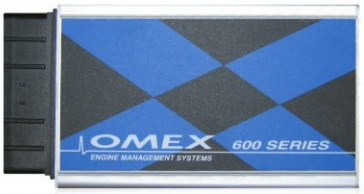
4 cyl DCOE / DHLA replacement Mappable Fuel and Ignition Kit

This kit provides an upgrade from DCOE / DHLA carburettors on any pre-electronic fuel injection 4 port, 4 cylinder engine to fully mappable fuel injection and fully mappable ignition. All you need to add is high pressure fuel and an inlet manifold to suit your engine and DCOE carburettors. If you have DCOE or DHLA carbs fitted at the moment then your inlet manifold can be used. It offers a simplified way of putting together all of the required parts from one supplier at a fixed cost with one reliable source of technical backup.

Kit Contents

DCOE / DHLA fitment Throttle Bodies
Fuel Rail
Air Horns
Injectors
Fuel Pressure Regulator
Throttle Position Sensor
Air Temperature Sensor
Coolant Temperature Sensor
600 Series Mappable ECU
Ready Built Wiring Harness
Instructions
Software

Throttle bodies, fuel rail, injectors, air horns and throttle position sensor are supplied built together, ready to just set the fuel rail length to fit your inlet manifold.



Omex's multi-championship winning 600 Series ECU controls the fuel injection, ignition, and optionally, many other functions around the vehicle. The ECU is connected to the hardware with a complete ready built wiring harness, which is fully tagged and with the correct connections made, ensuring easy clip-on fitment, optimum performance and absolute reliability.

A fixed 3.5 bar fuel pressure regulator in a billet machined aluminium housing. Fuel pipe to go between the regulator and the fuel rail is also supplied.

The supplied injectors are modern design injectors giving excellent fuel atomisation for the best emissions and performance. Different flowrates are supplied for different power outputs.

PC Windows based ECU mapping software and datalogging analysis software is included allowing you full access to the ECU.

A coolant temperature sensor is supplied to fit to a water housing. The supplied air temperature sensor is mounted in the engine bay to help with air density calculations.

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Will the kit fit?

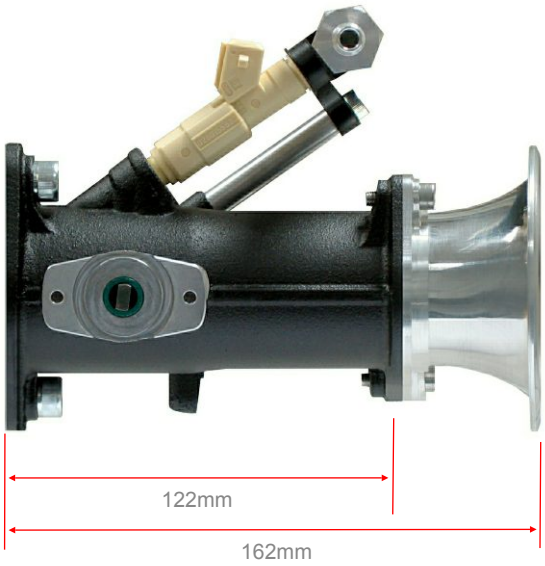
The throttle body length is similar DCOE/DHLA Carb (122mm) so will fit anywhere that these carbs will.

Remember to leave space for air filters and also allow space for the movement of the engine.

Standard airhorn length is 40mm, though different lengths can be supplied for those who have a specific inlet length requirement.

The bodies can be supplied in internal bores of 40, 42, 45 or 48 to suit your inlet manifold.

The wiring harness length allows the ECU to be mounted inside the passenger compartment in most applications, though with careful placement, the ECU can be mounted in the engine bay without problem.



All above dimensions and angles are approximate

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Wiring Harness Options

Standard 'Road' Specification

The standard specification harness in this kit is the 'road' specification. This harness uses thin wall, lightweight automotive grade cable loomed together with PVC tubing and harness tape; a specification similar to that found on premium modern road cars. Each harness is individually computer tested to ensure the build is correct.

Rubber connector boots

PVC tubing covered cable

Upgrade 1 – 'Race' Specification

The 'race' specification uses lightweight automotive grade cable, loomed together using motorsport heatshrink as found on nearly every professional motorsport harness for high flexibility, resistance to solvents and superior cut resistance. Within this outer, the cables are twisted together to provide resistance against radiated electrical noise from sources such as the high tension sparks, alternator and starter motor giving clean sensor signals to the ECU. The terminals connecting to the ECU are gold plated to ensure the best connections to the ECU possible to maintain the clean signals from the sensors. All joints in the harness are made with crimps rather than solder to withstand the high vibrations often found with solidly mounted drivetrains in race vehicles. The joints and the component connectors are then covered in glue lined heatshrink which is inflexible and so any tension placed on the harness during service goes onto the strong connector housings and cables and so away from the cable joint. All of these improvements together give longer service life and improved reliability in the harsh environment of a motorsport engine bay.

