



# TOYOTA LANDCRUISER V8 Twin Turbo Diesel with Automatic Transmission AB60F DRIVE SETUP



## Subject: AB60F 6-speed Automatic Transmission—Converter Lockup Improvement

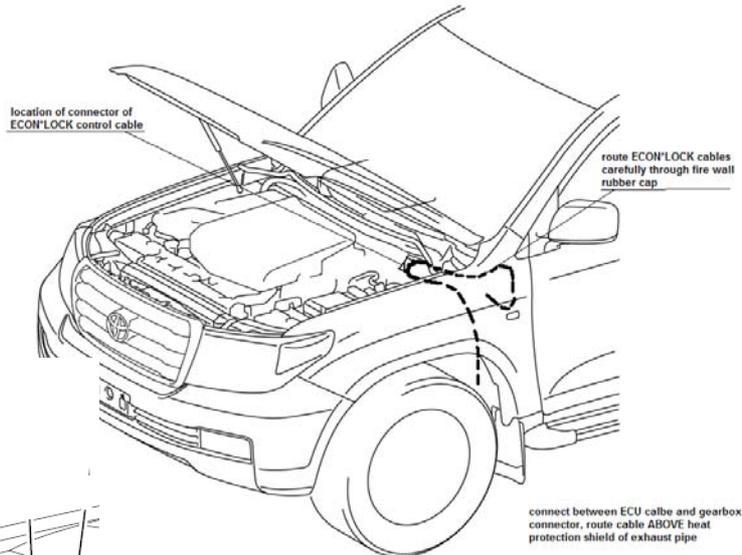
**Background:** This module is designed to fix a serious problem of the converter lockup functionality, which is responsible for a dramatic lack of fuel efficiency at speeds between 60 and 120km/h, bad engine brake effect when driving downhill and poor driving performance.

**BEFORE INSTALLATION:** Disconnect BOTH Batteries and connect on one battery side the cables for PLUS and GROUND together for the duration of the installation of **ECON\*LOCK**. This will delete all calibration parameters of the ECU and recalibrate the system once been powered up again.

**ECON\*LOCK** has been designed to use the converter lockup signal from the ECU and modifies it, so that the converter locks up at the expected conditions, improves fuel efficiency, improves the engine brake effect and makes the vehicle overall much more nippy.

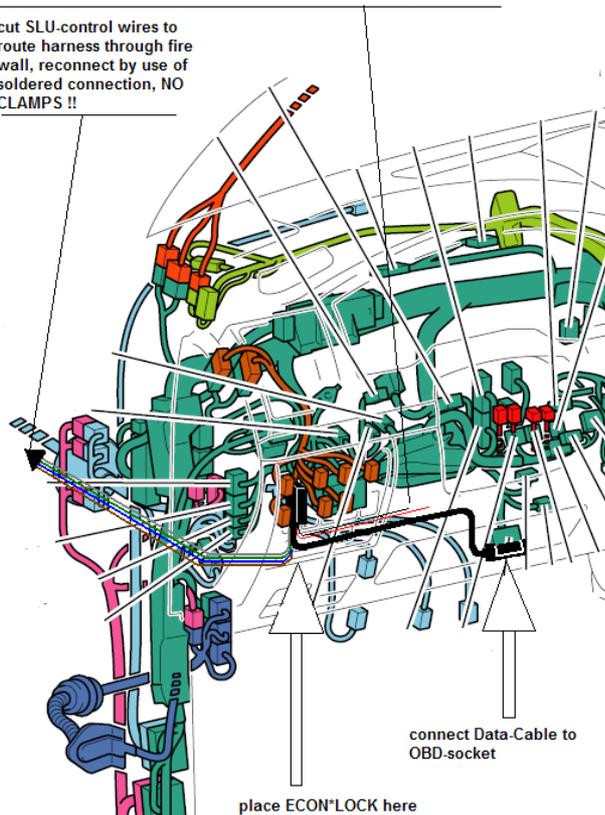
**Installation:** If the **ECON\*LOCK** is available with a plug & drive harness, the installation is pretty easy.

