

# CUPRA LEON VZ TCR

## DRIVER BRIEFING MANUAL V1

This document quickly introduces how driver can handle the CUPRA Leon Competición for driving it safe, efficient and fast.

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# 1. INTRODUCTION

This document introduces to the driver the basic knowledge needed for driving the CUPRA Leon Competición safely, efficiently, and faster.

This quick briefing will teach the driver how to start/stop the engine and the car correctly, where are the main functions needed for racing and how to interpret the different message and warnings the car will generate.

This racing car have three systems of interaction driver-car that consist on:

1. **Central console** with switch on & off buttons as well as a keypad with twelve additional functions
2. **Steering wheel module** with twenty additional buttons that will be quickly available for the driver
3. **Advance Display Unit** with different layout ready. It will be also the main indicator of the alarms and warnings for the driver interest

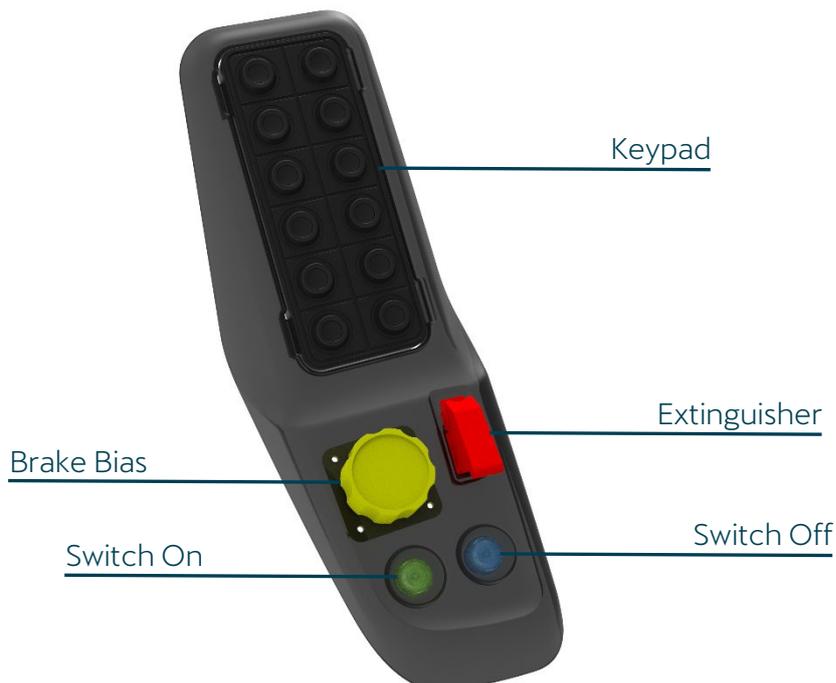


## 2. DRIVER'S CONTROLS

### 2.1. CENTRAL CONSOLE FUNCTIONS

TABLE 1. MAIN CONSOLE FUNCTIONS

FUNCTION	REMARKS
<b>Switch On (KL-30)</b>	Press the button to wake up the car. Battery connected. Power supply on. Once pressed, the button do not have others functions
<b>Switch Off</b>	Press the button to completely kill the car Battery disconnected. Power supply off.
<b>Extinguisher</b>	Press the button in case of emergency to actuate the extinguisher. Battery disconnected. Power supply off.
<b>Brake Bias</b>	Turn the wheel to balance the brake pressure Do no press the brake pedal while turning Balance may be checked in the <i>Brakes</i> page



