RESIDENTIAL AND COMMERCIAL SUPER HIGH EFFICIENCY CONDENSING WATER HEATER

40, 50, AND 75 GALLON SERVICE MANUAL

For use with the following models: RSHE40SB, RSHE40SR, RSHE50B, RSHE50RL, RSHE50RH, GHE50-SU, GHE50-SS, GHE75-SU, GHE75-SS CATEGORY IV Models / Fan Assisted Combustion.

(Includes Maximus and Triton LD)

AP23008 Rev 03

CONTENTS

TECHNICAL SUPPORT LINE
Phone: 800-432-8373
Fax: 334-260-1341

ORDER CENTER
1-800-621-5622

RHEEM WATER HEATERS
800 Interstate Park Dr.
Montgomery, AL 36109
Website: www.Rheem.com
e-mail: Techserv@Rheem.com

Before inspecting, diagnosing, repairing or operating any water heater, be sure to examine all of the safety and warning labels on the tank. Follow the instructions on these warning labels. Read and understand the Use and Care Manual that was shipped with the water heater. Failure to do so can result in unsafe operation of the water heater resulting in property damage, bodily injury, or death. Should you have any problems reading or following the instructions in the Use and Care Manual, seek the help of a licensed and qualified professional.

INTRODUCTION

The water heater configurations include fully condensing 40- or 50-gallon Residential and 50- and 75-gallon Light Duty Commercial High Efficiency Water Heaters intended for indoor installation only. These water heaters are equipped with a premix powered combustion system and a helical coil heat exchanger. The operational functions are provided by an electronic ignition control and user display.

Repairs should be performed by Qualified Service Technicians. Following resources are available to assist you in troubleshooting.

- Use and Care Manual
- Rheem Technical Support -800 Interstate Park Drive Montgomery, AL 36109 Wholesale: 1-800-432-8373 Retail: 1-866-279-4566
- Technical Bulletins
- Product Information on Rheem.com
- Specification Sheets
- Water Heater Labels
- National Fuel Gas Code NFPA 223.1

RECOMMENDED TOOLS

- Handheld Combustion Analyzer
- Multimeter and probes
- Digital Manometer with 1/8" hoses
- Screw drivers, wrenches
- Soap solution or suitable leak detector
- Diagnostic Codes on water heater

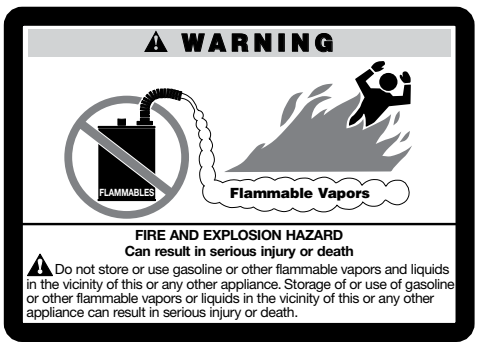
SAFETY

ELECTRICAL SHOCK

Troubleshooting and repairing this water heater can expose you to electrical shock. Some of the diagnostic procedures require the presence of 120 volt AC electricity. Use extreme caution when performing these procedures. When replacing an unserviceable component, turn off all power to the water heater and check for the presence of power with a multimeter or test lamp. The ignition cable carries more than 10,000 volts of electrical energy. Use extreme caution when diagnosing the Rheem Super High Efficiency Storage Water Heater.

FLAMMABLE VAPORS

Gasoline, as well as other flammable material and liquids (adhesives, solvents, etc.), and vapors they produce are extremely dangerous. DO NOT handle, use or store gasoline or other flammable or combustible materials near a water heater. The arc drawn in the water heater controls can ignite these vapors. Failure to do so can result in property damage, bodily injury or death.



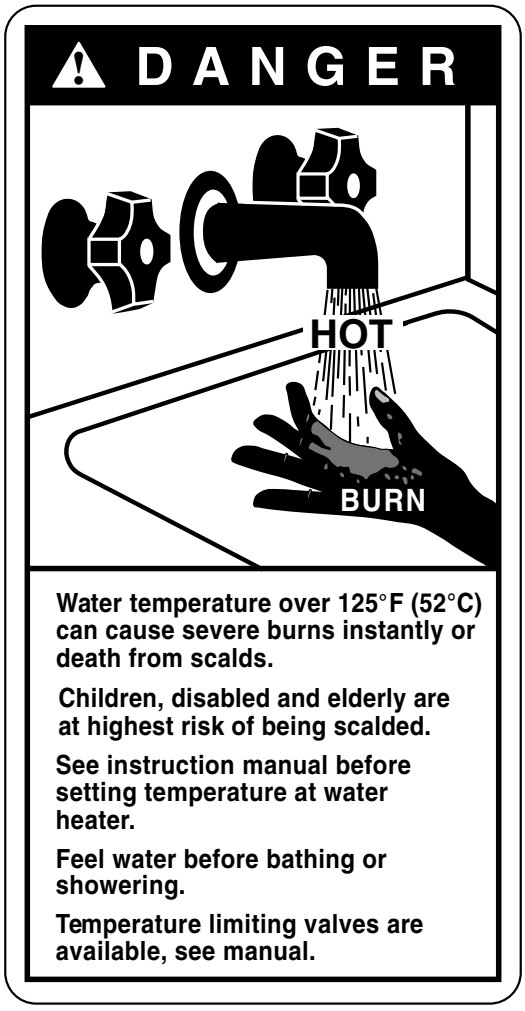
SAFETY

WATER TEMPERATURE ADJUSTMENT

Safety and energy conservation are factors to be considered when selecting the water temperature setting on the thermostat. Water temperatures above 125°F (52°C) can cause severe burns or death from scalding. The table shown below may be used as a guide in determining the proper water temperature for your application.

Temperature	Time To Produce a Serious Burn
120°F (49°C)	More than 5 minutes
125°F (52°C)	1½ to 2 minutes
130°F (54°C)	About 30 seconds
135°F (57°C)	About 10 seconds
140°F (60°C)	Less than 5 seconds
145°F (63°C)	Less than 3 seconds
150°F (66°C)	About 1½ seconds
155°F (68°C)	About 1 second

Table courtesy of Shriners Burn Institute



RESIDENTIAL SPECIFICATIONS

RESIDENTIAL MODEL SUMMARY FEATURES							
MODEL	STANDARD MODELS		PREMIUM MODELS				ADDITIONAL RESOURCES
	40 GAL	50 GAL	40 GAL	50 GAL	50 GAL	50 GAL	
DIMENSIONS	21.75" DIA, 50" HEIGHT	21.75" DIA, 60" HEIGHT	21.75" DIA, 50" HEIGHT	21.75" DIA, 60" HEIGHT	21.75" DIA, 60" HEIGHT	21.75" DIA, 60" HEIGHT	PDH,SPECIFICATION SHEET
HEATER WEIGHT (Lbs.)	183	212	183	212	212	212	PDH
PACKAGED WEIGHT (Lbs.)	221	247	221	247	256	256	PDH,SPECIFICATION SHEETS
RATED GALLON CAPACITY	40GAL	50GAL	40GAL	50GAL	50GAL	50GAL	PDH, RATING PLATE
RATED INPUT (BTUH)	50,000	50,000	50,000	50,000	76,000	100,000	
ENERGY EFFICIENCY	88G FHR 0.9 UEF	95 FHR, 0.88 UEF	88 FHR, 0.9 UEF	95 FHR, 0.88 UEF	136 FHR, 0.89 UEF	169 FHR, 0.89 UEF	PDH AND HEATER FOR ANNUAL FUEL CONSUMPTION
GAS CONNECTIONS	1/2" NPT FEMALE ADAPTER ATTACHED TO VALVE, LOCATED AT THE TOP OF THE HEATER						PDH AND HEATER FOR ANNUAL FUEL CONSUMPTION
WATER CONNECTIONS	TWO 3/4" NPT TOP CONNECTIONS AND TWO 3/4" NPT SIDE CONNECTIONS FOR SPACE HEATING AND OTHER APPLICATIONS						
IGNITION SYSTEM	DIRECT SPARK IGNITION TO MAIN BURNER						SERVICE MANUAL
HEAT EXCHANGER	HIGH EFFICIENCY, HELICAL COIL HEAT EXCHANGER						SERVICE MANUAL
COMBUSTION SYSTEM	FIBER MESH BURNER AND DOWN FIRED PREMIX COMBUSTION SYSTEM, LOW FLOW				FIBER MESH BURNER, AND DOWN FIRED PREMIX COMBUSTION SYSTEM, HIGH FLOW		SERVICE MANUAL
CATEGORY RATING	CATEGORY IV WITH ATTACHED CONDENSATE EXHAUST DRAIN WITH NEUTRALIZER						USE AND CARE (U&C)
NOx RATING	10ng/j				14ng/j		PDH
HI ALT NAT (FEET)	0 - 2,000 ft		0 - 10,100 ft WITH SETTING ADJUSTMENTS ON DISPLAY		0 - 10,100 ft, NO ADJUSTMENTS NEEDED		USE AND CARE (U&C)
HI ALT LP (FEET)	0 - 7,800 ft, HIGH ALTITUDE SKU'S NEED TO BE ORDERED				0 - 10,100 ft, NO ADJUSTMENTS NEEDED		
VENTING	POWER VENT AND POWER DIRECT VENT CONFIGURATIONS						
VENT MATERIALS	PVC, CPVC, ABS, Polypropylene						
VENT SIZES	2", 3", 4", RIGID						
	2" AND 3" FLEX						
TERMINATIONS	FLAT						
	CONCENTRIC						
	45,90 ELBOW						
CONTROLS	TEMP CONTROL SETTING FROM 85°F (29°C) TO 160°F (71°C), FACTORY SET AT 85°F (29°C)						SERVICE MANUAL AND U&C
	DIAGNOSTICS, ERROR CODE ALARMS AND ALERTS ON LCD PANEL						
NOISE LEVEL	52 dbA MIN				67 dbA MIN		
ELECTRICAL	120V, 50/60HZ, 7AMP MAX. EARTH GROUND AND POLARITY SENSITIVE						SERVICE MANUAL AND U&C
SAFETY DEVICES	TEMPERATURE AND PRESSURE RELIEF VALVE						SERVICE MANUAL, U&C, AND HEATER LABELS
	ENERGY CUT-OFF HIGH TEMPERATURE SWITCH (TRIPS AT 194°F (94°C), AUTO RESET AT 120°F (48°C))						
	EXHAUST TEMPERATURE LIMIT SWITCH (TRIPS AT 160°F (71°C), AUTO RESET AT 155°F (68°C))						
	AUTOMOTIVE STYLE 3 AMP FUSE						

COMMERCIAL SPECIFICATIONS

COMMERCIAL MODELS SUMMARY FEATURES				
MODELS (SU AND SS)	50 GAL, 76K BTUH	50 GAL, 100K BTUH	75 GAL, 100K BTUH	ADDITIONAL RESOURCES
DIMENSIONS	21.75" DIA, 60" HEIGHT	21.75" DIA, 60" HEIGHT	26.25" DIA, 59" HEIGHT	PDH, SPECIFICATION SHEET
HEATER WEIGHT	50GAL	50GAL.	75GAL.	PDH
PACKAGED WEIGHT (Lbs.)	212	212	290	PDH, SPECIFICATION SHEETS
RATED GALLON CAPACITY	50GAL	50GAL	75GAL	PDH, RATING PLATE
RATED INPUT (BTUH)	76,000	100,000	100,000	
ENERGY EFFICIENCY	136 FHR, 0.89 UEF	169 FHR, 0.89 UEF	96% THERMAL 900BTUH STAND-BY	PDH AND HEATER FOR ANNUAL FUEL CONSUMPTION
GAS CONNECTIONS	1/2" NPT FEMALE ADAPTER ATTACHED TO VALVE, LOCATED AT THE TOP OF THE HEATER			PDH FOR SIZES -SPECIFICATION SHEETS FOR LOCATION DETAILS
WATER CONNECTIONS	TWO 3/4" NPT TOP CONNECTIONS AND TWO 3/4" NPT SIDE CONNECTIONS FOR SPACE OR OTHER APPLICATIONS			
IGNITION SYSTEM	DIRECT SPARK IGNITION TO MAIN BURNER			SERVICE MANUAL
HEAT EXCHANGER	HIGH EFFICIENCY, HELICAL COIL HEAT EXCHANGER			SERVICE MANUAL
COMBUSTION SYSTEM	FIBER MESH BURNER, AND DOWN FIRED PREMIX COMBUSTION SYSTEM			SERVICE MANUAL
CATEGORY RATING	CATEGORY IV WITH ATTACHED CONDENSATE EXHAUST DRAIN WITH NEUTRALIZER			USE AND CARE (U&C)
NOx RATING	14ng/j			PDH
HI ALT NAT (FEET)	0 - 10,100 ft, NO ADJUSTMENTS NEEDED			USE AND CARE (U&C)
HI ALT LP (FEET)	0 - 10,100 ft, NO ADJUSTMENTS NEEDED			
VENTING	POWER VENT AND POWER DIRECT VENT CONFIGURATIONS			
VENT MATERIALS	PVC, CPVC, ABS, Polypropylene			
VENT SIZES	2", 3", 4", RIGID 2"AND 3" FLEX			
TERMINATIONS	FLAT CONCENTRIC 45°, 90° ELBOW			
CONTROLS	TEMP CONTROL SETTING FROM 85°F (29°C) TO 180°F (82°C) WITH OPTION FOR 185°F (85°C), FACTORY SET AT 120°F (49°C)			SERVICE MANUAL AND U&C
	DIAGNOSTICS, ERROR CODE ALARMS AND ALERTS ON LCD PANEL			
NOISE LEVEL	67dbA MIN			
ELECTRICAL	120V, 50/60HZ, 7AMP MAX. EARTH GROUND AND POLARITY SENSITIVE			SERVICE MANUAL AND U&C
SAFETY DEVICES	TEMPERATURE AND PRESSURE RELIEF VALVE			SERVICE MANUAL, U&C, AND HEATER LABELS
	ENERGY CUT-OFF HIGH TEMPERATURE SWITCH (TRIPS AT 194°F (90°C), AUTO RESET AT 120°F (48°C)			
	EXHAUST TEMPERATURE LIMIT SWITCH (TRIPS AT 160°F (71°C), AUTO RESET AT 155°F (68°C))			
	AUTOMOTIVE STYLE 3 AMP FUSE			

INTAKE AIR AND EXHAUST VENT LENGTHS

40G-50K AND 50G-50K; POWER VENT CONFIGURATION; (RIGID PIPE)				40G-50K AND 50G-50K; POWER DIRECT VENT CONFIGURATION; (RIGID PIPE)				
ELEVATION (FEET)	VENT SIZE (INCHES)	NAT MAX EQ. LENGTH (FEET)	LP MAX EQ. LENGTH (FEET)	NAT MAX EQ. LENGTH (FEET)		LP MAX EQ. LENGTH (FEET)		TERMINATIONS
				INTAKE	EXHAUST	INTAKE	EXHAUST	
0-2000	2"	50'	50'	50'	50'	50'	50'	2" AND 3" 90° ELBOWS, 2", 3" AND 4" CONCENTRIC AND 2" AND 3" PANCAKE
	3"	140'	140'	140'	140'	140'	140'	
	4"	140'	140'	140'	140'	140'	140'	
2000-5400	2"	50'	40'	50'	50'	40'	40'	
	3"	140'	110'	140'	140'	110'	110'	
	4"	140'	110'	140'	140'	110'	110'	
5400-7800	2"	50'	20'	50'	50'	10'	20'	
	3"	140'	110'	140'	140'	110'	110'	
	4"	140'	110'	140'	140'	110'	110'	
7800-10,100	2"	50'	NOT APPLICABLE	50'	50'	NOT APPLICABLE	NOT APPLICABLE	
	3"	140'	NOT APPLICABLE	140'	140'	NOT APPLICABLE	NOT APPLICABLE	
	4"	140'	NOT APPLICABLE	140'	140'	NOT APPLICABLE	NOT APPLICABLE	
*MINIMUM INTAKE AIR AND EXHAUST VENT: 10' EQUIVALENT LENGTH								
NATURAL GAS MODELS CAN BE INSTALLED IN HIGH ALTITUDE LOCATIONS WITH DISPLAY CONTROL SETTING CHANGES AS SHOWN IN HIGH ALTITUDE SECTION. APPLIES ONLY TO TOUCH SCREEN DISPLAY MODELS.								
++LP GAS MODELS HAVE UNIQUE HIGH ALTITUDE MODEL NUMBERS. THEY ARE FACTORY SET FOR HIGH ALTITUDE OPERATION. HIGH ALTITUDE MODELS HAVE A 'H' DESIGNATION AT THE END OF THE MODEL NUMBER. REFER TO RATING PLATE FOR MODEL NUMBER.								

50G-76K AND 50G-100K; POWER VENT CONFIGURATION; (RIGID PIPE)				50G-76K AND 50G-100K; POWER DIRECT VENT CONFIGURATION; (RIGID PIPE)				
ELEVATION (FEET)	VENT SIZE (INCHES)	NAT MAX EQ. LENGTH (FEET)	LP MAX EQ. LENGTH (FEET)	NAT MAX EQ. LENGTH (FEET)		LP MAX EQ. LENGTH (FEET)		TERMINATIONS
				INTAKE	EXHAUST	INTAKE	EXHAUST	
0 - 10,100	2"	40'	40'	40'	40'	40'	40'	2" AND 3" 90° ELBOWS, 2", 3" AND 4" CONCENTRIC AND 2" AND 3" PANCAKE
	3"	140'	140'	140'	140'	140'	140'	
	4"	140'	140'	140'	140'	140'	140'	
*MINIMUM INTAKE AIR AND EXHAUST VENT: 10' EQUIVALENT LENGTH								

NOTE: The intake and exhaust connections are set-up with 2" solid core PVC pipe size. An adapter may be used to increase pipe size to 3" and 4" along the length of the vent and air intake. Vent and air intake pipes should always be set-up to the same size. The vent length calculations should be based upon termination size

All power direct models can use 2" concentric venting only as listed in the above chart.

2" concentric vent can only be used with 2" rigid piping.

DO NOT mismatch concentric vent terminations with different rigid piping as it may cause the heater to malfunction or cause a lock-out condition unless specifically mentioned.

3" Concentric vent may be used with 3" and 4" venting.

FLEXIBLE POLYPROPLYLENE PIPE (ft)				
PIPE SIZE (IN)	2"		3"	
	INTAKE	EXHAUST	INTAKE	EXHAUST
Max PV	0	30' (13m)	0	30' (13m)

Follow manufacturers instructions for installation of flex vents.

INTAKE AIR AND EXHAUST VENT LENGTHS

COMMERCIAL VENT LENGTHS

50G-76K, 50G-100K, 75G; POWER VENT CONFIGURATION; RIGID PIPE				50G-76K AND 50G-100K, 75G; POWER DIRECT VENT CONFIGURATION; (RIGID PIPE)				
ELEVATION (FEET)	VENT SIZE (INCHES)	NAT MAX EQ. LENGTH (FEET)	LP MAX EQ. LENGTH (FEET)	NAT MAX EQ. LENGTH (FEET)		LP MAX EQ. LENGTH (FEET)		TERMINATIONS
				INTAKE	EXHAUST	INTAKE	EXHAUST	
0 - 10,100	2"	40'	40'	40'	40'	40'	40'	2" AND 3" 90° ELBOWS, 2", 3" AND 4" CONCENTRIC AND 2" AND 3" PANCAKE
	3"	140'	140'	140'	140'	140'	140'	
	4"	140'	140'	140'	140'	140'	140'	
*MINIMUM INTAKE AIR AND EXHAUST VENT: 10' EQUIVALENT LENGTH								

NOTE: Vent pipe size should not be mixed for venting these units. Use same diameter for all venting of the unit.

All power direct models can use 2" concentric venting only as listed in the above chart.

2" concentric vent can only be used with 2" rigid piping.

DO NOT mismatch concentric vent terminations with different rigid piping as it may cause the heater to malfunction or cause a lock-out condition unless specifically mentioned.

3" Concentric vent may be used with 3" and 4" venting.

FLEXIBLE POLYPROPLYLENE PIPE (ft)				
PIPE SIZE (IN)	2"		3"	
	INTAKE	EXHAUST	INTAKE	EXHAUST
Max PV	0	30' (13m)	0	30' (13m)

Follow manufacturers instructions for installation of flex vents.

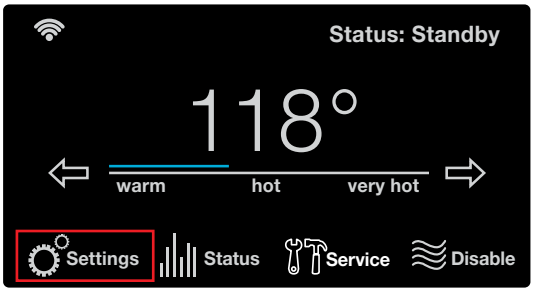
HIGH ALTITUDE

Input rating of this water heater is based on sea level operation. At higher elevations the actual input rate may be lower than the value listed on the rating label due to the derating of Natural Gas and LP Gas.

Natural Gas models with sea level rated input rates of 50,000 BTUH require adjustments on touch screen display for high altitude installations above 2000ft. These adjustments are activated only on models that require high altitude adjustments.

Refer to vent length chart in Venting and Air Intake section for appropriate elevations, vent sizes, and equivalent lengths.

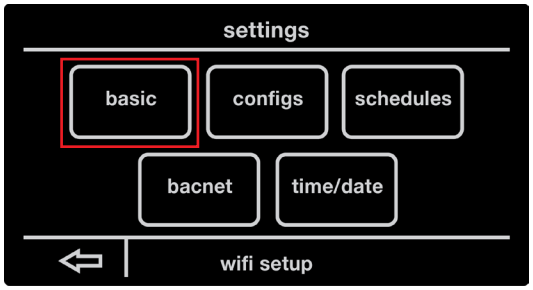
⚠ WARNING:
Failure to install a water heater suitable for the altitude at the location it is intended to serve, can result in improper operation of the appliance resulting in property damage and/or producing carbon monoxide gas, which could result in personal injury or death.



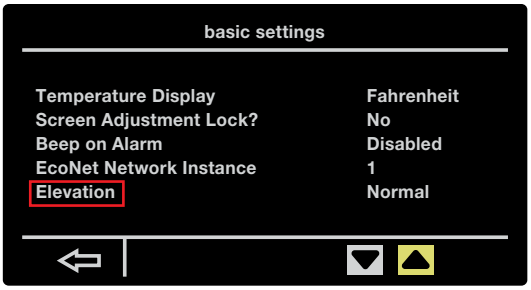
1. MAIN SCREEN - On the main screen select Settings.

INTAKE AIR AND EXHAUST VENT LENGTHS

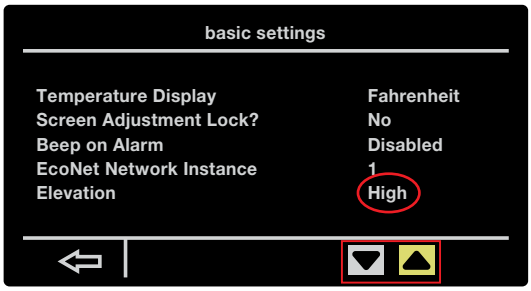
HIGH ALTITUDE (CONT.)



