

Control Pack for Ford 7.3 V8 'Godzilla' Crate Engine

The Installation Guide to Plug & Play Engine Electronics and Accessories

**OBR***Control Systems*

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Introduction

Thank you for purchasing our control pack for use with your Ford 7.3 V8 'Godzilla' crate engine. Our aim is to provide you with a trouble-free installation of the kit. With our kit you do not have to modify or replace any sensors or actuators. It works with the original coils, controls the cam timing and the oil pressure and reads data from the digital drive-by-wire throttle body.

Please note that these parts are legal for sale and use on uncontrolled (Non-Emissions Controlled) vehicles and on off-road racing vehicles ONLY.

WARNING: It is against the law to install these parts on an emissions-controlled vehicle

All OBR products are exclusively manufactured for racing purposes. Installing these products on any vehicle eliminates the legal use, in any capacity, on public roads/highways and may be subject to fines and/or criminal liability as per the Clean Air Act.

What is in the box?

Our kit contains these parts:

- OBR ECU with our speed density calibration for the production engine.
- New OBR engine wiring harness made using light weight aircraft type wires and fitted with standard Ford connectors for all sensors, coils, injectors, and other actuators. You do not need to replace any standard components on the engine.
- Adapter fitted with a Bosch pressure and temperature combined sensor, called a TMAP sensor.
- Power supply harness with engine, fuel pump and cooling fan relays with 30 A fuses.

Optionally, the package may also include the following recommended parts:

- A coolant plug with seal and fastener, used to close a coolant hole in the cylinder block.
- Two wide band NTK lambda sensors, one for each cylinder bank.
- Pedal kit with standard Ford throttle pedal and our wiring to connect it to our engine harness.

Important Notice

Our control packs are calibrated using premium fuel with 93 octane rating with fuel pressure set to 60 psi.

- **It is essential that you use this fuel grade.**
- **Using a fuel with lesser octane rating may result in severe engine damages**

Please contact us if this fuel grade is not available in your area and we will provide you with a 87 octane calibration.

If you are using our calibration tool, you can of course adjust the spark advance to whatever you choose.

Step 1 - Remove the Original Engine Wiring Harness

All connectors on the original engine harness have a locking feature.

Pull the lock on each connector backwards towards the wire, now press down on the tap and carefully pull the connector off the sensor or actuator.

The tap on the connector on the throttle body is located under the tape securing the wire loop to the connector housing.

The harness is secured to the engine using so called fir tree zip ties. These have a base which is pressed into a hole in the block, cover or intake manifold. Use a dedicated tool to pull them out of the locating hole.

You may use other tools, be careful not to damage neither yourself nor the wiring harness.

Step 2 - Install the OBR Engine Wiring Harness

Our harness is intended to come onto the engine from the back. It splits in a 'Y' for connections to cylinder bank 1 – the bank on the passenger side – and to cylinder bank 2 – the bank on the driver side. It is easy to identify either leg:

Bank 1 carries all injectors and coils marked '1' to '4', oil pressure, lambda 'O2 1', the ETB and connections to the camshaft sensor, VCT and the cylinder head temperature sensor.

Bank 2 carries all injectors and coils marked '5' to '8' and the connectors for crankshaft sensor, lambda 'O2 2' and the alternator connector.

