IFT Control System Overview

This fireplace control system consists of the following components:

Ignition and Control Components

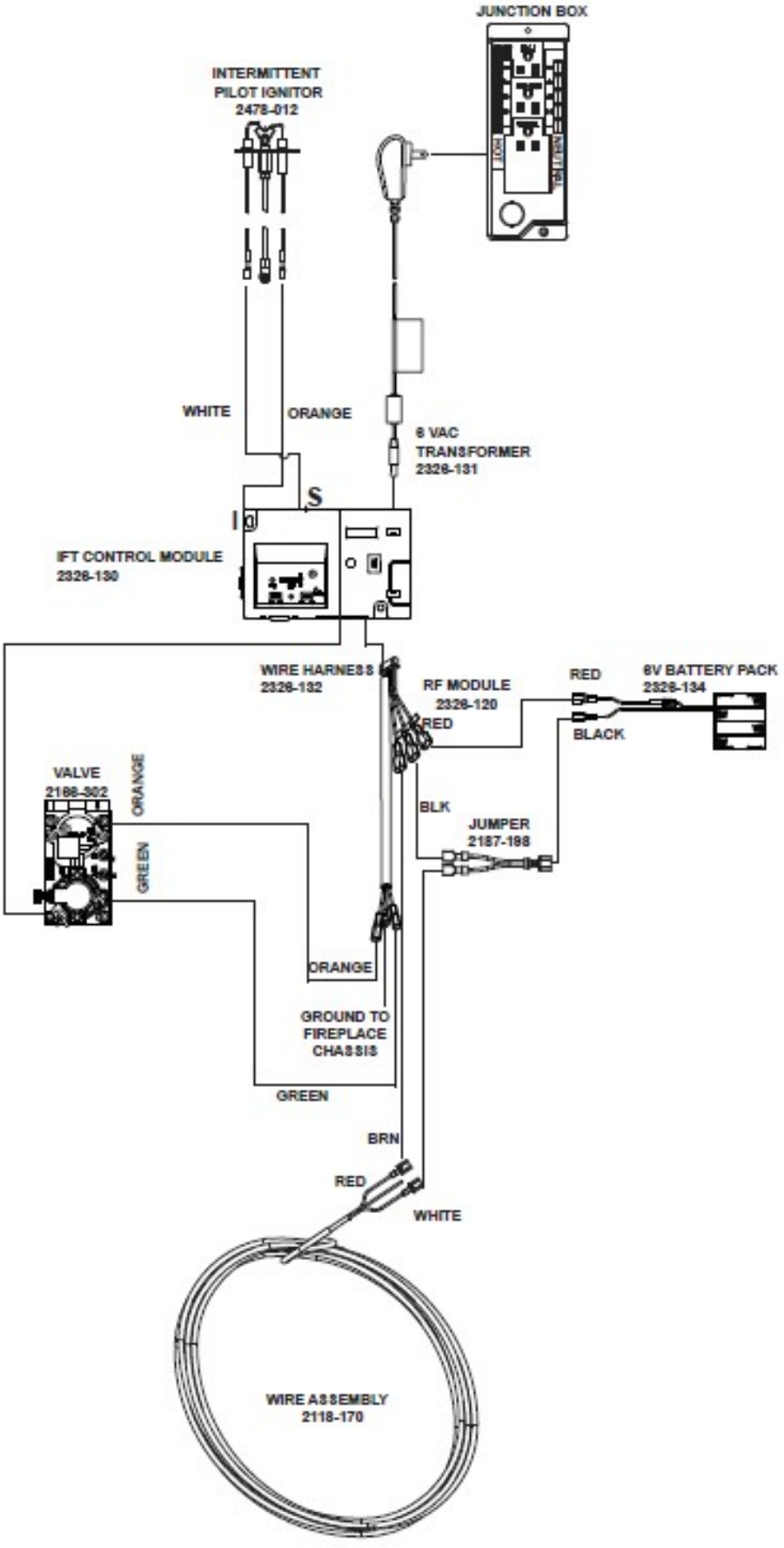
- Electronic Control Module (ECM): This is the primary control for the system. It controls ignition spark voltage, gas valve voltages, IPI pilot flame sensing, and other consumer-directed functions.
- AC/DC Adapter: This component transforms 120VAC power from the junction box to 6VDC as the primary power source to the ECM
- IPI Pilot Assembly: Provides ignition spark discharge, pilot flame, and flame sense electrode.
- Gas Valve: Provides gas supply to the IPI Pilot, and regulated gas supply to the main burner.
- Multi-wire Harness: Connects the ECM to the gas valve, chassis ground, back-up battery pack, and optional switching configurations including to the Powervent Pressure Switch.
- Back-up Battery Pack: Optional power source for use during power outages. Not intended as a primary power source. Cannot be used with Powervented appliances.

