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lockup-mate[®] PLUS+

Toyota Landcruiser

LC150 KDJ 3.0L Diesel 5-Speed (2009-2014)

LC200 VDJ 4.5L Diesel 6-Speed (2015-2021)



Operating Instructions

Rev D: 19 Apr 2021



*Watch our installation and operation videos
on the MM 4X4 Channel*

OWNERS COPY – Save these instructions for future reference

Thanks for purchasing **lockup-mate®PLUS+**; designed especially for the Toyota, it's a fantastic product to protect the transmission from over-heating, and to improve fuel economy, engine braking, and overall drivability.

lockup-mate®PLUS+ KEY FEATURES

General Benefits of lockup-mate®PLUS+

<i>Feature</i>	<i>Benefit</i>
Improved fuel economy	The unit will pay for itself in the long run
Significantly reduces automatic transmission heat build-up	Prolongs the life of the transmission oil and helps to avoid transmission damage related to over-heating
Improved engine braking	Reduced use of brakes on hill descents
Fully automatic operation at all speeds and gears; in SPORT and DRIVE modes, 4H and 4L	Easy to use Automatically adjusts for high and low range 4WD
No engine error codes	Works in harmony with the factory Transmission ECU and doesn't require any code deletes from the factory ECU
SafeLock® - Clutch Protection Technology	Protects the clutch from excessive wear for long life and reliability
Lockup engagement uses the same low slip criteria as factory ECU	
PWM control of the TCC (TCC) solenoid	Mimics the factory control for smooth TCC lockup and confidence
Doesn't modify the factory ECU firmware, and can be switched OFF	No re-maps or error code deletes of the ECU are required
Advanced Digital micro-processor using CANBus interface to ECUs	Digital interface to the vehicle computers to provide advanced lockup control and features
Simpler installation with comprehensive installation instructions	DIY saves money, or reduces cost if installed by an auto-electrician

Feature	Benefit
Compatible with OBD2 devices	Compatible with your existing UltraGauge, ScanGauge, GPS HUD, etc.
1st gear lockup support	Supports transmissions that have undergone a valve body upgrade to enable torque converter lockup in 1 st gear
Firmware upgrades	Control unit needs to be returned to MM4X4 for firmware updates

lockup-matePLUS+ Operation

Lockup controller uses speed, RPM, accelerator pedal position, 4WD mode, transmission mode (SPORT or DRIVE), headlight status, temperature, ECU lockup-status, slip, current gear and more

Complex logic to ensure the TCC (TCC) is locked up whenever possible and protect the clutch from excessive wear, and to avoid engine trouble codes

CANBus interface is used to obtain information from the vehicle's internal digital network, via connection to the existing OBD2 port

Precise, reliable and accurate digital information

Simpler installation – no cutting of wires to obtain vehicle information

Immunity to electrical noise

Works when transmission is in either SPORT or DRIVE mode

Optimum benefits are obtained in SPORT mode – you shift gears to maximise lockup time

Keeping the **blue** LED light on keeps the transmission cool and saves fuel!

Can be enabled or disabled using the LED/Switch

Can be easily switched off when desired

Remembers the setting between engine starts

LED indication of the lockup status

Driver knows when the TCC is locked.

Excessive slip alert (LED flashes)

Alerts the driver after 10 seconds of excessive slip to either change to a lower gear, or reduce power to enable lockup

Feature	Benefit
LED is visible in sunlight, and automatically dims for night use (when headlights are on)	Avoids a glaring LED at night
Automatic headlight dimming can be over-riden by the driver	LED will be visible during the daytime when driving with the headlights on
Compatible with other vehicle modifications (pedal re-mapping devices, engine re-tune, and exhaust upgrades, etc)	lockup-matePLUS+ has adjustable sensitivity to tune it to your own car's performance and configuration
User initiated self-diagnostic mode, displaying results on the instrument cluster	Confirms correct installation and assists with fault finding
Detailed installation instructions	Easy to follow, DIY installation saving you money
Automatic VIN check	Automatically disables if installed into an unsupported vehicle
Compact design	Simpler installation
Small LED/Switch	Discrete and simple installation
Reset Engine Trouble Codes	Ability to reset the engine error light

User Configurable

Update user settings using the vehicle instrument cluster and transmission shift lever as the user interface	No need for an extra display or to access the lockup-matePLUS+ control unit to adjust the settings Quick Reference Card is provided for the sun-visor
<ul style="list-style-type: none"> Adjustable sensitivity 	Fine tune when the TCC lockup engages 4H and 4L sensitivity is separately adjustable
<ul style="list-style-type: none"> Transmission activation (warmup) temperature 	Choose the transmission temperature before lockup-matePLUS+ activates (20°C to 90°C in 10°C increments). Default 30°C

