MM4X4
VEHICLE ELECTRONICS

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lockup-mate® PLUS+

Toyota Landcruiser

200 Series & Prado 150

Lexus

450D



Operating Instructions

Rev K: 5 Feb 2022 (v7.6)

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CONTENTS

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+

Feature	*Benefit*
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	Very easy to use Automatically adjusts for high and low range 4WD
No engine error light (CEL)	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 the 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, etc.
1st gear lockup support	Supports transmissions that have undergone a valve body upgrade to enable torque converter lockup in 1st gear
Firmware upgrades	Control unit needs to be returned to MM4X4 for firmware updates

lockup-mate® PLUS+ 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 is locked up whenever possible and protect the clutch from excessive wear, protect the transmission from rough gear changes, 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 at speeds under 70 kph. 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 20 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-ridden 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-mate®PLUS+** 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 CEL (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-mate®PLUS+** control unit to adjust the settings Quick Reference Card is provided for the sun-visor
• **Adjustable sensitivity**	Fine tune when the TCC lockup engages 4H and 4L sensitivity is separately adjustable
• **Transmission activation (warmup) temperature**	Choose the transmission temperature before **lockup-mate®PLUS+** activates (20°C to 90˚C in 10˚C increments). Default 30°C

Feature	*Benefit*
• **Gear at which lockup commences**	Select 1st, 2nd, 3rd, etc (default is 2nd) Lockup in 1st requires an after-market modified valve body
• **Start-up state (on or off)**	Remembers the switch setting
• **Slip warning LED**	LED flashes to warn of excessive torque converter slippage (after 20 seconds) advising you to change to a lower gear Choices are: • OFF • SPORT Only (default) • DRIVE and SPORT
• **Pulse LED during warmup**	The LED will pulse while waiting for the transmission to warmup to the chosen activation temperature OFF or ON (default)
• **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

Getting Started

lockup-mate®PLUS+ can be toggled ON and OFF by pressing the LED/switch. The LED responds with a long flash for ON, a short flash for OFF.

When the unit is turned ON, the LED will pulse until the transmission oil has warmed up, then **lockup-mate®PLUS+** will start to operate.

When turned OFF, the automatic gearbox will operate normally.

When turned ON, you can use the automatic gearbox in "D" or "S", and in 4H or 4L.

The unit automatically detects the modes, and the blue LED indicates when the torque converter is locked.

In "D" it will lockup in general driving conditions when above ~70kph.

In "S" it uses more aggressive lockup logic to suit specific circumstances (such as hills driving or towing), whilst still retaining the many protection features built into the unit.

Until you become familiar with its operation, we recommend:

- In 60kph zones, use S4 when you want it to lockup, or use D if not.
- In 80kph+ zones, use either D, or S6. (S5 for 5 speed transmissions)
- When towing use S4, or, if the conditions are suitable use S5.

In all modes of operation, the unit will automatically lock and unlock the converter with the many inbuilt features, such as **SafeLock®**, to protect the transmission and driveline.

Once familiar with the unit's operation, best results can be achieved in "S".

It is strongly recommended that you take the time to read this Operation booklet and watch the operation videos to familiarise yourself with the full range of features of **lockup-mate®PLUS+** so you can gain the full benefit.

Scan the QR Code below to go directly to our YouTube Playlist where you will find the Operation video:

Cold Start

lockup-mate®PLUS+ 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-mate®PLUS+** is switched off. The activation (warmup) temperature is adjustable. Once warm, the LED will illuminate when the torque converter is locked.

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-mate®PLUS+ will automatically lockup the torque converter in any speed and gear (2nd– 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 and unlocked.

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. 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-mate®PLUS+** will keep the TCC locked. Instead of unlocking the torque converter, to obtain more power you push the pedal to encourage the transmission to change into a lower gear (eg, 4th).

Avoid labouring the engine

Drive Mode

In Drive the lockup algorithm is setup for smoothness in city conditions, and for lockup during higher speed travel (above 70kph). This speed is the slowest speed for lockup in 5th gear.

NOTE: The inbuilt protection features (such as **SafeLock®**) remain active, so 70kph is a guide rather than a rule. The unit may delay lockup until the low slip criteria is met, and unlock the torque converter for better drivability or to avoid harsh gear changes.