Auxiliary Control Components

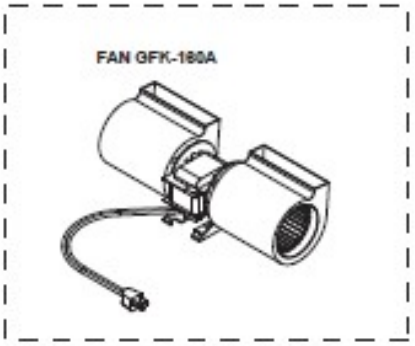
- Auxiliary Control Module (ACM) Provides voltage control to optional peripheral loads, including one convection blower, one Power Vent Kit, and/or lights. The ACM connects to the ECM. The ACM is powered by a separate 120VAC cord connected to the junction box.

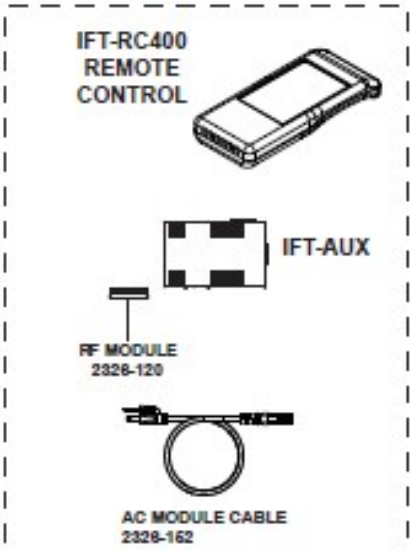
Wireless Control Components

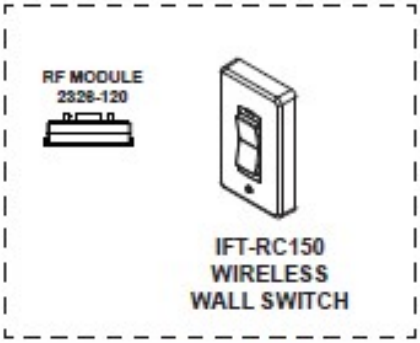
- RF Module: Provides wireless radio-frequency capability to the ECM. The RF module must be connected to the ECM to communicate with the RC400 or RC150 remote controls.
- RC400: Multifunction ‘touch-screen’ remote control
- RC150: Wireless wall switch, with ON/OFF and cold-climate switching function


JUNCTION BOX
INTERMITTENT
PILOT IGNITOR
2478-012
WHITE
ORANGE
6 VAC
TRANSFORMER
2328-131
IFT CONTROL MODULE
2328-130
WIRE HARNESS
2328-132
RF MODULE
2328-120
RED
6V BATTERY PACK
2328-134
BLACK
VALVE
2186-302
ORANGE
GREEN
BLK
JUMPER
2187-188
ORANGE
GROUND TO
FIREPLACE
CHASSIS
GREEN
BRN
RED
WHITE
WIRE ASSEMBLY
2118-170