Heatshrink connector boots

Twisted cables in heatshrink sleeving

Heatshrink harness joints

Gold plated terminals

Upgrade 2 – Bespoke 'Race' Specification

The perfect harness should also fit perfectly. The bespoke 'Race' specification is built using the same materials and methods as the standard 'Race' specification harness, but with lengths tailored to suit your engine bay.

Heatshrink connector boots

Twisted cables in heatshrink sleeving

Heatshrink harness joints

Gold plated terminals

Bespoke lengths

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How much power will my engine make?

The peak power figure should match or slightly beat the power achieved using correctly tuned DCOE carbs. The ability of ECU control to give the correct fuelling at all engine conditions without compromise, will mean the engine should beat a carburettor setup everywhere else. The ECU also controls the ignition meaning optimally and accurately placed sparks of maximum energy at all engine conditions, giving maximum power and efficiency.

Can the ECU control the engine's emissions?

Although only required for engines that need to pass catalytic emissions tests (so not required for cars that were registered before the introduction of this test), should the laws ever change to require all road engines to use emissions control, the ECU is capable of doing so simply with the addition of a lambda sensor. Even without the need for emissions control, the addition of a lambda sensor will improve fuel economy (on engines that will run at λ=1).

Lambda sensor

Lambda sensor boss

Will the engine need setting-up?

Given engine details, Omex will supply the kit with the best calibration we can to allow the engine to be started. The engine will then need to be run on a rolling road or engine dyno to map the ECU specifically to your engine. You have full access to the ECU, and mapping software is provided in the kit.
The throttle bodies will need balancing to achieve a perfect idle, emissions compliance (where applicable) and smooth running.

What else will I need?

Throttle linkage – single and twin cable versions are available. They are supplied already built onto the throttle bodies assembly and may be adjusted to give the best throttle action. The linkage can be fitted over or under the throttle bodies pulling to the left or right.

Single cable throttle linkage kit

Twin cable throttle linkage kit

Air filtration – the throttle bodies will accept DCOE / DHLA pattern backplate air filters. 'Sock' filters can be used where space is tight but they can affect airflow so should be avoided if possible.

Air filter and back plate adds 50mm to kit length

Air filter socks

Synchrometer - This tool measures the airflow through each airhorn to enable fine balancing of the throttle bodies. Fine balancing is recommended for all engines, and is essential for those that need to pass emissions tests. If you are having the engine set-up by a tuner then they will already have this tool.

Balancing tool

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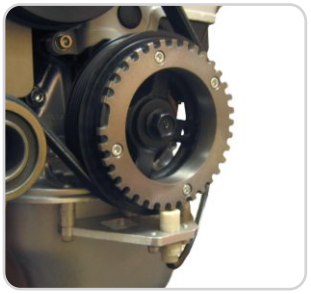
Ignition System - ECU control of the ignition means accurate spark placement due to timing from the crank rather than a distributor drive, and the ability to time the spark at every possible engine condition to give the best power and best efficiency. There are two choices for your ignition system. The first is to put the standard single coil (1 ohm or less primary resistance) under ECU control and the distributor is used simply to direct the spark to the correct cylinder, so just the distributor's rotor arm and cap are used - the points, advance mechanisms etc are now redundant. This maintains the original look of the engine but with mappable, accurate ECU ignition timing control. The second option is to use a modern distributorless coil pack. As there are no moving parts with this system reliability is increased, and spark energy is often higher with these distributorless coil packs than with old single coils. The distributor can usually also be removed giving more space in the engine bay.

Distributorless Coil Pack

Trigger Wheel and Crank Position Sensor - Engine speed and position must be read from the crank using a series of teeth and a missing tooth as a positional reference. The easiest way to achieve this is to fit a trigger wheel and sensor to the crank pulley. Omex can supply general-purpose parts. These are not in the kit as standard as it may also be possible to machine the trigger pattern into the pulley or even the flywheel.

