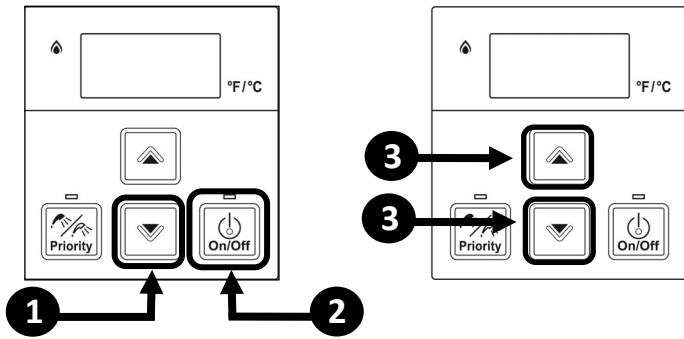


PERFORMANCE DATA

To Obtain Performance Data:

- Press and hold the **▼(Down)** button.
- While holding the **▼(Down)** button for 2 seconds, press and hold the "On/Off" button (hold both buttons simultaneously).
- Use the **▲(Up)** and **▼(Down)** buttons to scroll to the desired performance information described below.



Performance Data Table

#	DATA	UNIT
01	Water Flow Rate	x0.1 gal/min
02	Outgoing Temperature	*F
03	Combustion Hours	x100 Hours
04	Combustion Cycles	See following information
05	Fan Frequency	Hz
06	Additional Controllers Connected	See following information
07	Water Flow Control Position	0=Mid, 1=Open, 2=Closed
08	Inlet Temperature	*F
09	Fan Current	x10 mA
11	HEX Outlet Temperature	*F
12	By-Pass Flow Control Position	Degrees of opening
17	Freeze Protection Temperature	*F
19	Pump Hours	x100 Hours
20	Pump Cycles	See following information
30	Upper Tank Thermistor Temperature	*F
31	Lower Tank Thermistor Temperature	*F

04	Combustion Cycles
20	Pump Cycles

DISPLAY	CYCLE COUNT
000 to 999	x100 (0 to 99,900)
10- to 99-	x10,000 (100,000 to 990,000)
1-- to 6--	x1,000,000 (1,000,000 to 6,000,000)

05	Controllers Connected	
CONTROLLER MODEL	CONNECTED	NOT CONNECTED
MC	...1	...0
BC	...1	...0
BSC & BSC2	1... 2... (QTY2)	0...

Default display is 100.
... depends on connection status of another controller.

MANIFOLD PRESSURE SETTINGS

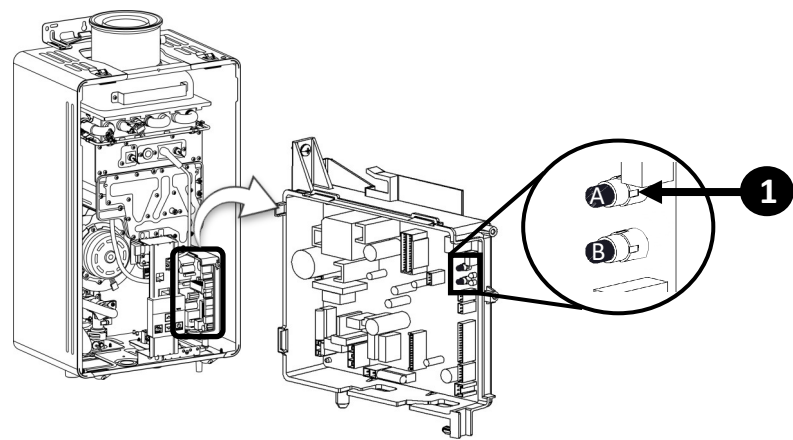
Ensure gas pressure check under Commissioning has been completed first! The regulator is electronically controlled and factory pre-set. Under normal circumstances it does not require adjustment during installation. Make adjustments only if the unit is not operating correctly and all other possible causes for incorrect operation have been eliminated.

- Turn off the gas supply.
- Turn off the 120 V power supply.
- Remove the front panel from the appliance.
- Turn on the 120 V power supply.
- Check the gas type using the data plate on the side of the unit and parameter setting 10 (refer to Parameter Settings section). (A=LPG, B=NG).
- Remove test port screw and attach the manometer to the burner test point, located on the manifold.
- Turn on the gas supply.
- Flow water through the water heater at the maximum flow rate obtainable. (At least 3 gallons per minute is recommended. If there is not enough water flowing, the water heater could shut off or sustain damage due to overheating.)
- Push and hold "A" button. "1F" will appear on the display.
- Push and hold "A" button. "Forced Low" will appear on the display.
- Push and hold "A" button again. "Forced High" will appear on the display.
- While in "Forced Low" or "Forced High", use the Up button on the controller to increase the pressure. Use the Down button to decrease the pressure.
- To exit "Forced Low" or "Forced High", push and hold "B" button. "2L" will appear on the display.
- Push and hold "B" button again. "3C" will appear on the display. (Indoor models only).
- Push and hold "B" button again. "4T" will appear on the display.
- Push and hold "B" button again. The set temperature will appear on the display (indoor models only).
- Close hot water taps.
- Turn off the gas supply and 120 V power supply.
- Remove the manometer and re-install the sealing screw.
- Turn on the gas supply and 120 V power supply.
- Operate the unit and check for gas leaks.
- Install the front panel.

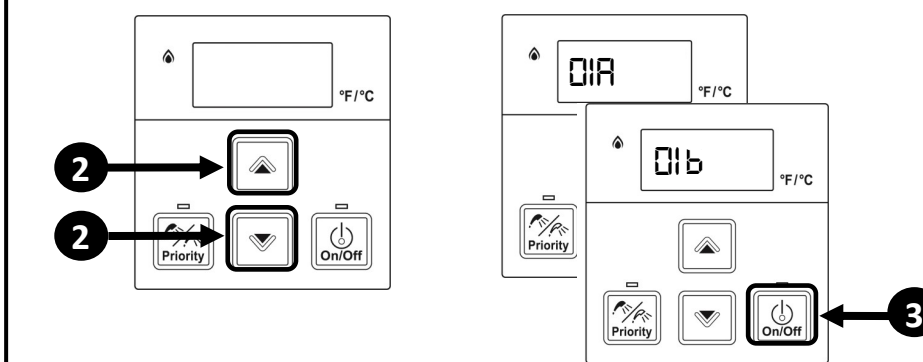
PARAMETER SETTINGS

To Adjust the Parameters:

- Press the "A" button for 1 second.



- Use the **▲(Up)** and **▼(Down)** button on the controller to select a setting number (See *Parameter Settings Table*).
- Once the desired setting number is selected, use the "On/Off" button on the controller to change the selection for the setting number. Example: Display will change from 01A to 01b for Maximum Temperature setting (as shown below).
- To exit the parameters, press the "A" button on the PC board for 1 second.



