

***Jaguar V12 efi* product description and installation manual.**

Description of the different systems.

STD Kit

Basic system for V12 with distributor and 1 or 2 coils. The kit controls both fuel and ignition. This is a bolt on kit which is preprogrammed and keeps the engine close to original look with its distributor and coil in place as before.

The kit replaces the old engine harness, injectors, coolant operated idle valve (AAV), ignition amplifier, and ecu with its built-in map sensor and all vacuum lines with its solenoids and timers.

The kit consists of an ECU with integrated fuses for coil, injectors, ecu, auxiliary outputs and a relay to arm the whole system.

There are also 12 calibrated new Bosch injectors, clamps for these and hose attachments to mount them to the existing fuel rail. Also, a new inlet air temp sensor, coolant water sensor, electronic idle air valve, O2 sensor and a new coil drive amplifier, blanking plate for the old AAV valve and a complete engine harness with connectors and markings.



The system is stand alone and does not need anything from the Jaguar except +12v from the battery, engine ground and +12v from ignition key which you find at the original coil. The rest of the connectors is plug and play at the existing engine sensors, everything is marked.

The EFI kit for distributor engines uses the distributor signal as reference and the original distributor needs to be in good working order.



Waste spark Kit

The upgrade system has no need for distributor and is based on what we call waste spark. With this Kit you must remove the distributor and install the included plug for the distributor mounting hole, and this plug is also a bracket for the two coils which has connectors for 12 ignition leads. The two coils have 6 connections each plus the connectors from the ECU. With this kit you will lose the original look with the distributor in place, but there is a cover for the coils to make it look good. The waste spark kit needs a crank position sensor at the crankshaft in front of the engine.



The waste spark kit includes the same as the std kit but in addition you get two coil packs for 12 ign leads, coil bracket and distributor blanking plug, one crank trigger sensor with mounting bracket and a trigger wheel to fit a crank pulley/damper from a 1989 and later V12, you can buy this pulley and it fits all earlier V12 versions, there are both V-belt and poly-V belt versions available, but the poly-V version is easiest to find and you then need to change the generator pulley to Poly-V as well.

If you own a Marelli or later engine 1989 and up, you already have the crank sensor bracket and pulley on your engine.

So in basic we can say this: The std kit for distributor use is good for 1982-1988 P-digital engines with a functioning distributor and for those who want the original look of the engine. The basic kit will also fit all other engines if you buy a HE distributor in place of you old Pre HE or Marelli distributor.

The Waste spark kit is for those with a defect distributor, Marelli or later engines, big horsepower goals, racing, or the early Pre HE v12 with the not so good distributor. Or just because you want it.

Ordering.

To order a kit I need to know what engine you have, Pre HE, HE or Marelli or later. Is it a xjs, xj or E-type. Do you have any special wishes of ecu placement? The XJ system is normally mounted beside the brake booster with a included bracket, the xjs has room for the ecu just besides the dynamo at the inner wheel arch and the E-type often have it placed under the dashboard. But you can also have a rubber sleeve on the harness to route it through the bulkhead, but you need to make a big hole then. The maximum distance from back of the engine to the ecu is 130cm. And you need to decide between Std kit or Waste spark kit.



Pre Installation preparation for STD kits.

Before installing a kit for distributor engines, you need to check if the distributor advance system is ok. The vacuum system is not needed but the weights must work. Take off the cap and see if the rotor is possible to rotate by some degrees, there should be a small spring force that moved it back to normal position. Often the inner distributor shaft and outer sleeve on top has not seen oil for some time and the lubrication can be dried out or even worse rusted.



Take off the rotor and drip some oil into the shaft centre. If everything is free to move it is fine, if not, you need to overhaul your distributor, buy a new one or consider the waste spark system. When this is ok mount the rotor and cap again. Take off the vacuum line to the distributor and blank off the rubber hose (to avoid false air getting in). Start the engine and check the ignition setting with a lamp and looking on the front pulley and its degree wheel.

