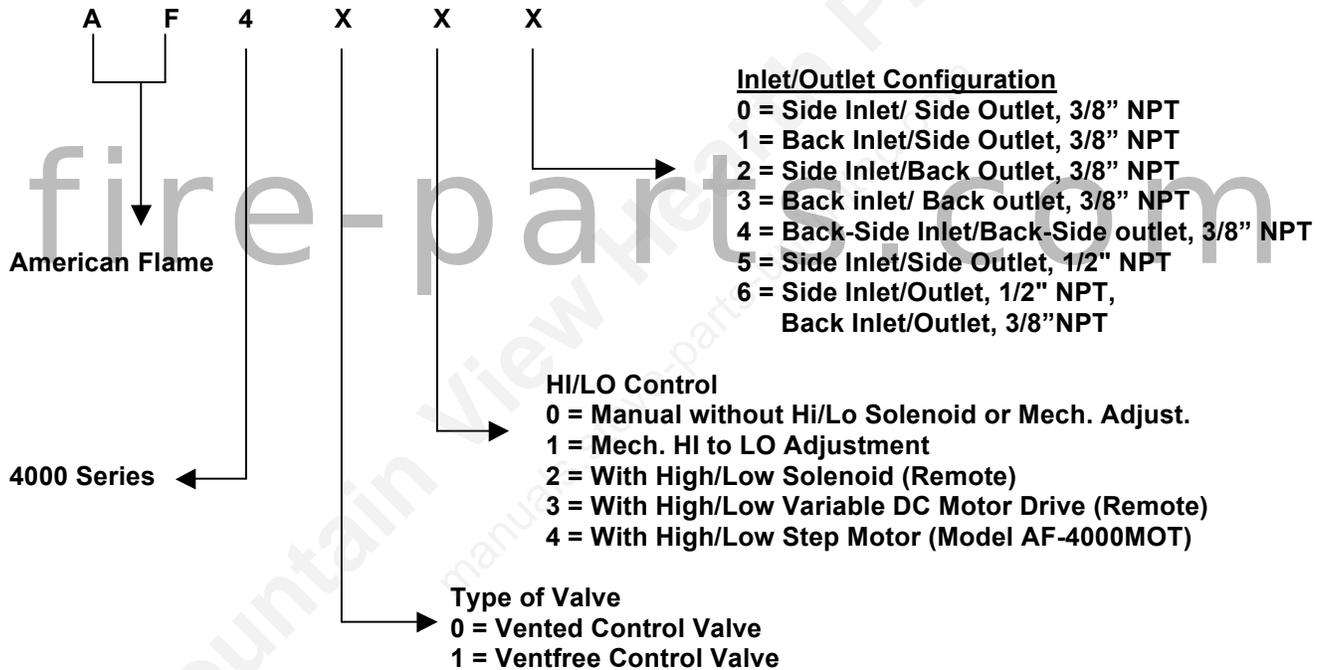


AF-4000 Series Electronic Gas Control Valve

APPLICATION

The AF-4000 Electronic Gas Control Valve is designed for use in gas in hearth products, wall mount furnaces, and space heating appliances. For use with Propane or natural gas.

AF-4XXX MODEL IDENTIFICATION



FEATURES

- Multi positional (All Plans) / Versatile Mounting.
- DC volt powered internal solenoids.
- 50,000 BTU/hr as tested by CSA per test standard with a 2" wc inlet and 1" wc outlet with 1" wc pressure drop (All inlet/outlet configurations).
- AF-4000 series available with 0°F to 175°F (-18° C to 79° C) temperature range.
- Multiple inlet/outlet connections (3/8" NPT, Optional 1/2" NPT Side Inlet and Outlet).
- Multiple Pilot connections (Side and Back).
- Fine mesh screens on inlets.
- Multiple mounting holes (All 10-24 SAE threads)
- Low profile / Compact size.
- Easy pilot adjustment screw (Valve on the front).
- European style inlet / outlet pressure taps (Located on the valve front).
- Simple unique rotary conversation from natural to propane gas.
- Vented / Vent free models available.

TABLE #1

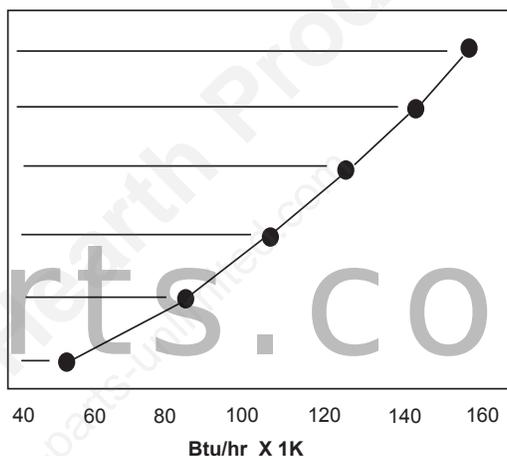
AF-4000 VOLTAGE / CAPACITY RATINGS

Model	Position	Internal Solenoids	Capacity@ 1" Pressure Drop Side inlet & outlet	Capacity@ 1" Pressure Drop Back inlet & outlet
All Models	Multi positional	6 Volt DC	50,000 BTU/hr	50,000 BTU/hr

**Pressure Drop
in. w.c**

- 7.0" Inlet @ 3.5" outlet = 3.5" Pressure drop
- 6.0" Inlet @ 3.0" outlet = 3.0" pressure drop
- 5.0" Inlet & 2.5" outlet = 2.5" pressure drop
- 4.0" Inlet @ 2.0" outlet = 2.0" pressure drop
- 3.0" Inlet @ 1.5" outlet = 1.5" pressure drop
- 2.0" Inlet @ 1.0" outlet = 1.0" pressure drop

**Pressure Drop & Capacity Curve
AF-4000 Series Gas Control**



This information is American Flame lab generated data and is to be used as reference only.