2. SETTINGS SCREEN - On the settings screen, select Basic.



3. BASIC SETTINGS SCREEN - On the basic settings screen, select Elevation.



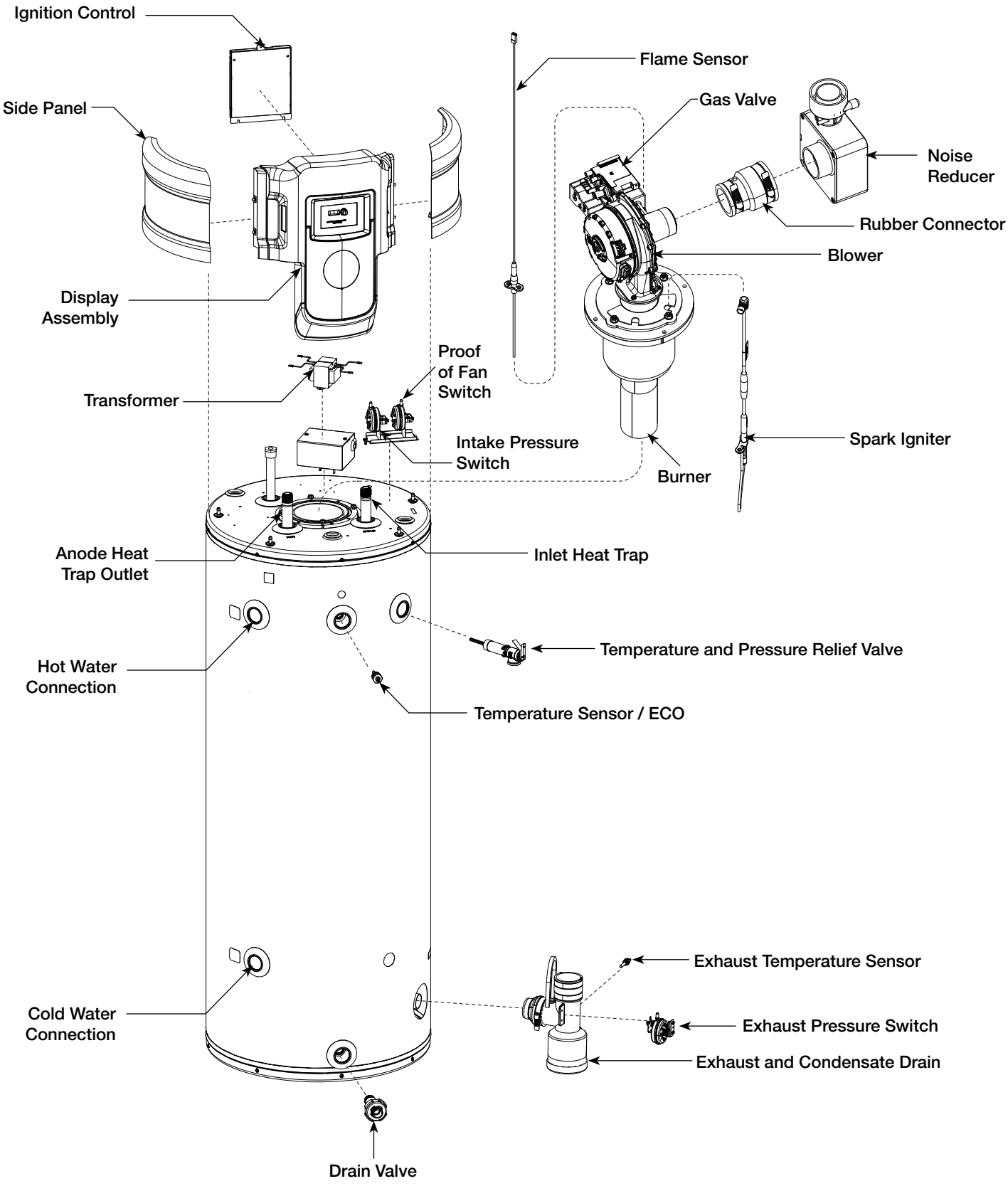
4. BASIC SETTINGS SCREEN - After elevation is selected, use the arrow keys to select High. The heater is now adjusted for high altitude.

BLOWER SPEEDS

UNIT INFO	MIN SPD (RPM)	MAX SPD (RPM)	PRE PURGE TIME (S)	POST PURGE TIME (S)
40G-50K NG	4800	6400	21	60
50G-50K NG	4800	6400	21	60
50G-76K NG	5500	6400	21	60
50G-100K NG	5500	8300	21	60
75G-100K NG	5500	8600	21	60
40G-50K LP	4800	6300	21	60
50G-50K LP	4800	6300	21	60
50G-76K LP	5500	6100	21	60
50G-100K LP	5500	8000	21	60
75G-100K LP	5500	8300	21	60
40G-50K NG 50G-50K NG	6000	6500	21	60
40G-50K LP 50G-50K LP	6000	6500	21	60

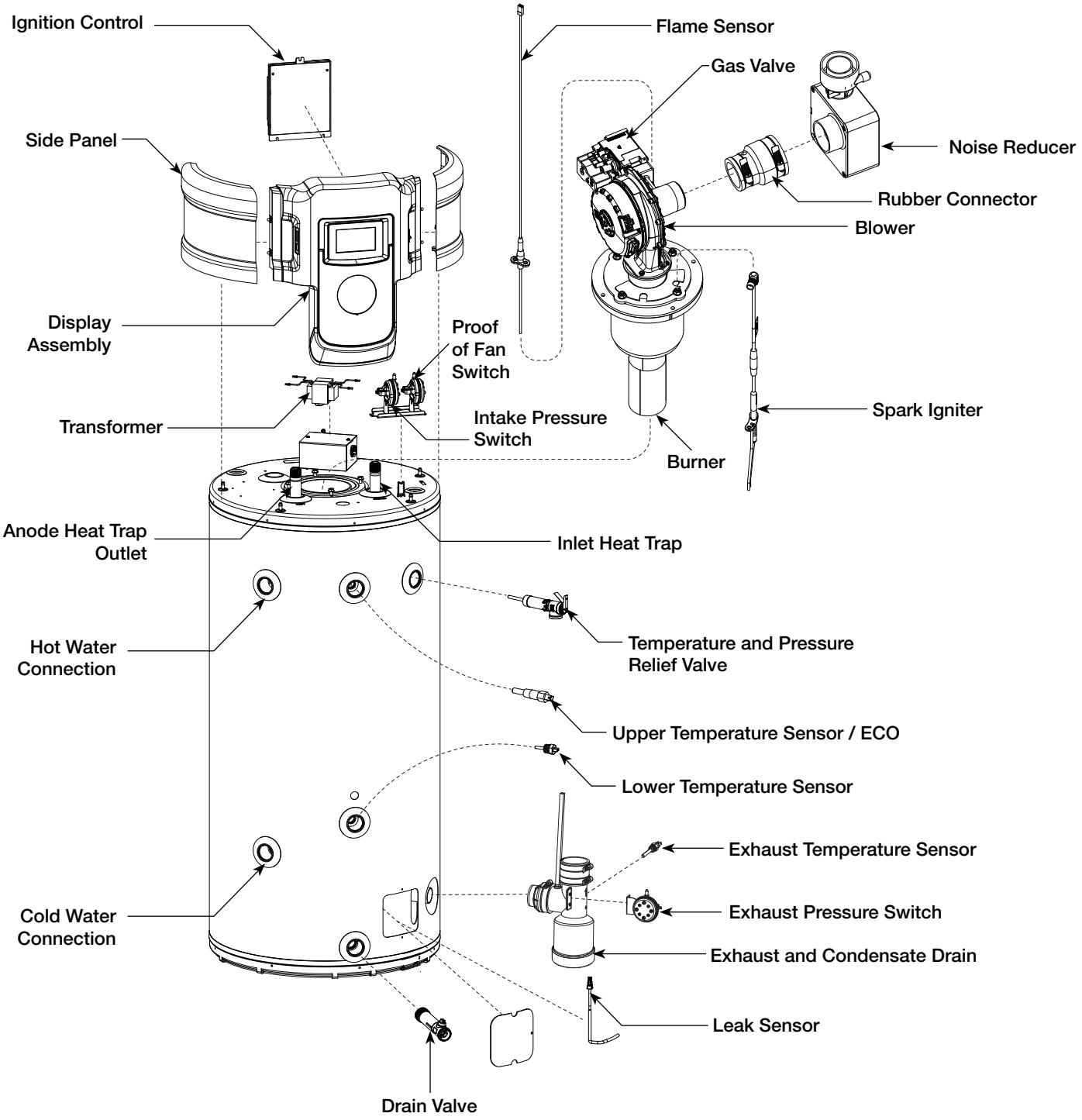
RESIDENTIAL (STANDARD) COMPONENT PARTS

RSHE40SB, RSHE50B STANDARD MODELS



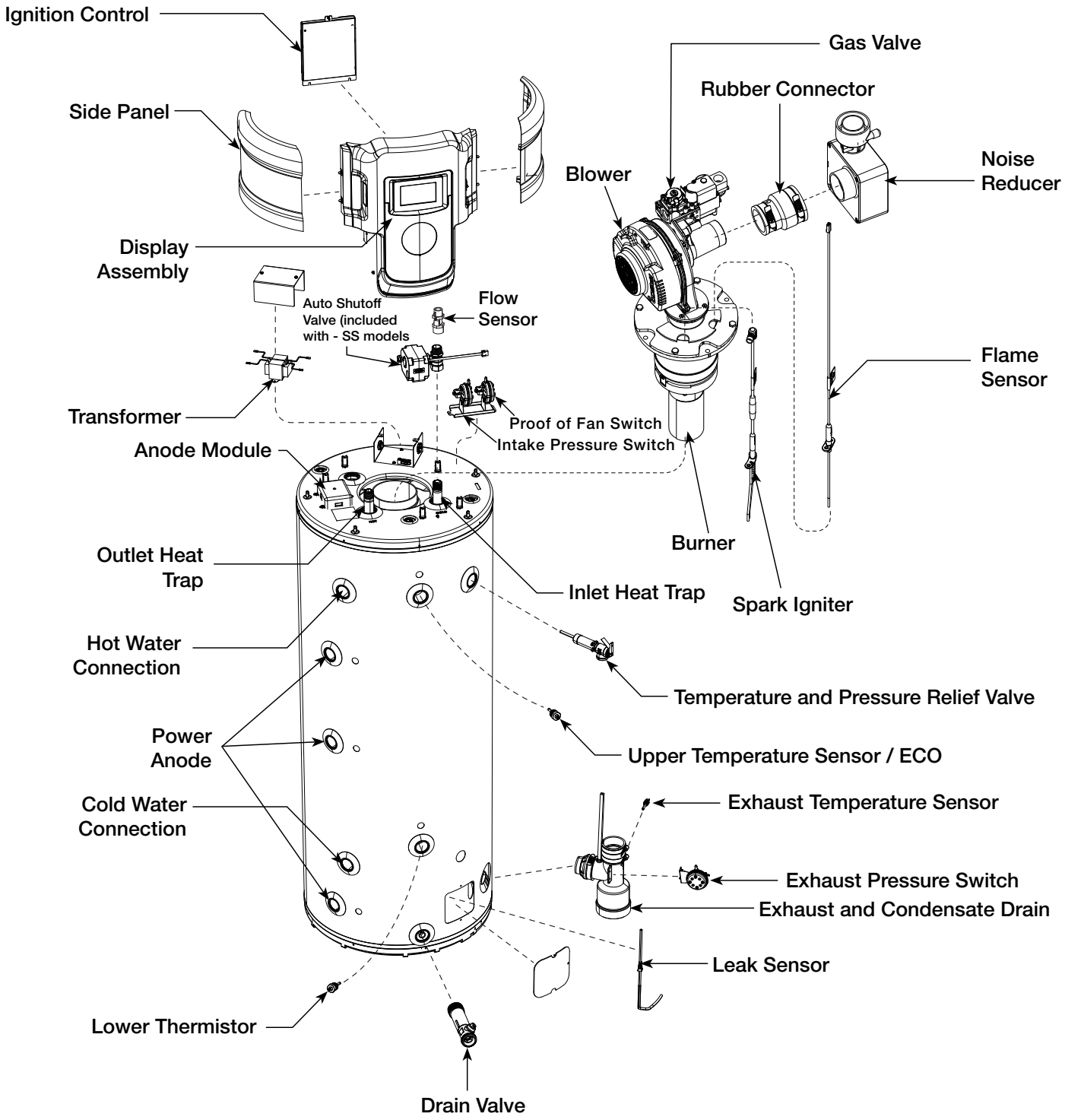
RESIDENTIAL (PREMIUM) COMPONENT PARTS

RSHE40SR, RSHE50RL, RSHE50RH PREMIUM MODELS



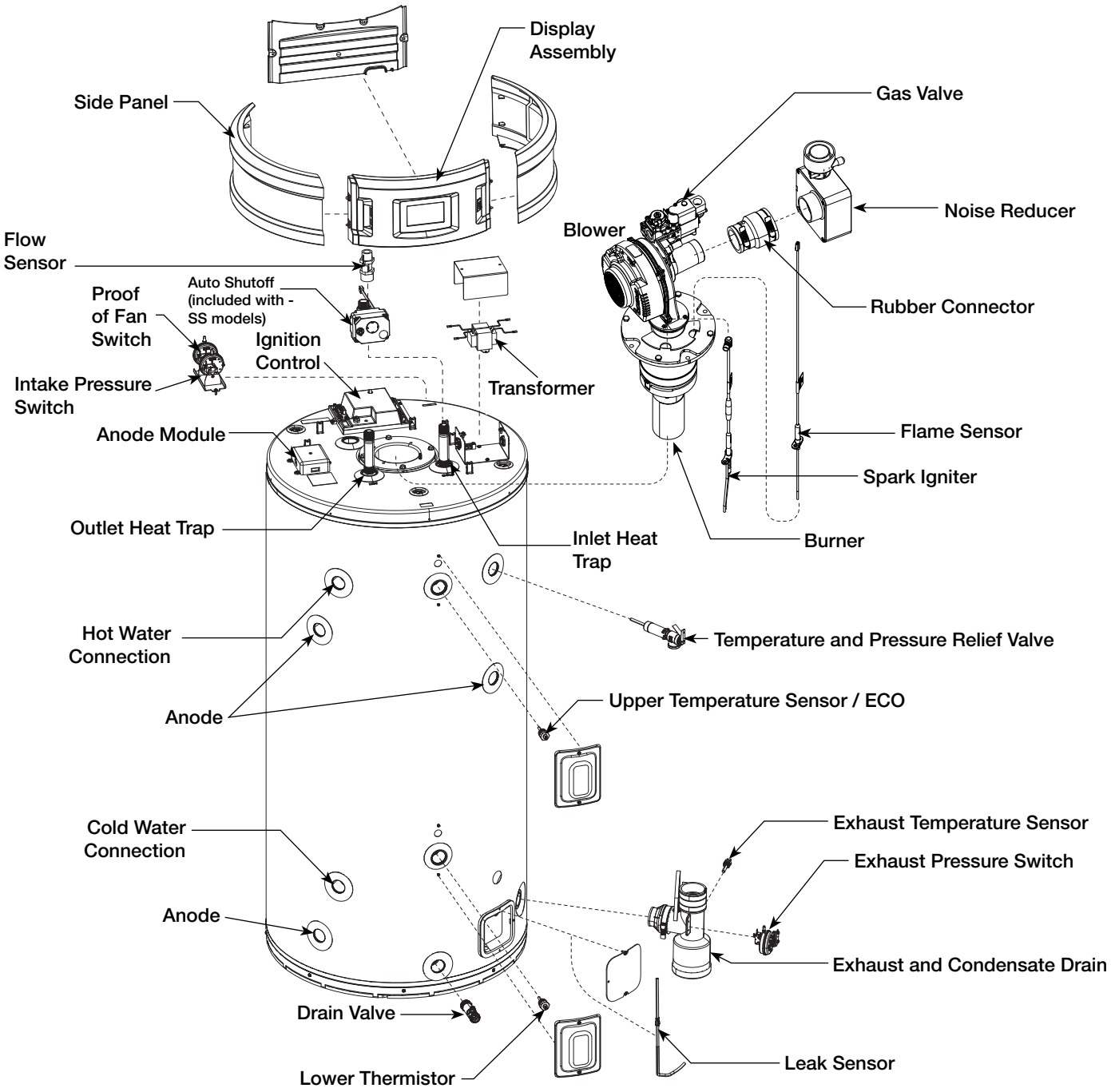
COMMERCIAL (50 GAL) COMPONENT PARTS

GHE50 (-SU, -SS)



COMMERCIAL (75 GAL) COMPONENT PARTS

GHE75 (-SU, -SS) MODELS



SERVICE PARTS

1 - 40G-50K RSHE40SB 2 - 50G-50K RSHE50B 3 - 40G-50K RSHE40SR 4 - 50G-50K RSHE50RL
5 - 50G- RSHE50RH 6 - 50G- GHE50 7 - 75G- GHE75

Residential Standard | Residential Premium | Commercial

SUBASSEMBLY	COMPONENT	DESCRIPTION	1	2	3	4	5	6	7
Anode Rods	AP11524C	ANODE .840 x 44" MAGNESIUM		X		X	X		
	AP11524Y	ANODE .840 X 34" MAGNESIUM	X		X				
	AS43152	ANODE ROD/NIPPLE/HEAT TRAP ASSEMBLY - 28 IN. LONG ANODE - MAGNESIUM	X		X				
	AS43153	ANODE ROD/NIPPLE/HEAT TRAP ASSEMBLY - 40 IN. LONG ANODE - MAGNESIUM		X		X	X		
Anode Rod (Powered) + Anode Module	AP21844	ANODE CONTROL MODULE						X	X
	AP21048	POWER ANODE - 50 GAL						X	
	AP18572	POWER ANODE - 75 GAL							X
Blower	SP21129	SERVICE KIT - BLOWER NATURAL GAS	X	X	X	X			
	SP21130	SERVICE KIT - BLOWER NATURAL GAS					X	X	
	SP21131	SERVICE KIT - BLOWER - LP	X	X	X	X			
	SP21132	SERVICE KIT - BLOWER - LP					X	X	
	SP21178	SERVICE KIT - BLOWER - LP HIGH ALTITUDE	X	X	X	X			
	SP21190A	SERVICE KIT - BLOWER ASSY (NATURAL GAS)							X
	SP21190B	SERVICE KIT - BLOWER ASSY (LP)							X
Burner Assembly	SP21112	SERVICE KIT - BURNER ASSEMBLY KIT	X	X	X	X	X	X	X
Dip Tube	AP13763H	DIP TUBE 3/4 HELIX PEX 32.500	X		X				
	AP13763K	DIP TUBE 3/4 HELIX PEX 38.500					X	X	X
	AP13763X	DIP TUBE 3/4 HELIX PEX 42.000		X		X			
Display Assembly	SP21165	SERVICE KIT - RSHE FRONT PANEL DISPLAY ASSEMBLY (STANDARD)	X	X					
	SP21166A	SERVICE KIT - RSHE FRONT PANEL DISPLAY ASSEMBLY (PREMIUM) - RHEEM®			X	X	X		
	SP21166B	SERVICE KIT - RSHE FRONT PANEL DISPLAY ASSEMBLY (PREMIUM) - RUUD®			X	X	X		
	SP21166C	SERVICE KIT - RSHE FRONT PANEL DISPLAY ASSEMBLY (PREMIUM)- RICHMOND®			X	X	X		
	SP21167A	SERVICE KIT - GHE FRONT PANEL DISPLAY ASSEMBLY (LD COMMERCIAL) - RHEEM®						X	
	SP21167B	SERVICE KIT - GHE FRONT PANEL DISPLAY ASSEMBLY (LD COMMERCIAL) - RUUD®						X	
	SP21167C	SERVICE KIT - GHE FRONT PANEL DISPLAY ASSEMBLY (LD COMMERCIAL) - RICHMOND®						X	
	SP21170	SERVICE KIT - GHE TOP PANEL DISPLAY ASSEMBLY (LD COMMERCIAL)							X
	AP19107	DISPLAY BEZEL	X	X	X	X	X	X	X
Display Assembly & Control Board	SP21182A	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RHEEM®						X	
	SP21182B	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RUUD®						X	
	SP21182C	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RICHMOND®						X	
	SP21182D	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RHEEM®			X	X	X		
	SP21182E	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RUUD®			X	X	X		
	SP21182F	SERVICE KIT - IGNITION & DISPLAY CONTROLS - RICHMOND®			X	X	X		
	SP21182H	SERVICE KIT - IGNITION & DISPLAY CONTROLS							X
	SP21244A	PROP G40-50U CN HE - IGNITION CONTROL	X						
	SP21244B	PROP G40-50P CN HE - IGNITION CONTROL	X						
	SP21244C	PROP G50-50U CN HE - IGNITION CONTROL		X					
	SP21244D	PROP G40-50P CN HE - IGNITION CONTROL		X					
	SP21244F	ECE G40-50U CN HE - IGNITION CONTROL	X						
	SP21244G	ECE G50-50U CN HE - IGNITION CONTROL		X					
	SP21244Z	IGNITION CONTROL			X	X	X	X	X
Exhaust Tee	SP21152	ASSEMBLY KIT - EXHAUST TEE	X	X	X	X	X	X	X
	AP16770	CALCIUM CARBONATE - 3/4 LB BAG 3/4 IN	X	X	X	X	X	X	X
	AP21338	EXHAUST TEE, 2"-3"	X	X	X	X	X	X	X
Hoses & Connectors	SP21168	SERVICE KIT - HOSE & JUNCTION	X	X	X	X	X	X	X
	AS38455D	VINYL TUBING - 3/16 ID x 1.5 ft	X	X	X	X	X	X	X
	AP21904	COUPLING WITH PRESSURE TAP	X	X	X	X	X	X	X
	AP21705	NOISE REDUCER	X	X	X	X	X	X	X
	AP15993A-1	SQUARE FEEDBACK HOSE	X	X	X	X	X	X	X

SERVICE PARTS

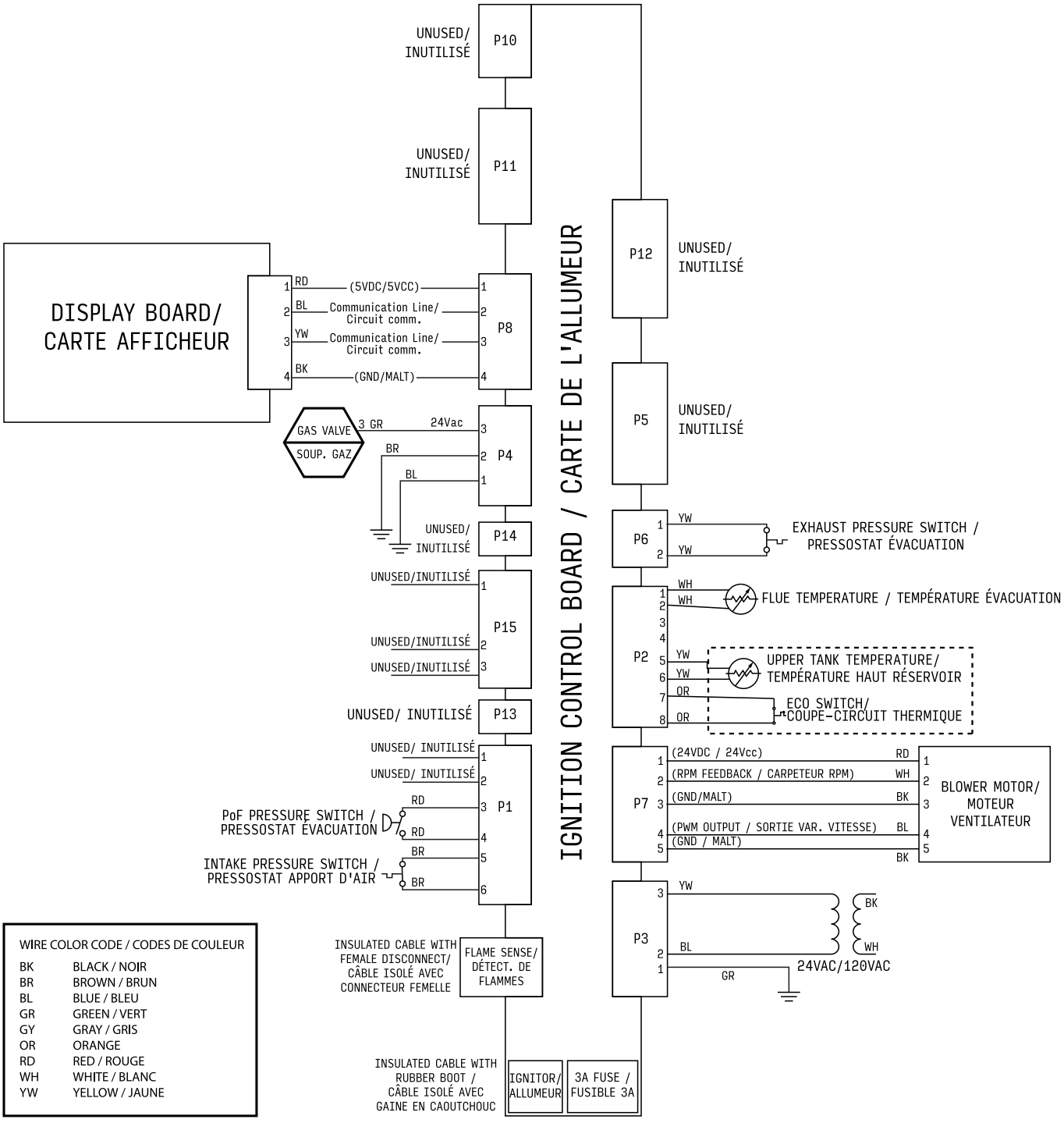
1 - 40G-50K RSHE40SB 2 - 50G-50K RSHE50B 3 - 40G-50K RSHE40SR 4 - 50G-50K RSHE50RL
5 - 50G- RSHE50RH 6 - 50G- GHE50 7 - 75G- GHE75

