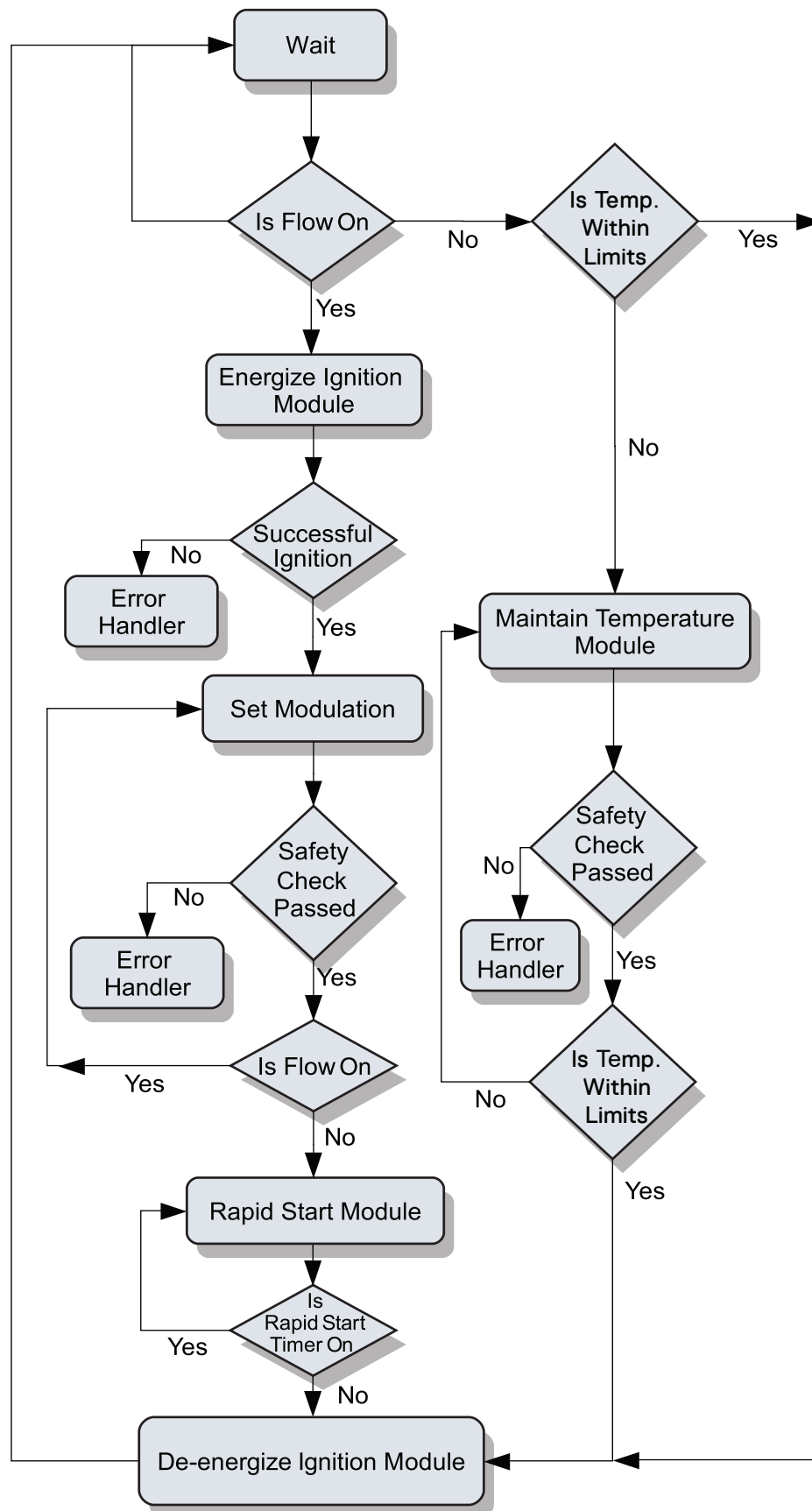


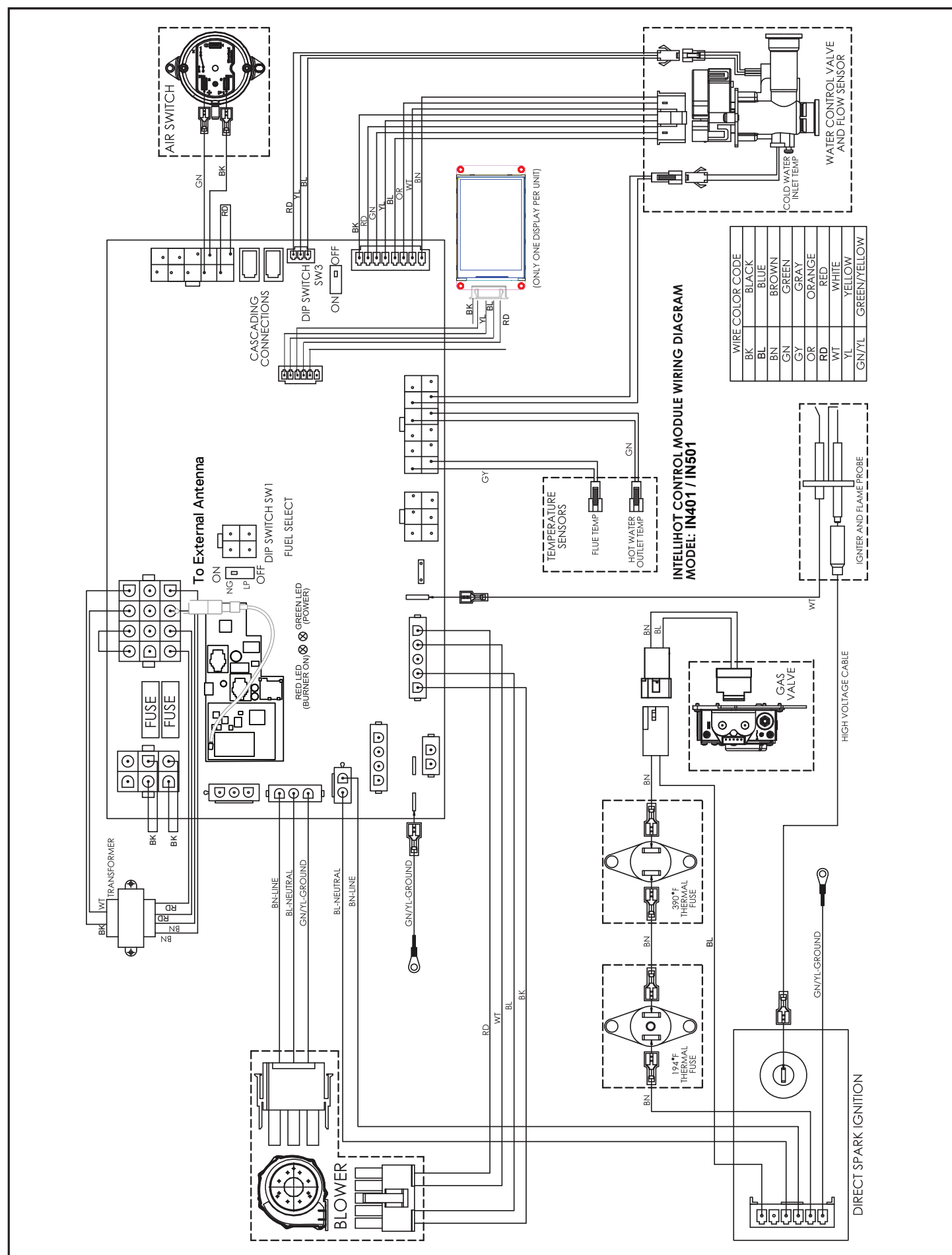
15. Wiring Diagrams and Troubleshooting

15.1 Operational Flow Chart



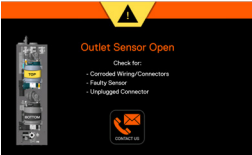

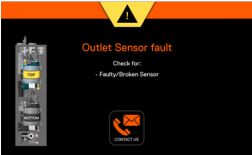




IH-56

15.2 Complete Wiring Diagram (all models)

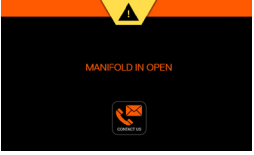



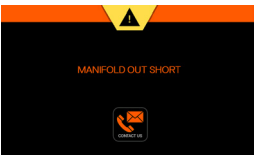

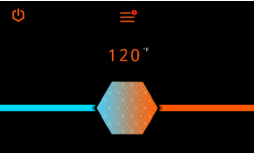
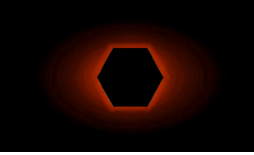




15.3 Troubleshooting Guide

Description	Possible Cause	Remedy
Blower Speed Fault  - Speed Signal fault 	<ul style="list-style-type: none"> • Blower noisy / impeller jammed. • Disconnected signal wire. • Wiring faulty. 	<ul style="list-style-type: none"> • Inspect blower / impeller. Clean and remove any obstructions. • Check PWM signal. Check for loose wires / pins, and repair. • If the problem persists, turn control panel OFF, shut gas valve, disconnect power from unit, and contact an authorized service technician.
Igniter Ignition Fault 	<ul style="list-style-type: none"> • Water over-heat switch tripped. • Faulty DSI, faulty igniter wire, faulty ignition connection, faulty PCB, bad igniter. • Low gas pressure. • Wiring faulty. 	<ul style="list-style-type: none"> • Check pump, check cross-over solenoid. Electrical noise (DSI). • Replace part. • Adjust gas pressure at regulator, check / increase size of gas line, check for gas line blockage. • If the problem persists, turn control panel OFF, shut gas valve, disconnect power from unit, and contact an authorized service technician.
Open Sensors Inlet / Outlet Sensor  	<ul style="list-style-type: none"> • Unplugged connectors. • Faulty sensor wiring. • Faulty sensor. • Heat engine water outlet temperature sensor. • Flue temperature sensor. • Inlet water temperature sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Check connectors and ensure they are securely connected • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F) • Replace controller.
Faulty Sensors Inlet / Outlet Sensors  	<ul style="list-style-type: none"> • Faulty sensor wiring or faulty sensor. • Inlet water temperature sensor. • Heat exchanger water outlet temperature sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors. • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F) • Replace controller

Description	Possible Cause	Remedy