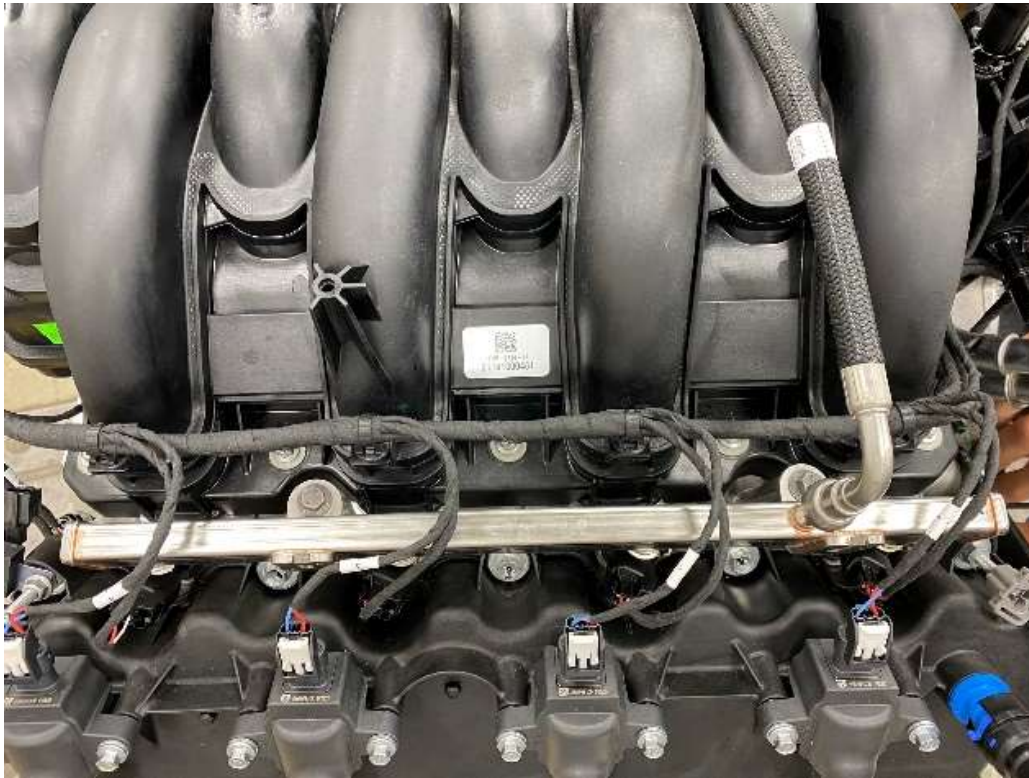
As mentioned, our harness is fitted with fir tree zip ties to ensure a safe and reliable installation on the engine. Start by securing the harness to the rear of the engine, push the zip ties into the 2 holes as shown:



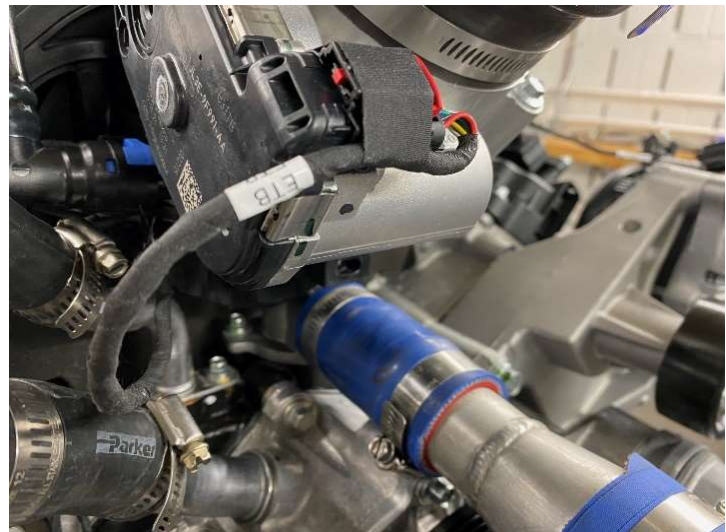
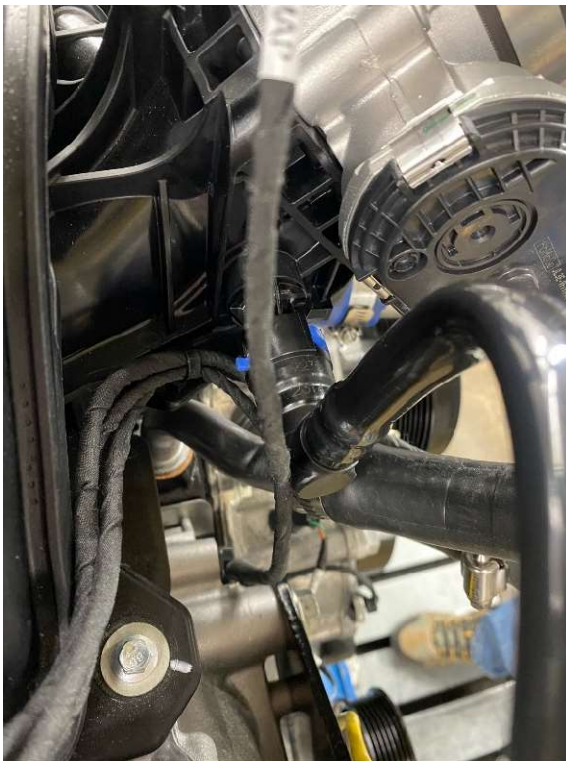
Start on bank 1 and lay the harness along the fuel rail, on the side towards the intake manifold. Run each pair of coil and injector connectors over the fuel rail and plug the connectors into the injectors and coils. Push the lock on each connector forward to secure its location.

