Peak-performance heating systems

Revision 4 – October 2023

VOLTMAX

Design Specifications

The **VOLTMAX** line of electric boilers was developed to efficiently supply hydronic heating systems in commercial, institutional, and industrial applications. The boiler is available in two configurations, the **STG** series, or the **SCR** series, which 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:

	VOLTAGE	
POWER (KW)	208 VAC	240 VAC
22.5	☐	NA
27	☐	NA
30	☐	☐
36	☐	☐
40	NA	☐
41	☐	NA
45	☐	NA
48	NA	☐
49.5	☐	NA
54	☐	NA
55	NA	☐
60	NA	☐
66	NA	☐
72	NA	☐

NA: Not Available

THERMO 2OOO INC

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TEL.: 819-826-5613 FAX: 819-826-6370

B – 60HZ THREE-PHASE

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

	VOLTAGE			
POWER (KW)	208 VAC	240 VAC	480 VAC	600 VAC
22.5	☐	NA	NA	NA
27	☐	NA	NA	NA
30	NA	☐	☐	☐
34	☐	NA	NA	NA
36	NA	☐	☐	☐
40.5	☐	NA	NA	NA
45	☐	☐	☐	☐
54	☐	☐	☐	☐
56	☐	NA	NA	NA
60	NA	☐	☐	☐
67.5	☐	NA	NA	NA
72	NA	☐	☐	☐
74	NA	NA	NA	NA
75	NA	☐	☐	☐
81	NA	NA	NA	NA
90	NA	NA	☐	☐
99	NA	NA	☐	☐
108	NA	NA	☐	☐
120	NA	NA	☐	☐
132	NA	NA	☐	☐
144	NA	NA	☐	☐
150	NA	NA	☐	☐
165	NA	NA	☐	☐
180	NA	NA	☐	☐

NA: Not Available

II – CONFIGURATION AN DESCRIPTION

The STG series modulates by stages according to the unit's power while the SCR series allows for proportional power modulation from 0 to 100% using a solid-state SCR relay, with other additional features.

VOLTMAX STG ☐ VOLTMAX SCR ☐

A - VOLTMAX STG AND SCR SERIES

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 home screen 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
- 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

2. TEMPERATURE ADJUSTMENT

- Adjustable set point temperature range 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

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

4. CONNECTIVITY

- Ethernet and BACnet network communication ports enable remote communication
- BACnet IP or MSTP series 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

5. ELECTRIC CIRCUIT

SINGLE PHASE, 60HZ

- The electrical connection must be 2-wire cable with a ground.
- 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 circuit breakers to protect low-voltage circuits.
- Electrical power circuits will be protected by circuit breakers.

THREE-PHASE, 60HZ

- The electrical connection must be 3-wire cable with ground.
- 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, standard on models higher than 60 kW or optional on models of 60 kW or less.

B - VOLTMAX STG ONLY

1. ELECTRIC CIRCUIT

- Modulation by stage based on demand, but while accurately controlling the temperature with a PID controller. In addition, it rotates through the stages to ensure components wear equally.

C - VOLTMAX SCR ONLY

1. CONTROLLER
- Return temperature display
- Boiler flow-rate display
- Display of amperage measured at the boiler (three-phase models only)
- Power consumption estimate display (three-phase models only)

2. TEMPERATURE ADJUSTMENT
- External 0-10Vdc temperature control

3. POWER ADJUSTMENT
- External 0-10Vdc power control
- Auxiliary energy source used as a backup or master

4. ELECTRIC CIRCUIT

- 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 (three-phase models only) to detect anomalies and estimate power consumption
- An external contact lowers the heat demand when the building is unoccupied

III - IDENTIFICATION

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

Example:
VOLTMAX STG 60-240-1 PH
VOLTMAX SCR 120-600-3 PH

IV – HEATING ELEMENT

A- POWER 90 KW OR LESS

The tank will be made of steel according to CSA B-51-14 standards and will bear a Canadian Registration Number (CRN) and 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 70psi (482kPa) and will hold 11 US gallons (42 liters) of water. It will undergo a 105 psi (724 kPa) ASME-compliant hydrostatic test.

The boiler will be installed directly on the ground and will be equipped with four (4) 1 ½'' NPT M connections located on the sides of the tank to enable a multi-position installation and facilitate connection. There are 5 openings to install the square flange elements. The tank will be equipped with a ¾" ball drain valve and will be shipped from the factory also equipped with an ASME-compliant safety valve with a 70 psi (482 kPa) trigger point.

