

Gas Log 101 Troubleshooting

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RH Peterson Company

Course Description

In this session we will discuss the basics of gas log troubleshooting. Topics will include: proper sizing for gas logs and burners, a review of vented and unvented system requirements, proper burner installation, pilot light and burner troubleshooting and a special "What Not To Do" safety review. .



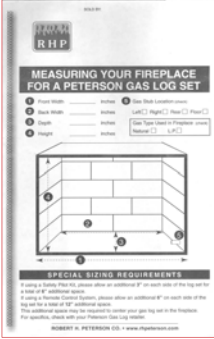

Welcome To:

“Gas Log 101 Troubleshooting”

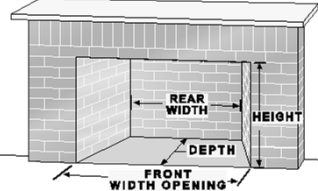
Technical Training
Hosted by: Ernie Haupt

Sizing Burner to Fireplace

Sizing the Fireplace



- * Is Gas Supplied To Fireplace?
- * Where Is The Gas Stub?
- * What Is The Line Size?
- * Gas Pressure Reading For Supply?
- * What type Of Gas?



Sizing Real Fyre Gas Log Sets

IV. Sizing Charts-Selecting the Proper Size Log Set

The Middle Dimension of the fireplace must be greater than the sizes listed below

- * For G4, G45 and G5 Series log sets*

Log Set Size	1		2		3		4	
	Total Width when using an AFV valve	Add 4" To Set Size	Total Width when using an AFV valve	Add 4" To Set Size	Total Width when using an AFV/PIE valve	Add 4" To Set Size	Total Width when using an AFV/PIE valve	Add 12" To Set Size
16"	20"	24"	24"	28"	28"	32"	36"	48"
18/20"	22"	26"	26"	30"	30"	34"	38"	50"
24"	28"	32"	32"	36"	36"	40"	44"	56"
30"	34"	38"	38"	42"	42"	46"	50"	62"
36"	40"	44"	44"	48"	48"	52"	56"	68"
42"	46"	50"	50"	54"	54"	58"	62"	74"

- * For G46*

Log Set Size	1		2	
	Total Width when using an AFV valve	Add 4" To Set Size	Total Width when using an AFV/PIE valve	Add 4" To Set Size
18/20"	20"	24"	24"	28"
24"	26"	30"	30"	34"
30"	32"	36"	36"	40"


*Before purchasing your Peterson Gas Log Set, read the General Rules and Important Information on Page 2.

ANSI Burner Systems




- * G45 ANSI Certified Burner (Factory Installed Valve)
- Controls: Manual, On/Off Millivolt, Variable, Electronic IPI, IPI With Variable
- ANSI Sizes Range 16" to 36"
- Many Available in See Thru Models

Specialty Burners



- Glass Burner
- ANSI Sizes 16"/19" to 36"
- Optional ANSI Controls
- Unregulated Listed Sizes 16" to 60"
- Special Designed Glass Screen
- Some Available in See Thru



- Stainless Steel Outdoor Burners
- Applicable for Freestanding fireplaces
- Stainless Heat Shield Box
- Outdoor Safety Manual Valve
- Push Button Battery Piezo Igniter
- Pilotless System With Thermocouple
- Some Available in See Thru

Unregulated Burner Pans



Included Parts

Make sure all included parts are in the box & correct gas type



Remotes & Wall Switches

Basic On/Off Remote Kit



Includes Receiver Box, Shield, Transmitter with Batteries & Harness

Standard on/off remote control.

Thermostat On/Off Remote Kit



Deluxe on/off remote control. Temperature display and thermal control function.

NOTE: Vent Free Only

Basic Variable Remote Kit



Standard variable flame height remote control.

Includes: Receiver, Transmitter, Shield, Batteries & Harness

Variable Thermostat Remote Kit



NOTE: Vent Free Only

Deluxe variable flame height remote control. Thermal control temperature display.