Cylinder '1' is at the front of the engine.

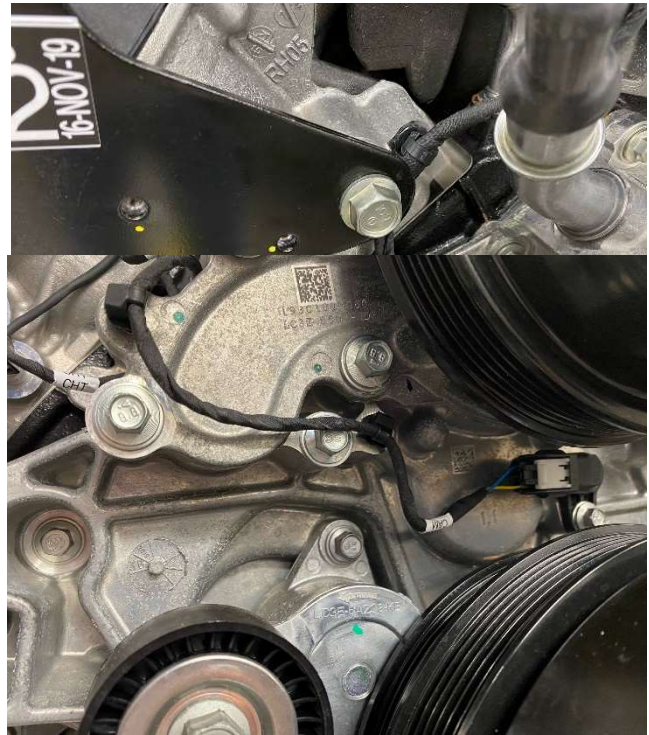
Press the zip ties into the 4 holes on the intake manifold:



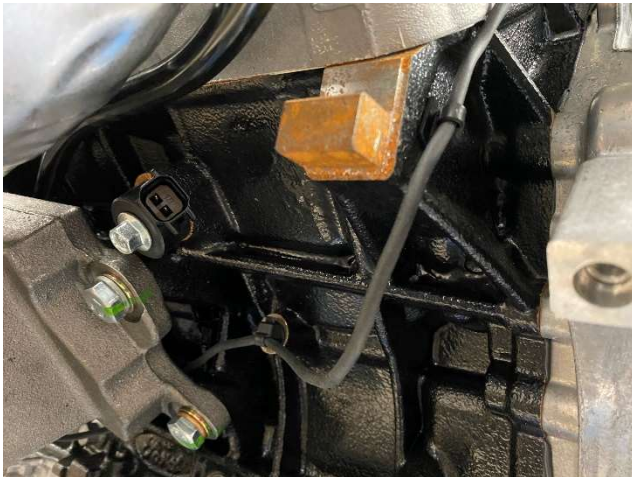
Secure the leg with the oil pump control, CHT, VCT, ETB and the cam sensor connectors to the intake manifold and run the 'ETB' cable to the throttle body:



Secure the connections to CHT, VCT and the cam sensor on the front cover:



Run and secure the wire to the oil pump control as shown:



Our harness does not include connections to the knock sensors.

Switch to the wiring leg on bank 2 and lay the harness along the fuel rail, on the side towards the intake manifold.

Run each pair of coil and injector connectors over the fuel rail and plug the connectors into the injectors and coils. Push the lock on each connector forward to secure its location.

Cylinder '5' is at the front of the engine.

Press the zip ties into the 4 holes on the intake manifold:



Run and secure the wire for the crank shaft speed sensor as shown:



Connect the wire to the oil pressure sensor and fix the ground terminal to the cylinder head with the supplied fastener.



Warning: Make sure you have connected your battery's negative terminal to chassis ground AND that your engine also has a wired connection to the car chassis.

We recommend you run a battery cable from the battery's negative pole to the same point where you ground the engine to chassis.

You can seriously damage both the control pack electronics and engine components if you attempt to start the engine with insufficient or missing ground wiring.

Connect the 3-way connector marked ALT to your alternator.

Step 3 – Connect the O2 sensor – also called lambda sensor

Please observe that our control package will only work in closed loop fuel control if you use the NTK wide band sensors supplied by OBR.

Connect the lambda sensor on bank 1 to the 6-way connector marked 'O2 1'. The 'O2 1' sensor controls the injectors on the bank where you find cylinder 1 which is the passenger side.

Connect the lambda sensor on bank 2 to the 6-way connector marked 'O2 2'. The 'O2 2' sensor controls the injectors on bank 2, which is the driver side.

