

# ***VoltMax***

## COMMERCIAL / 400

### Design Specifications

The **VoltMax** line of electric boilers was developed to efficiently supply hydronic heating systems in commercial, institutional and industrial applications. The boiler can meet any voltage demand for both single-phase and three-phase currents. Its easy-to-use electronic controller provides precise temperature and power control to minimize energy costs and to optimize the boiler's performance. **VoltMax's** compact design is great for small spaces and requires minimal clearance around the unit.



## I - POWER AND VOLTAGE

### A – 60HZ SINGLE PHASE

The boiler will be 100% efficient at the following powers and voltages:

POWER (KW)	VOLTAGE	
	208 VAC*	240 VAC*
57.8	<input type="checkbox"/>	NA
60	<input type="checkbox"/>	NA
63	<input type="checkbox"/>	NA
66	<input type="checkbox"/>	NA
72	<input type="checkbox"/>	NA
77	NA	<input type="checkbox"/>
80	NA	<input type="checkbox"/>
84	NA	<input type="checkbox"/>
88	NA	<input type="checkbox"/>
96	NA	<input type="checkbox"/>

NA: Not Available

\* Lower power models are available for this voltage in the VoltMax commercial / 180 series.

## THERMO 2000 INC

500, 9th avenue, Richmond (Quebec) J0B 2H0  
TEL.: 819-826-5613 FAX: 819-826-6370



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## **B – 60HZ THREE-PHASE**

The boiler will be 100% efficient at the following powers and voltages:

POWER (KW)	VOLTAGE			
	208 VAC*	240 VAC*	480 VAC*	600 VAC*
78.8	<input type="checkbox"/>	NA	NA	NA
90	<input type="checkbox"/>	NA	NA	NA
94.5	<input type="checkbox"/>	NA	NA	NA
105	NA	<input type="checkbox"/>	NA	NA
108	<input type="checkbox"/>	NA	NA	NA
120	NA	<input type="checkbox"/>	NA	NA
126	NA	<input type="checkbox"/>	NA	NA
144	NA	<input type="checkbox"/>	NA	NA
192	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
204	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
216	NA	NA	NA	<input type="checkbox"/>
225	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
240	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
255	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
270	NA	NA	NA	<input type="checkbox"/>
288	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
306	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
315	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
324	NA	NA	NA	<input type="checkbox"/>
336	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
357	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
378	NA	NA	NA	<input type="checkbox"/>
384	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>
408	NA	NA	<input type="checkbox"/>	<input type="checkbox"/>

NA: Not Available

\* Lower power models are available for this voltage in the VoltMax commercial / 180 series.

## **II – CONFIGURATION AN DESCRIPTION**

The VoltMax commercial / 400 series is offered in SCR version only. The SCR version allows for proportional power modulation from 0 to 100% using a solid-state SCR relay, with other additional features.

### **1. CONTROLLER**

The boiler will be operated by a Schneider Electric controller with the following features:

- A 3-inch LCD screen
- The controller is accurate, easily-configured and has a rear-lit display
- The controller's displays the unit's operating status and the following information at a glance:
  - Heat demand
  - Set point temperature
  - Outlet temperature
  - Outdoor temperature when the sensor is connected
  - Boiler power in real time
  - Number of stages and percentage of the capacity being used
  - Operating pressure

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- Operating mode: electric, auxiliary or dual-energy
- “Boost” mode in operation
- “Warm Weather Shut Down”: The boiler shuts down when the outdoor temperature is high
- Visual and audible alarm with alarm code
- Operating status indicator lights: green, amber or red
- Unit (°C/°F) and language (English/French) selector
- Return temperature display
- Boiler flow-rate display
- Display of amperage measured at the boiler
- Power consumption estimate display

## 2. TEMPERATURE ADJUSTMENT

- Adjustable set point temperature ranges from 50°F to 200°F (10°C to 93°C)
- There are different ways to control the set point temperature:
  1. Fixed set point temperature
  2. Water temperature modulation via the outdoor temperature sensor
  3. Remote water temperature control using an external BACnet IP or MSTP controller
  4. Variable water temperature based on a building occupancy schedule
- The controller can be used to set a second, higher set point temperature, which allows you to use an indirect water heater with or without domestic hot water priority.
- “Boost” mode to automatically increase the temperature when demand persists
- Exterior temperature sensor included
- “Warm Weather Shut Down”: The boiler shuts down when the outdoor temperature is high
- External 0-10Vdc temperature control