OPTIONS


FAN GFK-160A


IFT-RC400
REMOTE
CONTROL
IFT-AUX
RF MODULE
2328-120
AC MODULE CABLE
2328-162

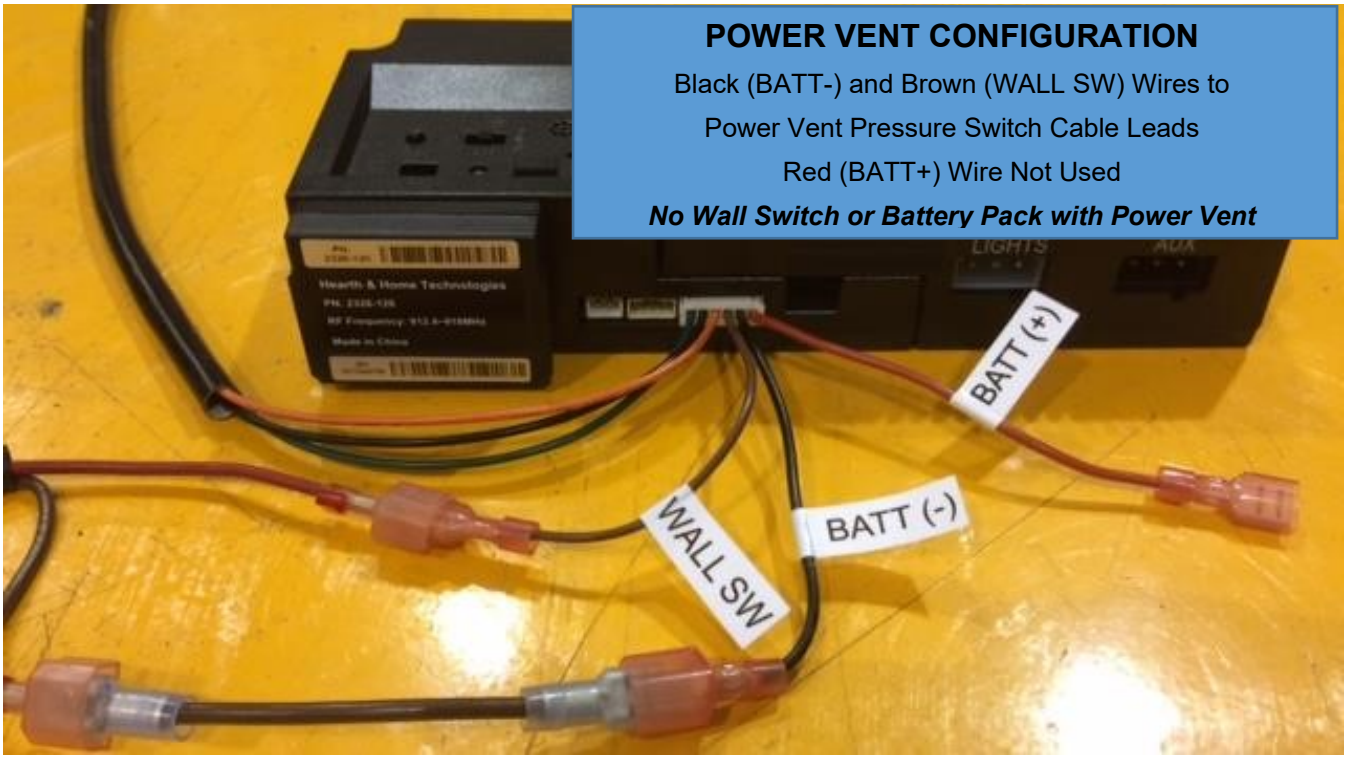

RF MODULE
2328-120
IFT-RC150
WIRELESS
WALL SWITCH


WI-FI OPTION

STANDARD CONFIGURATION

Black (BATT-) and Brown (WALL SW) Wires to Optional Wired Wall Switch

Red (BATT+) and Black (BATT-) Wires Connected to Battery Pack



POWER VENT CONFIGURATION

Black (BATT-) and Brown (WALL SW) Wires to

Power Vent Pressure Switch Cable Leads

Red (BATT+) Wire Not Used

No Wall Switch or Battery Pack with Power Vent

ACM and ECM Power Connections

- The ACM is connected to the ECM. The connection is a low-voltage data connection.
- The ACM must be connected to 120VAC power source at the appliance J-Box.
- The ECM must be connected to 6VDC power source via the AC/DC Adapter.
- Grounding is critical to IFT Control performance and safety. When servicing product, always verify that the J-Box is securely attached to the appliance chassis.

IFT Troubleshooting Diagnostics

System Error Codes & Built-in Diagnostics

The IFT has enhanced system diagnostic capabilities in two forms, the ECM LED Error Codes and the RC400 (if equipped). The authorized service technician shall utilize the information from these sources to direct actions & document the findings.

ECM LED Error Codes

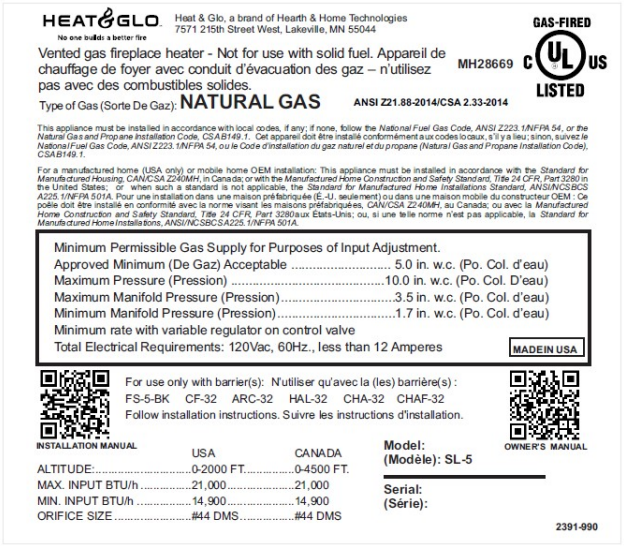
ECM LED Error Codes	Description
3 Red: 1 Green	IFT-RC400 error message: 'Appliance Safely Disabled', no ignition and/or flame rectification during ignition trial. Technician shall follow applicable IPI Pilot Ignition and Flame Sensing Rectification troubleshooting guide to resolve the issue.
2 Red: 1 Green	IFT-RC400 display: 'Error Pilot Flame', pilot valve solenoid not detected. Technician shall follow applicable gas valve troubleshooting guide to resolve the issue.
2 Red: 2 Green	Sparking feedback signal error, spark coil failure. The module has an internal hardware failure that cannot be repaired. Replace the control module
5 Red: 1 Green	IFT-RC400 display: 'Error Power Vent'. This Error Code only occurs in systems equipped with an approved Powervent Kit. There are multiple possible causes for this Error Code. Service Technician shall follow applicable troubleshooting guide for the powervent system to resolve the issue.