**Keypad button view:**

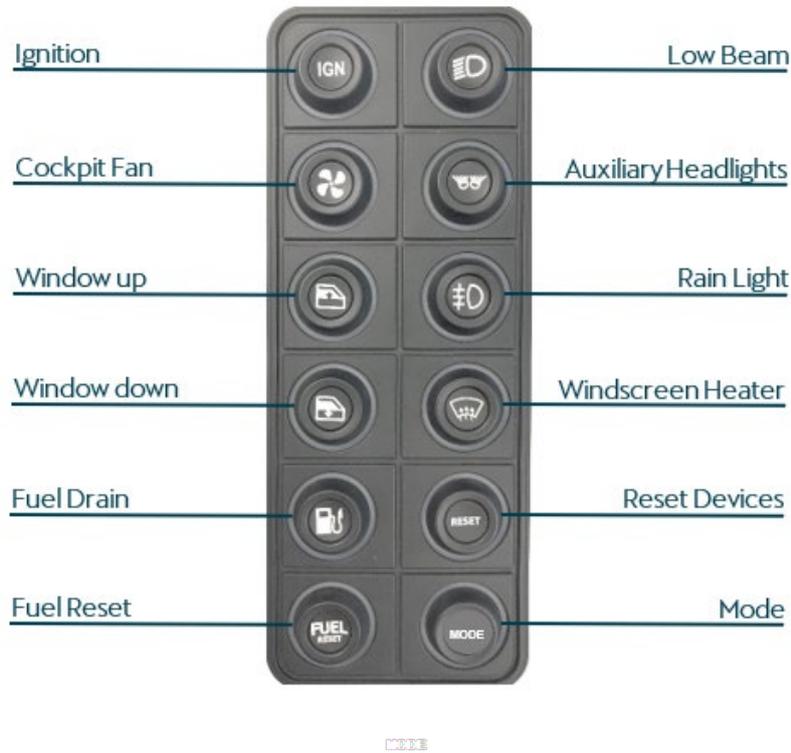


TABLE 2. KEYPAD FUNCTIONS

FUNCTION	REMARKS
<b>Ignition (KL-15)</b>	<p>Press to activate power supply to all the devices. It is a necessary previous step before starting the engine</p> <p>Immediately after the <b>switch on</b> button is pressed, <b>Ignition</b> will be white backlight illuminated. Then, when <b>Ignition</b> is pressed, its backlight will turn to red.</p>
<b>Cockpit Fan</b>	Press to switch on/off the cockpit fan
<b>Widow up</b>	Maintain pressed to move the window upwards
<b>Widow down</b>	Maintain pressed to move the window downwards
<b>Fuel Drain</b>	<p>Press to empty the fuel tank (used only by mechanics)</p> <p>Maintain pressed to manually force the fuel flow</p>
<b>Fuel Reset</b>	Press to enter the <i>Fuel Management Mode</i>

	<i>Fuel Management Mode</i> is further explained in the <i>Electronics User Manual</i>
<b>Low Beam</b>	<p>Press to switch on/off low beam headlights</p> <p>When the headlights are activated, a white backlight turns on the whole keypad.</p> <p>Ignition required</p>
<b>Auxiliary Headlight</b>	<p>Press to switch on/off auxiliary headlight</p> <p>Ignition required</p>
<b>Rain Light</b>	<p>Press to switch on/off rain light</p> <p>Ignition required</p>
<b>Windscreen Heater</b>	<p>Press to switch on/off windscreen heater.</p> <p>Ignition required</p>
<b>Reset Devices</b>	<p>If the button backlight is red means that at least one of the devices is not working properly.</p> <p>Press Reset button to rearm malfunctioning devices. If the resulting backlight is green, means that all the devices are working correctly.</p> <p>If the button backlight is still blinking in red means that at least one of the devices of the car is not working properly. To identify which are the devices affected engineer have to go to the Electronics User Manual / <i>Device Diagnostic Mode</i></p>
<b>Mode</b>	<p>This button has several function depending on what mode the car is. For example, if the car is on Fuel Management Mode it modifies the type of fuel refilling.</p> <p>By pressing it for 2 seconds, you will enter the scrutineering page.</p>

## 2.2. STEERING WHEEL FUNCTIONS



FIGURE 1. STEERING WHEEL LAYOUT

The electronic steering wheel module permits activating different functions without removing hands from the steering wheel. Notice that some buttons have double functionalities.