On/Off Wall Switches



Applicable For Millivolt Automatic Pilot Valves:

Wall switch for log set on/off controls

NOTE: Vent Free & Vented

On/Off One Hour Timers



Wall switch with log set on/off controls with timer.

Applicable For Millivolt Control Pilot Valves Only

NOTE: Vent Free & Vented

Variable Wall Switches



NOTE: Vent Free & Vented

Variable Wall Switches Include Rocker Switch & Battery Pack

Vent Free Burners

Vent Free Burner Features

- Certified Heating Appliance Z21.11.2B-2010
- Equipped with An Oxygen Depletion Sensor (ODS)
- Use in Listed Solid-Fuel Burning or Vent Free Firebox
- Active Natural Flames & Glowing Embers For Realism On Most Sets.
- 99% Heating Efficiency Which Means Less Gas
- Available for LP or NAT Gas
- Logs or Contemporary Glass Styles to Choose From

Vent Free Burners


- Manual Valve Control Option
- Available In LP or Nat Fuel
- Bedroom Burners Under 10,000 BTU's
- Most VF Up to 40,000 Max BTU's
- Sizes Range 16", 20", 24" & 30" Sets
- See Thru Models Available
- Contemporary Styles Available
- ANSI Certified Z21.11.2B-2010
- No Flame Impingement




Vent Free Controls


Manual Control Valves (Vent Free)

- Manual Control Function
- ODS Pilot with Thermocouple
- On/Off Control
- Standing Pilot



Millivolt Control Valve (Vent Free)

- On/Off Millivolt Control Valve
- Remote & Manual Function
- Compatible On/Off Remote Kits
- Optional Thermostat Remotes
- Toggle On/Off Switch Manual Function
- Thermopile Generated 325mv Minimum

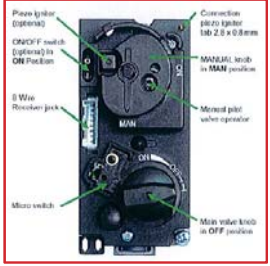



GV-34 Control Valves (Vent Free)

- On/Off Variable Control Valve
- Remote or Manual Function
- Compatible Variables Remote Kits
- Optional Thermostat Remote
- Built-in Piezo Igniter Knob
- ODS Standing Pilot with Thermocouple



GV-60 Control Valve

Receiver Module

GV-60 Features

Vent Free Electronic IPI System

Features:

- Battery Operated 6 Volt System
- "On Demand Pilot" Electronic Ignition System
- Defaults to Manual Mode After Ignition
- Flame Height Control
- "Learns the Room System" Measures Room Temp & Compares it To Set-Point Temperature.
- Remote Transmitter Sends Signal Every 4 Minutes to the receiver

GV-60 System Features

- **Low Battery Receiver:** Low battery power in the receiver, the system shuts off the fire completely.
- **6-Hour No Motor Movement:** Manual/Temp/Timer Modes= The valve will turn to pilot if there is no change in flame height for a 6 hour period.

Temp/Timer Mode= If the ambient room temp changes, the flame height will adjust automatically to maintain set temp and the fire will continue to function normally. Valve will turn to pilot flame if the set temp & ambient temp remain the same over a 6 hour period.

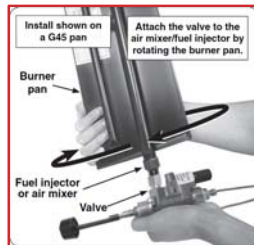
Burner Installation Procedures

Gas Rated Tape or Pipe Compound on pipe thread fittings Only (Not on flared Fittings)



NPT= (National Pipe Thread) FPT= Female Pipe Taper Both Require Joint Sealing Compounds or Joint Tape, US Standard.

Safety Pilot Kit Installation



INSTALL VALVE

1. Apply gas pipe sealing compound (or Teflon tape) to the male end of the fuel injector or air mixer on the burner.
2. Install the valve to the fuel injector or air mixer by screwing the pan into the valve (Fig. 5-2). Take care not to damage the attached pilot assembly when rotating the burner pan. Be sure all connections are tight, however do not overtighten to prevent damage to the valve.

