MM 4X4
VEHICLE ELECTRONICS

www.mm4x4.com.au

auto-mate PRO

Mitsubishi Pajero 2009+ NT, NW, NX

Operating Instructions

Rev C: 30 Apr 2021

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CONTENTS

Thanks for purchasing **auto-matePRO**; a fantastic product designed for the vehicle enthusiast who wants maximum control over the operation of their transmission.

Features & Benefits of auto-matePRO

Feature	*Benefit*
Key Benefits and Features	
Significantly reduces automatic transmission heat build-up	Prolong the life of the transmission oil and help avoid temperature related transmission failures
Improved fuel economy	Typically, a 10% improvement when towing or when using larger tyres. The unit will pay for itself in the long run.
A new DRIVE mode, optimised to lock the Torque Converter Clutch (TCC) and gear changes	Adds a tow mode to your transmission
Two user configurable memory settings Individually adjust: • Gear Shift profile • Lockup Sensitivity • Activation gear • Engine Braking Level • Activation Temperature (and LED operation) • LED Brightness	Highly configurable operation Memories can be switched while driving More customisation for improved performance with re-tuned engines Setup each memory for different driving conditions (eg, city, towing, over-temp protection, off-road low range or re-tune)
SafeLock™ - Clutch Protection Technology • TCC lockup using the same low slip criteria as factory ECU before engaging the clutch. • TCC unlock during emergency braking to help protect the transmission from impact shock	Help protect the transmission and torque converter clutch from excessive wear or damage for longer life and reliability
Excessive Slip Alert (DRIVE and SPORT mode) LED flashes if the TCC is unlocked (3rd gear an above), and there is excessive slip to safely lockup the clutch	Informs the driver to change to a lower gear to enable lockup to occur, or to reduce engine power (RPM) to lockup the clutch
auto-matePRO can be turned ON or OFF	Can be switched on or off at any time using the LED/switch
LED indication of the lockup status	Driver knows then the TCC is locked
Fifth (5th) gear lockout mode	Deactivate the over-drive gear (5th). When active, only gears 1-4 are used

Feature	*Benefit*
Integration with the instrument cluster to display the current gear number, even when in DRIVE mode	Driver knows the transmission's current gear, instead of just a 'D'
Works when transmission is in either SPORT or DRIVE mode (4LLc is SPORT only)	Keeping the **blue** LED on helps keep the transmission **cool**!
Automatically adjusts for 4WD low-range use	Simple use
Automatically adjusts for later NX models (MY17+) which have the high rear diff ratio	Shift pattern is automatically adjusted
Micro-processor controlled	Provides advanced digital control and features
Doesn't change the factory ECU firmware	No re-mapping of the transmission ECU required
Still use your favourite OBD2 devices as it won't interfere with them	Doesn't use OBD2 messages and passively listens to the CANBus, so it's compatible with your existing ScanGauge, GPS HUD etc.
Clear Check Engine Light (CEL)	Issue the OBD2 command to reset the CEL and clear the trouble codes

Other Features

auto-matePRO's computer uses vehicle parameters such as speed, RPM, pedal position, 4WD mode, transmission mode (SPORT or DRIVE), transmission temperature, and current gear for optimum performance and features.	Complex control logic to ensure the correct gear is selected to ensure the TCC is locked up whenever possible, and unlocked when it's not.
Vehicle status is obtained from the vehicle's internal vehicle digital network (CANBus), via connection to the car's existing OBD2 port.	Precise and reliable digital information Simpler installation – no cutting of wires to obtain vehicle information Immunity to electrical noise
Small custom LED/Switch	Discrete and simple installation and in the driver's sight
LED pulses during transmission warm up period	Driver knows **auto-matePRO** is working and is waiting for the transmission oil to warm-up before allowing TCC lockup and control. [This feature can be switched OFF]
Headlight dimming can be overridden by the driver	LED will be visible during the daytime when driving with the headlights on

Feature	Benefit
LED is visible in sunlight, and automatically dims for night use (headlights are on)	Avoids a glaring LED at night
Avoids the 1st gear quirk that affects Pajero NT+ when a lockup-kit is used.	Masks the quirk which causes the transmission to stay in 1st gear when below 30 kph
Electrical (PWM) control of the TCC clutch is the same as the factory ECU	Mimics the factory control for confidence, and smoother TCC engagement

Installation Features

Comprehensive installation instructions aimed at DIY installation	DIY saves money, or reduces cost if installed by a professional
User initiated self-diagnostic mode, displaying results on the instrument cluster	Confirms correct installation and assists with fault finding
Automatic VIN check	Automatically disables if installed into an unsupported vehicle
Compact design	Simpler installation
Installed in 2-3 hours	DIY installation
Clear Check Engine Light (CEL) 	Reset the check engine light to self-recover in case of an error during installation

User Configurable Parameters

Two user setting memories	Triple click the LED while driving to toggle the memory being used
1. Adjustable transmission shift pattern	Fine tune when the gear shift points occur.
2. Adjustable lockup sensitivity	Fine tune the engine load before it unlocks again
3. Gear when lockup commences	Select 1st, 2nd, 3rd, etc.
4. Engine Braking Level (for DRIVE mode)	Select from 3 levels (OFF, Medium, Full)
5. Activation (warmup) Temperature	Lockup control and gear changes only commences when the transmission oil is above this temperature. The LED pulsing during warmup can be disabled.
6. LED brightness	Adjustable to your preference, for both day and night.

Feature	*Benefit*
Setup the user settings using existing Instrument Cluster and Cruise Control switches as the user interface	No need for an extra display or to access the **auto-matePRO** controller to adjust the settings
Reset to factory defaults	Restore settings to the original
Startup state (on or off)	Remembers the switch setting
Enters user configuration mode only when vehicle engine is off	Safety feature
Stores user settings in micro-processor's non-volatile memory	Remembers setting when power is removed
Firmware upgrades	Unit will need to be returned to MM4X4 for the update

- ✓ Technical support
- ✓ Made in Australia
- ✓ 12-month warranty

30-day money back satisfaction guarantee

BASIC OPERATION

The original **auto-mate** was designed to add a towing mode to the transmission, and be used either OFF (normal driving), or ON (when towing).

auto-matePRO improves upon **auto-mate** and is designed for the enthusiast who wants more control over its operation and to choose between multiple configurations.

With **auto-matePRO** you now have:

- **Two user defined memories which can be setup for different driving conditions or performance.**

  Triple click the LED/Switch to switch between the memories while driving. The gear number will momentarily flicker 1 or 2 showing the memory in use

- **More ability to tune gear shift profiles and the lockup sensitivity**, so **auto-matePRO** better suits higher power engines (retunes/chips) and vehicles with larger 33" tyres. Due to the extra torque of higher power engines, it can cause driveline vibration when under high load at lower RPMs (<2200) when the torque converter is locked. This can now be tuned out.