Residential Standard | Residential Premium | Commercial

SUBASSEMBLY	COMPONENT	DESCRIPTION	1	2	3	4	5	6	7
Flame Rod Assembly	SP21159	SERVICE KIT - FLAME SENSOR ROD	X	X	X	X	X	X	X
Gas Valve Adapter	SP21156	SERVICE KIT - SIT ADAPTER	X	X	X	X			
Igniter Assembly	SP21158	SERVICE KIT - IGNITER DSI	X	X	X	X	X	X	X
Sensor - Leak	SP21169	SERVICE KIT - LEAK SENSOR			X	X	X	X	X
	AP20679	LEAK SENSOR			X	X	X	X	X
Sensors - Thermistor/ECO/Flow	AP22246	SWITCH SENSOR 12K/90 ½" NPT	X	X	X	X	X	X	X
	AP23101	THERMISTOR-NTC PROBE 1/2" NPT			X	X	X	X	X
	AP20980	FLOW SENSOR 3/4"			X	X	X	X	X
Panels & Covers	AP21069A	SIDE PANEL - RESIDENTIAL (GRAY)	X	X	X	X	X		
	AP21069B	SIDE PANEL - COMMERCIAL (BLACK)						X	
	AP18578	SIDE PANEL - COMMERCIAL (75-GAL)							X
	AP20827	WIRE BOX COVER 26.25			X	X	X	X	
	AP20781B	WIRE BOX COVER 21.750							X
	AP21843	COVER, LOWER THERMISTOR			X	X	X		
Pressure Switch	AP17893D	SWITCH - PRESSURE, INTAKE - ENDURA	X	X	X	X	X	X	X
	AP17892A-1	SWITCH - PRESSURE (P.O.F.) - ENDURA	X	X	X	X	X	X	X
	AP21683	SWITCH - PRESSURE, EXHAUST - ENDURA	X	X	X	X	X	X	X
Recirculation Pump	SP21191A	SERVICE KIT - RECIRCULATION PUMP	X	X	X	X	X	X	X
	SP21191B	SERVICE KIT - RECIRCULATION PUMP	X	X	X	X	X	X	X
	SP21191C	SERVICE KIT - RECIRCULATION PUMP	X	X	X	X	X	X	X
	SP21191D	SERVICE KIT - RECIRCULATION PUMP	X	X	X	X	X	X	X
Transfomer	AP21679	TRANSFORMER (120/24 VAC)	X	X	X	X	X	X	X
Wiring	AP20738	WIRE HARNESS - TOP PAN 40/50 GAL (STANDARD)	X	X					
	AP20739	WIRE HARNESS - TOP PAN 40/50 GAL (PREMIUM)			X	X	X		
	AP20741	WIRE HARNESS - TOP PAN 50 GAL (COMMERCIAL)						X	
	AP21480	WIRE HARNESS - TOP PAN 75 GAL (COMMERCIAL)							X
	AP20789	WIRE HARNESS - GAS VALVE	X	X	X	X			
	AP18576	WIRE HARNESS - GAS VALVE					X	X	X
	AP20667	WIRE HARNESS - JACKET	X	X	X	X	X		
	AP20668	WIRE HARNESS - JACKET - 50 GAL - COMMERICAL						X	
	AP22807	WIRE HARNESS - JACKET - 75 GAL - COMMERICAL							X
	AP21694	WIRE HARNESS - TRANSFORMER (40/50-GAL)	X	X	X	X	X	X	
	AP22938	WIRE HARNESS - TRANSFORMER (75-GAL)							X
	AP21715	DISPLAY TO SHUTOFF VALVE HARNESS			X	X	X	X	X
	AP21935	FLOW SENSOR HARNESS			X	X	X	X	X
	AP22103A	GROUND WIRE	X	X	X	X	X	X	X
	AP21657	POWER CORD - 6FT (US/CANADA)	X	X	X	X	X	X	X
Valve - Drain	AP16800C	DRAIN VALVE 2.14, PLASTIC	X	X					
	AP16830C	DRAIN VALVE-BALL TYPE-BRASS 2-1/4"			X	X	X	X	X
Valve - Shutoff	SP21172	AUTO SHUTOFF VALVE KIT			X	X	X	X	X
Valve - T&P	AP20402G	RELIEF VALVE	X	X	X	X	X	X	X
Venting	SP20245	CONCENTRIC TERMINATION 3"	X	X	X	X	X	X	X
	SP20897	CONCENTRIC TERMINATION 2"	X	X	X	X	X	X	X
	SP20796	4" CONCENTRIC VENT KIT	X	X	X	X	X	X	X
	SP20286	FLAT TERMINATION 3"	X	X	X	X	X	X	X
	SP20285	FLAT TERMINATION 2"	X	X	X	X	X	X	X
	SP21091	2" FLEX VENT	X	X	X	X	X	X	X
	AP19356	3" x 25FT LONG FLEX VENT	X	X	X	X	X	X	X
	SP21260	ACCESSORY BAG	X	X	X	X	X	X	X

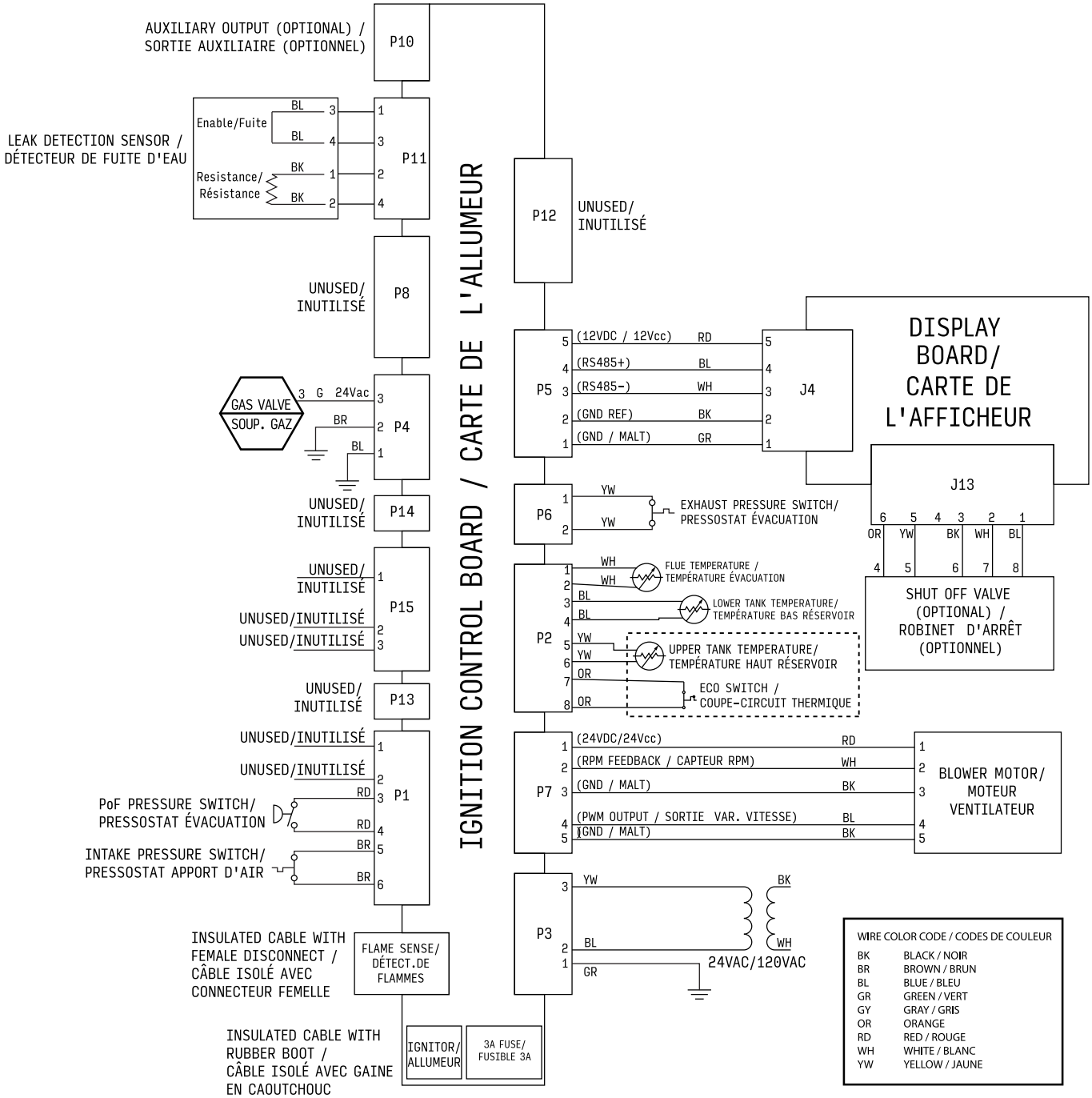
WIRING SCHEMATIC DIAGRAM (RESIDENTIAL STANDARD)

RSHE40SB, RSHE50B STANDARD MODELS



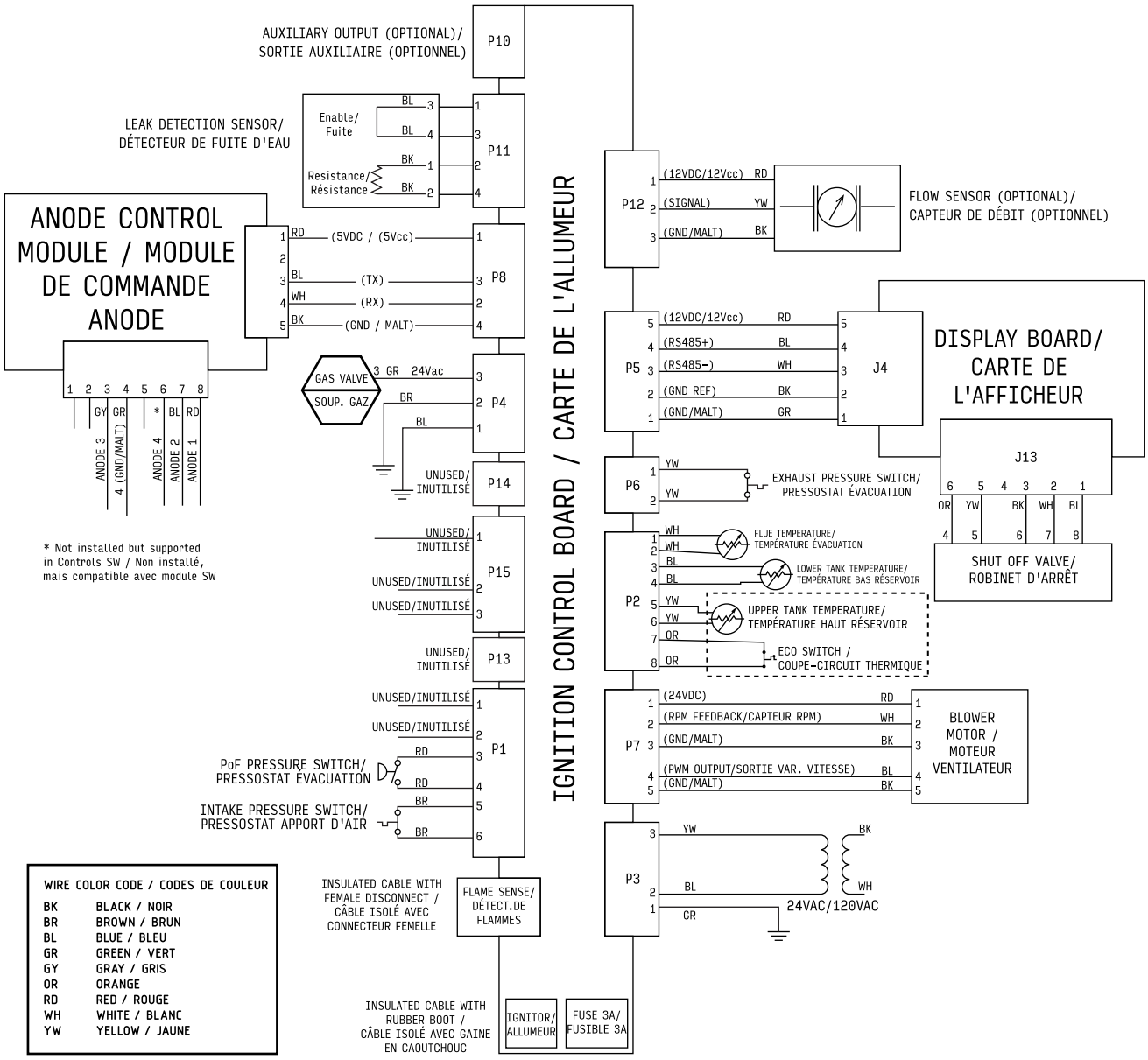
WIRING SCHEMATIC DIAGRAM (RESIDENTIAL PREMIUM)

RSHE40SR, RSHE50RL, RSHE50RH PREMIUM MODELS

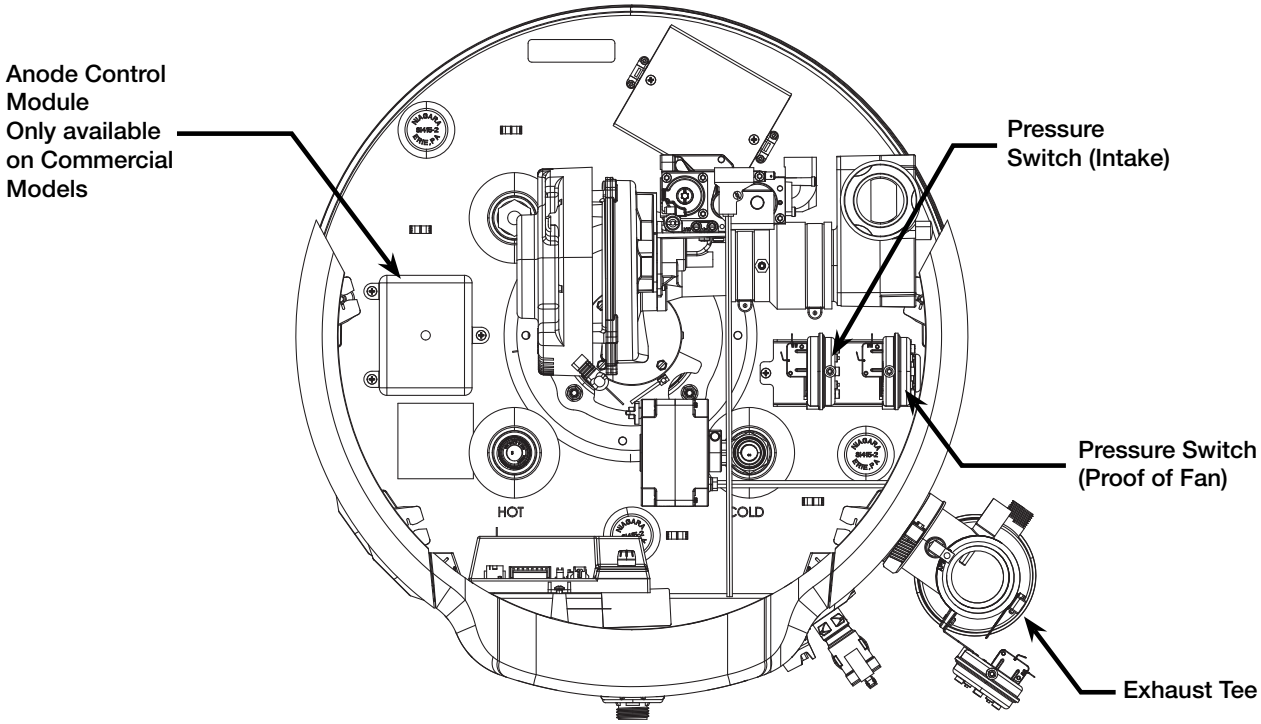


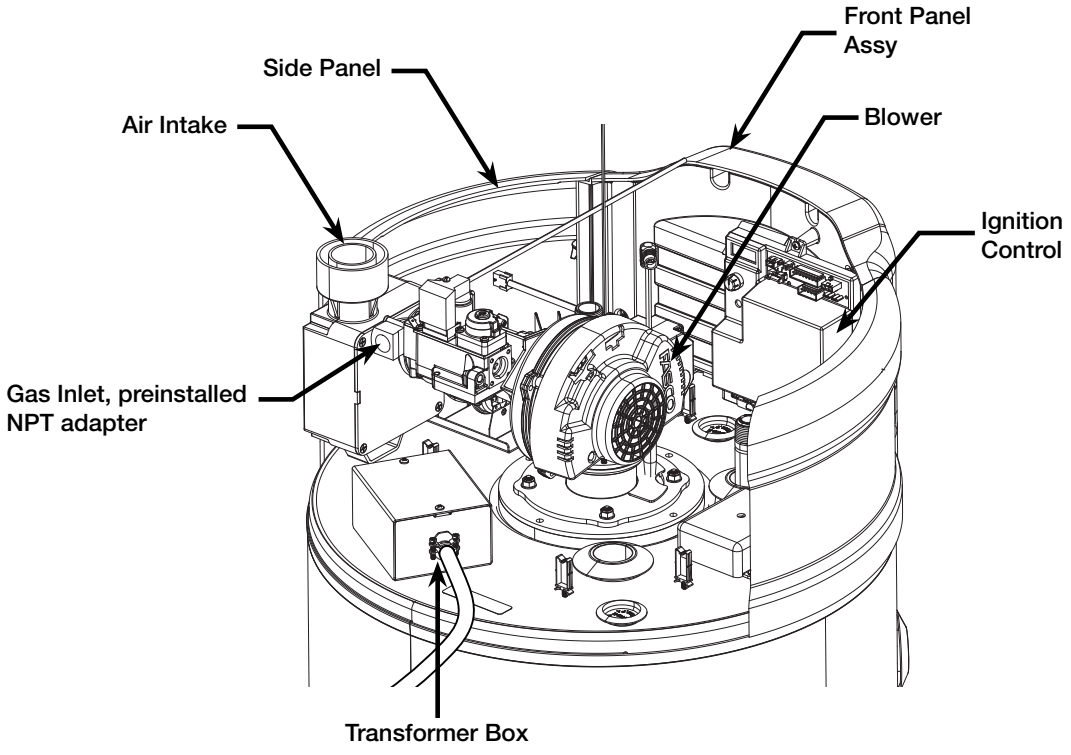
WIRING SCHEMATIC DIAGRAM (COMMERCIAL)