<i>Feature</i>	<i>Benefit</i>
<ul style="list-style-type: none"> • Gear at which lockup commences 	<p>Select 1st, 2nd, 3rd, etc (default is 2nd)</p> <p>Lockup in 1st requires an after-market modified valve body</p>
<ul style="list-style-type: none"> • Start-up state (on or off) 	Remembers the switch setting
<ul style="list-style-type: none"> • Slip warning LED 	<p>LED flashes to warn of excessive torque converter slippage (after 10 seconds) advising you to change to a lower gear</p> <p>Choices are:</p> <ul style="list-style-type: none"> • OFF • SPORT Only • DRIVE and SPORT (default)
<ul style="list-style-type: none"> • Pulse LED during warmup 	<p>The LED will pulse while waiting for the transmission to warmup to the chosen activation temperature</p> <p>OFF or ON (default)</p>
<ul style="list-style-type: none"> • Stores user settings in micro-processor's non-volatile memory 	Remembers all settings when power is removed

- ✓ **Technical Support**
- ✓ **Designed & Made in Australia**
- ✓ **12 Month Warranty**
- ✓ **30 Day Money Back Satisfaction Guarantee**

lockup-mate[®] PLUS+ OPERATION

Put Simply

The aim is to keep the **blue** LED on to achieve maximum fuel savings and heat reduction.

Keep the LED Blue, to “Keep Cool and Save Fuel”

So, in the simplest terms, to most effectively use **lockup-matePLUS+**:

1. Turn **lockup-matePLUS+** ON – press the LED/Switch to toggle on and off.
2. Try to keep the **blue** LED ON when driving.
3. If the LED is flashing, switch to SPORT mode to select a lower gear, and if after that it still flashing it means the SafeLock[®] feature is protecting the clutch from wear. Reduce the slip momentarily by backing off the accelerator to allow lockup.
4. Choose the highest gear that allows the LED to stay **blue** without labouring the engine.

Cold Start

lockup-matePLUS+ does not activate until the transmission has reached the activation temperature. The **blue** LED will pulse slowly (1 second intervals) while warming up. The LED does not pulse if **lockup-matePLUS+** is switched off. The activation (warmup) temperature is adjustable. Once warm, the LED will illuminate when the torque converter is locked.

Normal Use

lockup-matePLUS+ will automatically lock the TCC (TCC) from 2nd gear upward whenever the conditions are suitable (speed, gear, engine load, and with low slip).

In DRIVE mode the transmission ECU chooses the gear, which is often too high for lockup to occur, so, all the driver is required to do is ensure the chosen transmission gear is suitable for lockup to occur, and that the torque converter is not excessively slipping.

The rest is automatic!

Excessive Slip Alert

If the **lockup-matePLUS+** LED flashes, it is alerting you that there is torque converter slip. Either down-shift a gear, or back-off on the accelerator momentarily as SafeLock[®] may be active.

It flashes when the TCC is unlocked and there is excessive torque converter slip for 10 seconds or more. This is a reminder to move across to SPORT mode to manually select

a lower gear. **NOTE:** *SPORT mode usually defaults to S4 (ie 4th gear).* Often this is all that is required to enable lockup when driving above 60kph.

If after changing down a gear and there is still excessive slip, momentarily reduce power and the torque converter will then lockup. This protects the clutch from wear.

Toyota Transmission Behaviour

By design, the Toyota transmission does not lock the TCC in 1st gear. (The exception is if the customer has purchased and installed a modified transmission valve body that specifically enables 1st lockup.)

lockup-matePLUS+ will automatically lockup the torque converter in any speed and gear (2nd– 5th/6th) according to the driving conditions. It constantly monitors the vehicle status including speed, current gear, RPM, accelerator pedal, torque converter slip, ECU lockup status, 4H/4L position, the SPORT gear choice. This information is used to determine when the TCC should be locked.

Often the transmission ECU will select a gear which is too high to allow the TCC to be locked. You may need to manually select a lower gear in SPORT mode to enable lockup. *Example: In DRIVE the ECU will use 5th gear at 60kph up a slight incline. To achieve lockup, select S4.*

Unlike some other manufacturers, selecting SPORT mode (eg, S4) in a Toyota transmission does not actually ensure this is the gear used. Instead, the chosen gear only limits the top gear that the transmission will use, eg, S4 will only use 1->2->3->4, and S3 1->2->3.

When the vehicle comes to a stop, the chosen SPORT gear is still displayed (eg, S4), and the transmission changes gear automatically (1, 2, 3, 4) until this gear is reached.

Once 90 kph has been reached, the engine is operating in its maximum torque range, and **lockup-matePLUS+** will keep the TCC locked. Instead of unlocking the torque converter, to obtain more power to overtake you push the pedal to encourage the transmission to change into a lower gear (eg, 4th).

