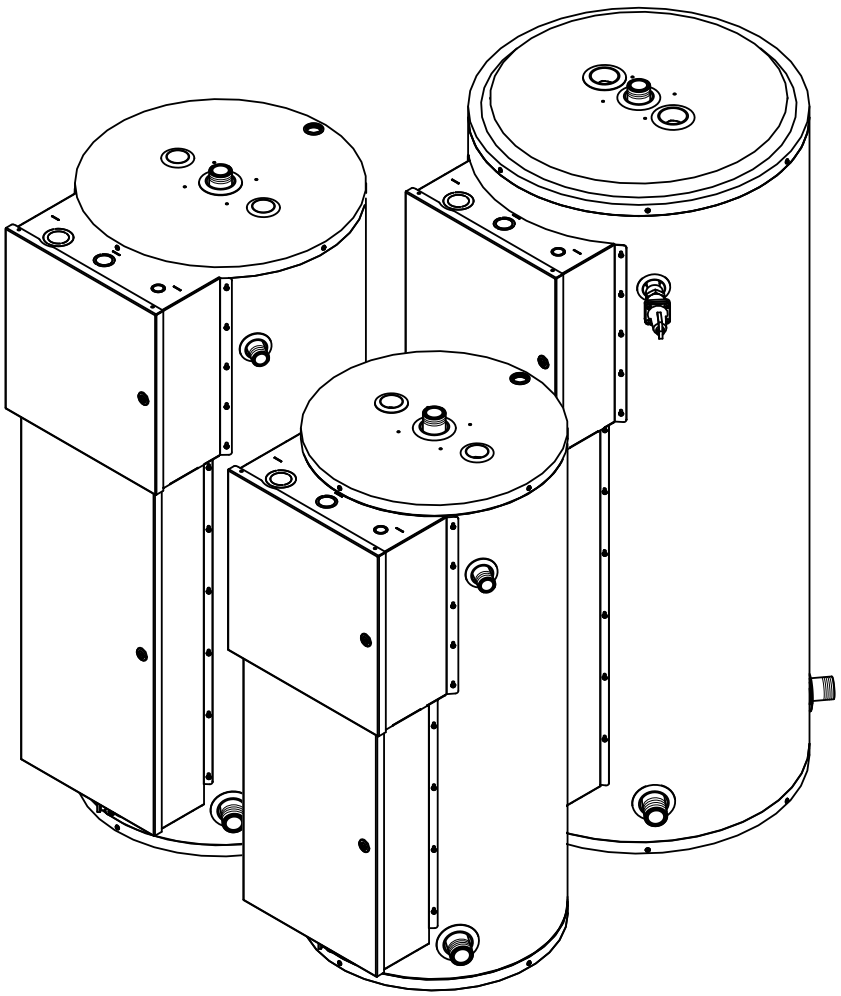
COMMERCIAL ELECTRIC WATER HEATERS, FLEXIBLE CONVERSION KIT INSTRUCTION MANUAL

Model 105, 108 &112



VOLT WATTS PHASE

CONVERSION

⚠ WARNING

This conversion kit shall be installed by qualified service personnel only. The conversion shall be carried out in accordance with the requirements of the local authority having jurisdiction; and local and national electrical codes.

⚠ WARNING

Disconnect from power supply before attempting the conversion procedure. Additional safety lockout procedures may be required! Read all instructions before proceeding with the conversion procedure.

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The purpose of this manual is to explain how to change the voltage, wattage or phase of your commercial electric water heater by changing the wiring configuration or the elements. This manual is not intended to explain the rebuilding of commercial electric water heaters in the field.

The addition or removal of heating elements in reference to the original model of water heater is not permitted by the Certification Agency. This modification shall not be attempted.