GHE50 (-SU, -SS) GHE75 (-SU, -SS) MODELS

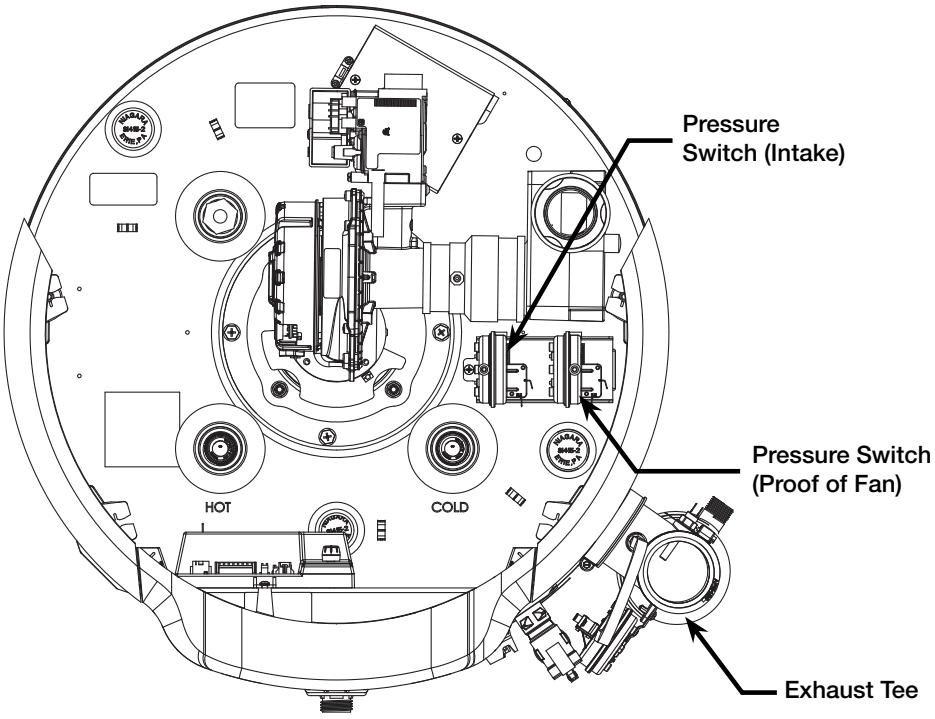


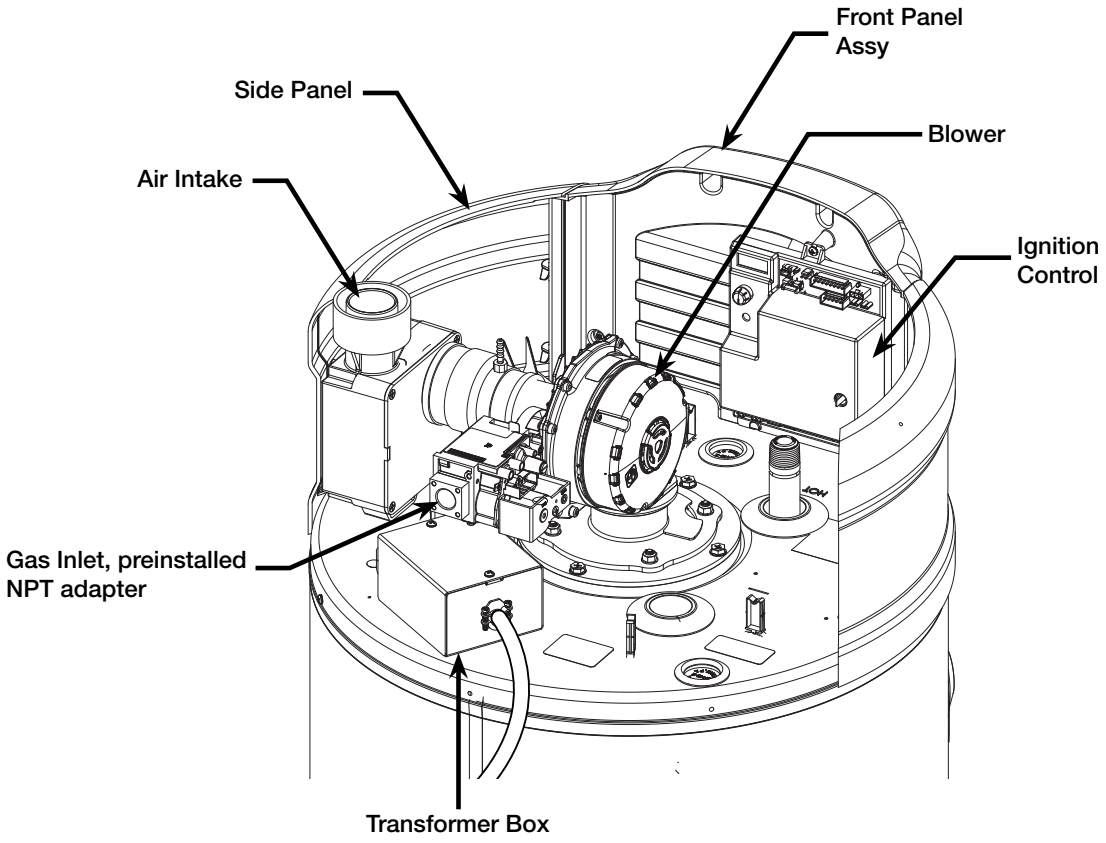
TOP VIEW 50G COMMERCIAL AND REPLACEMENT



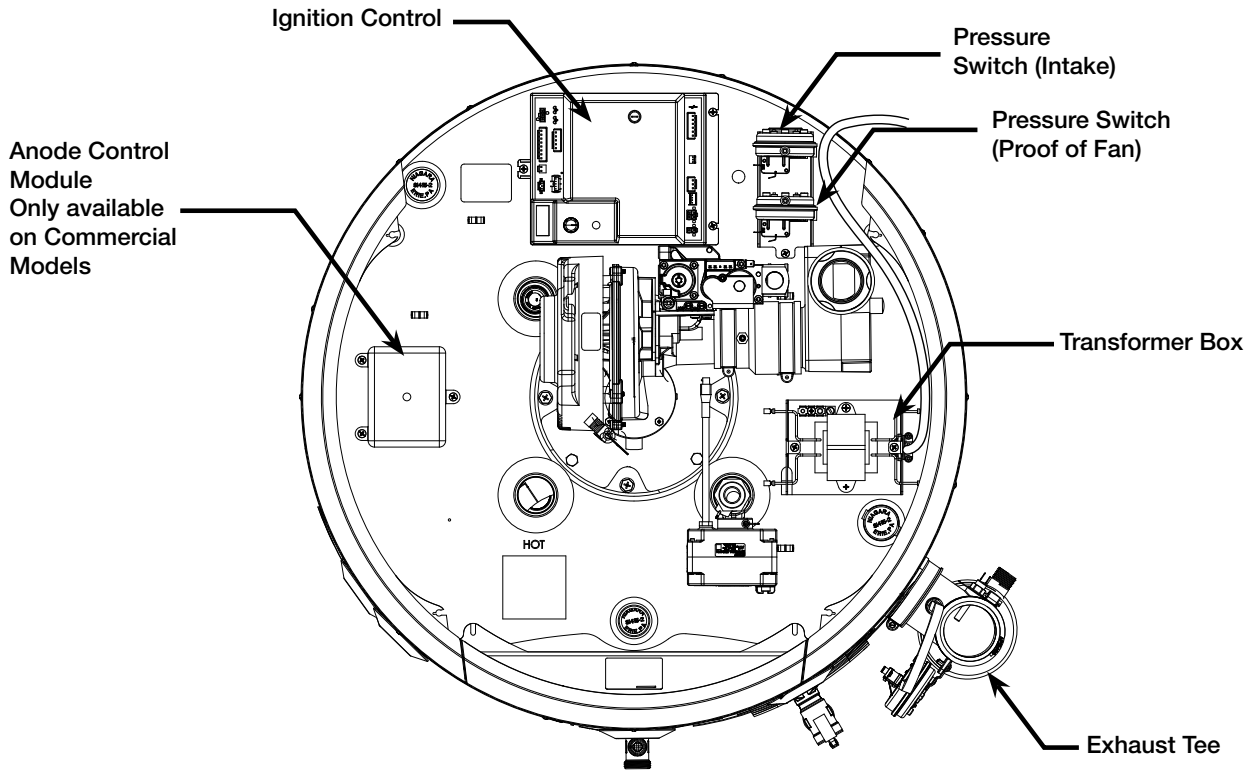


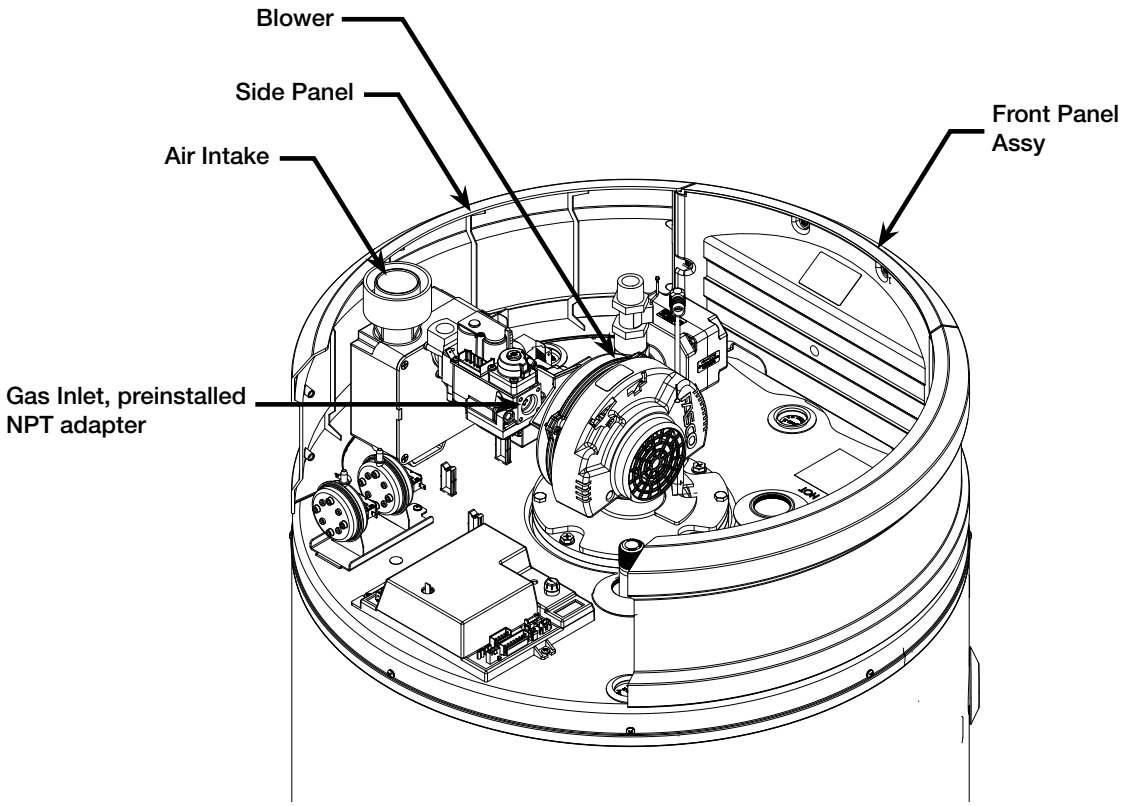
TOP VIEW STANDARD



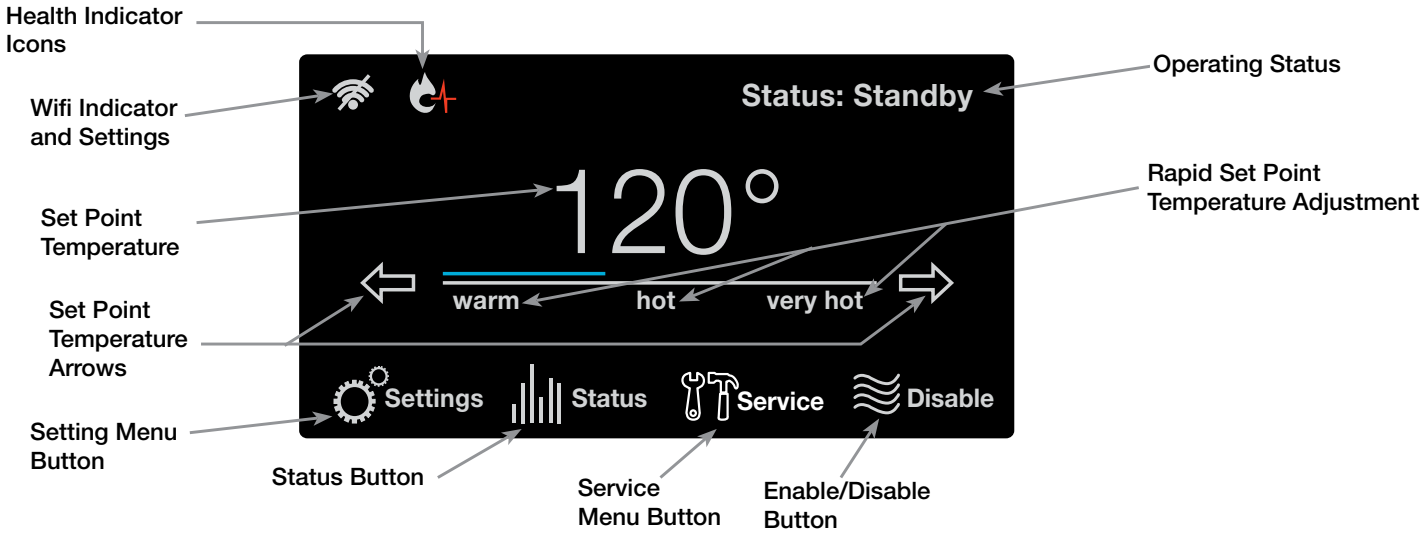


TOP VIEW 75G


Ignition Control
Pressure Switch (Intake)
Pressure Switch (Proof of Fan)
Anode Control Module Only available on Commercial Models
Transformer Box
HOT
Exhaust Tee


Blower
Side Panel
Air Intake
Front Panel Assy
Gas Inlet, preinstalled NPT adapter

NAVIGATING THE USER INTERFACE



STARTUP

Once power is applied to the water heater and the On/Off switch is set to On, the Startup Wizard will transition through the following features:

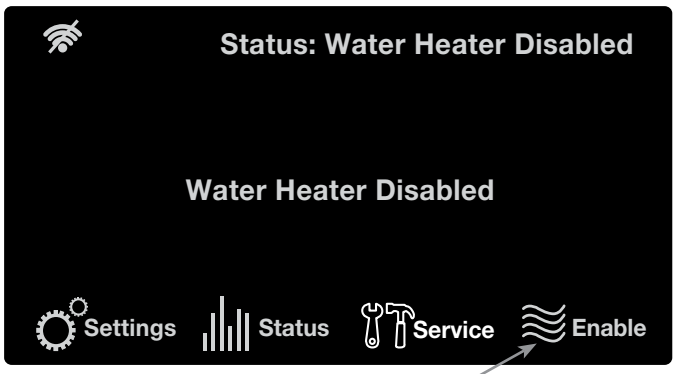
1. Setting of Time and Date

2. Setting Hours of Operation for the business

3. Wifi Setup

Follow the on-screen instructions to complete setup. Some of these items can be skipped if a later setup is desired.

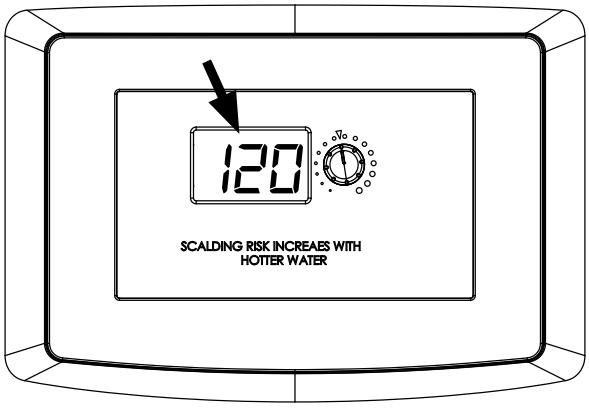
ENABLING (TURNING ON) THE UNIT



Press Enable to allow heater to maintain set point temperature.

LED DISPLAY MODELS (STANDARD MODELS)

If the water temperature needs adjustment, use the control knob to increase temperature by rotating clockwise (turn to the right), or decrease temperature by rotating counter-clockwise (turn to the left).



NAVIGATING THE USER INTERFACE

TEMPERATURE ADJUSTMENT

Tank temperature will be maintained according to the setting displayed on the LCD touch screen or LED display. If the water temperature setting needs adjustment, use the Set Point temperature adjustment arrows on the display to select desired temperature.

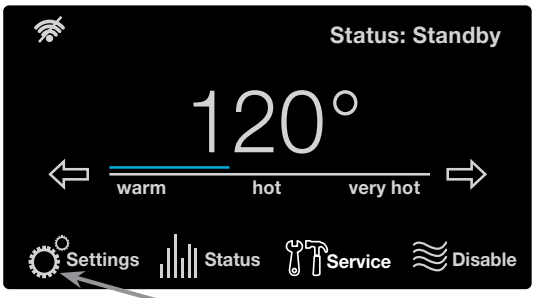
The display also has a rapid temperature adjustment feature that corresponds to the below temperature settings.

	RESIDENTIAL	COMMERCIAL
WARM	110°F (44°C)	110°F (44°C)
HOT	120°F (49°C)	140°F (60°C)
VERY HOT	140°F (60°C)	180°F (83°C)

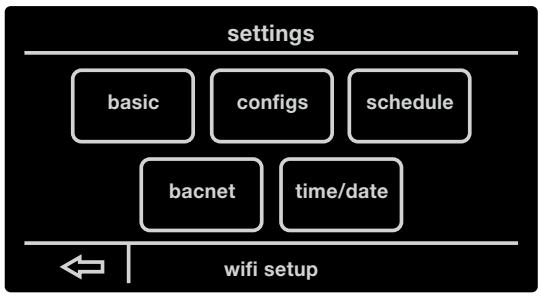
Touching the text 'warm', 'hot', or 'very hot' will adjust the temperature according to these temperature settings.

SETTING MENU

The settings function on the water heater display allows access to the basic settings, configurations, schedules, and the time/date.



Pressing the settings button will allow access to water heater settings



NOTE: BACnet capability is only available in Triton LD models GHE-50, GHE-75 variants.

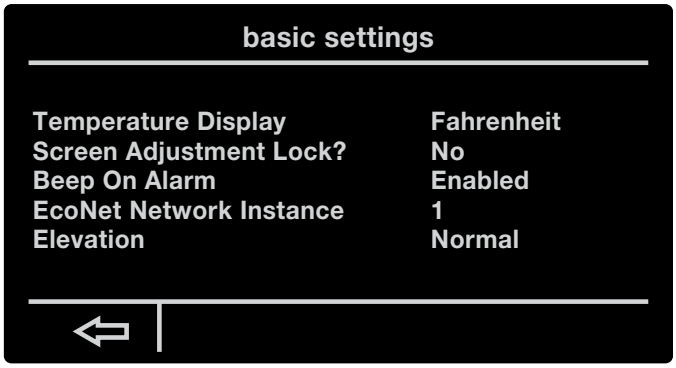
BASIC SETTINGS

The basic settings in your water heater can:

- Allow you to change the temperature unit,
- Screen adjustment lock/unlock,
- Enable/disable the alarm beep,
- Set your EcoNet network instance,
- Set Elevation information for the water heater.

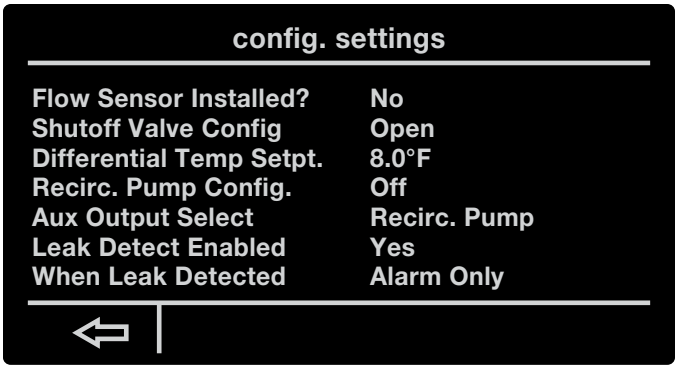
To access the Basic Settings, from the Main Screen, touch the Settings icon then touch the Basic button. To change any of the available parameters, touch the desired configuration state / value to bring up the arrows used to adjust the parameter.

For example, to change the configuration for Beep on Alarm, press Enabled and use or down arrow to change to any of the available options.



NAVIGATING THE USER INTERFACE

CONFIGURATION SETTINGS



Config Settings (Commercial Model).

FLOW SENSOR INSTALLED

For Commercial models only, if a flow sensor is installed, use this configuration parameter to notify the system in order to track water consumption through the water heater.

SHUTOFF VALVE CONFIGURATION (SOV)

For Residential models, the user has the option to set the SOV to Not Installed or Installed. For Commercial models, the user has the option to set the SOV to Open, Closed, Close if Leak Detected and Close if Unoccupied and Leak Detected.

1. Open Valve is always Open and is not commanded to operate based on system inputs.
2. Closed Valve is always Closed and is not commanded to operate based on system inputs.

NOTE: setting to this configuration will cause the water heater to become disabled

3. Close if Leak Detected Valve will close if a leak is detected
4. Close if Unoccupied and Leak Detected Valve will close if a leak is detected AND the leak occurs at a time where the schedule is set to Away or Unoccupied.

DIFFERENTIAL SET POINT

For Commercial models only, Differential Set Point can be adjusted between 1 °F and 30 °F in increments of 0.5 °F. The Differential Set Point is the temperature below the set point temperature at which a demand for heat is generated.

For residential models only, the differential set point is set to 8°F by default. In instances of high demand, the differential can be set to Max mode. Max mode provides you up to 15% increase in first hour gallons.

RECIRCULATION PUMP

If equipped, the water heater can control a recirculation pump based on the schedule of the water heater or via an application on your smart device. There are 5 configurations for controlling this pump:

1. **OFF.** Pump never energized
2. **ON.** Pump always energized
3. **Schedule.** Pump energized based on schedule: Energized in 15 minute increments when the schedule is configured as Home or Occupied and not energized when the schedule is configured as Away or Unoccupied.
4. **Schedule ON.** Energized continuously when the schedule is configured as Home or Occupied and not energized when the schedule is configured as Away or Unoccupied.
5. **On Demand.** Energized when commanded from your smart device application

NAVIGATING THE USER INTERFACE

CONFIGURATION SETTINGS (CONT.)

AUXILIARY OUTPUT SELECT

This configuration allows the system to energize an output driver to energize an external auxiliary output device by different means.

1. **NONE.** No external device is connected to the system.
2. **Recirculation Pump.** When installed and configured as Recirc Pump, the auxiliary driver will be energized based on the schedule. (See configuration for Recirculation Pump).
3. **Alarm Output.** When installed and configured as Alarm Output, the auxiliary driver will be energized any time an alarm (A-code) is active.

LEAK DETECT ENABLED

Leak Detection is available for both Residential and Commercial models.

For Commercial models only, Leak Detection defaults to OFF. When ON, the user has the ability to determine how detected leaks are handled via annunciation and system response.

The user has the ability to turn Leak Detection to OFF, if desired. If Leak Detection is turned ON, the user has the ability to determine how detected leaks are handled.

WHEN LEAK DETECTED

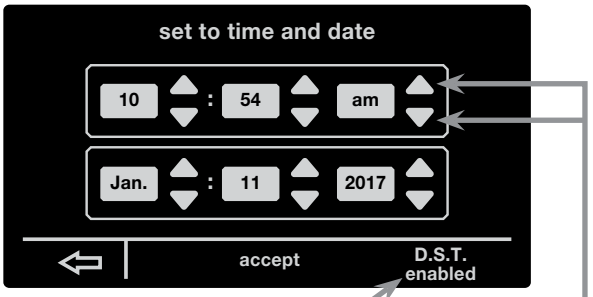
This configuration allows the user to determine if the water heater should just annunciate the alarm or if the water heater should be disabled for a detected water leak.

SCHEDULE SETTINGS

The Schedule Settings option allows the unit to know when you are home vs away (on Residential models with an LCD) or occupied vs unoccupied (on Commercial Models). Your heater allows you to select a day you want and set the times when the heater will be in use. You can also copy/paste the day you select and apply it to the other days as well.

TIME/DATE SETTINGS

By selecting time/date you can change the water heater's current set time. You can also select the daylight savings time function to automatically adjust the time for Daylight Savings.



The D.S.T. function allows you to adjust the time for daylight savings time

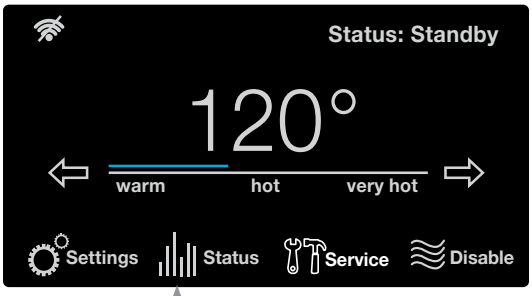
The up/down arrows allow you to control the time, month, day and year

BACNET (Commercial Triton LD Units Only)The Commercial Triton LD units are compatible with BacNet MS/TP protocol. Please refer to the BacNet instruction sheet for details on the set up.

NAVIGATING THE USER INTERFACE

STATUS MENU

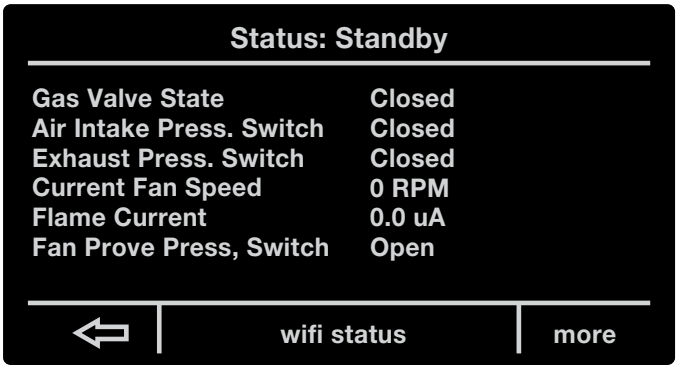
The status screen provides information on the current operating status of the water heater. This screen also provides information on the WiFi status.



The status icon will transition the screen to show the current states and values for the water heater's features and I/O.

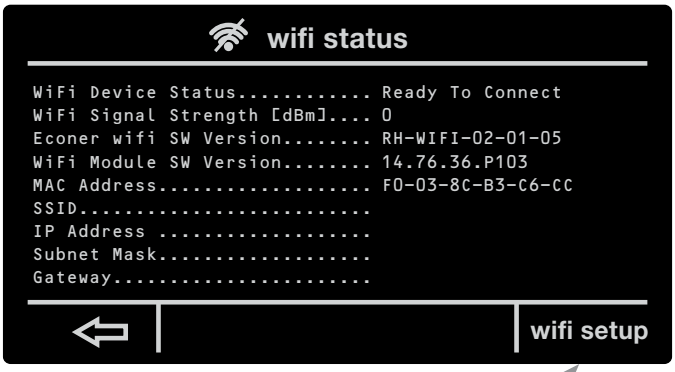
MORE FUNCTION

Additional water heater operating parameters can be accessed by selecting the More function on the Status screen. This prompt will allow you to view the upper and lower tank temperatures, flue temperatures, ECO Switch state and auxiliary Relay State.



WIFI STATUS

Selecting the WiFi status button allows you to transition to the WiFi Status screen showing the current WiFi Status of the water heater as well as other Network information.



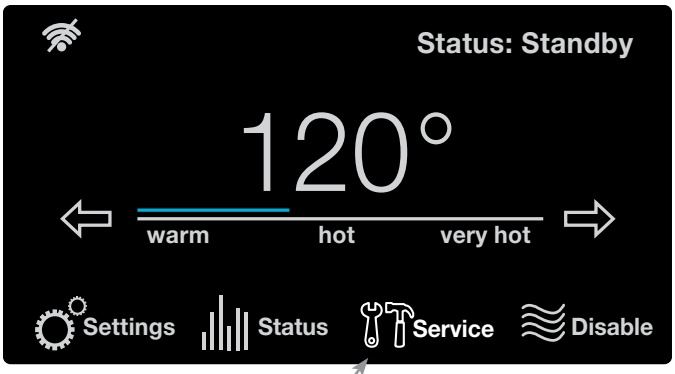
Selecting the WiFi setup function will transition the screen to the WiFi setup screen where the user can connect the water heater to a local WiFi network.

NAVIGATING THE USER INTERFACE

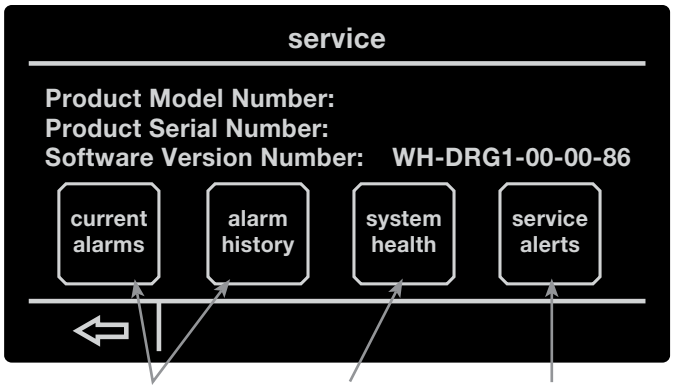
SERVICE MENU

The service menu provides information on the product, alarms, system health, and service alerts. Alarm details can be found in the “Before You Call Service” section of the Use and Care Manual

In the event of an active alarm, the Service button will blink on the home screen. Pressing the Service button will transition to the Service screen where buttons for active alarms and alarm history are available.