For lockup below 70kph use SPORT mode (eg, S4).

Sport Mode

In SPORT mode, **lockup-matePLUS+** uses a more aggressive lockup algorithm which locks the torque converter when possible.

When driving in SPORT mode it will automatically unlock if the speed becomes too low to maintain lockup. If you want to maintain lockup, just downshift a gear manually at the appropriate time.

LC150 & LC200 (09-15 pre-facelift) and Petrol only:

> **lockup-matePLUS+** will lockup the TCC when the actual transmission gear and driving conditions allow lockup. However, the factory gear up-shift profile normally changes up gears too early to maintain consistent lockup. As a result, in practice it may not lockup until at an appropriate speed for the S gear chosen. When S5 and S6 are chosen, it will perform the same as in DRIVE, and will not lockup until ~70kph. This avoids unnecessary locking/unlocking of the Torque converter, as the factory ECU will always eventually select 5th gear when below 70kph, which is too slow to maintain lockup.
>
> To lockup under 70kph, use S4 or lower.

LC200 - 2015+ facelift only:

> The **lockup-matePLUS+** control unit is unable to read the current S gear number from the ECU, so is unable to determine when S5, S6 has been selected. If driving at speeds under 70kph, S4 or lower is recommend to avoid the ECU changing to 5th gear (in 5th at 60kph it can't maintain lockup).

The choice of SPORT or DRIVE depends on driving style. If you normally use very light acceleration, DRIVE is a better choice for speeds under 70kph, otherwise try S4.

Excessive Slip Alert

If the **lockup-mate®PLUS+** 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 20 seconds or more. This is a reminder to manually select a lower gear.

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.

By default, the slip alert feature is active only in SPORT mode, however it can be configured for DRIVE also, or be turned off completely.

Torque Converter Flex-Lockup Mode

lockup-mate®PLUS+ fully supports the Toyota AISIN transmission's flex-lockup mode of the torque converter for maximum fuel savings under light acceleration. Flex-lockup operates when the RPM is below 1300 and under 20% throttle to reduce slip and save fuel.

lockup-mate®PLUS+ and the ECU working together

lockup-mate®PLUS+ 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-mate®PLUS+** is regularly taking over control of the TCC, and then handing back control to the factory transmission computer. **lockup-mate®PLUS+** 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-mate®PLUS+** 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-mate®PLUS+** will take back control and keep the TCC locked.*

High Range (4H) and Low Range (4L) Operation

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

In 4L, **lockup-mate®PLUS+** uses the 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. As you slow, manually down-shift gears in anticipation of the right gear for the speed in order to keep the TCC locked.

For LC200:

Under medium acceleration, the gear shift profile allows for lockup from 2nd gear once the conditions are right (see **SafeLock®**). As you slow, manually down-shift gears in anticipation of the right gear the speed in order to keep the TCC locked.

4L mode operation

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

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-mate®PLUS+ 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 1800, as under this speed the clutch cannot engage. This can be achieved by downshifting a gear in SPORT mode.

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-mate®PLUS+** reads the real-time vehicle status and 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, 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).

If emergency braking, **lockup-mate®PLUS+** will immediately unlock the torque converter immediately to protect the driveline from potential impact damage.

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 an 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.

This is the most conservative use of the lockup kit, and it will only activate to help prevent overheating. The slipping torque converter is the primary contributor to high transmission temperatures. With **lockup-mate®PLUS+** 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-mate®PLUS+** to act as a 'Guardian Angel' and utilise the normal factory control of the transmission until it becomes hot. **lockup-mate®PLUS+** can be configured so it will only activate when a set temperature has been reached.