SPECIFICATIONS

Main Gas Connections:

Valve: 3/8 in. NPT thread on all Inlet and Outlet connections.
Optional 1/2"NPT Side Inlet and Outlet

Pilot Gas connections and flow:

Connection Size: 7/16-24 UNS.
Flow: ~ 5,250 Btu/hr at 7.0 in wc Maximum.
Side & Back of valve.

Pilot locations:

Ambient Temperature Range:

0° F to 175° F (-18° C to 79° C)

Voltage:

6 Volt DC Powered

Approvals:

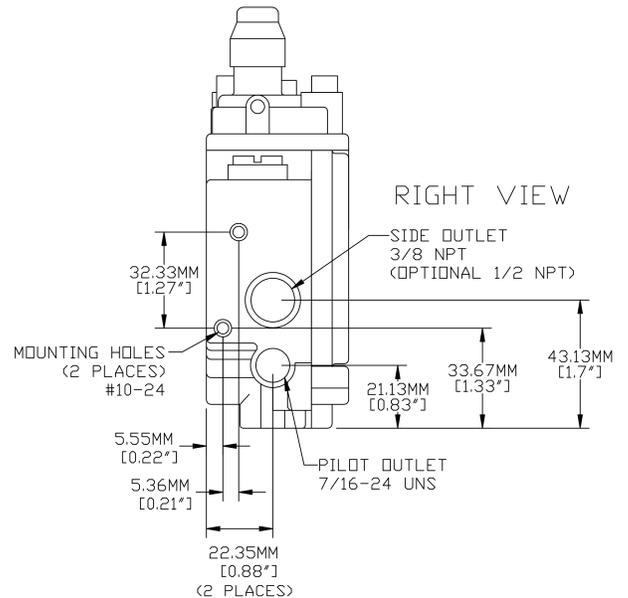
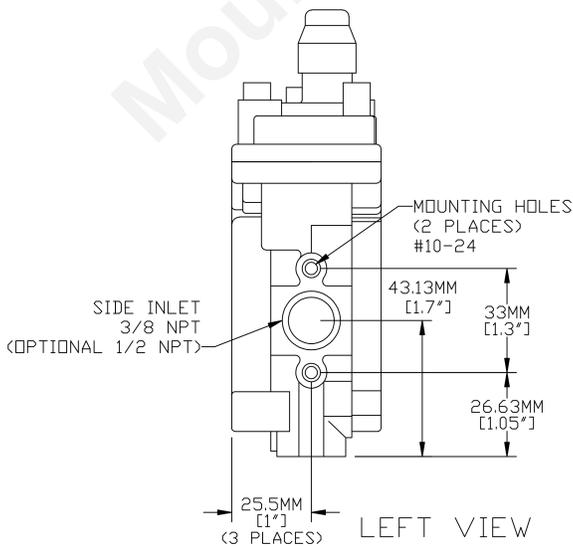
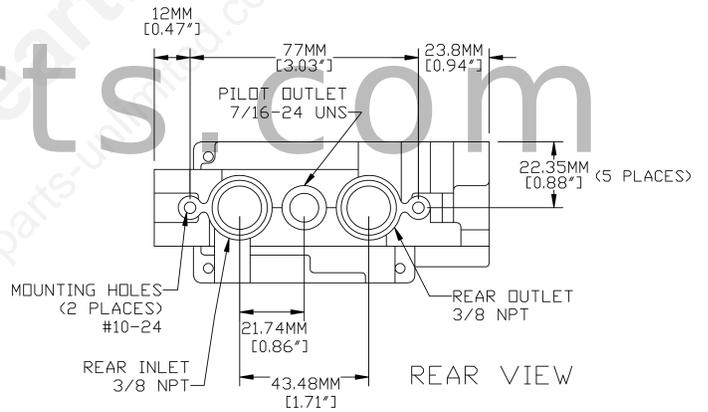
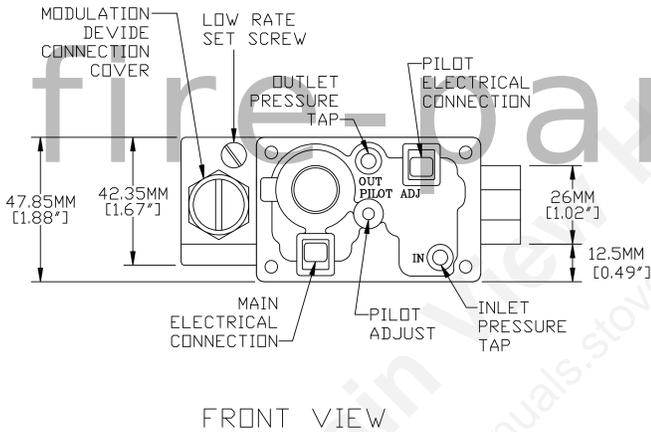
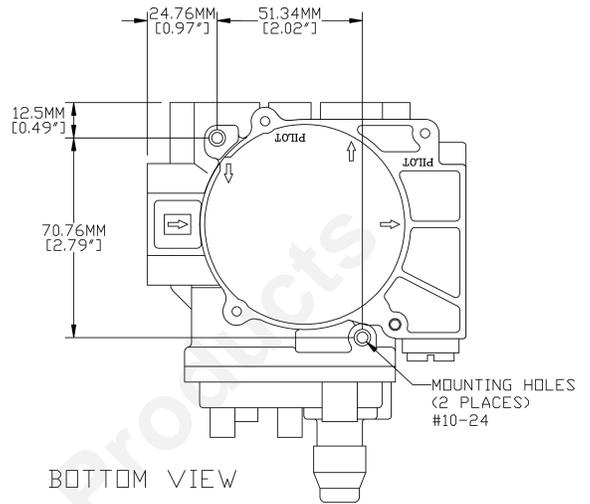
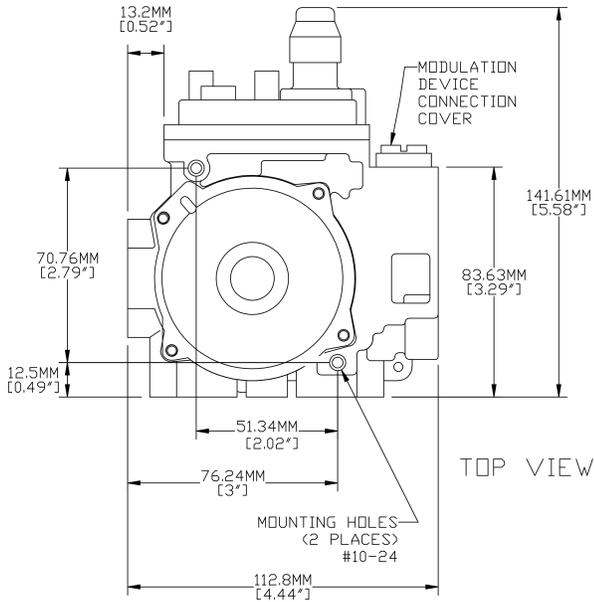
CSA International
Valve: Report Number 224930-1546330
Module: Report Number 224930-1998843