Parameter Settings Table

SETTING #	SETTING DESCRIPTION	SELECTION			
		a	b	c	d
02	High Altitude (Installation Location)	0 - 2,000 ft (0-610 m)	2,001 - 5,400 ft (610 - 1,646 m)		
03*	Service Soon	Disable	0.5 Year	1 Year	2 Years
10**	Gas Type (Factory Set)	LPG	NG		
50***	Retrofit Application	Disable (Default)	Enable		

* See "Service Indicator (Service Soon, SS)" section in Installation and Operation Manual for more information Service Soon.

** Factory set. Only used with approved conversion kit.

*** Factory set. Do not adjust unless instructed by Technical Support.

Note: For additional installation and commissioning information, refer to the Installation and Operation Manual.

WARNING This appliance must be installed, serviced and removed by a trained and qualified person. During pressure testing of the consumer piping, ensure gas valve is turned off before unit is shut off. Failure to do so may result in serious injury to yourself or damage to the unit.

Commissioning

With all gas appliances in operation at maximum gas rate, the following inlet gas pressure at the incoming test point on the Rinnai water heater should read 4 in. wc - 10.5 in. wc on natural gas and 8 in. wc - 13.0 in. wc on propane gas. If the pressure is lower, the gas supply is inadequate and the unit will not operate to specification. Check the gas meter regulator and pipework for correct operation/sizing and correct as required.

Gas Type	Gas Inlet (W.C.)		Forced Low (W.C.)	Forced High (W.C.)
	Min	Max		
NG	4.0	10.5	0.7	2.56
LP	8.0	13.0	1.1	4.24

ELECTRICAL DIAGNOSTICS

NOTE: Wiring diagram is available in manual and on the inside front cover.

Important Safety Notes

There are a number of (live) tests required when performing electrical diagnostics on this product. Proceed with caution at all times to avoid contact with energized components inside the water heater. Only trained and qualified service technicians should attempt to repair this product. Before checking for resistance readings, disconnect the power source to the unit and isolate the item from the circuit (unplug it).

Freeze Protection

This unit has freeze protection heaters mounted at different points to protect the water heater from freezing. All of them should display a positive resistance reading.

Flame Rod

Place one lead of your meter to the flame rod and the others to ground. When the unit is attempting to ignite, you should read more than 0.5 VAC.

Amp Fuses

This unit has two glass fuses located on the PC Board, one inline (10) amp and one (4) amp glass fuse. Remove the fuses and check continuity through it. If you have continuity through each fuse then it is functioning. Otherwise the fuse is blown and must be replaced. Note: RE140I/e does not have a 4 amp fuse.

Thermistors

Check all thermistors by inserting meter leads into each end of the thermistor plug. Set your meter to the 20 K scale and read resistance. Applying heat to the thermistor bulb should decrease the resistance. Applying ice to the thermistor bulb should increase the resistance. Below are examples of typical temperatures and resistance readings.

Temperature	Resistance Readings
59°F	11.4 - 14KΩ
86°F	6.4 - 7.8KΩ
113°F	3.6 - 4.5KΩ
140°F	2.2 - 2.7KΩ
221°F	0.6 - 0.8KΩ

Electrical Circuit Table

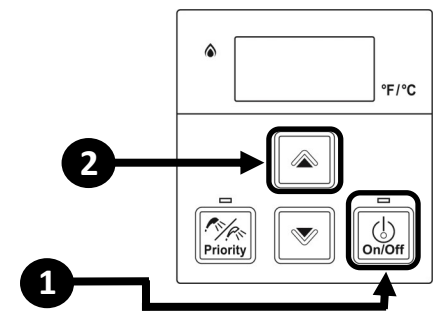
COMPONENT	WIRE COLOUR	VOLTAGE	RESISTANCE	PCB	
				Connector	PIN
Power Supply	Black-White	AC108~132V	N/A	CN100	1-3
Flame Rod	Yellow-Body	more than 0.5VAC	N/A	CN9	37
	Pink-Body	more than 0.5VAC	N/A	CN7	1
Spark Electrode	White-Black	11~14VDC*	N/A	CN9	5-8
Combustion Fan	Red-Black	7~48VDC*	N/A	CN9	1-3
	White-Black	2~14VDC*	N/A	CN9	2-3
Water Flow Control Device	Yellow-Black	11~14VDC	N/A	CN9	4-3
	Red-Pink	N/A	40~60Ω	CN9	21-19
	Blue-White	N/A	40~60Ω	CN9	25-23
	Orange-Grey	11~14VDC	N/A	CN9	6-13
By-Pass Flow Control Device (2737, 2432 model only)	Brown-Grey	limitter On: less than 1VDC limitter Off: 4~6VDC	N/A	CN9	17-13
	Red-Pink	N/A	40~60Ω	CN9	29-27
Main Solenoid Valve	Blue-White	N/A	40~60Ω	CN9	33-31
	Black-Black	8~13.5VDC	15~25Ω	CN9	18-32
Modulating Solenoid Valve	Yellow-Yellow	2~17VDC*	10~20Ω	CN9	12-14
Solenoid Valve 1	Blue-Black	8~13.5VDC	20~30Ω	CN9	24-22
Solenoid Valve 2	Yellow-Black	8~13.5VDC	20~30Ω	CN9	26-22
Solenoid Valve 3	Red-Black	8~13.5VDC	20~30Ω	CN9	28-22
Solenoid Valve 4 (2737, 2432, 2730 model only)	Orange-Black	8~13.5VDC	20~30Ω	CN9	30-22
Outgoing Water Thermistor	White-White			CN7	11-13
	White-White	59°F: 11.4-14kΩ 86°F: 6.4-7.8kΩ 113°F: 3.6-4.5kΩ 140°F: 2.2-2.7kΩ		CN7	4-5
Inlet Thermistor	White-White	221°F: 0.6-0.8kΩ		CN7	9-6
Heat Exchanger Thermistor	White-White	Disconnect the connector and measure at thermistor side.		CN7	8-4
Intake Thermistor (Indoor type only)	White-White	32°F: 32.0-32.7kΩ 120°F: 3.6-3.7kΩ 140°F: 2.4-2.5kΩ 180°F: 1.1-1.2kΩ		CN7	12-6
Upper Tank Thermistor	White-White	N/A	Disconnect the connector and measure at thermistor side.	CN7	6-7
Lower Tank Thermistor	White-White	N/A	Disconnect the connector and measure at thermistor side.	CN7	3-4
Freeze Protection Thermistor (Outdoor type only)	White-White	32°F: 38k-43k 50°F: 22k-26k		CN7	10-6
	Black-Black	less than 1VDC	less than 1Ω	CN9	10-16
Overheat Switch	Red-Black	11~14VDC		CN9	7-11
	Yellow-Black	4~7VDC* Comment: more than 6Hz (1.0L/min)	N/A	CN9	9-11
DDR Pump	White-Black	AC108~132V*	N/A	C101	1-2
Additional Controller(s)	White-White	11~14VDC	N/A	CN4	1-3
Thermal Fuse	White-White	less than 1VDC	less than 1Ω	CN9	20-34