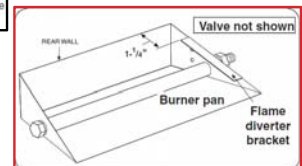
Installing Flame Diverter

INSTALL FLAME DIVERTER BRACKET

For installation on G4/G45 burners only. When properly installed onto the burner pan, the flame diverter bracket will promote quicker ignition and protect the safety control system from overheating.

Note: You must first install the flame diverter bracket before installing the pilot/igniter assembly.

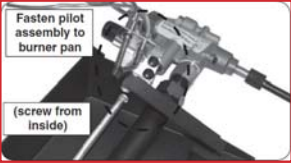
1. Place the flame diverter bracket over the side edge of the burner pan, near the location the safety control system pilot bracket will be attached. It should be placed **approximately 1-1/4"** from the rear wall of the burner pan (see Fig. 6-1).
2. Tap the bracket lightly with a rubber mallet to secure it in place.



Installing Pilot assembly

Fasten pilot assembly to burner pan

(screw from inside)




INSTALL PILOT ASSEMBLY TO BURNER

CAUTION: Do not kink or damage the pilot gas supply line and thermocouple lead. Do not unscrew the gas line from the valve.

- The pilot assembly comes with two Phillips screws installed on the long side of the pilot bracket. Remove the screws and use them to fasten the pilot assembly to the burner pan using the pre-drilled holes in the pan (see Fig. 6-2 and Fig. 6-3).

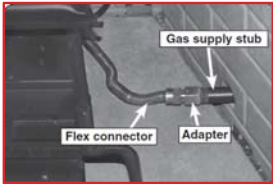
Note: Ensure the insulation is properly in place between the pilot bracket, burner pan, and pilot assembly. Screw from the inside of burner pan.

- Ensure the pilot supply line and thermocouple tube are bent in a similar manner as shown in Fig. 6-3 to prevent damage / unsafe operation, and to allow for proper heat shield placement. Maintain this orientation at all times.



Properly bend line and tube

Installing Burners With Safety Control Valve




Gas supply stub

Flex connector

Adapter

To large adapter / gas supply

Attach small adapter & flex connector to nipple on valve



Most Regulated Burners Include Factory Installed Safety Pilot & Flex Line.






Fig. 8-2 Heat shield properly placed

Acceptable Line Connections


1



2




3



Acceptable Lines?


- Aluminum Tubing
- Black Coated Flex
- Stainless Flex



Media Placement


Filling Burner Pan Completely With Correct Media


Cover Burner Tubes



- Sand (NAT) or
- Vermiculite (LP)


Fill Completely






Glowing Embers & Grate Placement

Glowing Ember Placement

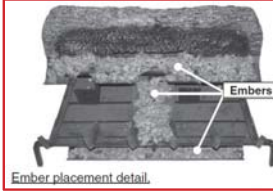


Centering Log Grate



Ember Media Placement

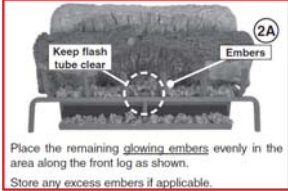
Ember placement detail.




Keep flash tube clear

Embers (2A)

Place the remaining glowing embers evenly in the area along the front log as shown. Store any excess embers if applicable.



Note: Some Burners Use No Sand or Vermiculite



DO NOT place any embers on top of the flash tube to ensure proper operation. Keep the area shown above clear at all times.

Ember Placement

1A Ember stop (part of frame)
Place embers B as shown

The ember stop at the front of the shelf serves to confine the embers B in place. Place a level amount of embers B on the shelf in front of the rear log as shown.

- Pack the embers down (to reduce heat transfer to components below).
- Save a small amount of embers for placement on the radiant booster grid.

1B Grid "C" facing forward
Grid within notches

1C Place remaining embers B as shown

Place embers A as shown

Ensure the embers are level and packed in place

LEAK TEST!!

Always End With A Leak Test To Ensure Safety

Gas Sniffer

Liquid Leak Detector

What Do You See?

Make it look good. You want satisfied customers!

Is This What They Saw In the showroom?