IMPORTANT

READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING THE CONVERSION. PROPER CONVERSION WILL PROVIDE SAFE AND EFFICIENT SERVICE, AND AVOID NEEDLESS EXPENSE NOT COVERED BY THE WARRANTY. SHOULD YOU HAVE ANY QUESTIONS, PLEASE CONTACT YOUR LOCAL DEALER OR REFER TO THE *GETTING SERVICE FOR YOUR WATER HEATER* SECTION OF THIS MANUAL. SAVE THIS MANUAL FOR FUTURE REFERENCES.

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Conversion Kit

This conversion kit shall contain the following items:

— One (1) manual “Conversion kit instruction”;
— Two (2), three (3), four (4) six (6) or nine (9) replacement elements with gaskets (Depending on the conversion kit model number);
— Four (4) 5/8” screws per element;
— One (1) conversion rating plate;
— Two (2) conversion labels (English & French).

Note: Always make sure kits are complete before starting the conversion process.

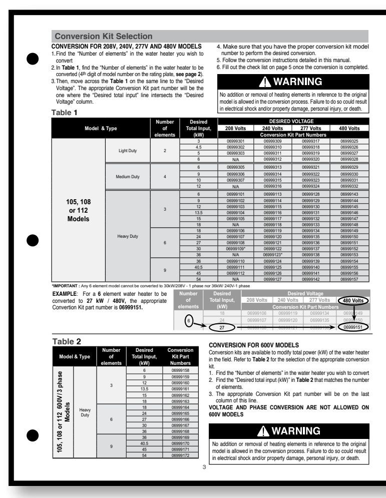
Conversion Guidelines

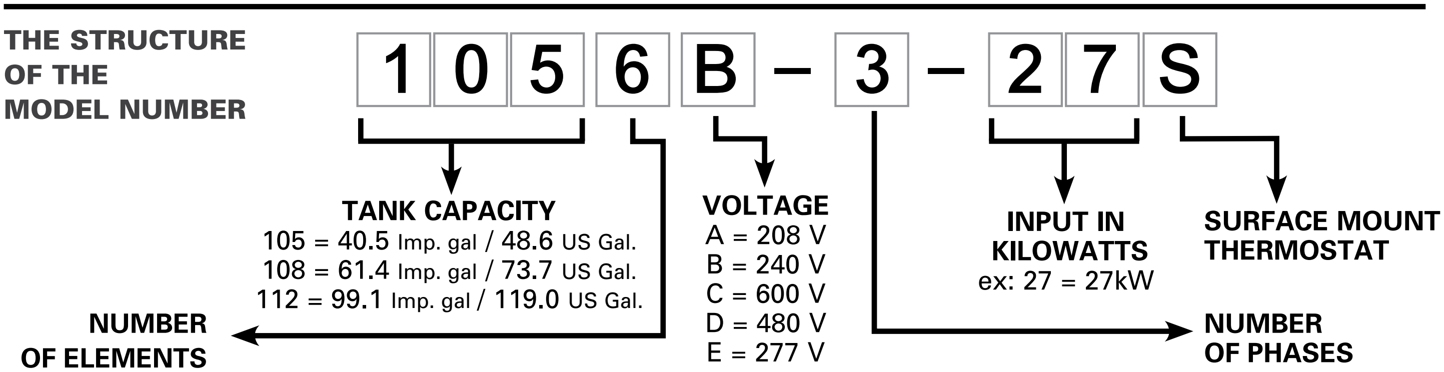
- Water heater model number allowed for conversion must start with the following: 105, 108 or 112 and must have been manufactured **after January 1st, 2020** (see rating plate);
- No addition or removal of heating elements in reference to the original model is allowed in the conversion process;
- Conversion kits for 208V, 240V, 277V and 480V are designed for specific voltages and wiring configuration (three phase “Delta”). No other voltage or configuration is allowed;
- Conversion kits for 600V models are supplied with 347V elements because of the three phase “Star” wiring configuration. **CAUTION: The 600V Models cannot be converted to any other voltages nor can they be converted to single phase.**