TABLE 3. STEERING WHEEL FUNCTIONS

FUNCTION	REMARKS
<b>Radio</b>	Maintain pressed to talk
<b>Launch</b>	Press to activate the <i>Launch</i> aid (rpm limitation) The main condition is wheel speed zero. The rpm limiter will be active as long as the button is held More information in section 4.1 <b>Ignition</b> required
<b>Left turn light</b>	Press to activate / deactivate the left turn light. Rear left button <b>Ignition</b> required
<b>Drink</b>	Press to activate the water pump The water pump is not supplied by the car
<b>FCY</b>	Press to activate/deactivate the Full Course Yellow speed limiter The speed limiter limitation will be the last saved value ( <b>50, 60, 80, 100, 120 km/h</b> ) To modify the value read the section 4.2

	Ignition required
<b>High Beam</b>	<p>Short push to flash</p> <p>Long push to activate / deactivate the high beams</p> <p>Ignition required</p>
<b>Marker</b>	<p>Marker is tool that driver can use to highlight a specific moment on the data acquisition.</p> <p>Press “marker” button to highlight the point on the data. This function is useful for later data analysis.</p> <p>Press “Marker” to remove warnings and messages from the display</p>
<b>Right Turn Light</b>	<p>Press to activate / deactivate the right turn light. Rear right button</p> <p>Ignition required</p>
<b>Wiper</b>	<p>Short push for low speed / high speed / deactivated</p> <p>Maintain pushed to activate the water splash + high speed</p>
<b>Starter</b>	<p>Maintain pressed to activate the starter if the following conditions are met:</p> <ul style="list-style-type: none"> <li>\ Ignition</li> <li>\ Neutral gear OR clutch pressed</li> <li>\ RPM &lt; 500</li> </ul> <p>If the conditions are fulfilled, the indicator led will show up in green. Otherwise, it will be yellow</p>
<b>Pit Limiter</b>	<p>Press to activate / deactivate the Pit Limiter</p> <p>This function is available when engine is running.</p> <p>If the engine stops, it will use the last value when restarts</p> <p>Options: <b>40, 50, 60, 80, 100 km/h</b></p> <p>If engine stops, Pit Limiter will be set to OFF</p>
<b>Anti-Lag System (ALS)</b>	<p>Press to activate /deactivate the ALS</p> <p>Notice that the engine will be under higher stress when using this function.</p> <p>Activate it when maximum performance is needed such as qualification laps.</p> <p>A cool down lap is highly recommended after using ALS</p>
<b>Neutral</b>	<p>Press the button to go to Neutral from Reverse or 1<sup>st</sup> gear.</p>

	Clutch pedal is also required
<b>Level up &amp; down</b>	Press up or down to modify different parameters of the car as the speed limiters values or fuel level
<b>Option (ABS)</b>	This button is only used in cars with an ABS mounted
<b>Map (Pedal Map)</b>	<p>Press and hold the “Map” button while using the right +/- button to scroll up and down through the four pedal maps.</p> <p>Condition: Main switch on and ignition off  Map position is displayed by a small digit (1 – 4) left side of the gear-indication on the dash main-page</p> <p><b>Map #1</b> – Aggressive pedal response  Suitable for high grip conditions</p> <p><b>Map #2</b> – Progressive pedal response  Smooth engine response for initial throttle-pedal request</p> <p><b>Map #3</b> – Smooth pedal response  Suitable for low grip conditions  Smooth engine response over the whole throttle-pedal range</p> <p><b>Map #4</b> – Linear pedal response  Unchanged, linear curve as until 2021</p> <p><b>*Selection is locked when engine is running</b></p>
<b>Page up &amp; down</b>	Press up or down to move thought the different display pages

## 3 . R E A D Y T O D R I V E P R O C E S S

In order to START the engine and get the car *ready to drive mode*, the driver should always proceed in this order:

### 3 . 1 . S T A R T T H E E N G I N E

- \ Switch ON button
- \ Ignition ON button
- \ Starter, meeting the necessary conditions
  - \ Neutral gear OR clutch pressed
  - \ RPM < 500

### 3 . 2 . S T O P T H E E N G I N E

The proper procedure to STOP the engine will be:

- \ Ignition OFF button

To disconnect the power supply and to complete switch off the car, once the engine is stopped:

- \ Check in the display if the turbo temperature indicator is green
- \ Switch Off button

### CAUTION:

- To inform the driver about the optimum conditions to stop the engine, display shows a turbo icon and when the icon is **green** lighted the turbo is saved, and engine can be stopped. In case to stop the engine suddenly becomes mandatory and icon is in **orange**, switching OFF the ignition to stop the car and switch ON again to activate the auxiliary turbo cooling. From orange to green takes approximately about 1 minute.