By selecting the service function, the screen will transition to the Service Screen where the user can see Current Alarms, Logged Alarms, System Health and Service Alerts.



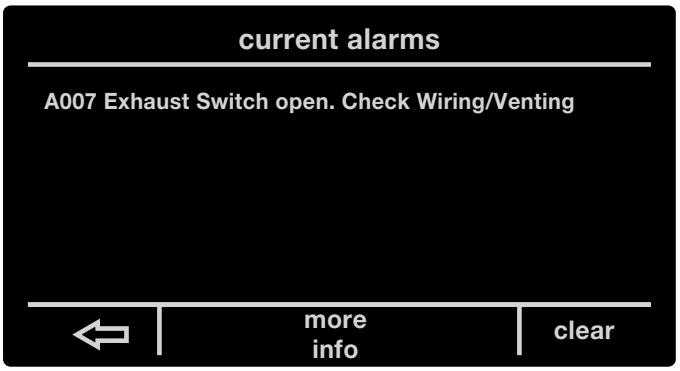
Current Alarms and Alarm History allows you to access any current alarms that have been activated and view a list of logged alarms.

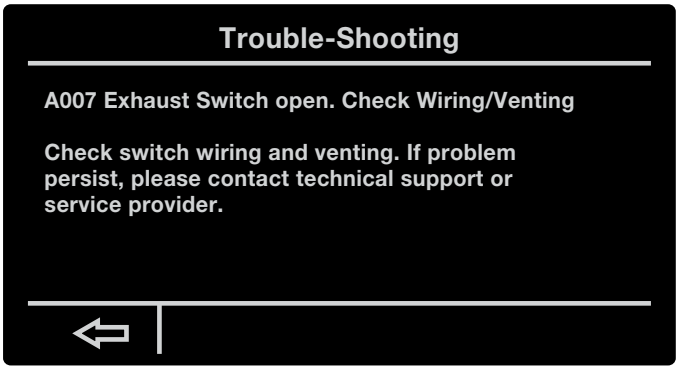
System Health will show you the status of the combustion health and overall tank health.

Service Alerts will allow you to set the duration between service intervals for maintenance items such as venting, clean the drain trap, replace the neutralizer, and to drain and inspect the tank.

ALARMS

The current alarms function allows you to see problems that have been detected by your water heater and are currently active. To view current alarms, from the Main Screen, press Service then Current Alarms button. To view additional information on an active alarms, select the active alarm and press More Info.





To clear the current alarms, press the clear button. If the conditions are present to activate the alarm, the alarm will once again appear on the screen.

NAVIGATING THE USER INTERFACE

ALARM HISTORY

Alarm history allows users to see any of the previous alarms that have activated in the past and provides the ability to clear previous alarms.

The alarm history function allows users to see the ten most recent alarms that have been activated by the water heater. To clear the history of logged alarms, press the clear button.

SYSTEM HEALTH

The system health function allows the user to view the current status of the water heater's and tank health.

To view System Health of the water heater, from the Main Screen, press Service then System Health button. The combustion health and tank health each indicate three levels of operation via a bar graph.

When combustion health is operating normally, the far right green box will flash.

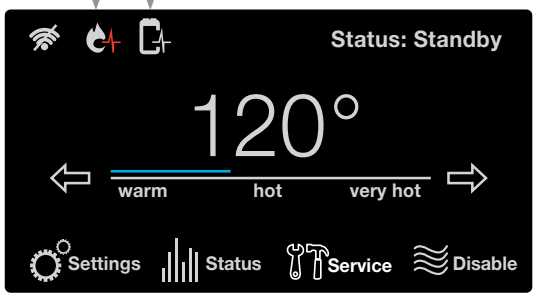
When the combustion health is decreasing in reliability, one of the yellow boxes will flash and the combustion health icon will flash on the Main Screen with a yellow pulse icon.

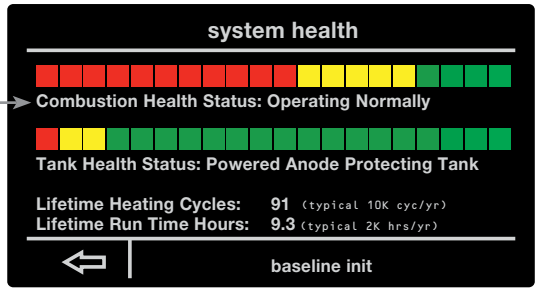
When combustion health needs service, one of the red boxes will flash and the combustion health icon will flash on the Main Screen with a red pulse icon.

In the event a combustion system component needs replacing, the Baseline Init button at the bottom of the System Health screen should be selected to reset internal averages and calculations used to calculate the value of combustion health.

This symbol will appear on your home screen if your combustion health is critical. Pressing this icon will take the user to the Health Status Screen

This symbol will appear if your tank health status has reached critical. Pressing this icon will take the user to the System Health Screen.





The health of your system's combustion system and overall health can be seen here. This screen can be accessed by tapping the health indicator icons on the home screen.

NAVIGATING THE USER INTERFACE

COMBUSTION HEALTH

HEALTH STATUS	RECOMMENDED ACTIONS
Normal Protection	No Action Needed
Protection Decreasing	Begin Planning for Service and/or Replacement
Need Servicing	Contact Service Provider

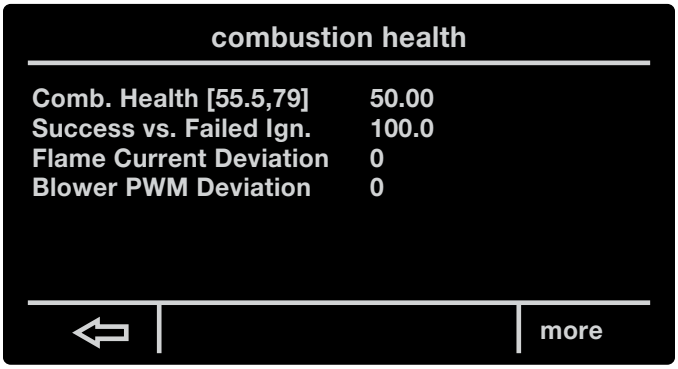
TANK HEALTH

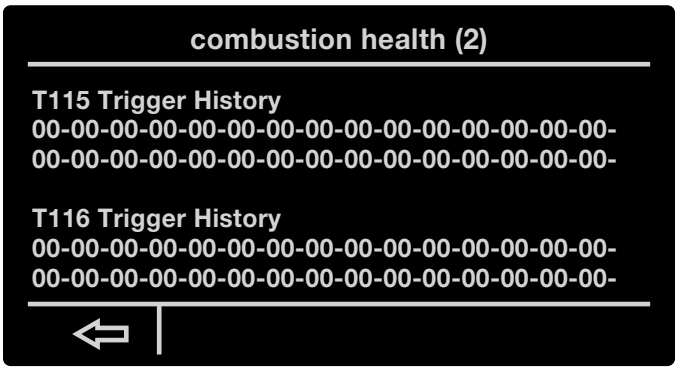
HEALTH STATUS	RECOMMENDED ACTIONS
Normal Protection	No Action Needed
Protection Decreasing	Begin Planning for Service and/or Replacement
No Longer Protecting	Contact Service Provider

SYSTEM HEALTH HIDDEN SCREEN FOR TROUBLESHOOTING

There is an additional screen available used to troubleshoot the system in the event of a Combustion Health Issue. To access this screen, from the Main Screen, press Service then System Health. Press and HOLD the lower right corner of the System Health screen for 10 seconds. A Combustion Health screen should appear showing information on components that cause combustion health issues.

The first screen shows the combustion health value and information on deviation parameters, flame current and blower PWM as well as the percent of successful to failed ignitions. Press the back arrow to return to the System Health screen. Pressing the More button will transition the screen to show the trigger history for both combustion health alerts (T115 is less severe than T116). Press the back arrow to return to the initial system health information screen.





SERVICE ALERTS

To view Service Alerts, from the Main Screen, press Service then Service Alerts button, Here users can:

- Enable service alerts
- Set the duration between service alerts
- Reset alerts if they are active

By selecting a duration for a service alert, the user can use the up down arrows to modify the duration value.

DISPLAY MESSAGES ON CONTROL BOARD

MODE OF OPERATION	DESCRIPTION
NO MODEL SELECTED	This is enumeration state '0' for the modes of operation and is present when the water heater has not yet been assigned a Model ID for operation.
WATER HEATER DISABLED	The water heater has power but is disabled and is not capable of heating water.
STANDBY	The water heater is in a non-active mode where the temperature of the water in the tank is within the set-point limits.
PRE-PURGE	The initial step in a heating cycle where the blower is energized to clear any potential by-products of combustion from the heat exchanger, sealed system,combustion chamber, etc. (21 seconds)
IGNITION	The ignition system and gas valve are energized during this period. Igniter starts sparking two seconds prior to valve opening and releasing fuel. Valve stays open for four seconds.
HEATING	A call for heat is present and the burner is actively firing.
POST PURGE	The call for heat is satisfied, the gas valve is de-energized while the blower remains energized to clear the heat exchanger, sealed system, combustion chamber, etc. (60 seconds)
RETRY	Ignition attempt failed but the system is in the process of retrying.
RECYCLE	The water heater is in the 30 minute delay between ignition retries. (Max 3 recycle delays)
FAULT	The water heater is experiencing a malfunction and displaying an error code.
IGN. CONTROL ERROR	The display is not communicating with the ignition control.

SAFETY FUNCTIONS OF THE CONTROLS

FLAME DETECTION

Proof of flame is accomplished by flame rectification via a burner sensor electrode and earth ground. The presence of a flame is measured via a flame rod that points into the flame. With a flame present to bridge the space between the flame rod and earth ground, the resultant current is monitored by the controller. The controller requires the flame current to attain a minimum value of 0.5 micro amps as a means to gauge the quality and stability of the flame.

In the absence of an acceptable flame current value, the controller will activate T029. The heater will continue the trials for ignition 27 times (30 minutes wait after every 9 failed trials). In the event the heater goes through 27 trials without successful ignition, error code A001 is activated.

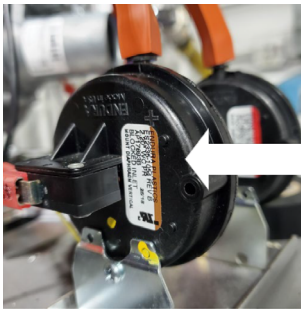
The flame current can be checked through the status screen on the display. The igniter and flame sensor may need to be cleaned periodically to remove contaminants like rust.

Typical flame current should be between 4 and 7 micro amps.

A030 will activate if the flame is present then lost during a heating cycle. If A030 occurs 3 times in a single call for heat, A002 will activate disabling the water heater.

ALL SWITCHES SHOULD BE CLOSED DURING HEATING OPERATION

	ACTIVATION PRESSURE	TOLERANCE
PROOF OF FAN (red sticker)	0.48	+/-0.03
INTAKE PRESSURE SWITCH (brown sticker)	1.90	+/-0.015
EXHAUST PRESSURE SWITCH (yellow sticker)	1.85	+/-0.008



Intake Pressure Switch

PoF Pressure Switch

EXHAUST TEMPERATURE (FLUE GAS) SENSOR

An exhaust temperature sensor is incorporated to detect excessive heat at the vent exhaust location. This protects the plastic PVC piping from damage. The controller monitors the status of the temperature sensor and in the event of abnormal conditions of temperatures exceeding 160°F (71°C), A017 will activate. The A017 will deactivate when the exhaust temperature drops below 155°F for 3 seconds. The controller will render the heater into a fault mode.

POWER OUTAGES

In the event the heater experiences a power interruption, the water heater will resume heating operation.

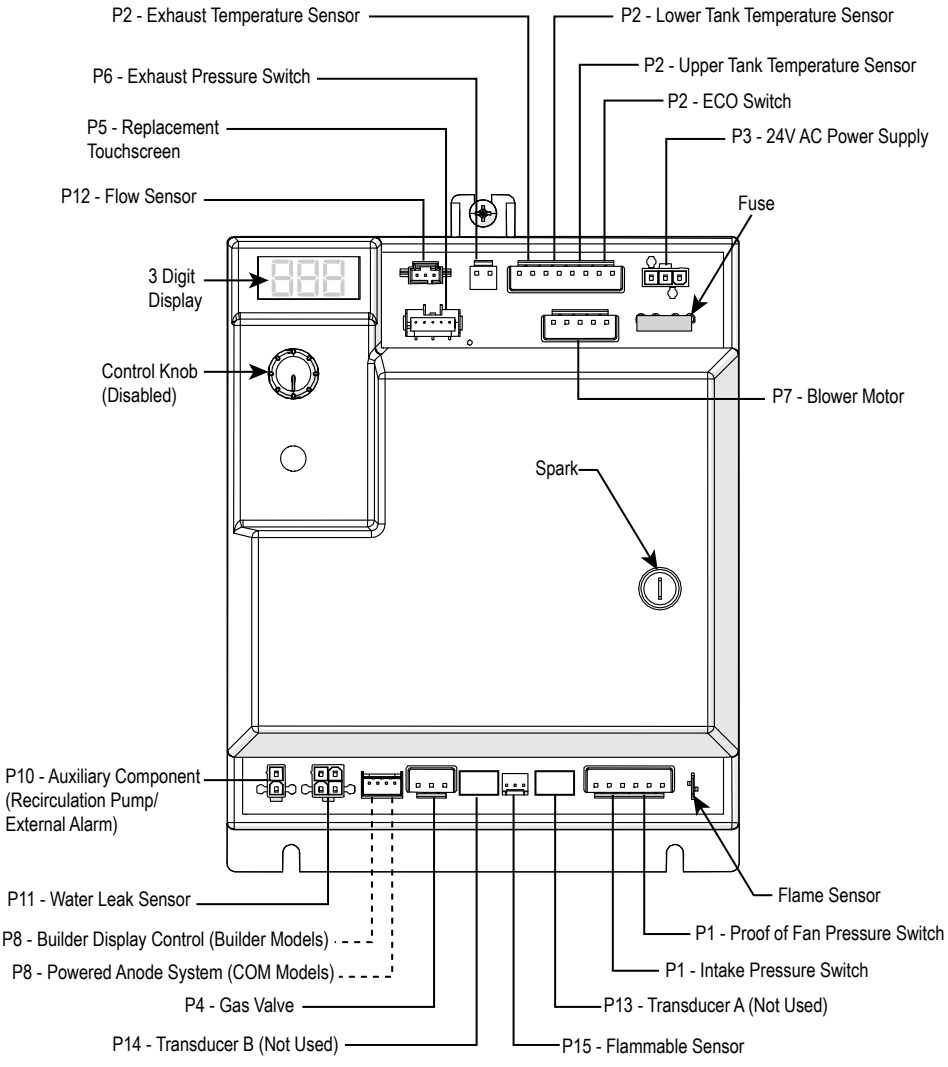
SAFETY FUNCTIONS OF THE CONTROLS

CONTROLLER RETRY AND IGNITION ATTEMPTS

If the first ignition cycle fails during a normal heating cycle sequence, the Ignition Control will finish the sequence of the ignition then de-energize the gas valve. The blower remains energized and the system is purged for the post purge duration. After the post purge time expires, the Ignition Control turns the blower off, waits for the Proof of Fan (PoF) switch to open and performs a relay check on the gas valve.

The blower is then turned on and waits for the PoF-switch to close. Normal ignition sequence is started. The Ignition Control will attempt to ignite and maintain a healthy flame.

If a flame is not maintained after 9 unsuccessful attempts, the Ignition Control will activate T029 and enter a Recycle time of 30 minutes. The water heater will be disabled during the 30 minutes. After 30 minutes has expired, the Ignition Control will again attempt to generate a successful flame. If unsuccessful after 9 additional attempts, T029 will reactivate and another Recycle period will commence where the unit is once again disabled. Finally a 3rd attempt will be made once the Recycle period has expired and if unsuccessful, that means 27 consecutive ignition attempts failed. At that time, the A001 fault code will activate and the unit will become locked out until the power is cycled on the water heater.

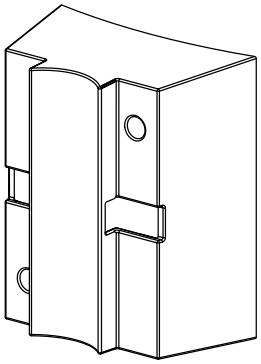


SAFETY FUNCTIONS OF THE CONTROLS

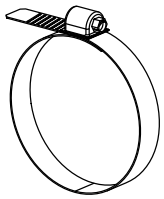
CONDENSATE REMOVAL DRAIN WITH EXHAUST TEE ASSEMBLY

Refer to Use and Care Manual for precautions that need to be taken while installing the exhaust tee, drain tube and neutralizer. Condensate build up in the exhaust tee can restrict the venting system and cause failure. A blocked condensate drain will likely result in an exhaust pressure switch error. Refer to 'Pressure Switch Faults' section for further instructions. Condensation is naturally acidic and uses the neutralizing rocks to treat it before exiting the system. The neutralizer in the exhaust tee needs replacement periodically. Follow service instructions to replace neutralizer when instructed on the display. When reinstalling the exhaust tee, blue lube is recommended for easier assembly (see picture below).

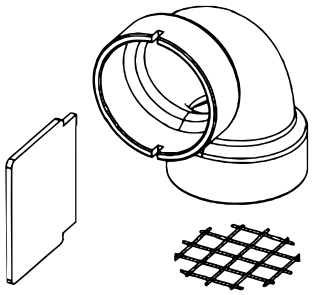
VENT SUPPORT BRACKET / AIR INTAKE TERMINAL



Vent Support Bracket



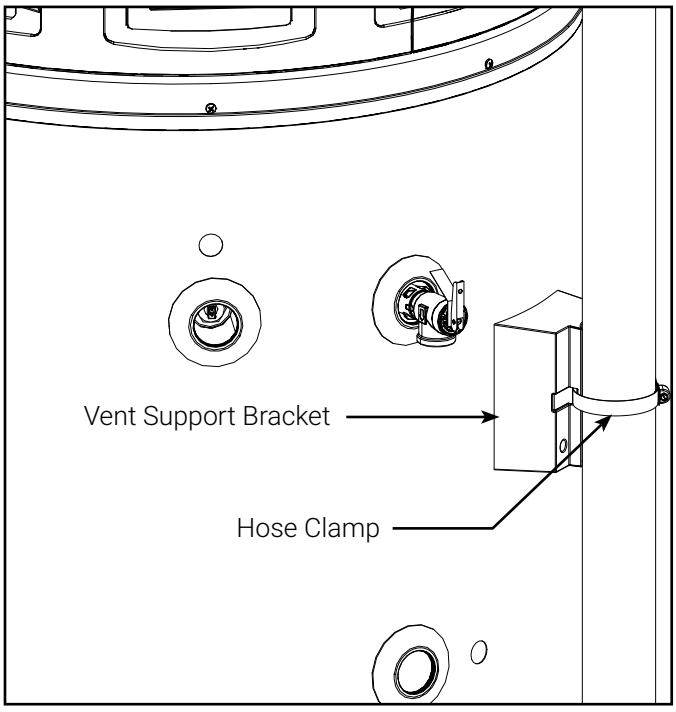
Hose Clamp

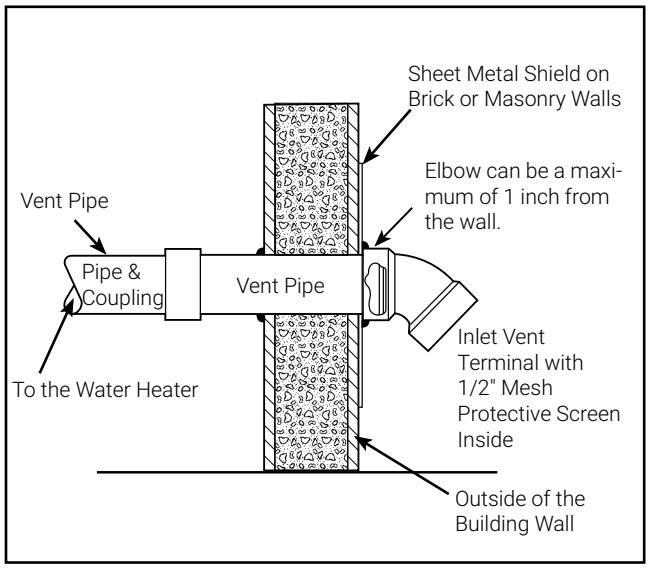


Air Intake Terminal

The vent support bracket and the hose clamp are used to secure the exhaust venting as it extends up the side of the water heater from the exhaust tee.

The air intake terminal is a 2" pvc elbow that has a wind vane and a stainless-steel screen. The assembly assists in combustion and helps maintain the overall performance of the water heater.





NOTE

REMINDER: Prior to installing the venting, ensure the condensation rocks have been placed in the exhaust tee.

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
A001	Ignition lockout due to a total of 9 consecutive failed ignitions. This will disable the heater.	A001 Ignition lockout. ->Clear error code by turning the unit off/on. If problem persists, contact technical support or service provider.
A002	Flame not stable lockout. Lost flame three times during one heat cycle. This will disable the heater.	A002 Flame is not stable. ->Clear error code by turning the unit off/on. If problem persists, contact technical support or service provider.
A003	The intake pressure switch was detected open when the blower was running. This will disable the heater.	A003 Intake Switch open. Check Wiring/Venting ->Check switch wiring and venting. If problem persists, contact technical support or service provider.
A004	The proof of air flow switch was detected open during heating operation. This will disable the heater.	A004 PoF Switch error H. Check Blower/Wiring. ->Check switch wiring and venting. If problem persists, contact technical support or service provider.
A005	The proof of air flow switch was detected open during pre-purge operation. This will disable the heater.	A005 PoF Switch error E. Check Blower/Wiring. ->Check switch wiring and venting. If problem persists, contact technical support or service provider.
A006	The proof of air flow switch was detected open during post purge operation.	A006 PoF Switch error P. Check Blower/Wiring. ->Check switch wiring and venting. If problem persists, contact technical support or service provider.
A007	Exhaust flue pressure switch was detected open during heating. This will disable the heater.	A007 Exhaust Switch open. Check Wiring/Venting ->Check switch wiring and venting. If problem persists, contact technical support or service provider.
A008	The proof of air flow pressure switch was detected closed before the blower started operation. This will disable the heater.	A008 PoF Switch/Blower mismatch. Call Tech Svc ->The Proof of Fan pressure switch is closed when the blower is off. Contact technical support or service provider.
A010	Ignition Control Test Failure during End of Line (EOL) test	A010 Ignition Control Test Failure -> End of Line (EOL) test failure. Unit disabled.
A012	Flame Detected During Standby/Disabled Mode	A012 ->Clear error code by turning the unit off and on. If problem persists contact technical support or service provider

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
A016	Energy Cutout (ECO) switch is open. This will disable the heater.	A016 High Tank Temperature. Call Tech Service. ->Clear error code by pressing clear button. Refer to use and care manual for troubleshooting, or contact technical support.
A017	Flue (exhaust) gas temperature has exceeded 155°F. This will disable the heater.	A017 High Flue Temp. Recycle unit ON/OFF. ->Blower will continue to run until exhaust temperature has decreased. If problem persists contact technical support.
A018	Flue temperature sensor (thermistor) detected open. This will disable the heater.	A018 Flue Temp Sensor open. Check wiring. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.
A019	Flue temperature sensor (thermistor) detected short circuited. This will disable the heater.	A019 Flue Temp Sensor shorted. Call Tech Svc. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.
T020	Lower tank (inlet) temperature sensor (thermistor) detected open.	T020 Lower Tank Sensor open. Check wiring. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.
T021	Lower tank (inlet) temperature sensor (thermistor) detected short circuited.	T021 Lower Tank Sensor shorted. Call Tech Svc. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.
A022	Upper tank temperature sensor detected open. This will disable the heater.	A022 Upper Tank Sensor open. Check wiring. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.
A023	Upper tank temperature has exceeded 205°F. This will disable the heater.	A023 Upper Tank temp. too hot. Call Tech Svc. ->Clear error code by pressing clear button. Refer to use and care manual for troubleshooting, or contact technical support.
A024	Upper tank temperature sensor detected short circuited. This will disable the heater.	A024 Upper Tank sensor shorted. Call Tech Svc. ->Check wiring to sensor. If condition persists refer to use and care manual or contact technical support.