## 3. POWER ADJUSTMENT

- The maximum power can be controlled as follows:
  1. The controller has no constraints or limitations
  2. The maximum power is controlled manually
  3. Maximum power modulated based on the sensor's outdoor temperature
  4. Remote power control (using an external BACnet IP or MSTP controller)
  5. Variable maximum power based on a pre-set schedule
- External 0-10Vdc power control
- Auxiliary energy source used as a backup or master

## 4. CONNECTIVITY

- Ethernet and BACnet network communication ports enable remote communication
- Standard BACnet IP or MSTP network communication
- Ability to view the operating status and to remotely modify the settings on a webpage
- Operating anomalies information and history
- Can be configured to send alarms by email

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## 5. ELECTRIC CIRCUIT

### SINGLE PHASE, 60HZ

- The electrical connection must be 2-wire cable with ground.

### THREE-PHASE, 60HZ

- The electrical connection must be 3-wire cable with ground.

### SINGLE PHASE, 60HZ & THREE-PHASE, 60HZ

- The heating elements will be square flange immersion type. They will be low density equipped with high-temperature nickel-iron-chrome “incoloy” alloy.
- The boiler will be equipped with two limit controls, the first will be adjustable with an automatic reset and the second will be at a fixed temperature with a manual reset.
- Control circuit ON/OFF switch
- Electrical control circuits will be equipped with fuses to protect the low-voltage circuits.
- Electrical circuits will be equipped with fuses to protect the high-voltage circuits.
- A low water level control with an automatic reset will shut down the boiler when the water level is low and includes a test button and light indicators.
- The unit's power can be modulated through a solid-state SCR relay from 0 to 100% based on the demand. In addition, it rotates through the stages to ensure components wear equally.
- A contact to activate an auxiliary boiler as a backup or in dual-energy mode
- Return temperature sensor
- Amperage measurement to detect anomalies and estimate power consumption
- An external contact lowers the heat demand when the building is unoccupied

## III – IDENTIFICATION

VOLTMAX SCR (KW)-(VOLTAGE)- (X) PH

Example:

VOLTMAX SCR 77-240-1 PH

VOLTMAX SCR 408-600-3 PH

## IV – HEATING ELEMENT

The tank will be made of steel according to CSA B-51-14 standards and will bear a Canadian Registration Number (CRN) as well as an “H” seal certifying that the tank's construction conforms to the standards of Section IV of the ASME Boiler and Pressure Vessel code. The tank will have a maximum operating pressure of 160 psi (1103 kPa) and will hold 62 US gal (235 litres) of water. It will undergo an ASME-compliant 240psi (1655 kPa) hydrostatic test.

The boiler will be installed directly on the ground by means of four (4) seismic resistant holes. It will be equipped with four (4) 3” NPT M connections, located on the sides of the tank to enable a multi-position installation and facilitate connection. There are 24 openings to install the square flange elements. The tank will be equipped with a 1 ¼” ball drain valve and will be shipped from the plant equipped with an ASME compliant safety valve with 150 psi (1034 kPa) trigger point. See section VI for safety valves of 60 psi (441 kPa) or 125 psi (862 kPa).

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## **V - CABINET**

The steel cabinet's outer wall is coated with a layer of baked enamel. The housing is designed to reduce space while facilitating access to the components. The lower front door provides access to the power components. The upper front compartment provides access to the low-voltage control components and the top cover provides access to the electric components. There is a 3" (75 mm) thick fibreglass insulating sheath.

## **VI – AVAILABLE OPTIONS**

Add a power switch

☐ VOLTMAX - SWITCH

Add built-in switch fuses

☐ VOLTMAX – SWITCH&FUSE

A 60 psi safety valve

☐ VOLTMAX – 60 PSI

A 125 psi safety valve

☐ VOLTMAX – 125 PSI

## **VII - WARRANTY**

The boiler's heating element is covered by a 10-year limited warranty for closed-circuit heating applications. Parts and accessories have a 2-year warranty. The boiler must be tested, certified and bear the CSA Canada and US logos according to CSA C22.2 No. 165-92 and UL834 standards.