## 4. LAUNCH LIMITER & PIT LIMITER

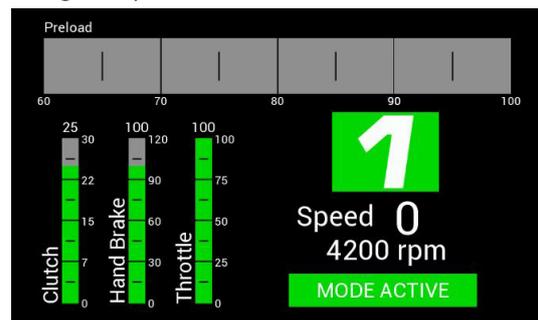
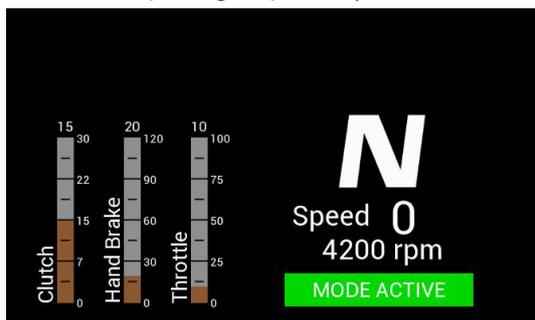
### 4.1. LAUNCH LIMITER

Launch control is an electronic aid assist drivers to accelerate from a standing start optimally.

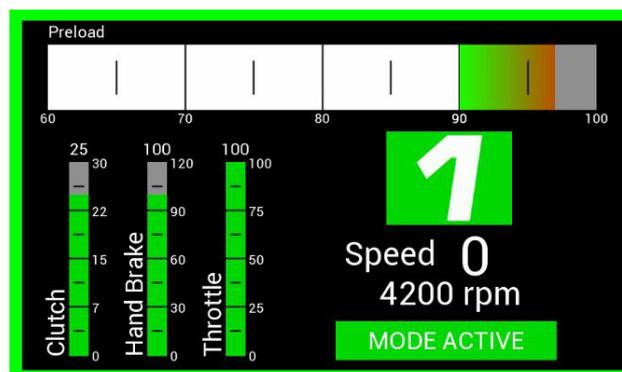
The system helps to adjust the engine load to find an optimum launching point.

#### Launching process:

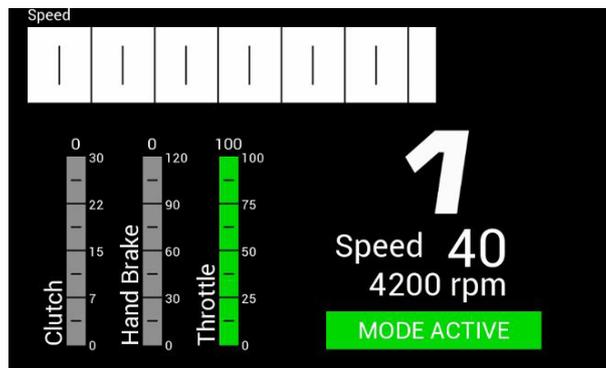
1. Car completely stopped (wheels to zero)
2. Press the Launch button and hold it (LCH on the steering wheel module). Once the launch button is pushed, a new display screen will appear. As long as the Launch button is pressed, the Mode Active flag will be highlighted on green and the engine speed limitation will be activated automatically. (Target engine speed limiter is shown on the launching screen).
3. Press the clutch pedal and engage the 1st gear (both will turn on green)
4. Pull and brake strongly (hand brake bar will turn on green)
5. The order of the operation points 2, 3 and 4 is not relevant.
6. Step on gas pedal (throttle bar will turn on green)



