TRAVIS INDUSTRIES

HOUSE OF FIRE

GreenSmart™ 1 and GreenSmart™ 2

Troubleshooting

February 2021 Training

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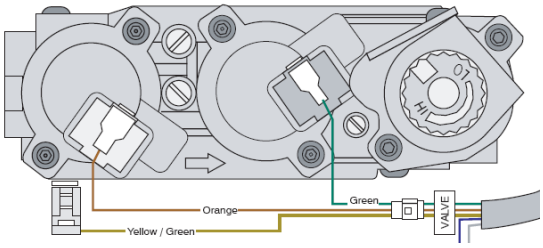
Quick Start Information

- If the issue is pilot ignition or flame rectification, check the pilot assembly first. The appliance should have a PSE pilot assembly. This assembly will improve pilot ignition and flame rectification.

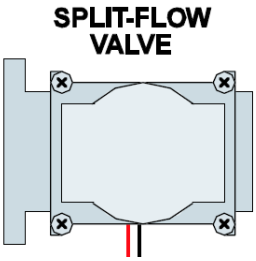
- Next, identify the version of IFC before you begin troubleshooting. The IFC will be marked with a silver numeral on both ends. An updated IFC will provide the necessary power for the spark electrode and flame sensor.
    - Base IFC's (shown on left) should be a number **4** or higher
    - Remote IFC's (shown on right) should be a number **5** or higher

Gas Control Valve – (250-01422)



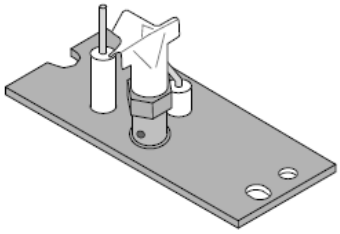
- Used on all GreenSmart appliances
- Allows for gas to become present at pilot and burner
- Pilot adjustment screw
- Pressure taps (incoming and outgoing)
- Electrical spades for voltage testing (orange, green)
- Manual High/Low regulator for pressure adjustments
    - *Note: Some inserts, deluxe fireplaces, and HO units come standard with NG stepper motor. Please refer to manual for details.*

Split Flow (Comfort Control) Valve – (250-01423)



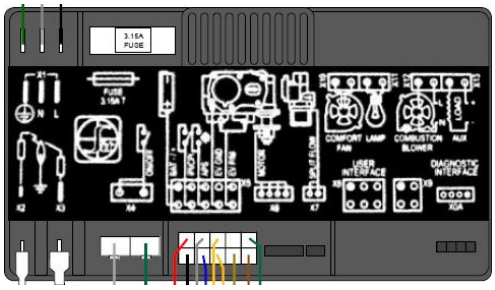
- Used on all GreenSmart appliances (*except 616 DF*)
- Allows on/off control of a portion of the burner
- In a base system, batteries needed to function

Pilot Assembly



- Used on all GreenSmart appliances
- PSE Pilot Assembly
    - 2-way assembly (250-02761)
    - 3-way assembly (250-02762) *DVL, 33 DVI 864 HO & Cypress only*
    - 3-way assembly (250-02793) *616 and 616 DF only*
    - Spark Rod (250-02777)

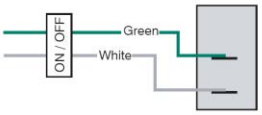
Base Integrated Fireplace Control (IFC) (250-02664)

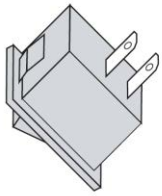


- Central processor (brain) for all base GreenSmart appliances
- Provides the spark and monitoring of the pilot
- Controls operation of the gas valve
- Contains red led light for diagnostics
- Protected by 3.15 amp fuse

Main Burner Switch – (250-02013)

- Used to turn main burner ON/OFF
- Switch has 2 male spades, use one top and one bottom as illustrated
- Used only in base systems
- Discarded when unit is upgraded to GS remote

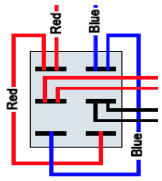


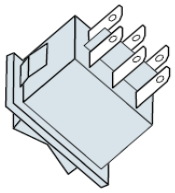


Main Burner

Comfort Control Switch – (250-01569)

- Opens and closes the split flow (comfort control) valve for rear or outside burner functions
- Used only in base systems
- Discarded when unit is upgraded to GS remote

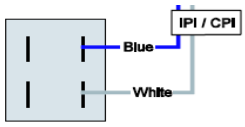




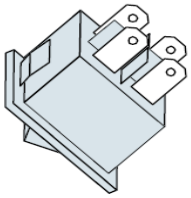
COMFORT CONTROL

IPI/CPI Switch – (250-01578)

- Switches between standing pilot and continuous pilot
- Used on base GreenSmart systems
- Discard when unit is upgraded

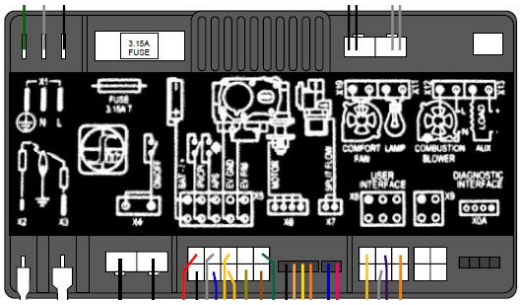


CONTINUOUS PILOT



GREENSMART PILOT

Remote Integrated Fireplace Control (IFC) (250-02662)



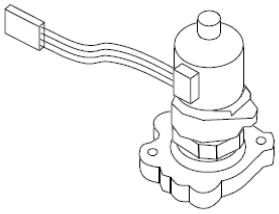
- Incoming Power connected to board
- Receiver built in
- Accent lights and Blower control
- Stepper Motor and Comfort Control connect to board
- Protected by 3.15 amp fuse

Wall Mounted Remote (250-03262)

- Sends signal to receiver
- On/Off button
- Thermostat button
- Up and Down arrow key
- Mode button
- IPI/CPI activation
- Blower and Light modulation
- Amber Back Light
- Used in upgraded GreenSmart remote units
- 3 AAA batteries

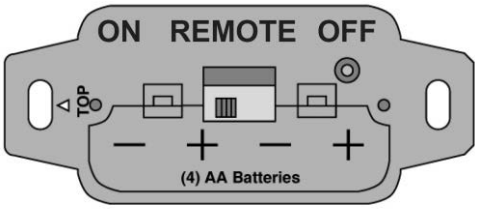
Stepper motor

Stepper Motor



- **Natural Gas (NG) – (250-01566)**
- **Natural Gas (NG) – (250-03263)**
  - *Used only on single burner units: 3615, 4415, 6015, 564DF, and 616DF*
- **Liquid Propane (LP) – (250-01463)**
- Used in GS remote upgrade kit
- Electronically modulates burner up and down
- Works in conjunction with remote transmitter
  - *Note: Some inserts, deluxe fireplaces, and HO units come standard with NG stepper motor. Please refer to manual for details.*

Battery Holder (250-02663)



Battery Box

- Battery Back up
- 4 AA batteries
- On/Off/Remote switch
- Operates burner when no remote
- “PRG” button for programming the remote

SIT GSR2 Remote Programming

Overview

The SIT GSR2 remote may be programmed to disable the thermostat or any of the modes (flame height, blower, light, comfort control, Standing Pilot *, or auxiliary power input). This allows you to tailor the remote to the appliance.

* We do not recommend disabling the standing pilot option for our gas appliances. This feature may be recommended for cold regions or installations with sub-optimal venting.

Compatibility

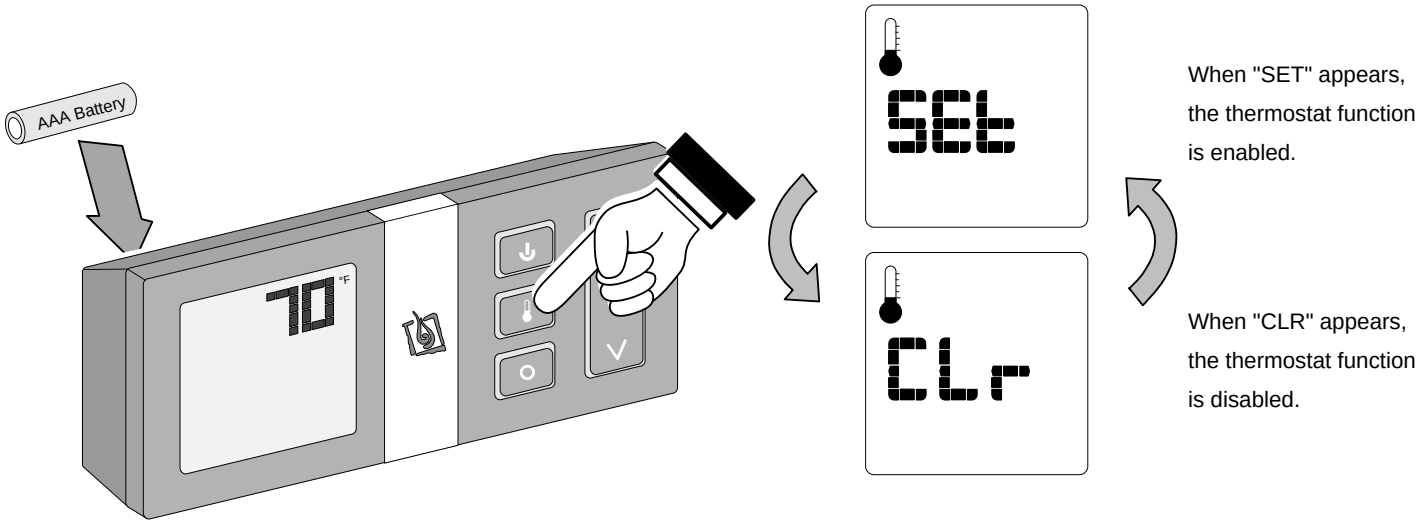
- GSR2 Appliances (1-Piece IFC controller with battery box)
- GSR1 Appliances (FCM Module and Receiver)
  NOTE: The accent light is controlled via the AUX mode (works as on/off only).

How to Turn the Thermostat Feature On and Off

NOTE: The remote is shipped from the factory with the thermostat enabled.

1 Remove one battery from the remote.

2 Press down on the thermostat button while replacing the battery. This will toggle the thermostat function. Repeat this process to toggle the thermostat function to the desired setting.

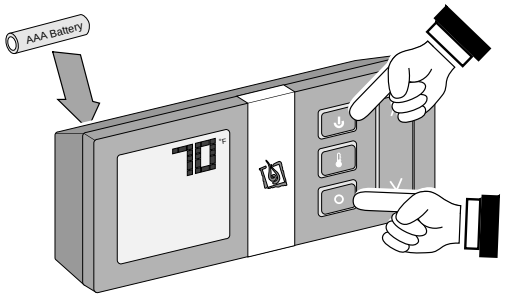


Disabling Modes From the Remote

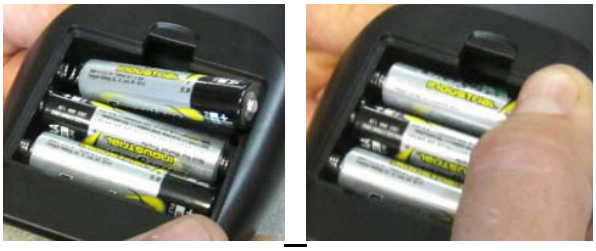
NOTE: The remote is shipped from the factory with all modes enabled except the auxiliary (AUX) function.

1 Remove one battery from the remote.

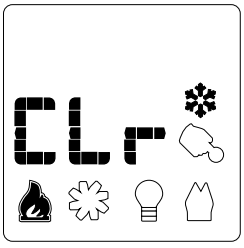
2 Press down on the on/off button and mode button while replacing the battery.
Make sure to keep the on/off button depressed during the following steps.