No front flame

Grate & Logs Corrected

Grate Pushed Back

Improved log stack pattern

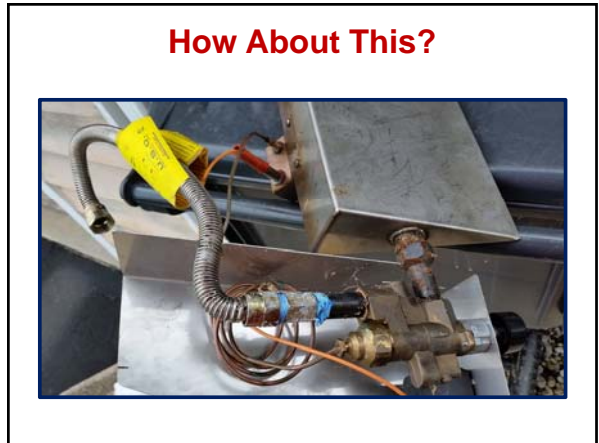
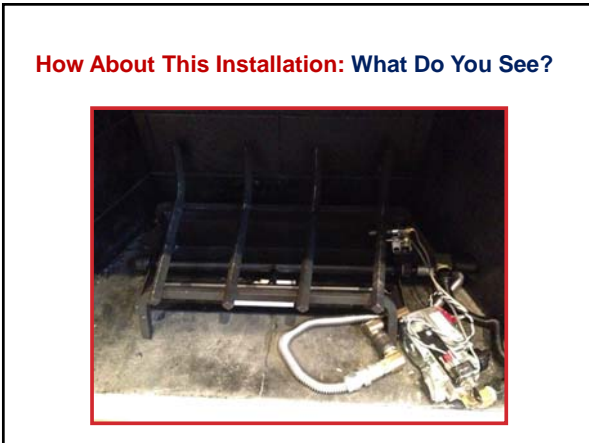
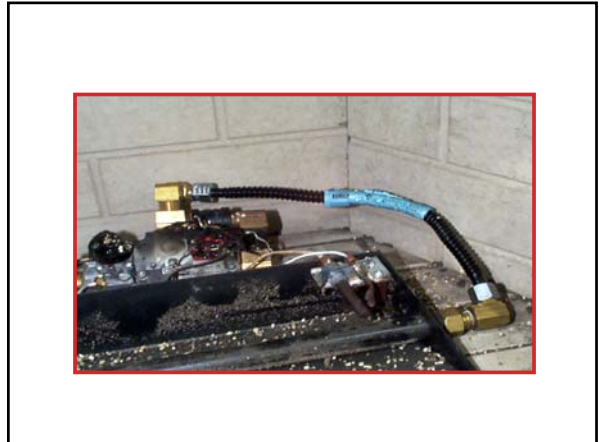
Front flame

Adding Accessories Makes Happy Customers

Installers Up-sale Accessories

Wood Chips, Pine Cones, Lava & etc

What Not To Do



Service Calls

- “The Call”**
Communication Is Key
- Consumer Calls With An Issue, Write Down All Information
 - Record The Date & Time of Call
 - Make Sure to Get Model & Serial Number
 - Make An Appointment with the Consumer Present
 - If You Know Related Issue Go With Parts So No Extra Visits

"The Visit"

- Once There Make Visual Inspection Before Touching Unit
- Have Customer Show You How They're Lighting Unit
- Then Try It Yourself, Maybe Not Being Used Correctly
- Determine If Complaint Is Indeed A Mechanical, Plumbing or Electrical Issue Under Warranty & Not User or Installation Error
- Make Sure You Have Stocked Parts Related To Issue In Truck
- Avoid Multiple Visits & Take The Consumer Out Of The Picture

Analyze Installation

- Does the system look too big for firebox?
- Check for required damper opening. Is it open? Damper clamp in place?
- Burning logs with glass doors closed? Must be fully open.
- Termination cap installed? Check for blockages or correct cap type.
- Look for excessive soot around fireplace opening, insert and mantle.

