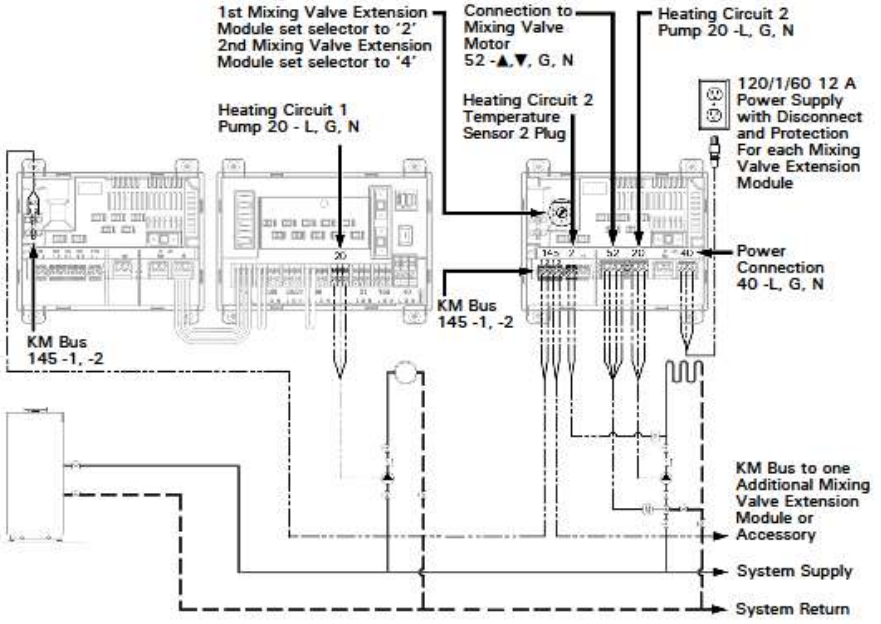


② Power and Sensor Connection



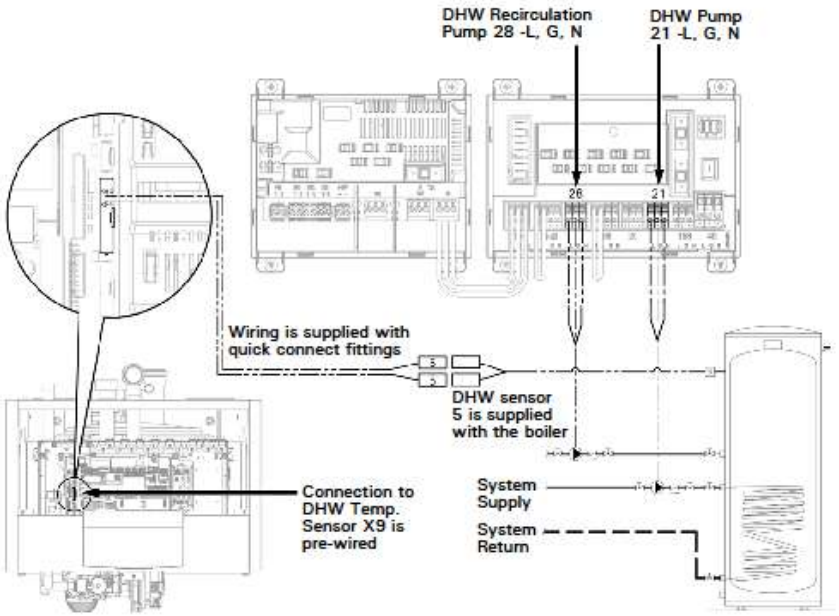
③ Heating Circuits Connection

with mixing valve extension module (max. 2)

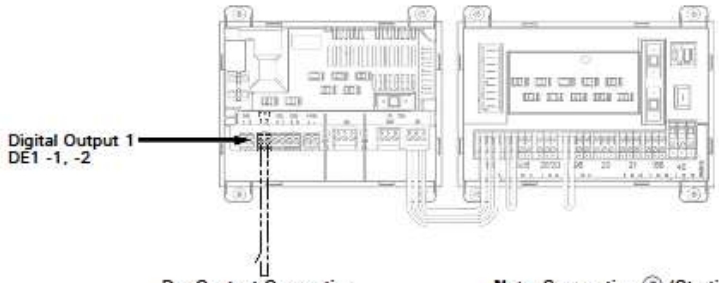


VITOCROSSAL 300 CU3A CONNECTION QUICK START GUIDE

④ DHW Connection

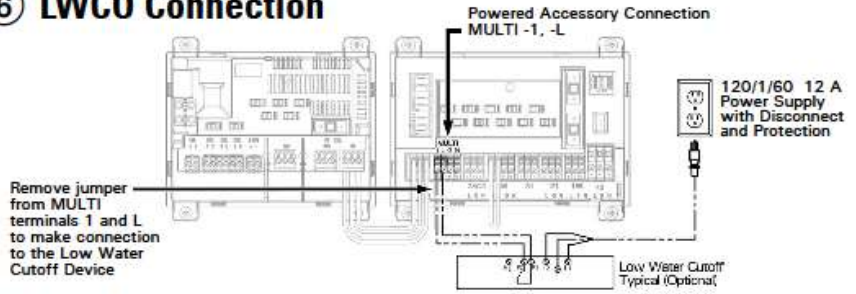


⑤ External Heat Demand Connection

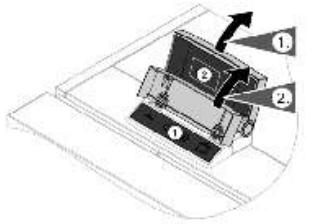


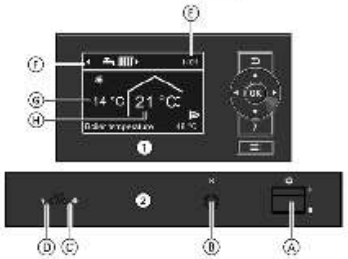
Note: See section ⑦ 'Starting the Boiler' under 'General' below for external heat demand required coding.