<p>Open Sensors</p> <p>Inlet / Outlet Sensors</p> 	<ul style="list-style-type: none"> • Unplugged connectors. • Faulty sensor wiring. • Faulty sensor. • Heat engine water outlet temperature sensor. • Flue temperature sensor. • Inlet water temperature sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Check connectors and ensure they are securely connected. • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors. • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F). • Replace controller.
<p>Heat Exchanger</p> <p>Outlet temperature exceeded set limit</p> 	<ul style="list-style-type: none"> • Flow rate changes excessive. • Faulty sensor wiring. • Faulty sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Ensure the water flow rate does not change faster than 2 GPM every 5 seconds. • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors. • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F). • Replace controller.
<p>Flue</p> <p>Temperature Exceeded Set Limit</p> 	<ul style="list-style-type: none"> • Incorrect vent set up. • High inlet temperature. • Faulty sensor wiring. • Faulty sensor. • Faulty controller. 	<ul style="list-style-type: none"> • If vent pipe material is CPVC or polypropylene, ensure that CPVC is selected in the vent material screen. • Ensure inlet temperature is lower than 150°F if vent pipe material is PVC or lower than 190°F if vent pipe material is CPVC or polypropylene. • Check for nicked or broken sensor wiring and connectors. Also check for corroded or wet connectors. • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F). • Replace controller
<p>Blocked Flue Fault</p> 	<ul style="list-style-type: none"> • Exhaust blocked (bird, etc). • Backed up condensate. • Wiring loose (switch open). 	<ul style="list-style-type: none"> • Check exhaust termination. Check exhaust connection at water heater. Install screens to prevent blockage. • Check slope of drain. Check for double loops, air locks, or debris in loop. • Check wiring.
<p>Flue sensor</p>  	<ul style="list-style-type: none"> • Unplugged connectors. • Faulty sensor wiring. • Faulty sensor. • Flue temperature sensor. • Inlet water temperature sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Check connectors and ensure they are securely connected • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F) • Replace controller.
<p>Cascading</p> <p>Alert</p> 	<ul style="list-style-type: none"> • Loss of communication between units. 	<ul style="list-style-type: none"> • Check for broken or nicked communication cable or loose connector. • Ensure that the communication cable is not bundled or tied to any high voltage lines. • Ensure dip switch (SW3) is ON in first and last units and OFF in all other units. • Ensure each unit numbering is unique.

