

A/F Checker

By Performance Trends

*For
Engine
Testing*



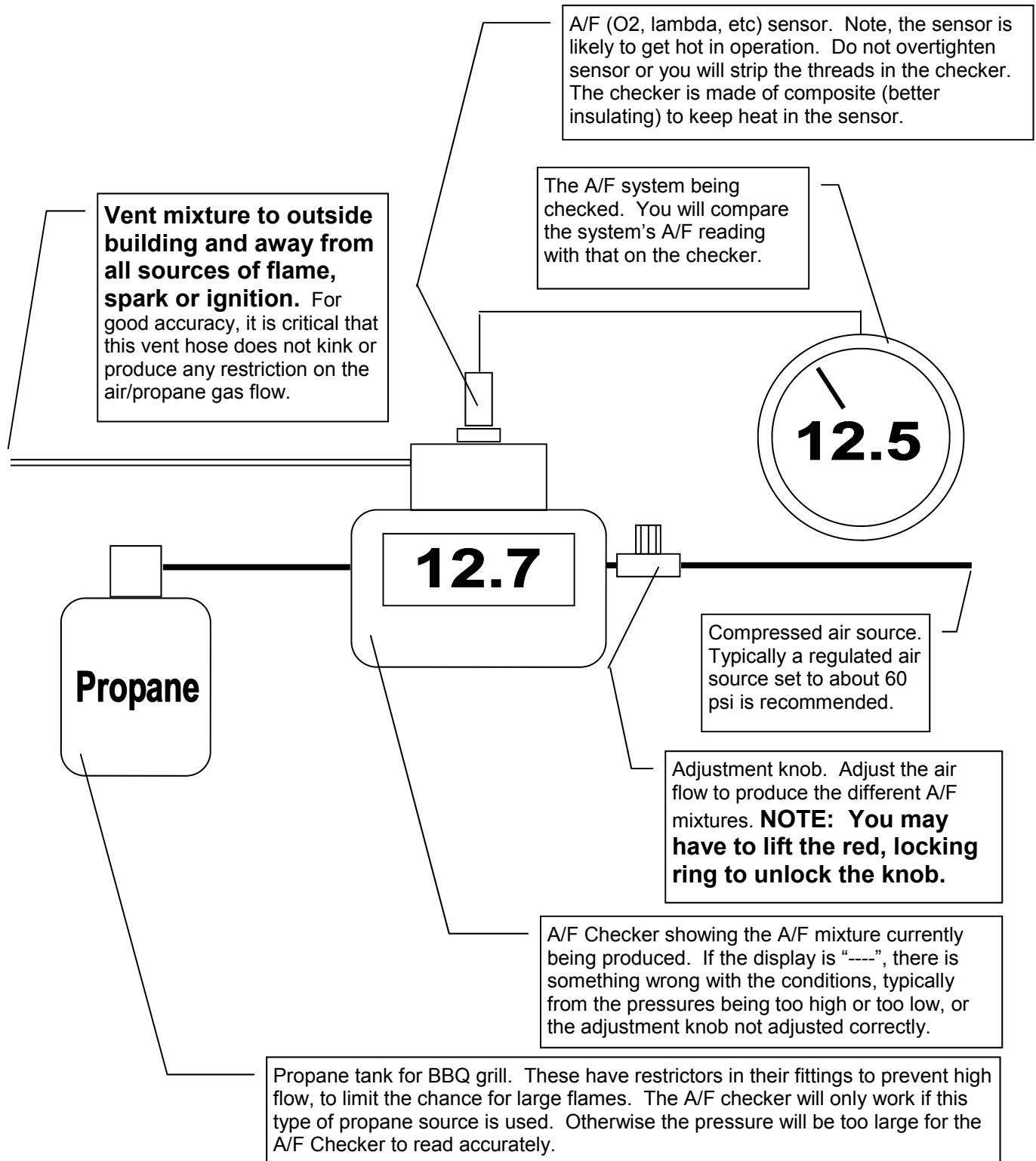
IMPORTANT:

You will be creating a very flammable mixture of propane and air. You must vent this mixture to outside your building and away from all sparks, flames, and other sources of ignition. Follow all safety warnings.

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A/F Checker Operation

The A/F Checker will create an air and propane mixture for checking your existing A/F measurement system. The schematic below gives an overview of the connections and hoses.