⑥ LWCO Connection



⑦ Starting the Boiler





Legend

① Programming Unit
② Vitotronic 200, KW6B
Ⓐ ON/OFF switch
Ⓑ Reset button
Ⓒ On indicator (green)
Ⓓ Fault indicator (red)
Ⓔ Heating circuit which is selected for operation in the standard menu
Ⓕ Header (shows the heating program for displayed heating circuit Ⓔ)
Ⓖ Current outside temperature
Ⓗ Set room temperature

1. Turn ON switch Ⓐ (indicator Ⓒ is on).
2. Using ▲/▼, select 'Language' and press OK.
3. Using ▲/▼, set 'Time and Date' and press OK.
4. Access coding level 2;
   - Simultaneously press OK and ☰ for 4 sec.
   - Simultaneously press OK and ⮌ for 4 sec.
   - Using ▲/▼, select desired coding group and press OK.

General
- Using ▲/▼, select the system layout address 00:_ _ and press OK.
- Using ▲/▼, select the system layout coding and press OK.

External Heat Demand (required coding if connected)
- Using ▲/▼, select address 3A:0 and press OK.
- Using ▲/▼, select coding 3A:2 and press OK.
- Using ▲/▼, select address 9B:0 and press OK.
- Using ▲/▼, select coding 9B:_ _ (for set point temp.) and press OK.

For changing to LPG, refer to the fuel conversion instructions.

Boiler
If no adjustments are required for the boiler go to the next group.

Note: 'DHW' and 'Heating Circuit 2 and 3' will not appear on the programming unit if not connected to the system.

DHW
If changes are not required to set DHW temp. go to the next group.

Heating Circuit 1, 2 and 3 (each circuit must be adjusted separately)
If adjustments are not required go to the 'service menu'.
- Press ⮌ to return to groups, press ⮌ for 'service menu'
- Using ▲/▼, select 'Actuator test' and press OK, use ▲/▼, to select 'test'
- Press ⮌ to return to 'Actuator test', press ☰ for 'extended menu'.

Extended Menu (after each change press ⮌ to return to 'extended menu')
To change display units from °C to °F, use ▲/▼, to select 'settings' and press OK.
- Using ▲/▼, select 'temperature unit' and press OK, use ▲/▼ to select °F and press OK.

To adjust the heating curve, use ▲/▼ to select 'heating' and press OK.
- Using ◄/►, select 'heating circuit' and press OK, use ▲/▼, to select 'heating curve' and press OK, use ▲/▼ to select 'slope' or 'shift' and press OK, use ▲/▼ to set required value and press OK.

To adjust room temperatures, use ▲/▼ to select 'heating' and press OK.
- Using ◄/►, select 'heating circuit' and press OK, use ▲/▼, to select 'room temp. setpoint' and press OK, use ▲/▼, to set 'value' and press OK, use ▲/▼ to set required value and press OK.

To adjust DHW temperature, use ▲/▼ to select 'DHW' and press OK.
- Using ▲/▼, select 'DHW temperature setpoint' and press OK, use ▲/▼ to select value and press OK.

Select ⮌ repeatedly to return to the home screen.

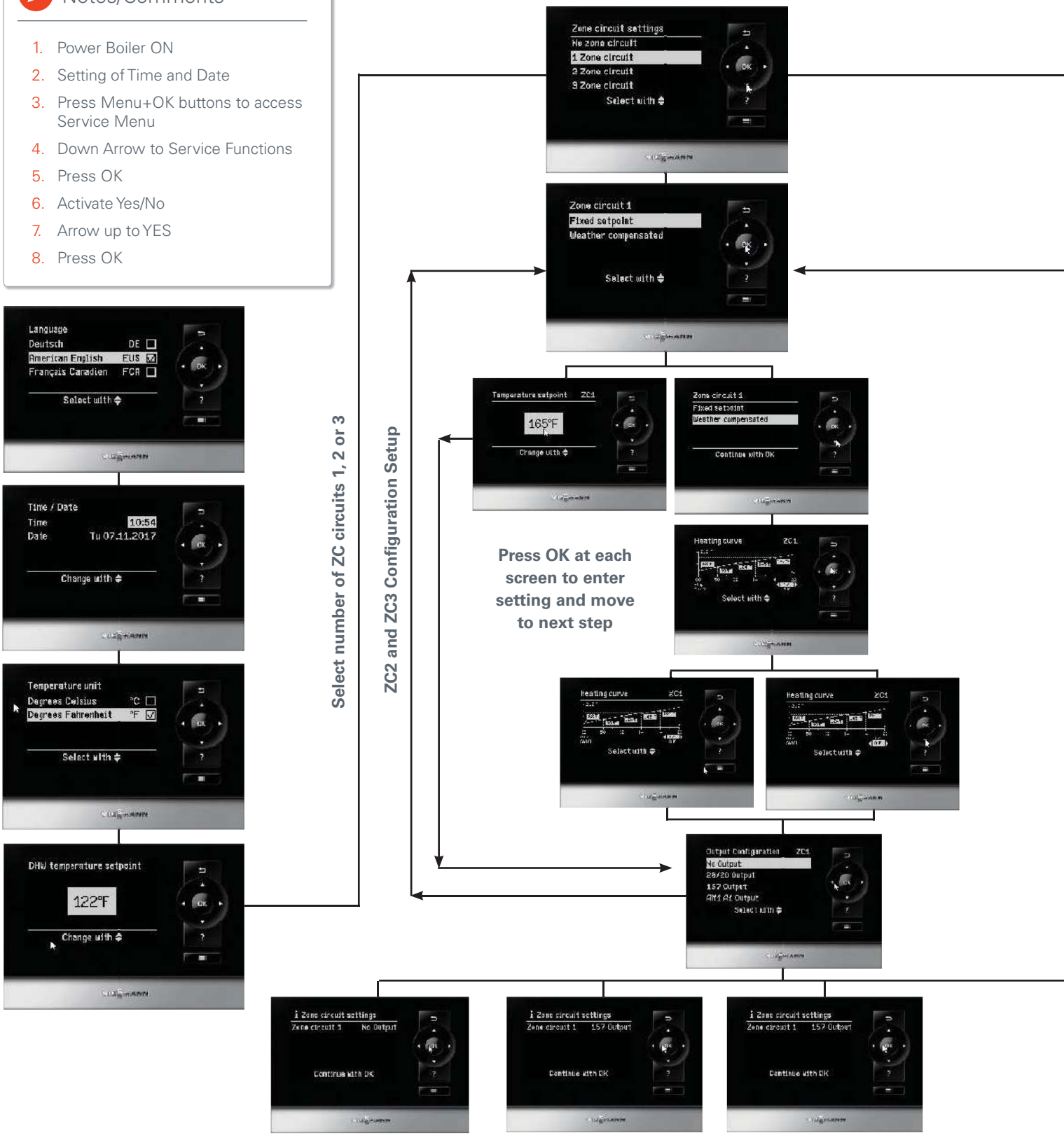
Information is subject to change without notice.