Conversion Tables

Refer to Table 1 for 208V, 240V, 277V and 480V Models

Refer to Table 2 for 600V Models





Conversion Kit Selection

CONVERSION FOR 208V, 240V, 277V AND 480V MODELS

1. Find the "Number of elements" in the water heater you wish to convert
2. In **Table 1**, find the "Number of elements" in the water heater to be converted (4th digit of model number on the rating plate, **see page 2**).
3. Then, move across the **Table 1** on the same line to the "Desired Voltage". The appropriate Conversion Kit part number will be the one where the "Desired total input" line intersects the "Desired Voltage" column.
4. Make sure that you have the proper conversion kit model number to perform the desired conversion.
5. Follow the conversion instructions detailed in this manual.
6. Fill out the check list on page 5 once the conversion is completed.

⚠ WARNING

No addition or removal of heating elements in reference to the original model is allowed in the conversion process. Failure to do so could result in electrical shock and/or property damage, personal injury, or death.

Table 1

Model & Type		Number of elements	Desired Total Input, (kW)	DESIRED VOLTAGE			
				208 Volts	240 Volts	277 Volts	480 Volts
				Conversion Kit Part Numbers			
105, 108 or 112 Models	Light Duty	2	3	06999301	06999309	06999317	06999325
			4.5	06999302	06999310	06999318	06999326
			5	06999303	06999311	06999319	06999327
			6	N/A	06999312	06999320	06999328
	Medium Duty	4	6	06999305	06999313	06999321	06999329
			9	06999306	06999314	06999322	06999330
			10	06999307	06999315	06999323	06999331
			12	N/A	06999316	06999324	06999332
	Heavy Duty	3	6	06999101	06999113	06999128	06999143
			9	06999102	06999114	06999129	06999144
			12	06999103	06999115	06999130	06999145
			13.5	06999104	06999116	06999131	06999146
			15	06999105	06999117	06999132	06999147
			18	N/A	06999118	06999133	06999148
		6	18	06999106	06999119	06999134	06999149
			24	06999107	06999120	06999135	06999150
			27	06999108	06999121	06999136	06999151
			30	06999109*	06999122	06999137	06999152
			36	N/A	06999123*	06999138	06999153
		9	36	06999110	06999124	06999139	06999154
			40.5	06999111	06999125	06999140	06999155
			45	06999112	06999126	06999141	06999156
			54	N/A	06999127	06999142	06999157

***IMPORTANT :** Any 6 element model cannot be converted to 30kW/208V - 1 phase nor 36kW/ 240V-1 phase

EXAMPLE: For a **6** element water heater to be converted to **27 kW** / **480V,** the appropriate Convertion Kit part number is **06999151.**

Number of elements	Desired Total Input, (kW)	Desired Voltage			
		208 Volts	240 Volts	277 Volts	480 Volts
		Conversion Kit Part Numbers			
6	18	06999106	06999119	06999134	06999149
	24	06999107	06999120	06999135	06999150
	27	06999108	06999121	06999136	06999151

Table 2

Model & Type		Number of elements	Desired Total Input, (kW)	Conversion Kit Part Numbers
105, 108 or 112 600V/3 phase Models	Heavy Duty	3	6	06999158
			9	06999159
			12	06999160
			13.5	06999161
			15	06999162
			18	06999163
		6	18	06999164
			24	06999165
			27	06999166
			30	06999167
			36	06999168
		9	36	06999169
			40.5	06999170
			45	06999171
			54	06999172

CONVERSION FOR 600V MODELS

Conversion kits are available to modify total power (kW) of the water heater in the field. Refer to **Table 2** for the selection of the appropriate conversion kit.

1. Find the "Number of elements" in the water heater you wish to convert
2. Find the "Desired total input (kW)" in **Table 2** that matches the number of elements.
3. The appropriate Conversion Kit part number will be on the last column of this line.

VOLTAGE AND PHASE CONVERSION ARE NOT ALLOWED ON 600V MODELS

⚠ WARNING

No addition or removal of heating elements in reference to the original model is allowed in the conversion process. Failure to do so could result in electrical shock and/or property damage, personal injury, or death.