Model / Voltage / Capacity:

Reference Table #1

DIMENSIONS



INSTALLATION

When Installing this Product....

- Read these instructions carefully. Failure to follow these instructions completely could damage the product or cause a hazardous condition.
- Check the ratings given in the instructions and on the product to make sure the AF-4000 Electronic Gas Control is suitable for your application.
- Installer must be a trained, experienced service technician.
- After installation is complete, check out product operation as provided in these instructions.

! WARNING

Oxygen depletion hazard. Can cause injury or death due to asphyxiation.

1. Use only vented gas pilot assemblies on vented appliances.
2. Use only unvented pilot assemblies on unvented appliances.

! WARNING

Fire or explosion hazard. Can cause property damage, severe injury or death. Follow these warnings exactly:

1. Disconnect power before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform a Gas Leak Test after installation is complete.
3. Always install the sediment tap in the gas supply line to prevent contamination of the gas control.
4. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools. If the gas control knob does not operate by hand, the gas control should be replaced by a qualified service technician. Force or any attempt to repair the gas control valve can result in fire or explosion.

Location:

Locate the AF-4000 gas control where it cannot be affected by steam cleaning, high humidity, dripping water, corrosive chemicals, dust or grease accumulation or excessive heat. To assure proper operation, follow these guidelines:

1. Locate gas control in well-ventilated area.
2. Mount gas control high enough to avoid exposure to flooding or splashing water.
3. Assure the ambient temperature does not exceed the ambient temperature ratings for each component.
4. Cover gas control if appliance is cleaned with water, steam, or chemicals or to avoid dust and grease accumulation.
5. Avoid locating gas control where exposure to corrosive chemical fumes or dripping water is likely.

Install Piping to Gas Control:

All piping must comply with the local codes and ordinances or with the National Fuel code (ANSI Z223.1 NFPA No. 54) which ever applies.

Tubing installation must comply with approved standards and practices.

1. Use new, properly reamed pipe free from chips, When tubing is used, assure the ends are square, deburred and clean. All tubing bends must be smooth and without deformation.
2. Run pipe or tubing to the control. If tubing is used, obtain a tube-to-pipe coupling to connect the tubing to the control.
3. Install sediment trap in the supply line to the gas control. See Figure #1

! CAUTION

Gas Leakage Hazard. Failure to follow precautions can result in a gas-filled work area.

Shut off the main gas supply before removing end cap. Test for gas leakage when installation is complete.