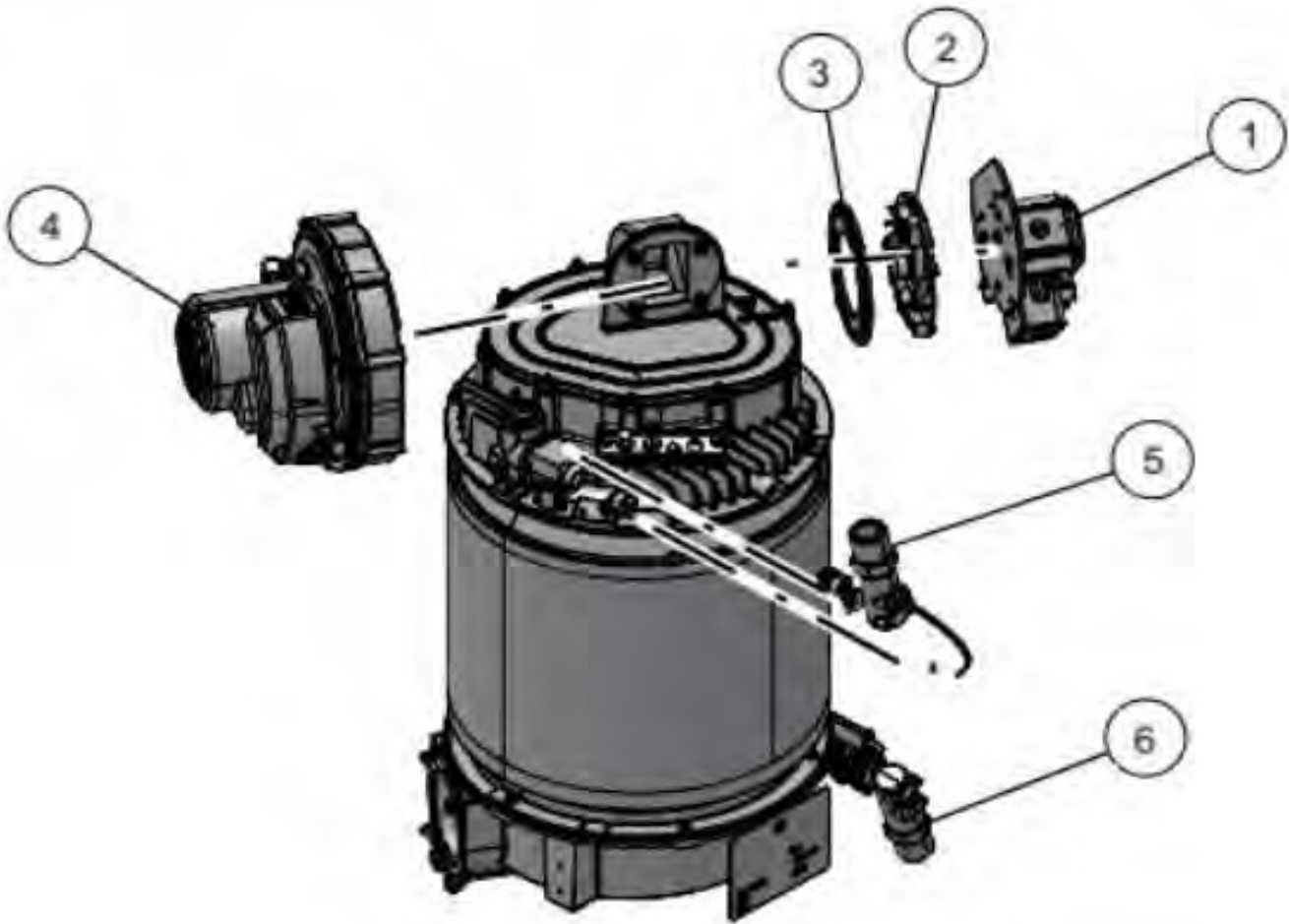
Description	Possible Cause	Remedy
<p>Water Valve</p> 	<ul style="list-style-type: none"> • Faulty sensor wiring. • Water valve clogged or damaged. 	<ul style="list-style-type: none"> • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors. • Replace water valve.
<p>Pump</p> 	<ul style="list-style-type: none"> • Faulty pump wiring. • Pump fuse blown. • Faulty pump. • Faulty controller. 	<ul style="list-style-type: none"> • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors. • Replace fuse (5 Amp) • Replace pump. • Replace controller.
<p>Fuel Type</p> 	<ul style="list-style-type: none"> • Wrong fuel type being used. 	<ul style="list-style-type: none"> • Use correct fuel type.
<p>Software</p> 	<ul style="list-style-type: none"> • Incorrect settings. • Incompatible settings. • Incorrect software version. • Faulty wiring. 	<ul style="list-style-type: none"> • Review and correct settings. • Review and correct settings. • Update software version. • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors.