Analyze Installation (Continued)

- Chimney venting correctly? Check flue size & Damper.
- Is the system setup for correct gas type?
- Is the burner centered correctly? Check placement.
- Confirm log placement in correct?
- Look for signs of damage; red heat marks, burner warping, logs cracking or deteriorating.

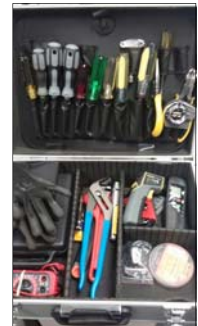
Be Prepared

Have all the necessary tools for troubleshooting:

Tool Box: Screwdrivers, nut drivers, socket set, all plier types & etc.

Multimeter for Electrical Diagnosing.

Gas Manometer for Proper Gas Pressure Readings



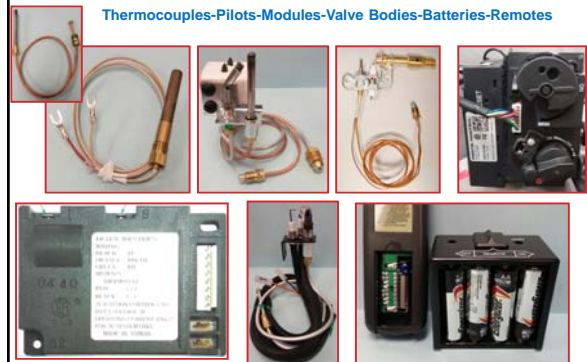
More Tools!

- Leak Detectors: Sniffer or Liquid
- Smart Phone & Camera:
- Drill Gun



Be Prepared "Parts"

Thermocouples-Pilots-Modules-Valve Bodies-Batteries-Remotes



Techs! Take Before & After Pictures




Pictures say 1000 words. Protect yourself & Job

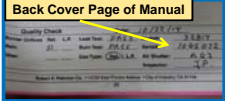
“Important Things to Remember”

Places to Find Serial Numbers

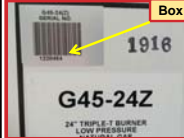
Front Cover




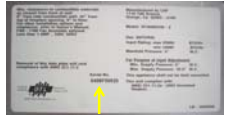
Back Cover Page of Manual



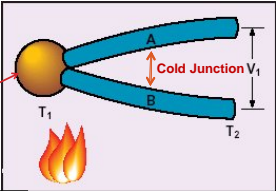
Box



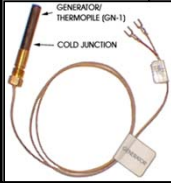




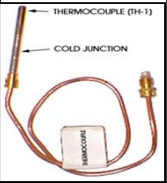
Thermocouple & Thermopile



Seebeck Effect:
Two dissimilar metals are heated. Thus creating temperature differences measurable by low voltage between metals A & B



GENERATOR/ THERMOPILE (GN-1)
COLD JUNCTION



THERMOCOUPLE (TH-1)
COLD JUNCTION

How Safety Pilots Work

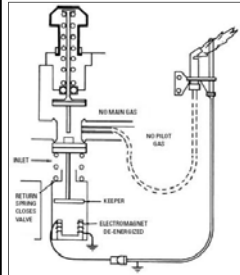
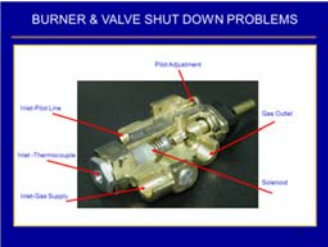



Figure 5-27 Thermocouple used in conjunction with an automatic pilot valve. (Courtesy: Rheem/Ruud Controls Co.)

BURNER & VALVE SHUT DOWN PROBLEMS






Pilot Troubleshooting Steps

Troubleshooting Pilot Symptoms

- **Pilot Will Not Light?**
Obstruction in pilot tubing or pilot gas supply line is kinked. Inadequate gas supply, check gas pressure. Air in line; Bleed line. Check electrode wire. IPI system check batteries or power source.
- **Pilot Will Not Stay Lit?**
Pilot hood not aimed at thermocouple. Thermocouple cracked or worn out. Inadequate gas supply. Thermocouple either too tight or loose at valve. Check millivolts on thermocouple with multimeter.
- **Noisy Pilot?**
Check pilot hood for burrs or obstruction. Pilot adjustment.