A/F Checker: Quick Start

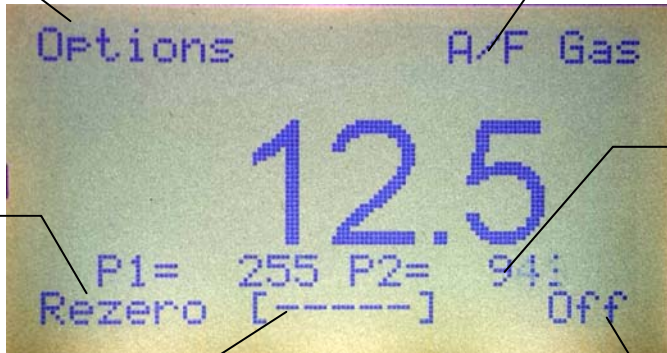
The A/F Checker will create a mixture of air and fuel (propane) of a certain “richness”. You then read your A/F sensor readout and see if it matches the display. The A/F Checker does not measure A/F, it simply lets you see if your system is accurately displaying the A/F reading that most A/F sensor systems would display. There are several options which you can select to customize the logger for your particular needs.

The screen features are shown below:

Press the Options button for menu to select features and customize the checker

Shows you the fuel type the A/F checker is simulating. If you're A/F system is showing A/F for Methanol (a type of alcohol), select Methanol as the Fuel Type in the Options.

Press the Rezero button zero out the pressure sensors with NO PRESSURE from either the propane or compressed air source. It will ask you to press one of the buttons on the right side of display once you have 0 pressure.



P1 and P2 readings show pressure readings. These can be turned under Options, then Calibration, then Display P1 P2. These can be very handy for troubleshooting the system.

Battery Indicator. If moving “+”, then battery is charging via USB cable. If “[-----]” then battery is fully charged. If “[-]” battery very low and may turn off power quickly to maintain battery power and save any recorded data.

Press the Off button to turn off the logger to shut it down and save the battery. Turning off power with latching button on side of logger extends battery life best.

Setting up your Logger for the First Time

1) Press Options, then Reset Defaults to restore all the logger's settings to their standard settings and use right side buttons to choose Yes, then press Select button. (NOTE: Once you have set up your logger, do **NOT** Reset Defaults as you may lose some special settings you like.)

2) Press Options, then Calibration and select the Calibration K from the list. For your Checker the Calibration K is