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

To setup for hot temperature activation, refer to Configuration Settings Section:

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

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

Adjustable sensitivity

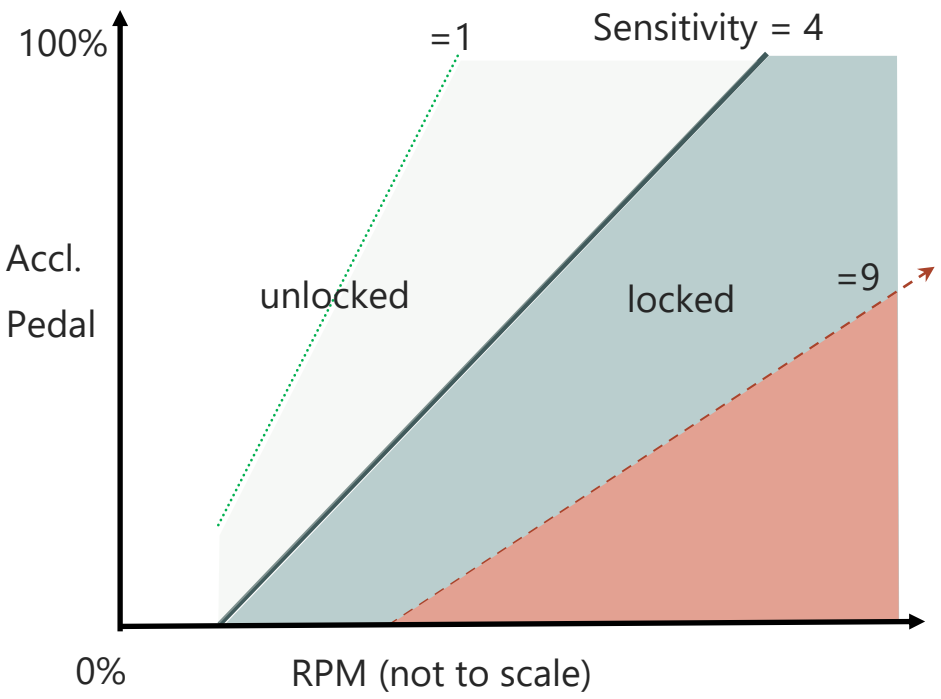
(See Configuration Parameters section for more detail)

4H

Sensitivity affects when **lockup-mate®PLUS+** 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-mate®PLUS+** 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

Driving Conditions	*Recommendation*
City, country and highway	**lockup-mate®PLUS+ 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-mate®PLUS+ OFF *** * Configure for hot activation only, or just leave it OFF only unless the transmission oil becomes hot (eg, >80°C), then switch **lockup-mate®PLUS+** 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-mate®PLUS+ ON or OFF, use SPORT mode** **Short hills:** Leave OFF unless the transmission oil becomes hot (eg, >80°C), then switch **lockup-mate®PLUS+** ON to reduce the transmission temperature. To cool the transmission, use SPORT mode and climb in 2nd gear where possible to allow the torque converter clutch (TCC) to lockup. The transmission will not lockup in 1st 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-mate®PLUS+ ON** and climb in 2nd gear.

Driving Conditions	*Recommendation*
Steep Hills (descent)	**lockup-mate® PLUS+ ON or OFF** Typically, a 4L steep descent is conducted in 1st gear. Since the transmission cannot not lockup in 1st gear the use of **lockup-mate® PLUS+** doesn't improve engine braking in this situation. For better 4H engine braking on the asphalt, switch **lockup-mate® PLUS+** ON and use SPORT mode.
Sand **(beach run at higher speeds >40kph)**	**lockup-mate® PLUS+ ON** Use SPORT mode - ensure the **blue** LED stays on. **Reason:** Keep the transmission cool and better fuel economy
Sand (dunes and deep sand) **Mud**	**lockup-mate® PLUS+ ON or OFF** **OFF** for short sections where excessive driveline shock could be experienced. **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-mate® PLUS+** is functioning correctly and waiting for the transmission to warmup
LED ON	Torque converter is fully locked
LED OFF	Torque converter is not locked NOTE: LED is always OFF when **lockup-mate® PLUS+** is switched OFF.
LED Flashing	Excessive slip alert warning; to inform driver they may wish to change down a gear or reduce power momentarily to enable lockup clutch engagement

Switch Commands

Momentary push	Toggle **lockup-mate®PLUS+** 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 **(when engine not running)**	Toggle **SafeLock®** Clutch Protection Mode 2 flashes = OFF 5 flashes = ON (recommended)
Double click	 Reset the Check Engine Light (CEL). **lockup-mate®PLUS+** sends the standard OBD2 command message to reset the engine error lamp. NOTE: This will reset the CEL regardless of the cause of the problem.

lockup-mate®PLUS+ 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-mate®PLUS+ ON and OFF

Turn **lockup-mate®PLUS+** 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 help prevent accidentally turning it OFF.