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
A025	Control does not detect blower RPM. This will disable the heater.	A025 No Blower RPM feedback. Call Tech Service ->Contact technical support or service provider.
T026	Blower RPM feedback (actual RPM) is ≥300 RPM from desired RPM for > 1 minute.	A026 Blower expected RPM vs actual RPM mismatch ->Contact technical support or service provider.
A027	Flame current detected prior to opening gas valve. This will disable the heater.	A027 Flame present before ignit. Call Tech Svc ->Clear error code by turning the unit off and on. If problem persists please contact technical support or service provider.
A028	Flame current detected 10 seconds after closing gas valve. This will disable the heater.	A028 Flame present w/o heating. Call Tech Svc. ->Clear error code by turning the unit off and on. If problem persists please contact technical support or service provider.
T029	Unit did not light.	T029 Failed ignition. Retrying.
A030	Unit lost flame.	A030 Flame lost during heating. Retrying.
T032	Lower (inlet) thermistor analog to digital converter fault.	T032 Lower Tank temp A/D error. Call Tech Svc. ->If problem persists, please contact technical support or service provider.
A033	Exhaust flue thermistor analog to digital converter fault. This will disable the heater.	A033 Flue sensor A/D error. Call Tech Service. ->If problem persists, please contact technical support or service provider.
A034	Upper tank thermistor analog to digital converter fault. This will disable the heater.	A034 Upper Tank temp A/D error. Call Tech Svc. ->If problem persists, please contact technical support or service provider.
T035	Gas relay #1 contacts did not close. The unit will continue to try and close the relay to initiate combustion.	T035 Gas Relay 1 stuck open. Call Tech Service ->If problem persists, please contact technical support or service provider.
A036	Gas relay #1 stuck closed. This could inadvertently allow the gas valve to open. This will disable the heater.	A036 Gas Relay 1 stuck closed. Call Tech Svc. ->If problem persists, please contact technical support or service provider.
A037	Gas relay #2 contacts failed to properly close. This can cause gas valve cycling and gas buildup in the burn chamber. This will disable the heater.	A037 Gas Relay 2 stuck open. Call Tech Service ->If problem persists, please contact technical support or service provider.

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
A038	Gas relay #2 stuck closed. This could inadvertently allow the gas valve to open. This will disable the heater.	A038 Gas Relay 2 stuck closed. Call Tech Svc. ->If problem persists, please contact technical support or service provider.
A039	This is a control board hardware fault and requires control board replacement if persistent. This will disable the heater.	A039 Flame sense cct fault. Call Tech Service ->If problem persists, please contact technical support or service provider.
A040	This is a control board hardware fault and requires control board replacement if persistent. This will disable the heater.	A040 Controller RAM fault. Call Tech Service. ->If problem persists, please contact technical support or service provider.
A041	This is a control board hardware fault and requires control board replacement if persistent. This will disable the heater.	A041 Controller ROM fault. Call Tech Service. ->If problem persists, please contact technical support or service provider.
A042	This is a control board hardware fault and requires control board replacement if persistent. This will disable the heater.	A042 Controller EEPROM fault. Call Tech Svc. ->If problem persists, please contact technical support or service provider.
A043	This is a control board hardware fault and requires control board replacement if persistent. This will disable the heater.	A043 IC Program execution fault. Call Tech Svc ->If problem persists, please contact technical support or service provider.
A044	Input power frequency not 60 Hz. (outside allowable deviation). This will disable the heater.	A044 Processor Clock/Line Frequency Disagree ->If problem persists, please contact technical support or service provider.
T046	Number of Anodes Mismatch	Software communication error between the Ignition Control and the Power Anode Module. ->Please contact technical support or service provider.
A101	This is a display board hardware fault and requires control board replacement if persistent. This will disable the heater.	A101 Configuration Data Restore Failure ->Initialization of the control system failed at startup. Please contact technical support or service provider.
A102	Set the internal clock time.	A102 Time Clock needs to be programmed ->Go to Settings, select time/date menu and set the time and date.
A103	This is a display board hardware fault and requires control board replacement if persistent. This will disable the heater.	A103 Time Clock not advancing time properly ->contact your qualified service provider.

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
A104	Presence of water detected by the leak sensor in the bottom pan. If water is seen locate source and take appropriate action to correct the issue. This may disable the heater based on configuration settings.	A104 Water Leak Detected ->The presence of water has been detected by the control. Please contact a qualified service provider.
T105	Check to see if leak sensor is installed in the bottom pan. Check wiring on connector P11 of the ignition control board.	T105 Water Leak Sensor Not Installed ->Check water leak sensor connection. Refer to use and care manual for troubleshooting, or contact technical support.
A108	Communication lost between the display board and the ignition control board. The ignition control board will continue to operate the heater using the last known configuration settings. Check wiring between the display and P5 of the ignition control board.	A108 Ignition Board Communication Failure ->Communications lost with ignition control board. If problem persists, contact technical support or service provider.
A110	The automatic, reoccurring test of the shutoff valve (premium models only) was not completed properly. The valve did not close in the allotted time.	A110 Shutoff Valve Test Close Error ->Auto Shutoff valve failed to close during test cycle. Please contact technical support or service provider.
A111	The automatic, reoccurring test of the shutoff valve (premium models only) was not completed properly. The valve did not open in the allotted time. This will disable the heater.	A111 Shutoff Valve Test Open Error ->Water heater has been disabled. Manually open valve. Contact technical support or service provider.
A112	Automatic shutoff valve (premium models only) is closed. This will disable the heater.	A112 Shutoff Valve Not Open: Heating Disabled ->Manually open valve if no water detected or if unit is not being serviced. Contact technical support or service provider.
T113	Peak flame rod current has deviated from the startup average. This is indicative of degradation of the flame rod (dirty, sooty). It needs to be cleaned and inspected .	T113 Flame Rod Degraded and Needs Servicing ->Clean or replace per use and care manual. Please contact technical support for assistance.
T114	Peak flame rod current has deviated from the startup average by a significant amount. Clean and inspect flame rod. Replace if necessary.	T114 Flame Rod Degraded and Needs Servicing ->Clean or replace per use and care manual. Contact technical support for assistance.
T115	Monitored characteristics of the combustion system indicate degraded performance. Combustion system needs to be inspected and serviced.	T115 Combustion Health Degraded: Needs Service ->Combustion system performance is degraded. Contact technical support or service provider for assistance.
T116	Monitored characteristics of the combustion system indicate severely degraded performance. Combustion system needs to be inspected and serviced.	T116 Combustion Health Degraded. Needs Service ->Clear error code by pressing clear button. Refer to use and care manual for troubleshooting, or contact technical support.
T117	Periodic maintenance, inspection, and upkeep on the unit.	T117 Time to Drain and Inspect Tank ->Refer to the use and care manual for instructions, or contact technical support or service provider.
T118	Periodic maintenance, inspection, and upkeep on the unit.	T118 Time to Check Venting for Debris ->Refer to the use and care manual for information, or contact technical support or service provider.

ERROR CODES

<table>
<tr><th>Alarm ('A') and Alert ('T') Codes</th><th>Description</th><th>Current Alarm Screen Display</th></tr>
<tr><td>T119</td><td>Periodic maintenance, inspection, and upkeep on the unit.</td><td>T119 Time to Clean Out the Condensate Drain Trap
->Refer to the use and care manual for instructions and locations. Call technical support or service provider if necessary.</td></tr>
<tr><td>T120</td><td>Periodic maintenance, inspection, and upkeep on the unit.</td><td>T120 Time to Replace the Neutralizer
->Clear error code by pressing clear button. Refer to use and care manual for troubleshooting, or contact technical support.</td></tr>
<tr><td>T121</td><td>No water detected in Tank due to anode signal(s) being OPEN circuited.</td><td>This is a good indication the 8 pin connector is not securely connected to the Powered Anode Module. Confirm the connector is securely connected. If the connection is secure, check the continuity between the anode terminals and the 8 pin connector. If all circuits are continuous, replace the water heater / get a new harness to run externally between the anodes and the PAM (not yet designed).</td></tr>
<tr><td>T122</td><td>The Display Control is no longer receiving information about the Powered Anodes from the Powered Anode Module.</td><td>Communication between the Powered Anode Module and the Ignition Control has occurred. Disconnect P8 from the Ignition Control and J4 from the Powered Anode Module. Confirm continuity between the J4 5 pin connector on the Powered Anode Module and the Ignition Control P8. If any circuits are OPEN, replace the top pan harness. If all circuits are good, replace the Powered Anode Module. If replacing the PAM is unsuccessful at clearing the code, replace the Ignition Control.
->If replacing the Ignition Control is unsuccessful in clearing the code, replace the Display.
<table>
<tr><th colspan="3">CONNECTION TABLE</th></tr>
<tr><td>CONN</td><td>P8</td><td>J4</td></tr>
<tr><td>Pin</td><td>1</td><td>1</td></tr>
<tr><td>Pin</td><td>2</td><td>4</td></tr>
<tr><td>Pin</td><td>3</td><td>3</td></tr>
<tr><td>Pin</td><td>4</td><td>5</td></tr>
</table></td></tr>
<tr><td>T123</td><td>Upper Anode "open" circuit which could be caused by wiring damage, wiring disconnected or anode damage.</td><td>There is an open circuit for this anode. Confirm continuity from P7 (8-pin connector) pin 8 and the terminal at the anode is true. Confirm continuity from P7 pin 4 and the ground block in the transformer enclosure is true. If both are continuous, replace the Powered Anode Module. If replacing the Powered Anode Module is unsuccessful at clearing the code, replace the Ignition Control.
->If replacing the Ignition Control is unsuccessful in clearing the code, replace the Display.</td></tr>
<tr><td>T125</td><td>Upper Anode "short" circuited which could be caused by wiring damage, anode damage or the anode is in contact with the tank. This is not a connector issue and not caused from leaking. This can only be a failed anode.</td><td>There is a short circuit for this anode. Confirm the terminal connection at the anode is not making contact with the metal surrounding the anode. Confirm continuity is not present between P7 (8-pin connector) pin 8 and the ground block in the transformer enclosure. If a short is present, confirm there are no visible pinches between the Ignition Control and the Powered Anode module. If none of these issues are present, replace the Powered Anode Module. If this does not clear the code, replace the Ignition Control.
->If this does not clear the code, replace the Display.</td></tr>
</table>

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
T126	Upper Anode power ≥ 100% and has reached its protective limit.	Power to the anode has reached 100% of expected power levels. The anode needs to be replaced immediately.
T127	Upper Anode power > 87% but < 100%. The anode is approaching its protective limit.	Power to the anode has reached 87% but is less than 100%. The anode should be replaced soon.
T128	Middle Anode "open" circuit which could be caused by wiring damage, wiring disconnected or anode damage.	There is an open circuit for this anode. Confirm continuity from P7 (8-pin connector) pin 7 and the terminal at the anode is true. Confirm continuity from P7 pin 4 and the ground block in the transformer enclosure is true. If both are continuous, replace the Powered Anode Module. If replacing the Powered Anode Module is unsuccessful at clearing the code, replace the Ignition Control. -> If replacing the Ignition Control is unsuccessful in clearing the code, replace the Display.
T130	Middle Anode "short" circuited which could be caused by wiring damage, anode damage or the anode is in contact with the tank. This is not a connector issue and not caused from leaking. This can only be a failed anode.	There is a short circuit for this anode. Confirm the terminal connection at the anode is not making contact with the metal surrounding the anode. Confirm continuity is not present between P7 (8-pin connector) pin 7 and the ground block in the transformer enclosure. If a short is present, confirm there are no visible pinches between the Ignition Control and the Powered Anode module. If none of these issues are present, replace the Powered Anode Module. If this does not clear the code, replace the Ignition Control. ->If this does not clear the code, replace the Display.
T131	Middle Anode power ≥ 100% and has reached its protective limit.	Power to the anode has reached 100% of expected power levels. The anode needs to be replaced immediately.
T132	Middle Anode power > 87% but < 100%. The anode is approaching its protective limit.	Power to the anode has reached 87% but is less than 100%. The anode should be replaced soon.
T133	Lower Anode "open" circuit which could be caused by wiring damage, wiring disconnected or anode damage.	There is an open circuit for this anode. Confirm continuity from P7 (8-pin connector) pin 3 and the terminal at the anode is true. Confirm continuity from P7 pin 4 and the ground block in the transformer enclosure is true. If both are continuous, replace the Powered Anode Module. If replacing the Powered Anode Module is unsuccessful at clearing the code, replace the Ignition Control. -> If replacing the Ignition Control is unsuccessful in clearing the code, replace the Display.
T135	Lower Anode "short" circuited which could be caused by wiring damage, anode damage or the anode is in contact with the tank. This is not a connector issue and not caused from leaking. This can only be a failed anode.	There is a short circuit for this anode. Confirm the terminal connection at the anode is not making contact with the metal surrounding the anode. Confirm continuity is not present between P7 (8-pin connector) pin 3 and the ground block in the transformer enclosure. If a short is present, confirm there are no visible pinches between the Ignition Control and the Powered Anode module. If none of these issues are present, replace the Powered Anode Module. If this does not clear the code, replace the Ignition Control. -> If this does not clear the code, replace the Display.

ERROR CODES

Alarm ('A') and Alert ('T') Codes	Description	Current Alarm Screen Display
T136	Lower Anode power ≥ 100% and has reached its protective limit.	Power to the anode has reached 100% of expected power levels. The anode needs to be replaced immediately.
T137	Lower Anode power > 87% but < 100%. The anode is approaching its protective limit.	Power to the anode has reached 87% but is less than 100%. The anode should be replaced soon.
T138	Anode #4 "open" circuit which could be caused by wiring damage, wiring disconnected or anode damage.	There is an open circuit for this anode. Confirm continuity from P7 (8-pin connector) pin 6 and the terminal at the anode is true. Confirm continuity from P7 pin 4 and the ground block in the transformer enclosure is true. If both are continuous, replace the Powered Anode Module. If replacing the Powered Anode Module is unsuccessful at clearing the code, replace the Ignition Control. If replacing the Ignition Control is unsuccessful in clearing the code, replace the Display.
T140	Anode #4 "short" circuited which could be caused by wiring damage, anode damage or the anode is in contact with the tank. This is not a connector issue and not caused from leaking. This can only be a failed anode.	There is a short circut for this anode. Confirm the terminal connection at the anode is not making contact with the metal surrounding the anode. Confirm continuity is not present between P7 (8-pin connector) pin 6 and the ground block in the transformer enclosure. If a short is present, confirm there are no visible pinches between the Ignition Control and the Powered Anode module. If none of these issues are present, replace the Powered Anode Module. If this does not clear the code, replace the Ignition Control. -> If this does not clear the code, replace the Display.
T141	Anode #4 power ≥ 100% and has reached its protective limit.	Power to the anode has reached 100% of expected power levels. The anode needs to be replaced immediately.
T142	Anode #4 power > 87% but < 100%. The anode is approaching its protective limit.	Power to the anode has reached 87% but is less than 100%. The anode should be replaced soon.
A143	The switch information on the Shutoff Valve is indicating incorrect information such as both switches are OPEN or both switches are CLOSED.	Replace the Shutoff Valve as both switches used to indicate the state of the valve is conflicting.
T150	Percentage of Successful Ignitions Low The water heater has experienced a higher number of failed ignitions that expected.	
T151	Flame Current Deviation Too High The flame current detected has deviated outside the expected range.	
T152	Blower Motor Deviation Too High The blower motor PWM signal has deviated outside the expected range.	
A200	Incompatible Ignition Control SW The ignition control and display are incompatible with each other. Contact technical support.	Incompatible Ignition Control SW, replace Ignition Control with the proper part number designed for this product.
T504	WiFi Chip Communication Error. Refer to the use and care manual for information, or contact technical support or service provider.	Reset the WiFi connection. From the Main Screen, press the WiFi icon then press the WiFi Reset button at the bottom of the screen. If the WiFi Device Status at the top of the screen does not transition to Connected to Internet within 120 seconds, replace the display.

TEMPERATURE SENSOR FAULTS

ERROR CODES A016, A017, A018, A019, A022, A023, A024, T020, T021

ERROR A016

ENERGY CUT-OFF SWITCH IS OPEN:

The control has detected water temperature in the tank above 194°F (90°C). In this condition the water heater is disabled. The fault will be reset when the tank temperature cools to 140°F.

Inspect the wiring and connections on the upper temperature probe and ignition control and try to clear the alarm through the display. If alarm does not clear, cycle power off, and check the ECO for continuity using a multimeter. For this disconnect wiring from ECO/ Temp probe. Check for continuity across pins 3 and 4. If no continuity is found, replace ECO/Temperature probe.

If continuity is present through the probe, reconnect wires to the ECO/Temperature probe. Disconnect P2 harness connector from the ignition control board and check for continuity across the two orange wires. If no continuity is present through wiring, replace wiring harness.

In some instances, you may find the connector and terminal pins may not be mating properly. Check the connectors and pins carefully to ensure good contact is being made.

If continuity is detected through both ECO/Temperature probe and wiring, replace the control board.

ERROR A017, A018, A019

FLUE (EXHAUST) GAS TEMPERATURE SENSOR

This error code indicates the combustion gases at exhaust tee at the bottom of the tank are too hot. The sensor trips at 160°F and the alarm cannot be cleared until the sensor temperature is below 155°F. Check the PVC elbow for signs of disfigurement and/or discoloration caused by heat.

Make sure the yellow wires are attached to the sensor. Make sure the P2 connector and the wires are secure. Disconnect the two yellow wires from the flue gas sensor and check the ohm reading across the two spade terminals on the sensor. Using the chart below, the ohm reading should between ambient air temperature and no more than 160°F. If the sensor is reading open or outside specified temperature range, wait 5 minutes and recheck. If sensor is still outside range, replace sensor. If the ohm reading on the sensor is within the required temperature range and the error will not clear, cycle power off the unit. Reconnect the yellow wires to the sensor, Disconnect the P2 harness from the control board and check the ohm reading across the white wires. The reading should be about the same as you got on the spade terminal. If the readings do not coincide, replace the harness wires. If all readings on the sensor and wiring harness are within limits defined in the table, replace the control board.

For replacement models (touch screen displays), you must CLEAR the A016 fault code in order for the water heater to resume operation.

TEMPERATURE SENSOR FAULTS

For Buderus models (LED display), the user must perform the following sequence to clear the A016 fault code in order for the water heater to resume operation:

1. Once the sensor is confirmed to be ok, turn OFF the water heater via the ON/OFF rocker switch on the right side of the display assembly.
2. When you turn the ON/OFF rocker switch back to the ON position, you must perform the following steps 3 times within the first 10 seconds of the switch being turned ON.
3. Turn the temperature dial on the front LED display FULLY LEFT (counter clockwise) and pause for a moment (i.e. – ½ second)
4. Turn the temperature dial FULLY RIGHT (clockwise) and pause for a moment (i.e. – ½ second)

If you have successfully performed the reset, you will only see the set point temperature displayed on the LED display.

If you see the A16 reappear, try the sequence in steps 1 and 2 again.

TEMP °C	TEMP °F	RESISTANCE (Ω)
0	32	36100
5	41	28590
10	50	22790
15	59	18290
20	68	14770
25	77	12000
30	86	9805
35	95	8055
40	104	6653
45	113	5524
50	122	4609
55	131	3863
60	140	3253
65	149	2752
70	158	2337
75	167	1994
80	176	1707
85	185	1467
90	194	1266
95	203	1096
100	212	952

ERROR A022, A024, A023, T020, T021:

UPPER TANK TEMPERATURE SENSOR IS OPEN, UPPER TANK TEMPERATURE SENSOR SHORTED, UPPER TANK TEMPERATURE SENSOR IS TOO HOT (APPLIES TO LOWER TANK TEMPERATURE SENSOR AS WELL)

Make sure the connectors on the ECO/Temperature probe and P2 location on the ignition control board are securely connected and the locking tabs are in the proper orientation. Ensure that the pins on the ignition control board connector are not broken.

Verify the ohm reading across pins 1 and 2 as shown in the ECO/Temperature probe picture above. The resistance should match the temperature of the water reasonably closely in the Temperature-Resistance chart. If the reading is too high, it means the temperature sensor is open. If the resistance is too low, the temperature sensor is shorted. In either case the temperature sensor will need to be replaced.

If ECO/Temperature probe reading is correct, reconnect wiring at the ECO/Temperature probe. Disconnect the P2 connector on the ignition control board and measure the ohm readings across the blue wires on the harness. The reading should match the one you observed on the ECO/Temperature probe terminals. If the reading is not close or the circuit reads open, replace the harness. If all readings are correct, replace ignition control board.

PRESSURE SWITCH FAULTS

ERROR CODES A003, A004, A005, A006, A007, A008

ERROR CODES A003 AND A007:

INTAKE PRESSURE SWITCH AND EXHAUST PRESSURE SWITCH OPEN

The intake switch is a normally closed switch. It should only open if there is a blockage/restriction in the intake venting causing inadequate supply of combustion air. The exhaust pressure switch is also normally closed. It will only open in the event of excessive pressure in the exhaust venting.

Check wiring to the switch to ensure no wires have been broken, damaged or disconnected. Confirm the red square hoses are properly connected and not damaged. Check for condensate in the hoses. If you find water in the hose, replace pressure switch and hose. With the heater turned OFF, remove wires from intake switch and check for continuity. If continuity is not present, replace the switch. If continuity is present, cycle power ON and clear alarm code. If switch opens (loses continuity) with blower operating, then the switch is operating normally and there may be something causing vent restriction.

Ensure that the intake air pipe size and vent length meet the max allowable equivalent length and instructions for adapters have been followed. Confirm that proper pitch has been maintained and no pooling of condensate is taking place in any section of the vent. Ensure that the screen on the intake air elbow is clean and not clogged with debris or ice formation. Clear any debris from the screen.

Similar instructions apply to the exhaust pressure switch open error code. Check for condensate backing up into exhaust tee. Clear the condensate drain line and ensure a free flow.

ERROR CODES A004, A005 AND A006:

PROOF OF FAN SWITCH OPEN DURING HEATING, PRE-PURGE, AND POST PURGE

The Proof of Fan switch is a normally open switch that closes from positive pressure from the blower. These error codes indicate the switch is detected open while the blower is energized. Conduct some preliminary diagnostics tests. Check the wires to the pressure switch to ensure wires are not broken, damaged or disconnected. Confirm the red square hose from the pressure switch to the air intake collar is properly connected and not kinked, broken, or damaged.

ERROR CODES A004, A005 AND A006

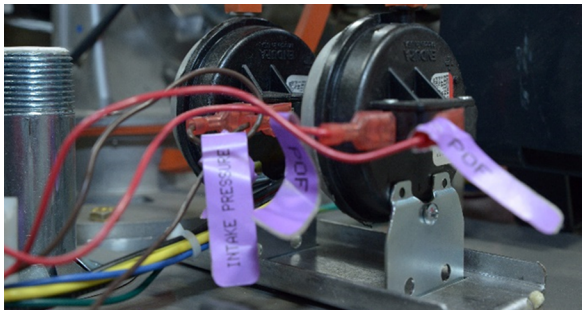
Check intake for blockages and remove blockage if present. Confirm no debris is sucked into the blower housing. You can clear the error code from the 'Current Alarms' screen. Check for switch continuity while the blower is running in pre-purge mode. If switch does not have continuity while the blower is running replace proof of fan switch. If the blower is not running during pre-purge check the blower harnesses for continuity. If the switch has continuity while the blower is running, but alarm persists, replace the control board.

If you have a digital manometer, you can test for activation pressure of the switch. Connect a digital manometer by using a T- or Y-connection and additional hosing. Disconnect the tube on the desired pressure switch and use the T- or Y-connection to include the manometer. This enables the heater to work properly while being able to read the pressure. In pre-purge mode check the pressure reading when the blower reaches maximum speed. Compare against activation pressure provided in the table. If the pressure exceeds activation pressure, but the switch does not close, replace switch. If pressure does not reach activation pressure check blower.