(* Value to be measured while unit is in operation)

DIAGNOSTIC CODES

To Display Diagnostic Codes:

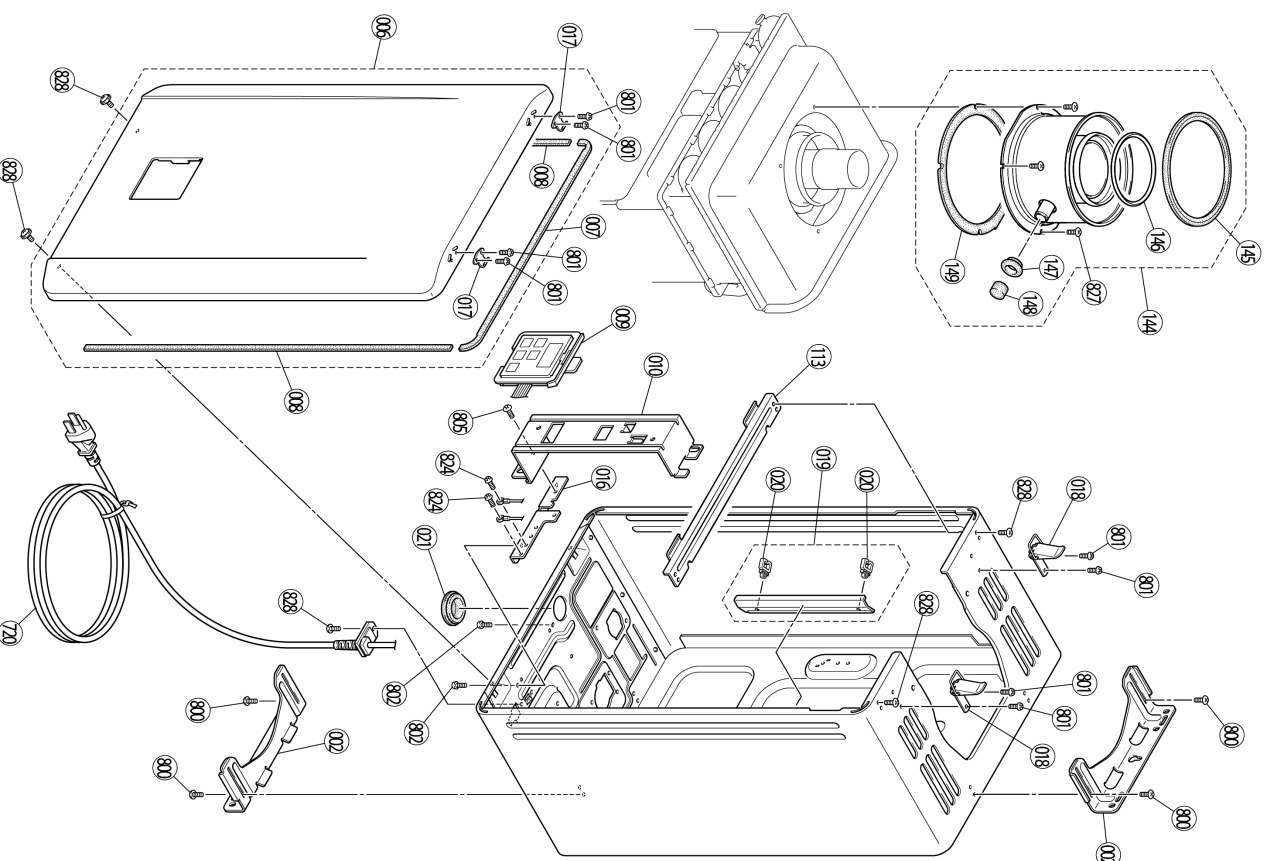
- Turn off the water heater by pressing the "On/Off" button.
- Press and hold the "On/Off" for 2 seconds and then the **▲(Up)** button simultaneously.
- The last 9 maintenance codes display and flash one after the other.
- To exit diagnostic codes and return the water heater to normal operation, press and hold the "On/Off" button for 2 seconds and then the **▲(Up)** button simultaneously.
- Turn on the water heater by pressing the "On/Off" button.