Conversion Instructions

The conversion of a commercial electric water heater may require modification to the total input (kW), the voltage or the phase. The conversion may involve modification to one, two or all three of these electrical characteristics.

⚠ WARNING

Disconnect from power supply before attempting the conversion procedure. Additional safety lockout procedures may be required!

Read all instructions before proceeding with the conversion procedure. Failure to do so may result in property dammage, personal injury or death.

Water Heater Preparation

Before you start the conversion, make sure that you have the proper conversion kit model number in order to perform the desired conversion.

If the water heater needs to be shipped after the conversion is completed, make sure not to damage the cardboard box when performing the conversion. A dash line has been punched into the front of the cardboard box to give access to the control panel and element panel of the water heater. Gently remove the dashed portion of the box to gain access to the water heater. If there is no dash line punched into the cardboard box, the box will have to be removed completely by removing staples and then sliding it upward over the water heater.

Open the element access panel and electrical junction box (if required) by releasing the two turn lock screws using a flat screw driver.

Remove the fiberglass insulation from the element panel to expose the elements.

⚠ WARNING

Conversion process shall be performed before initial installation. Otherwise, special care shall be taken to disconnect power and to completely drain the tank before attempting next steps.

Wattage Conversion (kW)

1- Open the conversion kit box and check each element to ensure that they have the correct voltage and wattage marking on the flange for your conversion.

2- Measure the ohm resistance across the terminals of each element. Elements must be disconnected from the circuit. Refer to Table 3 for ohms values for all elements used in commercial electric water heater. Ohms resistance should be within ± 5% of the values in **Table 3**.

3- Remove both wires from the element installed on the tank, one element at a time.

4- Remove the four bolts securing the element to the tank using a 5/8" socket.

5- Remove the element and gasket.

6- Clean the tank flange surfaces of any dirt or debris.

7- Install the new element and gasket provided in the kit. Use four new 5/8" screws provided and tighten them in a diagonal pattern. Do not over tighten the screws or damage will occur. Make sure to install the elements in the position described in the **Figure 1**. (Orientation of the text on the element flange is important.)

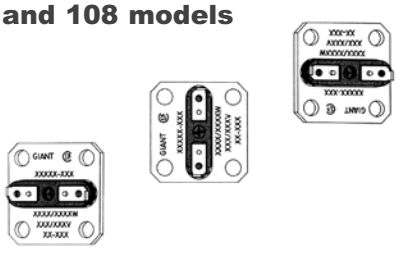
8- If a thermostat was installed on that element, make sure to re-install such thermostat bracket over the element. Insert the thermostat behind the bracket. Check that the thermostat is in contact with the tank. If necessary, bend the clips towards the tank to provide more pressure on the thermostat.

9- Reconnect the wires to the element terminals. Consult the wiring diagram located inside the control panel door for proper connections.

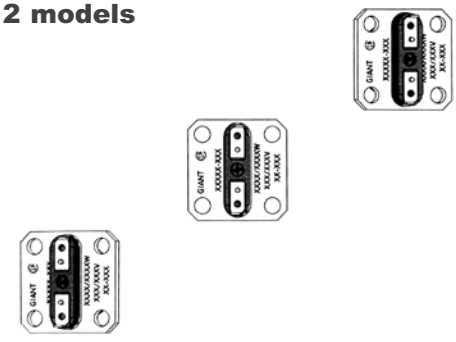
10- Repeat steps 3 through 9 for all elements on the tank.

Figure 1

105 and 108 models



112 models

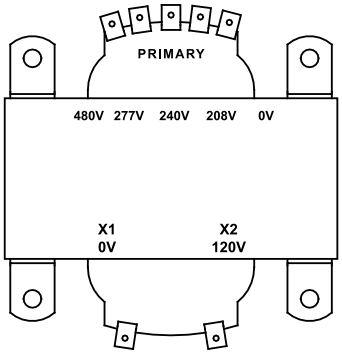


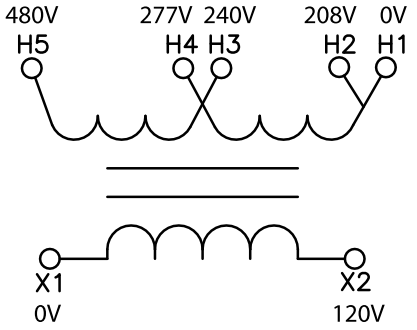
Voltage Conversion

A voltage conversion will require that all elements be replaced.