B- POWER GREATER THAN 90 KW

The tank will be made of steel according to CSA B-51-14 standards and will bear a Canadian Registration Number (CRN) and 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 125 psi (862 kPa) and will hold 30 US gallons (114 litres) of water. It will undergo a 188 psi (1296 kPa) ASME-compliant hydrostatic test.

The boiler will be installed directly on the ground and will be equipped with four (4) 2 ½'' NPT M connections located on the sides of the tank to enable a multi-position installation and facilitate connection. There are 10 openings to install the square flange elements. The tank will be equipped with a ¾" ball drain valve and will be shipped from the factory also equipped with an ASME-compliant safety valve with a 125 psi (862 kPa) trigger point.

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 (three-phase models only)
☐ VOLTMAX - SWITCH

Add built-in switch fuses (three-phase 150A or less models only)
☐ VOLTMAX – SWITCH&FUSE

A self-resetting low water level control will shut down the boiler in case of low water, including a test button and light indicators (standard on higher than 60 kW models).
☐ VOLTMAX – LEVEL

Maximum operating pressure of 125 psi, a 125 psi safety valve
☐ VOLTMAX – 125 PSI

The tank will be made of steel according to CSA B-51-14 standards and will bear a Canadian Registration Number (CRN) and 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 125 psi (862 kPa) and will hold 30 US gallons (114 litres) of water. It will undergo a 188 psi (1296 kPa) ASME-compliant hydrostatic test.

The boiler will be installed directly on the ground and will be equipped with four (4) 2 ½’’ NPT M connections located on the sides of the tank to enable a multi-position installation and facilitate connection. There are 10 openings to install the square flange elements. The tank will be equipped with a ¾” ball drain valve and will be shipped from the factory also equipped with an ASME-compliant safety valve with a 125 psi (862 kPa) trigger point.

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.

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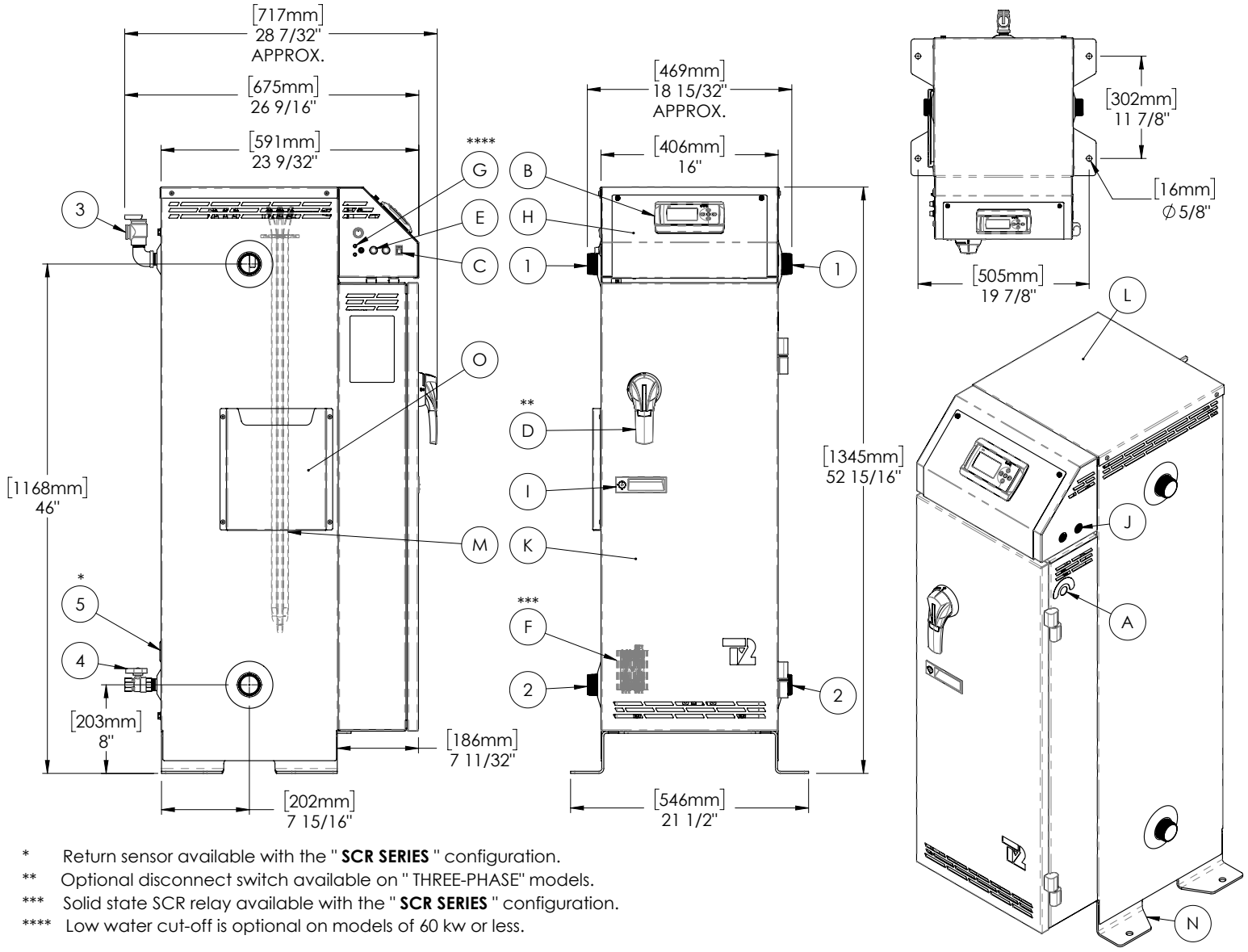