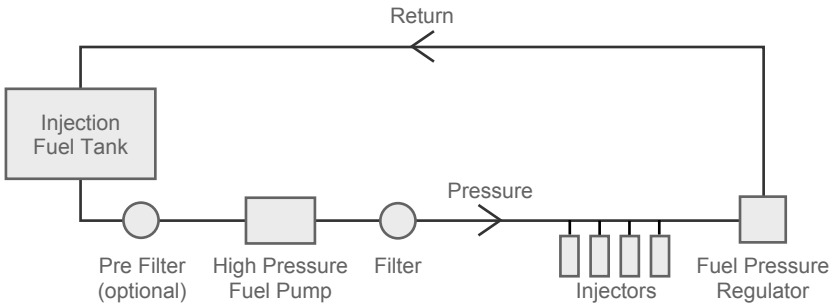
Trigger Wheel and Crank Position Sensor



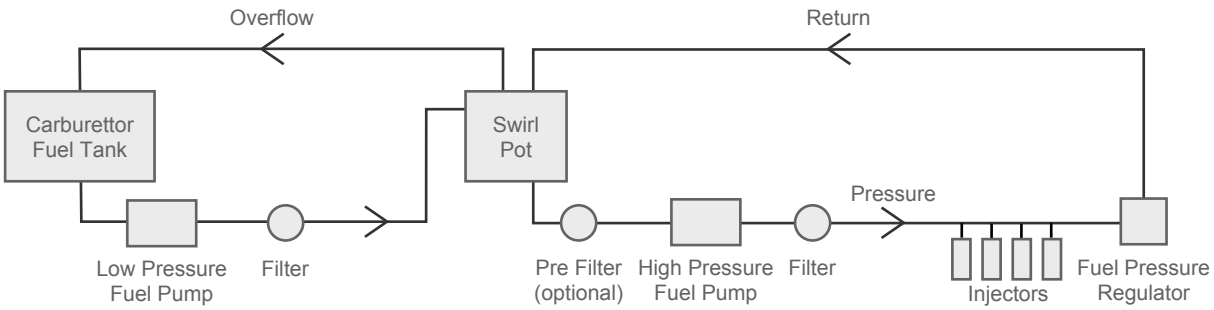
Example Installation

High Pressure Fuel System - The fuel supply for carburettors is a low pressure supply. Fuel injection requires a high pressure supply and so different components and piping. There are two ways of achieving this dependent on the chassis you are using. All parts are easily available from fuel system suppliers and most motorsport 'catalogue' suppliers;

Using a fuel injection specific fuel tank



Using a carburettor tank and swirl pot



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Extra ECU functions

With optional extra parts the Omex 600 ECU is capable of much more than simply running the engine;
Shift lights - a visual warning for the optimum rpm gearshift. Normally a high intensity 10mm red LED is used, but other sizes and colours are available on request.
Full throttle gearshift - gearshifts without lifting off the throttle. In the case of sequential gearboxes, even without using the clutch. Sequential gearboxes often have a switch inbuilt for input to the ECU, and those using a 'normal' gearbox can use an Omex clutch switch, signalling an ignition retard that temporarily reduces engine power output.
Launch control - consistent fast starts. A button on the steering wheel that gives a temporary lower rev limit holding the engine steady on the startline.
Radiator fan control - reduce the number of sensors, joins in the cooling system, and have full programmability of the ON / OFF temperatures for the radiator fan. An additional relay is required for this control.

Shift light (10mm LED)

Full throttle gearshift (clutch switch)

Launch control (button)

Radiator fan control (Relay and base)

Further information

Fuel pipe – the kit is for use with push-on rubber pipe. An upgrade to dash 6 pipe fittings is available for the fuel rail and pressure regulator.
Barometric air pressure correction – If you are using the engine with large altitude changes (such as in the Alps), then air pressure changes due to the altitude changes will affect the amount of fuel required. An upgrade to fit an air pressure sensor to automatically make these changes is available.

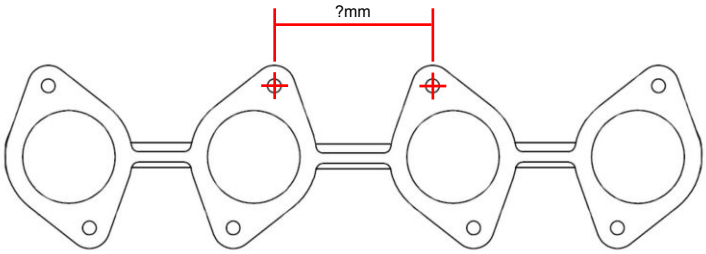
Push-on to screw-on fuel rail and pressure regulator upgrade (-6)

Barometric pressure sensor and harness upgrade

Ordering Information

Please note that this system is only suitable for 'normal' engines with 4 individual inlet ports. It is not suitable for engines where 2 inlet valves share an inlet port (known as siamesed inlets). If you have any questions about this, please contact Omex.

Distance between throttle bodies – We need to know the distance between the two sets of throttle bodies. Measure the distance between the centres of the middle top two studs on your inlet manifold.



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Why choose Omex Products?

The difference between winning and losing is very small. In hillclimbing and sprinting it can regularly be 0.05 secs, in circuit racing a half cars length, in rallying one corner.....

So what makes Omex products win so many events and championships? Simple, attention to DETAIL.