The HE should have 0 degree at 750 rpm and 18 degree at 3000 rpm. If this is not correct adjust the small screw in front of the distributor until it is correct. If the range is not 0-18 there is an issue with rust or stickiness in the weight system in the distributor.

(Pre HE should have 5-25 at 750-3000 if I ever decide to make a std kit for Pre HE)

If this is ok you can start the installation.

Installation of the std system

Remove the throttle shafts with their rod ends going left and right out from the top disc. Remove the throttle wire attached to the top disc, Take away the fuelrail with its injectors and brackets, remove all rubber vacuum lines on the engine and blank off the pipes sticking out of the inlet manifold where they was connected. Remove the vacuum solenoids and valves, remove the vacuum lines to the fuel pressure regulators, blank off the rubber hose going to the original ecu in the trunk.

Do not throw away the injectors, solenoids and vacuum hardware, someone may need them for an all original rebuild in the future.

Do **not** remove the vacuum lines to the air-condition system, brake booster or automatic transmission.

Remove the complete original engine harness at its connectors, don't cut anything unless you know what you are doing, it is fully possible to remove the harness by undoing connectors. Watch the old wire going to the + side of the coil, you will need it later. Also, the wire connected to the original ignition amplifier that goes to the tachometer, remove the black square box that is the ignition amplifier. If you have the original two coil setup you shall not remove the two wires connecting the two coils.

Clean up the valley and change sparkplugs if you want.



Open the radiator cap (on the expansion tank) to depressurise the coolant system. Remove the AAV valve at the rear left corner of the engine, install the included blanking plate with the original screws.

Remove the coolant sensor at the front left thermostat house and install the included sensor, make sure the threads fit, there are two thread versions. Remove the intake air sensor at the left air intake and replace it with the included sensor. Install all injectors with its new clamps, mount the hoses included, the two long ones in front.

Lay the engine harness into the engine, try to route everything to its place tidy and nice and use the original harness clamps to fix it. The engine ground wire can be connected to the inlet manifold or any other good engine ground. Plug in the connectors where their markings say and try to make it look good and hidden. Distributor and sensor wires away from the sparkplug leads.

Mount the new idle valve with the included rubber hose on the manifold where the old AAV was attached. Connect the intake of the valve to the connection on your air filter box where the old AAV was connected.

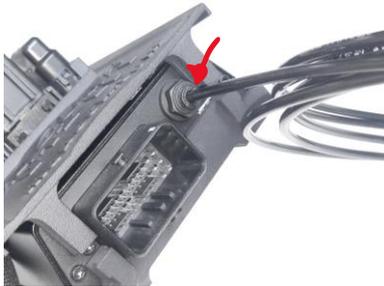
Try the fuelrail on and see if the hoses are the correct length, cut them if necessary. They must not be too long as the fuelrail will crash with the top throttle shafts, or the throttle wire mount with its kickdown switch. This is the thing to watch. Then you can crimp the included hose clamps so the hoses are fastened to the fuelrail. The hoses are lined with Ethanol proof liners with a blue colour.

Attach the original fuel lines to the fuelrail again and the original fuel pressure regulators shall remain in their place.

Find the old +12v wire that was connected to the coil and connect it to the new harness wire marked IGN.

Connect the new harness wire marked Tacho to the old wire that was connected to the old ignition amplifier.

In this kit I have prepared the connection of an throttle position sensor, but I don't use it. My experience with tps sensors, both old and new from Lucas is that they don't work very well and only mess up the enrichment system. If in the future Lucas can make a good tps sensor we can connect it and then you have the three wires in the harness as you can see. In this kit I use manifold vacuum as load signal and it works pretty well on these heavy auto cars, if you have an manual conversion or tuning parts in your engine you can alter the enrichment in the ecu map.



To get manifold vacuum signal to the ecu there is a small plastic tube included, this one shall be connected to the inlet manifold at one of the vacuum take offs (don't use the ones positioned directly on the throttle bodies) and it connects to the push fitting on the ecu itself.