Make sure these connections do clear the coils on cylinders 4 and 8 and that they are not exposed to the heat radiation from the headers.

Step 4 - Install the Bosch Pressure and Temperature Sensor

The adapter with the Bosch TMAP sensor fits onto the nipple on the intake manifold next to the ETB – as shown in the photo.



Carefully push the adaptor down onto the nipple, make sure the adaptor slides all the way down over the nipple. The collar marked with the red arrow must be inside the adaptor and above the slot.



Insert the spring clip into the slot, make sure it grabs the intake manifold nipple below the lock ring and now press it into its lock, make sure it is fully inserted and that the adapter is kept safely in its place. Plug the 4-way connector with the orange seal into the sensor.



Step 5 - Coolant Plugs

If your engine is a crate engine, you will need one coolant plug to close a coolant connection in the engine block, driver side by the flywheel. Ensure the sealant O-ring is fitted correctly on the plug and use the supplied fastener:



Step 6 - Throttle Pedal and wiring

Our throttle pedal is a standard Ford pedal from a late model Mustang. It is supplied with a cable which plugs into the 6-way connector in the pedal and into the 4-way connector marked 'Pedal' in our engine wiring harness. The ECU is calibrated for use with this pedal and no adjustments to the calibration is required.

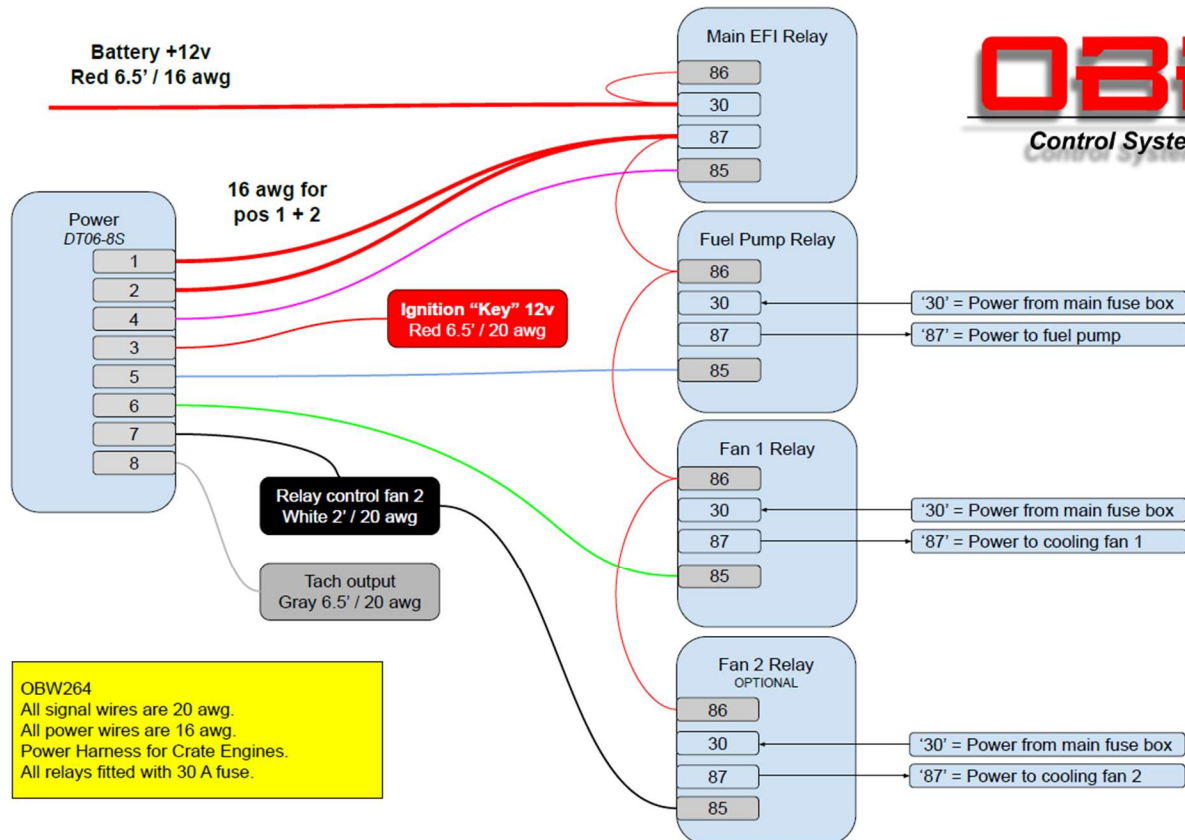
Step 7 – ECU Placement

The ECU can be fitted in either the engine compartment or in the cabin, the preferred location. If the ECU is placed in the engine compartment it must be oriented with the connectors pointing down. If the ECU is placed outside the cabin be careful if power washing the engine bay.