Zone Control Wizard Setup

Notes/Comments

1. Power Boiler ON
2. Setting of Time and Date
3. Press Menu+OK buttons to access Service Menu
4. Down Arrow to Service Functions
5. Press OK
6. Activate Yes/No
7. Arrow up to YES
8. Press OK

System with 1 Zone Circuit



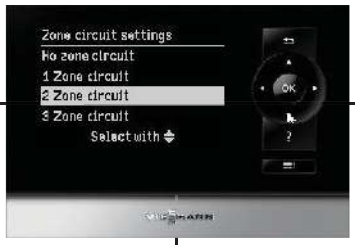
Select number of ZC circuits 1, 2 or 3

ZC2 and ZC3 Configuration Setup

Press OK at each screen to enter setting and move to next step

System with 2 Zone Circuits

OR



System with 3 Zone Circuits

OR

Operational Screen Information

ZC Fixed Setpoint Configured

ZC Weather Compensated Configured

User Interface Details:

1. Indication of ZC circuit boiler is configured for ZC1/ZC2/ZC3 use arrows left or right to select.
2. Display will show when a ZC call is present and a symbol if ZC1/ZC2/ZC3 are configured with an associated pump output.
3. Display of actual boiler water temperature.
4. Flame indication when burner ON and will show % of modulation.
5. Target temperature of zone. The Fixed Setpoint will show the set temperature during configuration and Weather Compensated will show target based on slope and shift.
6. Outdoor temperature is shown when Weather Compensated ZC is configured.

Extrol® Sizing

Extrol EX Series Sizing

Boiler	Type of Radiation			
Net BTU Output (Thousands)	Finned Baseboard	Convectors or Unit Heaters	Radiators Cast Iron	Baseboard Cast Iron
25	EX-15	EX-15	EX-15	EX-15
50	EX-15	EX-15	EX-30	EX-30
75	EX-30	EX-30	EX-30	EX-60
100	EX-30	EX-30	EX-60	EX-60
125	EX-30	EX-60	EX-60	EX-90
150	EX-30	EX-60	EX-90	EX-90
175	EX-60	EX-60	See SX Series	
200	EX-60	EX-90		
250	EX-90	EX-90		
300	EX-90			

Sizing based on: 12 PSIG fill; 30 PSIG relief Valve; 180° F average temperature. For sizing with fluids other than water, visit amtrol.com, download the AMTROL App or consult AMTROL Technical Support.

Extrol SX Series Sizing

Boiler	Type of Radiation and Piping System			
Net BTU Output (Thousands)	Finned Tube Baseboard or Radiant Panels	Convectors or Unit Heaters	Cast Iron Radiators One Pipe System	Cast Iron Radiators Series-Loop
200	SX-30V	SX-30V	SX-30V	SX-30V
250	SX-30V	SX-30V	SX-30V	SX-40V
300	SX-30V	SX-30V	SX-40V	SX-40V
350	SX-30V	SX-30V	SX-40V	SX-60V
400	SX-30V	SX-40V	SX-60V	SX-60V
450	SX-40V	SX-40V	SX-60V	SX-90V
500	SX-40V	SX-40V	SX-60V	SX-90V
550	SX-40V	SX-60V	SX-60V	SX-90V
600	SX-40V	SX-60V	SX-90V	SX-90V
650	SX-60V	SX-60V	SX-90V	SX-90V
700	SX-60V	SX-60V	SX-90V	SX-90V
750	SX-60V	SX-60V	SX-90V	SX-110V
800	SX-60V	SX-90V	SX-90V	SX-110V
850	SX-60V	SX-90V	SX-90V	SX-110V
900	SX-60V	SX-90V	SX-110V	SX-110V
950	SX-90V	SX-90V	SX-110V	SX-110V
1,000	SX-90V	SX-90V	SX-110V	SX-110V
1,100	SX-90V	SX-90V	SX-110V	SX-130V
1,200	SX-90V	SX-90V	SX-110V	SX-130V
1,300	SX-90V	SX-110V	SX-130V	SX-160V
1,400	SX-110V	SX-130V	SX-160V	SX-160V
1,500	SX-110V	SX-130V	SX-160V	(2)SX-110V

Sizing based on: 12 PSIG fill; 30 PSIG relief Valve; 180° F average temperature. For sizing with fluids other than water, visit amtrol.com, download the AMTROL App or consult AMTROL Technical Support.