I0	Air Supply or Exhaust Blockage <ul style="list-style-type: none"> Ensure approved venting materials are being used. Check that nothing is blocking the flue inlet or exhaust. Check all vent components for proper connections. Ensure vent length matches with the vent lengths set in the parameter settings. Verify High Altitude setting is set properly. (See Parameter Setting) Check fan for blockage. 	51	Inlet Water Temperature Thermistor <ul style="list-style-type: none"> Check sensor wiring for damage. Measure resistance of sensor. (See Electrical Diagnostics) Replace sensor if necessary.
I1	No Ignition (Heater Not Turning On) <ul style="list-style-type: none"> Check that the gas is turned on at the water heater, meter, or propane cylinder. If the system is propane, make sure that gas is in the tank. Bleed all air from the gas line. Ensure appliance is properly grounded. Ensure gas type and pressure is correct. Ensure gas line, meter, and/or regulator is sized properly. Verify parameter setting are set properly. Ensure igniter is operational. Check igniter wiring harness for damage. Check gas solenoid valves for open circuits. Ensure flame rod wire is connected. Check flame rod for carbon build-up. Remove burner cover and ensure burners are properly seated. Remove burner plate; inspect burner surface for condensation/debris. Check the ground wire for the PC board. 	52	Modulating Solenoid Valve Signal <ul style="list-style-type: none"> Check modulating gas solenoid valve wiring harness for loose or damaged terminals. Measure resistance of valve coil.
I2	No Flame <ul style="list-style-type: none"> Check that the gas is turned on at the water heater, meter, or cylinder. Check for obstructions in the flue outlet. If the system is propane, make sure that gas is in the tank. Ensure gas line, meter, and/or regulator is sized properly. Ensure gas type and pressure is correct. Bleed all air from gas lines. Ensure proper venting material was installed. Ensure condensation collar was installed properly. Ensure vent length is within limits. Verify parameter setting are set properly. Check power supply for loose connections. Check power supply for proper voltage and voltage drops. Ensure flame rod wire is connected. Check flame rod for carbon build-up. Disconnect and reconnect all wiring harnesses on unit and PC board. Check gas solenoid valves for open circuits. Remove burner plate; inspect burner surface for condensation/debris. 	53	Recovery Low Flow <ul style="list-style-type: none"> Ensure the inlet water filter is clean and free of debris. Ensure parameter setting are correctly set. Ensure pump supply voltage. Check the wiring harness to the pump and PCB for damaged and/or loose connections. Ensure air is removed from the recovery lines.
I4	Thermal Fuse <ul style="list-style-type: none"> Check for restrictions in air flow around unit and vent terminal. Check gas type of unit and ensure it matches gas type being used. Check for low water flow in a circulating system causing short-cycling. Check for foreign materials in combustion chamber and exhaust piping. Check heat exchanger for cracks or separations. Check heat exchanger surface for hot spots which may be caused by scale build-up. Refer to instructions in manual for flushing heat exchanger. Hard water must be treated to prevent scale build up or damage to the heat exchanger. Measure resistance of safety circuit. Ensure high fire and low fire manifold pressure is correct. Check for improper gas conversion of product. 	54	Water Flow Servo <ul style="list-style-type: none"> Measure the resistance values and voltage of the water flow control.* Ensure the harness and connector are not wet. If the voltage from the PC Board is abnormal, replace the PC Board; otherwise, replace the water flow servo valve.
I5	High Outgoing Temperature <ul style="list-style-type: none"> Check for restrictions in air flow around unit and vent terminal. Check for low water flow in a circulating system causing short-cycling. Check for foreign materials in combustion chamber and exhaust piping. Check for blockage in the heat exchanger. Check the thermistor sensor and clean sensor of scale build-up. 	55	Water Leak Detected <ul style="list-style-type: none"> Turn off water supply and contact licensed professional.
I9	Electrical Grounding <ul style="list-style-type: none"> Check all components for electrical short. 	LC	Scale Build-up in Heat Exchanger (when checking maintenance code history, "00" is substituted for "LC") <ul style="list-style-type: none"> LC indicates that there is scale build up in the heat exchanger and that the heat exchanger needs to be flushed to prevent damage. Refer to the flushing instructions in the manual. Hard water must be treated to prevent scale build up or damage to the heat exchanger. After flushing, reset LC code as instructed. Please call Rinnai technical department.
32	Outgoing Water Temperature Thermistor <ul style="list-style-type: none"> Check sensor wiring for damage. Measure resistance of sensor. (See Electrical Diagnostics) Clean sensor of scale build-up. Replace sensor if necessary. 	55 (SS)	Service Soon (Flush Heat Exchanger) <ul style="list-style-type: none"> 55 is a time-based service indicator set during installation. See section "4.10 Configure Parameter Settings" for additional details on setting and changing the 55 indicator. 55 indicates that it is time for service. The heat exchanger should be flushed to prevent damage (refer to section "6.2 Flushing the Heat Exchanger" for more information). Hard water must be treated to prevent scale build-up or damage to the heat exchanger. To reset the 55 code, push the On/Off button on the temperature controller 5 times in 5 seconds.
33	Heat Exchanger Thermistor <ul style="list-style-type: none"> Check sensor wiring for damage. Measure resistance of sensor. (See Electrical Diagnostics) Replace sensor if necessary. 	NO CODE	Nothing happens when water flow is activated <ul style="list-style-type: none"> Clean inlet water supply filter. On new installations ensure hot and cold water lines are not reversed. Verify you have at least the minimum flow rate required to fire unit. Check for cold to hot cross over. Isolate circulating system if present. Turn off cold water to the unit, open pressure relief valve; if water continues to flow, there is bleed over in your plumbing. Verify turbine spins freely. Measure the resistance of the water flow control sensor. If the display is blank and clicking is coming from the unit, disconnect the water flow servo motor (GY, BR, O, W, P, BL, R). If the display comes on then replace the water flow servo motor.
34	Combustion Air Temperature Thermistor Fault <ul style="list-style-type: none"> Check for restrictions in air flow around unit and vent terminal. Check sensor wiring for damage. Measure resistance of sensor. Ensure fan blade is tight on motor shaft and is in good condition. Replace sensor if necessary. 	FF	Maintenance Indicator <ul style="list-style-type: none"> Placeholder in Diagnostic code history indicating that a service provider performed maintenance or service. Enter this code after performing service by pressing ▲(Up), ▼(Down) and On/Off simultaneously. FF is visible on the monitor.
35	Upper Tank Temperature Sensor <ul style="list-style-type: none"> Check sensor wiring for damage. Measure resistance of sensor. (See Electrical Diagnostics) Replace sensor if necessary. 		
36	Lower Tank Temperature Sensor <ul style="list-style-type: none"> Check sensor wiring for damage. Measure resistance of sensor. (See Electrical Diagnostics) Replace sensor if necessary. 		

