Augment Automotive Technical Manual Title: Augment Automotive AugTronic Quick Start Manual Document Number: AUG/MAN/009 Version: 001 Author: Tom Barker Date: 30/07/2014	

AugTronic Quick Start Manual

This manual has been produced to provide users with a set of pre-start checks and a general strategy for initial testing of AugTronic ECU's. The aim is to help users get their vehicles up and running safely and diagnose common faults quickly. It is primarily intended for those users fitting and tuning their own vehicle.

An AugTronic ECU's and its associated components represent a major modification to the Porsche 944's factory ECU. As such there are a number of factors that can cause issues during initial start. To minimise delays and general frustrations it is recommended to follow the notes and strategy presented in this manual.

This manual is intended to be used from the point at which the AugTronic system and its associated components are fully installed and connected to a computer running Augment Automotive 3D Tune. Please refer to the installation manuals for help getting to this point.

Requirements

- Computer with Augment Automotive 3D Tune
- Multimeter
- Thermometer for ambient air temperature (not strictly required)
- Air fuel ratio monitoring

Software Version Checks

Clicking the About menu in Augment Automotive 3D Tune with the computer connected to AugTronic will display the software version for both Augment Automotive 3D Tune and the AugTronic firmware. Please take note of these and send them to Augment Automotive Ltd, via email, for inspection.

AugTronic Configuration Checks

At Augment Automotive Ltd we do our best to ensure that all AugTronic ECU's ship with safe base maps for our customers. But in recognition that we may make mistakes and to familiarise the user with AugTronic we recommend users check carefully through the configuration of their AugTronic ECU. This can be done using Augment Automotive 3D Tune.

Sensor Checks

In this section we will test the various sensors that are critical to the proper functioning of the AugTronic ECU. This will be done using Augment Automotive 3D Tuner. Using the dial system check the measured sensor values for the following sensors, checking that they display a value within the indicated range. This should be carried out with the engine stopped and cold. First measure the battery voltage at the batter terminals.

- MAP Sensor (950 -1050 mbar)
- Intake Air Temperature Sensor (Ambient Air Temperature +/- 5ºC)
- Coolant Temperature Sensor (Ambient Air Temperature +/- 10ºC)
- Battery Voltage (Battery voltage +/- 0.2V)

If any of the sensors do not display the expected values first check for proper connection of the sensors to the wiring loom. If this does not resolve the issue contact Augment Automotive Ltd for further advice.

Crank Sensors

In order to test the crank sensors the engine must be cranked over with the starter motor. This can be done with the engine disabled e.g. injectors disconnected but it is acceptable at this stage for the engine to be started. If the engine starts when cranking then typically there will not be any issues, however it is recommended that the position errors variable is monitored by the user to check for excessive position errors. Typically position errors do occur at a low frequency, typically a single error now and again. If there is evidence of more significant numbers of errors please contact Augment Automotive Limited for further advice.

Should the engine fail to start, or is disabled, the next step is to use Augment Automotive 3D

Tune to check the output of the crank sensors. There are three parameters available via the dial menu which are useful for this stage of the diagnostics:

- Position Errors
- Engine Rotations
- Engine Speed

Once these parameters are displayed crank the engine over for 5-10 seconds. AugTronic counts each passing of the Reference Sensor (RS) and each time checks that the correct number of flywheel teeth have been counted between each passing of the RS. AugTronic has the capability to start and run the engine (in a limp mode) without a functioning Flywheel Sensor (FS).

However if the RS is not functioning it will not run at all. If the RS is working the Engine Rotations value will increase at a steady rate and the ignition and injectors should operate. The injectors can typically be heard as a ticking in the engine bay and the ignition system firing should cause the RPM counter on the dash to jump up and down. If the Engine Rotation counter does not increment or increments intermittently this is a sign of improper functioning of the RS.

If the RS is healthy and properly adjusted this should not occur, however if the sensor is in poor health or improperly adjusted AugTronic can in some case not detect signals from the RS.

It has been observed that even when the factory ECU can at times detect a poorly adjusted or degraded RS at the extreme end of poor signals AugTronic is not able to do so. This is something we are working on improving. For advice on crank sensor issues contact Augment Automotive Ltd.

Starting the Engine

A number of important steps should be followed following initial engine start. It is important to go through these basic checks before driving the vehicle. Any issues are very unlikely to cause engine damage at light throttle and low engine speeds. It is essential to have some measurement of air fuel ratio for this step as it is a key parameter.

Following start of a cold engine AugTronic adds additional fuel to compensate for various effects that change the fueling requirements of the engine. No attempts should be made to alter the fuel map when the engine is cold. The ammount of fuel added can be viewed in the dial system as Fuel Coolant Temperature Compensation. Due to the extra fuel the engine should run rich until warmed. It is recommended that the engine is started and allowed to warmup to normal opearting temperature and the air fuel ratio checked before driving the car for the first time. Engines with different setups will idle with different air fuel ratios. If unsure

please contact Augment Automotive limited for advice on what are acceptable air fuel ratios.

The engine should run steadily and smoothly during this warmup period. If the engine runs lean during warmup the Fuel Coolant Temperature Compensation may need adjustment. If the engine is lean once warmed up the Fuel Map may need adjusting.
If the engine is lean once warmed do not attempt to drive the car without carrying out adustments.

Warning: Lean fuelling can cause catastrophic engine damage at high loads.

Contact Augment Automotive Limited if the engine is running lean at idle and do not attempt to drive the vehicle. Should the engine run excessively rich it is not recommended to drive the vehicle or continue to run it without alteration to the fuel map.

Warning: Rich fuelling can cause foulin, poor running and stalling of the engine.

Assuming that the air fuel ratios are acceptable the vehicle can be driven. It is recommended to gently drive the car building confidence in the tune. As such it is recommended to drive only at light throttle ad low to mid engine speeds until confidence is established. It is recommended this be done in a safe environment in case of issues with the running of the engine.

Once fuelling at light loads has been checked higher loads can be used. Again proceed steadily and cautiously progressing up in load and engine speed in a controlled manner. This process will drastically reduce the risk of engine damage should some aspect of the setup contain an error.

Warning: On the road you are responsible for the safety of yourself, your passengers and that of other road users. Do not allow yourself to be distracted from the road during this process. It is recommended a passenger operates Augment Automotive 3D Tune or logs are used for post driving analysis. You have been warned!

A correctly configured engine will drive smoothly and with good throttle response. If the engine is hesitant or surges it is likely to indicate an incorrect fuel mixture. If available knock detection equipment should be used to validate the ignition parameters. Knock can also be audible to the driver so it’s worth having the window down, any detonation will give a pinging sound. This may not be audible at high loads/RPM. This is not strictly necessary as Augment Automotive Ltd provide what we believe to be safe and well tested maps with our ECU’s. However many factors impact upon the detonation point of an engine so there are no 100% guarentees. For an extra margin of safety we recommend starting with a high octane fuel e.g. UK 98-99 RON.

Warning: Engine knock can cause catastrophic engine damage at high loads.

Please contact Augment Automotive Limited for advice during this process if required.