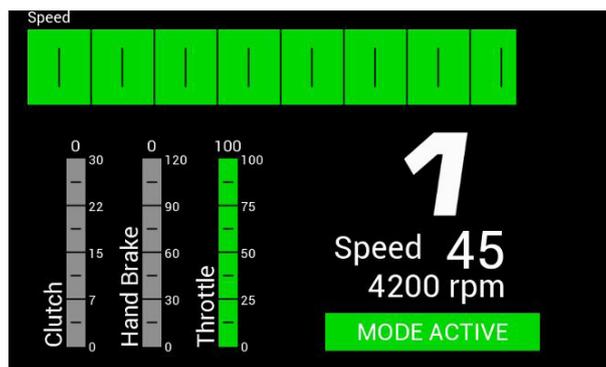
7. When all the parameters are on green, the preload bar will be shown at the top of the screen. This preload is the relation between the intake manifold air pressure and the target pressure.
8. Release partially the clutch pedal to see increasing the preload bar from 60% on white. Then, at 90% it will turn on green and it will be gradient to red until 100%.
9. The optimum launching moment is when the preload is around 95%, where the screen outer frame will turn on green.



10. Maintaining the launch button pressed, release the hand brake and play with clutch and throttle for spinning control. (Advisable around 2.5 sec)
- \* Clutch overheating when more than 4 sec. is applied



11. The rear wheel speed bar will be filled in white until the speed arrives to 45 km/h, when the complete bar will change to **green**. This is the moment to release the Launch button, to not have a massive wheelspin and to not limit the speed due to the launch limiter.



The rear wheel speed bar will be filled in white until the speed arrives to 45 km/h, when the complete bar will change to **green**. This is the moment to release the Launch button, to not have a massive wheelspin and to not limit the speed due to the launch limiter.

The release button speed is adjusted to run the limiter at 4200rpm. If you increase the launch limiter speed, you should adapt the bar to be more accurate on the button release.

**To take in account on the launching process:**

- If the launch button is released before releasing the clutch, the launching system ends, so engine speed limiter will be deactivated (OFF)
- Even the launch button is pressed, so engine speed is limited, you can choose to apply throttle pedal below limitation (damp or wet conditions)
- The engine speed limiter cannot be adjusted by the driver. (Marelli SYSMA)
- “Launching Screen” view remains active for 4.5 sec after release the launch button

**IMPORTANT:**

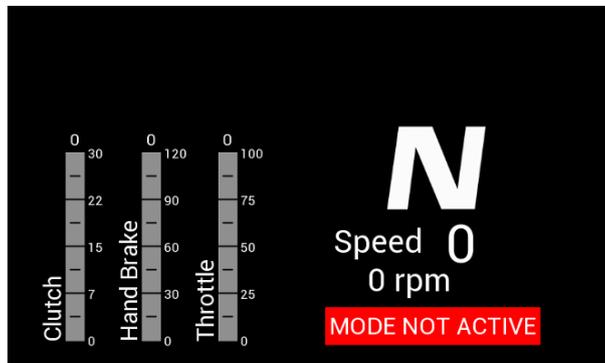
The **Launch** system **DOES NOT WORK** if the **PIT LIMITER** is **activated**. Drivers who practice launching procedure after pits zone must bear in mind.

Take care of the time you are keeping the **car preloaded**. The clutch and engine temperatures may increase quickly. It is recommended **no more than 4 seconds**.

Torque transfer between clutch release and throttle percentage must be practiced and tailored to the tires and conditions to achieve a good efficiency.

During testing, it is strongly recommended to **do two laps between each launching training** to cool down the clutch, otherwise could be damaged.