_____ Calibration K

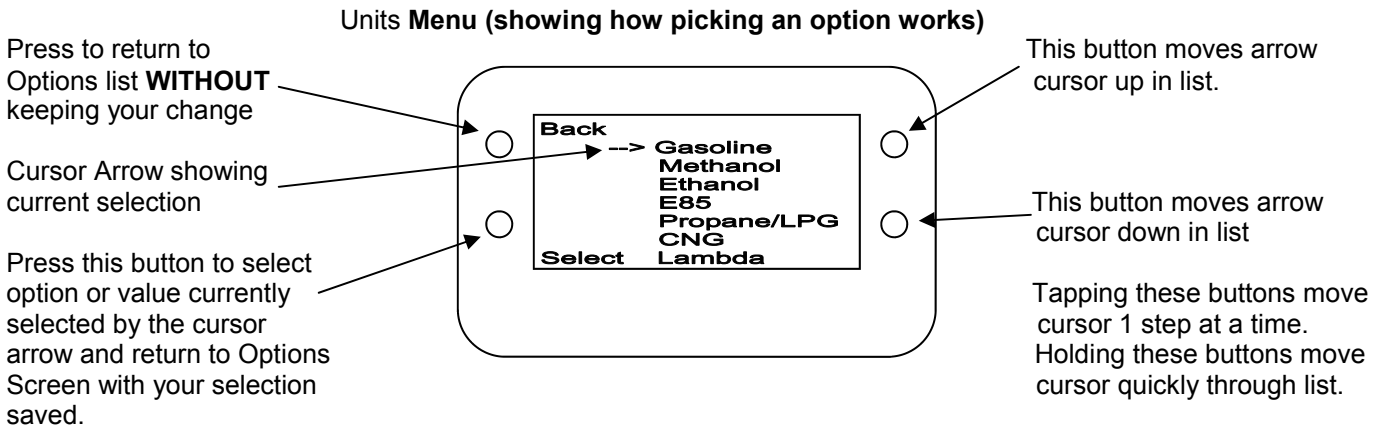
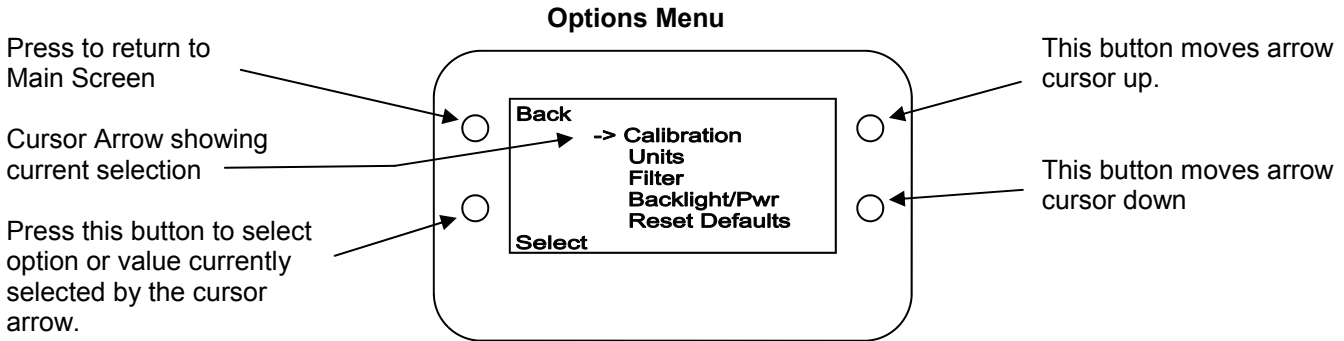
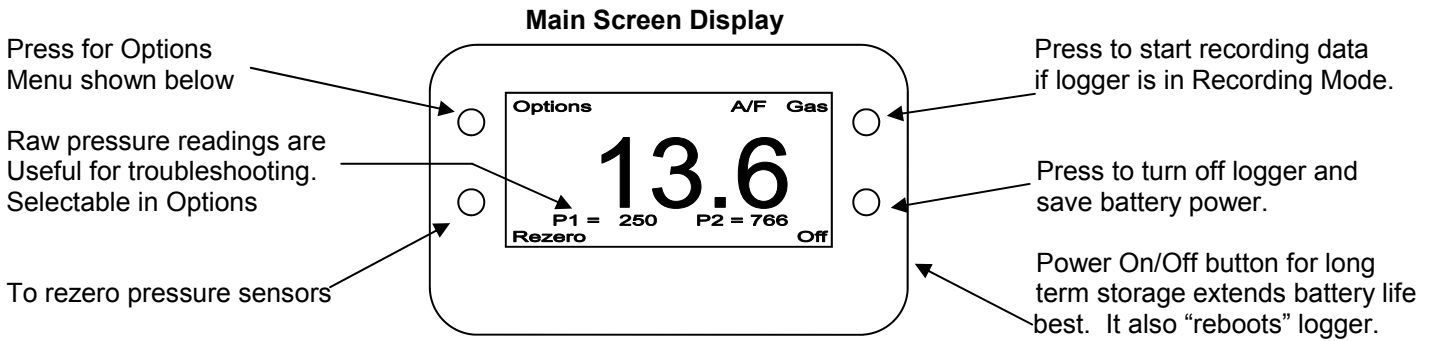
Then press the Select button. Then press Back button (upper left) to return to the main display.

3) When back at main display, press the Rezero button (lower left) and then press one of the right buttons with NO PRESSURE from either the propane tank or the compressed air source after the system has fully warmed up (been on for 5 min or so).

Notes:

- You will charge your logger via the USB cable to any computer's USB port.
- The logger will shut down automatically if it senses it is not moving, to save battery power.
- The LCD backlight will shut down automatically if it senses it is not moving, to save battery power. The time to keep the light on can be modified in the Options menu.
- If you are not using the system for more than a day or so, it is best to disconnect the 8 pin harness to the sensor to further save battery life. The sensor puts a small current draw on system even in sleep mode.