Avoid labouring the engine in 5th gear.

Drive Mode

Drive mode uses a less aggressive lockup algorithm than SPORT mode. The **lockup-matePLUS+** controller will delay locking the TCC until the gear changes have stabilised for 6 seconds. It will still lockup from 2nd gear upwards, but only when the vehicle has been in a particular gear for at least 6 seconds. Thereafter it will stay locked if the transmission down-shifts a gear.

Alternatively, use SPORT mode to have more control over the gears.

Sport Mode

In SPORT mode, **lockup-matePLUS+** uses a more aggressive lockup algorithm and doesn't have the 6 second delay of DRIVE mode.

LC150 only:

lockup-matePLUS+ will lockup the TCC when the actual transmission gear is the same as the display SPORT gear number (eg, S3).

The factory gear shift profile changes gears too early to maintain consistent lockup. As a result it would lock and then need to unlock as the gear upshift. As a result, **lockup-matePLUS+** waits until either the chosen gear is reached (in SPORT mode), or the gear changes have stabilised for 6 seconds (in DRIVE mode) before activating the TCC.

The 6 second delay helps avoid unnecessary locking and unlocking of the TCC during acceleration.

Example: To initiate lockup in 2nd gear and keep locked as you accelerate to speed, start-off in S2, and as soon as the transmission goes into 2nd (at the right speed, load) the TCC will lock. Thereafter, accelerate and manually select the gears (S3, S4, S5) as if driving a manual.

LC200 - 2015+ facelift only:

In SPORT mode, and when under medium acceleration, the factory gear shift profile allows **lockup-matePLUS+** to initiate lockup from 2nd gear and without needing to unlock at each upshift gear change. Hence unlike in the LC150, **lockup-matePLUS+** doesn't wait until the chosen gear (eg, S4) is reached before initiating lockup. *This allows for good fuel savings when driven around town in S4.*

In DRIVE mode, however, it is more conservative and waits for the gear changes to stabilise for 6 seconds before activating the TCC. *Around town it may not lockup unless in an 80 zone.*

Choice of SPORT or DRIVE depends on driving style. If you normally use very light acceleration, DRIVE may be a better choice so-as to avoid unlocking between gear changes which may happened if SPORT mode is selected.

Torque Converter Flex lockup mode

lockup-matePLUS+ fully supports the Toyota AISIN transmission's flex-lockup mode of the torque converter for maximum fuel savings. Flex-lockup is similar to a "partial" TCC lockup mode and operates when the RPM is below 1300 and under 20% throttle. It is normal to have a small amount of slip when operating in flex-lockup mode. The LED displays at half brightness when the transmission is in flex-lockup mode.

lockup-matePLUS+ and the Transmission ECU work together in harmony

lockup-matePLUS+ works in harmony with the factory Transmission ECU to use its flex-lockup and full lockup modes, but also take over full lockup control when required.

With its advanced micro-computer-controlled intelligence and constant communication with the ECUs, **lockup-matePLUS+** is regularly taking over control of the TCC, and then handing back control to the factory transmission computer. **lockup-matePLUS+** and the ECU are collaboratively working together to control the torque converter lockup clutch.

*Example: When the ECU wants to fully lock the TCC, **lockup-matePLUS+** will hand over control of the TCC solenoid back to ECU to save power and prevent the load resistor from becoming hot. If the factory then wants to unlock due to a slight climb (or you backoff on the accelerator), **lockup-matePLUS+** will override it and keep the TCC locked.*

<p>lockup-matePLUS+ will light the LED when the transmission is operating in flex-lockup mode (half brightness) and full-lockup mode (full brightness).</p>
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High Range (4H) and Low Range (4L) Operation

lockup-matePLUS+ automatically detects if the transfer case is in 4H or 4L, and adjusts its operation accordingly. In 4H, **lockup-matePLUS+** uses a combination of speed, gear, RPM, slip and acceleration pedal to determine when to lock the TCC.

In 4L, **lockup-matePLUS+** uses just the speed, gear and RPM to determine when to lock the TCC.

The 4H and 4L settings are user adjustable. See the Configuration Parameters section of this booklet for more detail.

ADVANCED OPERATION

Driving it like a clutch-less manual

For LC150:

To lockup during acceleration, you can use SPORT mode to drive it like a manual transmission. Select S2 and accelerate until the LED comes on, then allow the RPM to increase to >2000 before manually changing into S3. The TCC will remain locked, and continue to manually up-shift (at >2000RPM) until the desired speed is reached and the LED stays ON. Down-select gears as you slow to keep the TCC locked.

For LC200:

Under medium acceleration, the gear shift profile allows for lockup from 2nd gear. You can still drive it like a clutch-less manual, however this is not necessary in order to accelerate to speed with the TCC locked.