If the launch button is pressed for a short push but not held, the **MODE NOT ACTIVE** flag will appear for 4.5sec



## 4.2. SPEED LIMITERS' SETUP

There are different speed limiters that limit the velocity of the car during the different race situations. They consist on:

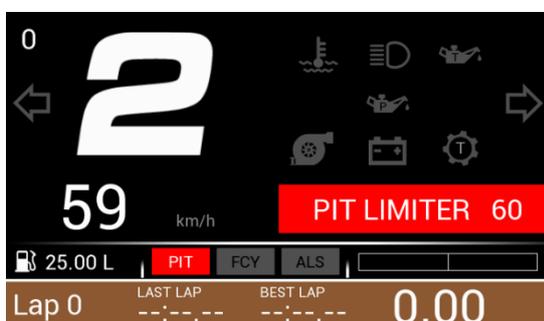
- **Pit Limiter:** to be activated when entering the pit. There are five levels of velocity that will be used depending on the track regulations (**40, 50, 60, 80, 100 km/h**).
- **Full Course Yellow:** to be activated when race conditions demand it. There are five levels of velocity that will be used depending on the track regulations (**50, 60, 80, 100, 120 km/h**)

In order to change the values of the Pit Limiter or FCY, the engine must be stopped and both require just **Main Switch On** (KL-30), without **Ignition** (KL-15). The process will consist on:

- Pressing the button of the function to be changed (Pit Limiter or FCY).
- While pressing the button press level up or down buttons of the steering wheel module, which are the selectors on the left.
- The velocity limiter selected will appear in the display.
- Once the limiter is the right one, wait until the display indicator disappear.



At the Race page, a new flag will be shown, where the driver can see when the limiter is active and the target speed limiter that is selected. With this layout, the driver can quickly check if the car speed is higher than the selected one.



If the car speed is higher than the target limiter speed, check the tyre circumference selected on the ECU clx file (2100 mm as default) that should match with the size of the tires used on the car.

## 5. DRIVER'S DISPLAY



### 5.1. DRIVER'S ALARMS



TABLE 4. DISPLAY LED FUNCTIONS

LED	COLOUR	FUNCTION
LED 1	Violet	<p>WARNING. High gearbox oil temperature</p> <p>Drive out of the slipstream and keep checking the temperature value</p>
	Violet - Blinking	<p>MAJOR WARNING. Very high gearbox oil temperature</p> <p>Drive out of the slipstream and keep checking the temperature value. If it is not decreasing, the recommendation is to retire the car.</p>
LED 2	Blue	<p>High intake temperature</p> <p>Drive out of the slipstream and keep checking the temperature value since it may cause a torque reduction</p>
	Orange	<p>WARNING. High engine water temperature</p> <p>Drive out of the slipstream and keep checking the temperature value. If no red alarm appears, you can continue. If the alarm disappears, keep pushing</p>
LED 3	Red - Blinking	<p>MAJOR WARNING. Very high engine water temperature</p> <p>Drive out of the slipstream and keep checking the temperature value. If it is not decreasing, the recommendation is to retire the car.</p>
	Orange	<p>WARNING. High engine oil temperature</p> <p>Drive out of the slipstream and keep checking the temperature value.</p>
LED 4	Red - Blinking	<p>MAJOR WARNING. Low engine oil pressure</p>

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Major risk of breaking engine components. It is highly recommended to slow down the car. If the alarm stays, stop the car in a safe location.

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**LED 5**    White            Low fuel pressure  
Check the fuel level

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**LED 6**    Cyan                    Battery low voltage  
Check the alternator and the poly-V belt

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Violet                    Low pressure at the gearbox pneumatic accumulator  
Check the compressor and the pneumatic circuit