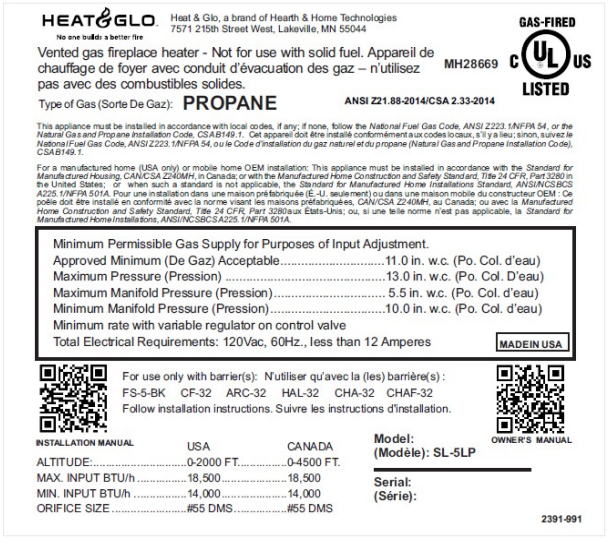
Gas Valve Troubleshooting

Pilot won't light, there is no noise or spark, 2 Red/1 Green Lockout.	Pilot solenoid not detected.	Verify that valve harness orange wire is securely connected to pilot solenoid valve. Verify pilot solenoid resistance is between 38 to 42 ohms. If resistance is low, open lead, or shorted, replace valve. Check valve harness wire continuity, if open replace 6-pin harness.
IFT-RC400 displays the following message on-screen: Call Dealer Error: Pilot Flame In addition, the LED indicator on the IFT-ECM will flash twice red and once green indefinitely.	Valve harness orange wire is not attached to gas valve.	Verify that all wires are correctly installed between the gas valve and the IFT-ECM.
	IFT-ECM is not grounded.	Verify that the black wire from the 6-pin wiring harness on the IFT-ECM is securely attached to the metal chassis.
	Wire is damaged and open.	Verify continuity of the green and orange valve wires, and the black ground wire. Replace wire harness if open lead exists.
	Wires damaged due to heat.	Verify that none of the wires are melted, and/or shorted. Replace damaged wiring if it exists.
	Gas valve is damaged.	Verify the pilot valve solenoid resistance by measuring across the pilot spade and any non-oxidized metal surface of the gas valve. If open, or coil resistance less than 38 ohms, replace the gas valve.

Working Supply and Manifold Gas Pressures

- Refer to the appliance rating plate for specified working inlet and outlet pressure for appliance/gas-type.
- IFT Controls require working pressures within the tolerances on the appliance rating plate. Make any necessary adjustments to the supply working pressure.