Description	Possible Cause	Remedy
Manifold Sensors      	<ul style="list-style-type: none"> • Unplugged connectors. • Faulty sensor wiring. • Faulty sensor. • Flue temperature sensor. • Inlet water temperature sensor. • Faulty controller. 	<ul style="list-style-type: none"> • Check connectors and ensure they are securely connected • Check for nicked or broken sensor wiring or connectors. Also check for corroded or wet connectors • Measure resistance of sensor at connector (18 kΩ at 50°F, 10 kΩ at 77°F, 3 kΩ at 140°F) • Replace controller.
System Alert / Fault 	<ul style="list-style-type: none"> • A system alert or fault is present (main menu screen). • Malfunction of monitored part or system. 	<ul style="list-style-type: none"> • Press the Menu bar and refer to the remedy for indicated part or system.
Alive   	<ul style="list-style-type: none"> • Shows status of water heater. • Sleep mode. • Sleep mode passcode protected. • Indicates a fault exists within the monitored parts or system. 	<ul style="list-style-type: none"> • Touch display screen to awake. • Refer to the remedy for indicated part or system. • Refer to the remedy for indicated part or system.

Description	Possible Cause	Remedy
<p>Service Alert</p>       	<ul style="list-style-type: none">• A system alert or fault is present (main menu screen).• Malfunction of monitored part or system.	<ul style="list-style-type: none">• Press the Menu bar and refer to the remedy for indicated part or system.