4L mode operation

lockup-matePLUS+ automatically determines when low range (4L) has been selected and changes the TCC lockup algorithm. When in 4L, **lockup-matePLUS+** uses the 'locked' RPM to determine when to lockup the TCC (ie, the slip RPM is removed).

(Default setting 1 engages when the locked RPM is 1275)

There are 10 user selectable settings available. Each setting adjusts the RPM by 75 RPM.

Example: The setting of 0 engages the TCC at 1200 RPM. Selecting a setting of 4 would increase this by 4x75 (300 RPM) to 1500.

NOTE: In 4L, if emergency braking is conducted at very low RPM, the engine may stall. This is due to the TCC not being able to respond and unlock in a timeframe to avoid the stall.

Improved engine braking

lockup-matePLUS+ will improve downhill engine braking. Select SPORT mode and an appropriate gear (typically S4 or S3) to increase the RPMs to >2500.

It will not lock the TCC unless the RPM is above 1200, so if coasting downhill (800-900 RPM) you will need to increase the RPM to engage the TCC for lockup. This can be achieved by downshifting a gear in SPORT mode, or gently pressing the accelerator. Once the TCC has locked up, the increased RPM will be maintained.

SafeLock® - Clutch Protection Technology

Exclusive to MM4X4 is **SafeLock®**, which prevents excessive wear that may occur if the TCC is engaged under high slip conditions. The advanced digital control of **lockup-matePLUS+** reads the real-time vehicle status and it is able to determine the amount of slip in the torque converter. Using the same slip limits as the factory ECU, it will only engage the clutch when within this range giving maximum longevity and reliability of the clutch.

Under light acceleration, the lockup clutch will engage at a lower speed as there will be low slip. Under heavy acceleration it will lockup later as SafeLock® is delaying engagement until the slip is low again. If active (LED OFF or flashing), the driver need only back off on the accelerator a little to reduce the RPM (slip) for the clutch to then engage (LED comes on).

Monitoring the Transmission Oil temperature

Monitoring your transmission oil temperature is recommended. Vehicles do not come with a transmission temperature gauge on the instrument display. Instead, they have an over-temperature warning lamp. Unfortunately, when this lamp activates the oil is extremely hot and is already degrading.

You can monitor the transmission temperature using an after-market OBD2 reader such as UltraGaugeMX or a ScanGauge^{II}. These devices need to be programmed to read the temperature from the vehicle computer. 60-80°C is ideal; avoid over 100°C.

To setup ONLY for high temperature protection

NOTE: The fuel saving benefits of the lockup kit will be lost until it activates.

The slipping torque converter is the primary contributor to high transmission temperatures. With **lockup-matePLUS+** always ON, it is rare to experience high oil temperatures, as keeping the TCC locked stops heat generation in the first place.

However, some customers may prefer **lockup-matePLUS+** to act as a 'Guardian Angel' and utilise the normal factory control of the transmission until it becomes hot. **lockup-matePLUS+** can be configured so it will only activate when a set temperature has been reached.

The activation temperature is user configurable. **lockup-matePLUS+** will automatically activate when the transmission oil is above the chosen temperature, and deactivate at 5°C lower than the chosen temperature.

Refer to Configuration Settings Procedure:

Set parameter #2 (Activation temperature) to 8 or 9 (9=80°C, 9=90°C)

Set parameter #5 (Warmup LED pulse) to OFF (to stop the LED pulsing)

Adjustable sensitivity

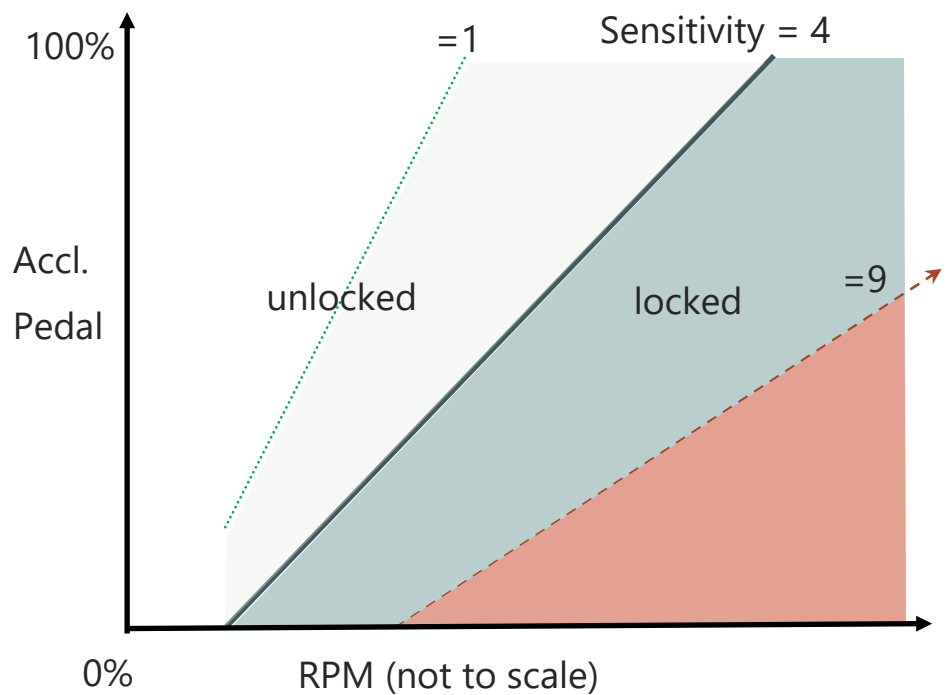
(See Configuration Parameters section for more detail)

