

BITZ RACING

# **Fuel Pressure Gauge Installation guide for the CIS to EFI conversion kit**

## **Installation Guide Rev 1.1**

---

©Copyright 2007 BITZ Racing  
<http://www.bitzracing.com>

Reproduction or redistribution without written consent is prohibited

# **Table of Contents**

TABLE OF CONTENTS.....	1
DISCLAIMER.....	1
PLAYING SAFE.....	2
PARTS NEEDED.....	3
INSTALLATION.....	4
PROPER FUEL PRESSURE.....	7
CALIBRATING FUEL PRESSURE.....	8
FUEL PRESSURE WITH ENGINE RUNNING.....	10

## **Disclaimer**

By installing a fuel pressure gauge and or following these instructions you agree to the following terms and conditions:

You agree to be fully responsible for any personal injury or property damaged caused directly or indirectly. It is your responsibility for meeting any laws with regards to purchasing and installing such a product on your vehicle.

## **Playing Safe**

Refer to the BITZ Racing CIS to EFI installation guide for safety guidelines.

## **Parts needed**

Installing a fuel pressure gauge requires a gauge and an adaptor. There are many parts that work, but this installation guide will use the parts below. If you do choose another gauge it is recommended that you choose one that is liquid filled to reduce vibrations of the needle.

Pressure gauge is the Summit Racing part number SUM-800160. It has a 0-60psi range, is 1.5 inches in diameter, liquid filled and uses a 1/8 NPT male fitting. It can be purchased from <http://www.summitracing.com>. 60psi range is sufficient for a Normally Aspirated engine. If you are running higher fuel pressure and boost, you may want to consider a gauge with an 80psi range.

Fuel Pressure adaptor is the Summit Racing part number RUS-670340. The part is made from “Russell Performance Products”. It has a -6AN Male fitting, -6AN female fitting, and a 1/8 NPT female port. It can be purchased from <http://www.summitracing.com>.



Figure 1: Parts needed

## Installation

First step is to install the gauge to the fuel adaptor. The 1/8NPT thread requires Teflon tape/sealant for proper installation. Refer to the manufactures instructions.

Note NPT fittings use deformation of the threads to seal, so once you tighten your gauge to the adaptor; do not unscrew it for readjustment otherwise you will end up with a leak. Think how you want the gauge orientated before you screw it in and where you will stop the rotation.

Here is the gauge installed on the adaptor.



Figure 2: Gauge and adaptor

Next figure out on where you want to install the gauge. You can install it on either end of the fuel rails. The preferred spot is the right fuel rail as shown below.



Figure 3: Engine bay before

Note that the fuel is under pressure even if the car hasn't been started for a while. Disconnect the battery for safety and have a working fire extinguisher handy.

As you unscrew the fitting from the fuel rail, fuel will spray out so wrap a cloth around the fitting to prevent fuel spraying everywhere as you unscrew it.

Once the existing fuel line is removed, install the gauge to the fuel rail fitting, and then the fuel line to the adaptor. You may want to trim off some of the fuel line since the gauge adds a bit of length.

Below is a picture of the installed gauge.



Figure 4: Gauge installed in engine bay

With the gauge installed, you now need to check for leaks. To do this you need to have the fuel pump running. The MegaSquirt ECU however will stop the fuel pump if the engine is not running within 5 seconds. So you need to temporarily disable this safety feature. To do this disconnect the PINK wire from the BITZ Racing harness to the Porsche fuel pump relay wire harness. With the PINK wire disconnected the fuel pump will run continuously when the ignition key is turned on.

Don't be tempted to bypass this step and just turn the key on and off a few times as the ECU primes the engine every time you turn the key on and you will flood the engine.

With the fuel pump on, check for fuel leaks vigilantly. Leaking fuel is very dangerous.

## Proper fuel pressure

The BITZ Racing kit assumes a fuel pressure of 36psi (2.5bar). Note that 1bar is 14.5psi, so with the fuel pump running AND the engine OFF your fuel gauge should read 36psi (2.5bar) as shown below. If you are running a non-standard set up with 3.0bar fuel pressure you should then read 43psi(3.0bar).



Figure 5: Fuel pressure reading

If you purchased your Fuel Pressure Regulator (FPR) from BITZ Racing, then it will already be calibrated for 36psi (2.5bar) fuel pressure. If you purchased the FPR on your own, you will have to calibrate it to read 36psi (2.5bar) with the engine OFF.



## Calibrating Fuel Pressure

The fuel pressure regulator has an adjustment screw that will allow you to calibrate the fuel pressure. Loosen the locking nut first. Screwing in the adjustment screw will increase the fuel pressure, unscrewing will reduce fuel pressure. Set the gap between the screw and the locking nut to about 1/8 of an inch as a starting point for 36psi(2.5bar) fuel pressure as shown in the picture below..