Surface Mount Thermostat:

1. Install the appropriate heating elements. See previous section "***Wattage Conversion (kW)***".
2. Change the voltage tap on the control transformer. Each heavy duty model is equipped with a control transformer having 5 connections: common (0V), 208V, 240V, 277V and 480V as well as secondary connections: 0V and 120V. See the following figures. **Only one wire needs to be changed on the control transformer in order to change voltage.** Remove the wire from the terminal marked 208V, 240V, 277V or 480V and attach it to the appropriate terminal marked 208, 240, 277 or 480 for the conversion.





CAUTION: 600V WATER HEATERS CANNOT BE CONVERTED TO ANY OTHER VOLTAGES.

Phase Conversion

Phase conversion applies only to 208, 240 or 480 Volts water heater models with three (3), six (6) or nine (9) elements.

⚠ WARNING

600V Models cannot be converted to Single Phase. 277V Models cannot be converted to Three Phases.

⚠ WARNING

Two (2) and four (4) element water heaters are single phase only and cannot be converted to three (3) phase.

⚠ WARNING

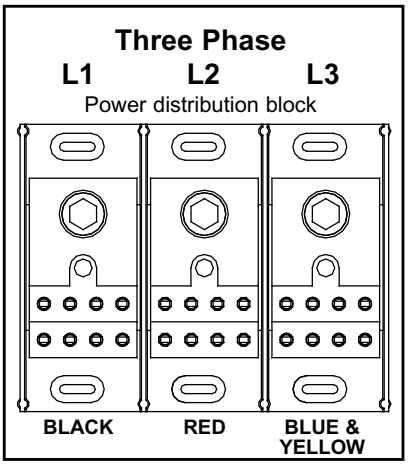
Disconnect the power supply before proceeding with the conversion. Read all guidelines before proceeding with the conversion

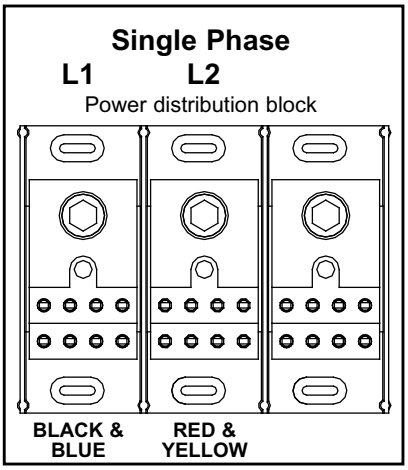
Surface mount thermostat – Three phase to single phase

1. Disconnect all blue wires and yellow wires from terminal L3 on the power distribution block.
2. Reconnect all blue wires to terminal L1.
3. Reconnect all yellow wires to terminal L2.
4. Connect incoming power to terminal block L1 and L2.

Surface mount thermostat – Single phase to three phase

1. Disconnect all blue wires from terminal L1 on the power distribution block.
2. Disconnect all yellow wires from terminal L2.
3. Reconnect all blue and yellow wires to terminal L3.
4. Connect incoming power to terminal block L1, L2 and L3.





Note : Actual part may differ slightly from illustration depending on model.

Verification

Check that all electrical connections are tightly secured and that wire routings are neat and orderly. Make sure that you have done the proper wiring as specified in these instructions and on the wiring diagram.
NEVER OPERATE the water heater before it is completely filled with water.