Purging Air From Gas Control Valve

Air In
The Line

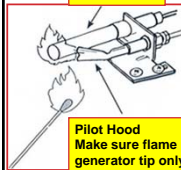


- 1- Turn main gas on and proceed to next step.
- 2- Loosen inlet tap screw until you hear the air coming out of the tap until gas odor is evident.
- 3- Close tap and check for gas leak. Next, follow pilot lighting instructions to light pilot.

Adjusting Pilot Flame Screw


- If applicable first remove the protective cap screw.
- Turn the pilot screw clockwise to reduce the pilot flame. Counterclockwise to increase pilot flame. (Do not turn all the way)
- Replace the protective cap screw and washer if applicable.

Note: Pilot flame should encircle the generator tip, which is preset at the factory. (See figure below)



Generator


Pilot Hood
Make sure flame points to generator tip only



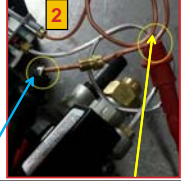
Pilot Adjustment Screw

Note: Ordinarily the pilot will not require field adjustment.

Checking Millivolts Using Multimeter




1- Un-thread thermocouple fitting at control valve



2- Clip black lead to the TH-1 Bulb. Red lead to the copper line.

Checking Thermocouple Voltage



3- Apply flame to the TH-1 tip for 2-5 minutes. Verify factory specs are met. Min. 15mv

1st Things First: Gas Pressure?

Most Manometers Don't Read Good or Bad? Lol
Most Issues Are Gas Pressure Related

We Need Static & Load Pressure Reading



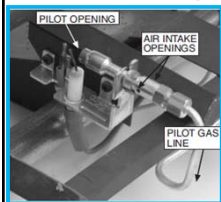
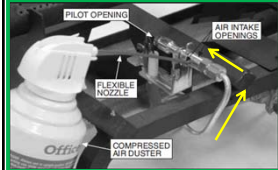
Not What We Want To Hear



Troubleshooting Pilot Symptoms

- **Log Set Extinguishes After Lighting?**
Inadequate gas supply causes pilot flame to reduce after burner lights; May have to increase pilot flame? Check gas pressure.
- **Log Set Extinguishes After 10min to 1hr?**
Thermocouple is Overheating; Check for glass doors closed, must be open. Thermocouple overheating cold junction; Check for flame diverter installation or position. Logs could be deflecting flames to pilot.
- **Valve Will Not Turn "Off" With Remote?**
Valve Over heated; Make sure heat shield is installed. Check Batteries and Relearn remote kit.

Cleaning Vent Free ODS Pilot

- 1- Make sure gas is off and system is cool.
- 2- Lightly brush off pilot opening & around air intake.
- 3- Blocked ODS openings will not operate properly.
- 4- Using an Air Duster insert the flexible straw into either air intake hole, make sure air is pointed towards the pilot opening. (See Figure Below)

- 5- Relight pilot to make sure it burns properly.
- 6- IF pilot does not stay lit, using 1/4" wrench disconnect the pilot tubing from the valve.
- 7- Insert flexible nozzle & blow air into the tube and the direction of gas flow. (Never from pilot opening)
- 8- Reinstall tubing and relight pilot.

Note: If still does not stay lit. Replace ODS.

Cleaning Vent Free ODS Pilot

After Cleaning ODS & you're still having shut downs, remove the orifice and inspect for any remaining obstructions.