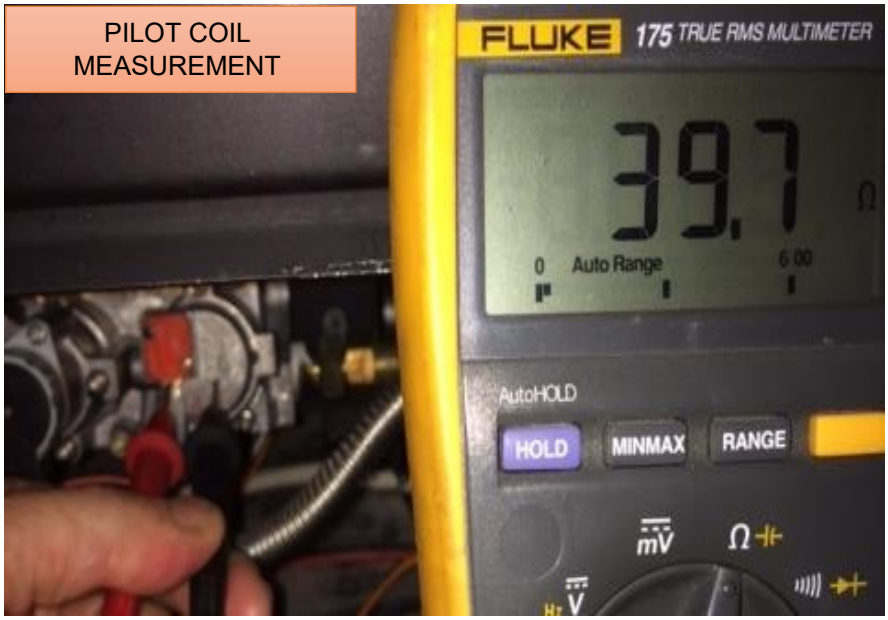




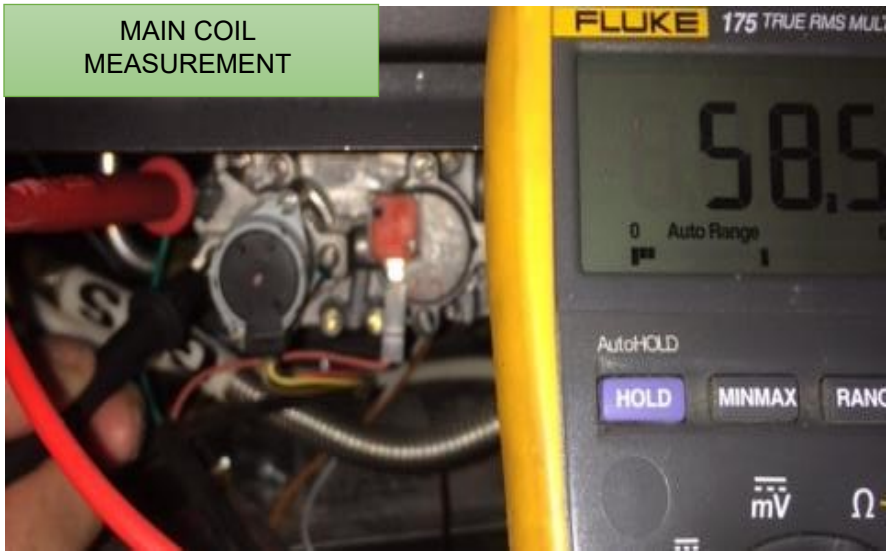
Valve Solenoid Resistance Checks

- Gas valve coil resistance is a fast and effective measurement of the valve function.
- Pilot solenoid resistance range 38 - 42 Ohms
- Main solenoid resistance range 58 – 62 ohms
- If solenoid measures outside of range, or is open, replace the gas valve.
- If solenoid resistance is normal, then the valve should not be suspected as direct cause of problem.

PILOT COIL MEASUREMENT

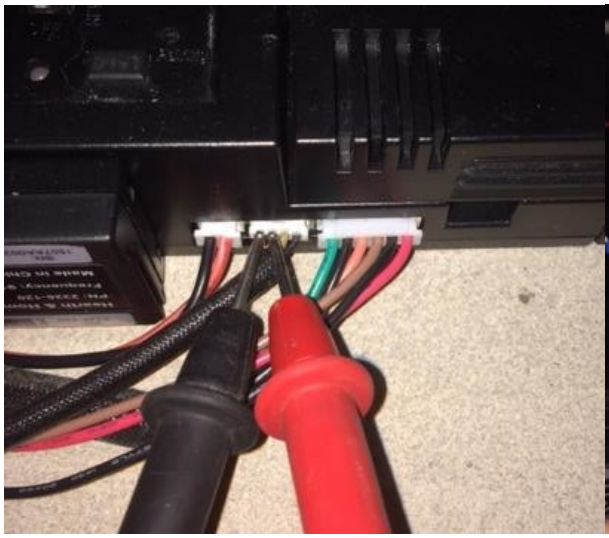


MAIN COIL MEASUREMENT



Valve Stepper Motor Resistance Checks

- Stepper Motor is not serviceable. Must replace the regulator assembly.
- Stepper Motor requires 5 VDC to energize, so it can malfunction during system operation when powered during emergency battery backup. As batteries deplete to < 5 V, the ability to energize the Stepper Motor is compromised.
- The Stepper Motor coil resistance is a fast and effective measurement to determine if the valve is malfunctioning. Decision to replace valve should be based on motor resistance measurements. It is highly unlikely that the ECM is the source of a suspected valve stepper motor issue.
- Stepper Motor is bi-directional, with two coils, as measured across RED and YELLOW wire pair, and BLACK and BROWN wire pair. Access wires on back of 4-pin connector as connected to the ECM. Each pair should exhibit resistance of 4.5 to 5.5 ohms. If out of range, or open, replace the Stepper Motor Regulator assembly.