Radiant Extrol® Sizing

Feet of Tubing	Nominal Pex Tubing Size				
	3/8"	1/2"	5/8"	3/4"	1"
1,000	RX-15	RX-15	RX-15	RX-15	RX-15
5,000	RX-15	RX-15	RX-15	RX-30	RX-30
7,500	RX-15	RX-15	RX-30	RX-30	RX-60
10,000	RX-15	RX-30	RX-30	RX-60	RX-60
14,000	RX-15	RX-30	RX-60	RX-60	Contact AMTROL
18,000	RX-30	RX-60	RX-60	RX-60	
22,000	RX-30	RX-60	RX-60	Contact AMTROL	
30,000	RX-30	RX-60	Contact AMTROL		

Sizing based on: 12 PSIG fill; 30 PSIG relief valve; 120° F average temperature. System filled with water. For glycol applications, consult AMTROL Technical Support.

Solar Extrol® Sizing

System Volume (Gallons)	Average System Operating Temperature				
	140° F	160° F	180° F	200° F	220° F
10	SE-15	SE-15	SE-15	SE-15	SE-15
20	SE-30	SE-30	SE-30	SE-30	SE-30
30	SE-30	SE-30	Contact AMTROL		
40	SE-30	SE-30			
50	SE-30	Contact AMTROL			

Sizing based on: 25 PSIG fill; 50 PSIG relief valve; 50% water and propylene glycol max. For other applications, consult AMTROL Technical Support.

Comb. Package & Fill-Trol Equivalents

Extrol Model	EX Combination Package	Fill-Trol Model
EX-15	EX-1500	FT-109
EX-30	EX-3000	FT-110
EX-60	—	FT-111
EX-90	—	FT-112

WORTHINGTON INDUSTRIES
1400 Division Road, West Warwick, RI USA 02893
T: 800.426.8765 **www.amtrol.com**

InSight. ISO 9001:2015 CERTIFIED MARK OF THE ORIGINATOR PHCC PLUMBING-HEATING-COOLING CONTRACTORS ASSOCIATION MADE IN USA

MC2680 (06/21)

Precise Sizing

Precise Sizing of EXTROL® & RADIENT EXTROL™

Things you must know:

1. Total System Volume . . . . . .(1)_____ gallons
2. Minimum System Temperature . . . . . .(2)_____°F
3. Maximum System Temperature . . . . . .(3)_____ °F
4. Minimum Operating Pressure at Expansion Tank . . . . . .(4)_____ psig
5. Maximum Operating Pressure at Expansion Tank . . . . .(5)_____ psig

Selection of Expansion Tank:

6. Find and enter "Net Expansion Factor" . . . . . .(6)_____ (see table 1)
7. Amount of Expanded Water = line (1) x line (6) . . . . . .(7)_____ gallon
8. Find and enter "Acceptance Factor" . . . . . .(8)_____ (see table 2)
9. Minimum Total Tank Volume = line (7) ÷ line (8) . . . . . .(9)_____ gallons
10. Using Specifications on pages 6 and 7, select an Expansion Tank that is at least equal to line (9) for "Total Volume" and line (7) for Max. Expanded Water Acceptance Gallons. Mulitiple tanks may be required.

Table 1. Net Expansion of Water

Max.Sys. Temp. °F	Minimum System Temperature °F						
	40°F	50°F	60°F	70°F	80°F	90°F	100°F
60°F	.0005	.0049	–	–	–	–	–
70°F	.00149	.00143	.00094	–	–	–	–
80°F	.00260	.00254	.00204	.00111	–	–	–
90°F	.00405	.00399	.00350	.00256	.00145	–	–
100°F	.00575	.00569	.00520	.00426	.00315	.00170	–
110°F	.00771	.00765	.00716	.00622	.00511	.00366	.00196
120°F	.0100	.0099	.0095	.0086	.0074	.0060	.0043
130°F	.0124	.0123	.0118	.0109	.0098	.0083	.0066
140°F	.0150	.0149	.0145	.0135	.0124	.0110	.0093
150°F	.0179	.0178	.0173	.0164	.0153	.0133	.0121
160°F	.0209	.0208	.0204	.0194	.0181	.0165	.0148
170°F	.0242	.0241	.0236	.0227	.0216	.0201	.0184
180°F	.0276	.0275	.0271	.0261	.0250	.0236	.0219
190°F	.0313	.0312	.0307	.0298	.0287	.0272	.0255
200°F	.0351	.0350	.0346	.0336	.0325	.0311	.0294
210°F	.0391	.0390	.0386	.0376	.0365	.0351	.0334
220°F	.0434	.0433	.0428	.0419	.0408	.0393	.0376
230°F	.0476	.0475	.0471	.0461	.0450	.0436	.0419
240°F	.0522	.0521	.0517	.0507	.0496	.0482	.0465

Note: For ethylene glycol and for propylene glycol contact AMTROL technical services.

Table 2. Acceptance Factors*

Max.Oper. Pressure at Tank (psig)	Minimum Operating Pressure at Tank (psig)										
	5	10	12	15	20	30	40	50	60	70	80
27	0.527	0.408	0.360	0.288	0.168	–	–	–	–	–	–
30	0.560	0.447	0.403	0.336	0.224	–	–	–	–	–	
35	0.604	0.503	0.463	0.403	0.302	0.101	–	–	–	–	–
40	0.640	0.548	0.512	0.457	0.366	0.183	–	–	–	–	–
45	0.670	0.586	0.553	0.503	0.419	0.251	0.084	–	–	–	–
50	0.696	0.618	0.587	0.541	0.464	0.309	0.155	–	–	–	–
55	0.717	0.646	0.617	0.574	0.502	0.359	0.215	0.072	–	–	–
60	0.736	0.669	0.643	0.602	0.536	0.402	0.268	0.134	–	–	–
65	0.753	0.690	0.665	0.627	0.565	0.439	0.314	0.188	0.062	–	–
70	0.767	0.708	0.685	0.649	0.590	0.472	0.354	0.236	0.118	–	–
75	0.780	0.725	0.702	0.669	0.613	0.502	0.390	0.279	0.167	0.056	–
80	0.792	0.739	0.718	0.686	0.634	0.528	0.422	0.317	0.211	0.106	–
90	0.812	0.764	0.745	0.716	0.669	0.573	0.478	0.382	0.287	0.191	0.096
100	0.828	0.785	0.767	0.741	0.698	0.610	0.523	0.436	0.347	0.261	0.174
110	0.842	0.802	0.786	0.762	0.723	0.642	0.561	0.481	0.401	0.321	0.241