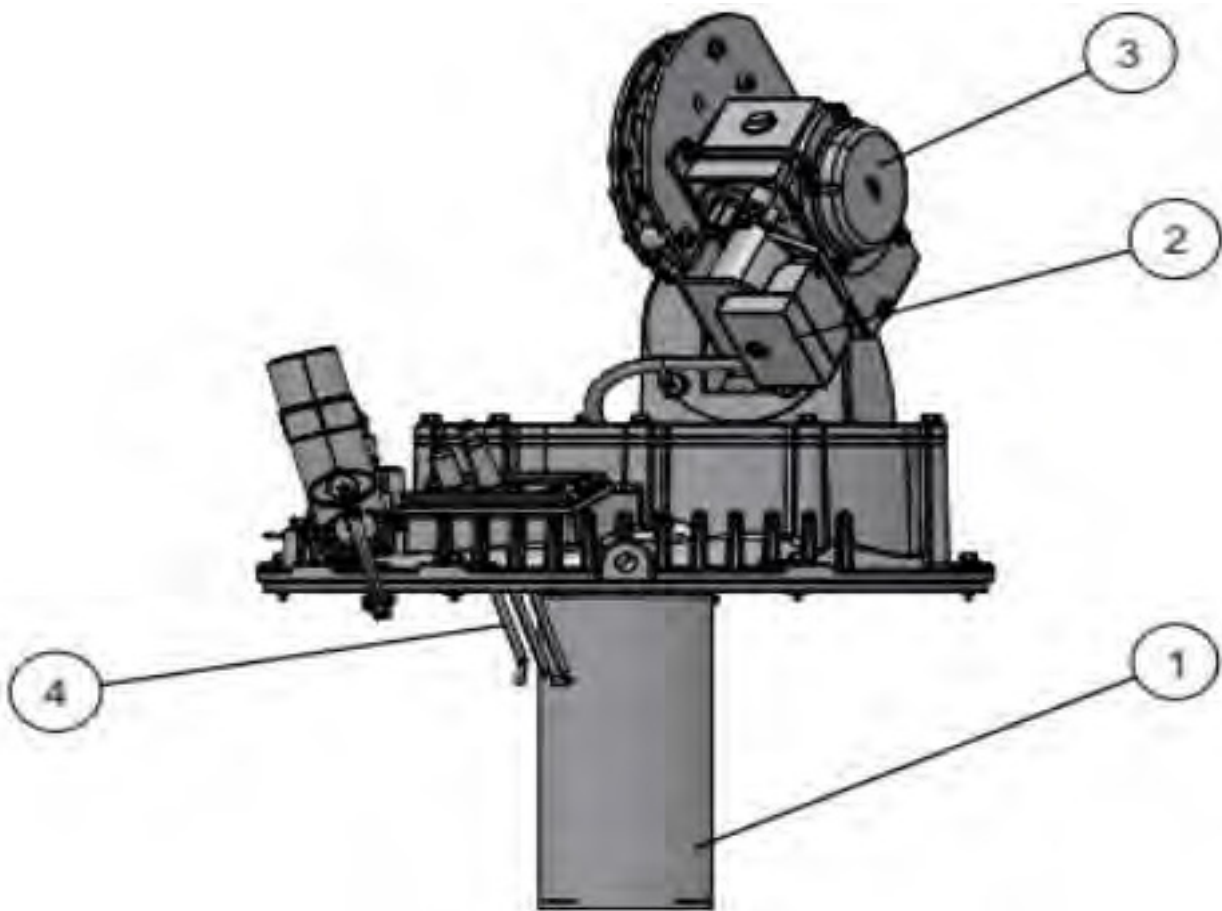
16. Serviceable Parts

16.1. Blower & HEX Parts



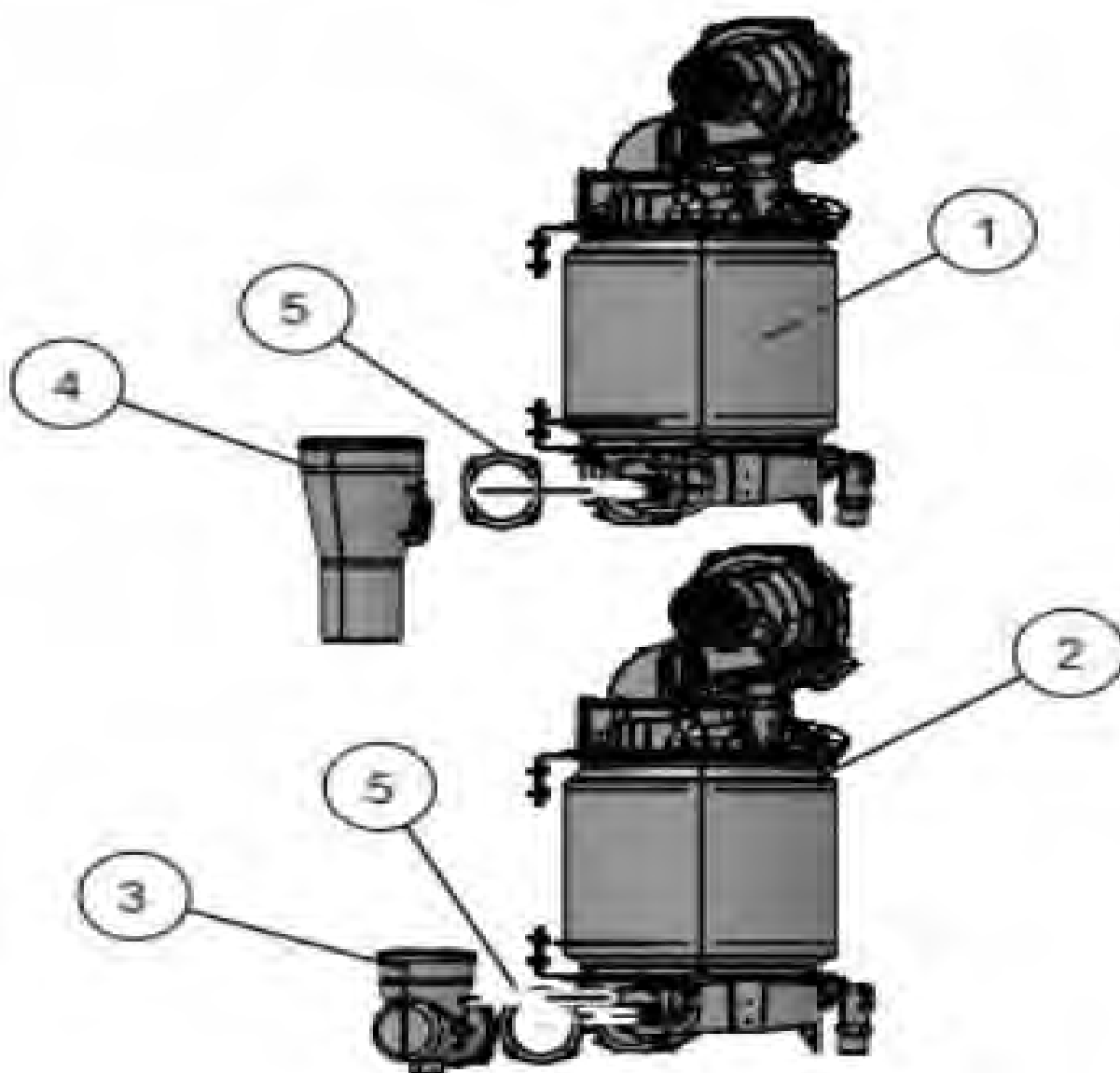
Item	Part Number	Description
1	IGT-SPR0011	Gas Valve Kit
2	IGT-ELC0147	Gray Swirl Plate
3	IGT-ELC0012	Fan Adapter Plate
4	IGT-SPR0008	(EBM) Blower Kit
	IGT-SPR0131	(AMETEK) Blower Kit
5	IGT-CST0011	Outlet Casting Adapter
6	IGT-CST0010	Inlet Casting Adapter

16.2. Burner, Electrode & Gas Valve



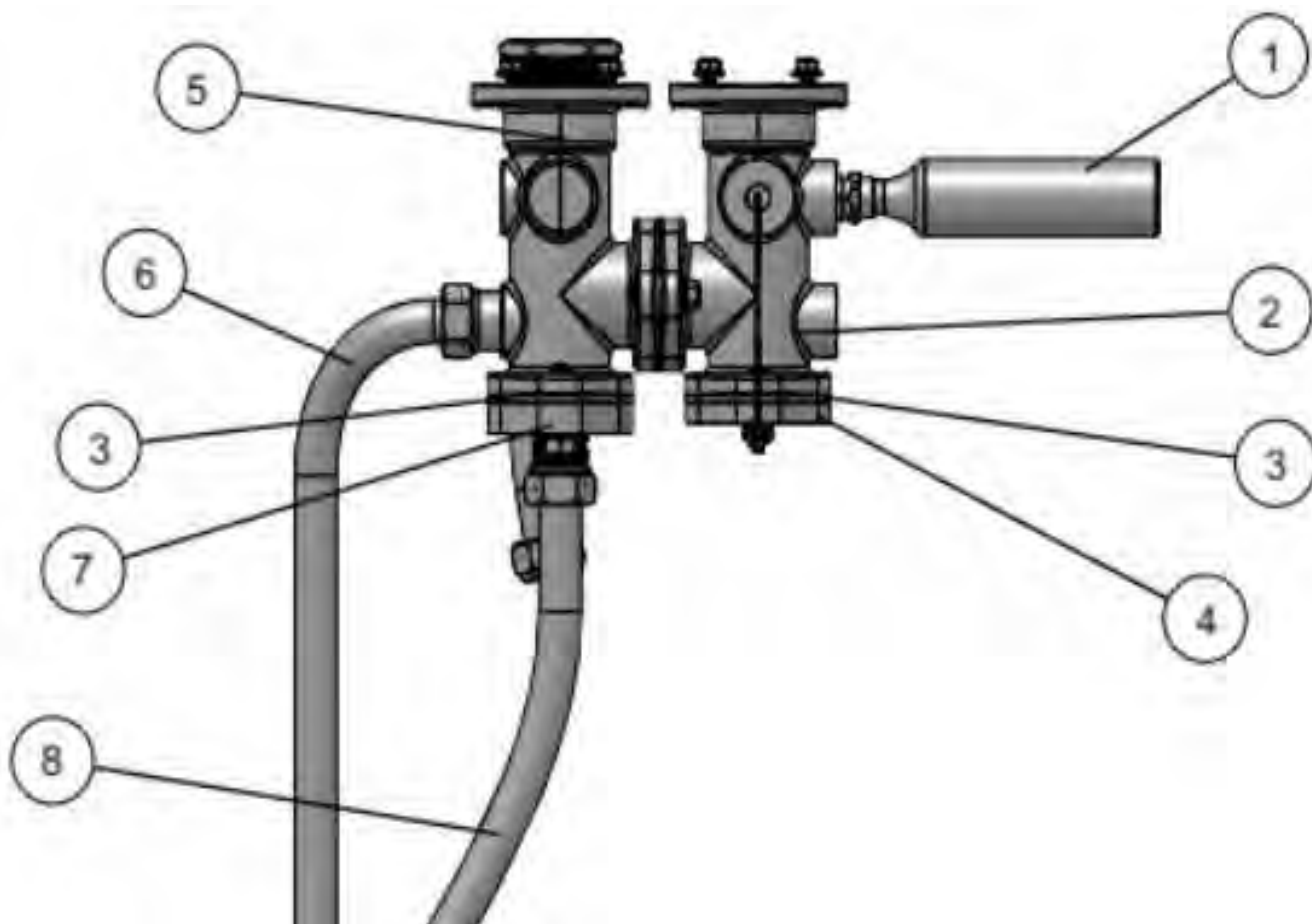
Item	Part Number	Description
1	IGT-SPR0111	Gen II V02 Burner Kit
2	IGT-ELC0020	Gas Valve Harness
3	IGT-SPR0011	Gas Valve Kit
4	IGT-SPR0106	Gen II V02 Electrode Kit