Silk spider web in this case was causing pilot outage, clean with rubbing alcohol

Orifice

IPI Systems

- Required Tools
- Wiring Diagram & Color Codes
- Troubleshooting Pilot & Module Symptoms
- Troubleshooting Valve Symptoms

Required Tools For Testing

Screwdriver (#2) tip - 4" long Philips round blade

Screwdriver 3/16" tip width. 3" long slotted narrow round blade for pressure taps

Screwdriver, 1/4" tip width. 4" long slotted round blade to access regulator cap screw and regulator adjustment screw

Test/Jumper leads

Multimeter for testing voltage, current and continuity

Low pressure reading device

Digital Manometer

Digital Multimeter

Pilot is Not Sparking

IPI Troubleshooting "Dexen"

System is turned ON but not Sparking

(Note: Always inspect the wires for good connections and no heat damage)

The problem may be:

1. Weak batteries or Bad AC adapter
2. A shorted or loose connection in the wiring configuration or wire harness
3. Improper wall switch or remote wiring
4. Poor ground
5. Faulty module

IPI Wiring Diagrams

Dexen IPI System

	1. (BLACK) TP
	2. (ORANGE) TP/TH
	3. (GREEN) TH
	4. (IND) WIRE
	5. (BROWN) SWITCH
	6. (BROWN) SWITCH
	7. (RED) BATTERY
	8. (BLACK) BATTERY

System is Turned "ON" But Not Sparking

Make sure leads are on tight. When testing the 2 "D" batteries for voltage, set multimeter to VDC and test for 2.8v to 3.4 volts.
If voltage reading is lower then 2.8 volts replace the batteries.

Note: Always inspect the wires for good connections and no heat damage

System is Turned "ON" But Not Sparking



Verify continuity from the 2 brown switch wires. You will hear a tone verifying wires connections are good. If you are hearing a broken tone, verify wire harness is fully engaged. **If no tone, this indicates a faulty connection and the wire harness needs to be replaced.**

Note: Always inspect the wires for good connections and no heat damage

Pilot Is Not Sparking

IPI Troubleshooting "GV-60"

System is turned ON but not Sparking

(Note: Always inspect the wires for good connections and no heat damage)

The problem may be:

1. Weak batteries or Bad AC adapter
2. A shorted or loose connection in the wiring configuration or wire harness
3. Improper wall switch or remote wiring
4. Poor ground
5. Faulty module

Check Batteries & Voltage



TEST: Check batteries for proper voltage.

PROCEDURE: Connect "+" test probe to the pin on the far left of the 5-wire connector. Connect "-" test probe to ground, e.g. valve body or appliance chassis.

RESULT: The reading should be 5 - 6VDC.



Testing The Valve

The Appliance will Not Light With The Transmitter?

MAXITROL GV60 Training

Step 1 Troubleshooting the GV60 Testing the Valve

TEST: Verify that the MANUAL knob is in the ON position.

PROCEDURE: Visually inspect MANUAL knob position.

RESULT: MANUAL knob should be rotated into the ON position. The knob will "click" when it is engaged correctly.

CORRECT: MANUAL knob should be fully in the ON position.

INCORRECT: MANUAL knob is not fully in the ON position. The GV60 will not operate properly with the knob in this position.

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Testing IPI Valve

The Appliance will Not Light With The Transmitter?

MAXITROL GV60 Training

Step 2 Troubleshooting the GV60 Testing the Valve

TEST: Manually light the fireplace to verify the gas supply is sufficient.

PROCEDURE: Turn MANUAL knob to MAN. Insert small tool and depress the plunger. Light pilot and hold the plunger for 10 seconds. Turn knob back to ON.

RESULT: If the manual light is successful, test the electronics.

Result: If Burner Lights Manually, Bad Module?

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Intermittent Operation

Test Gas Pressure

MAXITROL GV60 Training

Troubleshooting the GV60 Testing Gas Pressure

TEST: Check gas pressure at pressure test ports on valve.


PROCEDURE: The pressure test ports use a captured screw. It will not fall out but it must be retightened after checking both inlet and manifold pressure.

IMPORTANT: Check pressure test ports for leaks after test is complete.

RESULT: Gas pressures should match those below.


Note: Always check gas pressure at full flow.