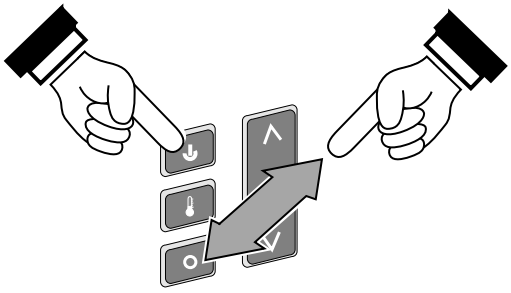


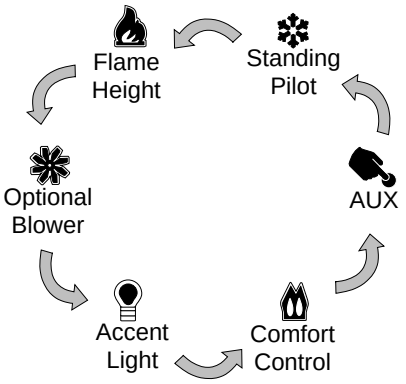
HINT: The easiest way to do this step is to place the top battery in the holder, slightly ajar. Then hold the the buttons down as you press the battery into place.



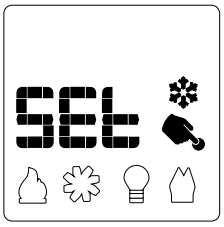
3 While keeping the on/off button depressed, press and release the mode button until the mode that needs to be changed is illuminated.

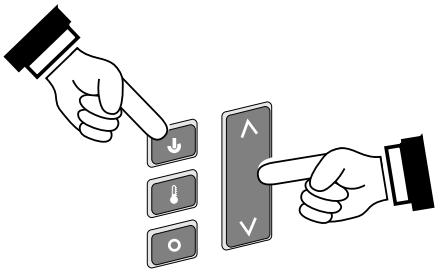






4 With the desired mode illuminated (the illustration below shows the AUX mode illuminated), press the “up” or “down” button to activate or clear the mode being addressed. Make sure to keep the on/off button depressed during this process.





Press the "up" button to activate ("SET") the mode selected.

Press the "down" button to clear ("CLR") the mode selected.

5 Release the on/off button to complete programming.

Tools needed:

1. Multimeter
2. Gas pressure gauge
3. Gas leak detector
4. Phillips screwdriver#2
5. Small flat blade screwdriver
6. 1/4" & 5/16" nut drivers
7. Needle nose pliers
8. Slip joint pliers
9. Outlet analyzer
10. 3/4" & 7/8" open end wrenches
11. #20 torque driver
12. Test cord for lights and fan (250-00316)

Recommended Parts List for GreenSmart2 service:

1. PSE Pilot Assembly (2-way 250-02761, 3-way 250-02762, and 616 – 3-way 250-02793))
2. Base IFC (250-02664), Remote IFC (250-02662)
3. Battery Holder (250-02663) and 4-AA batteries
4. Wall Mounted Remote (250-03262) and 3-AAA batteries
5. Switches
   - Main burner (250-02013)
   - Comfort Control (250-01569)
   - IPI/CPI (250-01578)
6. Regulator NG (250-01436) & LP (250-01427)
7. Stepper Motor NG (250-01566) & LP (250-01463)
8. Sit Gas Valve (250-01422)
9. Wiring harnesses
   - 250-02665 Main harness used on all GS2 units (except 430/616)
   - 250-02675 Main harness for 430/616
   - 250-02671 Short Power Supply harness used on DVS/31DVI, 616, and 21TRV
   - 250-02672 Long Power Supply harness used on all GS2 units except those noted above
   - 250-02668 Remote Upgrade harness used on all upgraded GS2 units
   - 250-02669 Fan/Light harness that plugs into IFC
10. 3 Amp fuses for lights and fan (250-03000 – 5 pack)
11. 3.15 Amp fuses for IFC (250-02798 – 5 pack)

TRAVIS INDUSTRIES
HOUSE OF FIRE

GAS FIRE-UP CHECK LIST

Date: _____

Customer: _____

Address: _____

Model & S/N: _____

Tech Name _____

Was gas line to home installed at time of fire-up? Yes No

Gas line installed by: _____

Termination	
Horizontal	**NG**
Vertical	**LP**

ACTIONS PERFORMED

_____ Touched up painted surfaces.

_____ Tack clothed the appliance thoroughly and vacuumed the valve & heat exchange area.

_____ Installed Firebacks properly.

_____ Installed interior Fire-Art properly (Logs, Driftwood, Stones).

_____ Installed ember material or crushed glass properly.

_____ Cleaned and remounted glass; checked gasket for complete seal.

_____ Removed all protective coatings and labels on glass and plated surfaces (where applicable).

_____ Verified LP conversion was done properly (if applicable).

_____ Took digital photos of installation, unit, and vent termination.

ACTIONS PERFORMED <u>IF GAS WAS TURNED ON</u>

_____ Lit and tested unit in both IPI and CPI modes.

_____ Checked wall switch, fan, and remote for proper operation.

_____ Checked for gas and exhaust leaks around the glass and around all gas connections.

_____ Adjusted intake and exhaust restrictors to maximize performance.

_____ Visually inspected termination cap for proper installation and obstructions.

_____ Confirmed termination cap is the required brand.

MEASUREMENTS

Pilot Sensor Continuity Tone Test Yes No

_____ Checked proper polarity and ground to the appliance.

_____ Volts: Voltage reading on household line to the appliance.

_____ DC Volts: Voltage reading on Module for IPI systems

Outgoing Gas Pressure (WCI) _____ High _____ Low

Incoming Gas Pressure (WCI): Test unit alone first.
Then progressively turn on other gas appliances in the home.

Appliance	Hearth	#1	#2	#3	#4	#5	#6
WCI							

List all Gas Burning Appliances:
(don't forget outside patio items!)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

CUSTOMER OPERATION & CARE INSTRUCTIONS

_____ Instructed customer on remote operation (handed customer Homeowner DVD to encourage viewing!)

_____ Explained to the customer when CPI mode is used.

_____ Explained to the customer when IPI/GreenSmart mode is used.

_____ Reviewed homeowner maintenance and battery replacement vs dealer service.

Continuous Pilot is recommended during Fall, Winter, and early Spring, or when the outside temperature drops below 40° F.
Benefits of **Continuous** Pilot (Winter Mode): continuous draft for smooth startup, eliminates cold glass, reduces glass stains.
Benefits of **Intermittent** Pilot (Summer Mode): no heat into home when fire's not in use, reduces fuel consumption.

GreenSmart2™ Troubleshooting

TRAVIS INDUSTRIES
HOUSE OF FIRE

PILOT IGNITION

Turn Main Burner Switch To ON, Wait 10-30 Seconds.

IS SPARK SEEN AT PILOT?

NO

1. Is the Intergrated Fireplace Control (IFC) in lockout - 3 RED FLASHES every few seconds. Turn off for 5 seconds and back on.
2. Does stove have a PSE pilot upgrade kit If not install kit.
3. Check spark rod. Is spark seen at the base? If so porcelain is cracked. Replace ignitor.
4. Check ignitor wire at IFC. Is spark seen there? If so check to make sure insulation tube is down all the way on the wire.
5. Check to see if batteries are in properly.
6. Check battery voltage at the battery molex. If voltage is below 4.8 replace the batteries. RED and Black Wires **(See Diagram B)**
7. Verify appliance is connected to grounded circuit properly (use outlet analyzer).
8. Check inline voltage and polarity. (See Diagram A)
   - Black to L
   - White to N
   - Green to ground unit.
   - Check Fuse (3.15 amp) on IFC
9. Check to see if the unit is grounded on IFC to base.
10. Check voltage to ON/OFF switches on Green and White wire. You should have 3+ volts DC with switch in the OFF position (BASE ONLY). If no, replace IFC.
11. Check ON/OFF switch for continuity. No continuity, replace switch (Base Only).
12. Check voltage to Continuous pilot switch. Blue and White wire should have 3+ volts DC with the switch in IPI position. On upgrade, unplug jumper to test. If no voltage, replace IFC.
13. Check continuity of continuous pilot switch. Continuity, switch is good, No Continuity, replace switch.

YES

DOES THE PILOT LIGHT?

NO

1. Verify main harness connection to IFC **(X5)**. **(See Diagram K)**
2. Check to see if igniter wire connected to IFC **(X2)**. **(See Diagram K)**
3. Check continuity of the pilot coil. Continuity within range = good value. No continuity or outside of range = bad value. Replace valve. **(See Diagram C)**
4. Check that the orange wire is connected to the pilot coil.
5. Check voltage at the pilot coil. Should be 5 volts DC for 1 sec. After 1 sec. voltage will drop to .9 volts. No voltage. Replace IFC. **(See Diagram D)**
6. Check incoming gas pressure. Is gas turned on? **(See Diagram H)**
7. Check continuity of ORANGE wire to ground - no continuity OK. If continuity replace wiring harness

YES

DOES PILOT BURN BUT IGNITOR CONTINUES TO SPARK?

YES

NOTE: IFC can continue to spark up to 60 seconds after pilot is lit. This can be normal as pilot establishes.

1. Is flame sensor being hit by pilot flame? If not, adjust pilot.
2. Is the flame sensor wire connected to the IFC and grounded? If not, connect it **(X3)**. **(See Diagram K)**
3. Check log placement.
4. Check continuity of flame sensor. See Page 14.

NO

SEE NEXT PAGE.

GreenSmart2™ Troubleshooting

TRAVIS INDUSTRIES
HOUSE OF FIRE

BURNER IGNITION

DOES THE PILOT FLAME ACT NORMAL?

NO →

1. Identify if the pilot activity is turbulance or starvation. Adjust Intake and Exhaust Restrictors as needed.
2. Does the pilot have the right orifice installed?

YES ↓

DOES THE BURNER COME ON?

NO →

1. Check that the green wire is connected to the gas valve main burner coil, if not, connect it.
2. Check to see if the IFC is grounded to the gas valve. If not, connect it.
3. Do continuity test of the main burner coil in the gas valve. Continuity within range = valve good. If no continuity or outside of range, replace the gas valve. **(See Diagram C)**
4. Check voltage to the main burner coil. It should be 5 volts DC for 1 sec. After 1 sec. voltage will drop to .9 volts. If no voltage replace IFC. **(See Diagram D)**
5. Check outgoing gas pressure. **(See Diagram H)**
6. Check continuity of GREEN wire to ground. No continuity good - if continuity replace wiring harness.

YES ↓

WILL THE REAR BURNER SHUT OFF (if applicable)

NO →

1. Check battery voltage.
2. Check continuity of split flow valve. If no continuity replace split flow valve.

YES ↓

DOES THE FLAME LOOK GOOD?