- **Improved smoothness when in 60 and 80 kph zones** which are right on 1500-1600 rpm lockup limit (for 4th and 5th gears). As the speed slowly drops below 60 (or 80), **auto-matePRO** can first unlock the torque converter before then changing down a gear if needed. This reduces the number of gear changes and is a smoother driving experience.

- **In DRIVE the activation gear setting can be changed.** When 3rd or above is chosen, **auto-matePRO** uses a new 2nd-3rd gear shift profile which also removes the delay changing to 3rd gear cause by waiting for the 2nd gear TCC lockup to complete.

- **Three engine braking settings when coasting (OFF, Medium, and Full).** In Medium and Full the TCC remains locked when coasting. In Medium the gear will upshift whereas in Full the same gear will be held.

- **Automatically adjustments for the NX MY17+ rear diff ratio change**, and the tunability features allow for smoother operation of these NXs.

- **Ability to reset the Check Engine Light**. This is used when entering Low Range 4WD mode (4Llc) to reset the 1st gear quirk.

Typical memory configuration setups for **auto-matePRO** are:

*Auto-mate Configuration**	*Purpose*	*Memory Configuration*
High temperature protection *[Memory 1 factory default]*	Factory ECU operation only until temperature protection is needed.	Factory operation until the oil is hot (eg, 80°C). Then activates **auto-matePRO** lock-up to maintain lower temperatures. Deactivates **auto-matePRO** again once the temperature is 5° below set point (eg, 74°C). LED doesn't pulse during warmup, and only illuminates when auto-mate is active. Setup per the smoother City Driving configuration when active.
Towing and Touring *[Memory 2 factory default. To remember, think TWO=TOW]*	Maximum transmission temperature reduction and fuel economy improvements when towing heavy loads.	Maximise TCC lockup Maximise engine braking Lockup from 2nd gear
City Driving	Smoother operation in 60 and 80 kph zones, or during stop/start and heavy traffic, Provides temperature reduction benefits and the manual gearbox like 'direct power' to the road experience.	Unlock TCC first, then down shift if needed Medium engine braking (Upshift when coasting) Lockup from 3rd gear Just modify the default Memory 1 activation temperature from 180 to 40 to try it.
High Power Engine	Unlock the TCC in high power conditions that cause excessive driveline vibration.	Modified lockup-sensitivity and gear shift profile to avoid vibration.
Low Range 4WD (4LLc)	eg, Modified transmissions which allow lockup in 1st gear	Modify activation gear to 1st

* More detail of the setting values is later in this booklet.

COLD START

auto-matePRO monitors the transmission temperature and does not activate until it has reached the configurable activation (warmup) temperature. (Memory 1 default is 80˚C, memory 2 default is 40˚C).

While waiting to reach the activation temperature, normally the LED pulses gently so you know the unit is operating. The this can be turned off, such as when **auto-matePRO** is configured for high temperature protection (the memory 1 default).

DRIVE POSITION

In DRIVE it is fully automatic – just set and forget. It will lock the torque converter above 30 kph and thereafter keep operate according to the memory configuration. When extra torque is needed, it will downshift a gear or unlock the torque converter.

The driver can control how and when **auto-matePRO** changes gears by how much or little the pedal is pressed. Use the pedal to encourage up or down shifts.

For example, in towing configuration and engine braking downhill with your foot off the pedal, it will hold the current gear – lightly touch it, and it will then change up a gear. Alternatively, change the engine braking setting to upshift when coasting.

If you're finding the transmission is changing between 4th and 5th too often, use the 5th gear lockout feature, just double-click the LED to toggle this mode. Alternatively, use SPORT mode.

Want a SPORTIER feel? Adjust the shift profile to your preference.

If you personally find **auto-matePRO** holds onto a gear too long before changing up-shifting, adjust the gear profile setting.

In 4LLc, **auto-matePRO** does not lockup the TCC when in DRIVE mode. Use SPORT mode instead.

SPORT POSITION

In SPORT mode, **auto-matePRO** will automatically lock the Torque Converter Clutch (TCC) whenever the conditions are suitable (speed, gear, engine load, slip). The driver must ensure the right gear and engine load to enable lockup. In SPORT mode the engine braking level is always setup to FULL.

It's now a Hybrid Sport/Drive

To avoid the 1st gear quirk, the transmission is placed into DRIVE mode when below ~30 kph. SPORT is a hybrid DRIVE/SPORT mode, and manual control of the gears will only occur when above ~30 kph. The green D will illuminate according to the current mode.

This means even though the shift lever position is in SPORT, the vehicle operates and changes gear as per factory DRIVE mode when speed is <30 kph.

Once the speed is above ~30 kph, the driver has control of the gear choice again

So, in **auto-matePRO** SPORT mode, the +/- shift lever is ignored until the speed is above 30 kph - This is normal.

If precise 1st and 2nd gear choice control is needed at speeds <30 kph, **auto-matePRO** can be simply turned OFF.

Tips when driving in SPORT mode

- ✓ It essentially turns the transmission into a clutch-less manual. This thought should guide how to best drive the vehicle when in this mode. Imagine it is a manual transmission, so you need to change gears according to the RPM. When driving gently, change gears at ~2000-2400 RPM. If accelerating quickly, around 2600-3000+ RPM.
- ✓ Change down a gear if the LED is flashing.
- ✓ Experiment with RPM and load to determine the right time for the gear changes.
- ✓ Choose the highest gear that allows the LED to stay **blue** without labouring the engine.
- ✓ **auto-matePRO** will improve downhill engine braking. Select an appropriate gear (typically S4 or S3)
- ✓ **auto-matePRO** will unlock the torque converter if the RPM is too low to avoid vibration, however if you change up a gear too early it may very momentarily vibrate and the factory transmission ECU may throw a Check Engine Light (CEL) error (P2758 – Torque Converter Stuck ON). Double-click the LED/Switch when in d to reset the CEL.

EXCESSIVE SLIP ALERT

When the **auto-matePRO** LED flashes, it is alerting you change to a lower gear because there is excessive torque converter slip and it cannot lockup safely. This is a reminder to select a lower gear or slightly back-off on the accelerator to enable lockup. If after changing down a gear and there is still excessive slip to safely engage the clutch, SafeLock™ is protecting you. Momentarily back off on the accelerator to reduce power, and the torque converter will then lockup. It will only flash in 3rd or above, when the accelerator pedal is depressed, and the RPM slip is above the slip protection limit.