* Return sensor available with the " **SCR SERIES** " configuration.
** Optional disconnect switch available on " THREE-PHASE" models.
*** Solid state SCR relay available with the " **SCR SERIES** " configuration.
**** Low water cut-off is optional on models of 60 kw or less.

BOILER CONNECTIONS		
1	Boiler outlet	1 1/2" NPT M
2	Boiler inlet	1 1/2" NPT M
3	Pressure relief valve	3/4" NPT F
4	Drain Valve	3/4" 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
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
O	Documents holder

MIN. CLEARANCES FOR INSTALLATION & MAINTENANCE	
Left & Right sides	3"/ 76mm
Rear	3"/ 76mm
Front	24" / 610mm
Bottom	0" / 0mm
Top	32" / 813mm

GENERAL INFORMATIONS	
Weight	310lbs / 141kg
Water volume	11 us gal./ 41.6 liters
Max. operating pressure	STANDARD: 30psi OPTION: 70 PSI 125PSI (See 99-180KW Shop Drawing)

VOLTMAX 208 VAC, 60 Hz, 1 ph.							
Model	**Power**		**Amps**	**Elements 240V**	**STG Series**	**SCR Series**	
	KW	**BTU/h**			**Relay Stages**	**Relay Stages**	**SCR Stages**
23	22.5	76 770	108.4	6 x 5 kW	3 x 7.5 kW	2 x 7.5 kW	1 x 7.5 kW
27	27	92 124	130.1	6 x 6 kW	3 x 9 kW	2 x 9 kW	1 x 9 kW
30	30	102 360	144.5	8 x 5 kW	4 x 7.5 kW	3 x 7.5 kW	1 x 7.5 kW
36	36	122 832	173.4	8 x 6 kW	4 x 9 kW	3 x 9 kW	1 x 9 kW
41	41	139 892	198.7	5 x 5 kW 5 x 6 kW	5 x 8.25 kW	4 x 8.25 kW	1 x 8.25 kW
45	45	153 540	216.8	10 x 6 kW	5 x 9 kW	4 x 9 kW	1 x 9 kW
49.5	49.5	168 894	238.4	6 x 5 kW 6 x 6 kW	6 x 8.25 kW	5 x 8.25 kW	1 x 8.25 kW
54	54	184 248	260.1	12 x 6 kW	6 x 9 kW	5 x 9 kW	1 x 9 kW

208V 1-phase electrical supply (L1-L2) with two 90 °C conductors and a ground.