Do not direct the water stream towards the connectors.

Step 8 - Power Supply Harness

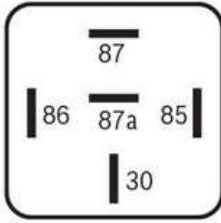
Included with the base controller pack is a power supply harness. This plugs into the large 8-way gray connector on the engine harness.



Step 9 - Ignition Switch and ECU Power Supply

Connect the thick 16-gauge red wire from the main fuse block to battery constant power supply. If you are wiring a race car, this connection must be after the battery isolator switch.

Wire the thin red 20-gauge wire from position 3 in the 8-way power connector to the switched side of your ignition switch.

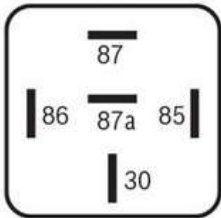
Step 10 - Fuel Pump Relay

It is strongly recommended to let the ECU control your fuel pump relay. We updated the power harness in July 2022 to include a dedicated fuel pump relay. The kit includes a relay and two terminals for the fuel pump wires but not the wires. The wires must be minimum 16 gauge.

Crimp the terminal to your power supply wire and push it into the relay socket in position 30.

Crimp the terminal to your pump feed wire and push it into the relay socket in position 87.

Fit the relay into the socket.

Step 11 - Coolant Fan 1 Power Supply

The ECU controls the relay labelled 'FAN'. This can be used to control a conventional coolant fan.

Please note that this connection cannot be used with a fan having a brushless motor!

The power harness includes a relay and two terminals for the fan wires but not the wires. The wires must be minimum 16 gauge.

Crimp the terminal onto your power supply wire and push it into the relay socket in position 30.

Crimp the terminal onto your fan feed wire and push it into the relay socket in position 87.

Fit the relay into the socket.

The fan relay is programmed to be activated once the cylinder head temperature exceeds 225 F with a minimum engine speed of 700 RPM and to switch off when the temperature drops below 219 F.

Step 12 - Coolant Fan 2 Power Supply

The short red 20-gauge wire in position 7 in the 8-way power connector is the control signal from the ECU to the coolant fan relay. Connect this wire to position 85 in the fan relay. The battery power for the relay activation must be a switched supply, controlled by the ignition switch, and it connects to position 86 in the fan relay.

Position 87 in the fan relay is the power supply for the coolant fan.

The main power supply and the fan power supply wires and the fan relay is not included with our kit.

The fan relay is programmed to activate at a cylinder head temperature exceeding 225 F with a minimum engine speed of 700 RPM and to switch off when the temperature drops below 219 F.

Step 13 - Connect a Tachometer

A tach typically requires a +12V square edge signal.

The gray wire in the power connector in position 8 is a trigger signal for use with a tachometer.

Connect this wire to your instrument's trigger input, the correct RPM should be displayed once the engine runs.

A modern tach should work without any modifications.

Other older tachometers, which are designed to trigger off an ignition coil signal, will need a pull-up resistor between the signal wire and the dash's power supply wire. You will have to fit a resistor with a value of around 5 kOhm (5,000 Ohm) fitted between the tach signal input and its +12V power supply to create a square edge signal.

We can supply you with a simple plug which connects into the CAN2 connector on the engine harness. With this fitted your tach outputs a square edge signal.

This connector has a resistor fitted between pin 1 and pin 5 in the CAN2 connector.

Part number is OBW281.

Contact OBR Control Systems if you have questions about this installation.

Step 14 - Connect a display via CAN

The ECU exports 80 engine data channels via CAN.

The CAN is setup with a baud rate of 1 Mbit/s, exporting data as words in a Motorola format.

We shall be pleased to assist with any questions about this communication.

The CAN port is not terminated.

Have a look at the displays offered, manufactured by Plex. These are fully programmable and offers sophisticated features for a reasonable amount.

<https://obrcontrolsystems.com/displays/>

Step 15 - Connect a display via OBD II

The ECU exports many engine data channels via OBD II.

The OBD II port is terminated and configured with a baud rate of 500 Kbps, exporting data according to the SAE protocol.

Connecting an OBD II display or scan tool to engine wiring harnesses manufactured before October 2022 requires our OBW265 adapter cable.