NO →

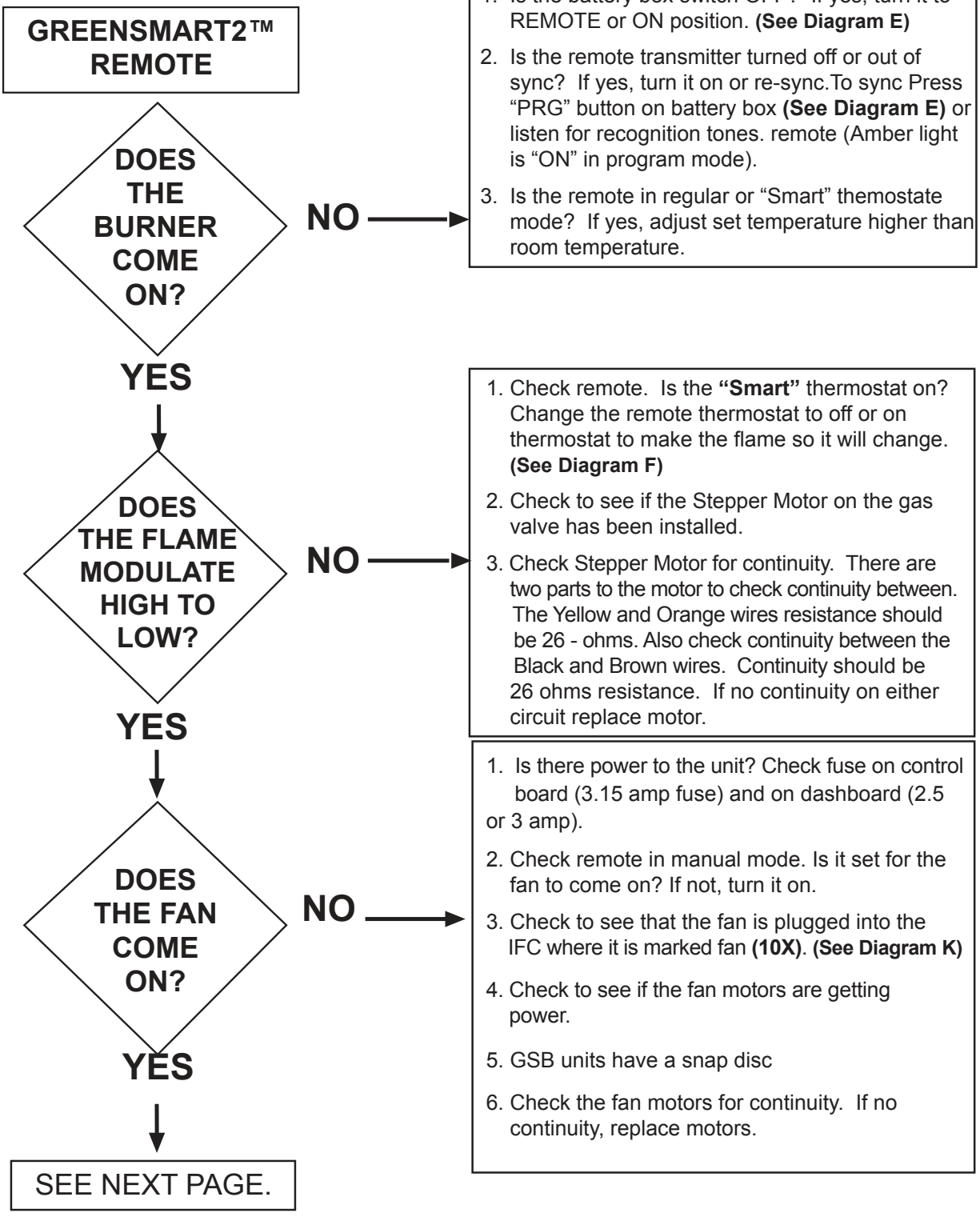
1. Flame is too blue = adjust the air shutter closed to make the flame more yellow.
2. Flame is orange and sooty = adjust the air shutter open to make the flame more yellow.
3. Sooty tall flame = was the unit converted to LP? Check if the orifices are correct and the regulator is the correct one.
4. Short blue flame = check the input gas pressure.

YES ↓

SYSTEM IS WORKING PROPERLY

GreenSmart2™ Troubleshooting

TRAVIS INDUSTRIES
HOUSE OF FIRE



GreenSmart2™ Troubleshooting

TRAVIS INDUSTRIES
HOUSE OF FIRE

GREENSMART2™ REMOTE (Cont.)

DO THE LIGHTS COME ON?

NO

1. Is there power to the unit?
2. Check fuse on control board (3.15 amp) and on dashboard (2.5 or 3 amp)
3. Check the remote. Is the light turned on?
4. Check that the light bulb is good.
5. Check the wiring to see if it is connected correctly.
6. Check continuity of light wires to ground to check for short.
7. Check light fixture (base).

YES

Does Back Burner Function Properly ON/OFF?

NO

1. Check to see if the unit has a split flow valve. If no split flow valve the back burner will not turn off.
2. Check the remote transmitter. Is it turned on?
3. Check battery voltage. If below 4.8 voltage, replace batteries.
4. Check that the wires to the split flow valve are connected.

YES

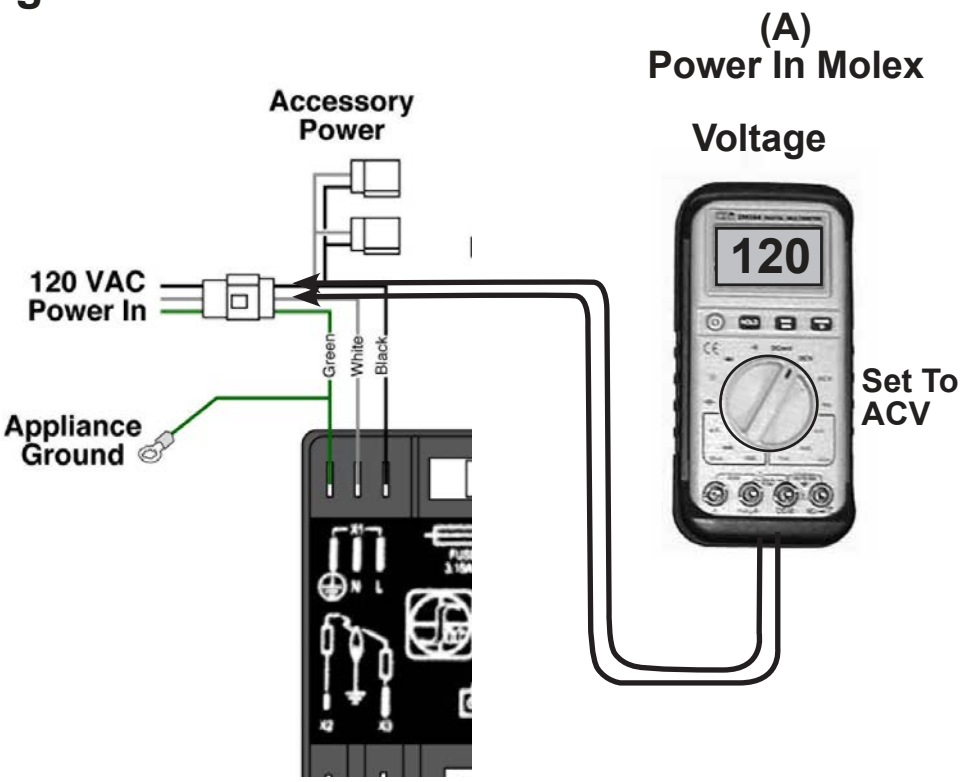
SYSTEM IS WORKING PROPERLY

1 Red Flash	The power backup batteries are dead	Replace the batteries
2 Red Flashes	The heater encountered a pilot error	Contact your dealer if this occurs.
3 Red Flashes	The heater encountered an error when trying to start	Make sure gas is turned on. Turn heater off for 5 seconds (make sure standing pilot is off) – then turn back on.
Amber Light	Ready to Sync Transmitter	