- 1) Place **ECON\*LOCK** on the passenger side under the dashboard next to the ECU.
- 2) Route the **ECON\*LOCK** harness along the fire wall under the plastic cover to the driver side. Follow the whole way



connect RED wire to IGN-PLUS and BLACK wire to body-GROUND

cut SLU-control wires to route harness through fire wall, reconnect by use of soldered connection, NO CLAMPS !!



down to the suspension arm of the front wheel. Route the harness out of the corner and push it back to wards the cable connector of the gearbox. The cable has to be feeded OVER the head protectors of the exhaust pipe, to ease this work, one fixing screw of the heat protection plate has to be opened.

- 3) Disconnect the original gearbox control cable with the big connector and fit the adapter between original connector and gearbox.



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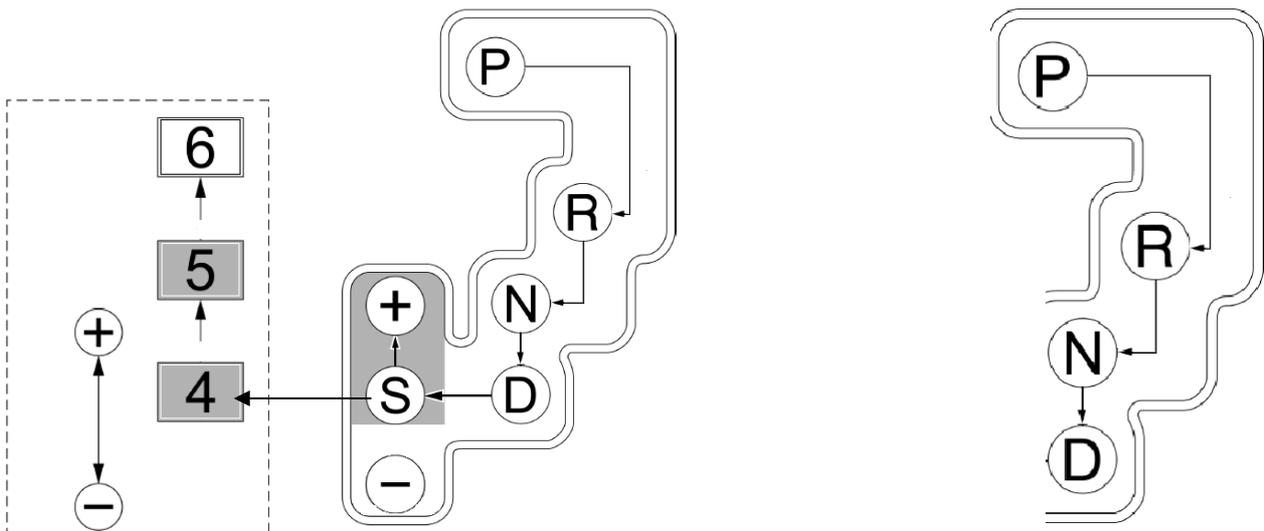


5) Connect the OBD-Cable to the OBD-Socket

6) The **ECON\*LOCK** requires a power supply from the Ignition system. Since there are no IGN-terminals available under the dashboard, one source could be the supply of the wiper-ECU.

Operation: AFTER starting the engine, **ECON\*LOCK** will be active in D-Mode and S-Mode. In D-Mode ECON\*LOCK will activate the converter lockup at 70km/h, depending on driving conditions, in S-Mode the activation will be at lower speeds, depending on the pre-selected gear position.

ECON\*LOCK can be deactivated by pressing when the gearbox is operated in „2nd-Mode“ or in „PWR-Mode“. To reactivate ECON\*LOCK after operating the gearbox in „2nd-Mode“ or „PWR-Mode“, you simply have to be in „D“ or you shift into „S-6“ once.



Once **ECON\*LOCK** is activated, the operation will be performed within the mapping of the **ECON\*LOCK** controller.

At any time it is possible to change back to regular ECU-control by shifting into D and lifting the foot from the acceleration pedal.