16.3. HEX & Sidecast



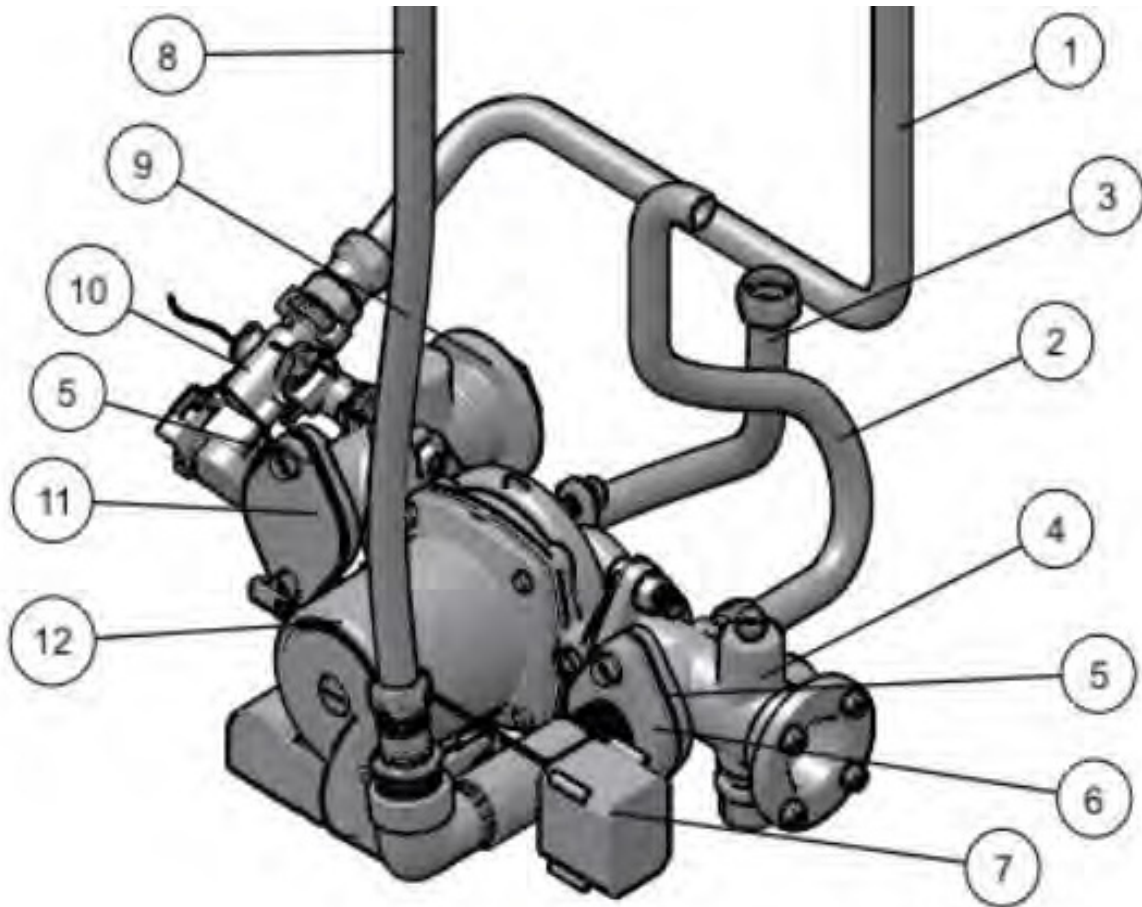
Item	Part Number	Description
1	IGT-SA0511	Top Heat Exchanger
2	IGT-SA0512	Bottom Heat Exchanger
3	IGT-CST0029	Side Cast - Exhaust, 3"
4	IGT-CST0035	Side Cast - Exhaust, 4" to 3"
5	IGT-SLS0083	Side Cast Seal