(1.) Voltage Testing

Power In Molex + Battery Molex

Diagram A



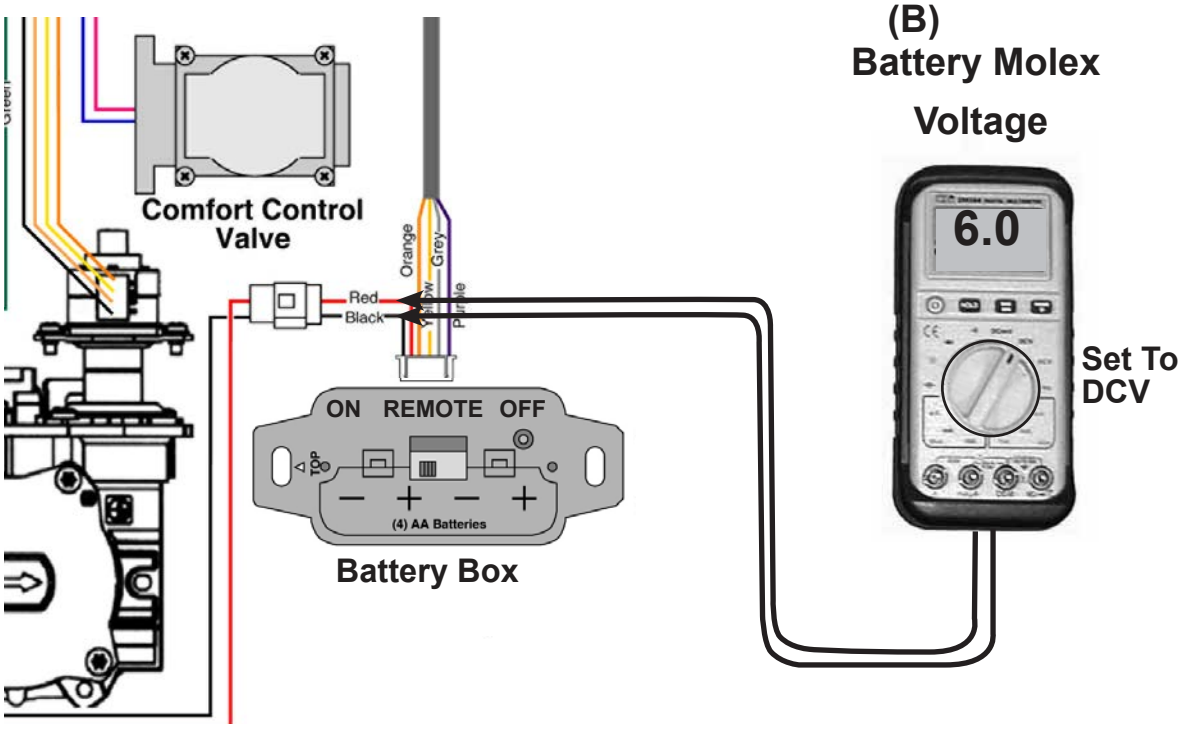


Diagram B

(2.) Continuity Testing Gas Valve

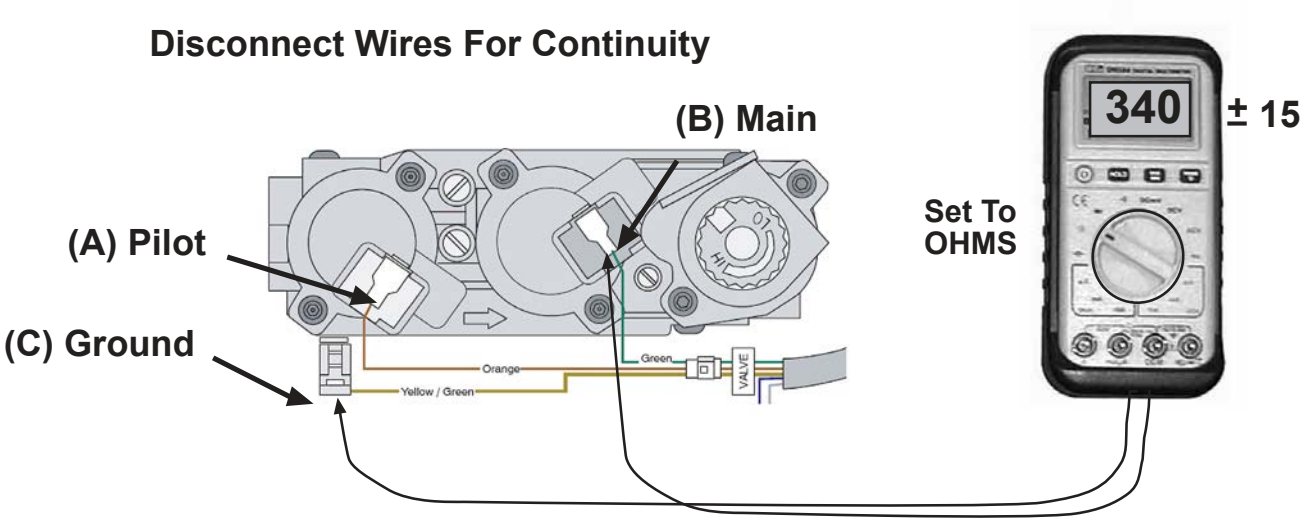


Diagram C

(3.) Voltage Testing Gas Valve

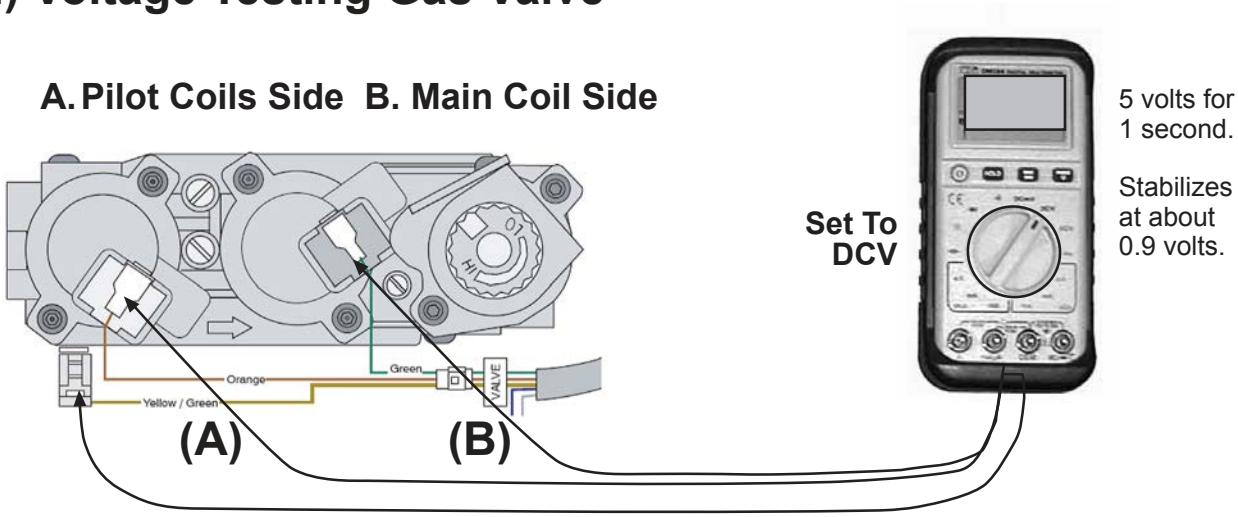
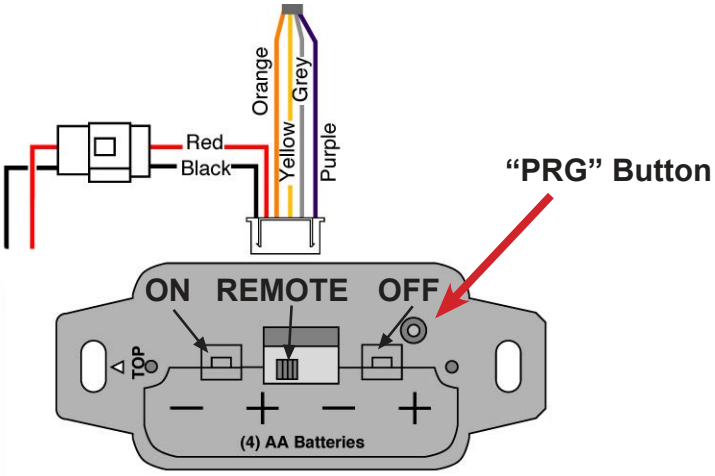


Diagram D

4. Battery Holder

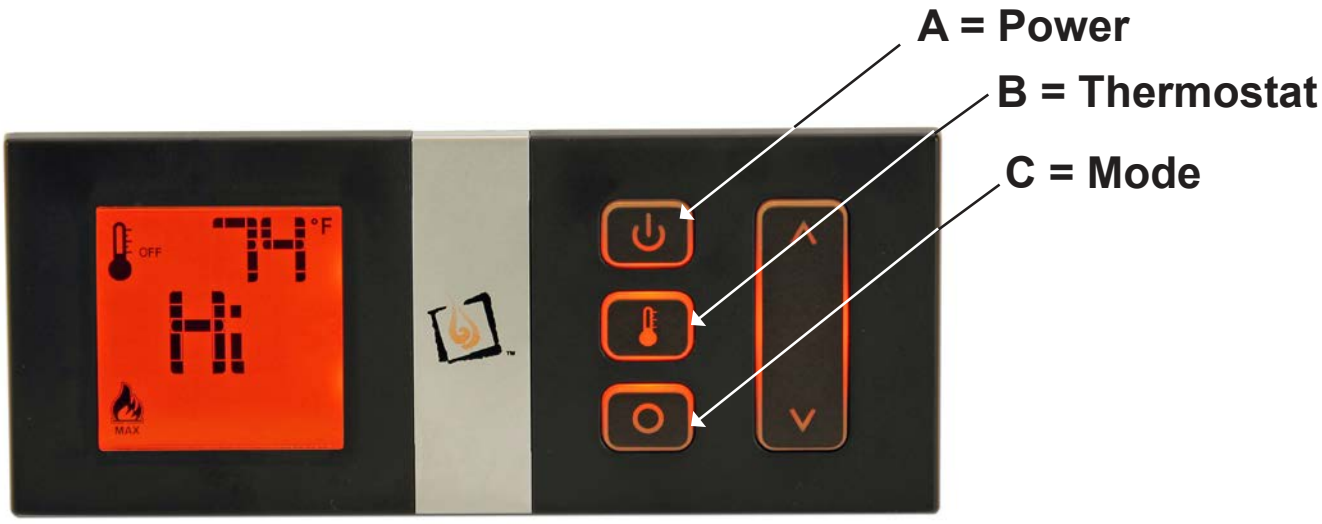
Diagram E



Battery Box (Manual On/Off)

5. Transmitter

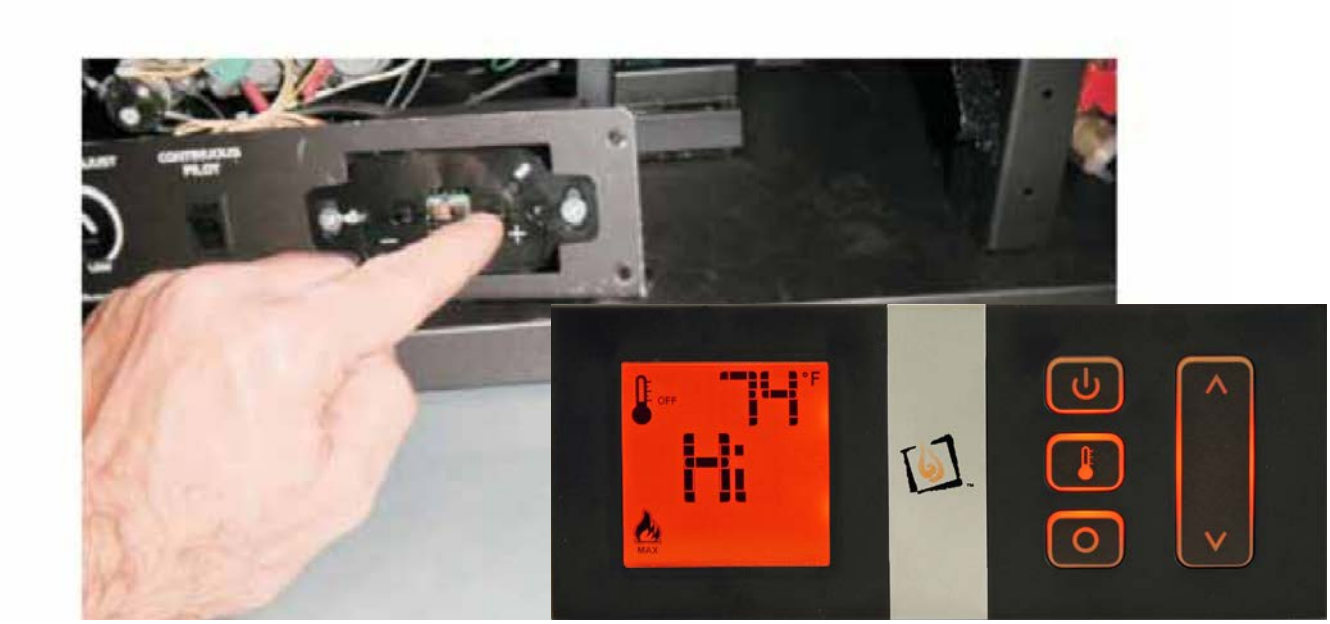
Diagram F



NEW Wall Mount GreenSmart 2™ Remote Thermostat

Programming Remote

Diagram G



Gas Pressure

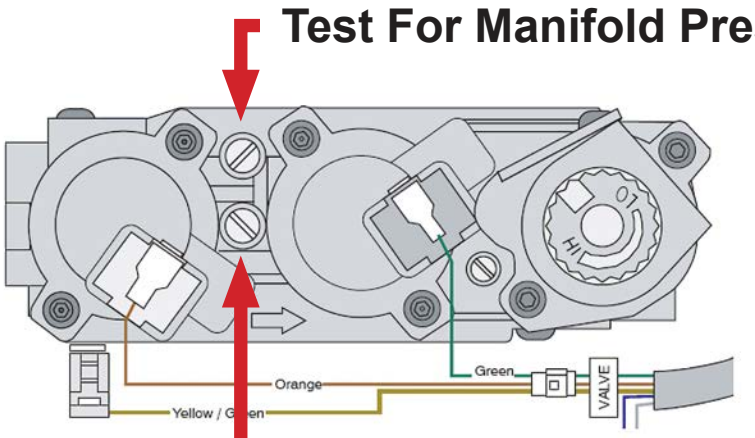


Diagram H

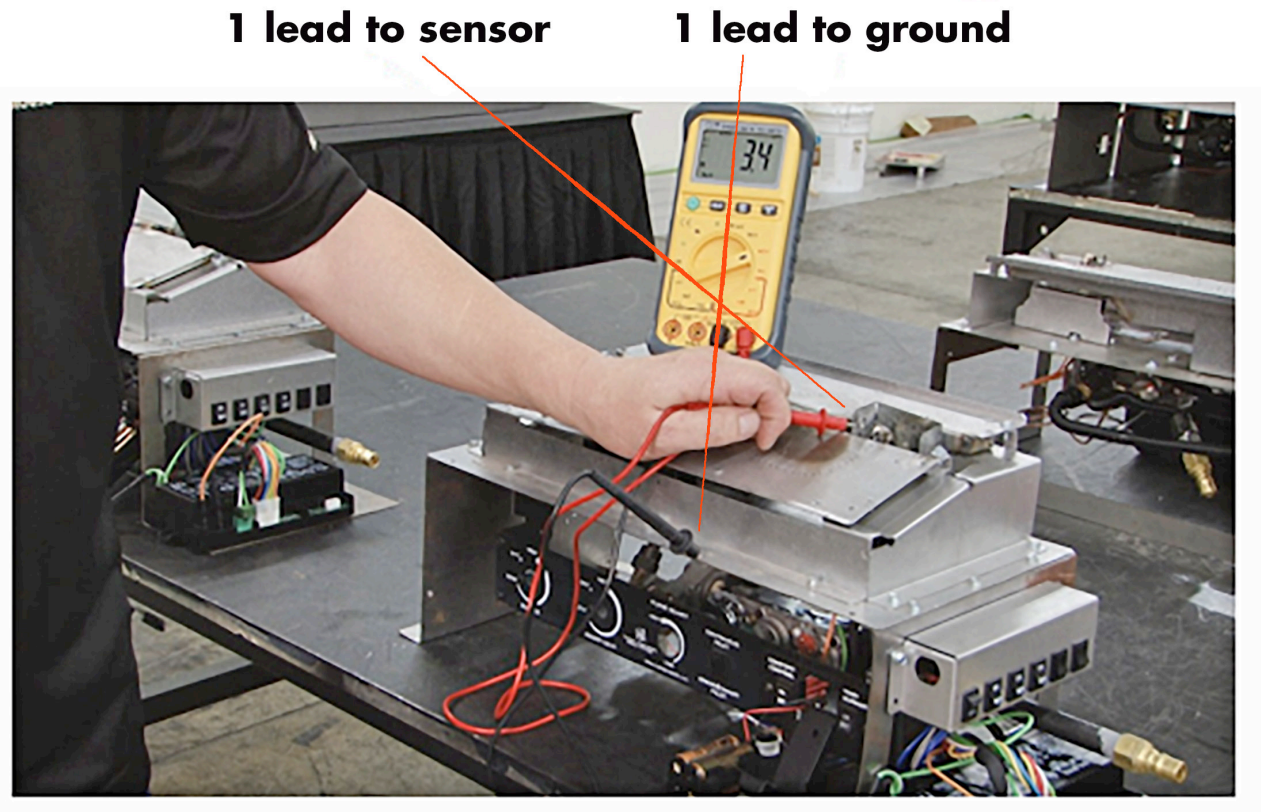
Testing the Pilot Sensor.