4H

Sensitivity affects when **lockup-matePLUS+** will engage and release the TCC.

Lower numbers = less sensitive and requires more throttle pedal (engine load) before unlocking the TCC. Higher numbers unlock more readily.

4H Sensitivity
Adjustment



4L

In 4L, **lockup-matePLUS+** uses the speed and gear to calculate the equivalent locked RPM to determine when to lock and unlock the TCC.

4L and 4H are separately adjustable.

OPERATING RECOMMENDATIONS

<i>Driving Conditions</i>	<i>Recommendation</i>
City, country and highway	lockup-matePLUS+ ON Reason: Excellent protection from high transmission temperatures and better fuel economy. Use SPORT mode for better downhill engine braking. For country driving in the hills, SPORT mode is recommended with the gear chosen to maintain lockup (keep the blue LED ON to “keep cool and save fuel”).
Rocks and creek-beds	lockup-matePLUS+ OFF * * Configure for hot activation only, or just leave it OFF only unless the transmission oil becomes hot (eg, >80°C), then switch lockup-matePLUS+ ON to reduce the transmission temperature. Reason: The torque converter absorbs driveline shock caused by the highly variable nature of rock driving, eg, lifting/dropping wheels or hitting rock ledges.
Steep Hills (4L ascent)	lockup-matePLUS+ ON or OFF, use SPORT mode Short hills: Leave OFF unless the transmission oil becomes hot (eg, >80°C), then switch lockup-matePLUS+ ON to reduce the transmission temperature. To cool the transmission, use SPORT mode and climb in 2 nd gear where possible to allow the torque converter clutch (TCC) to lockup. The transmission will not lockup in 1 st gear. Reason: The torque converter absorbs driveline shock, and releasing the torque converter enables higher RPM thus more turbo boost and power. Long hills: Steep hill climbs will rapidly heat-up the transmission oil, so if conditions are suitable switch lockup-matePLUS+ ON and climb in 2 nd gear.

OPERATING RECOMMENDATIONS

<i>Driving Conditions</i>	<i>Recommendation</i>
Steep Hills (descent)	lockup-matePLUS+ ON or OFF Typically, a 4L steep descent is conducted in 1 st gear. Since the transmission cannot not lockup in 1 st gear the use of lockup-matePLUS+ doesn't improve engine braking in this situation. For better 4H engine braking on the asphalt, switch lockup-matePLUS+ ON and use SPORT mode.
Sand (beach run at higher speeds >40kph)	lockup-matePLUS+ ON Use SPORT mode - ensure the blue LED stays on. Reason: Keep the transmission cool and better fuel economy
Sand (dunes and deep sand)	lockup-matePLUS+ ON or OFF OFF for short sections where excessive driveline shock could be experienced.
Mud	ON for sustained deep sand driving to avoid high transmission temperatures. Use SPORT mode to choose an appropriate gear and keep the revs high so when it needs the power and the RPM drops, the engine is still at high turbo boost.

INTRODUCTION TO THE LED/SWITCH

The LED/switch has a **blue** LED in the centre. This is also a momentary switch which can be pressed.

Quick press and release to switch the unit on or off.

Press and hold or double click to access other features. The LED will respond according to the command.



LED Status Summary

LED Pulsing

Pulsing = (bright, dim bright, dim...)

lockup-matePLUS+ is functioning correctly and waiting for the transmission to warmup

LED ON (full brightness)

Torque converter is fully locked

LED ON (half brightness)

Torque converter is flex lockup mode

LED OFF

Torque converter is not locked

NOTE: LED is always OFF when **lockup-matePLUS+** is switched OFF.