Akustic Error Signals:

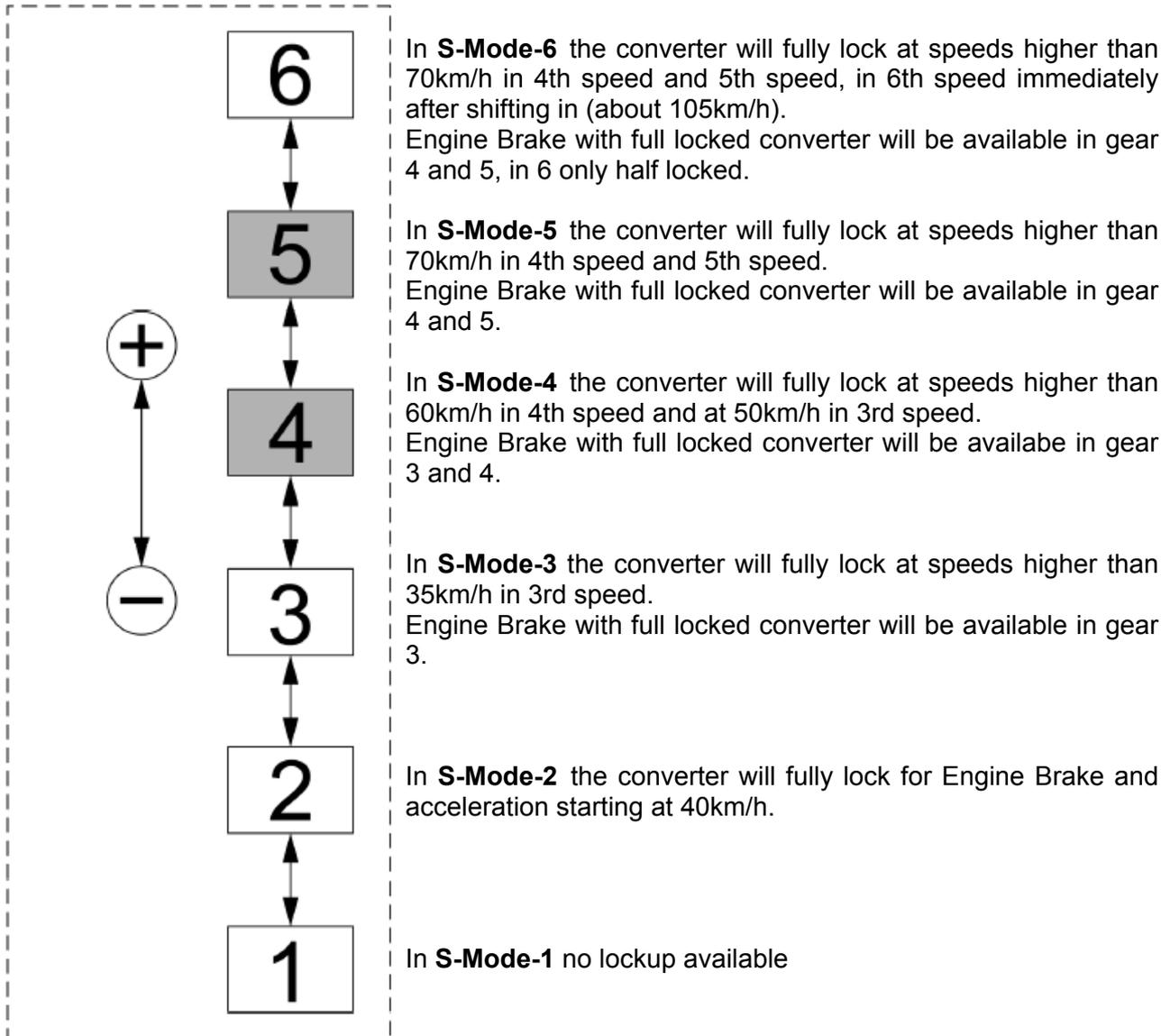
beep after starting the engine = **ECON\*LOCK** successfully booted

beeeep after shifting into D or from an unlock mode into S-6: **ECON\*LOCK** activated

beep beep beep: no data from CAN-bus, OBD-cable disconnected or **ECON\*LOCK** is powered up when vehicles Ignition is turned off



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At any time the lockup signal as half lock or full lock from the ECU will be passed through the **ECON\*LOCK** module. Especially in lower speeds the ECU likes to assist engine brake with half lock signal, although it has no real effect, **ECON\*LOCK** allows this support.

ECON\*LOCK turns off when engine has been turned off, or the modes **PWR** or **2nd** have been selected.