16.4. Water (hot water side)



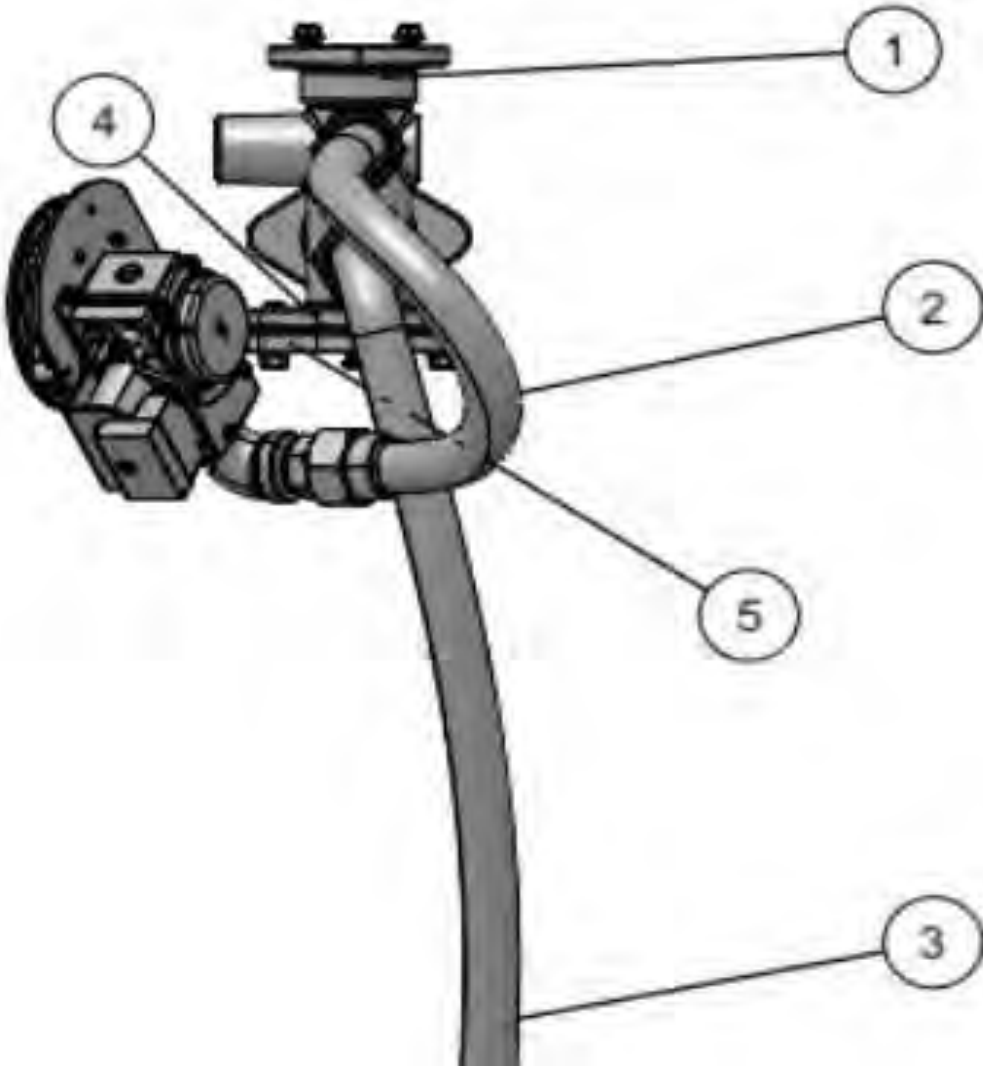
Item	Part Number	Description
1	IGT-PLG0018	Water Hammer Arrestor
2	IGT-FTT0235-3	Water out fitting, hot side
3	IGT-SLS0041	Flange Seal
4	IGT-SM0558	Close-off Plate
5	IGT-FTT0235-4	Water out fitting, T&P side
6	IGT-LNE0063	Corrugated Water line assembly
7	IGT-FTT0243-1	Flange Adapter fitting
8	IGT-LNE0064	Corrugated Water line assembly

16.5. Water (cold water side)



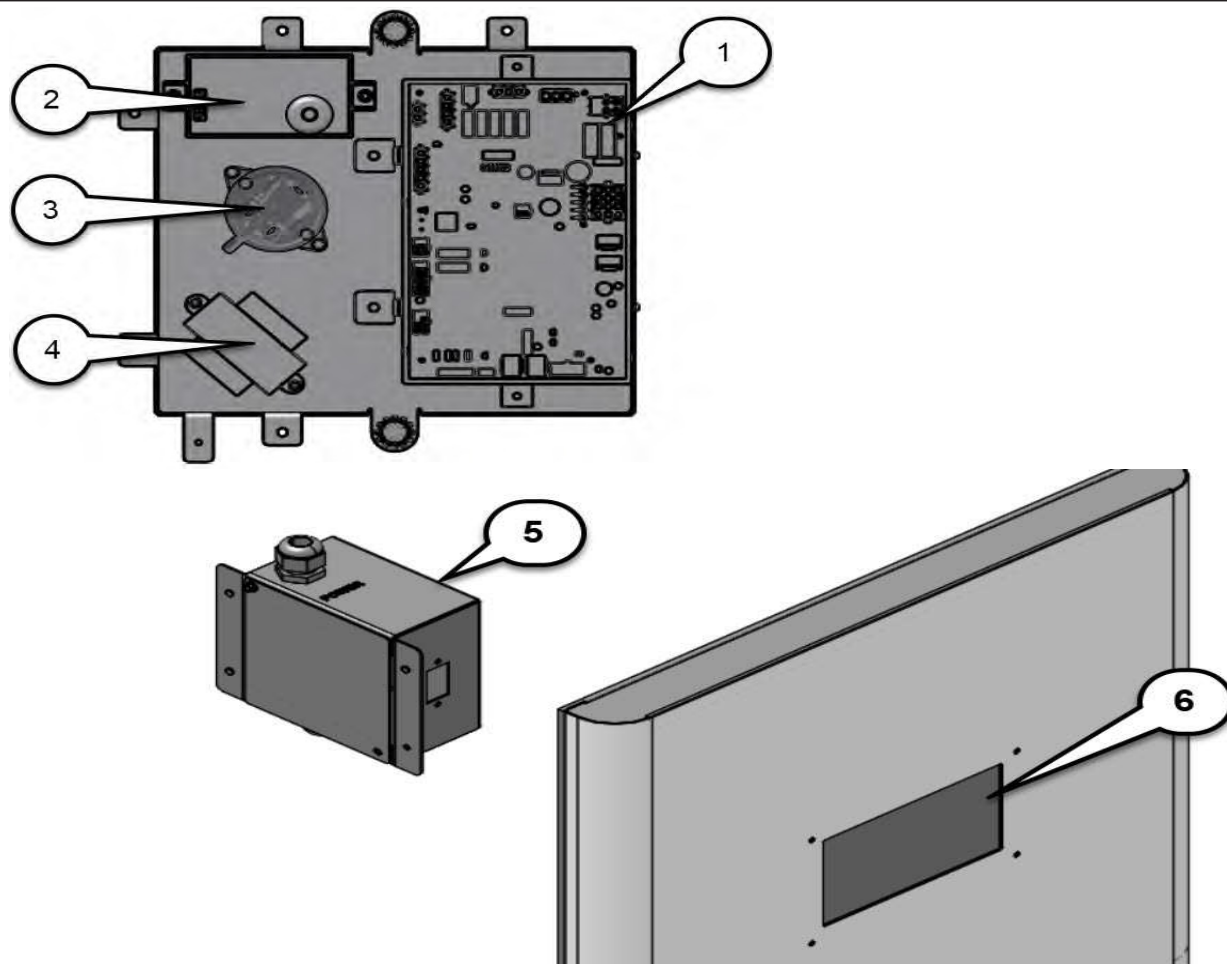
Item	Part Number	Description
1	IGT-LNE0059	Corrugated line assembly
2	IGT-LNE0053	Corrugated line assembly
3	IGT-LNE0061	Corrugated line assembly
4	IGT-FTT0235-1	Water In Fitting, Cold Side
5	IGT-SLS0041	Flange Seal
6	IGT-FTT0244	Flange Adapter Fitting
7	IGT-VL0019	Bypass Valve
8	IGT-LNE0064	Corrugated line assembly
9	IGT-FTT0235-2	Water in Fitting, Strainer
10	IGT-SPR0003	Water Valve kit
11	IGT-SM0558	Close off Plate fitting
12	IGT-SPR0075	Recirculation pump