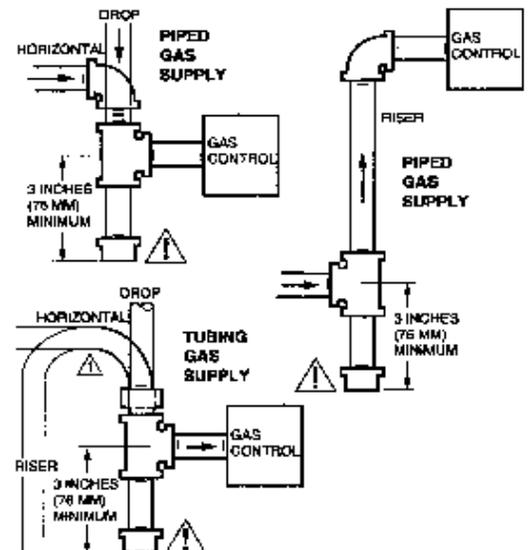


Figure #1

Installation of AF-4000 Control

1. Mount control 0 to 90 degrees in any direction, from the upright position of the gas control knob, including vertically.
2. Mount the control so gas flow is in the direction of the arrow on the side or back of the control.
3. Thread pipe 9/16 in. into the control. Do not inset deeper than 3/8 in. Valve distortion or malfunction can result if the pipe is inserted too deeply.
4. Apply a moderate amount of good quality pipe compound to pipe only, leaving two (2) end threads bare. On LP installations, use compound resistant to LP gas. See Figure #2
5. Remove plastic dust seals over the control Inlet and Outlet if necessary.
6. Connect pipe to control Inlet and Outlet. Use wrench on either side of the pipe outlet. See Figure #3

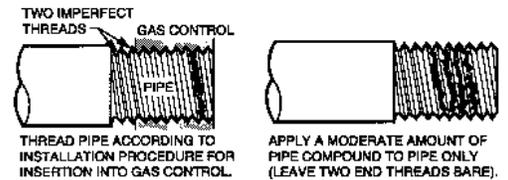


Figure #2

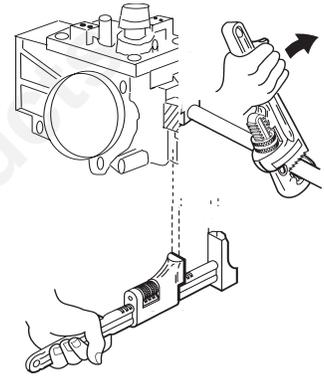


Figure #3

Converting the AF-4000 Natural to Propane

The AF-4000 electronic control valve is convertible from natural gas to propane gas by a Simple Rotary knob located on the front (Face) of the valve. Note: Figure #4

1. Unscrew and remove the cover cap. Note: the position of the marker on the shaft of the Simple Rotary knob. This mark will point to NAT or LP that indicates the type of gas the valve is set on.
2. To convert the AF-4000 from the factory setting (NAT) push in the Simple Rotary knob and rotate 90°. Note: the marker will now point to LP and the shaft will stay in.
3. To convert the AF-4000 back to the factory setting (NAT) push in the Simple Rotary knob and rotate 90°. Note: the marker will now point to NAT and the shaft will stay out.
4. After the conversion has been made check the out let pressure with a manometer. The factory setting on the internal regulator is 3.50"wc natural and 10.5"wc propane.
5. Replace the cover cap.

Use extreme caution when changing this Simple Rotary knob

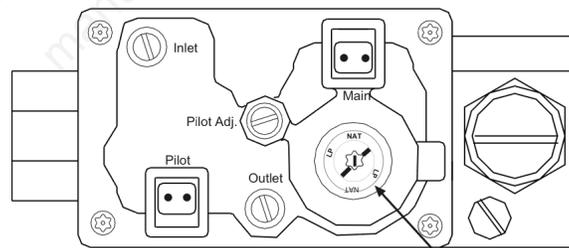


Figure #4

NATURAL TO PROPANE
CONVERSION SHAFT
(UNDER CAP)
FACE VIEW OF GAS CONTROL WITH NO HI/LOW CONTROLS

Spark to Pilot Burner Connections

This gas control uses a spark to pilot burner assembly. The pilot gas connections are as follows:

1. Select the pilot outlet on the AF-4000 valve to be used (Side or back) connection. If the side connection is used, the plug will need to be moved to the back pilot connection. After the plug has been installed check for leaks with rich soap and water solution.

2. Connect the pilot tubing fitting into the gas control connection and tighten. (Use caution on brass connectors) Note: Figure #5

Wiring The Pilot

1. Connect the "S" & "I" wires from the pilot assembly to the "S" & "I" terminals on the (AF-4000 MOD) modular Note: Figure #6.
2. Route the "S" & "I" wires from the pilot assembly to the (AF-4000 MOD) module in an area that will be away from the pilot or main burner flame.