The very basics of how the ECU works makes a big difference. How it calculates when an ignition spark is going to be placed, when it's calculated, how engine acceleration is taken into account, and so ultimately how accurately that spark is placed, are things that you do not think about when looking at ECUs. Here at Omex we do because those details that are often taken for granted are the difference between one ECU system and another, the difference between winning and losing... The detailed approach to design of the basics by our team of top software and hardware design engineers, responsible for race wins throughout all forms of motorsport at the very highest levels, means you do not need to think about these details because we do. Features lists don't win races; it's how these features work that wins races. Other ECUs may have similar features lists, but how an Omex works makes all the difference. Naturally, Omex ECUs have all of the features you would expect from a top level ECU.Winning Championships is a combination of performance and reliability. Reliability is found in the details of the way the ECU is designed and built. All Omex ECUs are robot assembled in the UK on an ISO9001:2000 approved assembly line, ensuring a consistent, high quality build. They are all then thoroughly tested, twice, before leaving Omex. A well running system is a combination of ECU and many other components. It is important that all components in the system continue to work in order for the ECU to be able to perform, and so Omex source all other components such as sensors and injectors only from highly respected manufacturers.

Of course, before you can even think about winning races and championships, you need to get to the race! Omex employ only the very best engineers to ensure that whenever you contact us you get only the very best advice, right from specification of the best parts for your application, through to advice during installation, and finally, getting your engine running to its maximum potential.

And should something go wrong at any time during your ownership of your Omex ECU, the same team of technicians is available just a telephone call or mouse click away with free advice to help you through.

All these details have helped countless others win races and championships. Maybe you will be next…

Price List

Kit	Part Number	Retail	inc VAT
Throttle Body and ECU Kit XXmm below 190bhp	- OMTBKIT99XX01L	- £1600.00	- £1920.00
Throttle Body and ECU Kit XXmm above 190bhp	- OMTBKIT99XX02L	- £1600.00	- £1920.00

Please replace XX in the part number with the required bore diameter when ordering. (40, 42, 45 or 48)

Options and Upgrades

'Race' specification wiring harness upgrade	- OMEM1519(U)	- £110.00	- £132.00
Bespoke 'Race' specification wiring harness upgrade	- OMEM1539(U)	- £230.00	- £276.00
Lambda (oxygen) sensor	- OMEM2301	- £55.00	- £66.00
Lambda sensor boss	- OMEM2351	- £10.40	- £12.48
Throttle linkage **single cable**	- CL1-Single	- £98.00	- £117.60
Throttle linkage **twin cable**	- CL1-Twin	- £150.00	- £180.00
Air filter and blank back plate	- AFFB + AFBA	- £107.00	- £128.40
Air filter socks (set of 4)	- OMEM9051	- £44.00	- £52.80
Shift light (10mm LED - red) - inc mounting bezel and cables	- OMEM6003	- £7.80	- £9.36
Shift light (5mm LED - red) - inc mounting bezel and cables	- OMEM6004	- £7.80	- £9.36
Full throttle gearshift clutch switch - inc cables	- OMEM6010	- £6.50	- £7.80
Launch control button - inc cables	- OMEM6011	- £10.00	- £12.00
Radiator fan control relay and base (fitted)	- OMEM5010(F)	- £25.00	- £30.00
Push-on to screw-on fuel rail and pressure regulator upgrade	- FPR535-6(U) + FRA/XX-6(U)	- £8.00	- £9.60
Barometric pressure sensor upgrade, including harness modification when using standard 'Road' spec harness	- OMEM2100 + OMEM1419A(U)	- £95.00	- £114.00
Barometric pressure sensor upgrade, including harness modification when using 'Race' harness upgrade OMEM1519(U)	- OMEM2100 + OMEM1519A(U)	- £100.00	- £120.00
Synchrometer for balancing of the throttle bodies	- OMEM9900	- £46.00	- £55.10
Coil Pack (DIS wasted spark) not supplied with HT leads	- OMEM3505	- £55.00	- £66.00
Trigger wheel and crank position sensor	- OMEM2460 + OMEM2401	- £60.50	- £72.60
USB Adaptor - for communications	- OMEM002	- £17.50	- £21.00

Optional parts are standalone extra parts and can be added to your kit at any time. Upgrade parts, designated by a '(U)' in the part number, are upgrading parts in the kit and so are only available at the above prices at the time of kit purchase. They are available at any time, but at the full price of the part.
All information provided is, to the best of Omex's knowledge, correct at time of print. Due to differences in individual engines, differences in specification from original manufacturer that we may be unaware of, and differences in individual installations such as different exhaust designs, any claims of power or emissions cannot be guaranteed.

E&OE. VAT@20.0%

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