** Acceptance factors based on expansion tank being charged to minimum operating pressure while empty of liquid.*

AMTROL INC.

w w w . a m t r o l . c o m

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AMTROL Canada, Ltd.
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Telephone: 519-478-1138 • Fax: 519-748-4231

MADE IN USA

Part # 9003-031 Rev. B MC# 2680 (9/05)

Series “HFT” Hydronic Heating Tanks

DESCRIPTION

The Series HFT tank is designed to absorb the force of thermal expansion of heating water and to maintain proper pressurization in a closed hydronic system. The heavy duty butyl diaphragm separates system water from the air in the tank preventing water logging problems.

OPERATING DATA

Maximum working pressure . . . . . .100 PSI (689kPa)
Maximum operating temperature 240ºF (115ºC)

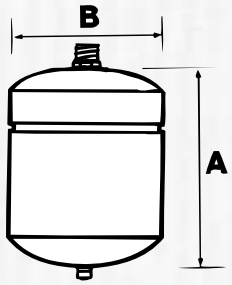
MATERIALS OF CONSTRUCTION

Shell . . . . . .Carbon Steel
Diaphragm . . . . . .Heavy Duty Butyl Rubber

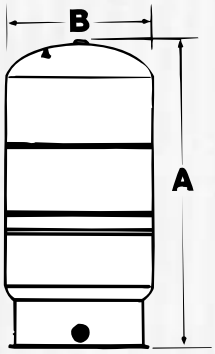
Dimensions: Gallons (Ltrs.), Inches (mm), Weights: LBS. (KG)

MODEL NUMBER	PART NUMBER	VOLUME GALLONS (Liters) TANK	VOLUME GALLONS (Liters) ACCEPTANCE	A HEIGHT	B DIAMETER	SYSTEM CONNECTION	APPROX. SHPG. WT. LBS. (Kg)
HFT-15	1BN201	2 (7.5)	1.0 (3.7)	12 5/8 (321)	8 (203)		5 (2.3)
HFT-30	1BN202	4.4 (16.6)	2.5 (9.4)	15 1/2 (394)	11 (279)	1/2" NPTM	9 (4.1)
HFT-60	1BN203	7.6 (28.7)	2.5 (9.4)	23 (584)	11 (279)		14 (6.4)
HFT-90	1BN204	14 (53)	11.3 (42.8)	21 (533)	15 3/8 (390)		23 (10.4)
HFT-30V	1BN205	14 (53)	11.3 (42.8)	24 3/4 (629)	15 3/8 (390)		25 (11.3)
HFT-40V	1BN206	20 (75.7)	11.3 (42.8)	32 1/2 (826)	15 5/8 (390)	1" NPTF	33 (14.9)
HFT-60V	1BN207	32 (121.1)	11.3 (42.8)	47 1/2 (1207)	15 5/8 (390)		43 (19.5)
HFT-90V	1BN208	44 (166.5)	34 (128.7)	36 (914)	22 (559)		69 (31.2)
HFT-110V	1BN209	62 (234.6)	34 (128.7)	46 3/4 (1186)	22 (559)	1 1/4" NPTF	92 (41.7)
HFT-160V	1BN210	86 (325.5)	46 (174.1)	47 1/4 (1199)	22 (559)		123 (55.8)

Dimensions subject to change. Not to be used for construction purposes. Tanks are factory pre-charged at 12 PSI (83kPa).

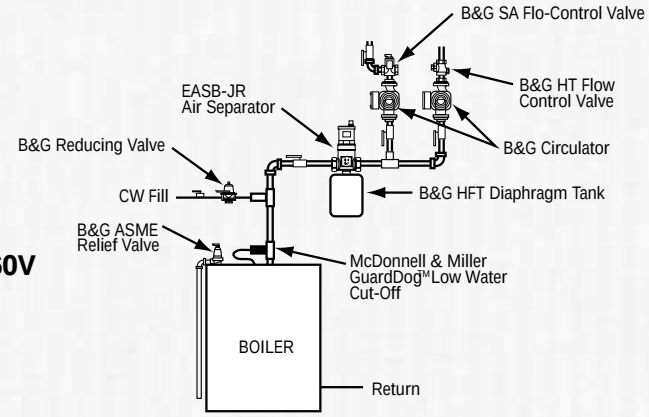


HFT-15 THROUGH HFT-90



HFT-30V THROUGH HFT-160V

TYPICAL APPLICATION



Sizing Guideline

Boiler Size	Type of Radiation			
Net Output	Finned Tube Baseboard or Radiant Panel	Convectors or Unit Heaters	Radiators Cast Iron	Baseboard Cast Iron
BTU/HR	Use Tank Model			
25,000	HFT-15	HFT-15	HFT-15	HFT-15
50,000	HFT-15	HFT-15	HFT-30	HFT-30
75,000	HFT-30	HFT-30	HFT-30	HFT-60
100,000	HFT-30	HFT-60	HFT-60	HFT-60
125,000	HFT-30	HFT-60	HFT-60	HFT-90
150,000	HFT-30	HFT-60	HFT-90	HFT-90
200,000	HFT-60	HFT-60	HFT-30V	HFT-30V
250,000	HFT-30	HFT-90	HFT-30V	HFT-40V
300,000	HFT-90	HFT-30V	HFT-30V	HFT-40V
350,000	HFT-30V	HFT-30V	HFT-40V	HFT-60V
400,000	HFT-30V	HFT-40V	HFT-40V	HFT-60V