SafeLock® Clutch Protection Mode prevents engagement of the TCC during high slip conditions to reduce wear on the clutch.

To toggle between the **SafeLock®** ON and OFF, press and hold the LED/Switch for 10 seconds when the ignition is ON, but the engine OFF.

The LED will respond with:

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

SafeLock® ON (default)

lockup-mate®PLUS+ 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® also immediately disengages the clutch under emergency braking to avoid potential impact damage to the driveline.

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 light; also known as a Malfunction Indicator Lamp (MIL), or Check Engine Light (CEL).

This feature will send the standard 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.

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

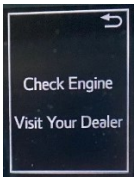
A CEL not expected when using **lockup-matePLUS+**.

[LC200 only] When lockup-mate is ON, it monitors for trouble codes and will automatically clear a torque converter (TC) related code (P2757, P2759) if one occurs, but only when it is the only reported code in the ECU. This ensures it won't clear other fault codes. This feature can be switched off (for diagnostics) by triple-clicking the LED once configuration mode is entered (2 flashes=off, 5 flashes=ON).

LC200 (GX,GXL): A TC error code will flash the 4LO lamp.

LC200 (VX/Sahara): A TC error code will alternately display the following:

NOTE: There is no malfunction of the Pre-Crash Safety System, it is just disabled.



SETTING USER PREFERENCES

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

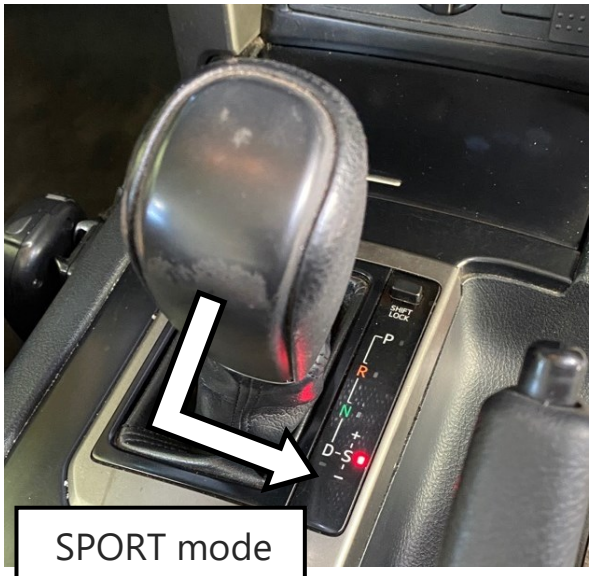
lockup-mate®PLUS+ allows the driver to modify the configuration settings. This mode can only be accessed when the ignition is ON and the engine is NOT running.

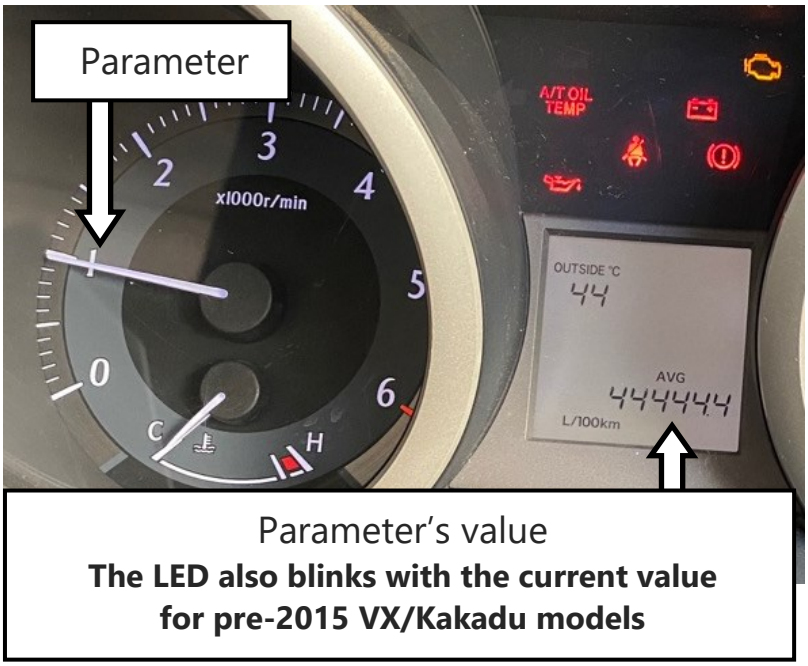
To enter configuration mode, place into SPORT mode and press LED/Switch.