Drill a hole in the downpipe of the exhaust where the two exhaust pipes joins together behind the steering rack, this is the hottest place in your exhaust and the best place to mount the O2 sensor, weld the sensor bung included to the exhaust pipe if you don't already have a Lambda sensor connection there. This is the only mechanical work needed.



Connect the new harness wire marked +12v to the battery on xj12 or main + terminal on xjs.

The wire marked FAN can be used to control a electric fan on the radiator if you remove the original belt driven fan. The red and black wire controls terminal 85-86 of a normal relay. If not in use be sure the two wires don't short circuit. The Fan actuation are at 86 degrees, but can be changed in the ecu.

The wire marked Fuel shall control the original fuel relay. An xj12 has the fuel relay at the top of the rear edge of the radiator, you can replace the old two leads with connectors attached in the relay holder with the two new wires marked Fuel.



An xjs has the fuel relay in the trunk besides the ecu at the right side. To get the signal from the enginebay to the trunk you can use two of the wires in the old harness going from enginebay to the trunk. At the front right end of the enginebay there is now a connector from the old injector control that is not attached to the engine harness anymore. You can use two of the wires there and connect the new harness fuel relay wires to. Then find the same wires in the ecu connector in the trunk and route two wires to the terminal 85-86 of the fulrelay holder.



If all connectors of the new harness are attached to its marked positions like injectors, air and water temp sensors, distributor connector and coil + and – you should turn ignition on. **Do not start.** Before you start check if you can hear the relay on the ecu click, this is arming the system, you should also hear the fuel pump start and run for a few seconds.

If this does not happen you must check if you have +12v on the wire marked IGN, good ground and +12v on the main wire, or call me at +4792806900

Do this several times to prime the fuel lines, **and check for leaks** of your injector hoses.



Now its time to adjust the throttles with its links
First check if the shafts going from the throttle body and rearwards to the sheetmetal bracket has the bushing on place. A lot of cars are missing the shaft bushing which make it impossible to do a good synchronisation. Now remove the top rod to be able to adjust the throttle plate without influence. Screw the throttle stop screw in until the throttle stop is free from the screw and the throttle is completely closed. If the throttle body is dirty and the plate is sticking, please clean it up.

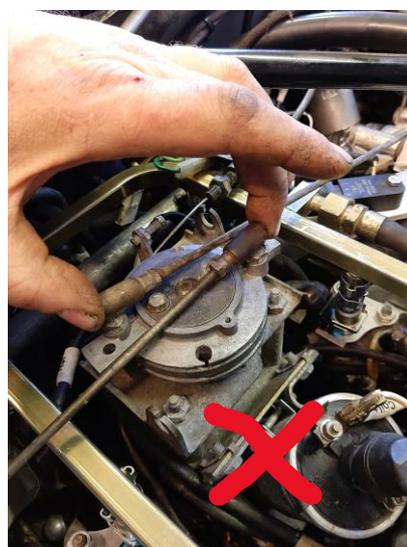
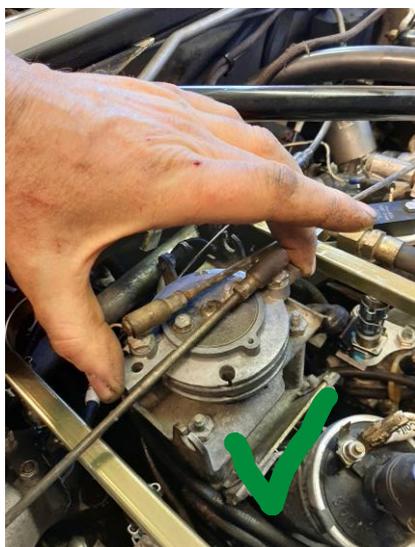
Now screw the small stop screw out carefully until it touches the throttle stop arm, stop.

Now carefully screw the stop screw further out to open the throttle a bit. You should turn it totally 9 faces of the hexagon head from when it touched the throttle arm. That is aprox 1.5 turn out.