VOLTMAX, 240V, 60 Hz, 1 ph.							
Model	**Power**		**Amps**	**Elements 240V**	**STG Series**	**SCR Series**	
	KW	**BTU/h**			**Relay Stages**	**Relay Stages**	**SCR Stages**
30	30	102 360	125	6 x 5 kW	3 x 10 kW	2 x 10 kW	1 x 10 kW
36	36	122 832	150	6 x 6 kW	3 x 12 kW	2 x 12 kW	1 x 12 kW
40	40	136 480	166.7	8 x 5 kW	4 x 10 kW	3 x 10 kW	1 x 10 kW
48	48	163 776	200	8 x 6 kW	4 x 12 kW	3 x 12 kW	1 x 12 kW
55	55	187 660	229.2	5 x 5 kW 5 x 6 kW	5 x 11 kW	4 x 11 kW	1 x 11 kW
60	60	204 720	250	10 x 6 kW	5 x 12 kW	4 x 12 kW	1 x 12 kW
66	66	225 192	275	6 x 5 kW 6 x 6 kW	6 x 11 kW	5 x 11 kW	1 x 11 kW
72	72	245 664	300	12 x 6 kW	6 x 12 kW	5 x 12 kW	1 x 12 kW

240V 1-phase electrical supply (L1-L2) with two 90 °C conductors and a ground.

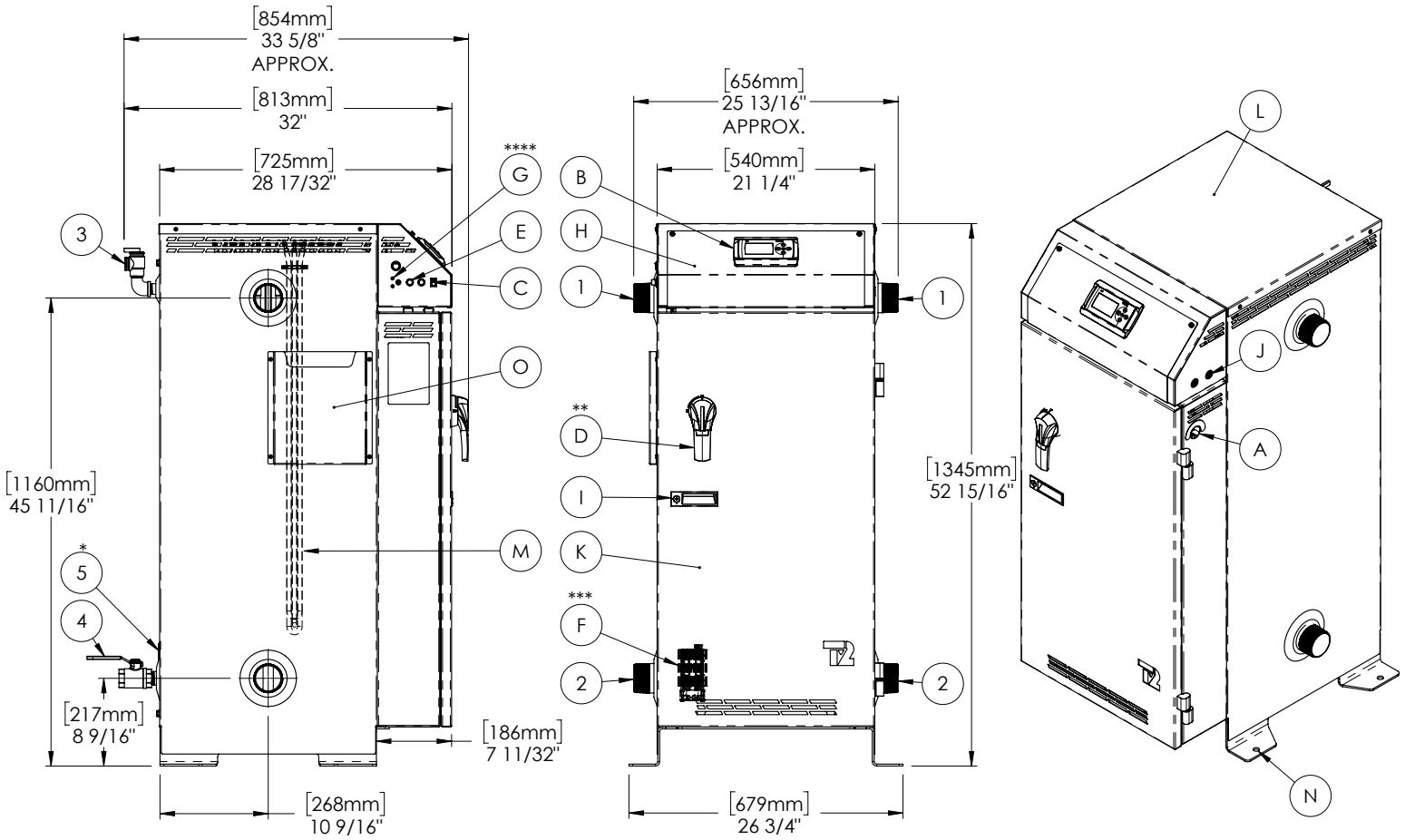
VOLTMAX, 208V, 60 Hz, 3 ph.							
Model	**Power**		**Amps**	**Elements 240V**	**STG Series**	**SCR Series**	
	KW	**BTU/h**			**Relay Stages**	**Relay Stages**	**SCR Stages**
23	22.5	76 770	62,6	2 x 15 kW	2 x 11.25 kW	1 x 11.25 kW	1 x 11.25 kW
27	27	92 124	75,1	2 x 18 kW	2 x 13.5 kW	1 x 13.5 kW	1 x 13.5 kW
34	34	116 008	93,9	3 x 15 kW	3 x 11.25 kW	2 x 11.25 kW	1 x 11.25 kW
41	40.5	138 186	112,6	3 x 18 kW	3 x 13.5 kW	2 x 13.5 kW	1 x 13.5 kW
45	45	153 540	125,1	4 x 15 kW	4 x 11.25 kW	3 x 11.25 kW	1 x 11.25 kW
54	54	184 248	150,2	4 x 18 kW	4 x 13.5 kW	3 x 13.5 kW	1 x 13.5 kW
56	56	191 072	156,4	5 x 15 kW	5 x 11.25 kW	4 x 11.25 kW	1 x 11.25 kW
68	67.5	230 310	187,7	5 x 18 kW	5 x 13.5 kW	4 x 13.5 kW	1 x 13.5 kW