ERROR A008:

PROOF OF FAN, BLOWER MISMATCH

This condition occurs when the proof of fan switch is closed when the blower is not energized (OFF). If the blower is running while the alarm is present, follow troubleshooting for error A025. If the blower is not running, check to ensure proof of fan switch has not been jumped. Check for continuity of the switch, it should be open while the blower is not energized. Replace switch if it is detected closed (has continuity). Replace control board if alarm returns after clearing, and the pressure switch is detected open.



FLAME SENSING FAULTS

ERROR CODES A012, A027, A028, A030, T113, T114, T151

ERROR CODES A012, A027, A028 AND A030:

FLAME DETECTION WHEN THERE IS NO CALL FOR HEAT

A027 indicates flame was detected prior to ignition or the control is detecting flame before the gas valve opens. This code can be cleared by powering OFF the unit. Ensure that the heater ground wires are securely attached and the electrical connection to the power supply has an earth ground. Shut Off the gas supply and cycle the water heater. If the error code returns, replace the ignition control board.

A028 indicates that the ignition control board detected a flame signal 10 seconds after the gas valve is closed after the previous heating cycle (in post-purge mode). Ensure that the heater ground wires are securely attached and the electrical connection to the power supply has an earth ground. Remove and clean the igniter and flame sensor. Allow the heater to go through a heating cycle. If the error occurs again.

A030 error code relates to lost flame signal during heating. The heater will attempt to light three times in three consecutive cycles. If the third trial is unsuccessful, the unit will lock out with an error code A001. Refer to error code A001 for troubleshooting.

ERROR CODES T113, T114, AND 151:

SERVICE ALERTS

T113 and T114 are error codes to alert the user that the peak flame sense current reading has substantially decreased from the initial start-up values recorded. This error code is indicative of a dirty flame rod. These alerts will not keep the unit from heating, but the errors cannot be manually cleared. Remove and clean the flame rod with an abrasive material such as emery paper or steel wool. Allow the heater at least 10 heating cycles for it to recognize the issue has been resolved and to clear the error on its own.

In some instances, the flame sensor or burner if not installed correctly, may touch the burner causing a short. Under these circumstances, the flame sensor will fail to sense a flame. There should be 0.400" gap between the burner surface and the flame sensor. This can be verified by removing the combustion system unit and visually checking to ensure the burner and flame sensor are not touching. Make certain to have the black O-ring handy prior to disassembling combustion chamber.

The electronic control monitors the flame current constantly through all heating cycles. The flame current values are compared against baseline flame current generated at the time of install. Any deviation in microAmp values beyond 72% triggers a T151 error code.

ERROR CODES T113, T114, AND 151

This code points to the need for servicing the flame sensor, either to clean rust and other residue or to replace with a new flame sensor. This error is a means to alert the customer of the need for servicing and does not prevent continued operation of the heater.

IGNITION FAILURE

ERROR CODES A001, A002, T029, T150, A028, A027, A030

ERROR CODE A001, A002, T029, T150, A030

An Error code A001 indicates the water heater has exhausted all available trials for ignition and needs manual intervention. The heater will attempt to ignite the burner 27 times. After the first nine ignition attempts, the heater will display an alert T029. After the 27th consecutive failed attempt, the heater will lock out and display a A001 error code.

Error code A030 means the unit lost flame signal during heating. The unit will attempt to heat three times in three consecutive cycles. After the third trial, the unit will lock out with a code A002.

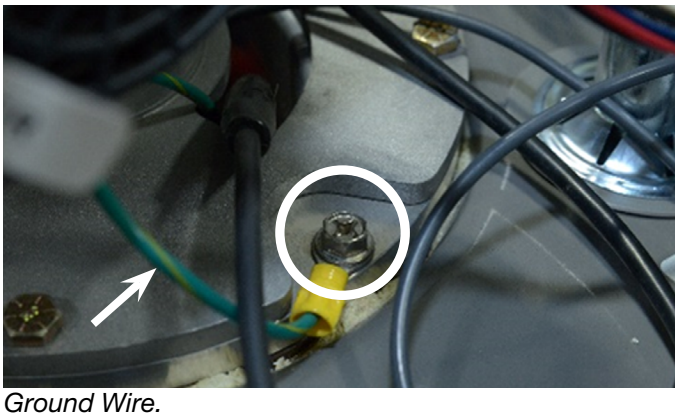
Error 002 is an indication of an unstable flame where the flame sensor sensed flame during a heating cycle but lost flame rectification three times within one call for heat.

If the heater has an unusually high percentage of ignition retries, it may display an error T150.

Ensure that gas is available to the water heater and is of the correct fuel type. The rating label has additional information on the water heater. Ensure that adequate air is available to the combustion system. Verify vent intake air and exhaust equivalent runs are within those specified in the Use & Care Manual. If using a concentric vent termination, remove intake vent from the heater and make an ignition attempt. Commonly observed vent termination issues relate to terminations installed with intake and exhaust reversed, center pipe loose or missing, and non-approved vent kits being used. These conditions can cause recirculation of exhaust gases resulting in poor ignition and operation of the water heater.

Check the condensate drain line for proper draining. Condensate that is not draining properly will back up into the exhaust elbow, restricting the exhaust vent. The Use and Care Manual provides details for configuring the condensate drain line. Ensure that the condensate line maintains at least 1/4” per foot fall to drain. Runs than cannot maintain at least 1/4” per foot fall and/or are over 15ft distance must utilize a condensate pump. Verify that the pump (if installed) is working properly.

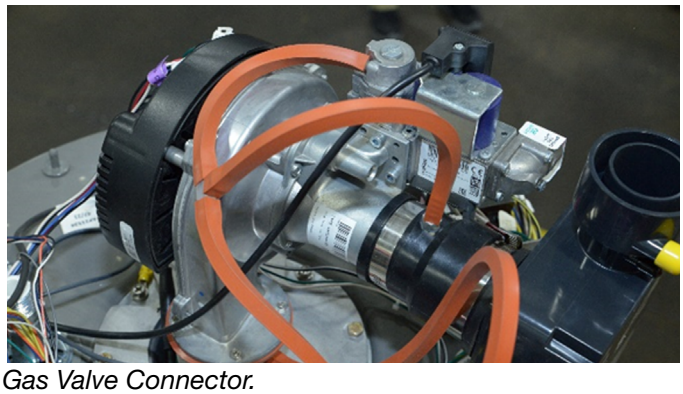
Ensure that the burner is grounded properly. There are two ground paths provided on the heater. See picture below. Ensure the igniter and flame sense wires are securely plugged. Replace or repair all damaged components. You can observe the status of the water heater on the top right corner of the display screen. Additional information can be accessed on the status screen. Look for flame sense current after heater goes through ignition cycle. If the heater fires and then goes out without registering a flame sense current, replace the board. A minimum of 0.5µAmps is needed for flame to be sensed by the control board. If the minimum flame sense current is detected but the error continues, replace control board.



Ground Wire.

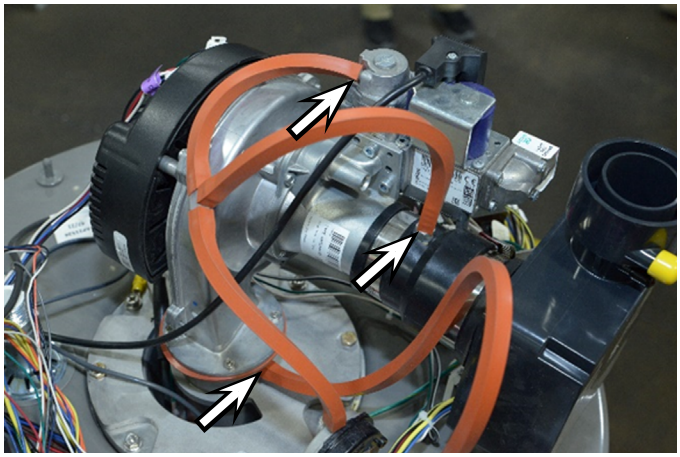
Ensure gas is available to the burner. Confirm the gas valve is opening. Locate the large black wire plugged to the top of the gas valve. (See following picture). Disconnect the harness from the gas valve. With the connector removed, cycle power ON. While the heater is reading IGNITION status, check voltages across pins 1 and 5 in the connector. Voltage reading should be 10-15 VAC. If the voltage is correct, then the gas valve is being supplied power. If you do not get 10-15VAC, then you may have a faulty harness or control board. Trace the harness from the gas valve to the P4 connector on the ignition control board.

Cycle power and measure across the two outside pins when the display is showing IGNITION. If you detect 24VAC across the pins then the control board is operating properly.



Gas Valve Connector.

IGNITION FAILURE



Pressure tap locations for Fasco and SIT valves.

Confirm that the gas valve is working. Reconnect all wires and connect a manometer to the inlet port of the gas valve.

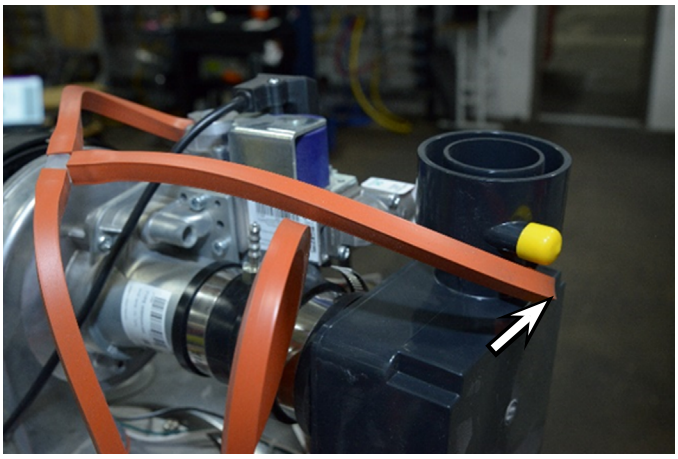
Cycle power and check for pressure drop when the heater goes into IGNITION mode. If you have any drop at all, the gas valve is opening and allowing gas to flow. Alternatively, if you place your hand on the valve, you can feel an audible click when the heater goes into IGNITION mode. Replace the gas valve if you don't feel the solenoid click.

ERROR CODE A027 AND A028:

FLAME PRESENT BEFORE IGNITION, FLAME PRESENT WITHOUT HEATING

An error code A027 indicates a flame was detected prior to ignition or the controller detected a flame prior to the gas valve opening. The same set of diagnostics and repair instructions apply to A027 as well.

An A028 Error code means the control board detected a flame signal 10 seconds after the gas valve had closed from the last heating cycle. Look for flame sense signal in the status screen. Make sure the burner is grounded properly. Remove and clean the igniter and flame sense rod with emery paper. Allow heater to go through heating cycle and check to see if error occurs again. Check the gas valve to ensure it is closed after the heating cycle has ended. Verify voltage across pins 1 and 5 on the connector. If voltage is detected, replace gas valve. Replace flame sensor if error code repeats itself. If error code continues, replace control board.



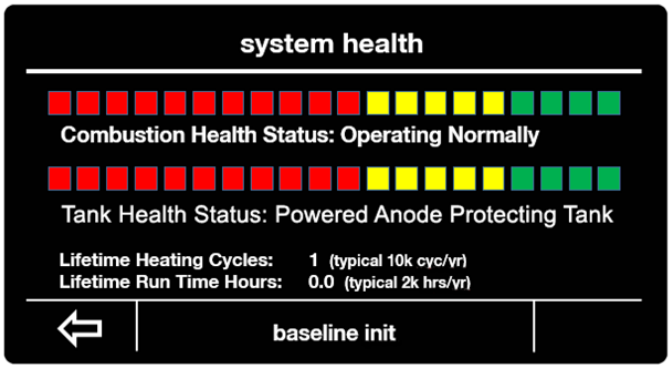
There is a pressure tap on the silencer instead of the intake boot for Fasco valves.

TANK HEALTH

ERROR CODES: T123, T125, T127, T128, T130, T132, T133 T135, T137

These error codes apply to power anodes installed on commercial models only. Follow care and maintenance instructions in Use and Care Manual for all other models.

Use the colored graph on the System Health screen found under the Service screen to view the health of your water heater's tank.



The colored portion of the graph that has a flashing square indicates the current health status of the system. For more information on the colored sections, see below:

Green: Powered Anode Protecting Tank

Yellow: Anode Protection Approaching End

Red: Anode No Longer Protecting Tank

The value of TANK HEALTH, used to determine which colored square is flashing for status indication, is calculated by subtracting the highest power level of all present anodes from 100.

Normal Operation - No action needed

Reliability Decreasing - Begin planning for service and/or replacement

Needs Servicing - Contact your service provider

An OPEN circuit occurs when one of the following conditions is present preventing electrical power from being transmitted to the anode:

1. A break in the wire is present (bypass the wire)
2. The terminal mated to the Anode has come disconnected (connect the terminal)
3. The ground wire in pin 4 of the 8-pin connector is broken or unseated from the connector (replace harness or fix wire connection)
4. There is no water at the level of the anode in the water tank (ensure tank is filled with water)

* if this is the case, T121 for No Water In Tank will activate

When an anode OPEN circuit is present, the corresponding fault codes will be active:
- T123: Upper Anode Open
- T128: Middle Anode Open
- T133: Lower Anode Open

A SHORT circuit occurs when one of the following conditions is present:

1. Water is located in the recessed cavity where the anode is installed (remove the water and allow to dry)
2. During the installation process of the anodes, too much thread sealant has been applied (replace anode)

When an anode SHORT circuit is present, the corresponding fault codes will be active:
- T125: Upper Anode Shorted
- T130: Middle Anode Shorted
- T135: Lower Anode Shorted

When a PRE-OVERLOAD is present, power level of the corresponding anode has reached a level of 87% of maximum power but has not exceeded 99%. This means bare metal is nearly showing inside your water heater tank and the glass / ceramic coating is thinning.

When an anode PRE-OVERLOAD is present, the corresponding fault codes will be active:
- T127 Upper Anode Pre-Overload
- T132 Middle Anode Pre-Overload
- T137 Lower Anode Pre-Overload

ACTION NEEDED: None

When an OVERLOAD is present, power level of the corresponding anode has reached a level of 100% of maximum power. This means bare metal is present inside your tank and the glass / ceramic coating is no longer present.

When an anode OVERLOAD is present, the corresponding fault codes will be active:
- T126: Upper Anode Overload
- T131: Middle Anode Overload
- T136: Lower Anode Overload

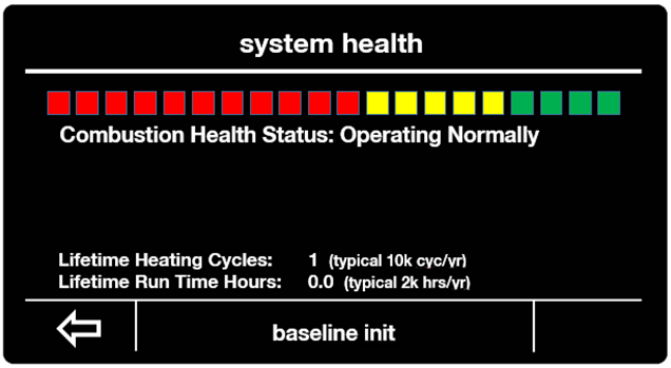
ACTION NEEDED: None.

COMBUSTION HEALTH

ERROR CODES T115 & T116, T150, T151, T152

The electronic control tracks the behavior and condition of three key combustion system components, blower, igniter, and flame sensor. Baseline operation values are established on initial install and operation. The control then tracks the performance through subsequent heating cycles. General guidelines for interpretation of Combustion health messages are provided below.

Use the colored graph on the System Health screen found under the Service screen to view the health of your water heater's combustion system.



The colored portion of the graph that has a flashing square indicates the current health status of the system. For more information on the colored sections, see below:

Green: Operating Normally

Yellow: Reliability Decreasing

Red: Needs Servicing

The value of COMBUSTION_HEALTH, used to determine which colored square is flashing for status indication, is calculated from data from the flame current, ratio of successful to failed ignitions and blower motor control signal. If the graph indicates a flashing green box, no action is needed.

Normal Operation - No action needed

Reliability Decreasing - Begin planning for service and/or replacement

Needs Servicing - Contact your service provider

During the first 40 ignition cycles on the water heater, the controls monitor and calculate values for how the combustion system components should perform. Until 40 ignition cycles have occurred, the value for Combustion Health will indicate 100% (GREEN).

The controls will retain a history of the last 30 ignition cycles and store information regarding unexpected performance in terms of blower motor control, detected flame current, and percentage of failed ignitions.

Once 40 ignition cycles have occured, T115 activates if 50% of the last 30 ignition trials indicate an issue in one or more of the following areas (any combination is possible and will be stored):

1. Blower motor PWM signal to drive the blower motor has deviated more than expected which could indicate an obstruction in the airway of the combustion system
2. Detected flame current falls well below the expected value during a heating cycle
3. Percentage of failed ignitions exceeds an unacceptable threshold

T116 works in the same manner as T115 but indicates a higher level of severity of detection.

T150: Percentage of successful ignitions is low

T115 activates at the same time as T150 indicating successful ignitions is less than 79%.

T116 activates at the same time as T150 indicating successful ignitions is less than 55%.

T151: Flame current deviation is high

T115 activates at the same time as T151 indicating flame current deviation > 72% of the expected flame current value.

T116 activates at the same time as T151 indicating flame current deviation = 100% of the expected flame current value.

T152: Blower motor contr. sig. deviation is high

T115 activates at the same time as T152 indicating blower motor PWM deviation > 21% of the expected blower motor PWM.

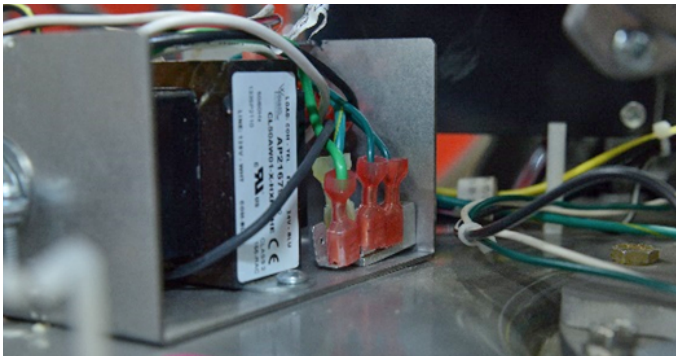
T116 activates at the same time as T152 indicating blower motor PWM deviation > 42% of the expected blower motor PWM.

GROUNDING, POLARITY AND GFCI

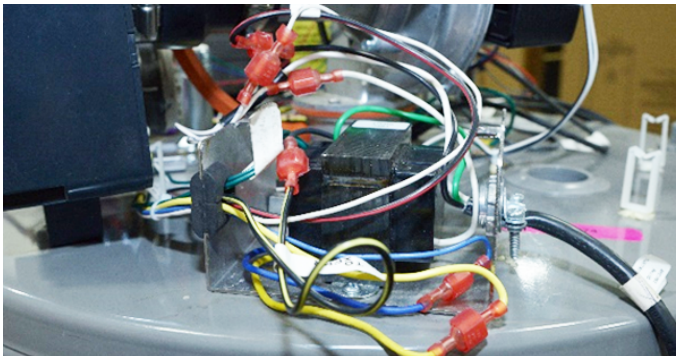
Ground must be present for safety using the provided 3-pin power cord for Residential as well as Commercial units. An ungrounded or improperly grounded heater will cause ignition failure errors. This will result in a system lock out condition. See Ignition and Flame Sensor errors for more details.

For commercial units, refer to a licensed electrician to ensure proper grounding is present. It is not recommended that this heater be installed in a GFCI circuit.

If wiring needs to be inspected further, refer to a licensed electrician to verify proper connections.



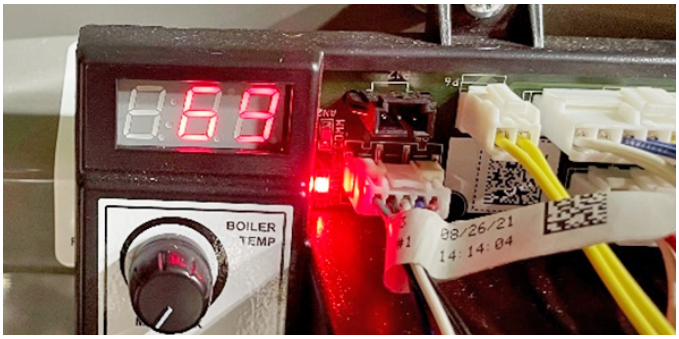
Grounding Block.



Proper wiring inside junction box.

UNRESPONSIVE CONTROL SYSTEM

If the Display becomes unresponsive, power cycle the unit for 60 seconds and apply power once again. When applying power, check to see the LEDs on the Ignition Control illuminate. If they illuminate, the Display Control needs to be replaced. If the LEDs on the Ignition Control do not illuminate, turn off the power switch on the water heater and confirm the 3A fuse on the Ignition Control has not blown by visual inspection or continuity check. If the fuse is found to be broken, replace the fuse, turn on power to the water heater and check to see if the LEDs on the Ignition Control illuminate and the Display Control is operational.



LED numbers and light illuminated.

If the fuse is not the issue, check the electrical connection to ensure power is available. Confirm the electrical breaker has not tripped or the power cord has not become unplugged. If power is believed to be present at the electrical outlet, confirm this by plugging in another electrical device (i.e., a lamp or fan) to confirm power.

If power is proven to be present at the outlet, the Transformer should be checked to confirm 120VAC is present on the primary side and 24VAC is present on the secondary side. If 120VAC is not present on the primary side, replace the electrical cord from the outlet / junction box. If 120VAC is present on the primary side but 24VAC is not present on the secondary side, the transformer needs to be replaced. If 24VAC is present on the secondary side, the Ignition Control needs to be replaced.

COMMUNICATION FAILURE

ERROR CODES: A108

If A108 is active indicating a communication issue between the Display Control and the Ignition Control, an issue could be present on the harness between the two components.

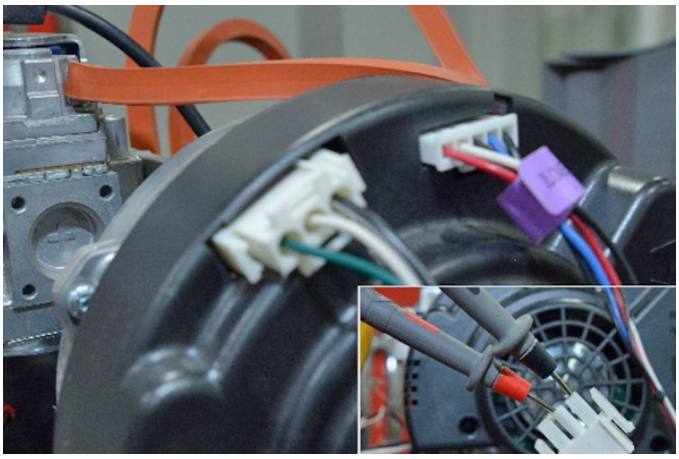
If the Display Control is operational and the Ignition Control is operational, confirm the harness connected to P5 on the Ignition Control is firmly seated and no wires are frayed or pinched. If not firmly seated, firmly connect the connection.

If the connection is firm, there is likely an issue with the harness. If this is the case, the Display Control needs to be replaced. Another failure is if the Ignition Control has become non-operational or stops communicating with the Display Control. If the LEDs on the Ignition Control are still illuminated but A108 is active on the Display Control, the Ignition Control should be replaced.

BLOWER INSPECTION

ERROR CODES: A025, A026
NO BLOWER RPM FEEDBACK, BLOWER EXPECTED RPM VERSUS ACTUAL RPM MISMATCH

Control does not detect blower RPM. This is typically caused by a bad blower or a disconnected wire harness. Using a multimeter, check voltage to the blower from the board to ensure 120VAC of power is available at the blower. If the blower is running while this error is present, disconnect and reconnect both wiring harnesses from the blower and make sure wiring harness from blower to board is secure at board. If blower continues to run with error present, replace the blower.