Do the same on the other throttle body. Now reattach the two top rods again and loosen the ends to be able to adjust their lengths.



When doing this it is important to turn the main center top disc by holding the aluminium disc itself and not put your fingers on the rod ends. This is because you want to adjust the rods to take up the slack in the rod ends of the disc also. You will not do that if you put your fingers on the rodends.





Now stand on the right side of the car with your left hand on the top main throttle disc, stretch over the engine and look at the left throttle stop where it rests on the screw. Put your right-hand finger on the throttle stop on the right hand throttle stop. Now turn the disc and look on the left side while feeling at the right side with your finger to see if they leave the stop screw at the same time. Adjust the rods until you are happy. Now go to the other side of car and do the same and see if you are still happy.

Tighten the rod end lock nuts and check again, on both sides.

Extras with waste spark system



If you have bought the waste spark system, you must remove the distributor and replace it with the included coil bracket. You can use the original distributor screws and O-ring. Mount the two coils with the connectors placed at the lower half of the coils.



Remove the crank pulley with its damper, if you have a Marelli or later engine you remove the original triggerwheel and mount the new one with the included shim ring and you can use the old screws, the triggerwheel is located correct by one dowel. If you have a pre Marelli engine you need to get a Marelli type crank pulley (harmonic damper) to do this.



If you have a Marelli or later engine the new crank sensor should fit on the original trigger sensor bracket. (Right in the picture)

Please check the distance between the sensor and the new triggerwheel, it should be 0.5 to 1.5mm, 1mm is best. Use small shim washer is necessary to adjust.

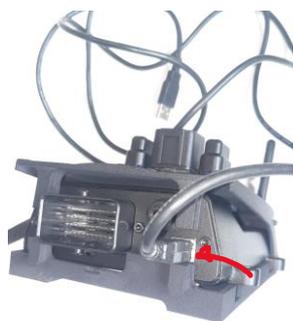
If you have a pre Marelli engine you get the sensor bracket with this kit. It is mounted by the same screws as the degree plate under the pulley, replace the degree plate with this new bracket. (left in the picture) Check sensor to triggerwheel distance. The xke engines are a little different with a thicker oil pan and oil cooler in this place, contact me to discuss solution.



Startup

Now start the car. Have a fire extinguisher ready as always when working on old cars. Don't use the throttle pedal. It should start and the rpm should rise until 1500rpm for a few seconds and land on approx 1000-1200 rpm if it is cold. It should be down to 750-850 when hot. Check for fuel and coolant leaks. Check if you have forgotten to blank any vacuum connections. Also check if you have remembered to blank off the rubber tube going to the old ecu in the trunk. Now go for a test drive. Bring the fire extinguisher along with you.

If OK tell everybody, if problems call me please.



If the idle is hunting or wrong you can try to adjust the throttle stops a little bit, same on both sides. Max 0.5 revolution. This will alter the response of the control loop of the idle. If you have done things to the engine that alter the idle quality or have installed headers, cams, pistons or similar you can connect to the ecu with a laptop, usb cable and free tuning software. Here you can play with idle control and many things, but please save your new work under a new name so you still have your old file intact. Before you start altering the Lambda table you need to know what you are doing, please do not alter VE table, injector spec or ignition tables unless you are experienced with this and have a dyno.

You find the software to tune your ecu with the attached usb cable here:

<https://www.maxxecu.com/downloads>

My Intension has been to preprogram the ecu in a way that it will work pretty good all ove the world, but ofcourse I have not been able to adjust cold start at like 30-40 degree Celsius intake air temp among other weather phenomenos I don't see here in Norway. So please report back if you have any issues or problems so we can sort it out together and develop the map to become more robust in the future.

I will release all map upgrades on the Mobeck EFI kit usergroup on Facebook.

<https://www.facebook.com/groups/803006037249227>

Also you are welcome to ask for membership there and please post questions and experiences there as there almost certain that others like to hear from others.

Best regard
Ole Martin Mobeck
+47 92806900