We shall be pleased to assist with any questions about this communication.

Step 16 - Fuel Supply and Fuel Pressure

Our control packs are calibrated using premium fuel with 93 octane rating with fuel pressure set to 60 psi.

- **It is essential that you use this fuel grade.**
- **Using a fuel with lesser octane rating may result in severe engine damages**

Please contact us if this fuel grade is not available in your area and we will provide you with a 87 octane calibration.

If you are using our calibration tool, you can of course adjust the spark advance to whatever you choose.

The fuel system on the 7.3 V8 'Godzilla' engine is a non-return system.

Be careful when you work with the fuel system and when checking the connections for leaks and when adjusting the fuel pressure.

Please make sure you do NOT have any sort of open flame present – this could cause an explosion!

Only use the right type of connector for the special connection on the fuel rail.

OBR can supply an aluminum fitting – OB092 - with quick connect to the original fuel rail and a -6 AN male connection to the fuel line.



When your installation is complete and safe, check for fuel leaks.

Fix any leaks before proceeding.

It is CRITICAL to adjust the fuel pressure to 60 psi, this is the pressure we used when calibrating the engine.

A connection hose from the intake manifold to the fuel pressure regulator is not required.

The control pack is pre-configured for use with our fuel pressure sensor kit OB255. Connect the fuel pressure sensor into for example your fuel pressure regulator, connect the cable to the sensor and to the AUX connector. Fuel pressure will now be included in your data display windows, available if you have purchased the OB252 communication kit, via the OBD II port or exported via the CAN2 connection.

Step 17 - Start the Engine

When you have installed all parts, checked your fuel line installation, and adjusted the fuel pressure, you are ready to start the engine. Check the oil level before starting the engine.

Warning: Make sure you have connected your battery's negative terminal to chassis ground AND that your engine also has a wired connection to the car chassis.

We recommend you run a battery cable from the battery's negative pole to the same point where you ground the engine to chassis.

You can seriously damage both the control pack electronics and engine components if you attempt to start the engine with insufficient or missing ground wiring.

Turn the key, let the engine crank for a few seconds. It should fire once fuel is distributed to all 8 cylinders.

When cold, it will initially idle just below 1,200 RPM, then dropping to 850 RPM when the normal operating temperature has been reached.

Step 18 - Communication Kit

If you have purchased our ECU communication kit OB252 (with data logging capability and 8 Gb of memory) or OB256, you will be able to access all sections of the software controlling the engine tune. You can configure for example traction control, launch control, driver operated RPM limiter, drag racing features, calibration map switches, turbo RPM sensors, shift light and paddle shift strategy for racing type gearboxes.

To establish communication, you must install 4 programs on your PC.

Please go to our website – www.obrcontrolsystems.com – and click on the 'Download' tab.

Now download and install these 4 programs:

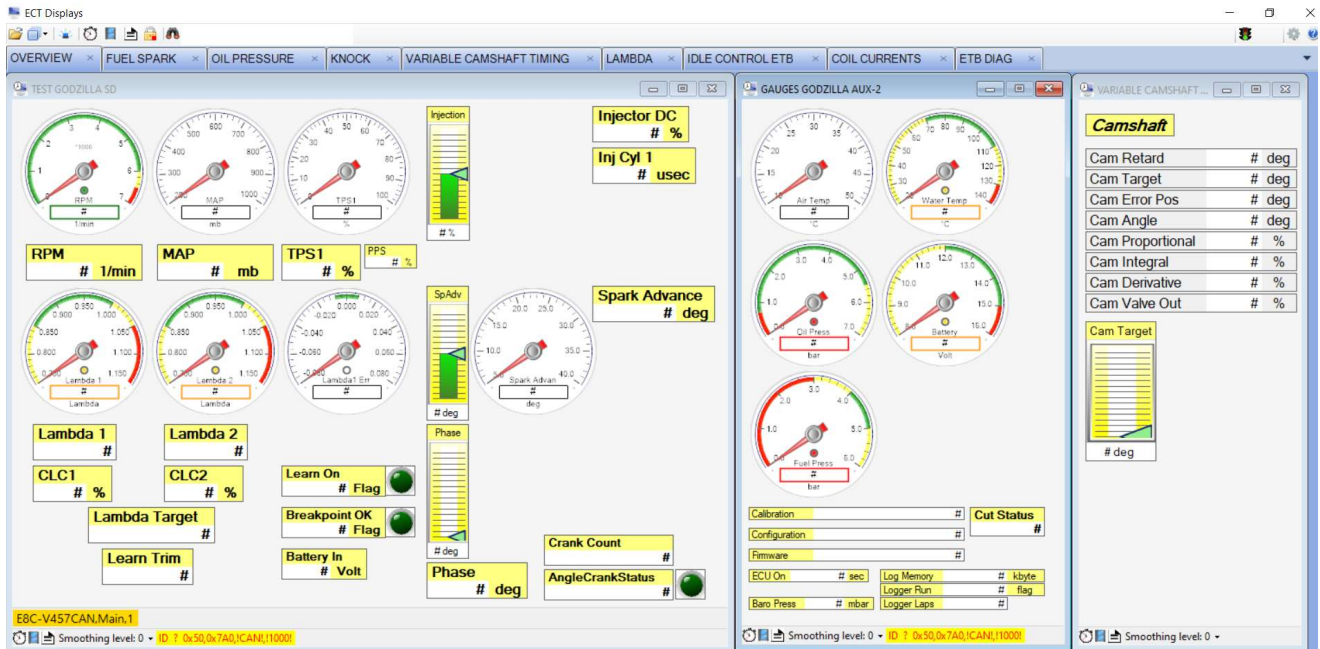
- ECT USB Drivers
- ECT PseudoProgrammer
- ECT Communication Server
- ECT Tool