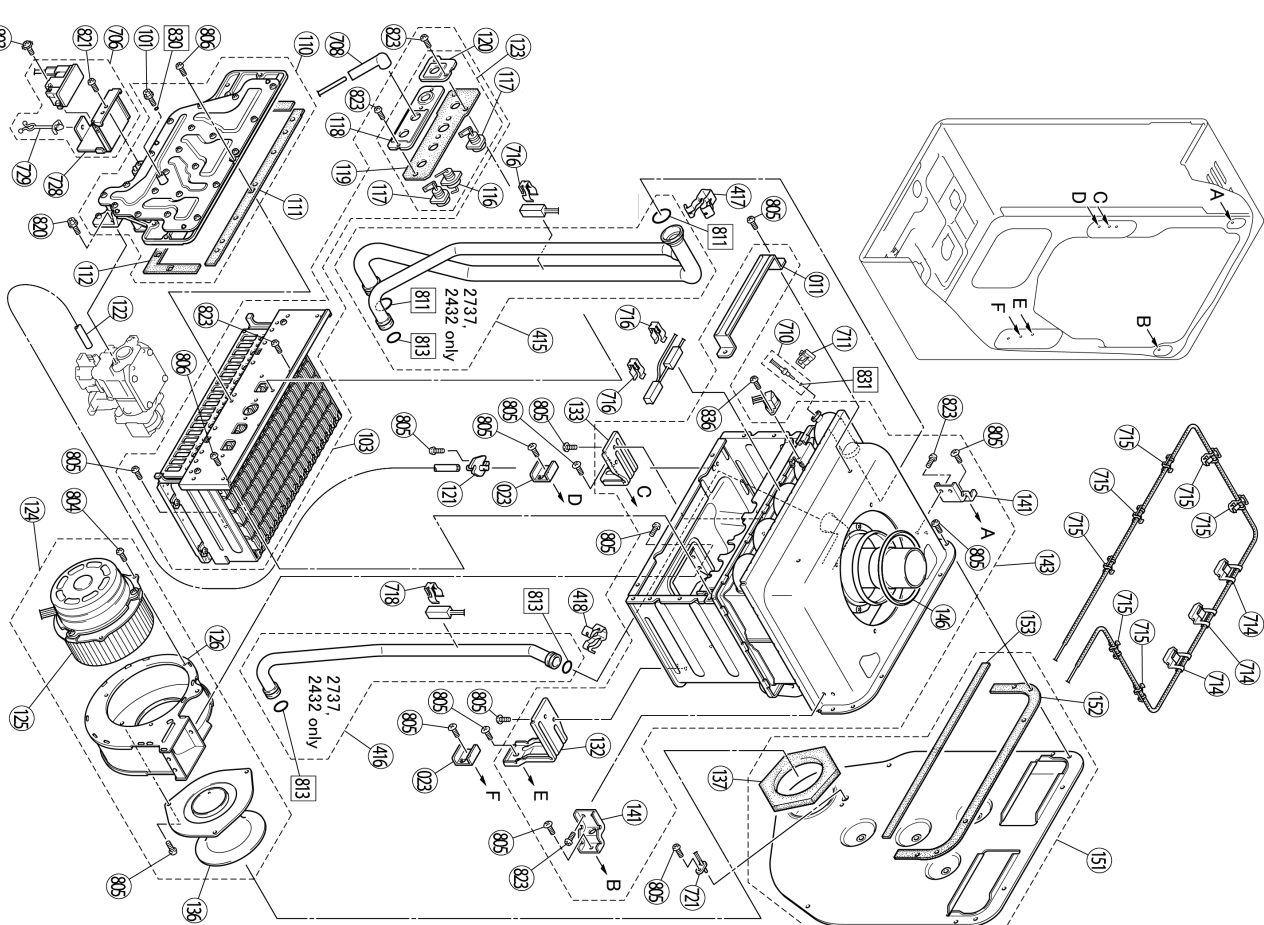
*See "Electrical Diagnostics"