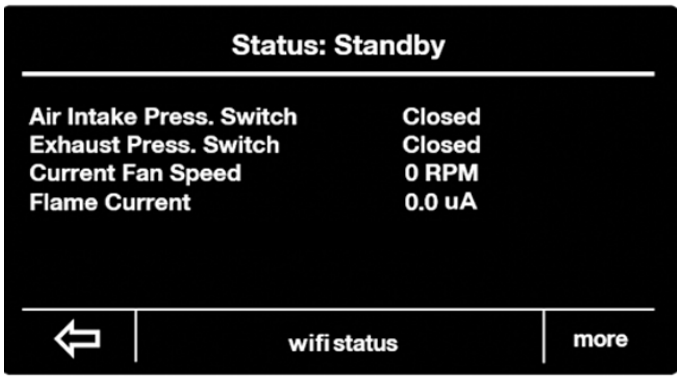


Testing the voltage to the blower.

If blower is not running, clear the alarm and see if blower comes on. If the blower does not come on, disconnect the wiring harness with black, white, red, and blue wires from blower. With the power turned on to the heater and this harness disconnected, the blower should run at full speed. If blower still does not come on or will only run at a very low speed, then replace the blower

Control board detects blower running at ≥300 RPM from desired RPM for > 1 minute. Confirm wiring harness from control board to fan is secured at both ends and all wires are secure in the Molex connectors. Cycle power and clear alarm. If issue remains, replace the blower.

The Current Fan Speed can be found through the Status menu, as shown below.



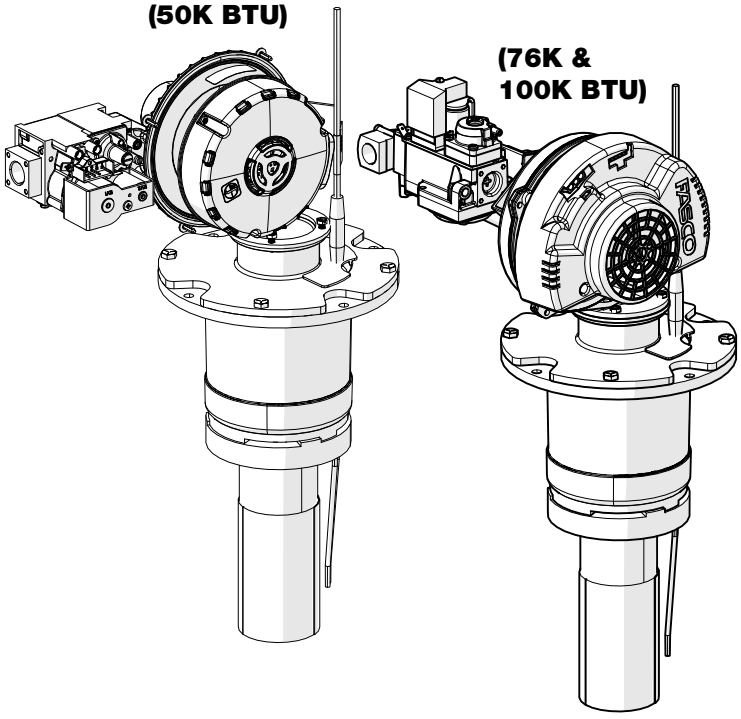
DISASSEMBLY AND REPAIR

MAIN CONTROLLER & DISPLAY

1. Always replace both the ignition controller and display board at the same time.
2. Disconnect power to the water heater.
3. Remove all wired connections to the control board. Wires are colored and the board locations have numbers to reconnect. See Wiring Diagram on the last page of this document.
4. Remove the four Phillips screws holding the control to the plastic top cover.
5. Remove the control and replace in reverse order.
6. When you re-apply power to the controller, it must be activated to the model number of the water heater.

GAS VALVE. BLOWER, AND VENTURI

The gas valve, blower motor, and venturi are all assembled as one repair part. You must replace the entire assembly if any of the parts are damaged.

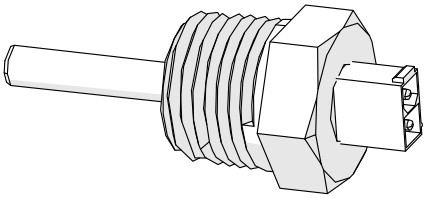


1. Disconnect power to the water heater.
2. Remove all wiring connections to the valve and blower.
3. Remove intake vent rubber connector attached to the venturi by loosening the worm gear clamp.
4. Remove all hose connections from the valve and blower.
5. Use a 10mm wrench to loosen all 4 hex bolts used to assemble the blower assembly to the combustion system.
6. Replace in reverse order. Make sure to replace the black colored blower gasket.

DISASSEMBLY AND REPAIR

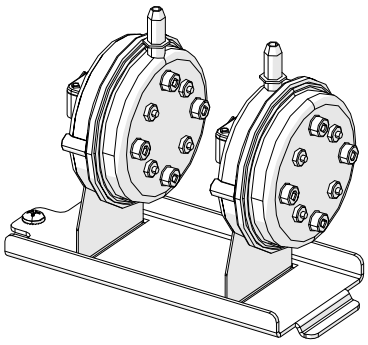
WATER TEMPERATURE SENSOR AND ECO

1. Disconnect power to the water heater.
2. Drain the water in the tank to a point below the level of the water temperature sensor.
3. Remove the connector to the sensor assembly.
4. Remove the sensor assembly with a 1/2" NPT socket wrench.
5. Replace in reverse order.



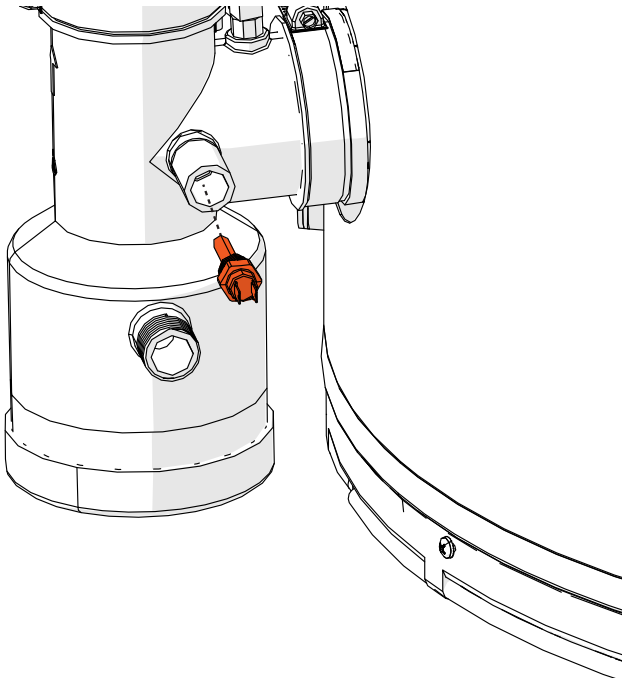
PRESSURE SWITCHES

1. Disconnect power to the water heater.
2. The pressure switches can be identified through color codes on the back of the switch.
3. BROWN = Intake; RED PoF; YELLOW Exhaust.
4. The POF and Intake switches are located on the top pan next to the blower.
5. The Exhaust switch is located on the exhaust tee.
6. Remove all wiring connections and rubber tubing to the pressure switch assembly.
7. Remove the Phillips head screw holding the pressure switch in place.
8. Replace in reverse order.



EXHAUST GAS TEMPERATURE SENSOR

1. Disconnect power to the water heater.
2. Remove the two wires from the exhaust gas temperature sensor.
3. Remove the sensor using a 1/4" wrench.
4. Replace in reverse order taking care to ensure the sensor is not cross threaded.



DISASSEMBLY AND REPAIR

GENERAL PRECAUTIONS:

1. Shut off gas ahead of controls before starting the replacement procedures.
2. Disconnect power supply (if applicable) to prevent electrical shock or damage to components.
3. Check to be sure the kit is for the same fuel type as the heater being serviced (if applicable).

REMOVAL OF CENTER DISPLAY & SIDE PANELS:

For RSHE40, RSHE50, GHE50SU, GHE50SS models only

1. Turn off the water heater and confirm fulfilment of the general safety precautions.
2. Remove side panel(s) (center panel is hard-mounted) by applying force vertically to each panel. After enough force is applied, the panel will release from two (2) spherical pegs on the center display panel and two (2) cylindrical pegs on the top pan. Set aside.

(NOTE: The center panel that has an LED or LCD display is hard-mounted and must be removed by lifting the hinged access door and loosening the screws before vertically applying force to remove.)

1. Disconnect each wire connection on the ignition control board.
2. Lift the access door on the front panel by pulling it towards you to expose two (2) #6 sheet metal screws.
3. Remove the two (2) #6 sheet metal screws and discard. The center panel will remain affixed to the unit after removal.
4. Close the access door and apply a vertical force to the center panel to release it from the two cylindrical pegs that fasten it to the top pan.
5. Proceed to the desired component removal and replacement section(s) before reinstalling the center display and side panels.

For GHE75SU and GHE75SS models only

1. Turn off the water heater and confirm fulfilment of the general safety precautions.
2. Remove side panel(s) (center panel is hard-mounted) by applying force vertically to each panel adjacent to the interface of the front and side panel. After enough force is applied, the panels will release from two spherical pegs on the center display.

(NOTE: The side panels are not meant to be completely removed from the unit, a rear fastener will allow you to swivel the panel away from the unit while it maintains attachment to the top pan.)

1. Disconnect each wire connection connected to the display.
2. Loosen the screws that secure the display monitor to the top pan.

(NOTE: No need to fully remove the screws from the top pan; once it becomes loose the display can be slid forward to remove)

1. Slide the display forward and set aside.
2. Proceed to the desired component removal and replacement section(s) before reinstalling the center display and side panels.

REMOVAL OF IGNITER:

1. Disconnect power to the water heater.
2. The igniter is to the left of the combustion system, looking from front. Disconnect the green grounding wire from the burner assembly by loosening the ¼-20 bolt. Disconnect the spark electrode from the ignition control.
3. Using a screwdriver at least 8" long with a magnetic tip, loosen the two Phillips screws in the well of the combustion system.
4. Remove the igniter by pulling on the igniter cable. Ensure the surface of the combustion tube is clean before assembling the replacement igniter.
5. Replace igniter in the reverse order. Carefully thread the screws making sure they are not cross threaded.
6. Once each screw has started threading, alternate tightening the two screws until they are both snug. After they are both snug, tighten each screw 1/2" turn. DO NOT OVERTIGHTEN! Uneven tightening or overtightening could damage the sealing feature or alter positioning of the igniter.

DISASSEMBLY AND REPAIR

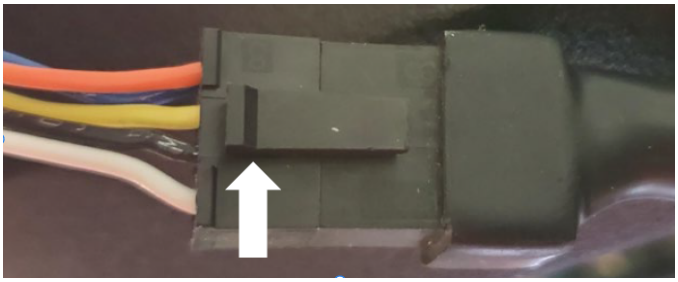
REMOVAL OF FLAME SENSOR:

1. Disconnect power to the water heater.
2. The flame sensor is to the right of the combustion system looking from front. Disconnect the flame sensor electrode from the ignition control.
3. Using a screwdriver at least 8" long with a magnetic tip, loosen the two Phillips screws in the well of the combustion system.
4. Remove the flame sensor by pulling on the igniter cable.
5. Ensure the surface of the combustion tube is clean before assembling the replacement flame sensor. Replace flame sensor in reverse order. Carefully thread the screws making sure they are not cross threaded.
6. Alternate tightening the two screws until they are both snug, ensuring the flame rod assembles evenly onto the surface. Once both screws are snug, tighten each screw ½ turn. DO NOT OVERTIGHTEN! Uneven tightening or overtightening could damage the sealing feature or alter positioning of the flame rod.

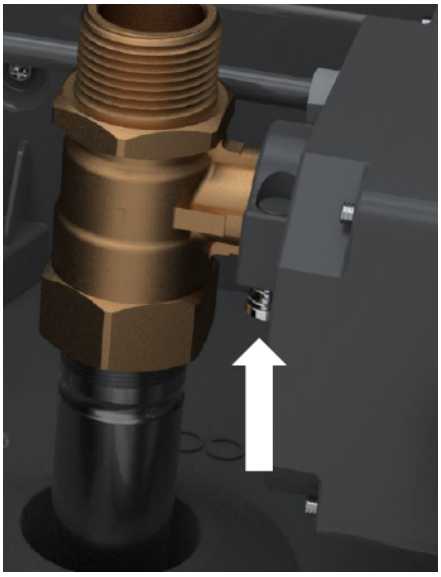
DISASSEMBLY AND REPAIR: SHUT-OFF VALVE

IMPORTANT: Read these instructions thoroughly and understand all steps and procedures before proceeding with the installation. Repair/Installation should only be performed by a qualified service technician.

1. Turn off power to the water heater.
2. If replacement requires replacing the actuator AND the ball valve, shut off the cold water supply to the water heater. Lift and open temperature and pressure relief valve to vent pressure. Open a nearby hot water faucet. Connect a garden hose to the drain valve at the bottom of the heater and open the drain valve, removing 3 to 5 gallons of water from the tank.
3. Disconnect the harness coming from the water heater to the Shutoff Valve harness by pressing the locking tab.



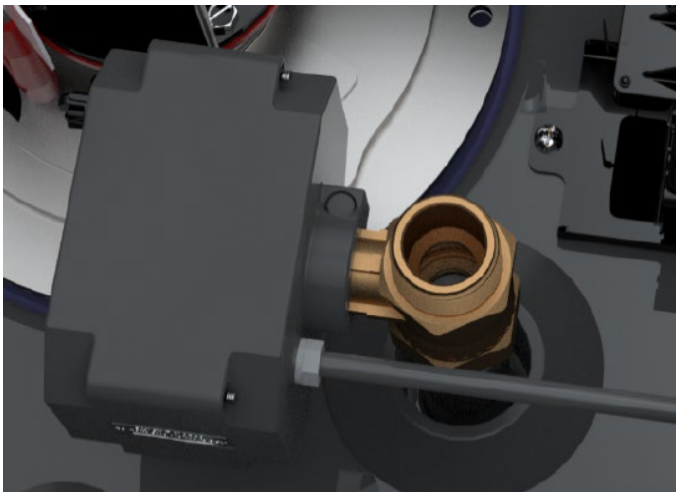
4. Removing the Actuator from the shutoff valve depends on the model. The quick release mechanism may be a spring loaded pin or a wire clip.



NOTE: The valve does a self check every 30 days and the following must be true for this auto check to occur:

- **Shutoff Valve is in Automatic mode of operation (Shutoff valve config is not set to Open or Closed)**
- **No Leak is detected (A104 is inactive)**
- **The unit is not in heating mode.**

5. If the brass valve requires replacement, unthread from the water inlet nipple.



6. Thread the new brass valve onto the water inlet nipple and reconnect all fittings.
7. Close the T&P relief valve and open the shutoff valve at the cold water inlet line. You will hear the heater start to fill with water. You may need to open a few faucets to ensure all air is removed from the system. After the air is removed, close all of the water outlets.

⚠ WARNING: Failure to properly fill tank could result in property damage or bodily injury.

8. Reconnect the new actuator to the brass valve by pushing the actuator pin upward or placing the wire clip back into the slot.
9. Attach the harness coming from the water heater to the new Shutoff Valve harness.

DISASSEMBLY AND REPAIR: SHUT-OFF VALVE

10. Turn on power to the water heater

NOTE: Installation of a new shut off valve may require it to be synchronized. Press and hold "Clear" for more than 10 seconds. Continue to hold through beep until tone is heard. A tone increasing in pitch indicates the shut-off valve has been synchronized.

11. Verify no alarms are present on the display of the User Interface Control.

12. Reference the Use and Care Manual for any adjustments to temperature, mode, etc.

**NOTE: The valve runs through a self-check procedure every 48 hours where it opens and closes. It will make a quick “whirring” or ‘buzzing” sound as the valve checks itself.
This should not be noticeable to the customer, but if mentioned, this sound is indicative of normal operation.**

COMBUSTION SYSTEM REPLACEMENT INSTRUCTIONS

REMOVE

1. Turn the heater OFF at the switch, SHUT down power by disconnecting the power cord from the outlet, SHUT off gas at the manual gas valve.
2. Remove the red square hoses from the gas valve, collar located below the blower, and the rubber coupling.
3. Disconnect the leads to the igniter, and flame sense rod from the ignition control board.
4. Disconnect the green ground wire from the burner assembly by loosening the ¼-20 bolt.
5. Undo the two harness connections from the blower. Disconnect the valve harness.
6. With a wrench, loosen the gas line and move out of the way.
7. Using a #10 screw wrench remove the 4 bolts attaching the blower assembly to the inner combustion tube.
8. Using a ¼-20 bolt wrench remove the 4 bolts used to mount the combustion system to the tank.
9. Carefully lift the whole combustion assembly from the tank. You may grab the collar to lift the assembly. Take care to make sure all harness wires and hoses are clear as you disassemble the combustion assembly from the tank.
10. Remove and discard the O-ring from the tank ring.
11. Peek inside the combustion tube on the tank to make sure it is clean and no debris. You may use a shop vac to clean or remove the dirt.

REPLACE

12. Replace the O-Ring on the tank ring with the new O-ring provided.
13. Carefully remove the new combustion system from the package.
14. Inspect the combustion assembly to make sure the electrode leads, the burner and, the refractory are not damaged. Do not use if damaged.
15. Observe the LOCATION OF THE PIN on the bottom of the combustion system flange. The pin helps to ORIENT the combustion system with FRONT access to igniter and flame sensor.
16. Carefully slide the new combustion system into place making sure it is FIRMLY positioned on the tank ring in proper ORIENTATION.
17. Place the ground wire from the igniter into one of the ¼-20 bolts for the combustion system.
18. Tighten the 4 ¼-20 bolts in a STAR sequence progressively tightening all four bolts together. Make sure the flange surfaces are in full contact.
19. Reconnect igniter and flame sensor lead wires to the ignition control.
20. Reconnect the two harnesses to the front of the blower.
21. Reattach the valve harness and secure it with the screw.
22. Reattach the POF switch hose to the collar. Reattach gas valves and rubber coupling hoses. This is the hose with the T-connection.
23. Reconnect the gas line to the valve and open the manual gas valve to the heater. Plug the power cord in the outlet. Turn ON the power switch on the heater.

RECIRCULATION PUMP CONTROL

This section describes the operation of the recirculation pumps that are connected and controlled via the Maximus control board. An external power source is required to power the pump, and is connected through P10 connection on the ignition control board. Based on the below descriptions, only “always on” or “demand based” pumps are recommended.

ON

The pump runs continuously as long as power is supplied to the water heater.

OFF

The pump in always OFF.

SCHEDULE

The pump runs based on the Schedule Period configured on the display (Settings >> Schedules). While Schedule Period = HOME / OCCUPIED, the pump will be energized to run for 15 minutes then de-energized to not run for 15 minutes. This cycle of 15 minutes ON then 15 minutes OFF will continue as long as the time of day falls under Schedule Period configuration of HOME / OCCUPIED.

If the Schedule Period is configured for AWAY / UNOCCUPIED, the pump will not energize to run.

SCHEDULE ON

The pump runs based on the Schedule Period configured on the display (Settings >> Schedules). While Schedule Period = HOME / OCCUPIED, the pump will be energized to run constantly.

If the Schedule Period is configured for AWAY / UNOCCUPIED, the pump will not energize to run.

ON DEMAND

The pump runs based on an On Demand command while using the configuration of the Schedule Period at the time of the On Demand command.

If the On Demand Command (from the smart device app) occurs while the Schedule Period is set to HOME / OCCUPIED, the pump will be energized for 15 minutes then de-energize.

If the On Demand Command (from the smart device app) occurs while the Schedule Period is set to AWAY / UNOCCUPIED, the pump will be energized for 30 minutes then de-energize.

If the pump does not run, confirm connections are secure on the wire nuts or an acceptable connection method.

NOTE: For “Smart Pumps”, make sure the Recirc. Pump Config is set to ON.

RECIRCULATION PUMP CONTROL

FIELD INSTALLATION INSTRUCTIONS

Recirculation Pump Replacement Kit - This kit applies only to certain models.

IMPORTANT NOTICE

These instructions are primarily intended for the use by qualified personnel specifically trained and experienced in the installation of this type of heating equipment and related system components. Installation and service personnel may be required to be licensed in some states. Persons not qualified shall not attempt to install this equipment nor attempt repairs according to these instructions.

DANGER - SHOCK HAZARD

Make sure electrical power to the water heater is disconnected and "OFF" to avoid damage to components, potential serious personal injury, or death. Make sure the gas to the heater has been shut off.

KIT CONTENTS	
QTY	DESCRIPTION
1	Installation Instructions
1	Recirculation Pump
1	Wire Harness - Auxiliary Output

⚠ DANGER: Make certain power to the water heater is "OFF" and the water in the tank is drained before working on the water heater for any reason. Failure to do so could result in property damage, bodily injury, or death.

GENERAL PRECAUTIONS:

1. Shut off gas ahead of controls before starting the replacement procedures.
2. Disconnect power supply (if applicable) to prevent electrical shock or damage to components.
3. Check to be sure the kit is for the same fuel type as the heater being serviced (if applicable).

INSTALLATION OF THE RECIRCULATION PUMP:

1. If the pump has no internal controls to the pump itself and the power cord has a plug, cut off the plug and expose the wires by about 2" which includes the sheathing. Discard the removed plug.
2. Strip off about ¼" of the protective sheathing to expose the bare wire from the black (hot) and white (neutral) wires on the pump wires.
3. On the power cord that plugs into the wall outlet, be sure the black (hot) and white (neutral) wires with protective sheathing are exposed.
4. Strip off about ¼" of the protective sheathing to expose the bare wire from the black (hot) and white (neutral) wires on the power cord wires.
5. Using wire nuts or an acceptable connection method, connect the black wire of the power cord to the black wire running to pin 2 of the wire harness included in this kit.
6. Using wire nuts or an acceptable connection method, connect the remaining black wire of the wire harness running to pin 1 to the input wire of the pump.
7. Using wire nuts or an acceptable connection method, connect the other wire from the pump to the white (neutral) wire of the power cord.
8. Plug in the power cord to an electrical source.
9. On the Display, navigate to Settings >> Configs.
   a. Modify/ConfirmAuxOutputSelect=Recirc.Pump
   b. Modify / Confirm Recirc. Pump Config = ON

NOTE: this is just a temporary configuration for Recirc. Pump Config to confirm the pump receives power and runs. If desired, change the configuration of Recirc. Pump Config to the desired configuration based on operation states on the next page.

RECIRCULATION PUMP CONTROL

ON
The pump runs continuously as long as power is supplied to the water heater.

OFF
The pump in always OFF.

SCHEDULE
The pump runs based on the Schedule Period configured on the display (Settings >> Schedules). While Schedule Period = HOME / OCCUPIED, the pump will be energized to run for 15 minutes the de-energized to not run for 15 minutes. This cycle of 15 minutes ON then 15 minutes OFF will continue as long as the time of day falls under Schedule Period configuration of HOME / OCCUPIED.

If the Schedule Period is configured for AWAY / UNOCCUPIED, the pump will not energize to run.

SCHEDULE ON

The pump runs based on the Schedule Period configured on the display (Settings >> Schedules). While Schedule Period = HOME / OCCUPIED, the pump will be energized to run constantly.

If the Schedule Period is configured for AWAY / UNOCCUPIED, the pump will not energize to run

ON DEMAND

The pump runs based on an On Demand command while using the configuration of the Schedule Period at the time of the On Demand command.

If the On Demand Command (from the smart device app) occurs while the Schedule Period is set to HOME / OCCUPIED, the pump will be energized for 15 minutes then de-energize.

If the On Demand Command (from the smart device app) occurs while the Schedule Period is set to AWAY / UNOCCUPIED, the pump will be energized for 30 minutes then de-energize.

10. If the pump does not run, confirm connections are secure on the wire nuts or an acceptable connection method.

NOTE: For “Smart Pumps”, make sure the Recirc. Pump Config is set to ON
AP22587

NOTES

TECHNICAL SUPPORT LINE
Phone: 800-432-8373
Fax: 334-260-1341

ORDER CENTER
1-800-621-5622

RHEEM WATER HEATERS
800 Interstate Park Dr.
Montgomery, AL 36109
Website: www.Rheem.com
e-mail: Techserv@Rheem.com