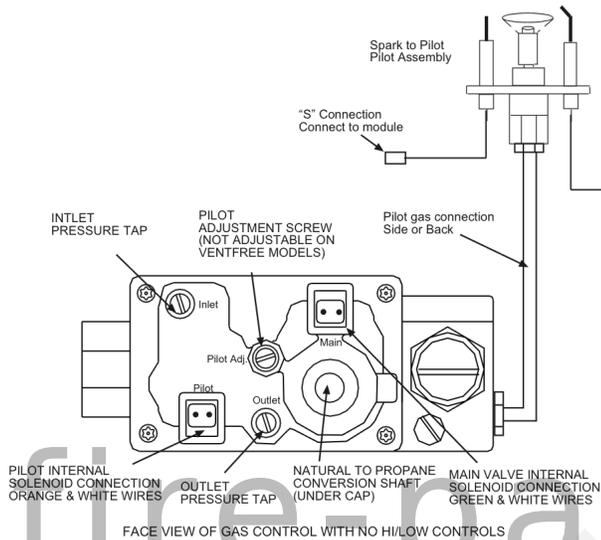


Figure #5

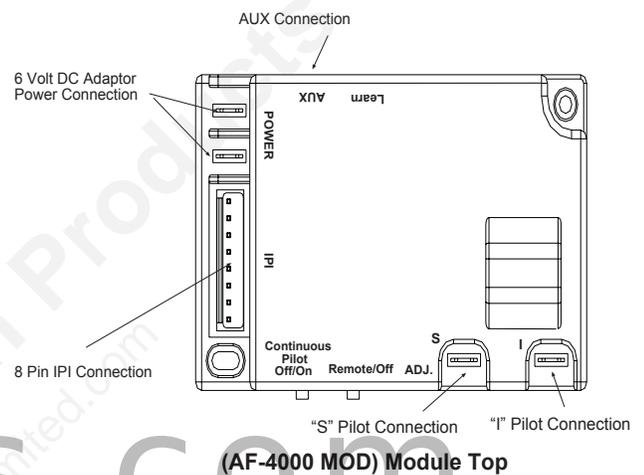


Figure #6

Wiring The (AF-4000) Valve

1. Locate the (2) pin male connectors on the front (Face) of the AF-4000 electronic control valve Note: Figure # 7.
2. If the AF-4000 electronic control valve is equipped with a HI/LO solenoid, HI/LO DC motor drive, or HI/LO Step Motor locate the wiring connections on the HI/LO device Note: Figure #8

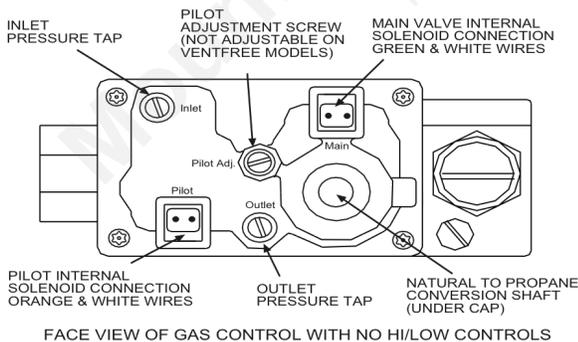


Figure #7

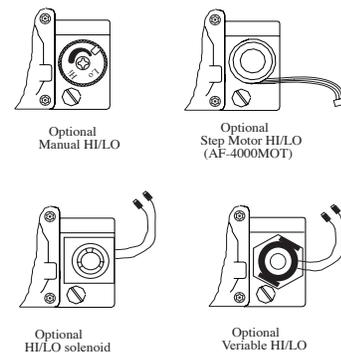


Figure # 8

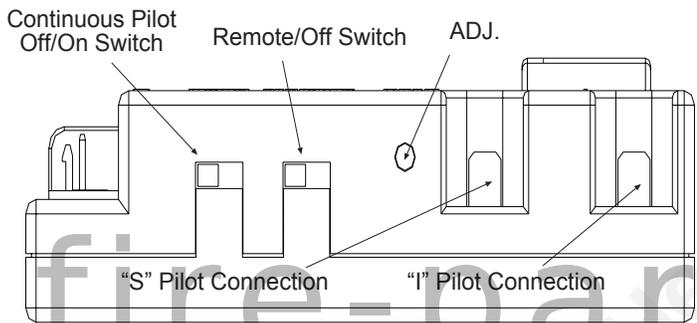
Wiring The (AF-4000 MOD) Module

1. Locate the (AF-4000 MOD) module in an area that that will not exceed an ambient temperature of 150° F.
2. Locate all the connections on the (AF-4000 MOD) module Note: Figure #6.
3. Locate all the wire connections on the (8) pin connector wiring harness Note Figure #12.

4. Connect the (2) wires from the spark to pilot assembly to the terminals marked “S” & “I” on the (AF-4000 MOD) module Note location on Figure #9.
5. Connect the (8) pin female connector on the wiring harness to the (8) pin male connector on the (AF-4000 MOD) module Note location on Figure #11.
6. Connect the black wire marked GROUND from the wiring harness to the appliance chassie.
7. Plug the (2) pin female connector marked PILOT (Orange & White wires) from the wiring harness to the (2) pin male connector on the front (Face) of the AF-4000 electronic control valve (Marked PILOT on the control valve) Note locations Figures #7 & #12.
8. Plug the (2) pin female connector marked MAIN (Green & White wires) from the wiring harness to the (2) pin male connector on the front (Face) of the AF-4000 electronic control valve (Marked MAIN on the control valve) Note locations Figures #7 & #12.
9. If a manual rocker or wall switch is used connect the (2) Brown wires marked SWITCH from the wiring harness to the switch Note marked wires Figure #12.