HIGH RANGE (4H) OPERATION

auto-matePRO automatically detects if the transfer case is in high range (2H/4H/4HLc) or low range (4LLc), and adjusts performance accordingly. In high range 4WD, it uses a combination of speed, gear, RPM, slip, SafeLock™ and the accelerator pedal to determine when to lock the TCC. In low range 4WD it uses pedal, gear and RPM.

LOW RANGE (4L) MODE OPERATION

In low range 4WD, **auto-matePRO** only works in SPORT mode and uses RPM to determine when to lock the TCC (engages around 1500-2000 RPM and disengages @1200 RPM).

Because of the '1st gear quirk' see "**Entering 4LLc (low range) procedure**" later in this booklet.

NOTE: In 4L, if emergency braking is conducted at very low RPM in 2nd gear, the engine may stall. This is due to **auto-matePRO** and the vehicle not being able unlock the TCC in a timeframe to avoid the stall.

THINGS YOU NEED TO KNOW – HOW IT WORKS

The AISIN transmission in the Pajero cannot lock the TCC in 1st gear (without modification).

auto-matePRO will automatically lockup the torque converter in any speed and gear (2-5) according to the driving conditions and configuration settings. It constantly monitors the vehicle status including speed, current gear, RPM, accelerator pedal, torque converter slip, 2H/4H/4L position, and the SPORT gear choice. This information is used to determine when the TCC should be locked and when to change gears. In DRIVE and SPORT modes, it locks only when above ~30 kph.

auto-matePRO works by locking the transmission TCC (when possible), and places the transmission into SPORT mode. It then changes gears just as if the driver was using the shift lever for + and – gear changes; fully automatically.

All the inbuilt protections of the factory computer remain. For example, it will not let you change into 2nd gear when the speed is too high. It does not reprogram the factory ECU.

SAFELOCK™ - CLUTCH PROTECTION TECHNOLOGY

Exclusive to MM4X4 is **SafeLock™**, which prevents excessive wear that may occur if the torque converter clutch is engaged under high slip conditions. The Advanced Digital Control of **auto-matePRO** 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. If active (LED OFF or flashing) the driver need only back off on the accelerator a little to reduce the RPM (and slip) for the clutch to then engage (LED comes on).

Emergency Braking

SafeLock™ will immediately unlock the TCC during emergency braking. The torque converter will help absorb mechanical shock and will help prevent damage to the transmission internals and driveline in the event of a sharp impact (such as a washout).

1ST GEAR QUIRK

Because **auto-matePRO** avoids the quirks, there are still some things you need to understand about how it works.

When using any lockup kit in a Pajero, there are sometimes unusual behaviors.

The Pajero's AISIN transmission ECU has advanced diagnostics that continuously monitor the operation of the transmission. By locking the TCC it modifies the 'normal' behavior of the transmission, and the diagnostics may detect this.

The result is unexpected behaviors (quirks):

1. When you're in SPORT mode it may prevent a gear change from 1st to 2nd until the speed is above 30 kph / 2800 RPM,
2. As you decelerate it may change into 1st gear at 30 kph causing you to lunge forward a little.

3. In 4LLc, it may become stuck with the 'quirks'.

In high range, these quirks don't occur when the transmission is moved to DRIVE mode.

auto-matePRO does the hard work and masks these quirks for you.

It works together with the factory transmission computer and automatically switches between DRIVE and SPORT modes at the right times to provide seamless operation and avoid the quirks. This provides a much nicer driving experience.

When DRIVE is selected the factory computer controls gear changes between 0-30 kph. Above 30 kph, **auto-matePRO** takes control and switches the transmission into SPORT mode, locks the TCC, and controls the gear changes with a shift profile optimised for lockup operation. Regardless, the instrument cluster remains displaying the green D, and the current gear number is displayed.

DOWNHILL ENGINE BRAKING

To increase downhill engine braking, move the shift lever to SPORT and select a lower gear. **auto-matePRO** will keep the torque converter locked when coasting to improve engine braking, and cool the transmission faster. It will not lock however, 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. Once the TCC has locked up, the increased RPM will be maintained.

In **auto-matePRO** DRIVE mode there are 3 user settings for engine braking when coasting.

Engine Braking Level	Hold TCC locked	Hold Current Gear
1 (OFF)	-	-
2 (MEDIUM)	✓	-
3 (FULL)	✓	✓

When you change from SPORT back to DRIVE (and still coasting) **auto-matePRO** will behave according to the engine braking setting.

SAFETY FEATURE – ENGINE BRAKING

auto-matePRO does not shift into DRIVE at 30 kph when you are in 1st or 2nd gear (SPORT mode) and are decelerating using engine braking (foot off accelerator pedal). Shifting into DRIVE releases engine braking and has the potential to cause an accident if unexpected.

At 30 kph and below, the transmission may either stay in 2nd gear, or switch to 1st gear (ie, quirk is not avoided). Although the quirk is not avoided, unexpected switching into 1st gear has the effect of increased engine braking and is safer compared to the alternative of releasing engine braking by switching to DRIVE.

Alternatively, for predictable gear control and to avoid the 1st gear quirk, switch off **auto-matePRO** using the LED/switch. Down-hill descents that require engine braking will not over-heat the transmission

NOTE: If after engine braking and the accelerator is pressed in 1st gear, or the speed drops below 10kph, **auto-mate** will then shift to DRIVE so the 1st quirk is avoided.

LOW RANGE OPERATION – 4LLC

When in 4LLc, the quirks described above aren't created during driving, however using the technique of selecting DRIVE will not avoid them. Instead, it may become 'stuck' with the quirks when in low range.

PROCEDURE TO CLEAR THE QUIRK

NOTE: Restarting the vehicle DOES NOT clear the quirk.

1. Place the transmission into PARK. It MUST be in PARK.
2. Double-click the LED/Switch to clear the engine trouble codes. The LED will respond with 1 flash to acknowledge the command. Alternatively, you can also use your OBD2 reader (ScanGauge, UltraGauge, Torque Pro, etc) to issue a CEL reset (ie reset engine trouble codes).
   Even though there may be no CEL light or engine trouble codes reported by the ECU, this works.

CHECK ENGINE LIGHT (CEL) – ENGINE TROUBLE CODE

On rare occasions in some vehicles, the ECU may throw an error code (P2758), and the check engine light (CEL) illuminates. P2758 error is *Torque Converter Clutch Pressure Control Solenoid Ctrl Circuit Stuck On*.

This may also occur if the driver selects a gear when the engine RPM is too low for the newly chosen gear.

If this happens (a CEL), the factory computer may disable SPORT mode and cruise control operation. The green N will flash, or the green D and N may alternately flash. The error code needs to be reset.

Place the transmission into **PARK** and **double-click the LED/Switch** to clear the engine trouble codes. It MUST be in PARK.

No damage results.

It is often the case that the code may only occur within the first couple of weeks of use. Thereafter the adaptive learning adjusts for the TCC being locked up.