LED Flashing

Excessive slip alert to inform driver to change down a gear or reduce power momentarily to enable lockup clutch engagement

Switch Commands

Momentary push	Toggle lockup-matePLUS+ ON and OFF Short flash (0.5s) = OFF Long flash (1.5s) = ON
Hold 5 seconds	Toggle LED night-time (headlights) over-ride mode DIM = LED brightness linked to headlights on or off
Hold 10 seconds	Toggle Clutch Protection Mode
(when engine not running)	2 flashes = OFF 5 flashes = ON (recommended)

lockup-matePLUS+ stores the above parameters in non-volatile memory, so the setting is remembered between engine starts.

The switch features are described in more detail in the following section.

OPERATION WHILST DRIVING

Switching lockup-matePLUS+ ON and OFF

Turn **lockup-matePLUS+** on and off by momentarily pressing the LED/Switch.

When pressed, a long flash of the LED indicates it is ON, a short flash is OFF.

Toggle day-time/night-time LED brightness

Press and hold LED/Switch for 5 seconds.

When driving with your headlights on in the day-time, you can override the 'night mode' LED intensity (which is too dim).

Night-time/Daytime LED intensity mode is linked to the headlights being on or off.

Protection Mode (SafeLock®)

This feature can only be changed when the engine is not running to prevent accidental toggling.

SafeLock® clutch protection mode prevents engagement of TCC during high slip conditions to reduce wear on the clutch.

To toggle between the Protection Mode ON and OFF, press and hold the LED/Switch for 10 seconds.

The LED will respond with:

- **5 flashes** – Protection Mode is **ON**
- **2 flashes** – Protection Mode is **OFF**

SafeLock® ON (default)

lockup-matePLUS+ will delay locking the torque converter until the amount of slip is low, using the same criteria as the factory ECU before engaging the clutch.

This ensures the wear of the clutch when it engages is no different to normal factory operation, ensuring maximum life from the clutch.

SafeLock™ OFF

This mode is provided for customers who want more aggressive lockup clutch engagement and disengagement. The TCC will engage whenever the speed/RPM/Load conditions will allow.

It disables the slip limit engagement criteria and lockup engagement is now primarily determined by the sensitivity setting. The sensitivity adjustment can be used to adjust when the clutch will engage.

CAUTION:

Switching SafeLock® clutch protection OFF is for the advanced driver who specifically wants full control. This mode may cause more wear of the TCC compared to using the standard factory engagement limit, as the clutch can engage under high slip conditions. ie. under medium to high load. The lockup sensitivity parameter can be adjusted higher to delay lockup when under power to reduce any wear on the clutch.

Reset Engine Trouble Codes

This feature of **lockup-matePLUS+** enables you to reset the engine error lamp (also known as a Malfunction Indicator Lamp (MIL), or Check Engine Light (CEL).



This feature will send the generic OBD2 command to reset the error codes for all ECUs. NOTE: You cannot display the code that caused the error.

double-click the LED/Switch to send an Engine Trouble Code reset command.

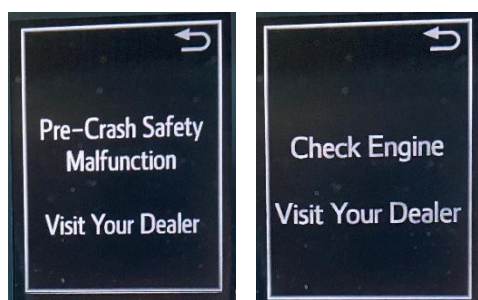
NOTE: The transmission will only accept the command when the vehicle is stopped.

Although engine trouble codes are not expected when using **lockup-matePLUS+**, should there be a such a situation (eg, cause by wiring fault) you can reset them without needing to visit the dealer.

Furthermore, with this feature you can reset any code generated by the ECU (ie. unrelated to **lockup-matePLUS+**)

LC200: By deliberately causing a Torque Converter error code the VX/Sahara will alternately display the following messages:

NOTE: There is no malfunction of the Pre-Crash Safety System.



SETTING USER PREFERENCES

NOTE: LC150 pictures shown, however LC200 is similar (per installation booklet).