Assumptions: fill pressure 12 PSI, relief pressure 30 PSI, avg. system temp. 200°F, system fluid is water, consult factory with requirements not shown

Bell & Gossett

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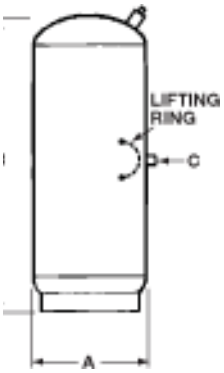
Bell & Gossett Commercial ASME Expansion Tank Quick Sizing Guide

- **Factory pre-charged to 12 psig**
- **Pre-charge should be adjusted to equal minimum operating pressure @ tank location**
- **Maximum working pressure: 125 psig**
- **Maximum operating temperature: 240F**



Boiler	Type of Radiation & Piping System			
Net Output in MBH	Finned Tube BB or Radiant Panels	Convectors or Unit Heaters	Radiators (One Pipe)	Radiators (Series Loop)
	Use Model	Use Model	Use Model	Use Model
200	D-40V	D-40V	D-40V	D-40V
250	D-40V	D-40V	D-40V	D-40V
300	D-40V	D-40V	D-40V	D-40V
350	D-40V	D-40V	D-40V	D-60V
400	D-40V	D-40V	D-60V	D-60V
450	D-40V	D-60V	D-60V	D-120V
500	D-40V	D-60V	D-60V	D-120V
550	D-40V	D-60V	D-60V	D-120V
600	D-40V	D-60V	D-120V	D-120V
650	D-60V	D-60V	D-120V	D-120V
700	D-60V	D-60V	D-120V	D-120V
750	D-60V	D-60V	D-120V	D-120V
800	D-60V	D-120V	D-120V	D-120V
850	D-60V	D-120V	D-120V	D-120V
900	D-60V	D-120V	D-120V	D-120V
950	D-120V	D-120V	D-120V	D-120V
1000	D-120V	D-120V	D-120V	D-120V
1100	D-120V	D-120V	D-120V	D-240V
1200	D-120V	D-120V	D-120V	D-240V
1300	D-120V	D-120V	D-240V	D-240V
1400	D-120V	D-120V	D-240V	D-240V
1500	D-120V	D-120V	D-240V	(2) D-120V

These recommendations are calculated on average boiler water volumes and the average water volumes of currently poplular types of radiation and piping systems. The industry operating standards of 12 psig fill pressure and 30 psig relief pressure are used.

PART NUMBER	MODEL NUMBER	TANK VOLUME	ACCEPTANCE VOLUME	A DIAMETER (INCHES)	B HEIGHT (INCHES)	APPROX. WEIGHT (LBS.)
116493	D-40V	21.7	11.3	16 1/4	29 1/2	90
116525	D-60V	33.6			45 1/8	110
116528	D-120V	68	34	24	43 7/8	224
116532	D-240V	132	46	30	53 1/2	427

7 Sixth Road - Woburn, MA - 01801 - Phone: (800) 423-7187 - Fax: (781) 933-3965
FIA - Fluid Industrial Associates Inc. - New England's premier plumbing, HVAC, radiant heating, and snow melting manufacturers representative

2022 residential air source heat pump rebate form

To receive your rebate faster, submit online at **MassSave.com/Rebates**

Required documents

- ❍ Completed and signed rebate form
- ❍ Copy of your invoice within 60 days of installation from a licensed contractor attached, including:
  - ❍ Installer/Contractor Name & Address
  - ❍ Outdoor and Indoor Equipment Manufacturer and Model Numbers
  - ❍ Integrated Control Model Number(s)
  - ❍ Installation Date
  - ❍ Installation Address
  - ❍ Total Install Cost
  - ❍ Proof of Payment
- ❍ Completed and signed Whole Home verification form, if applying for Whole Home incentive

WE ARE MASS SAVE®:

Cape Light Compact · EVERSOURCE · nationalgrid · Unitil

Terms & Conditions

Equipment Requirements

Air source heat pumps must be listed on the air source heat pump qualified product list. MassSave.com/HPQPL Integrated controls must be listed on the integrated control qualified product list. MassSave.com/ICQPL

Application Form: This application must be filled out completely, truthfully, and accurately. The customer must date and submit the completed application along with all required documentation for specific rebates and/or incentives. By submitting the rebate application, the customer agrees to abide by these Terms and Conditions.

Time Limit: Qualifying units for equipment rebate must be purchased and installed between January 1, 2022, and December 31, 2022. Applications must be postmarked by February 28, 2023 and within 60 days of installation. Program is subject to change without prior notice, including rebates and incentive levels.

Payments: From the time the application is processed and approved, please allow 6-8 weeks for payment of complete applications. Payment processing may be delayed if rebate application is missing required information. For customers that wish to designate their rebate payment directly to their contractor, contractors must first register with Mass Save. If contractors are not registered, and/or if the payee information is different from the account holder information, additional processing time will be needed for payee verification.

Geographic Requirements: Offers valid only for residential electric customers in Massachusetts where the Mass Save Electric Heating and Cooling Program is offered by Cape Light Compact, Eversource, National Grid and Unitil.

Rebate Limitations: This rebate may not be combined with any other utility or energy efficiency service provider offer for the same equipment. This does not apply to the HEAT Loan financing program. Other, non-Mass Save rebates or incentives may also be used. Rebate amount not to exceed the cost of equipment (excluding sales tax and all installation costs) and may be subject to change without notice. Equipment installed in new construction and additions is not eligible. This rebate is only available to residences that are occupied full time during the winter heating season

Proof of Purchase: A copy of the customer's invoice itemizing the purchased equipment must accompany each rebate application form. The invoice must indicate the equipment make, coil and condenser model numbers, size in tons, installation date and address, total install cost and proof of payment.

Contractor Certification: Contractor certifies that installation and services performed have been in accordance with all applicable municipal, state and federal codes, standards and regulations, as well as program requirements pertaining to the installed system.