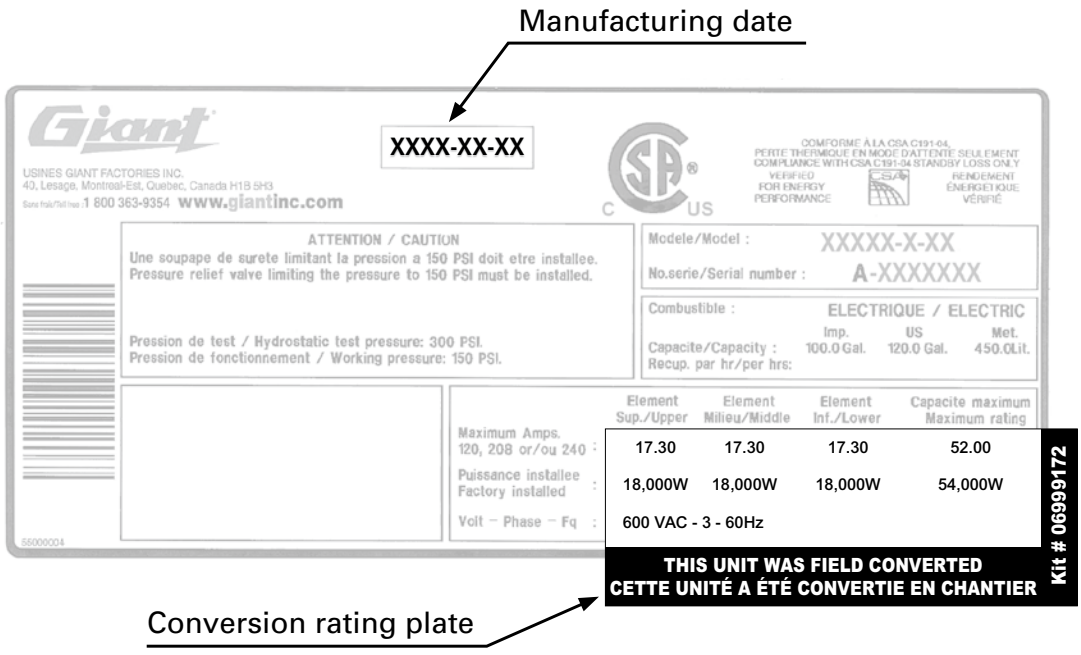
Final assembly

Replace the fiberglass insulation in the element panel to cover all elements and thermostat(s) as originally constructed.

Close the element access panel and electrical junction box (if required) by tightening the turn-lock screw(s) using a flat screw driver.

1- Check that the conversion rating plate information matches the conversion you have just completed. Install the conversion rating plate **over the right bottom part of the original rating plate** of the water heater. Make sure that the conversion rating plate **covers the electrical specifications of the original rating plate** as illustrated below.

1



2- Install the conversion label as close as possible to the rating plate. **Make sure to fill out** the required information on the label: Date of conversion and who converted the water heater.

If the water heater needs to be shipped once the conversion is completed, **make sure to cross out the water heater electrical specifications on the shipping label located on the top corner of the cardboard box**. Use a black marker to **write the new electrical specifications on the cardboard box**, matching those on the conversion rating plate. Close and tape the dashed portion of the cardboard box that was opened to gain access to the water heater. If the cardboard box was removed, insert the cardboard box over the water heater and staple it on the wooden pallet.

2

CONVERSION LABEL

Refer to the "**CONVERSION INSTRUCTIONS**" provided with the conversion kit for important information on the conversion of this water heater.

This water heater was converted

with kit No.:_____on _____
(day/month/year)

by:_____

_____
(name and address of organization making this conversion, who accepts the responsibility for the accuracy of this conversion).

Affix this conversion label as close as possible to the existing rating plate.

