Power Solutions, Inc. NG & LPG FIXED VENTURI FUEL SYSTEM SET UP

Theory and general operation:

The venturi fuel system is an extremely simple fuel metering system that meters fuel by using a differential between the pressure of air entering the engine and the fuel entering the mixer. There are two ways of adjusting the pressure differential between the air and fuel, first is the spring in the tower of the pressure regulator and second is the load adjustment valve (also referred to as the MAS or main adjustment screw on some venturi setups). The pressure regulator is used to control the pressure under starting and light load conditions. The load adjustment valve is used to adjust the flow, pressure, at higher load settings (70-100%).

Startup procedure General:

This procedure applies to the setup of all PSI fixed venturi open loop stationary engines. These include the 3.0L, 4.3L, 5.0L, and 5.7L naturally aspirated engine families.

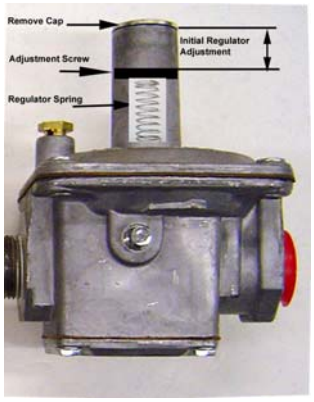
1. Attach instrumentation for step 1 of procedure.
2. Start the unit using factory setting or by making minor adjustment to pressure regulator.
3. Once unit is running set distributor using an adjustable timing light.
4. Using Oxygen sensor installed during step one fine tune the mixture under load and no load conditions
5. Remove setup instrumentation.

Startup procedure Detailed:

1. **Attach instrumentation for step 1 of procedure**.

   Install wide range oxygen sensor 6-12" downstream of exhaust collector according to Appendix A.

2. **Start the unit using factory setting or by making minor adjustment to pressure regulator**.



   The pressure regulator should be set to between 12 and 14mm or 1/2" to 5/8". The zero-pressure regulator settings are measured from the top of the spring adjustment screw to the top of the spring tower. Every venturi is factory flowed and the load adjustment valve set. There should be no need to adjust the load valve before startup. These initial settings should get the engine up and running for final adjustment with an oxygen sensor or exhaust analyzer**.** Before starting the engine ensure that the inlet side of the pressure regulator has between 7 and 11" fuel pressure. Start engine.

3. **Once unit is running set distributor using an adjustable timing light.**

   The distributor must be set before continuing the fuel system setup. Using an adjustable timing light set the timing between 30 and 32 degrees before top dead center (BTDC) for NG and between 26 and 28 degrees BTDC for LP.

4. **Using Oxygen sensor installed during step one fine tune the mixture under load and no load conditions**

   4.1 Connect wide range oxygen sensor to module and observe meter. *Note: Connecting wider range sensor to module before starting the engine will not affect the reading but may result in shortened life of the sensor because of the cold to hot cycling.*

   4.2 If no load point is between phi (1.00-1.071) or Lambda (1.00-.933). Run engine at no load until warm.

   4.3 Raise engine load to 100%. Check UEGO. Adjust load adjust valve to achieve phi (1.00-1.071) or Lambda (1.00-.933) on UEGO module. Turning the load adjust valve in the direction or R will cause the mixture to become rich and in the direction of L more lean.

   4.4 Return engine to no load. Check UEGO. Adjust the pressure regulator to achieve phi (1.00-1.071) or Lambda (1.00-.933). Clockwise rotation of the adjustment screw causes the mixture to become richer. Make sure the adjustment tower cap is reinstalled prior to final reading.

   4.5 Raise engine load again to 100%. Re-verify UEGO to be between phi (1.00-1.071) or Lambda (1.00-.933). Re-adjust load adjust valve as necessary. Return to no load and re-verify UEGO.

   4.6 Repeat steps 4.3-4.5 until fuel setting are between phi (1.00-1.071) or Lambda (1.00-.933).

5. **Remove setup instrumentation.**

For dual-fuel configurations, the standard NG fuel set up should have a tee added between the pressure regulator and load adjust valve. The side-leg of the tee should then have the pressure regulator and load adjust valve for the LP fuel. The initial settings for dual-fuel NG and LP are the same as the single-fuel settings below. The final air/fuel ratio adjustments should be done on NG first, then LP, using the procedure in section 4 above for each fuel.

EControls NTK UEGO module voltage to phi conversion chart.

	Volts		Phi			Phi		Lambda
Type in voltage	2.380	is	0.995	Type in phi		1.200	is	0.833

Typing the actual voltage in the cell above will give the actual Phi

Voltage	Phi	Lambda	Voltage	Phi	Lambda	Voltage	Phi	Lambda	Voltage	Phi	Lambda
4.50	1.500	0.667	3.45	1.250	0.800	2.40	1.000	1.000	1.35	0.750	1.333
4.45	1.488	0.672	3.40	1.238	0.808	2.35	0.988	1.012	1.30	0.738	1.355
4.40	1.476	0.677	3.35	1.226	0.816	2.30	0.976	1.024	1.25	0.726	1.377
4.35	1.464	0.683	3.30	1.214	0.824	2.25	0.964	1.037	1.20	0.714	1.400
4.30	1.452	0.689	3.25	1.202	0.832	2.20	0.952	1.050	1.15	0.702	1.424
4.25	1.440	0.694	3.20	1.190	0.840	2.15	0.940	1.063	1.10	0.690	1.448
4.20	1.429	0.700	3.15	1.179	0.848	2.10	0.929	1.077	1.05	0.679	1.474
4.15	1.417	0.706	3.10	1.167	0.857	2.05	0.917	1.091	1.00	0.667	1.500
4.10	1.405	0.712	3.05	1.155	0.866	2.00	0.905	1.105	0.95	0.655	1.527
4.05	1.393	0.718	3.00	1.143	0.875	1.95	0.893	1.120	0.90	0.643	1.556
4.00	1.381	0.724	2.95	1.131	0.884	1.90	0.881	1.135	0.85	0.631	1.585
3.95	1.369	0.730	2.90	1.119	0.894	1.85	0.869	1.151	0.80	0.619	1.615
3.90	1.357	0.737	2.85	1.107	0.903	1.80	0.857	1.167	0.75	0.607	1.647
3.85	1.345	0.743	2.80	1.095	0.913	1.75	0.845	1.183	0.70	0.595	1.680
3.80	1.333	0.750	2.75	1.083	0.923	1.70	0.833	1.200	0.65	0.583	1.714
3.75	1.321	0.757	2.70	1.071	0.933	1.65	0.821	1.217	0.60	0.571	1.750
3.70	1.310	0.764	2.65	1.060	0.944	1.60	0.810	1.235	0.55	0.560	1.787
3.65	1.298	0.771	2.60	1.048	0.955	1.55	0.798	1.254	0.50	0.548	1.826
3.60	1.286	0.778	2.55	1.036	0.966	1.50	0.786	1.273	0.45	0.536	1.867
3.55	1.274	0.785	2.50	1.024	0.977	1.45	0.774	1.292	0.40	0.524	1.909
3.50	1.262	0.792	2.45	1.012	0.988	1.40	0.762	1.313	0.35	0.512	1.954
									0.30	0.500	2.000