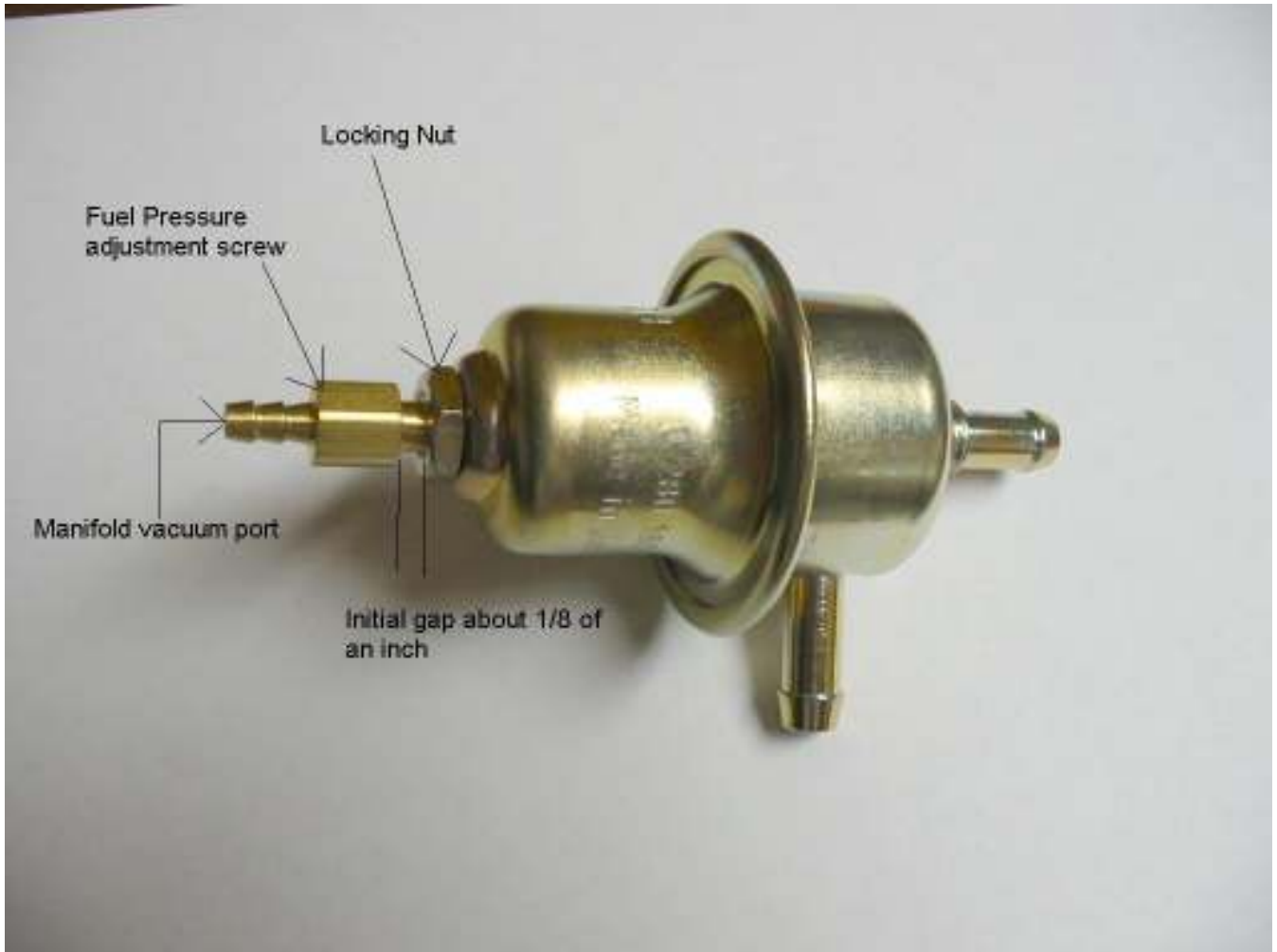


Figure 6: Fuel Pressure Regulator

With the FPR installed in the engine bay as shown below and the fuel pump running (engine OFF), adjust the screw accordingly to obtain the correct fuel pressure. Once you have the proper fuel pressure, tighten the locking nut to prevent the adjustment screw from coming loose



Figure 7: FPR installed in engine bay

## Fuel Pressure with Engine running

With the engine running the fuel pressure will not be 36psi. The FPR changes the fuel pressure so that the difference between ambient and the pressure in the manifold is kept constant at 36psi. So for example if the manifold is showing 6psi of vacuum then the fuel pressure will drop to 30psi so the difference is still 36psi.

This is the reason the FPR requires a hose to the manifold vacuum.

In order to test that this is working, you need to measure the fuel pressure with your newly installed gauge, and the manifold vacuum to check that the difference is 36psi.

Fortunately MegaSquirt ECU reports the manifold vacuum, so you don't need any other special tools. It can be read using the MegaTune software. Note that MegaTune reports Manifold vacuum in KPa.

The following table will show you what your fuel pressure gauge should read for a given manifold vacuum when the engine is running.

So the way to check is start your engine and let it idle for a bit. Using MegaTune read the manifold vacuum in KPa. Look up to see what the Fuel Pressure should be. Note the standard kit uses a 36psi (2.5bar) pressure system. If it does not read the correct pressure, check that the hose going to the FPR is coming from the manifold vacuum.

Table 1: Fuel Pressure for a given Manifold vacuum

Manifold Pressure	Fuel Pressure Reading for 36 psi (2.5bar) system	Fuel Pressure Reading for 43 psi (3.0bar) system
Units KPa	Units psi	Units psi
100	36.3	43.5
90	34.8	42.1
80	33.4	40.6
70	31.9	39.2
60	30.5	37.7
50	29.0	36.3
40	27.6	34.8
30	26.1	33.4
20	24.7	31.9
10	23.2	30.5
0	21.8	29.0

With your fuel pressure tested and calibrated, ensure the locking nut on the FPR is tight and that you re-install the pink fuel pump disable wire back on the wire harness.