TANKLESS CABINET



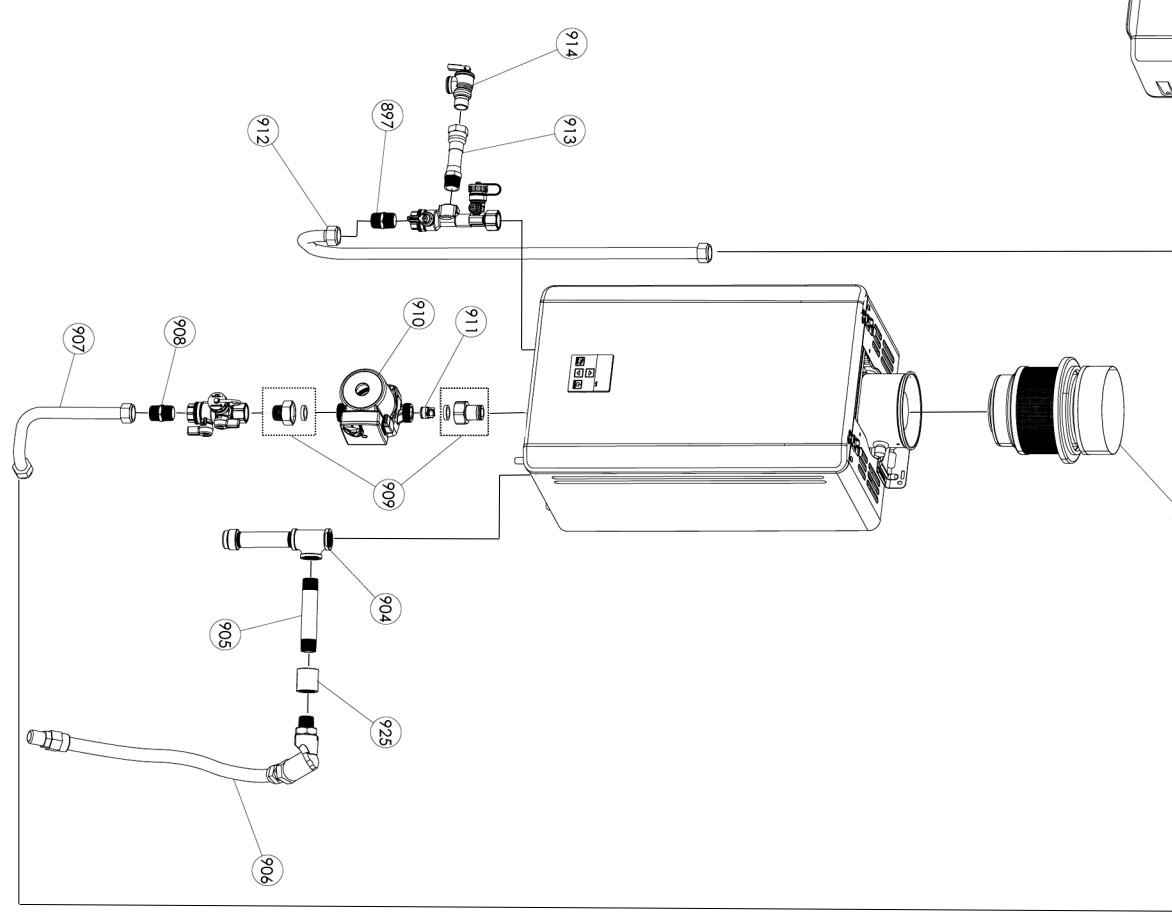
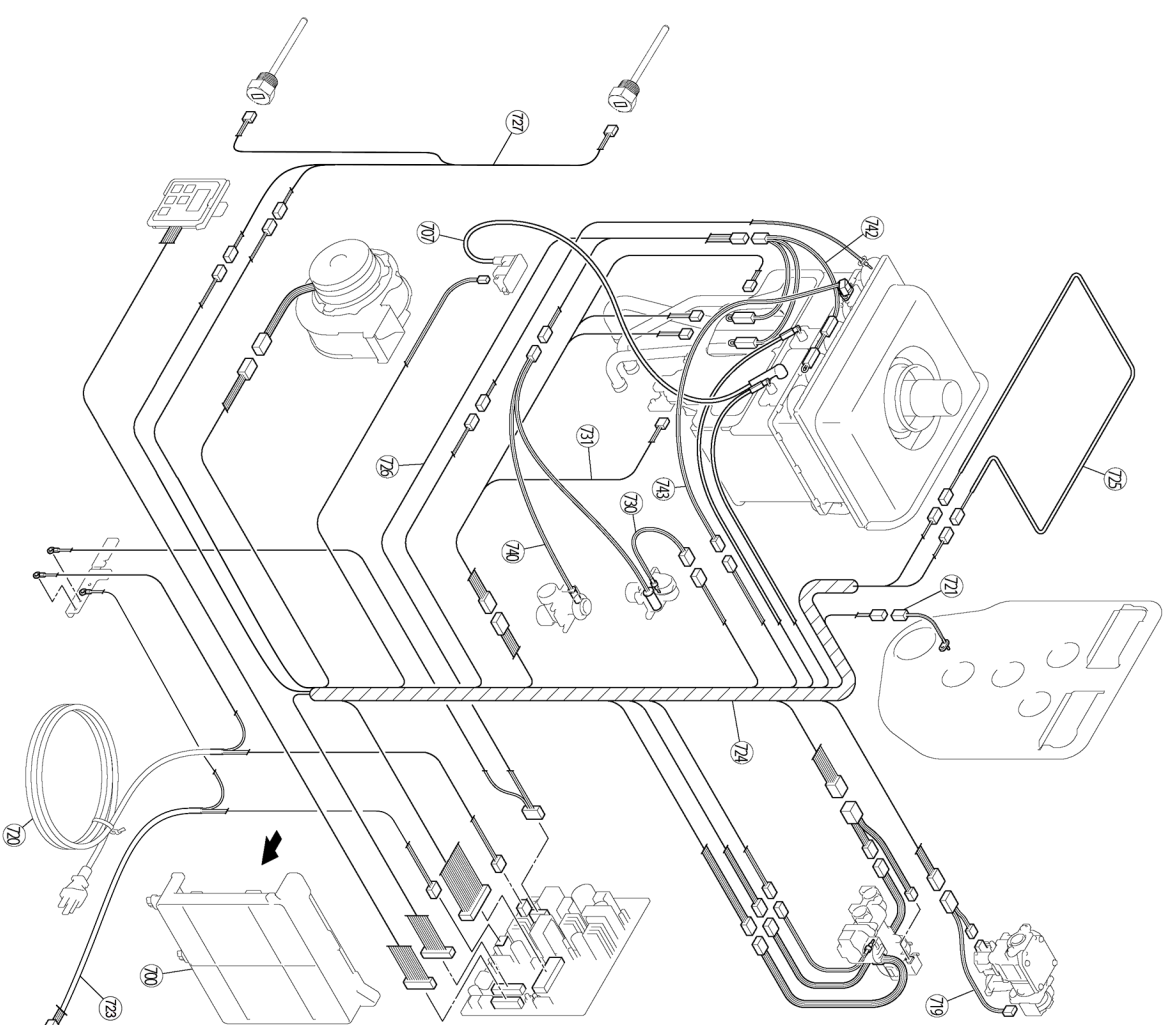
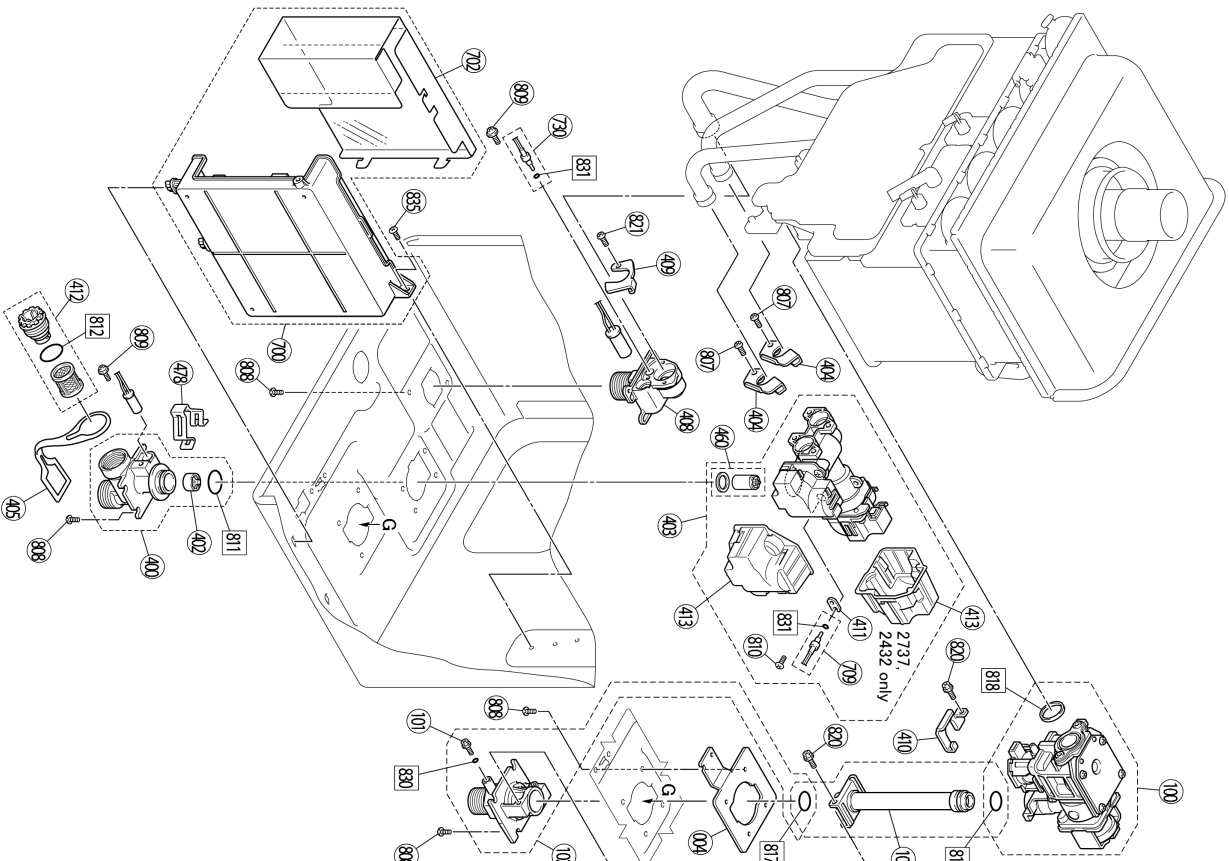
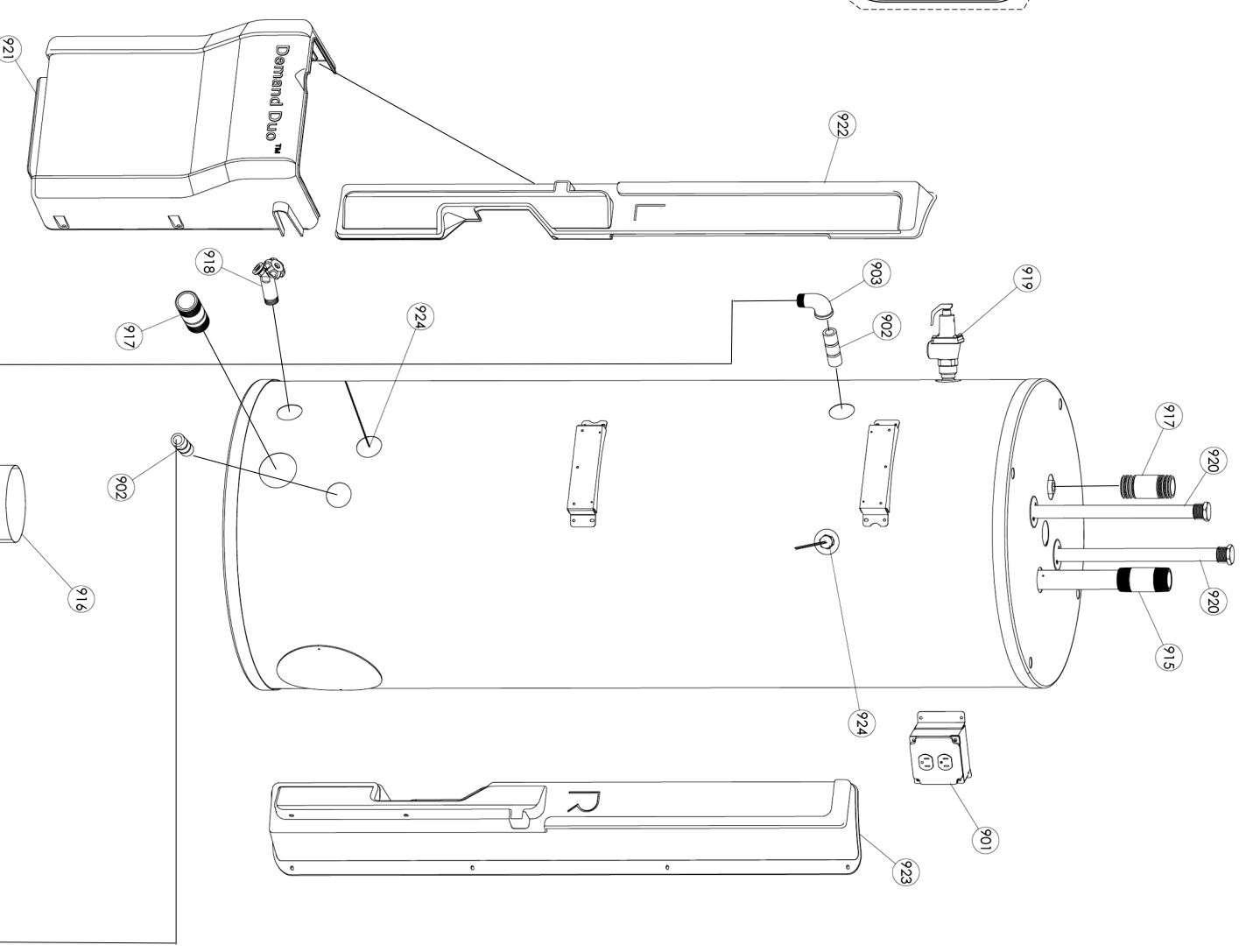
TANKLESS INTERNALS