When the installation of the ECT Tool program finishes, it will ask for a XIP data installation file. This file is sent to you by email when ordering the kit, if you have not received it, please contact OBR. Follow the on-screen instructions for installation if the data files.

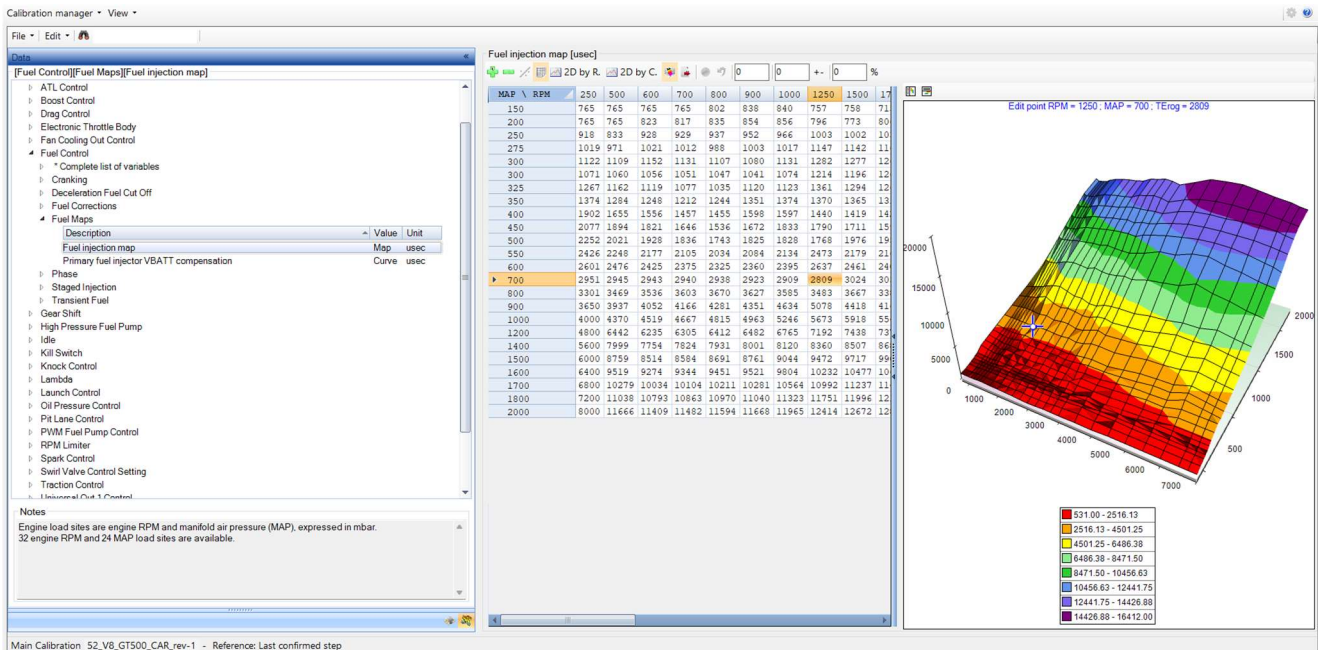
When completed, open the ECT Tool, scroll to the end, tick the box you have read and agree to the license agreement and then click OK to proceed.