AC/DC Adapter Troubleshooting

Symptoms	Possible Cause	Corrective Action
Pilot won't light, there is no noise or spark. IFT-ECM abnormal or no function when switched to 'ON' or 'REMOTE' mode.	No 110-120 VAC power to appliance AC/DC adaptor faulty	Verify AC power available to junction box. Verify that AC/DC adapter is plugged into the correct receptacle at junction box. Verify AC/DC adaptor is plugged into ECM. Verify AC/DC adaptor output voltage is between 5.7-6.3 VDC. If voltage is less than 5.5 VDC, or is unstable, then the device is faulty and should be replaced.

AC/DC Adapter Voltage Verification

- Set multimeter to Volts DC (VDC).
- Measure output voltage (VDC) of the AC/DC Adapter at the jack plug.
- Verify the output voltage is stable and between 5.7 and 6.3 VDC

Pilot Ignition Troubleshooting

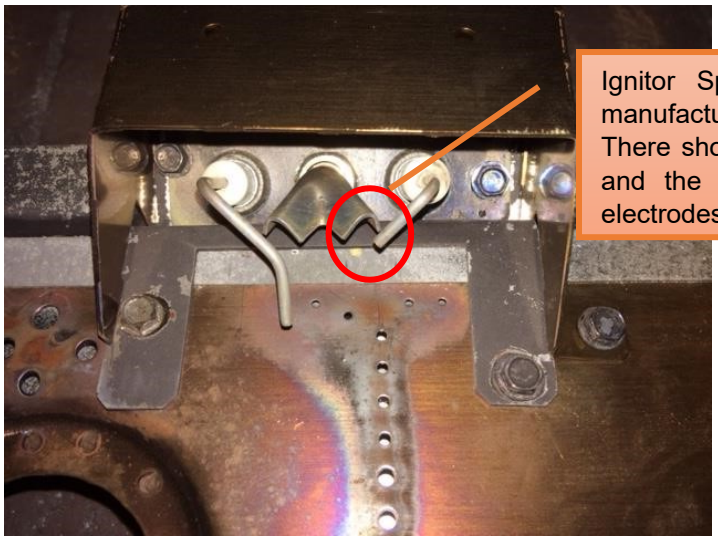
Symptom	Possible Cause	Corrective Action
Pilot won't light, module clicks but no spark, 3 Red/1 Green Lock out.	Incorrect wiring.	Verify 'S' (White) sense wire and 'I' (orange) ignitor wire are connected to correct terminals on IFT-ECM.
	Loose connections or electrical shorts in wiring.	Verify no loose connections or electrical shorts in wiring from module to pilot assembly. Verify secure connection between orange 'I' lead and the ECM. Verify wire insulation is not damaged. Verify wires are not grounding out to chassis, pilot burner, or any other metal object. Replace any damaged wires.
	Ignitor gap is too large.	Verify spark gap is approximately 0.095" (2.41 mm) to 0.135" (3.43 mm).
Pilot won't light, there is no noise or spark.	No AC power, AC/DC adaptor faulty, backup batteries (if being used) depleted, IFT-ECM slider switch in OFF position.	Verify IFT-ECM slider switch is in ON or IFT-REM position. Verify AC power available to junction box. Verify AC/DC adaptor is plugged into junction box and ECM. Verify AC/DC adaptor output voltage is between 5.7-6.3 DC. If battery pack is used, check battery pack voltage is >4.2 V (if not, replace batteries).
	Shorted or loose connection in system wiring or wiring harness.	Verify system wiring configuration. Remove and reinstall wiring harness that plugs into module. Check continuity of wires in valve wiring harness. Replace any damaged components.
	Poor or no system ground.	Verify black ground wire in valve harness is connected to metal chassis of fireplace.
Pilot won't light, there is no noise or spark, 2 Red/1 Green Lockout.	Pilot solenoid not detected.	Check if valve harness orange wire is connected to pilot solenoid valve. Check pilot solenoid resistance, nominal is 40 ohms. If open or shorted, replace valve. Check valve harness wire continuity, if open replace 6-pin harness.
Pilot won't light, there is no noise or spark, 2 Red/2 Green Lockout.	Spark coil failure.	Replace ECM.