A/F Checker Options Menu Operation



A/F Checker Options Menu Operation, cont

Explanation of some menu options: Most of the menu options are quite obvious. For example, under Options you have Units and then the options are Gasoline, Methanol, etc. Your choice here should match the units being used by the A/F system being checked.

However, some can be confusing and they will be explained here.

Off button at lower right corner of display reduces power consumption and puts system into a “sleep” mode. Pressing latching button on side cuts off battery power completely, extending battery life the best.

Options, Calibration, then Calibration K lets you pick the calibration for your Checker. In most all cases, it will be for the default value of 1, unless your paperwork from Performance Trends indicates something different.

Options, Calibration, then Display P1 P2 will have the Checker display the raw pressure readings. This can be very useful for troubleshooting. Typically the P1 propane reading will be between 200 and 280. If it is much outside this range, the checker will not be accurate and the A/F will not be displayed. The P2 air reading is typically between 200 to 2000 depending on the adjustment knob position. Both should be near zero with propane and compressed air turned Off.

Options, Filter lets you specify the amount of time for the readings to be averaged together to obtain the final A/F reading displayed. If you select None, only 0.1 seconds of A/F readings are averaged together. If you select 2 Seconds, the 2 seconds are averaged together and the display is only updated every 2 seconds. This method of averaging several readings together produces much more repeatable, stable readings.

Options, Backlight/Pwr lets you specify options to save on the battery life.

- Backlit On With lets you specify if motion of the logger or pressing a button will turn on the backlight.
- Backlight Time lets you specify how long the backlight will stay on after being activated.
- InactivePwrOff lets you specify how long the box can have no motion or button press or USB communications before the box “goes to sleep” to save on power.
- Low Bat PwrOff lets you specify how long before the box goes to sleep when the battery power is very low.

Options, Reset Defaults puts the logger back to all factory settings. This can be very useful if you think you have made mistakes with the settings.

Operation and Accuracy Tips:

- The A/F Checker is not producing the same type of mixture as produced in a running engine. Therefore, you should not use it as a calibration standard, and adjust your A/F system to exactly match the A/F Checker. It should be used to watch trends. For example, if you adjust to a richer A/F by 1.0, your A/F system’s readings should go richer by about 1.0. With a bad sensor, your A/F system may actually read leaner when you set a richer A/F.
- Most A/F systems will most closely match the A/F checker in the rich region. For Gasoline, that would be from about 10:1 to 14:1. For Lambda, it would be from 0.7 to about 0.95. In this region, most A/F systems will be within 3-5% of the A/F checker. For A/F Gasoline, that means about 0.5 A/F. For Lambda, it is about 0.05 lambda. For maximum power, this is the richness level where most engines will operate.
- It is best to compare your A/F system with a new Lambda (O2 or A/F) sensor to the A/F checker in this rich area to establish a baseline difference. For example, you may see your brand of A/F system reads about 0.3 A/F leaner than the A/F checker. That does not mean your system is wrong by 0.3 A/F. However, when you check your system in the future, and now it reads 0.5 A/F richer, there could be a rich shift in your system’s A/F readings.
- **It is critical for the vent hose to be vented to outside the building and away from all sources of ignition, flames, and sparks. It is producing a highly flammable mixture. Use proper precautions.**
- **The A/F Checker will not turn off air or propane flow when powered off. Always turn off the propane tank with its valve when not in use.**
- Because flow restrictions in the vent hose will affect pressure readings, it must be completely unrestricted for accurate readings.
- Use the supplied USB cable for recharging the battery by connecting to most any computer’s USB port.
- If the A/F display is showing “----”, it is most likely because the pressures supplied are not in the proper range or the adjustment knob is not adjusted correctly. We typically recommend compressed air source to be from 50-70 psi or so. To check the pressures, press Options, then Calibration, then Display P1 P2. Now the pressure readings will show on the screen for 3 minutes. P1 is for propane pressure and is typically in the 200 to 280 range. P2 is for compressed air and is typically in the 200 to 2000 range to produce A/F readings.
- If the adjustment knob appears “stuck”, lift the red plastic locking ring to unlock the knob.

A/F Checker Packing List

A/F Checker Module



25 ft of vent hose, to vent this very flammable mixture to outside the building, away from sources of ignition, flame, or sparks.



USB Cable for charging battery



Instruction booklet.