When the tool opens, click on 'Workspace', select 'Euro-8 Godzilla SD' and click on 'Open'.

The display screens open:



By selecting the various tabs, you can view and edit settings for fuel and spark, oil pressure control, variable camshaft timing, lambda fuel control, idle speed, monitor ignition coil currents and diagnose the drive-by-wire throttle body.



For further information about opening the calibration software, please refer to the 'ECT Quick Guide', also available for download on our website.

Please do not hesitate to contact OBR in case you have any questions about the kit, its installation, gasoline requirements or the functionality of the control pack.

Step 19 – US Shift Quick 6 Controller Wiring

Connections between the US Shift Quick6 and our control pack are intended to be using the CAN2 connector on our engine harness.

Shift Controller Power Supply

Connect the red power wire (pin 9) from the Quick6 transmission controller to pin 1 in the CAN2 connector through a 10A fuse.

The power connection in CAN2 is supplied from the main relay in the power supply harness.

Shift Controller Power Ground

Connect the black power wires (pin 15 and 16) from the Quick6 transmission controller to pin 4 in the CAN2 connector.

This ground connection connects directly to the engine ground.

Shift Controller Pedal Signal

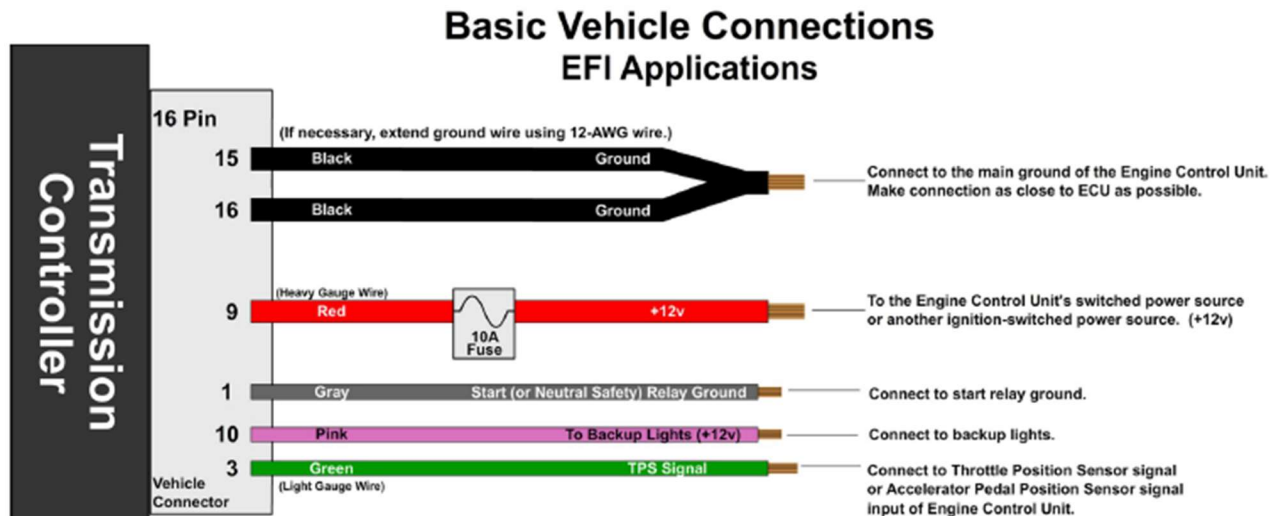
Connect the green throttle / pedal signal wire (pin 3) from the Quick6 transmission controller to pin 6 in the CAN2 connector.

Shift Controller Engine RPM Signal

The gray tach wire in our control pack power supply harness is in parallel with the tach wire in CAN2 pin 5.

Connect the yellow engine RPM wire (pin 7) from the Quick6 transmission controller to pin 5 in the CAN2 connector.

Fit a resistor with a resistance between 4 kOhm to 5 kOhm between CAN2 pin 1 and pin 5.



Step 20 – Tachometer Wiring

There are 2 connections in our control pack with a tach trigger signal.

You can use the gray wire in the OBW264 power supply harness as the signal wire for your tachometer.

You can also connect to the CAN2 connector on the engine harness and connect this way:

- Pin 1 = Battery power for tachometer.
- Pin 2 = Ground for tachometer.
- Pin 5 = Tach trigger signal.

If your tach does not display any engine RPM with the engine running, you will have to fit a resistor with a 4 kOhm to 5 kOhm resistance between pin 1 and pin 5 in the CAN2 connector.