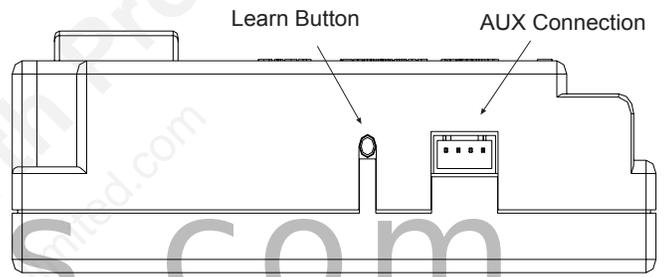
Optional: If a 6 volt power supply is used connect the (2) 1/4” female terminals from the 6 volt transformer to the (2) 1/4” male terminals marked POWER on the module Note: location on Figure #11.

Optional: If an AF-4000 BP battery pack is used follow the **Wiring The (AF-4000 BP) Battery Pack** section in these instructions.



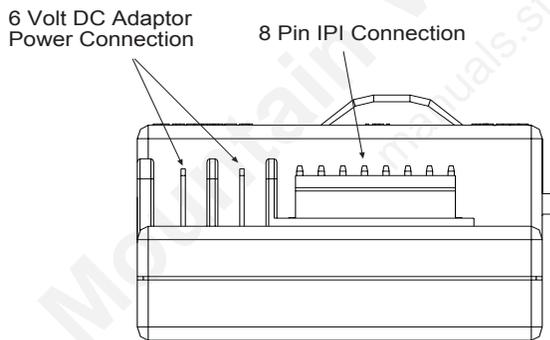
AF-4000 MOD Module Rt Side

Figure # 9



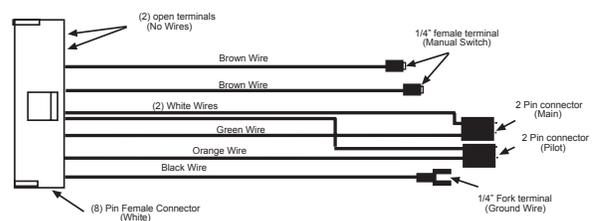
AF-4000 MOD Module Lt Side

Figure #10



AF-4000 MOD Module End

Figure # 11



AF-4000 MOD 8 Pin Connector Wiring Harness

Figure #12

Special Features On The (AF-4000 MOD) Module

The (AF-4000 MOD) module has (2) special features built into the system.

CONTINUOUS PILOT FEATURE: This allows the user to change from a spark to pilot system to a standing pilot system for direct vent appliances during Cold Climate to keep the firebox warm.

1. There is a switch located on the side right side of the (AF-4000 MOD) module that reads CONTINUOUS PILOT ON/OFF this switch will allow the user to select the pilot mode of operation. Note: Figure #9

2. When the continuous pilot switch is in the OFF position and the appliance on/off switch is turned ON the pilot will spark and light, and when the appliance on/off switch is turned OFF the pilot will shut OFF when the main burner shuts OFF.
3. When the continuous pilot switch is in the ON position and the appliance on/off switch is turned ON the pilot will spark and light, when the appliance on/off switch is turned OFF the pilot will stay ON when the main burner shuts OFF. This setting is generally used in Cold Climate to keep the firebox warm.
4. The CONTINUOUS pilot mode can also be activated by an (Optional) hand held Remote Control.

REMOTE CONTROL FEATURE: The (AF-4000 MOD) module has a built in remote control receiver this allows the user to program a hand held remote transmitter, wireless wall mount thermostat or wireless wall mount switch to the appliance at any time during or after installation of the appliance.

1. There is a switch located on the right side of the (AF-4000 MOD) module that reads REMOTE/OFF. Note: Figure #9
2. When the remote/off switch is in the OFF position the appliance will operate from an appliance mounted rocker switch or wall switch connected to the (2) BROWN wires on the (AF-4000 MOD) Module.
3. When the remote/off switch is in the REMOTE position the appliance will operate from the (Optional) Remote Control transmitter wireless wall mount thermostat or wireless wall mount switch.

Note: The AF-4000 MOD must be programmed to the (Optional) Remote Control transmitter wireless wall mount thermostat or wireless wall mount switch.

1. To program the AF-4000 MOD (Make sure the system is power) locate the learn button on the AF-4000 MOD (Note Figure #10) press and release the learn button there will be a beep sound from the AF-4000 MOD then press any key on the remote transmitter. Once the AF-4000 MOD internal receiver accepts the transmitter code there will be a series of confirming beeps.
2. The remote system is ready for use.

AF-4000 MOD (Options)

The AF-4000 MOD can be powered by two (2) different scores (1) is a standard 110 volt AC to 6.0 volt DC adaptor. This adaptor is connected to the AF-4000 MOD by connecting the (2) 1/4" female terminals from the adaptor to the (2) 1/4" male terminals located on the AF-4000 MOD marked (power).

Using the 6.0 volt adaptor (only) without using the AF-4000 BP battery pack the system will not have a back up power scores during a power outages.