**DISCLAIMER:** The manufacturer of ECON\*LOCK is not responsible for any kind of damage on the drive train or any kind of other damages caused due improper handling of the vehicle. Altering a certified vehicle is forbidden and could lead to a loss of operation permits by authorities. The installation of ECON\*LOCK is on the vehicle owner's risk and could lead to a loss of warranty of the vehicle. Because of legal reasons, ECON\*LOCK is available as an assembly kit only, the completion has to be done by the vehicle owner himself. The purchase of ECON\*LOCK is not on commercial basis, the fees are covering material and development costs only and don't cover any profits.



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### OPERATION RECOMMENDATIONS FOR DRIVE VERSION:

#### 1) Things to know before:

The ECU needs a relatively long period of time to choose the proper gear due the dynamic acceleration pedal motion characteristics and extreme changing driving parameters off road. When the gear selector is in S-6, the ECU basically evaluates possible gears to engage from 3 to 6. Under normal driving conditions, this problem is partly resolved by use the slip of the torque converter, that is the reason, why you never can really be in the wrong gear.

The delaytime for choosing the proper gear can be up to 1 second, the more the driver narrows the possible gear range suiting best for the actual driving condition, the faster the ECU will finally come to the correct conclusion. This is the reason, why the automatic gearbox can never be used in "D" for towing heavy trailers.

The "helping" slip of the converter, which makes about 20% of the total loss of power between the engine and the wheels, is been killed by **ECON\*LOCK**, because once the ECU decides for a gear which is within possible driving conditions and next to other parameters within in the green zone, **ECON\*LOCK** will stop the slip by engaging the converter lockup. If that happens, and you are in the wrong gear, mostly in a too high gear, you have a lost of thrust forward.

#### 2) how to operate the gearbox properly when towing heavy trailers:

In general the driver needs to understand, that towing a heavy trailer in "D" will cause sooner or later damages in the gearbox. The first problem is, that due the inexistence of a converter lockup by the ECU the vehicle has to pull the load always hydraulically, which leads to overheating of the AT-Fluid. Consequently this will lead to a brake belt slipping inside the gearbox and latest in this stage, the milage of the gearbox can be counted. Regardless if **ECON\*LOCK** is used or not, the driver should always manually select the gear-pre-selection that way, that the engine is running between 1500 and 2000Rpm.

The slip at the unlocked converter makes this engine revs observing pretty difficult because the slip can cause up to 1000Rpm more than the shaft speed of the gearbox when pulling heavy loads. Once the converter is locked, the entire vehicle behaves like manual shifted.

In practice this means, accelerate the "road train" smoothly by having the gear shift lever in S-4, as soon as you reach 60km/h, this is the lockup-speed under certain conditions, reduce your acceleration pedal position in order ease the lockup sequence and once the converter is locked continue to accelerate. When shifting into S-5, we recommend not do that below 80km/h, lift your food on the pedals slightly, shift into S-5, wait until the gear has been changed and the converter relocks (about 0,85sec) and continue to accelerate.

Forget S-6 when towing heavy trailers.

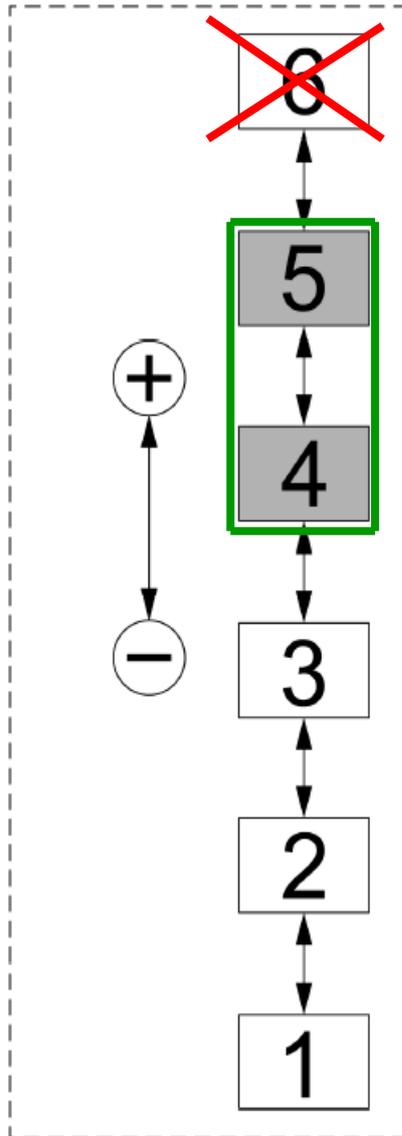
To reduce speed by using the enforced engine brake effect by **ECON\*LOCK**, just shift back within the speed ranges. From S-5 to S-4 between 100 and 60km/h, from S-4 to S-3 from 70 to 45km/h and from S-3 to S-2 from 55km/h to 30km/h.