Turn gas off at shutoff valve.

Using the AC on your auto ranging multi-meter place one lead on the sensor and the other on ground. Turn the unit on. If the sensor has continuity you will get a reading of 50+ volts when sparking. If no voltage or nominal (single digit) then there is no continuity on the sensor.

With a PSE pilot if there is no continuity clean the sensor and pilot hood.

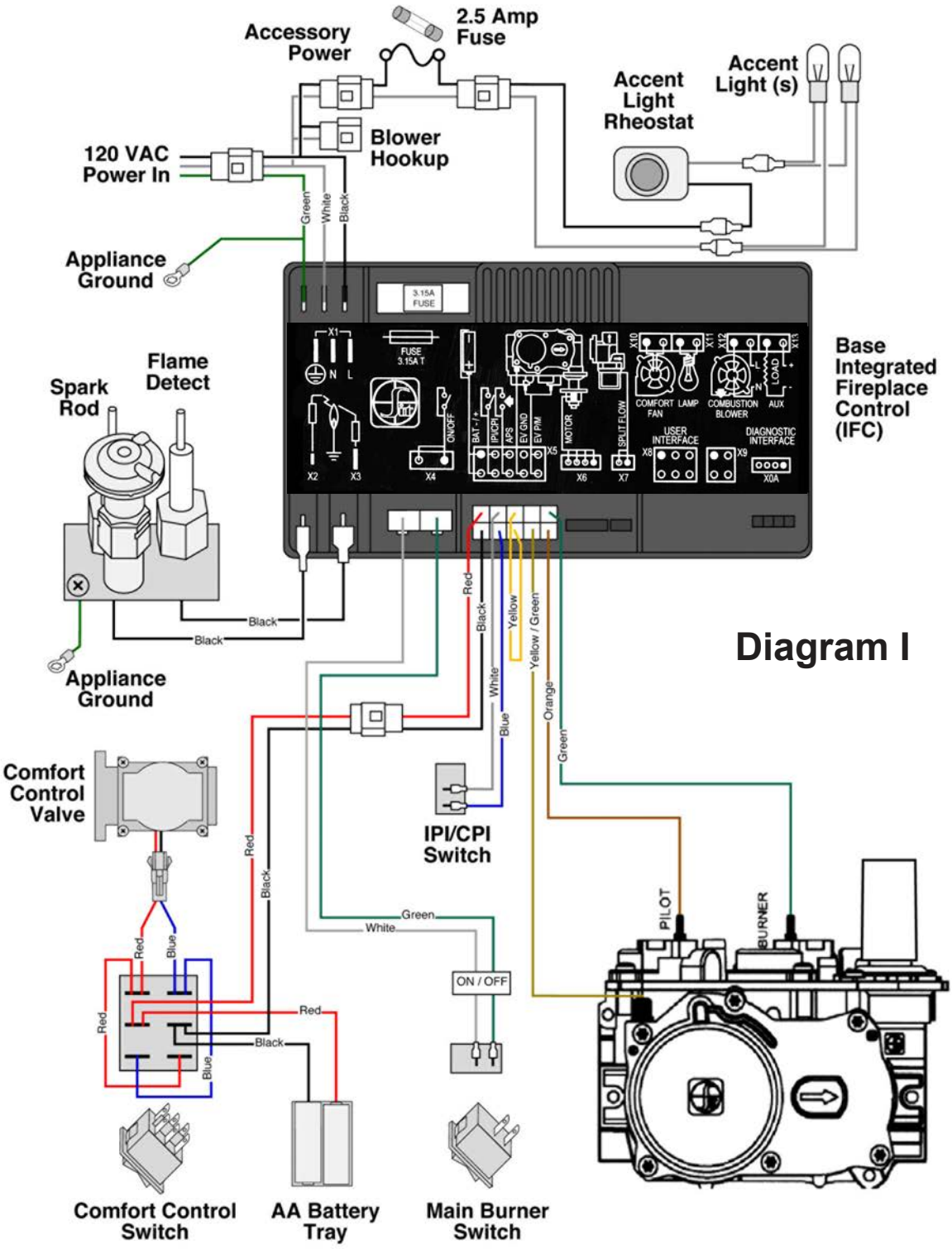
Recheck.



GreenSmart2™ Basic Wiring (No Remote)

Wiring Diagram

Caution: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.



GreenSmart2™ Remote Wiring

GS2 Remote Wiring Diagram

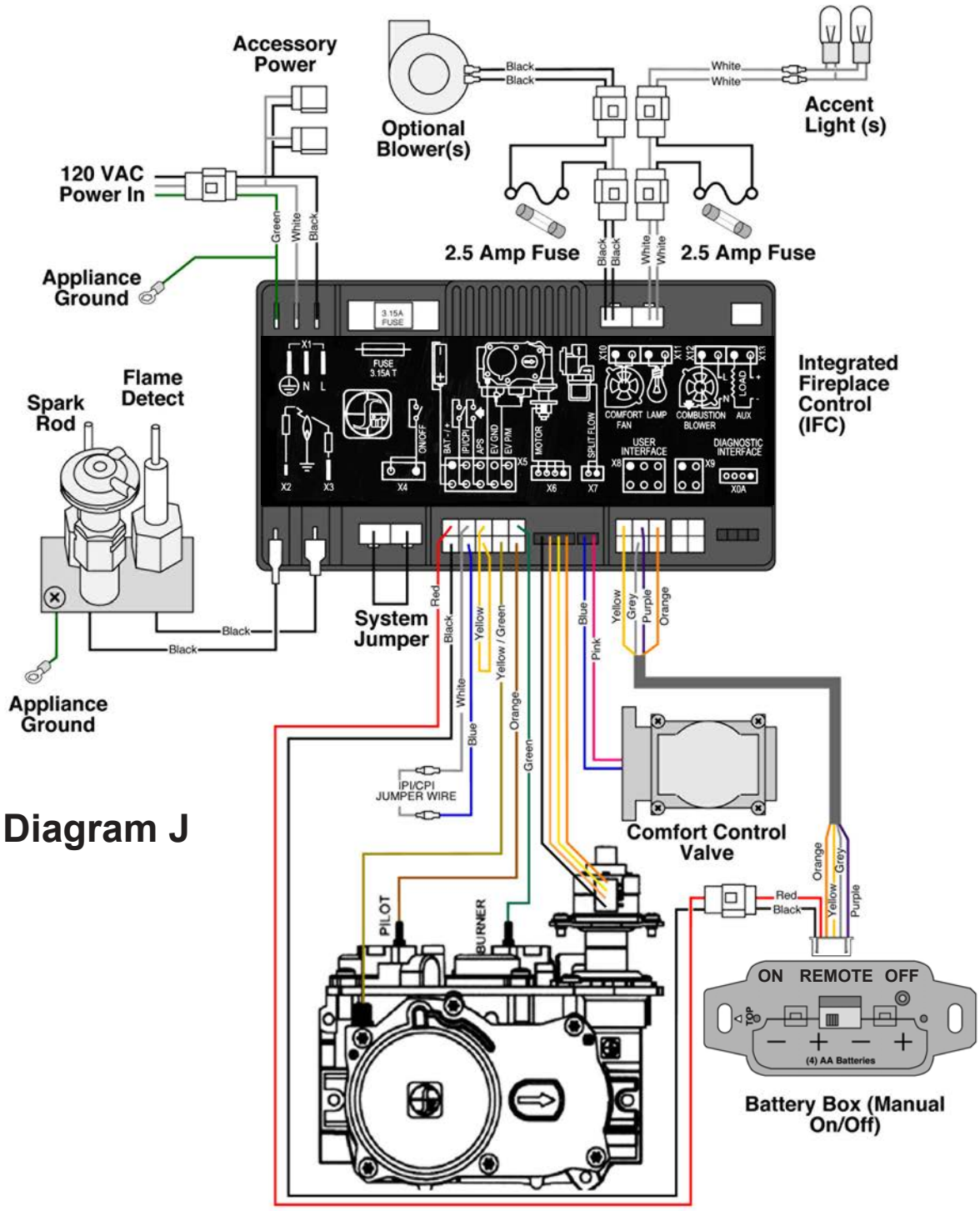
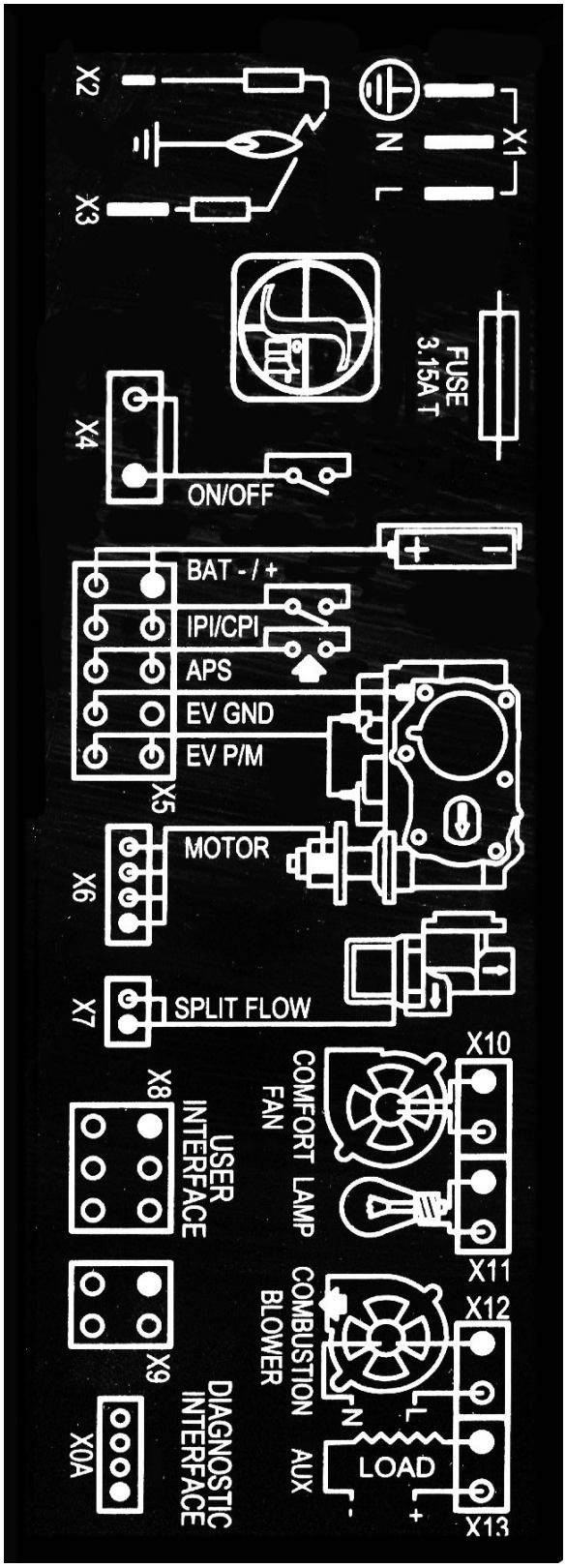