Wiring The (AF-4000 BP) Battery Pack

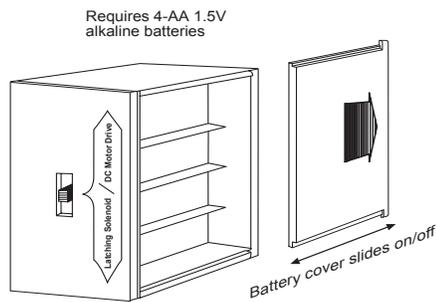
1. Locate the (AF-4000 BP) battery pack in an area that that will not exceed an ambient temperature of 130° F (Batteries exposed to temperatures above 120°F will drain voltage and shorten battery life).
2. Locate the AUX connection and the optional Hi/Lo wire connections on the (AF-4000 BP) battery pack Note: Figure #13.
3. Locate the wire connections on the (4) pin connector wiring harness and the solenoid or DC motor drive wiring harness shown in Note Figure #13.
4. Install (4) AA alkaline batteries in the (AF-4000 BP) battery pack.
5. Plug one of the (4) pin female connector on the (AF-4000 BP) battery pack wiring harness into the (4) pin male connector located on the back of the battery pack Note location shown in Figure #13.
6. Plug the other (4) pin male connector on the (AF-4000 BP) battery pack wiring harness into the (4) pin female AUX connector located on the (AF-4000 MOD) module shown Note location shown in Figure #10.
7. If the model of AF-4000 electronic control valve has a Hi/Lo solenoid or DC motor drive use the solenoid or DC motor drive wiring harness shown in Figure #13

Note: If the Hi/Lo Step Motor (Model AF-4000MOT) has been selected the this requires a unique operating control transmitter and receiver specifically set-up for the desired Hi/Lo increments required by the burner installed in the appliance that the AF-4000 valve system is used on.

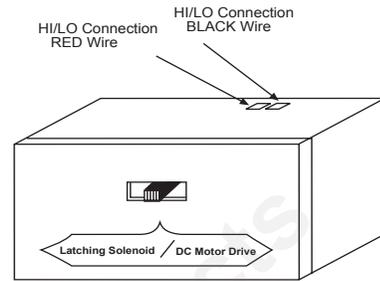
Wiring The Optional Hi/Lo

1. Connect the striped ends of the RED and BLACK wires on solenoid or DC motor drive wiring harness to the screw terminals located on ther top of the (AF-4000 BP) battery pack Note: location in Figure #13
2. Connect the (2) 1/4" female terminals on the solenoid or DC motor drive wiring harness to the matching color (RED & BLACK) 1/4" male terminals on the Hi/Lo solenoid or the Hi/Lo DC motor drive. Note: locations in Figure #8 & #13.
3. Note the Latching Solenoid mode and DC Motor Drive mode switch located on the front of the (AF-4000 BP) battery pack in Figure #13.

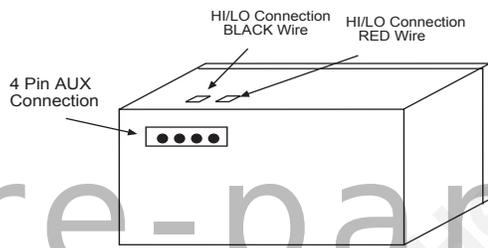
4. Use the **Latching Solenoid** mode when connecting to a Hi/Lo solenoid and the **DC Motor Drive** mode when using the Hi/Lo DC motor drive.
5. When the (AF-4000MOT) Hi/Lo Step Motor is used the 4 pin connector from the step motor connects directly into the 4 pin AUX connection on the (AF-4000MOD)



Module Battery Pack



Module Battery Pack Front



Module Battery Pack Back

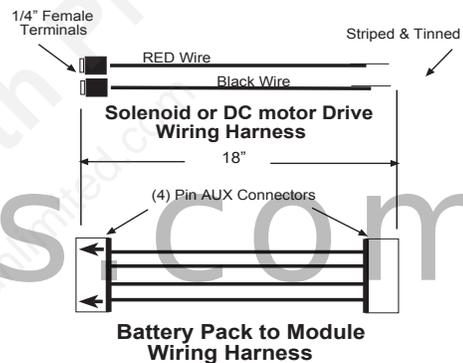


Figure #13

Direct Spark Ignition Operation (DSI) (optional)

The AF-4000 series gas valve may be used in conjunction with the AF-5000MOD direct spark ignition control for DSI operation.

1. For operation with the direct spark ignition control module (AF-5000MOD), both pilot outlets (side and rear) must be plugged.
2. Follow the AF-5000MOD control instructions for wiring and additional directions on using the AF-4000 series gas valve in a direct spark ignition configuration.

WARNING

Fire or explosion hazard. Can cause property damage, severe injury or death.

1. Stand away from the main burner while lighting, Hidden gas leaks can cause flashbacks in the appliance.
2. Check for gas leaks with rich soap and water solution any time work is done on a gas system.

Gas Leak Test

1. Paint the pipe connectors upstream of the gas control with rich soap and water solution, Bubbles indicate a gas leak.
2. If a leak is detected, tighten the pipe connections.
3. Light the main burner.
4. With the main burner in operation, paint the pipe joints (including adapters) with rich soap and water solution.
5. If another leak is detected, tighten the adapter screws, joints, and pipe connections.
6. Replace part if leak cannot be stopped.