Don't push the acceleration pedal the moment, when **ECON\*LOCK** is in the process to lockup the converter.

Keep in mind, the locked converter cannot deliver the full engine torque. **ECON\*LOCK** is programmed to protect the converter, however, the driver should be aware of technical facts about the converter.



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### The 6th gear pre-selection:

The ECU will shift all six gears according to driving conditions, as mentioned above, this wide variety of gears needs the longest period of time to choose the correct gear. **ECON\*LOCK** will lockup the converter in the 5th speed at 70km/h upwards and in 6th gear as soon as this gear is engaged, at about 110km/h at lowest throttle position or up to 150km/h at increasing throttle position. Forget this for towing heavy trailers !

### The 5th gear pre-selection:

The ECU will shift from one to five and **ECON\*LOCK** will lockup in 5th gear at speeds higher than 70km/h. It also locks up in 4th gear during engine brake effect. This gear is suitable for speeds between 90 and 140km/h and works also as an overdrive

### The 4th gear pre-selection:

This gear is 1:1 straight, provides the maximum performance and is good for speeds between 60 and 100km/h. The ECU shifts between first and fourth gear. **ECON\*LOCK** locks up the converter at speeds higher than 60km/h (1500Rpm) and is also locked for engine brake support down to third gear. This is the gear, in which the ECU is keeping an eye only on speed 3 and 4. **This is YOUR GEAR on going uphill and downhill**

### The 3rd gear pre-selection:

The ECU shifts up to gear 3 and is for speed climbing and especially for enforced engine brake support. **ECON\*LOCK** locks the converter at speeds higher than 40km/h but also down to 2nd gear for engine brake support. This is for digging in compact sand.

### The 2nd gear per-selection:

This is for extreme climbing only, **ECON\*LOCK** locks at 30km/h

**The first gear** finally is the first gear, no lockup possible.

**WARNING:** When towing off road, the vehicle behavior might change sudden, when **ECON\*LOCK** engages the converter lockup. Especially at high speed turns on sand and gravel operate with caution. We recommend to tow offroads at lower speeds with **ECON\*LOCK** turned off by having **PWR-mode ON**



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### TROUBLE SHOOTING:

**Symptom: IGNATION on, ECON\*LOCK does not stop beeping**

Reason: ECON\*LOCK is unable to retrieve data from CAN-bus-system. Check if the OBD-cable of ECON\*LOCK is properly plugged into the OBD-socket. If ECON\*LOCK remains beeping, either the ECON\*LOCK-software does not correspond to the ECU-software system or is defective.

**Symptom: IGNATION is off, ECON\*LOCK is beeping.**

Reason: ECON\*LOCK is still powered and false connected to a battery circuit or ACC-circuit, ECON\*LOCK must be connected to the IGNATION circuit.

**Symptom: during driving with ECON\*LOCK a master failure code is displayed** at the instrument panel, after reading out the error code, code P2756 is been detected.

Reason: either ECON\*LOCK cannot simulate the SLU-valve to the ECU properly.

Contact the vendor, in most cases, ECON\*LOCK software or circuit board cannot work with the vehicles ECU.

**Symptom: when starting the engine and shifting into S mode straight from Parking, ECON\*LOCK does not beep** to confirm activation and later does not lockup converter as expected.

Reason: ECON\*LOCK requires the gear shift lever position „D“ plus no pressure on the brake pedal for 0,5sec to engage, don't shift into S immediately, shift into D, get moving, foot off the brake pedal, then shift into S.

**Symptom: when driving and ECON\*LOCK has locked up the converter, just of a sudden and unexpectedly ECON\*LOCK unlocks and relocks** or remains unlocked, followed by 2 beep and remains inactive until either gear shift lever is set to „D“ or in „S-6“.

Reason: ECON\*LOCK has communication problems with the vehicle ECU, which are not related to a hardware problem.

Contact the vendor, in most cases, ECON\*LOCK requires a different software or ECON\*LOCK cannot yet work with this particular ECU-software-version.