OPERATING RECOMMENDATIONS

Driving Condition	*Recommendation*
Country and highway **[Memory 2]**	**auto-matePRO** ON [towing configuration] **Reason**: Excellent protection from high transmission temperatures and better fuel economy. Use SPORT mode for better downhill engine braking.
Guardian Angel / City mode **[Memory 1]**	**auto-matePRO** ON [high temperature protection configuration] **Reason**: City driving (unloaded) does not put stress on the transmission, but **auto-matePRO** will still provide protection from high transmission temperatures when needed. This also reduces the number of lockup cycles that occur in stop/start driving which will naturally extend the clutch's life.
Rocks and creek-beds **[Memory 1]**	**auto-matePRO** OFF or ON [high temperature protection configuration] **auto-matePRO** is inactive until the transmission oil becomes hot (eg, >80^{o}C) **Reason**: The torque converter absorbs driveline shock caused by the highly variable nature of rock driving, eg, lifting/dropping wheels or hitting rock ledges. Keeps the TC unlocked until temperature protection is needed. **Switch OFF is the conditions are unsuitable for lockup.**
Steep hills (4L ascent) **[Memory 2]**	**auto-matePRO** OFF or ON [temperature protection configuration]. Use SPORT mode. Use according to the conditions to avoid driveline shocks. Use SPORT mode and climb in 2nd gear where possible to allow the TCC to lockup when the temperature is high. NOTE: The transmission will not lockup in 1st gear. **Reason:** When unlocked, the torque converter absorbs driveline shock. **CAUTION: Steep hill climbs will rapidly heat-up the transmission oil, so if auto-mate activates and the conditions are UNSUITABLE for lockup, switch auto-mate OFF.**

Driving Condition	*Recommendation*
Steep hills (descent) **[Memory 2]**	Typically a 4L steep descent is conducted in 1st gear. Since the transmission cannot not lockup in 1st gear the use of **auto-matePRO** has no improvement to engine braking. Memory 2 is setup for maximum engine braking. For better 4H engine braking on the asphalt, use SPORT mode.
Sand (higher speeds >40 kph) **[Memory 2]**	**auto-matePRO** ON Use SPORT mode - ensure the blue LED stays on. **Reason:** Keep the transmission cool and better fuel economy.
Sand (deep sand) **Mud** **[Memory 1 or 2]**	**auto-matePRO** ON **Memory 2** for sustain 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. **Memory 1** for short sections. If transmission oil becomes hot (eg, >80°C), it will reduce the transmission temperature. Deep sand and mud are highly variable situations. When a deep section is entered more power is urgently needed to maintain momentum. The torque converter slippage allows the RPM to quickly increase for more turbo boost and power. **In mud, avoid locking the torque converter where high dynamic forces may impact the driveline. Turn auto-matePRO OFF**.

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.

Double click or triple click to access other features. The LED will respond according to the command.

LED STATUS SUMMARY

LED pulsing	Pulsing = (bright, dim bright, dim…)
	auto-matePRO is functioning correctly and waiting for the transmission to warm up.
LED ON	Torque converter is locked.
LED OFF	Torque converter is not locked
	NOTE: LED is also OFF when **auto-matePRO** is switched OFF.
LED flashing	Excessive slip alert informing the driver to change down a gear or reduce power momentarily to enable lockup clutch engagement.

SWITCH COMMANDS

Momentary push	Toggle **auto-matePRO** ON and OFF
	Short flash (0.5 sec) = OFF
	Long flash (1.5 secs) = ON
	(Flashes the selected memory (1 or 2), then displays the current gear number)
Double-click	In DRIVE or SPORT: Toggle 5th gear lockout mode (gear number flickers 4 or 5 with the setting)
	In PARK: Issues a clear Check Engine Light command (CEL reset)
Triple-click	Toggle user memory configuration. (gear number flickers 1 or 2)
Hold 10 seconds	Toggle Protection Mode
(Engine OFF only)	2 flashes = OFF
	5 flashes = ON (recommended)

CRUISE CONROL

Cancel button	Press and hold 5 seconds to toggle on and off.
	Override the night-time LED dimming when headlights are on. When driving with headlights on during the daytime you can keep the LED bright.

ADJUSTING AUTO-MATE TO SUIT YOUR DRIVING PREFERENCES

During driving, **auto-matePRO** allows the driver to adjust the following parameters using the LED/Switch:

1. **On or Off** - When off, fully reverts to factory transmission ECU control.
2. **Fifth (5th) Gear Lockout Mode** - Used only in DRIVE mode. When active, only gears 1-4 are used. Useful when driving through hilly countryside. This is not stored in the memory configurations, and is reset once the ignition is turned off.
3. **Memory Selection** – two memories are available
4. **Reset Check Engine Light (CEL) Command**– Clears all engine trouble codes. This is used when entering 4LLc to clear the 1st gear quirk, or in the rare case of a transmission error occurring.

With the engine off, the following parameter can be set using the LED/Switch:

1. **On or Off**
2. **Protection Mode** – Protects the clutch for wear during engagement and in SPORT mode it unlocks the torque converter if the load may cause driveline vibration.
3. **Reset Check Engine Light (CEL) Command**

During driving, **auto-matePRO** allows the driver to adjust the following parameters using the Cruise Control CANCEL button:

1. **LED Headlight Override** - The LED brightness automatically dims when the headlights are turned on. This can be overridden if full brightness is desired for day time use.

With the engine off, the following parameters can be set for each memory using the cruise control buttons:

1. **Gear shift profile**, ie, increase or decrease the speeds when gear shifts will occur.
2. **Lockup sensitivity**, ie, increase or decrease the engine load for locking and unlocking.
3. **Activation gear –** minimum gear when that lockup will occur
4. **Engine Braking.** Selects the lockup and upshift behavior
5. **Activation (warmup) temperature** - The transmission oil temperature before **auto-matePRO** commences lockup operations, and whether the LED pulses during warmup
6. **LED brightness** - The LED brightness is adjustable separately for day and night viewing.

The following sections describe these features in more detail.

LED/SWITCH OPERATIONS DURING DRIVING

SWITCHING AUTO-MATE ON AND OFF

auto-matePRO can be switched on and off by using the LED/Switch.

The LED can be pushed to activate the momentary switch.

Between engine starts, **auto-matePRO** remembers the previous switch status.

When pressed:

ON = a long flash of the LED (1.5 secs duration)
OFF = a short flash (0.5 secs)

During driving, the LED is ON when the torque converter is locked.

The instrument cluster always displays the current transmission gear when auto-mate is switched ON.

PROTECTION MODE

To toggle between the Protection Mode ON and OFF, press and hold the LED/Switch for 10 seconds when the engine is not running. The setting applies regardless of the selected memory.