Diagram J

GreenSmart2™ IFC Guide

Diagram E



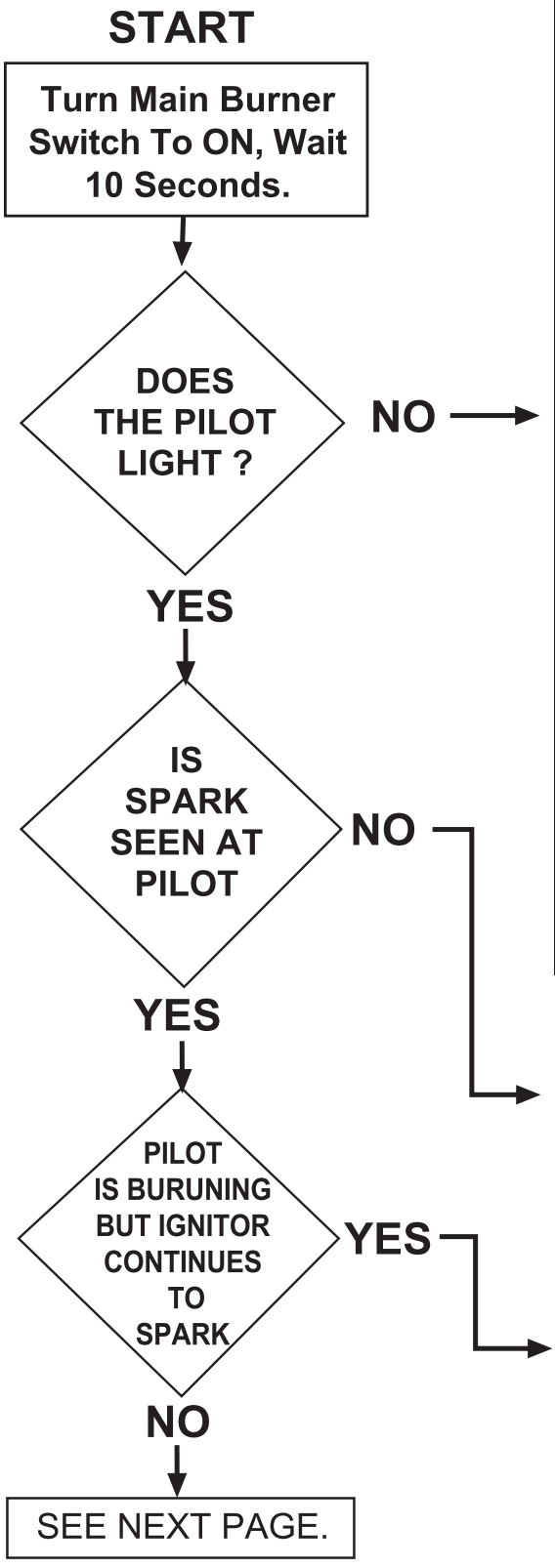
TRAVIS INDUSTRIES TRAINING

YOUR SUCCESS IS OUR BUSINESS

GreenSmart™ 1 Troubleshooting

Tips: Diagnosis By Symptom

SIT Electronic Ignition System

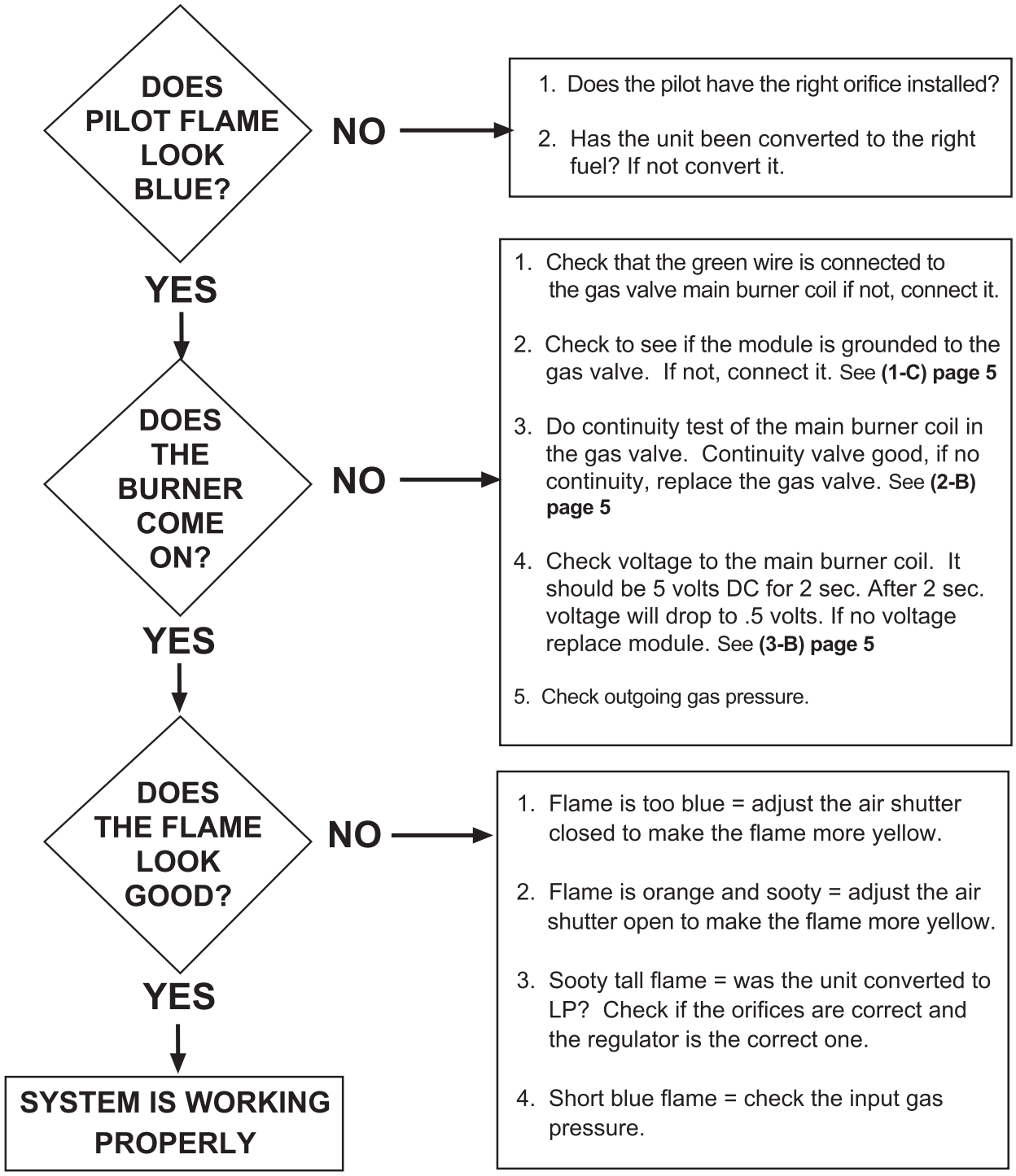


1. Check to see if batteries are in properly.
2. Check battery voltage CN1 #1 & #3. If voltage is below 4.4 replace batteries. See **(1-A) page 5 - ONLY ON BASIC SYSTEM**
3. Check AC adapter voltage CN1, #2 & #3. Voltage should be 7.3 to 6 volt. Unplug AC, this will show battery voltage on GSR system See **(1-B) page 5.**
4. Check to see if the unit is grounded CN 2 on module.
5. Check voltage to ON/OFF switches on Green wire. You should have 3 volts DC. If no, replace module.
6. Check ON/OFF switch for continuity. No continuity, replace switch.
7. Check voltage to Continuous pilot switch. Blue wire should have 3 volts DC. If no voltage, replace module.
8. Check continuity of continuous pilot switch. Continuity, switch is good, No Continuity, replace switch.
9. Check to see if igniter wire connected to ignition module CN 3.
10. Check continuity of the pilot coil. Continuity good, no continuity bad. Replace valve. See **(2-A) page 5**
11. Check that the orange wire is connected to the pilot coil.
12. Check voltage at the pilot coil. Should be 5 volts DC for 2 sec. After 2 sec. voltage will drop to .5 volts. No voltage. Replace module. **See (3-A) page 5**
13. Check incoming gas pressure.

1. Is the ignition Module in lockout - 3 Beeps every 2 seconds. Turn off and back on.
2. Check ignition. Is spark seen at the base? If so porcelian is cracked. Replace ignitor.
3. Check ignitor wire at ignition module. Is spark seen there? If so check to make sure insulation tube is down all the way on the wire.

1. Is flame sensor being hit by pilot flame? If not, adjust pilot.
2. Is the flame sensor wire connected to the module and grounded? If not, connect it.
3. Check log placement.
4. Check continuity of sensor. No continuity, replace sensor. If sensor had continuity, replace module.

SIT Electronic Ignition System



SIT Electronic Ignition System

GREENSMART™ REMOTE

DOES THE BURNER COME ON?

NO →

1. Is the remote receiver switch off? If yes, turn it to remote. See **(4) page 6**
2. Is the remote transmitter turned off? If yes, turn it on. Is the thermostat off? See **(5-A) page 6**
3. If the thermostat is on, is the set temperature lower than the room temperature. If so, set temperature higher to come on. See **(5-B) page 6**
4. Does it say Smart on? If yes, is the set temperature to low? If yes, raise set temperature to higher setting the than room temperature. See **(5-C) page 6**

YES ↓

DOES THE FLAME MODULATE HIGH TO LOW?

NO →

1. Check remote. Is the **"Smart"** thermostat on? Change the remote thermostat to off or on thermostat to make the flame so it will change. See **(5-B) page 6**
2. Check to see if the Modulating Motor on the gas valve has been installed.
3. Check Stepper Motor for continuity. There are two parts to the motor to check continuity between. The Yellow and Orange wires resistance should be 26 - ohms. Also check continuity between the Black and Brown wires. Continuity should be 26 - ohms resistance. If no continuity on either circuit replace motor.

YES ↓

DOES THE FAN COME ON?