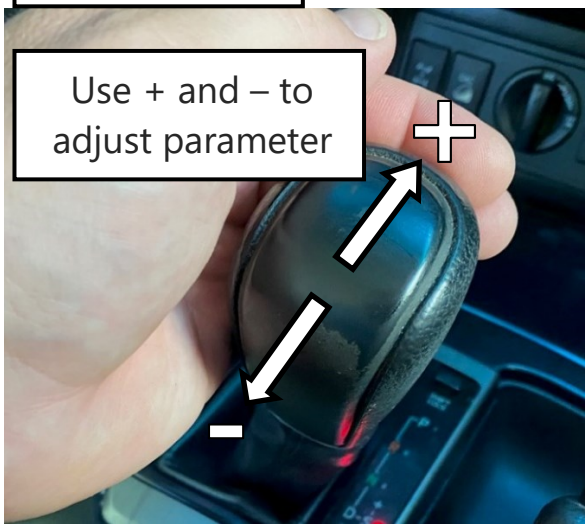
To reset to factory defaults, enter configuration mode, then press and hold the LED/switch for 10 seconds.

Enter configuration mode:

1. *Close door to stop chime!*
2. *Place the shift lever into SPORT mode with the ignition ON, and the engine not running*
3. ☛ *Press the **lockup-mate®PLUS+** LED/Switch*
4. *Use shift lever plus(+) and minus(-) to adjust the parameter's value.*
5. ☛ *Press LED/Switch for next parameter*







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

lockup-mate®PLUS+ 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-mate®PLUS+** 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. For example, if your car 'surges' at low RPM, increase the setting to unlock the TCC earlier. 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-mate®PLUS+** will activate or release the TCC. Instead, **lockup-mate®PLUS+** 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-mate® PLUS+** 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**

	LC200*	**LC150***
Setting	**Lockup RPM***	**Lockup RPM***
0	1025	1200
1	1100	1275
2	1175 (default)	1350 (default)
3	1250	1425
4	1325	1500
5	1400	1675
6	1475	1750
7	1550	1800
8	1625	1875
9	1700	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**	Warmup temperature of the transmission oil before **lockup-mate®PLUS+** commences operation. Range 2-9, **Default 3 (30°C)** 2=20˚C, 3=30˚C etc **lockup-mate®PLUS+** monitors the pan temperature sensor, which is the main oil reservoir of the transmission.
3	**Minimum activation gear**	Only activate **lockup-mate®PLUS+** when the chosen minimum gear is reached. Range 1–5 = 1st to 5th **Default 2nd** 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.
4	**Excessive Slip Alert**	The LED will flash (ON..OFF..ON..OFF) if there has been excessive torque converter slippage for 20 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. 0 = OFF. Doesn't flash 1 = Alert in SPORT only (default) 2 = Alert in both DRIVE and SPORT
5	**Pulse LED during warmup**	Pulse the LED (dim, bright, dim …) until the transmission warmup temperature is reached. This lets you know **lockup-mate®PLUS+** is running. Thereafter, the LED comes on only when the TCC is locked. The LED doesn't pulse if **lockup-mate®PLUS+** is switched OFF. 0 = OFF 1 = ON **default** If **lockup-mate®PLUS+** (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. Recommendation: ON if the activation temperature is 20-70˚C OFF if the activation temperature is 70-90˚C

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.

NOTES:

ABN 95 625 092 091

Tea Tree Gully, South Australia

Online Shop mm4x4.com.au **Email** enquiries@mm4x4.com.au **Phone** (08) 8164 6907