Approval and Verification: The participating utility or energy efficiency service provider reserves the right to conduct field inspections to verify installations prior to payment.

Tax Liability: Sponsors will not be responsible for any tax liability that may be imposed on the customer or contractor as a result of the payment of rebates.

Endorsement: Sponsors do not endorse any particular manufacturer, product, system design, or technology in promoting these offers.

Limitation of Liability: Sponsors and their rebate administrator's liability is limited to paying the rebate and incentive specified. Sponsors and their rebate administrator are not liable for any consequential or incidental damages or for any damages in tort connected with or resulting from participation in these offers.

Warranties: SPONSORS DO NOT WARRANT THE PERFORMANCE OF INSTALLED OR SERVICED EQUIPMENT, EXPRESSLY OR IMPLICITLY. Program sponsors make no warranties or representations of any kind, whether statutory, expressed, or implied, including, without limitations, warranties or merchantability or fitness for a particular purpose regarding the equipment or services provided by a manufacturer or vendor. Contact your contractor for details regarding equipment performance and warranties.

Electric Benefits: Other than the energy cost savings realized by customer, the program administrator is entitled to 100% of the benefits and rights associated with the energy-efficient measures, including without limitation ISO-NE products and all other attributes, credits or products associated therewith under any regional initiative or federal, state or local law, program or regulation or program, and customer waives, and agrees not to seek, any right to the same.

mass save® 2022

Residential air source heat pump rebate form

Up to $10,000 per home

WE ARE MASS SAVE®:

Cape Light Compact · EVERSOURCE · nationalgrid · Unitil

CUSTOMER INFORMATION

Residential Electric Utility or Energy Efficiency Provider	◯ Cape Light Compact	◯ Eversource	◯ National Grid	◯ Unitil
Account Holder Name:		Electric Account Number:		
Is this property occupied by an owner or a renter?	◯ Owner		◯ Renter	
Installation Address:		City:	State:	ZIP:
Phone Number:	Email Address:			

INSTALLER INFORMATION

Company Name:	Company ID (if participating in the Mass Save Heat Pump Installer Network):			
Mailing Address:		City:	State:	ZIP:
Phone Number:	Email Address:			
Payee for Rebate if Different From Customer	◯ Installer	◯ Other		

PAYEE FOR REBATE (IF OTHER SELECTED ABOVE)

Payee Name:	Phone Number:	Email Address:		
Mailing Address:		City:	State:	ZIP:
If rebate is being assigned to someone other than the account holder, please see terms and conditions.				

REBATES AVAILABLE

Equipment Type	Rebate Type	Efficiency Requirements	Additional Requirements	Rebate Amount
Air Source Heat Pumps	Whole-Home Rebates	Refer to the Mass Save Heat Pump Qualified Products List MassSave.com/HPQPL	Heat Pumps must be used as the sole source of heating during heating season. **Whole-Home Verification form must be completed and signed.**	$10,000 per home
	Partial-Home Rebates		Heat Pumps must be used to supplement the pre-existing heating system during heating season. If pre-existing system is oil or propane, integrated controls must be installed.	$1,250 per ton, up to $10,000 per home
Integrated Controls	Add on to existing air source heat pump installation	Refer to the Mass Save Integrated Controls Qualified Products List MassSave.com/ICQPL	Not applicable for electric resistance heat or full displacement.	$500 per indoor unit, up to $1,500 per home.

EQUIPMENT INSTALLED (CANNOT APPLY FOR MULTIPLE REBATE OFFERS FOR SAME EQUIPMENT INSTALLATION)

Pre-Existing Heating Type	◯ Oil	◯ Propane	◯ Electric Resistance	
Fully replacing pre-existing heating system? (must provide Whole-Home Verification Form to qualify for Whole-Home)			◯ Yes	◯ No

Install Date	AHRI Certified Reference #	Integrated Control Model # (not applicable for electric heat or Whole-Home installations)	AHRI Cooling Capacity BTUs	# of Tons (1 ton = 12,000 BTUs)

Integrated Controls (ADD-ON TO EXISTING HEAT PUMP INSTALLATION)

Pre-Existing Heating Type	Integrated Control Model # (Not applicable for electric heat)	Install Date	# of Indoor Units (3 unit max)
◯ Oil ◯ Propane			
◯ Oil ◯ Propane			

CUSTOMER ACCEPTANCE OF TERMS

I certify that all statements and information, including any attachments, made in this rebate form are correct, complete, true, and accurate to the best of my knowledge, and that I have read and agree to the terms and conditions on this form.

Customer Signature (required):	**Date:**

Please allow 6–8 weeks for processing. For more information, to confirm eligibility or to check the status of your rebate, call 800-232-0672 or email ask@efi.org

FOR ADDITIONAL INFORMATION, VISIT MASSSAVE.COM/REBATES OR CALL 800-232-0672.

2022 residential air source heat pump rebates

Air source heat pumps

Save with rebates on air source heat pumps purchased and installed between January 1, 2022, and December 31, 2022.

Offer only for heat pumps replacing or supplementing existing oil, propane, or electric baseboard (resistance). Rebate not to exceed purchase price. Limit one (1) Whole-Home rebate per home, maximum of $10,000.

To view the complete Heat Pump Qualified Products List, please visit **MassSave.com/HPQPL**

Integrated controls

Integrated controls are required for homes using heat pumps to supplement an existing oil or propane heating system.

To view the complete Integrated Controls Qualified Products List, please visit **MassSave.com/ICQPL**

How It Works

1. **Prepare your home:** Receive a $500 bonus when you move forward with weatherization recommendations made during a Home Energy Assessment prior to installing a heat pump. Learn more at **MassSave.com/EfficiencyFirst**
2. **Work with a Mass Save® heat pump installer:** Each home and customer situation is unique. The Sponsors of Mass Save urge you to work closely with a qualified contractor who can design and install a heat pump system that will meet your home's heating and cooling needs. Find a qualified installer at **MassSave.com/FindAHeatPumpInstaller**
3. **Consider financing:** Interested in 0% financing? Apply for a Mass Save HEAT Loan prior to installing your equipment. Learn more at **MassSave.com/HEATLoan**
4. **Claim your rebate:** Upon completion of installation, claim your rebate by submitting all required documentation.