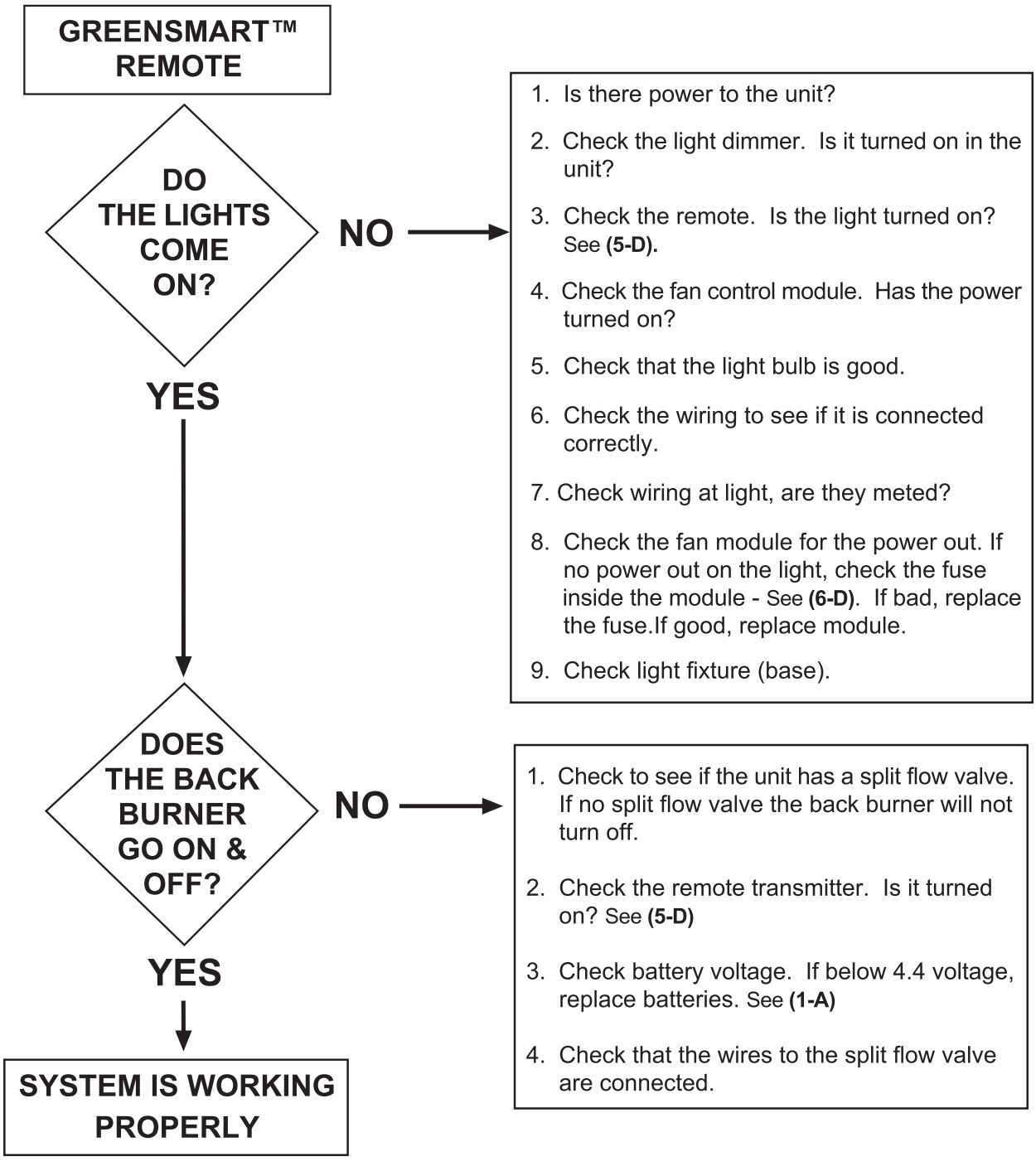
NO →

1. Is the unit hot? There is a snap disk that needs to heat up to turn the fan on.
2. Is there power to the unit?
3. Check fan control module. Is it turned on? See **(6-A) page 7**
4. Check remote. Is it set for the fan to come on? If not, turn it on. See **(5-D) page 6**
5. Check to see that the fan is plugged into the fan module where it is marked fan. See **(6-B) page 7**
6. Check fan snap disk when hot. It should have continuity. If no continuity, replace disk.
7. Check to see if the fan motors are getting power. If no power, check fan module for power out - See **(6-C) page 7**. If no power out, check fuse inside module. If bad, replace fuse.
8. Check to see if the fan rheostat been by-passed.
9. Check the fan motors for continuity. If no continuity, replace motors.

YES ↓

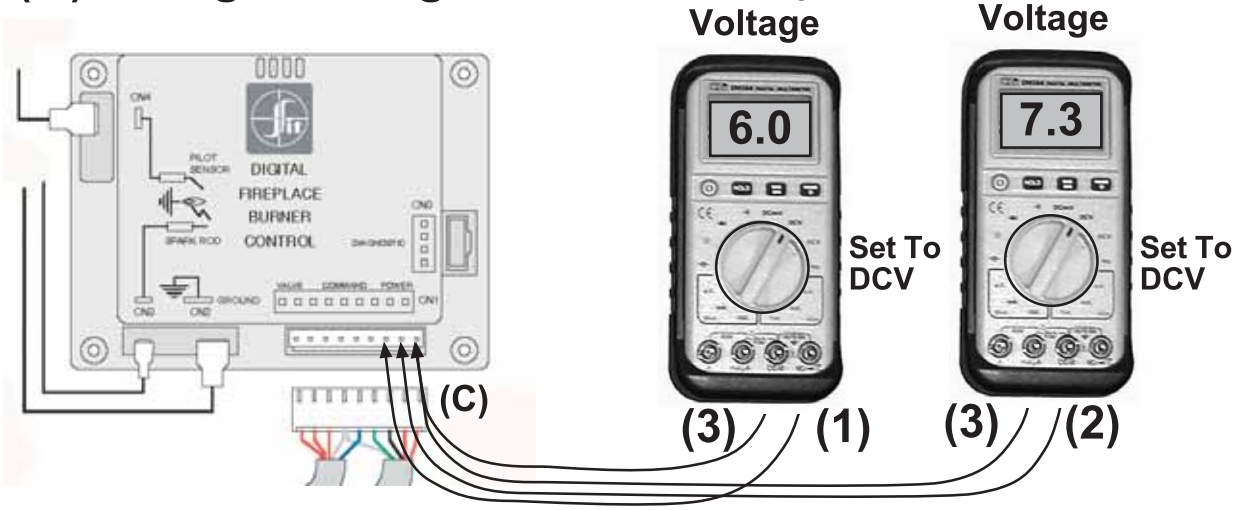
SEE NEXT PAGE.