The LED will respond with:

5 flashes – Protection Mode is **ON**

2 flashes – Protection Mode is OFF (not recommended)

The unit saves the mode setting into non-volatile memory.

ON (default)

There are two protection features built into **auto-matePRO**:

1. ***Excessive Engine Load*** – The position of the pedal is used in the algorithm that determines when **auto-matePRO** will release the TCC. It unlocks the torque converter if the driveline could vibrate due to the load.
2. ***Clutch Protection*** – **auto-matePRO** includes SafeLock™ which will delay locking the torque converter until the amount of slip is low. It uses 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 use, ensuring maximum life from the clutch.

OFF

This mode is provided for customers who want more manual control over lockup clutch engagement and disengagement, or have specific reason to do so.

When Protection Mode is OFF, **auto-matePRO** activates (locks) the TCC when it 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.

It disables SafeLock® and lockup will engage without delay.

CAUTION

Switching Protection Mode OFF is for the savvy/advanced driver who specifically wants full control. It relies on the driver making the right gear choices and under the right engine load to avoid excessive engine strain or clutch wear.

This mode may cause a small amount of extra wear on the torque converter clutch compared to the standard factory engagement limit, as the clutch can engage under high slip conditions (ie, when under medium to high acceleration). Applying too much power at low RPM may cause the driveline vibration.

5TH GEAR LOCKOUT (DRIVE MODE ONLY)

Double-click the LED when in DRIVE or SPORT to toggle this mode.

When active, only gears 1-4 are used. 5th gear is locked out.

Useful when driving through hilly countryside or to avoid 4th -5th -4th hunting that can occur in some driving conditions (eg, strong head winds or undulating hills).

The gear number in the instrument cluster will flash a 4 or 5 (for 1 second) as this mode is toggled.

RESET CHECK ENGINE LIGHT (CEL RESET)

Double-click the LED when in PARK to issue the command to reset the CEL. The LED will flash once. When entering 4LLc, place the vehicle in PARK and double-click the LED to reset the 1st gear quirk. The quirk sometimes prevents changing from 1st into 2nd gear until 2800rpm.

NOTE: This will reset the cause of any CEL. **auto-mate** cannot display the trouble code that caused the CEL.

MEMORY 1 or 2 SELECTION

Triple-click the LED to toggle the selected configuration memory to use.

The gear number in the instrument cluster will flash a 1 or 2 (for 1 second) to identify the selected memory.

HEADLIGHT OVERRIDE (DAY-TIME AND NIGHT-TIME LED BRIGHTNESS)

Press and hold CANCEL for 3 seconds. The LED will momentarily illuminate with the LED intensity.

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

The headlight override setting is retained in non-volatile memory.

MEMORY CONFIGURATION

auto-matePRO allows the driver to configure the following parameters for each memory using the Cruise Control Switches.

To enter configure each memory, enter the configuration mode as follows:

1. **Switch Ignition ON, ENGINE OFF**

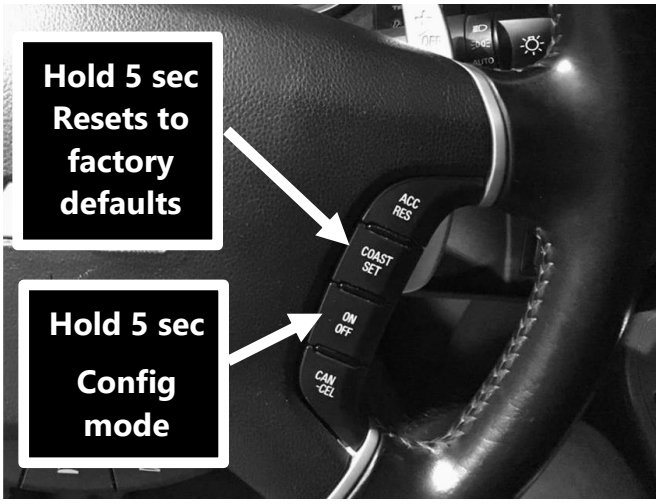
   Engine must not be running. User settings cannot be adjusted when driving. The engine must be off.

2. **Press and hold ON/OFF button for 5 seconds.**

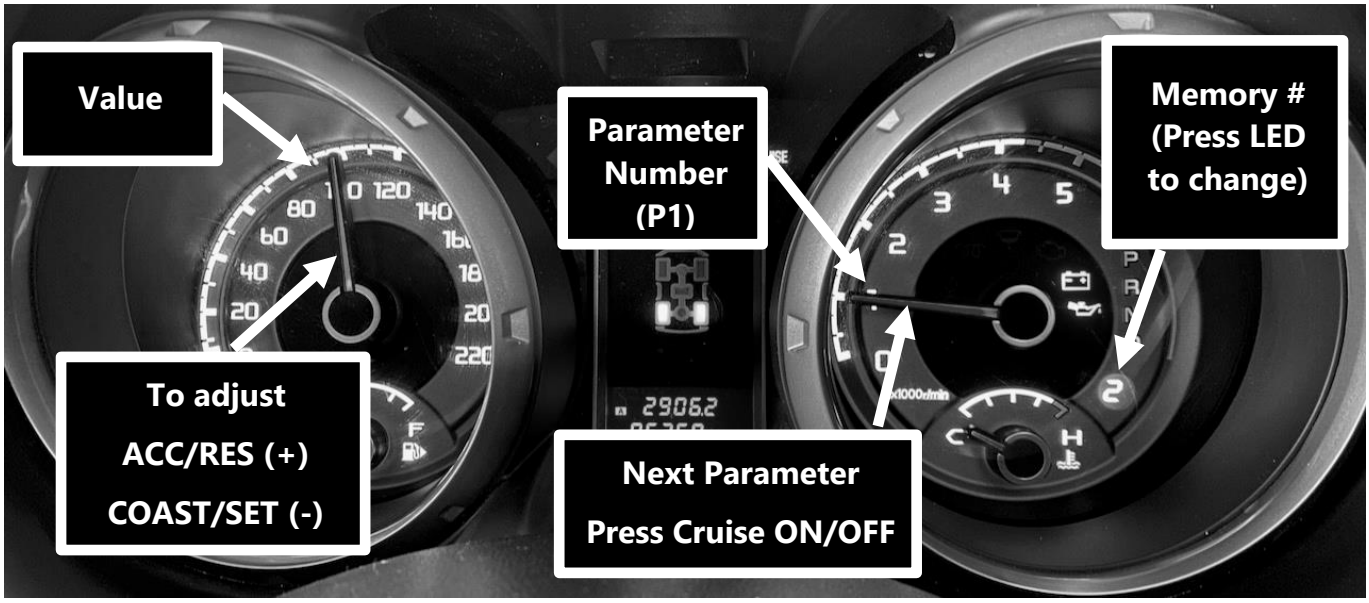
   (Hold until the instrument cluster displays a number on the speedo.)