CAUTION

Equipment Danger Hazard. Improper adjustment of gas input and burner can cause carboning and/or unnecessary shutdown of the system.

1. Do not exceed the input rating stamped on the appliance nameplate, or manufacture recommended burner orifice pressure for size orifice(s) used. Be sure primary air supply to the main burner is properly adjusted for complete combustion. Follow the instructions of the appliance manufacturer.
2. IF CHECKING GAS INPUT BY CLOCKING GAS METER: Be sure there is no gas flow through the meter other than to the appliance being checked. Other appliances must remain off with the pilots extinguished (or the consumption must be deducted from the meter reading). Convert the flow rate to Btuh as described in the GAS Controls Handbook, from 70-2602, and compare to the Btuh input rating on the appliance nameplate.
3. IF CHECKING GAS INPUT WITH MANOMETER: Both the input and output pressure taps have a captive screw. To measure the pressure of the tap, loosen, but do not remove the captive screw, attach a plastic tube with a 1/3 in. shell I.D. and connect the manometer. After checking the pressure, turn the gas control knob to the OFF position. Before opening the outlet pressure tap, be sure the gas control knob is in the OFF position. Before opening the inlet pressure tap, shut the gas supply at the manual valve in the gas piping to the appliance or, for LP, at the tank. Repeat the Gas Leak Test at the pressure tap with main burner operating.

MAINTENANCE

WARNING

Fire or explosion hazard. Can cause property damage, severe injury or death.

Do not attempt to take a part the gas control or to clean it. Improper assembly and cleaning can cause unreliable operation.

Regular preventive maintenance is important in applications that place a heavy load on the system such as those used in commercial cooking, agricultural, and industrial application because:

- In many such applications, particularly commercial cooking, the equipment operates 100,000 to 200,000 cycles per year. Such heavy cycling can wear out the gas control in one to two years.
- Exposure to water, dirt, chemicals, and heat can damage the gas control and shut down the control system.

The maintenance program should include regular checkout of the system as outlined in the Checkout section, and checkout the system as described in the appliance manufacturers literature.

Maintenance frequency must be determined individually for each application. Some considerations are:

- Cycling frequency. Appliances that may cycle 20,000 times annually should be checked monthly.
- Intermittent use. Appliances that are used seasonally should be checked before shutdown and again before the next use.
- Consequence of unexpected shutdown, where the cost of an unexpected shutdown would be high, and the system should be checked more often.
- Dusty, wet, or corrosive environment. Because these environments can cause the gas control to deteriorate more rapidly, the system should be checked more often.

Any control should be replaced if it does not perform properly on checkout or service. In addition, replace any module if it is wet or looks like it has been wet.

SERVICE

WARNING

Fire or explosion hazard. Can cause property damage, severe injury or death.

Do not disassemble the gas control; it contains non replaceable components. Attempted disassembly or repair can damage the control.

WARNING

Fire or explosion hazard. Can cause property damage, severe injury or death.

Exactly follow the warnings and the lighting instructions.

1. Before lighting, smell around the appliance area for gas. If the appliance uses LP (bottled) gas, be sure to smell next to the floor because LP gas is heavier than air. If you smell gas, immediately shut off the manual valve in the gas piping to the appliance or, on LP at the tank. Do not try to light any appliance. Do not touch any electrical switch or use the phone. Leave the building and call your gas supplier. If your gas supplier cannot be reached, call the fire department.
2. The gas control must be replaced if it has been flooded with water. Call a qualified service technician.
3. The gas control is a safety device. It must be replaced in case of any physical damage such as bent terminals, missing parts, stripped threads, or evidence of exposure to heat.

IMPORTANT:

Follow the operating instructions provided by the manufacturer of your heating appliance.

TROUBLESHOOTING

IMPORTANT:

An experienced qualified service technician should perform trouble-shooting procedures.

If the pilot will not stay lit:

1. Confirm that the "S" wire and the "I" wire are properly connected to the (AF-4000 MOD) modual "S" and "I" terminals. Note: Figure #7 for terminal locations.
2. Confirm that the Spark to Pilot burner is properly grounded to the AF-4000 gas control valve and to the (AF-4000 MOD) module.
3. Check the power source (1) the 6-volt power adaptor or the (AF-4000 BP) battery pack connections and condition of batteries.
4. Optional check the position of the CONTINUOUS PILOT switch on the (AF-4000 MOD) module

If main burner does not come ON when the manual switch or remote control is turned ON:

1. Confirm that the pilot sparks and lights.
2. Check the (2) pin plastic connectors that plug in the face of the AF-4000 gas control valve Note: Figure #6
3. Confirm that the AF-4000 gas control is properly grounded to the (AF-4000 MOD) module.

Limited Warranty

American Flame, Inc. warrants the AF-4000 Valve series for 12 months from the date of purchase or installation to the original purchaser to be free from defects in materials and workmanship. Damage to the AF-4000 Valve caused by accident, misuse, abuse, or installation error, whether performed by a contractor, service company, or owner, is not covered by this warranty. American Flame will not be responsible for labor charges and/or damage incurred in installation, repair, replacement, or for incidental or consequential damage. Some states, provinces, and nations do not allow exclusion or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply. This warranty gives you specific legal rights. You may also have other rights that vary by state, province, or nation.

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