IFT Ignition Spark Sequence

The IFT-ECM has either a 60 or 90 second trial for pilot ignition/rectification, depending on the module version level. During pilot ignition and then flame rectification, the module will generate spark discharge at the IPI Pilot Assembly. The IFT-ECM produces semi-continuous spark discharge, *with a two second pause every eight seconds*. In other words, the IFT-ECM is designed to generate spark at the pilot for eight seconds, followed by a two second pause, followed by another ten second cycle.

8 seconds SPARKING – 2 seconds NO SPARK – *repeated for up to 90 seconds*

This sequence is normal – do not change the module.



Ignitor Spark Gap is set during manufacturing at 0.1 to 0.13 inch. There should be no need to adjust, and the spark and flame sensor electrodes are not adjustable.

Power Source Effect on Spark Discharge

The power source to the IFT-ECM affects the ignition sparking characteristics. If “weak” or “slow” spark occurs, verify that the power source is 6+/-0.3 VDC. Reduced voltage, primarily when operating on battery backup, will cause the less spark energy intensity at the pilot. If operating on batteries, replace with new AA cells, and verify performance with full battery voltage.

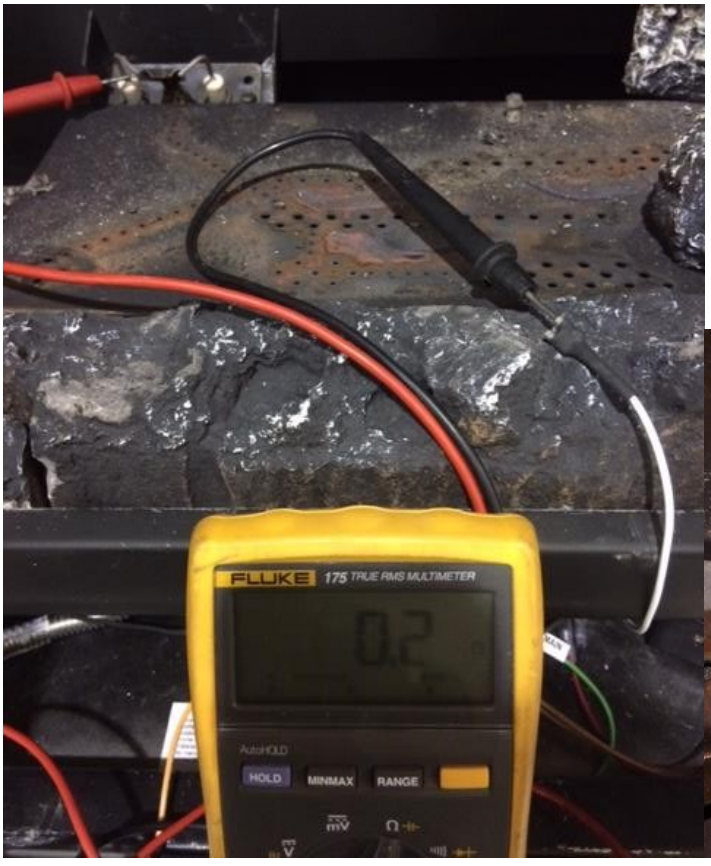
Pilot Flame Sense Rectification Troubleshooting