   Blue LED illuminates.

   To reset to factory defaults, press and hold COAST/SET instead of ON/OFF button.



The Instrument cluster displays the parameter number on the Tacho (P1 – P6), and parameter value is on the Speedometer. The gear number displays the current memory selected. Press the LED/switch to toggle between setting memory 1 and 2 parameters.



Adjust using value using the cruise control buttons ACC/RES (increase +) or COAST/SET (decrease -).
Select the next parameter by pressing the Cruise ON/OFF button. Configuration mode exits after P6 and the speedo and tacho will go full deflection and return to zero.

The value is written into non-volatile memory whenever Cruise ON/OFF is presses.
Press CANCEL to abort configuration mode.

	Name	Description / Values
P1	Gear shift profile*	Increase or decrease the speed when gear shifts will occur. For every increase or decrease of 10 kph, the shift point is adjusted by 100 RPM for all gears. The lockup sensitivity (P2) will be automatically to enforce the rule. If P1=P2, P2 will also be adjusted by the same amount.
P2	Lockup sensitivity*	Increase or decrease the engine load for lockup activation and deactivation. This parameter can be used to reduce vibration, especially in higher power (retuned) engines. RULE: The lockup sensitivity must be P2 <=P1, or P2 >= P1+15. **auto-mate** enforces this rule.
P3	Activation gear	lockup in 1st, 2nd, 3rd, 4th and 5th gears. 2nd or 3rd is recommended. NOTE: The transmission from factory does not lockup in 1st gear. Do not use 1st unless you have a modified after-market valve body fitted with the 1st gear lockup modification; otherwise, it has no effect and may cause engine trouble codes (CEL). When 3rd or above is selected, modified 2→3rd and 3→2nd gear shift profiles are used.
P4	Engine Braking	OFF, Medium, FULL When coasting this setting selects **auto-mate**'s behavior **Hold Lockup** / **Hold Gear** (10) **OFF** — No / No (20 **Medium** — Yes / No (30) **FULL** — Yes / Yes
P5	Activation (Warmup) Temperature	The transmission oil temperature before **auto-mate** activates. 20-100 kph = 20-100°C and LED pulses during warmup 120-200 kph = 20-100°C and LED is OFF during warmup
P6	LED Brightness	The LED brightness is adjustable separately for day and night viewing. The LED intensity is displayed on the LED/switch. Use the headlights switch to toggle between night-time brightness and daytime brightness. Night-time brightness is best adjusted when it's dark.

Refer to tuning **auto-matePRO section before adjusting*

TYPICAL MEMORY CONFIGURATIONS

		High Temperature Protection ONLY *Memory 1 default*	***City (Daily Driving)***	***Towing / 4WD Sand*** *Memory 2 default*	***4WD Rocks/ Creeks***	***High Power Retuned Engine***
P1	Gear shift profile*	85	85	100	100	95
P2	Lockup sensitivity*	110	110	100	100	115
P3	Activation gear	3	3	2	2	←
P4	Engine Braking	20	20	30	30	←
P5	Activation (Warmup) Temperature	180 (80 °C)	40 (40 °C)	40	180	←
P6	LED Brightness	80 (day) 3 (night)	80 (day) 3 (night)	80 (day) 3 (night)	80 (day) 3 (night)	←

*Refer to tuning **auto-matePRO** section before adjusting

TUNING auto-matePRO

For towing, the standard version of **auto-matePRO** (DRIVE mode) is tuned to *always* downshift a gear when more torque is needed. Lockup sensitivity and gear shift profile are linked.

With **auto-matePRO** the gear shift profile and lockup sensitivity can be adjusted separately.

There are two choices of behavior.

OPTION 1 – Down-shift first

When more torque is required the torque converter clutch remains locked and the gear is downshifted. This maximises temperature reduction benefits and fuel savings.

There are more gear changes with the torque converter locked, which is better for heat reduction, but not as smooth.

OPTION 2 – Unlock before down-shift

When more torque is required, unlock the torque converter first, and if still more torque is needed then downshift a gear. This is better for normal driving especially at lower RPM around 60kph and 80 kph.

This configuration is also better when using a pedal controller.
Furthermore, you may also wish to change P3 (activation gear) to 3rd gear to avoid lockup in 2nd, and it will use a 'factory like' 2nd to 3rd shift profile.

	Pros	***Cons***
OPTION 1 Down-shift	Reduces wear on the torque converter clutch, as it doesn't need to lock/unlock as often Minimised transmission temperatures More direct power and without 'slushbox' feeling	As the shift profile increases, it will stay in the gear longer before up-shifting (especially in 3rd at 60kph, or 4th at 80 kph, which are typically the two driving speeds when cruising in metropolitan areas)
OPTION 2 Unlock before down-shift	Much smoother driving experience especially when daily driving and unloaded Smoother when using a pedal remapper. Avoids vibration	More lock/unlock cycles of the clutch, however these are at low slip now due to the new SafeLock™ feature. Wear isn't a significant concern. When unlocked and under load, it will not lockup again until the slip is low again (SafeLock™ is active), and heat can build up. Note: The Slip Alert feature will warn you after 10 seconds of high slip.

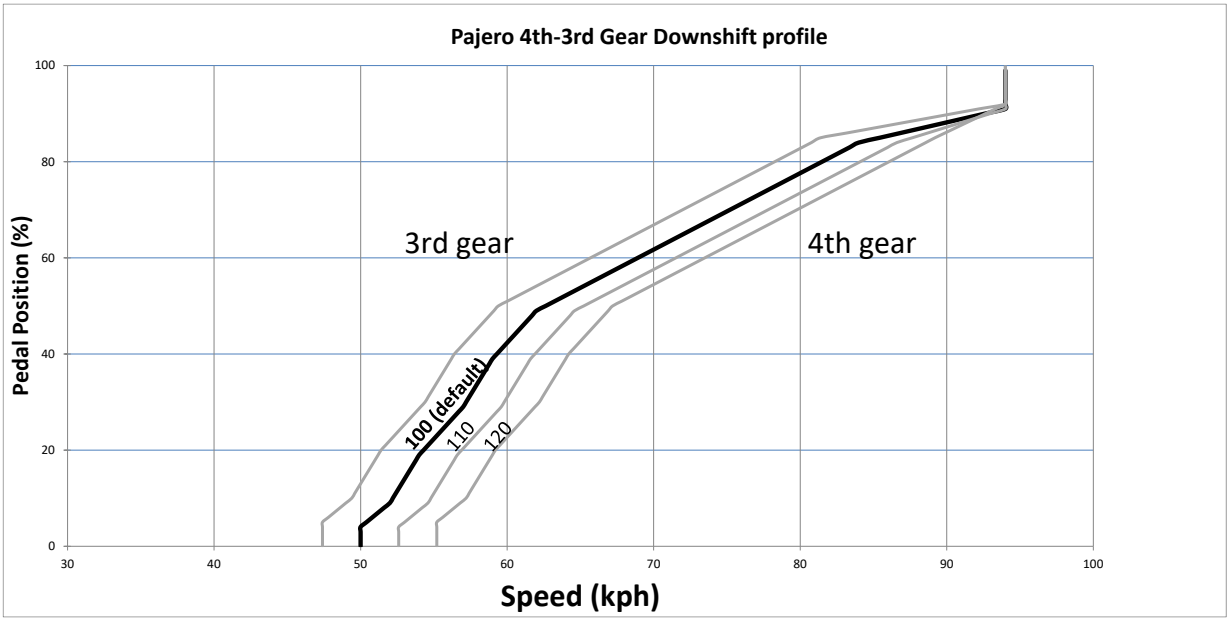
UNDERSTANDING (P1) THE SHIFT PROFILE ADJUSTMENT