## **VIII – START UP**

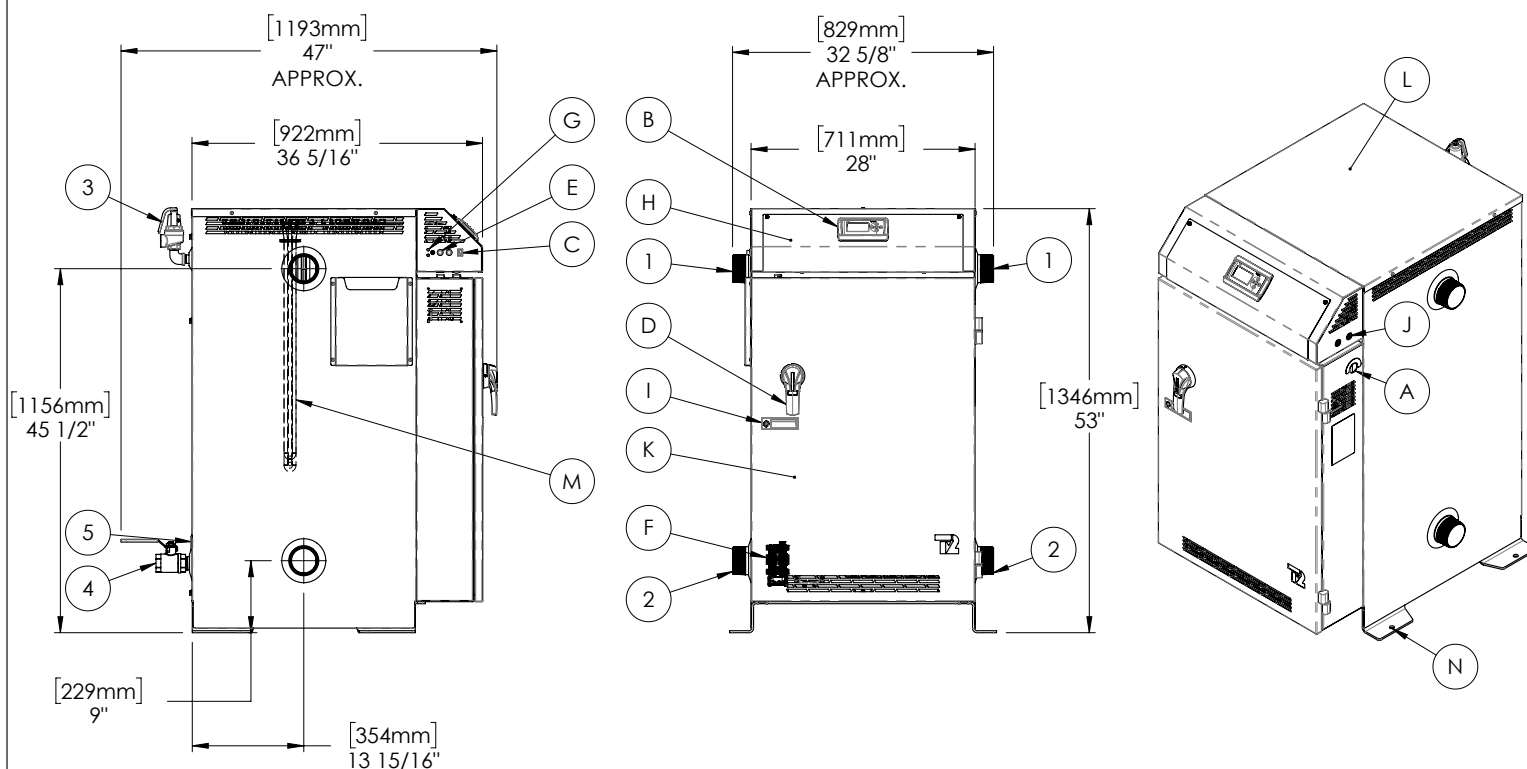
To facilitate start-up, a pre-adjustment form is available in the event you would like to change the VOLTMAX unit's default operating settings to values that correspond to your project's needs. Just indicate the values you need for your application and Thermo 2000 will program the controller in the factory.

Thermo 2000 Inc. reserves the right to modify, at any time without notice, the colours, components, materials, design specifications, or models that are described in this document.