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Burner Troubleshooting Steps

Troubleshooting Burner Symptoms

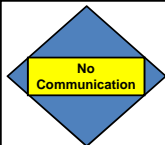
- **Burner Shutting Down?**
Check incoming gas pressure under load; Check manual for gas requirements. Check for other appliances on same gas line, could drop gas pressure to set. Check damper size requirement. Log set too big.
- **Low Flame Height?**
Check gas pressure. Propane tank may be low.
- **Not Burning Evenly?**
Burner orifice clogged; Clean orifice. Check for sand or vermiculite compaction; Loosen with screwdriver or hack saw blade.
- **Remote Not Communicating?**
Check batteries. Relearn remote kit. Remote receiver overheating; May be able to hear audible beeps at shut down.


Remote Receiver Placement






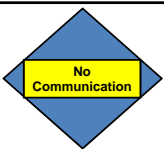
6"-8" Min. Clearance from burner needed

Note: Never place receiver in back of firebox due to overheating, always place forward of the burner as shown above. (Overheating Receiver Will Shut Unit Down)

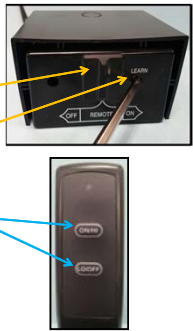

Remote Not Turning On Burner?

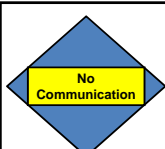
- Check Switch Position (Remote)
- Check Batteries For Voltage & Placement
- Check Wiring
- Check Receiver Location in Firebox
- Check Receivers Heatshield is being used.





Re-Learning Remote Kit

- 1- Make sure switch is on "Remote" Code will not learn in On or Off position.
- 2- Push & release the learn button. Should hear a beeping sound.
- 3- Next, press & release any button on the transmitter. A change in the beeping pattern at the receiver indicates transmitter's code has been programmed into the receiver.




01V Remote

- Receiver Module 4 AA (6 Volt) (AR-01V-2)
- Transmitter 9 Volt Battery (AT-01V-2)

Ever Have This Happen?

Ember Placement

My Bottom Burner Is Not Lighting?

- Ember Burner Will Not Light Without Glowing Embers
- Embers Create Back Pressure For Combustion

No Embers

Troubleshooting Burner Symptoms

- **Overheating?**
Check for closed damper. Remote location or oversized log set.
- **Sooting?**
Check for drafts in room; Close heating & air conditioning vents, returns and outside air vents. Floor or ceiling fans should be off when burner is on. Log placement; Check log placement chart. Make sure set is for correct gas type. Adding any accessories to log set that does not belong, needs to be removed.
- **Flame Description?**
Observe the flames. Main burner flames should be blue at the base with yellow body & tips. Flames 3" - 4" above the logs, center being tallest. Ember flames should be 1/4" above the ember glow.

Burner Shut Down

Overheating Issues?

Correct Application

- Minimum 3" burner & valve clearance met from left and right side walls.
- Burner centered in firebox is met.
- Correct log placement is met.
- Correct burner media (Sand or Vermiculite) amounts are met.

Overheating?

Fireplace Floor Requirement

DO NOT install this burner system if the fireplace hearth is recessed. The fireplace floor must be at the same level as or larger than the fireplace front opening. An ash lip or recess may not exceed 3/4". See Fig. 8-1 below.

Note: If glass doors are used the fireplace floor must not be blocked by the door frame; the frame must have openings to allow for fresh air circulation.

Shut Down & Sooting

Overheating & Sooting

Log Set Too Big

Doors Closed

Incorrect Log Stack

Sooting

Open Damper & Clamp

Damper

Damper Clamp

- Damper Must Be Fully Open & Locked.
- Damper Clamp Must be Installed (ANSI & NFPA Standard)
- Without the Damper Open There Will be Emissions Spillage Into the Room.

This unit is running with the damper closed

Burner is ON But Low Flames?

Check Orifices for Correct Size & Blockages
(Debris, Spider Web?)
Check Burners for Clogging
Check Gas Pressure
(Incoming Supply Line Regulator)

- 1- Locate the Regulator.
- 2- Remove Allen Hex Screw.
- 3- Thread Manometer Barb Fitting & Hose.
- 4- Turn Gas On, Then All Burners On & Read Pressure.



Training Wrap-Up

Closing Questions?

Thank You!