The gear shift profile determines when the gears up or downshift. The upshift profile is slightly different to the downshift profile, and they are different for each gear.

The adjustment affects both up and down shift profiles by the same amount.

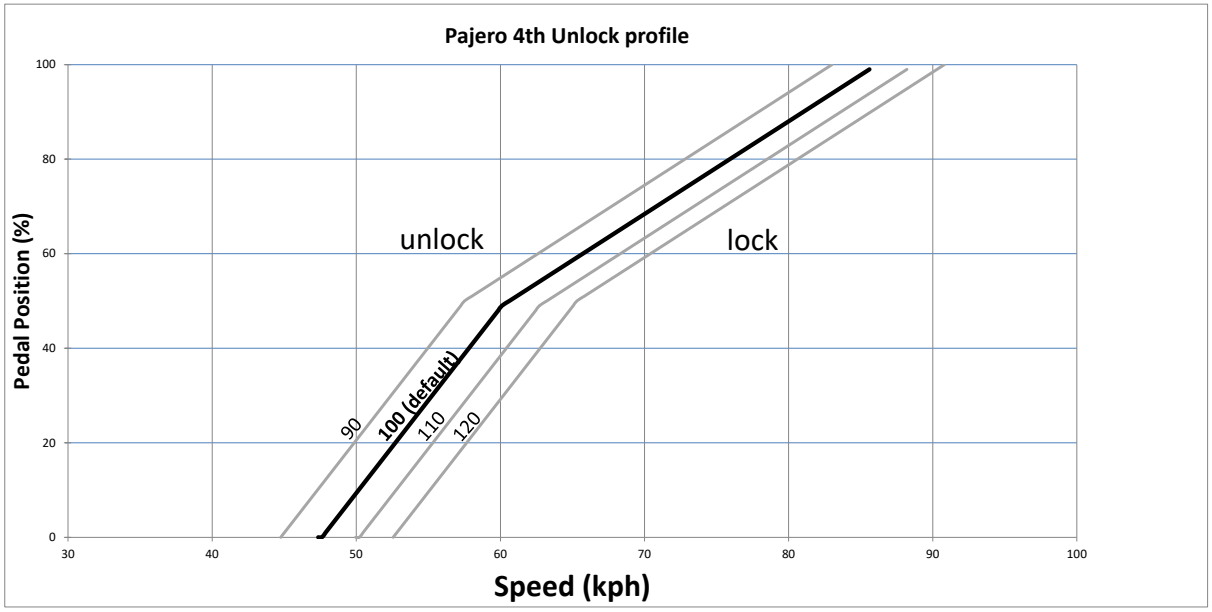
Every 10 points (10kph on speedo) of adjustment move the shift point by 100 RPM (or about 3.5 kph for 4th gear).

Settings above 100 will up-shift later (and down-shift earlier), below 100 is the opposite. You do not need to make significant changes to feel an effect.



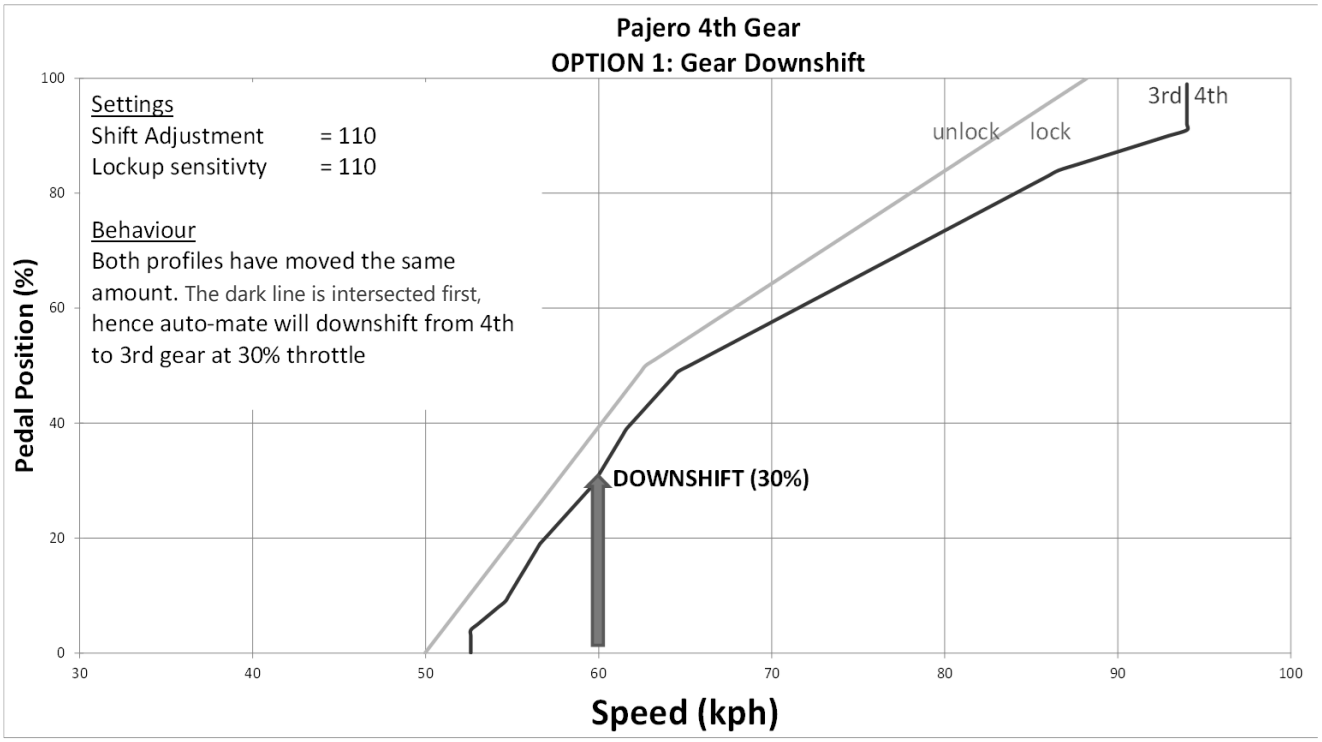
UNDERSTANDING (P2) THE LOCKUP SENSITIVITY ADJUSTMENT

The lockup sensitivity adjusts how much load there is before the torque converter unlocks. This is the primary parameter which needs to be adjusted if vibration is experienced. A retune will put a lot more torque into the driveline for the same accelerator pedal position and may cause the vibration.

