

OPERATING THE SYNERGY 4Bv3

The Synergy 4bv3 is a great update of our top selling Synergy 4, 2 channel tuning module for non-common rail engines.

CONNECTING *ALWAYS CHECK YOUR CONNECTIONS BY TRYING TO PULL THEM APART.*

Please see separate model specific sheets for fitting info.

REMOVE THE FRONT PANEL TO ACCESS THE FUELLING CONTROLS AND THEN RE-ATTACH USING THE SUPPLIED SCREWS WHEN YOU ARE HAPPY WITH THE RESULTS.

CONTROLS

The right hand mode control has 8 settings arranged as shown below and on the label. Settings start again at 0 when turned past 9. Settings 8 & 9 are the same as 0 and 1. **THIS CONTROL DOES NOT ADJUST THE FUELLING, ONLY THE SWITCH ON/OFF OF THE SYNERGY.**

A. STANDARD SETTINGS

- # 0 switches on the box at around 10psi (i.e. slightly higher rpm)
- # 1 switches on the box at about 6psi
- # 2 switches on the box at about 3psi (i.e. lower rpm – *use this setting of these 3 if possible*)

ADJUST THE FUELLING WITH THE CONTROL MARKED 'FUEL'. Remove front panel to access it. Turn to the right to increase. Default setting is about 10 o'clock. **DO NOT FORCE THE CONTROL PAST THE ENDS STOPS.**

BOX DOES NOTHING UNTIL IT'S ACTIVATED BY THE BOOST PRESSURE.

B. SETTINGS WITH EXTRA FUEL BEFORE TURBO SPOOLS UP FOR IMPROVED SETTING OFF

- # 3 switches on the box at around 10psi
- # 4 switches on the box at about 6psi
- # 5 switches on the box at about 3psi (*Use this setting of these 3 if possible*)

ADJUST THE OFF BOOST FUEL WITH THE CONTROL MARKED 'HSF' to improve the very low down torque before the turbo spools up, and the main (on-boost) fuel with the 'FUEL' control as above. Turn to the right to increase. Default setting is about mid way with the slot vertical. **DO NOT FORCE THE CONTROL PAST THE ENDS STOPS.**

IDLING & MPG CAN BE AFFECTED IF YOU TURN THE HSF CONTROL TOO FAR TO THE RIGHT.

C. SETTINGS FOR POOR HOT STARTING

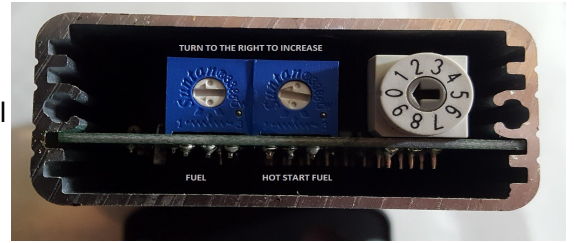
- # 6 - same as 1 but with extra fuel to aid hot starting **but only for 20secs** and adjusted with the HSF control. There is no Off Boost fuel feature for this setting.
- # 7 - same as 2 but with extra fuel to aid hot starting **but only for 20secs** and adjusted with the HSF control. There is no Off Boost fuel feature for this setting.

TIP: If the hot starting issue is mild, settings 3,4 or 5 may be suitable, or if bad, use 3,4, or 5 and fit a dash switch – press it in for hot starting (as well as when extra torque is needed).

IDLING CAN BE AFFECTED BUT ONLY DURING THE 20SECOND CRANKING WINDOW. A COLD START MAYBE ROUGH. SLIGHTLY OPEN THE THROTTLE TO STOP THIS

V3 HAS AN EXTRA ADJUSTER ON THE LEFT FOR THE SPORT SWITCH

To access the fuelling controls, grasp the end panel and pull to remove. Keep the white pegs for refitting it. Once you have finalised your settings, use the supplied screws for greater security.



- **LEFT MOST IS THE SPORT SWITCH ADJUSTER**
- **CENTRE IS MAIN FUEL WHEN THE BOX IS ACTIVATED BY THE BOOST PRESSURE.**
- **RIGHT IS FOR USE WITH SETTINGS 3,4,5 FOR OFFBOOST FUEL & HOT START FUEL ADJUSTMENT ON SETTINGS 6 AND 7.**
- TURN TO THE RIGHT TO INCREASE.
- THERE IS NO RECOMMENDED SETTING.
- OWNERS MUST CHOOSE THEM APPROPRIATE TO THEIR VEHICLE CONDITION, USAGE AND MANNER OF DRIVING.

OPTIONAL DASH SWITCHES

On the latest V3 version, the **left most adjusting screw** labelled 'SPORT' operates when the optional dash push button switch is plugged in, to vary the extra torque when the button is pressed in & led is lit. Turn right to increase. **DO NOT FORCE THE CONTROL PAST THE ENDS STOPS.**

Lift off the accelerator momentarily before pushing or releasing the button.

For the pushbuttons, red lit (in) = sport, out = normal. Green is the opposite: lit (in) = normal, out = sport.

You can press the button for extra fuel when cranking if you have hot or cold poor starting.

TIP: You can check the effect of the dash switch by simply plugging in a spare 3.5mm stereo jack plug with nothing connected to the wires. Inserted = sport mode.

NOTES

1. For best mpg the box needs to be working most of the time ie. you can feel the extra torque and also reduce gear changing so use settings 2 or 5.. (Auto boxes should change up sooner and down later)
2. The box switches off on the over run and at idle so this should not be affected unless you are using settings 3, 4, or 5 and have the HSF control too far to the right. See troubleshooting section.
3. Optionally use a dash switch to give extra torque for setting off with a trailer attached and on hills. The amount is now adjustable using the left hand screw.

TROUBLESHOOTING.