TANKLESS INTERNALS



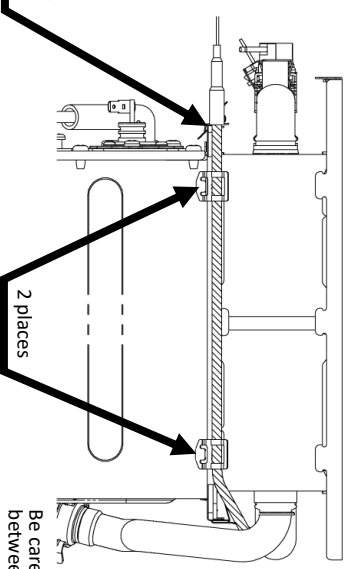
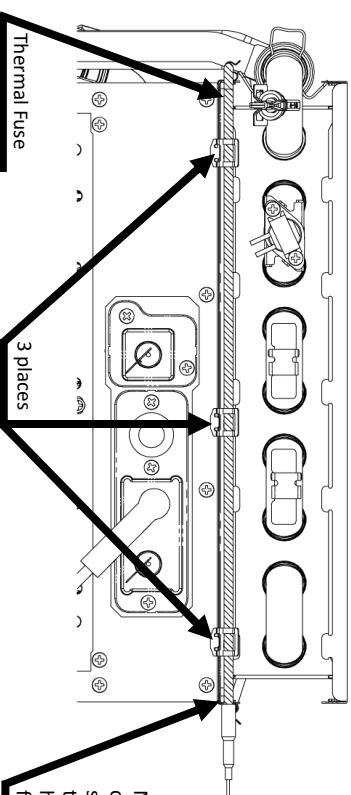
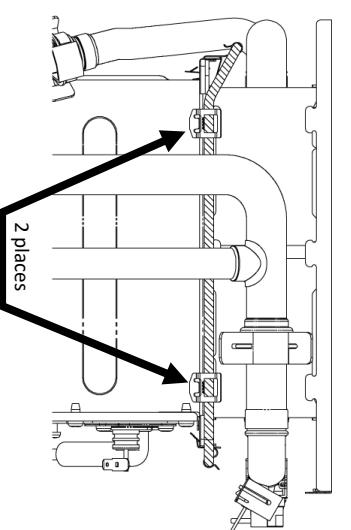
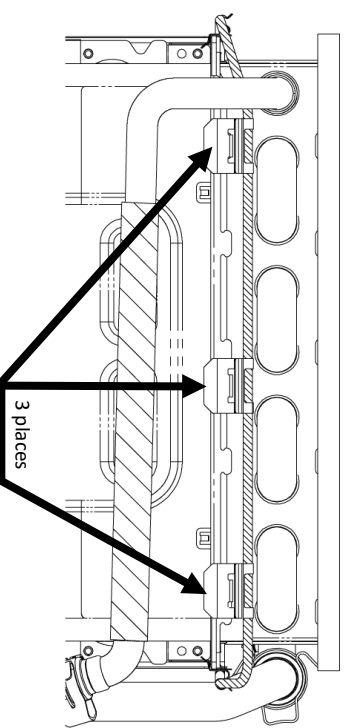
ELECTRICAL

SYSTEM ASSEMBLY



Thermal Fuse Location

When replacing the heat exchanger, thermal fuse must be properly installed and secured. Refer to the following illustration. Large HEX is shown as representative.