16.6 Gas Connections



Item	Part Number	Description
1	IGT-FTT0235-5	Gas-in Casting
2	IGT-PLG0014	Gas Corrugated tube
3	IGT-PLG0015	Gas Corrugated tube
4	IGT-SLS0041	Flange Seal
5	IGT-SM0560	Close Off Plate

6.7. Electronics



Item	Part Number	Description
1	IGT-SPR0002	(Green Color v9.3) Control Board
	IGT-SPR0129	(iN501=112024iN50179 or later; iN401=112124iN40186 or later) (White Color v9.4) Control Board
2	IGT-SPR0005	Igniter Module (DSI) Kit
3	IGT-ELC0007	Air Switch
4	IGT-SPR0065	Transformer Kit
5	IGT-ELC0138	Rocker Switch
6	IGT-SPR0088	Display Kit
	IGT-SPR0130	(iN501=112024iN50179 or later; iN401=112124iN40186 or later) (Red Color) Display Kit

16.8 Miscellaneous

Part Number	Description
IGT-ELC0092	25 ft cascading cable
IGT-ELC0232	50 ft cascading cable
IGT-SPR0110	Gen II V 2 Sensors Kit (includes Manifold inlet, Manifold outlet, Flue and Hotwater outlet sensors)
IGT-SPR0109	Gen II V 2 O-Ring kit
IGT-ELC0181	DSI to Electrode HV Cable
IGT-ELC0278	Heat Exchanger to Control board Complete Harness
IGT-ELC0279	Heat Exchanger to Water Valve Wiring Harness Set (top & bottom)
IGT-ELC0280	Mainfold Inlet Sensor Wiring Harness
IGT-ELC0281	Manifold Outlet Sensor Wiring Harness
IGT-ELC0284	Bypass Valve Wiring Harness
IGT-ELC0288	Display Wiring Harness
IGT-SPR0119	Neuron Wye Strainer Kit
IGT-SPR0118	BMS Kit (Factory Installed Option only)

17. Requirements for State of Massachusetts

17.1 Notice Before Installation

This appliance must be installed by a licensed plumber or gas fitter in accordance with the Massachusetts Plumbing and Fuel Gas Code 248 CMR Sections 2.00 and 5.00.

IMPORTANT: In the State of Massachusetts (248 CMR 4.00 & 5.00)

For all side wall horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

1. INSTALLATION OF CARBON MONOXIDE DETECTORS.

At the time of installation of the side wall horizontal vented gas fueled equipment, the installing plumber or gasfitter shall observe that a hard wired carbon monoxide detector with an alarm and battery backup is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gasfitter shall observe that a battery operated or hard wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building, or structure served by the side wall horizontal vented gas fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard wired carbon monoxide detectors.

- a. In the event that the side wall horizontally vented gas fueled equipment is installed in a crawl space or an attic, the hard wired carbon monoxide detector with alarm and battery back-up may be installed on the next adjacent floor level.
- b. In the event that the requirements of this subdivision cannot be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery operated carbon monoxide detector with an alarm shall be installed.

2. APPROVED CARBON MONOXIDE DETECTORS.

Each carbon monoxide detector, as required in accordance with the above provisions, shall comply with NFPA 720 and be ANSI/UL 2034 listed and IAS certified.

3. SIGNAGE.

A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas fueled heating appliance or equipment. The sign shall read, in print size no less than one-half (1/2) inch in size, "GAS VENT DIRECTLY BELOW. KEEP CLEAR OF ALL OBSTRUCTIONS".

4. INSPECTION.

The state or local gas inspector of the side wall horizontally vented gas fueled equipment shall not approve the installation unless, upon inspection, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CMR 5.08(2)(a)1 through 4.