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Check List

Replacement elements and gaskets have been installed properly and have been checked for tightness. . . . . ☐
Replacement elements have been wired as per instructions and wiring diagram label on the unit.. . . . . ☐
All connections have been checked for tightness.. . . . . ☐
Replacement elements have been leak checked.. . . . . ☐
Fiberglass insulation has been re-installed over the heating elements and thermostats.. . . . . ☐
Appropriate voltage and phase change have been performed as per instructions and wiring diagram label on the unit.. ☐
Conversion rating plate and conversion label have been installed as instructed. . . . . ☐
Water heater has been filled with water.. . . . . ☐
Full load current values of **TABLE 4** are compatible to supply line voltage.. . . . . ☐

Miscellaneous Information

All elements are marked with both wattage and voltage. Verification can be made by measuring the ohms resistance across the element terminals. Element must be disconnected from the circuit. The following table gives resistance in ohms for all elements used in commercial electric water heaters. Element ohms resistance should be within ±5% of the values below.

Ohms Resistance Table 3

	Voltage				
Wattage	208	240	277	480	347
2,000	21.63	28.80	38.36	115.20	72.00
3,000	14.42	19.20	25.58	76.80	40.14
4,000	10.82	14.40	19.18	57.60	30.10
4,500	9.61	12.80	17.5	51.20	26.76
5,000	8.65	11.52	15.35	46.80	24.08
6,000		9.60	12.79	38.40	20.07
7,000					17.20

NOTE: Based on Ohms law. Results can vary depending on temperature.

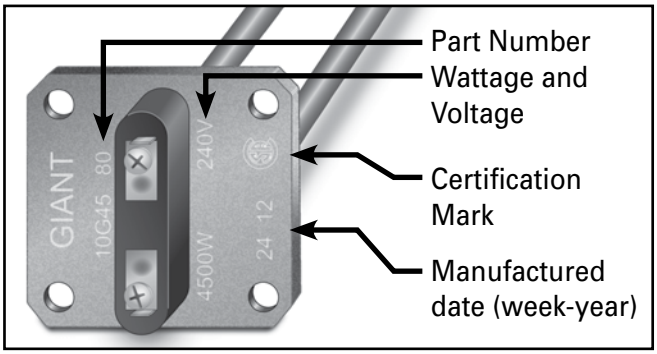

Table 4

Total Full Load Current in Amperes									
Total Input, kW	Voltage								
	208 Volts		240 Volts		277 Volts	480 Volts		600 Volts	
	1ph	3ph	1ph	3ph	1ph	1ph	3ph	3 ph	347V
3	14.4	—	12.5	—	10.8	6.3	—	—	
4.5	18.3	—	18.8	—	16.3	9.4	—	—	
5	24.0	—	20.8	—	18.0	10.4	—	—	
6	28.8	16.7	25.0	14.4	21.7	12.5	7.2	5.8	
9	43.3	25.0	37.5	21.7	32.5	18.8	10.8	8.7	
10	48.0	—	41.6	—	36.0	20.8	—	—	
12	57.7	33.3	50.0	28.9	43.5	25.0	14.4	11.5	
13.5	64.9	37.5	56.3	32.5	48.7	28.1	16.2	13.0	
15	72.1	41.6	62.5	36.1	54.2	31.3	18.0	14.4	
18	86.5	50.0	75.0	43.3	65.0	37.5	21.7	17.3	
24	115.4	66.6	100.0	57.7	86.6	50.0	28.9	23.1	
27	129.8	74.9	112.5	65.0	97.5	56.3	32.5	26.0	
30	144.2	83.3	125.0	72.2	108.3	62.5	36.1	28.9	
36	173.1	99.9	150.0	86.6	130.0	75.0	43.3	34.6	
40.5	194.7	112.4	168.8	97.4	146.2	84.4	48.7	39.0	
45	216.3	124.9	187.5	108.3	162.5	93.8	54.1	43.3	
54	—	—	255.0	129.9	194.9	112.5	65.0	52.0	
63	—	—	—	—	—	—	—	60.0	

Always make sure that full load current is compatible with electrical wire gage before turning **ON** the power supply to the water heater.

Getting service for your Water Heater

Refer to the "***GETTING SERVICE FOR YOUR WATER HEATER***" section in the Owner's Manual supplied with your Water Heater.

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