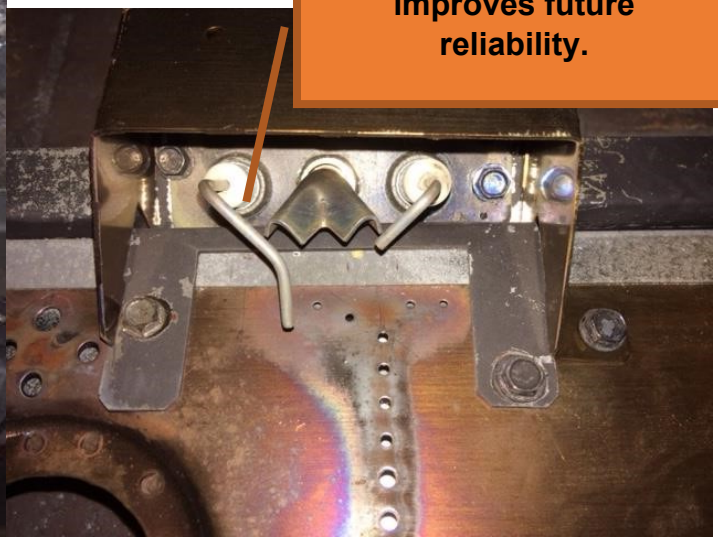
ECM LED Error Codes	Description	
3 Red: 1 Green	IFT-RC400 error message: 'Appliance Safely Disabled', pilot sparks, no either no ignition or flame rectification.	
Pilot sparking, but will not light, 3 Red/1 Green Lockout.	No gas supply.	Verify incoming gas line ball valve is 'Open'. Verify inlet pressure is within requirement for gas type used. Contact gas supplier.
	ECM has poor ground.	Verify wiring, check valve harness black wire is securely grounded to metal chassis.
	Gas valve defective.	Check pilot valve solenoid kick and hold voltages during ignition cycle. Kick V should be >1 V, hold V minimum 0.26 V. If voltages are OK, replace gas valve.
Pilot lights but main burner does not light. Pilot continues to spark for then goes into 3 Red/1 Green Lockout.	No flame detected. Flame rectification issue.	Check if white sense lead is securely connected to 'S' terminal of IFT-ECM. Check resistance of sense lead between sense rod tip and connector to IFT-ECM, should be less than 1 ohm - if not, replace pilot assembly. Check system ground, ensure black valve harness wire is securely attached to metal chassis. Check wiring for damage. With system OFF, check resistance between tip of sense rod and pilot hood, should be resistance (>1 M-ohm).
	No flame detected or sense rod contamination.	With glass assembly installed, verify pilot flame is engulfing flame sense rod on pilot assembly. Verify inlet gas pressure is correct for gas type. Polish flame sense rod with fine steel wool to remove any contaminants that may have accumulated.
Pilot lights and rectifies, but main burner does not light.	Main valve solenoid.	Check if green wire in valve harness is connected to green main valve solenoid. Check main valve solenoid resistance, nominal is 60 ohms. If open or shorted, replace valve. Verify valve inlet pressure is correct for gas type.
Pilot and main do not light, ECM goes into 5 Red/1 Green Lockout.	Power Vent (PV) Failure.	Power Vent blower defective - check wiring to IFT-ACM, check if blower is working. Check if PV pressure switch is connected to brown and black wire in 6-pin valve wire harness. Check if pressure switch is closed (shorted) when PV blower is running. Refer to PV troubleshooting instructions.
Appliance lights and runs for a few minutes then shuts down and/or appliance cycle ON and OFF with less than 90 sec of ON time.	Shorted or loose connection in flame detection circuit.	Check if white sense lead is securely connected to 'S' terminal of IFT-ECM. Check resistance of sense lead between sense rod tip and connector to IFT-ECM, should be less than 1 ohm - if not, replace pilot assembly. Check system ground, ensure black valve harness wire is securely attached to metal chassis. Check wiring for damage. With system OFF, check resistance between tip of sense rod and pilot hood, should be resistance (>1 M-ohm).

	Poor flame rectification or contaminated sense rod.	With glass assembly installed, verify pilot flame is engulfing flame sense rod on pilot assembly. Verify inlet gas pressure is correct for gas type. Polish flame sense rod with 200 grit emery cloth and/or Scotchbrite™ pad to remove any contaminants that may have accumulated. Verify no soot deposits are in sense rod to pilot hood gap.
	Logs are set up wrong.	Remove and re-install logs per the log placement instructions.
	Damaged pilot assembly.	Verify the pilot assembly ceramic insulator around the flame sensing rod is not cracked, damaged or loose. Check resistance between tip of sense rod and IFT-ECM connector, should be less than 1 ohm. Replace pilot assembly if damage is detected.

IPI Pilot Flame Sensor Resistance Checks

- Sensor wire resistance is a fast and effective measurement of the pilot function.
- Normal resistance, at room temperature, is < 1 Ohm. With this measurement, it is unlikely that the IPI Pilot is the direct cause of delayed flame rectification.
- High resistance of > 1 Ohm may affect the rectification sensing rate of the pilot flame. If the sensing rate is slow, and resistance is > 1 Ohm, clean and polish the sensor electrode with 200 grit emery cloth of Scotchbrite™ pad. If this does not improve the sensing rate and lower resistance, then it is likely that changing the pilot will improve reliability.
- Verify that the pilot has not been painted. Never paint the pilot. If re-painting a firebox during service, always cover the pilot to protect it from paint contamination.





Clean and polish the flame sensor with 200 grit emery cloth and/or Scotchbrite™ pad during service events. This removes oxidation and improves future reliability.

IPI Pilot Flame Sensing Troubleshooting Flowchart