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**BOILER CONNECTIONS**

1	Boiler outlet	3" NPT M
2	Boiler inlet	3" NPT M
3	Pressure relief valve	3/4" NPT F
4	Drain Valve	1 1/4" NPT F
5	Access to the return sensor	1/2" NPT F

**COMPONENTS IDENTIFICATION**

A	Electrical main supply
B	Boiler controller
C	"On/Off" switch
D	Disconnect switch & rotary handle (Optional)
E	Fuses for controls
F	Solid state SCR relay
G	Low water cut-off, test button and indicator lights
H	Electrical control access door
I	Door handle for electric access with lock
J	Electrical control wires access holes
K	Access door power circuit
L	Access cover to Heating elements
M	Heating elements
N	Anti-Seismic anchors holes

**MIN. CLEARANCES FOR INSTALLATION & MAINTENANCE**

Left & Right sides	6" / 152mm
Rear	6" / 152mm
Front	24" / 610mm
Bottom	0" / 0mm
Top	32" / 813mm

**GENERAL INFORMATIONS**

Weight	1200 lbs / 545kg APPROX.
Water volume	62 US gal / 235 liters APPROX.
Max. operating pressure	160 psi

**Table 1 : VoltMax 600 VAC / 60 Hz / 3 Phases<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 600V	Stage <sup>2</sup>
<b>VoltMax 192</b>	655 104	192	185	8 x 15 kW 4 x 18 kW	4 x 48 kW
<b>VoltMax 204</b>	696 048	204	197	8 x 18 kW 4 x 15 kW	4 x 51 kW
<b>VoltMax 216</b>	736 996	216	208	12 x 18 kW	4 x 54 kW
<b>VoltMax 225</b>	767 700	225	217	15 x 15 kW	5 x 45 kW
<b>VoltMax 240</b>	818 880	240	231	10 x 15 kW 5 x 18 kW	5 x 48 kW
<b>VoltMax 255</b>	870 060	255	246	10 x 18 kW 5 x 15 kW	5 x 51 kW
<b>VoltMax 270</b>	921 240	270	260	15 x 18 kW	5 x 54 kW
<b>VoltMax 288</b>	982 656	288	277	12 x 15 kW 6 x 18 kW	6 x 48 kW
<b>VoltMax 306</b>	1 044 072	306	295	12 x 18 kW 6 x 15 kW	6 x 51 kW
<b>VoltMax 315</b>	1 074 780	315	303	21 x 15 kW	7 x 45 kW
<b>VoltMax 324</b>	1 105 488	324	312	18 x 18 kW	6 x 54 kW
<b>VoltMax 336</b>	1 146 432	336	324	14 x 15 kW 7 x 18 kW	7 x 48 kW
<b>VoltMax 357</b>	1 218 084	357	344	14 x 18 kW 7 x 15 kW	7 x 51 kW
<b>VoltMax 378</b>	1 289 736	378	364	21 x 18 kW	7 x 54 kW
<b>VoltMax 384</b>	1 310 208	384	370	16 x 15 kW 8 x 18 kW	8 x 48 kW
<b>VoltMax 408</b>	1 392 096	408	393	16 x 18 kW 8 x 15 kW	8 x 51 kW

<sup>1</sup> Electrical supply 600 V 3 phase (L1-L2-L3) with 3 conductors Cu or AL ,90 °C with a ground.

<sup>2</sup> The 45 kW stage is composed of three 15 kW elements.

The 48 kW stage is composed of two 15 kW elements and one 18 kW element.

The 51 kW stage is composed of one 15 kW element and two 18 kW elements.

The 54 kW stage is composed of three 18 kW elements.

**Table 2 : VoltMax 480 VAC / 60 Hz / 3 Phases<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 480V	Stage <sup>2</sup>
<b>VoltMax 192</b>	655 104	192	231	8 x 15 kW 4 x 18 kW	4 x 48 kW
<b>VoltMax 204</b>	696 048	204	246	8 x 18 kW 4 x 15 kW	4 x 51 kW
<b>VoltMax 225</b>	767 700	225	271	15 x 15 kW	5 x 45 kW
<b>VoltMax 240</b>	818 880	240	289	10 x 15 kW 5 x 18 kW	5 x 48 kW
<b>VoltMax 255</b>	870 060	255	307	10 x 18 kW 5 x 15 kW	5 x 51 kW
<b>VoltMax 288</b>	982 656	288	347	12 x 15 kW 6 x 18 kW	6 x 48 kW
<b>VoltMax 306</b>	1 044 072	306	368	12 x 18 kW 6 x 15 kW	6 x 51 kW
<b>VoltMax 315</b>	1 074 780	315	379	21 x 15 kW	7 x 45 kW
<b>VoltMax 336</b>	1 146 432	336	405	14 x 15 kW 7 x 18 kW	7 x 48 kW
<b>VoltMax 357</b>	1 218 084	357	430	14 x 18 kW 7 x 15 kW	7 x 51 kW
<b>VoltMax 384</b>	1 310 208	384	462	16 x 15 kW 8 x 18 kW	8 x 48 kW
<b>VoltMax 408</b>	1 392 096	408	491	16 x 18 kW 8 x 15 kW	8 x 51 kW

<sup>1</sup> Electrical supply 480 V 3 phase (L1-L2-L3) with 3 conductors Cu or AL ,90 °C with a ground.