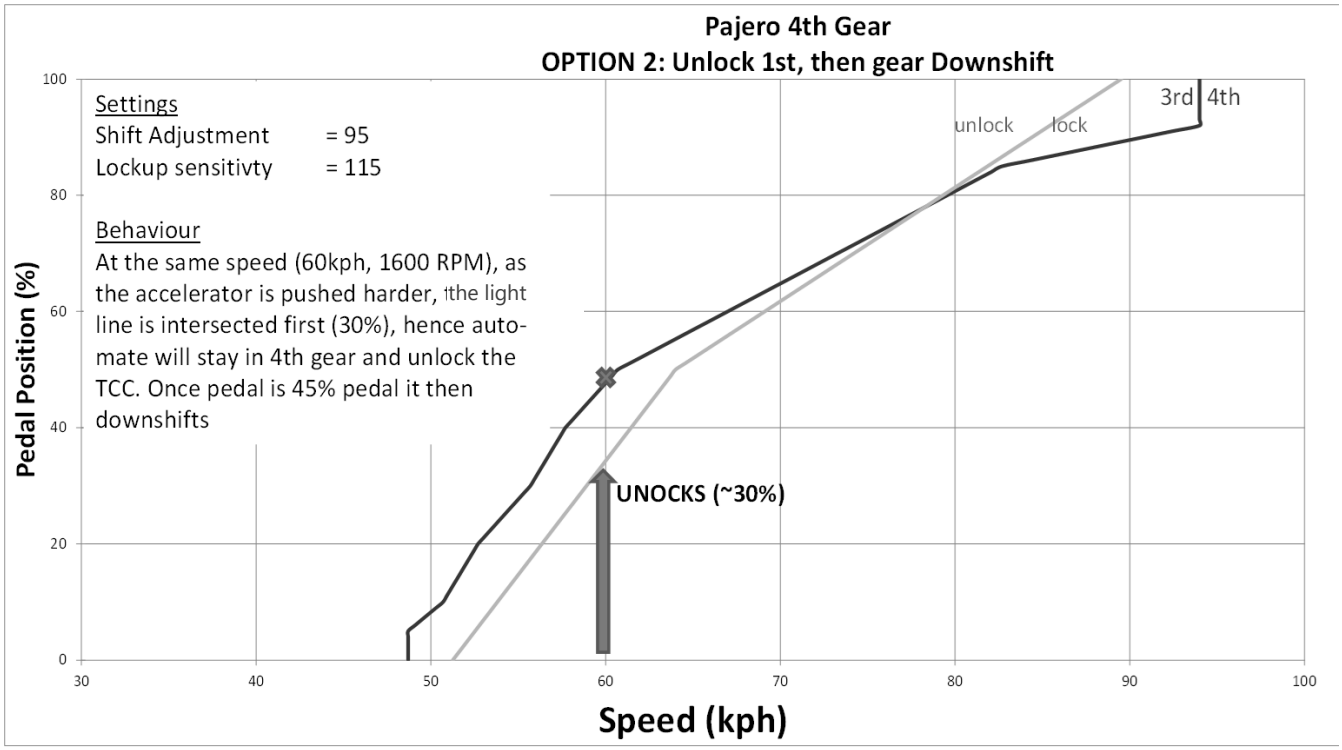


Below are example graphs showing the effects of the two modes of operation.

OPTION 1: Down-shift first



OPTION 2: Unlock before down-shift



SUGGESTED TUNING PROCEDURE FOR HIGHER POWER ENGINES

If vibration is experienced when <2200 RPM with a higher power (retuned) engine, the lockup sensitivity should be adjusted up. This procedure assists with setting this parameter.

Tuning should be conducted in a location (or time) when there is little traffic. The procedure involves driving to 80kph and slowing to below 50kph.

SAFETY IS THE DRIVER'S RESPONSIBILITY

The ideal location is a slight uphill in an 80 kph or 100kph zone

4 steps to tuning:

1. Learn to feel the vibration in a controlled way
2. Tune the lockup sensitivity P2 (to just avoid vibration when under power)
3. Adjust the shift profile P1 based to the sensitivity value and your preference
4. Fine tuning depending on your preferences

STEP 1 Feel the vibration in a controlled way

Use memory 2 default parameters (Option 1) for shift profile and sensitivity first – (100,100)
Put the transmission into SPORT (S4).
Drive up to speed (about 2000rpm and locked) and then drive up the medium incline with a constant pedal position (medium - light <30%) so the vehicle gradually slows down.

Learn how the car feels and the vibration (around 1600-1700 RPM) under medium acceleration.

A constant pedal position is important. You are trying to compare exact same runs up the incline with the same engine load, but varying lockup sensitivities (P2) until the vibration.

Then, drive at 1800 RPM (locked), and use FULL POWER, and feel for any vibrations around 2000-2300 RPM.

STEP 2 Adjust lockup sensitivity

Stop vehicle safely– engine off, ignition on. Hold Cruise ON/OFF until instrument cluster and auto-mate enter configuration mode.
For the chosen memory, set P1=100 and P2 =115 (or increase P2 between runs by 2-3 kph)

Repeat step 1 above to check if it unlocks before vibration.

Repeat adjusting (step 1 and 2) until the sensitivity and testing is ok and to your liking.

STEP 3 Adjust until the shift profile (P1)

Once the vibration is resolved, set P1.

For option 1 (downshift first), it is recommended P1=P2.

For option 2 (unlock first, then downshift), it is P1 is at least 15 less than P2, but not more than 30. auto-mate automatically ensures P1 and P2 are at least 15 apart.

STEP 4 Fine tuning

The tuning procedure and previous graphs are for 4th gear.

The other gears have shift patterns that similar but different.

As you understand the effect of changing these parameters, see how it performs in 3rd and 5th gears, noting when it unlocks and re-locks, and upshifts and downshifts.

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