208V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.

VOLTMAX, 240V, 60 Hz, 3 ph.							
Model	Power		Amps	Elements 240V	STG Series	SCR Series	
	KW	BTU/h			Relay Stages	Relay Stages	SCR Stages
30	30	102 360	72,2	2 x 15 kW	2 x 15 kW	1 x 15 kW	1 x 15 kW
36	36	122 832	86,6	2 x 18 kW	2 x 18 kW	1 x 18 kW	1 x 18 kW
45	45	153 540	108,3	3 x 15 kW	3 x 15 kW	2 x 15 kW	1 x 15 kW
54	54	184 248	129,9	3 x 18 kW	3 x 18 kW	2 x 18 kW	1 x 18 kW
60	60	204 720	144,3	4 x 15 kW	4 x 18 kW	3 x 18 kW	1 x 18 kW
72	72	245 664	173,2	4 x 18 kW	4 x 18 kW	3 x 18 kW	1 x 18 kW
75	75	255 900	180,4	5 x 15 kW	5 x 15 kW	4 x 15 kW	1 x 15 kW
240V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.							

VOLTMAX, 480V, 60 Hz, 3 ph.							
Model	Power		Amps	Elements 480V	STG Series	SCR Series	
	KW	BTU/h			Relay Stages	Relay Stages	SCR Stages
30	30	102 360	36,1	2 x 15 kW	2 x 15 kW	1 x 15 kW	1 x 15 kW
36	36	122 832	43,3	2 x 18 kW	2 x 18 kW	1 x 18 kW	1 x 18 kW
45	45	153 540	54,1	3 x 15 kW	3 x 15 kW	2 x 15 kW	1 x 15 kW
54	54	184 248	65	3 x 18 kW	3 x 18 kW	2 x 18 kW	1 x 18 kW
60	60	204 720	72,2	4 x 15 kW	4 x 15 kW	3 x 15 kW	1 x 15 kW
72	72	245 664	86,6	4 x 18 kW	4 x 18 kW	3 x 18 kW	1 x 18 kW
75	75	255 900	90,2	5 x 15 kW	5 x 15 kW	4 x 15 kW	1 x 15 kW
90	90	307 080	108,3	5 x 18 kW	5 x 18 kW	4 x 18 kW	1 x 18 kW
480V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.							