<sup>2</sup> The 45 kW stage is composed of three 15 kW elements.

The 48 kW stage is composed of two 15 kW elements and one 18 kW element.

The 51 kW stage is composed of one 15 kW element and two 18 kW elements.

**Table 3: VoltMax 240 VAC / 60 Hz / 3 Phases<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 240V	Stage
<b>VoltMax 105</b>	358 260	105	253	7 x 15 kW	7 x 15 kW
<b>VoltMax 120</b>	409 440	120	289	8 x 15 kW	8 x 15 kW
<b>VoltMax 126</b>	429 912	126	303	7 X 18 kW	7 X 18 kW
<b>VoltMax 144</b>	491 328	144	347	8 x 18 kW	8 x 18 kW

<sup>1</sup> Electrical supply 240 V 3 phase (L1-L2-L3) with 3 conductors Cu or AL ,90 °C with a ground.

**Table 4: VoltMax 208 VAC / 60 Hz / 3 Phases<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 240V <sup>2</sup>	Stage
<b>VoltMax 79</b>	268 695	78,75	219	7 x 15 kW	7 x 11,25 kW
<b>VoltMax 90</b>	307 080	90	250	8 x 15 kW	8 x 11,25 kW
<b>VoltMax 95</b>	322 434	94,5	263	7 X 18 kW	7 X 13,5 kW
<b>VoltMax 108</b>	368 496	108	300	8 x 18 kW	8 x 13,5 kW

<sup>1</sup> Electrical supply 208 V 3 phase (L1-L2-L3) with 3 conductors Cu or AL ,90 °C with a ground.

<sup>2</sup> 240V electrical element operated at 208V

**Table 5: VoltMax 240 VAC / 60 Hz / 1 Phase<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 240V	Stage <sup>2</sup>
<b>VoltMax 77</b>	262 724	77	321	7 x 5 kW 7 x 6 kW	7 x 11 kW
<b>VoltMax 80</b>	272 960	80	333	16 x 5 kW	8 x 10 kW
<b>VoltMax 84</b>	386 608	84	350	14 x 6 kW	7 X 12 kW
<b>VoltMax 88</b>	300 256	88	366	8 x 5 kW 8 x 6 kW	8 x 11 kW
<b>VoltMax 96</b>	327 552	96	400	16 x 6 kW	8 x 12 kW

<sup>1</sup> Electrical supply 240 V 2 phase (L1-L2) with 2 conductors Cu or AL ,90 °C with a ground.

<sup>2</sup> The 10 kW stage is composed of two 5kW elements

The 11 kW stage is composed of one 5 kW element et one 6 kW element

The 12 kW stage is composed of two 6 kW elements.

**Table 6: VoltMax 208 VAC / 60 Hz / 1 Phase<sup>1</sup>**

Model	BTU/h	kW	Amps	Elements 240V <sup>2</sup>	Stage <sup>3</sup>
<b>VoltMax 58</b>	197 043	57.75	278	7 x 5 kW 7 x 6 kW	7 x 8.25 kW
<b>VoltMax 60</b>	204 720	60	288	16 x 5 kW	8 x 7.5 kW
<b>VoltMax 63</b>	214 956	63	303	14 x 6 kW	7 X 9 kW
<b>VoltMax 66</b>	225 192	66	317	8 x 5 kW 8 x 6 kW	8 x 8.25 kW
<b>VoltMax 72</b>	245 664	72	346	16 x 6 kW	8 x 9 kW

<sup>1</sup> Electrical supply 240 V 2 phase (L1-L2) with 2 conductors Cu or AL ,90 °C with a ground.

<sup>2</sup> 240 electrical elements operated at 208V

<sup>3</sup> The 7.5 kW stage is composed of two 5kW elements

The 8.25 kW stage is composed of one 5 kW element et one 6 kW element

The 9 kW stage is composed of two 6 kW elements.

**Table 7 : Maximum operating pressure**

<i>All models VoltMax <sup>1</sup></i>	
Standard maximum operating pressure	160 PSI

<sup>1</sup> Safety valve pressure of 60 psi, 125 psi or 150 psi (Standard)