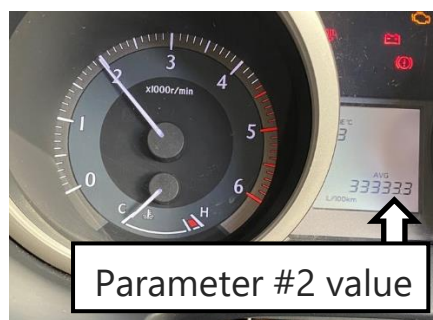
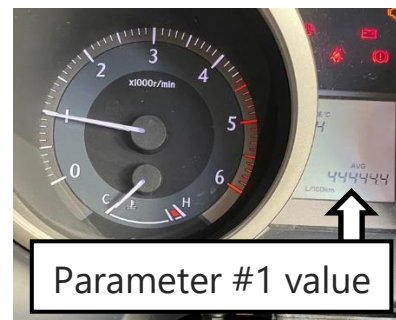
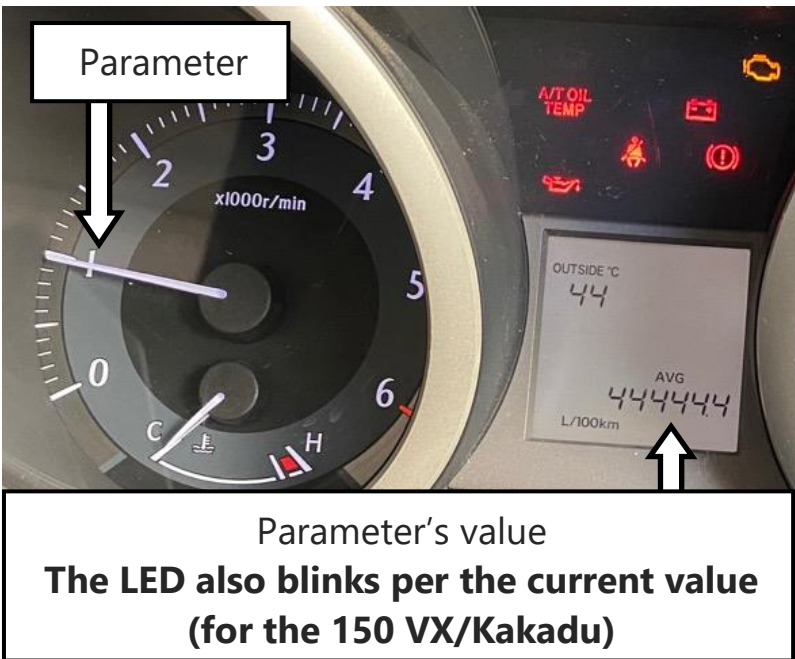
lockup-matePLUS+ allows the driver to modify the configuration settings. This mode can only be accessed when the ignition is ON and the engine is NOT running.

To enter configuration mode, place into SPORT mode and press LED/Switch.

To reset to factory defaults, enter configuration mode, then press and hold the LED/switch for 10 seconds.

Enter configuration mode:

1. Turn ignition OFF (close door to stop chime!)
2. Place the shift lever into SPORT mode
3. Turn ignition ON
4. ➔ Press the **lockup-matePLUS+** LED/Switch
5. Use shift lever plus(+) and minus(-) to adjust the parameter's value.
6. ➔ Press LED/Switch for next parameter



At any time, **CANCEL** by moving the shift lever to DRIVE position or turning the ignition OFF.

lockup-matePLUS+ CONFIGURATION PARAMETERS

Parameter Description

- 1* Lockup sensitivity (4H*)**
- The sensitivity of the 4H TCC lockup/unlock algorithm.
- *The sensitivity for high range (4H) and low range (4L) algorithms can be individually set. Place the vehicle in 4H before entering configuration mode to adjust 4H sensitivity.
- HIGH RANGE (4H)**
- Sensitivity affects when **lockup-matePLUS+** will engage and release the TCC.
- Lower numbers = less sensitive and requires more throttle pedal before unlocking the TCC.
- Higher numbers unlock more readily.
- This adjustment allows fine-tuning for varying vehicle configurations eg, ECU power remap (lower setting) or larger tyre size (higher setting).
- This setting typically does not affect when the clutch engages, as this is determined by SafeLock® (ie, engagement is when the slip is low and within equivalent of the factory limit to minimise clutch wear). It mainly changes the TCC unlock load.
- With SafeLock® OFF, however, the slip limit is deactivated and clutch engagement is primarily determined by the sensitivity value. Avoid settings that engage lockup during high slippage (see SafeLock® for more details).
- Range 0* - 9. default 4
- *ADVANCED FEATURE [Sensitivity = 0]**
- Sensitivity 0 is a special mode that does not use the position of the accelerator pedal (engine load) in the algorithm that determines when **lockup-matePLUS+** will activate or release the TCC. Instead, **lockup-matePLUS+** activates (locks) the TCC as soon as it technically can, and there-after keeps it locked regardless of the engine load (pedal position). It will only unlock again once the RPM drops below 1200.
- The driver should use SPORT mode and change gears manually and avoid labouring the engine.

Parameter Description

1* Lockup sensitivity (4L*)

The sensitivity of the 4L TCC lockup/unlock algorithm.
*The sensitivity for high range (4H) and low range (4L) algorithms can be individually set. Place the vehicle in 4L before entering configuration mode to adjust 4L sensitivity.

LOW RANGE

In 4L, **lockup-matePLUS+** uses the speed and gear (to calculate the equivalent locked RPM) to determine when to lock and unlock the TCC. Each setting adjustment increases/decreases the RPM by 75.