ITEM	DESCRIPTION	PART NUMBER	QTY.
002	Wall Bracket	109901247	2
004	Reinforcement Plate	109901248	1
006	Front Panel	109901250	1
007	Front Panel Upper Packing	109901252	1
008	Front Panel Lower Packing	109901253	2
009	Temperature Control Plate	109900952	1
010	Handle	109901254	1
016	Latch Hook	109901258	2
018	Latch	109901259	2
019	Clamp Firing Plate	109901260	2
020	Clamp	109901261	2
021	Rubber Stop	109900854	2
023	Combustion Chamber Stay	109900248	2
100	Gas Control Assembly	109900248	2
101	Test Port Set Screw	C100-5	2
102	3/4 Gas Inlet	109900119	1
103	Burner Limit Assembly	109900149	1
105	Gas Pipe	109900252	1
110	Manifold Assembly - LGS	109900253	1
111	Manifold Assembly - NG	109900256	1
112	Manifold Upper Packing	109900258	1
113	Top Side Reinforcement	109900258	1
116	Electrode	109900254	1
117	Flame Rod	109900854	2
118	Electrode Bracket - Right	109901265	1
119	Electrode Bracket - Left	109901266	1
120	Back Pressure Connector	109901267	1
121	Tube H	U242-312	1
122	Back Pressure Connector	109900260	1
123	Electrode Bracket Assembly	109901268	1
124	Fan Motor Assembly	109900956	1
125	Fan Motor	109900959	1
126	Fan Gearing	109900128	1
132	Combustion Chamber Bracket - Right	109901275	1
133	Combustion Chamber Bracket - Left	109901272	1
136	Seal Packing	109901279	1
141	Duct Bracket	102000076	2

ITEM	DESCRIPTION	PART NUMBER	QTY.
143	Heat Exchanger Assembly	106000312	1
144	Flue Connection Assembly	106000368	1
145	Inlet Seal	106000117	1
146	O-Ring	106000188	2
147	Pipe Seal	109901283	1
148	Cap	106000020	1
149	Padding	106000210	1
151	Air Inlet Assembly	106000126	1
152	Duct Packing Upper	102000074	1
153	Duct Packing Lower	102000074	1
400	Water Inlet	1070000614	1
402	Rectifier	1070000105	1
403	Brass Sump Assembly	106000958	1
404	Pipe Bracket	106001284	2
405	Pipe Band	109900018	1
408	Hot Water Outlet (3/4 NPT)	107000092	1
409	Stop Bracket	109901286	1
410	Gas Pipe Bracket	109901286	1
411	Bracket	109900187	1
412	Cover	H98-510-5	2
413	Cover	107000099	2
415	Hot Water Pipe Assembly	1070000614	1
416	Cold Water Pipe Assembly	1070000620	1
417	Clip	109901288	1
418	Clip	109900244	1
460	Water Flow Turbine	107000621	1
478	Clip	109900638	1
700	PC Board - Large	106000934	1
702	Cover	109901292	1
706	Ignitor	106000963	1
707	High Tension Grid	106000964	1
708	Electrode Sleeve	AJ206-218	1
709	Water Inlet Thermistor	89500085	1
710	Heat Exchanger Thermistor	106000965	1
711	Clip	106000990	1
714	Fuse Holder	109901295	3
715	Fuse Holder	109900786	7
716	Heater Clip	AJ124-618X01	3
718	Heater Clip	AJ100-721	1
719	Gas Control Harness	106000966	1

ITEM	DESCRIPTION	PART NUMBER	QTY.
720	Power Cord Assembly	105000238	1
721	Inake Air Thermistor	105000967	1
723	Pump Wire Harness	105001014	1
724	Sensor Harness - 9	105000943	1
725	Fuse Harness - 1	105000976	1
726	Power Supply Harness - 1	105000920	1
727	Thermistor Wire Harness	105001013	1
728	Ignitor Bracket	109901297	1
729	Cable Clip	105000982	1
731	Solenoid Harness	105000983	1
740	Heater	105000986	1
742	Over Heat Switch	105000981	1
800	Screw	109901288	8
801	Screw	109900949	2
802	Screw	ZB84848UK	8
803	Screw	CP-804512	2
804	Screw	ZFA8048SZ	3
805	Screw	109900598	33
806	Screw	109901299	9
807	Screw	899000179	2
808	Screw	899000177	21
809	Screw	U217-449	2
810	Screw	109900300	1
811	O-Ring	109901301	3
812	O-Ring	M108-214	1
813	O-Ring	M108-214	3
817	O-Ring	109900252	2
818	Packing	109900181	1
820	Screw	CP-20883-410UK	4
821	Screw	109900641	17
823	Screw	109900793	2
824	Screw	ZFD84848UK	10
827	Screw	109900793	4
828	Screw	109901306	4
830	O-Ring	M108-13-4	2
831	O-Ring	M108-2-4	3
835	Screw	109900308	1
836	Screw	109901305	2
888	Manual	100000808	1

ITEM	DESCRIPTION	PART NUMBER	QTY.
901	Electrical Outlet / 1/8 Assembly	105000337	1
902	Dielectric Nipple, 3/4 in	107000309	2
903	90° Fem X Male Elbow, 3/4 in	107000185	1
904	DiT Leg, 3/4 in	106000092	1
905	Black Iron Nipple, 3/4 in X 4-1/2 in	106000170	1
906	Gas Flex Hose and Swivel Assembly, 3/4 in	106000181	1
907	Flex, 1/8 00 3/4 NPSH X 3/4 NPSH, HTTC	107000523	1
908	Nipple 3/4 NPT, HTTC	107000260	2
909	Pump Fitting Assembly (Suction, Discharge, 2 Gaskets)	107000509	1
910	Pump UP 15-78	107000259	1
911	Check Valve Insert Spring Loaded HTTC	107000257	1
912	Tube, 3/8 00 NPSH X 3/4 NPT, HTTC	107000446	1
913	RVV Pipe Assembly X 4.50, HTTC	107000258	1
914	Frankless PNV	107000533	1
915	DiTtube	107000039	1
916	IFEC - Inake Filter Exhaust Connector	107000387	1
917	1-1/2 in Dielectric Nipple	107000315	1
918	Brass Drain Valve 3/4 X 2-3/4	107000472	1
919	Temperature and Pressure Relief Valve, 1 in X 1 in	109900314	2
920	Anode Rod, Magnesium	109900334	1
921	DDR gen2 Front Enclosure	109900335	1
922	DDR gen2 Enclosure Left	109900336	1
924	Thermistor 3/4 MNPT LK OHM HTTC	105002012	2
925	Back from Coupling, 3/4 in	106000182	1
N/A	VEC Technical Data Sheet (This Sheet) (Not Shown in Image)	100000809	1

Be careful of biting between the water connection pipe and the heat exchanger flange