Poor connections. If you get no improvement even when using setting 3, 4 or 5 regardless of the HSF control, the two wires are not connected to the wiring or ecu correctly. If you can feel a difference when turning the HSF control but not when the turbo is on boost then see map sensor issues below if turning the 'fuel' screw to the right does not help.

Map sensor must be working properly and not out of spec. As the sensor may not be used normally (other than for overboost detection – varies with vehicle) you may not be aware of its condition.

We recommend inspecting the port on the sensor – it should be completely clean. Also blow down the tube there should be no resistance & check for leaks. We've come across several cases where the tube or indeed, the sensor itself were not connected at all.

Idling is unstable &/or engine rpm does not drop as quickly on the over run is because the mode setting is too high **or** the HSF control is too high (only for settings 3,4,5,)

Turn the HSF control fully left, if no better, switch to settings 0, 1 or 2. Or if you have hot start issues, settings 6 or 7.

You can turn the HSF control with the engine idling

Power surge when the box switches on. If you are using a high fuelling setting (middle control) there will be a more noticeable step in power delivery when the box does switch on. This can be minimised by using the setting with the lowest switch on pressure so the box is on for most of the time. Otherwise you will need to adjust to the different throttle response and be less heavy footed - I.e. open the throttle progressively (this will also benefit mpg and reduced auto box activity)

Try the next higher setting in the bands: 0, 1, 2, or 3, 4, 5 or 6, 7. Eg use 5 if currently on 4, or 2 if on 1. Make a small left adjustment of the fuel control.

Performance was good but has dropped off recently. Check your intake hoses from the turbo intake and from the outlet to intercooler and to the manifold. (Split hoses are very common). If an egr valve is fitted, check it it not leaking when closed. Also check the map sensor tube.

Hot start not improved. If the injection timing is out, this is known to cause hot start problems which the Synergy cannot improve. So if the problem arises after a recent pump or cambelt (where relevant) change have the timing checked.

ENGINE RUNS ROUGH, POOR PERFORMANCE, WARNING LIGHT AND/OR LIMP MODE.

Change the fuel filter, check the Synergy 4 connections, check the map sensor and make sure there are no splits in the tube to it.

NB just because removing the Synergy seems to cure all the problems does NOT MEAN IT IS FAULTY because more fuel is required when it's fitted and any restrictions will cause unpredictable results. Diesel bug clogs filters rapidly and filling up at country filling stations outside of the UK is risky.

AUTOBOX GEARCHANGES HAVE CHANGED IN BEHAVIOUR.

We suggest the transmission fluid (ATF) is replaced

WEAR & TEAR CONSIDERATIONS:

In accordance with our Terms of Business section 9, which can be found here:

<https://www.tuning-diesels.com/legal>

we do not accept any liability for the consequences if any, for the use of this product on your vehicle.

There is no recommended settings because we cannot predict which would be appropriate for your vehicle.

SYNERGY 4 FAQs.

How does it work?

The Synergy 4 works with the engine ecu to increase the injected fuel quantity by altering the pump stroke.

Does it increase the injection pressure?

No, the injection pressure cannot be altered on VP type pumps.

Does it increase the boost pressure?

No, the ECU does not alter the boost pressure on most vehicles of this era with VP type pumps. But it will alter the boost profile due to the extra fuel causing the turbo to spool up sooner and more strongly. The max boost is not altered.

If you wish to raise the boost pressure fit an adjustable bleed valve in the tube to the actuator. Also fit a boost gauge so you can monitor the increase.

How can it improve the mpg?

When the box is active, less throttle is needed to maintain a steady speed which the engine ecu interprets as less engine load and therefore it adjusts various parameters resulting in improved efficiency. (it's as if you are descending a slight incline.) Less gearchanging is needed and autos should not change gear as often which also helps improve the mpg.

I fitted it but my idling is unstable – hunts up and down slightly.

You are using one of the OE settings – 3, 4 or 5 and have the HSF control too far to the right. Either use

settings 0,1,or 2, or turn the HSF control to the left until it stops hunting. You can adjust it with the engine idling

Why am I getting no or minimal improvement?

99.9% of problems are due to incorrect connections, normally the 2 injection pump wires so please disconnect them, check you have identified the correct ones and reconnect. In particular make sure you have found the correct black wire – IT IS NOT A GROUND WIRE see below.

On Mitsubishis, two types of injection pump are fitted and later models need the fuel screw to be turned much further to the right.

Why do I read a short circuit when I meter the pump wires?

Its not actually a short circuit but a very low resistance of a few ohms.

(both wires are connected to the ecu so we advise against metering the connections as ohm measurements work by injecting a voltage and measuring the current which the ecu electronics may not appreciate)

How can I increase the boost pressure?

You can fit an adjustable bleed valve into the pipe from wastegate actuator to the turbo compressor housing. Also fit a boost gauge and keep the increase to a few psi.

Settings 3,4,5 feature maps which allow the boost to be manually adjusted without the ECU from reacting negatively and invoking limp mode. (not on VWs)

Can I fit a vnt turbo to my engine?

Many owners upgrade the turbo to a VNT type from a similar size engine and use our Digibooster S to control it. This is a standalone digital controller which works very well and far better than any mechanical device. The turbo must have a vacuum actuator – the most common type on older turbos.

<https://www.tuning-diesels.com/store/DIGIBOOSTER-c21487243>

Can I use it on other vehicles?

NO, it only works on the vehicle you purchased it for, regardless of whether the other vehicle has the same connectors. *(they are wired differently and you will irreparably damage the Synergy if you try it)*

Is there a need for increased servicing requirements?

Any deviation from the vehicle manufacturer's specifications may require enhanced servicing such as more frequent lubricant changes, including the transmission fluids.