Range 0-9, **Default 2**

Setting	Lockup RPM*
0	1200
1	1275
2	1350 (default)
3	1425
4	1500
5	1675
6	1750
7	1800
8	1875
9	1950

* LOCKED RPM. Actual RPM is higher due to the torque converter slip. The unlock RPM is 75 less than the chosen value.

Lower settings are more suitable for slow crawling, whereas higher settings are better for climbing (to avoid stalling), and for mud or deep sand where the revs need to remain higher.

#	Parameter	Description
2	Transmission warmup temperature	<p>Warmup temperature of the transmission oil before lockup-matePLUS+ commences operation.</p> <p>Range 2-9, Default 3 (30°C) 2=20°C, 3=30°C etc</p> <p>lockup-matePLUS+ monitors the pan temperature sensor, which is the main oil reservoir of the transmission.</p>
3	Minimum activation gear	<p>Only activate lockup-matePLUS+ when the chosen minimum gear is reached.</p> <p>Range 1–5 = 1st to 5th Default 2nd</p> <p>NOTE: The factory standard transmission cannot lockup in 1st gear. The 1st gear choice is provided only for vehicles that have installed a modified transmission valve body that allows 1st gear lockup.</p>
4	Excessive Slip Alert	<p>The LED will flash (ON..OFF..ON..OFF) if there has been excessive torque converter slippage for 10 seconds or more. This advises the driver to change down a gear or reduce the power momentarily to enable TCC lockup conditions for optimum performance.</p> <p>0 = OFF. Doesn't flash 1 = Alert in SPORT only 2 = Alert in both DRIVE and SPORT (default)</p>
5	Pulse LED during warmup	<p>Pulse the LED (dim, bright, dim ...) until the transmission warmup temperature is reached. This lets you know lockup-matePLUS+ is running. Thereafter, the LED comes on only when the TCC is locked.</p> <p>The LED doesn't pulse if lockup-matePLUS+ is switched OFF. 0 = OFF 1 = ON default</p> <p>If lockup-matePLUS+ (Parameter #2) has been configured to activate for high transmission temperatures (eg, 80°C) the LED will pulse most of the time. To stop the LED pulsing it can be disabled using this setting, and the LED will only illuminate when the TCC is locked and the transmission is hot.</p> <p>Recommendation: ON if the activation temperature is 20-70°C OFF if the activation temperature is 70-90°C</p>

WARRANTY POLICY

MM 4X4 is committed to providing quality products to you and this policy outlines our warranty against defective products manufactured by MM 4X4.

MM 4X4 warrants our manufactured products against defects in workmanship or materials for the Warranty Period. The warranty does not cover damage due to normal wear and tear (for example marks and scratches).

This warranty is not applicable to products re-sold by MM 4X4. Warranties for these products are defined by the manufacturer.

MM 4X4 accepts no liability for damage to the vehicle as a result of product installation or use.

Warranty Period

MM 4X4 warrants MM 4X4 manufactured products for a period of 12 months commencing from the date of purchase.

Warranty Entitlement

To be entitled to claim a warranty claim, the customer must:

1. Fit the product according to the provided installations instructions;
2. Provide evidence of purchase;
3. Return the faulty product to MM 4X4 for assessment against the Warranty Entitlement Exclusions; and
4. Make a claim within the Warranty Period.

Warranty Entitlement Exclusions

The Customer is not entitled to a warranty claim if:

1. The defect is the result of misuse, inappropriate use, incorrect installation, or installation into a vehicle not supported by the product; or
2. The product has been modified; or
3. The product housing has been opened; or
4. The product has been damaged.

Making a Warranty Claim

To make a warranty claim:

1. Contact MM 4X4 (enquiries@mm4x4.com.au) to discuss the claim;
2. If directed by MM 4X4, return the product to the address provided by MM 4X4 (at the customer's expense) and ensure the product is accompanied with the following information:
 - a. A copy of the proof of purchase;
 - b. The return merchandise authorisation (RMA) number provided by MM 4X4;
 - c. The customer's name and contact details;
 - d. A return shipping address.

Upon receipt of the faulty product, MM 4X4 will assess the claim against the Warranty Entitlement and Exclusions. For valid warranty claims, MM 4X4 will repair or replace the goods and ship them (free of charge) to the provided shipping address.

For warranty claims that are assessed as invalid, MM 4X4 will contact the customer to seek further direction, which may include:

1. Reasons for denying the warranty claim;
2. A quote to repair the fault product;
3. Returning the faulty or repaired product to the provided shipping address (at the customer's expense);
4. Agreement to dispose of the faulty product; or
5. A quote to supply a replacement product.

Warranty Complaints and Enquiries

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.



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