VOLTMAX, 600V, 60 Hz, 3 ph.							
Model	Power		Amps	Elements 600V	STG Series	SCR Series	
	KW	BTU/h			Relay Stages	Relay Stages	SCR Stages
30	30	102 360	28,9	2 x 15 kW	2 x 15 kW	1 x 15 kW	1 x 15 kW
36	36	122 832	34,6	2 x 18 kW	2 x 18 kW	1 x 18 kW	1 x 18 kW
45	45	153 540	43,3	3 x 15 kW	3 x 15 kW	2 x 15 kW	1 x 15 kW
54	54	184 248	52	3 x 18 kW	3 x 18 kW	2 x 18 kW	1 x 18 kW
60	60	204 720	57,8	4 x 15 kW	4 x 15 kW	3 x 15 kW	1 x 15 kW
72	72	245 664	69,3	4 x 18 kW	4 x 18 kW	3 x 18 kW	1 x 18 kW
75	75	255 900	72,2	5 x 15 kW	5 x 15 kW	4 x 15 kW	1 x 15 kW
90	90	307 080	86,6	5 x 18 kW	5 x 18 kW	4 x 18 kW	1 x 18 kW
600V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.							



* Return sensor available with the " **SCR Series** " configuration.
** Optional disconnect switch available on " THREE-PHASE" models.
*** Solid state SCR relay available with the " **SCR Series** " configuration.
**** Low water cut-off is optional on models of 60 kw or less.

BOILER CONNECTIONS		
1	Boiler outlet	2 1/2" NPT M
2	Boiler inlet	2 1/2" NPT M
3	Pressure relief valve	3/4" NPT F
4	Drain Valve	3/4" 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
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
O	Documents holder

MIN. CLEARANCES FOR INSTALLATION & MAINTENANCE	
Left & Right sides	3"/ 76mm
Rear	3"/ 76mm
Front	24" / 610mm
Bottom	0" / 0mm
Top	32" / 813mm

GENERAL INFORMATIONS	
Weight	550lbs / 250kg
Water volume	30 usgal./ 113.5 liters
Max. operating pressure	STANDARD: 60psi OPTION: 125 PSI

VOLTMAX, 480V, 60 Hz, 3 ph.							
Model	**Power**		**Amps**	**Elements 480V**	**STG Series**	**SCR Series**	
	KW	**BTU/h**			**Relay Stages**	**Relay Stages**	**SCR Stages**
99	99	337 788	119,1	3 x 15 kW 3 x 18 kW	3 x 33 kW	2 x 33 kW	1 x 33 kW
108	108	368 496	129,9	6 x 8 kW	3 x 36 kW	2 x 36 kW	1 x 36 kW
120	120	409 440	144,3	8 x 15 kW	4 x 30 kW	3 x 30 kW	1 x 30 kW
132	132	450 384	158,8	4 x 15 kW 4 x 18 kW	4 x 33 kW	3 x 33 kW	1 x 33 kW
144	144	491 328	173,2	8 x 18 kW	4 x 36 kW	3 x 36 kW	1 x 36 kW
150	150	511 800	180,4	10 x 15 kW	5 x 30 kw	4 x 30 kw	1 x 30 kw
165	165	562 980	198,5	5 x 15 kW 5 x 18 kW	5 x 33 kW	4 x 33 kW	1 x 33 kW
180	180	614 160	216,5	10 x 18 kW	5 x 36 kW	4 x 36 kW	1 x 36 kW

480V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.

VOLTMAX, 600V, 60 Hz, 3 ph.							
Model	**Power**		**Amps**	**Elements 600V**	**STG Series**	**SCR Series**	
	KW	**BTU/h**			**Relay Stages**	**Relay Stages**	**SCR Stages**
99	99	337 788	95,3	3 x 15 kW 3 x 18 kW	3 x 33 kW	2 x 33 kW	1 x 33 kW
108	108	368 496	103,9	6 x 8 kW	3 x 36 kW	2 x 36 kW	1 x 36 kW
120	120	409 440	115,5	8 x 15 kW	4 x 30 kW	3 x 30 kW	1 x 30 kW
132	132	450 384	127	4 x 15 kW 4 x 18 kW	4 x 33 kW	3 x 33 kW	1 x 33 kW
144	144	491 328	138,6	8 x 18 kW	4 x 36 kW	3 x 36 kW	1 x 36 kW
150	150	511 800	144,3	10 x 15 kW	5 x 30 kw	4 x 30 kw	1 x 30 kw
165	165	562 980	158,8	5 x 15 kW 5 x 18 kW	5 x 33 kW	4 x 33 kW	1 x 33 kW
180	180	614 160	173,2	10 x 18 kW	5 x 36 kW	4 x 36 kW	1 x 36 kW

600V 3-phase electrical supply (L1-L2-L3) with three 90 °C conductors and a ground.