SIT Electronic Ignition System

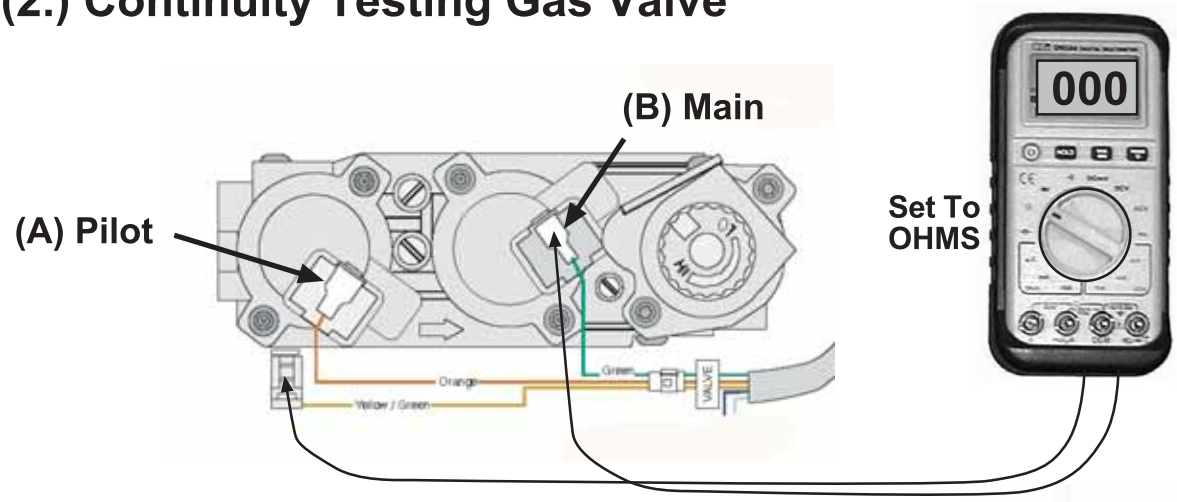


SIT Electronic Ignition System

(1.) Voltage Testing

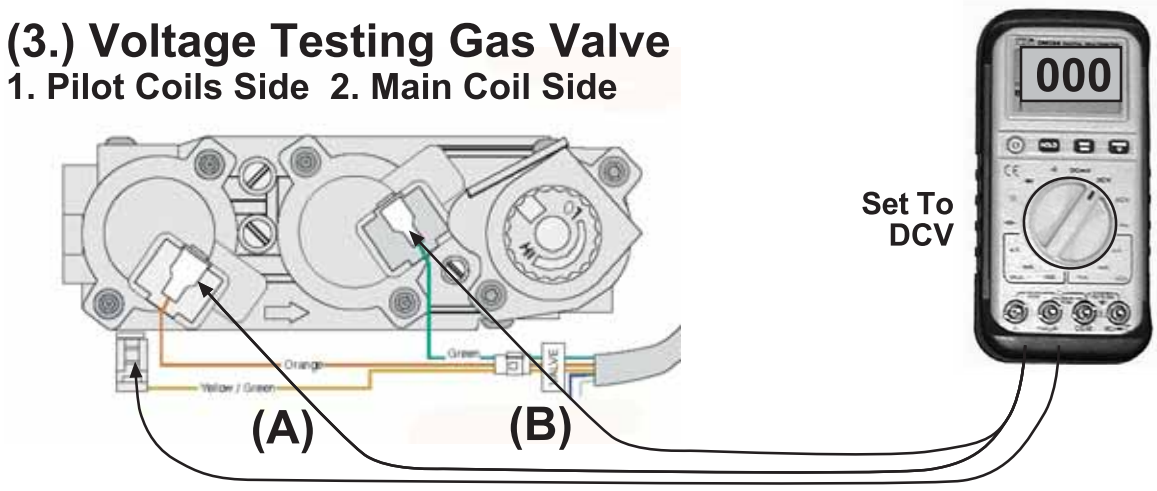


(2.) Continuity Testing Gas Valve



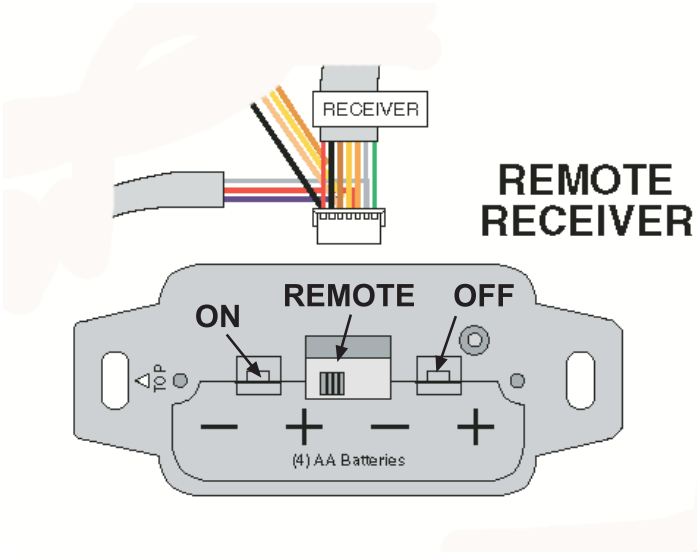
(3.) Voltage Testing Gas Valve

1. Pilot Coils Side 2. Main Coil Side

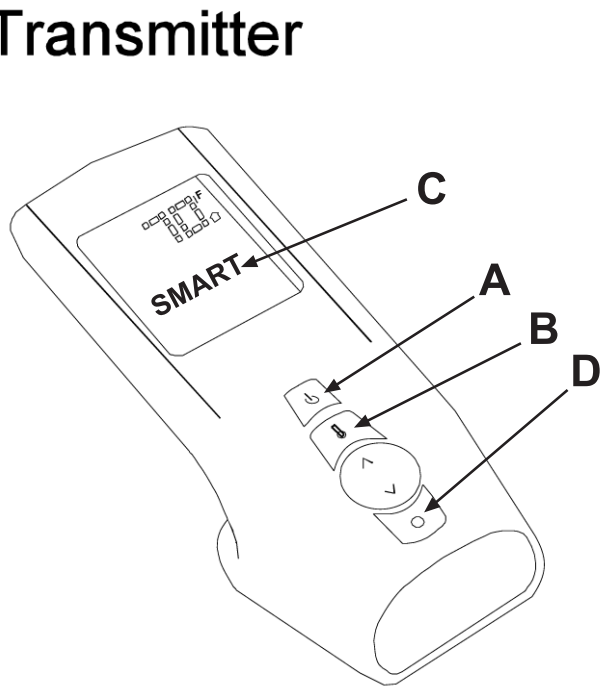


SIT Electronic Ignition System

4. Receiver

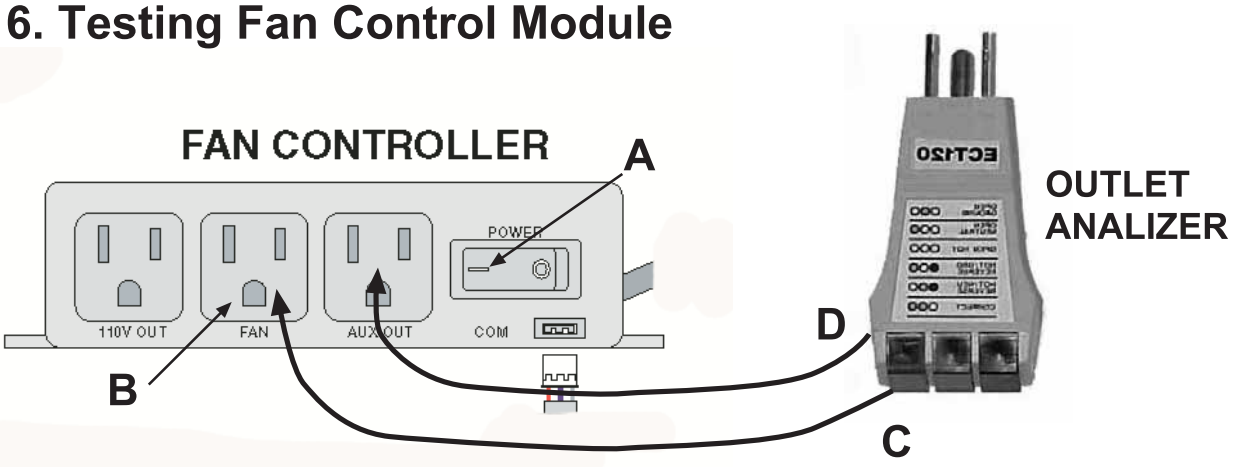


5. Transmitter



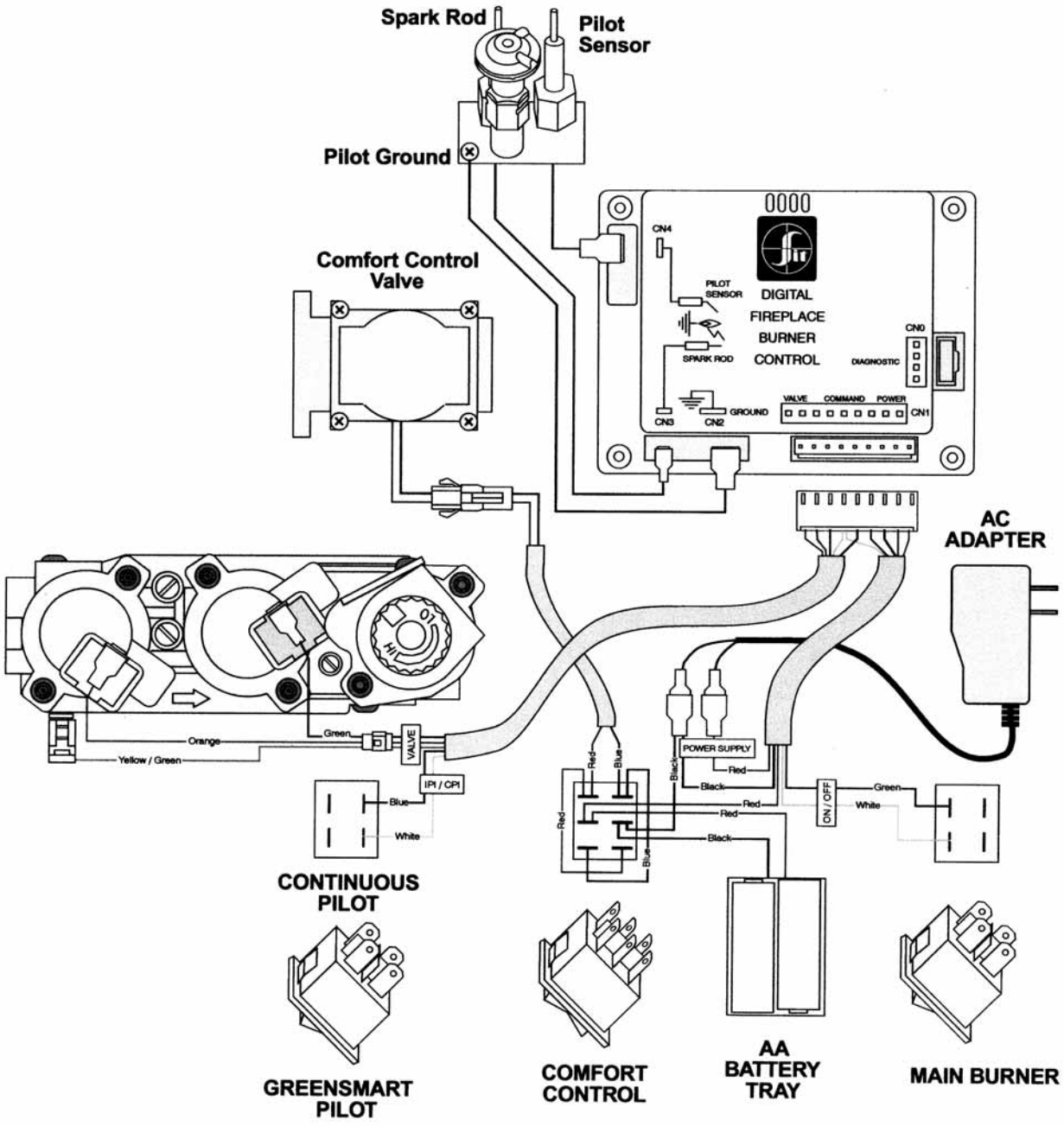
SIT Electronic Ignition System

6. Testing Fan Control Module

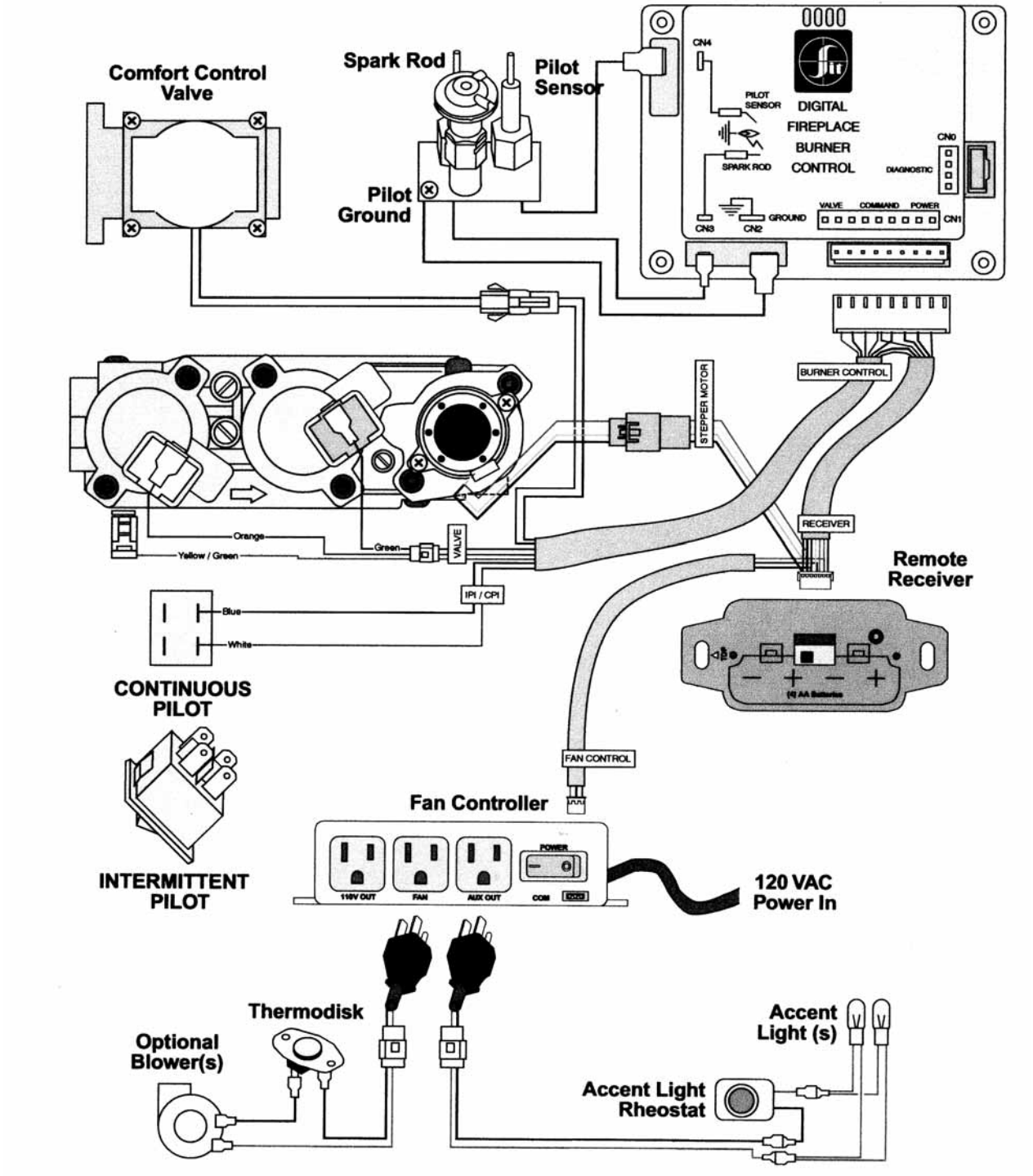


Programming Remote

GreenSmart Base Wiring (No Remote)



GreenSmart Remote Wiring



TRAVIS INDUSTRIES
HOUSE OF FIRE

TRAINING DEPARTMENT

GS2 Upgrades

Units with pilot brackets:

1. Remove burner and have access to the bracket assembly
2. Remove the screws mounting the pilot to the bracket
3. Remove both screws at the base of the bracket
4. If you are adding a sleeve to the sensor wire
    a. Loosen the pilot assembly so that the silicone seal is broken
    b. Carefully remove the zip ties and free both the sensor and spark wire
    c. With the wires removed carefully enlarge the clearance for the sensor wire to .250". Make sure that there are no burr's or sharp edges
    d. Add the sleeve to the wire placing the sleeve over the sensor base
    e. At the connector end use a 1" piece of heat shrink tube to keep the sleeve from slipping.
    f. Reroute both wires and connect them to the IFC
        i. The wires can the restrained separately
        ii. Do not bundle them together, bundle them separate from each other and avoid direct metal contact with the sensor wire even though it is sleeved.
5. If the ground wire is routed with the sensor wire move it to the same clearance hole as the pilot tube
6. Re install pilot and burner assembly

Units with pilot housings:

This includes all inserts, Tree of Life, Berkshire, and the 564HO

Inserts:

1. Remove valve tray
2. Invert the valve and place it on a piece of foam to prevent damage to the pilot assembly
3. Remove the restraints from the sensor, spark and ground wire
4. Separate the three wires and carefully add the sleeve until it covers the base of the sensor
    a. At the connector end use a 1" piece of heat shrink tube to keep the sleeve from slipping.
5. Loosely bundle the three wires separately and leave enough slack in the leads to avoid contact with the base of the housing and bottom of the valve tray
    a. Do not restrain the wires to the
        i. Main harness
        ii. Metal or grounding surface
        iii. Keep them separate

Tree of Life, Berkshire and 564 HO

1. Gain access through either the convection opening or by dropping the belly on freestanding units.
    a. **Berkshire and Tree of Life may need to be removed from the pallet so that the belly can be dropped**
    b. **You gain more access on the free-standers by removing the control panel**
2. Separate the three wires and carefully add the sleeve until it covers the base of the sensor
    a. At the connector end use a 1” piece of heat shrink tube to keep the sleeve from slipping.
3. Loosely bundle the three wires separately and leave enough slack in the leads to avoid contact with the base of the housing and bottom of the valve tray
    a. Do not restrain the wires to the
        i. Main harness
        ii. Metal or grounding surface
        iii. Keep them separate