Online:
MassSave.com/Rebates

Mail:
Mass Save Residential Heating & Cooling Program,
P.O. Box 2528
Manchester, CT 06045

Pipe Volumes
In Gallons Per Foot

Use for Anti-freeze Calculations

Type	Nominal	Pipe Diameter ID "	Area sq. in.	Volume cu in / ft	Gallons/ft Multiplier
Copper	1/4"	0.305	0.07	0.88	**0.0038**
Copper	3/8"	0.402	0.13	1.52	**0.0066**
Copper	1/2"	0.527	0.22	2.62	**0.0113**
Copper	5/8"	0.652	0.33	4.01	**0.0174**
Copper	3/4"	0.745	0.44	5.23	**0.0227**
Copper	1"	0.995	0.78	9.33	**0.0404**
Copper	1 1/4"	1.245	1.22	14.62	**0.0633**
Copper	1 1/2"	1.481	1.72	20.68	**0.0895**
Copper	2"	1.959	3.02	36.19	**0.1566**
Copper	2 1/2"	2.435	4.66	55.91	**0.2420**
Copper	3"	2.907	6.64	79.68	**0.3449**
Copper	3 1/2"	3.385	9.00	108.04	**0.4677**
Copper	4"	3.857	11.69	140.27	**0.6072**
PEX	5/16"	0.292	0.07	0.80	**0.0035**
PEX	3/8"	0.35	0.10	1.16	**0.0050**
PEX	1/2"	0.475	0.18	2.13	**0.0092**
PEX	5/8"	0.574	0.26	3.11	**0.0134**
PEX	3/4"	0.671	0.35	4.25	**0.0184**
PEX	1"	0.862	0.58	7.01	**0.0303**
PEX	1 1/4"	1.053	0.87	10.45	**0.0453**
PEX	1 1/2"	1.243	1.21	14.57	**0.0631**
Steel	3/8"	0.493	0.19	2.29	**0.0099**
Steel	1/2"	0.622	0.30	3.65	**0.0158**
Steel	3/4"	0.824	0.86	10.38	**0.0449**
Steel	1"	1.049	1.50	17.96	**0.0777**
Steel	1 1/4"	1.38	1.50	17.96	**0.0777**
Steel	1 1/2"	1.61	2.04	24.44	**0.1058**
Steel	2"	2.067	3.36	40.29	**0.1744**
Steel	2 1/2"	2.469	4.79	57.48	**0.2488**
Steel	3"	3.068	7.40	88.75	**0.3842**
Steel	4"	4.026	12.74	152.83	**0.6616**
Steel	5"	5.047	20.01	240.18	**1.0397**
Steel	6"	6.065	28.90	346.84	**1.5015**

Multiply total length of piping in ft. by gallons per foot multiplier.
This will give you total volume of liquid content in piping. Multiply by % of glycol desired to determine gallons of anti-freeze needed.

Formulas

Water

BTU/h = 500 x GPM △ T

Cv = flow in GPM @ 1PSI pressure drop

Ft of Head = 2.31 x PSI

Air

Air changes/hr = CFM x 60 min / space volume ft^3

CFM per ton = 400-450 standard 200-250 hi velocity

CFM = foot area (ft^2)x velocity (f/m)

FR (friction rate) $= \frac{\text{ASP x 100}}{\text{TEL}}$

ASP = Available Static Pressure

TEL = Total Equivalent Length duct

$BTU_{sensible}$ = 1.08 x CFM x △T

Other

COP = Power output / power input

EER = Btu out cooling / Electrical Input

Efficiency (thermal)= Output / Input

Electrical

1 KW = 3413 Btu

E = I x R E(volts) I(amps) R(ohm)

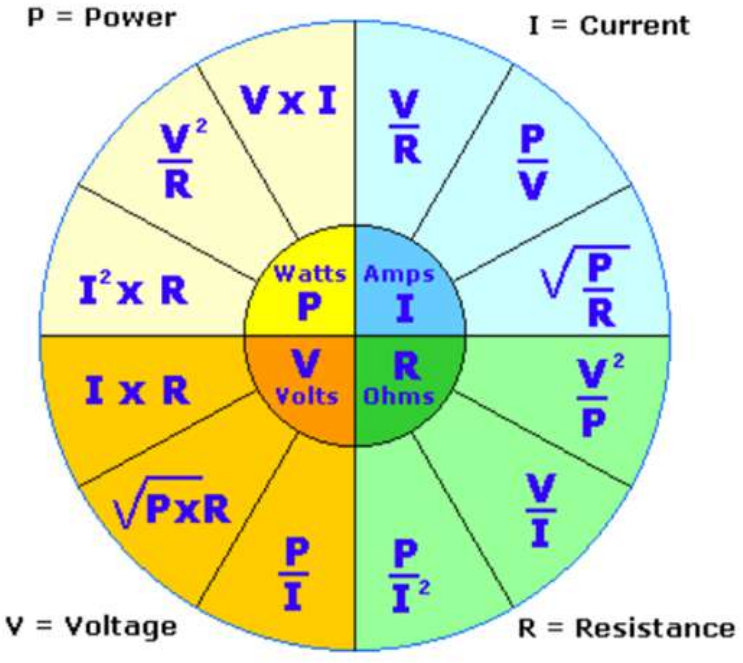
VA transformer sizing = Volts x Amps

1 HP = 746 Watts

Temperature

Fahrenheit = Celsius x 1.8 + 32

Celsius = (Fahrenheit -32) / 1.8



V or *E* from "voltage" or "electro motive force"