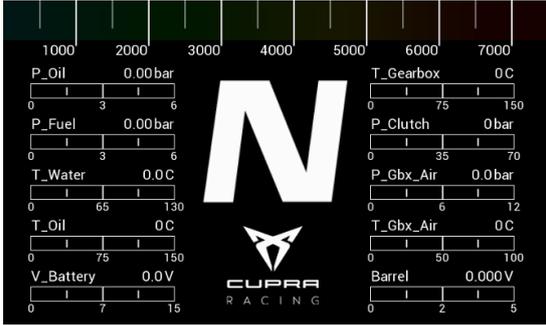
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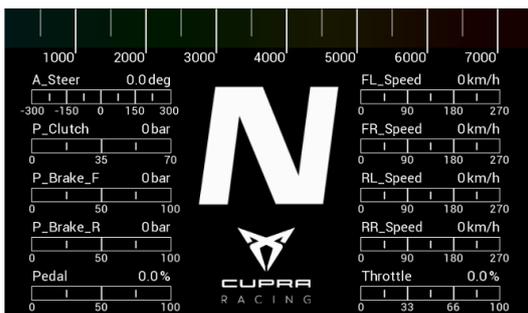
\*Note that the alarms show above corresponds to a std configuration. The Team engineer could have modified it. To consult.

## 5.2. PAGE LAYOUTS

Once the car is delivered to the customers, the display will have some page layouts ready for racing, qualifying and main checks.

TABLE 5. MAIN PAGES MANAGED BY THE PAGE UP/DOWN BUTTONS

MAIN PAGES	REMARKS
 <p>The screenshot shows a racing dashboard with a large 'N' gear indicator, a speedometer at 0 km/h, and various warning icons. At the bottom, it displays 'Lap 0' and '0.00 L' fuel level.</p>	<p><b>Racing Layout</b></p> <p>Gear, velocity, and warning indicators</p> <p>Fuel Level</p>
 <p>The screenshot shows a dashboard focused on brake performance, featuring a large 'N' gear indicator, a speedometer at 0 km/h, and three gauges for Brake Balance (0.0%), Front Brake Pressure (0.0 bar), and Rear Brake Pressure (0.0 bar). It also shows 'Lap 0' and '0.00 L' fuel level.</p>	<p><b>Brakes Layout</b></p> <p>RPM bar and gear</p> <p>Brake pressure bars and brake balance</p>
 <p>The screenshot shows a dashboard for engine and gearbox checks, featuring a large 'N' gear indicator and a speedometer at 0 km/h. It includes multiple gauges for P_Oil (0.00 bar), P_Fuel (0.00 bar), T_Water (0.0C), T_Oil (0C), V_Battery (0.0V), T_Gearbox (0C), P_Clutch (0 bar), P_Gbx_Air (0.0 bar), T_Gbx_Air (0C), and Barrel (0.000 V). A tachometer scale from 1000 to 7000 is visible at the top.</p>	<p><b>Engine &amp; Gearbox checks</b></p> <p>Main values of the engine and the gearbox are shown to be checked if necessary</p>

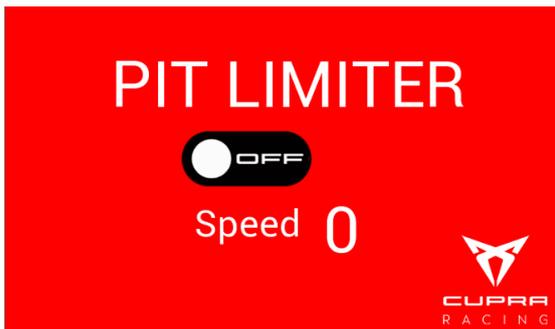


## Driver's inputs & wheel speeds

Current values of the different driver's inputs (i.e. Steering angle, clutch pressure, etc.) as well as other sensor values are shown

TABLE 6. OVERLAY PAGES APPEAR WITH A SPECIFIC BUTTON COMBINATION

OVERLAY PAGES	REMARKS
	<h3>Launch Layout</h3> <p>This overlay page automatically appears when the driver is pressing the launch button.</p> <p>It contains the interesting values during launch situations</p>
	<h3>ALS Layout</h3> <p>It appears when pressing the ALS button in the steering wheel module</p> <p>It disappears after 2 seconds</p>
	<h3>FCY Layout</h3> <p>It appears when pressing the FCY button in the steering wheel module or when the driver modifies the FCY speed limiter</p> <p>It disappears after 2 seconds</p>



### Pit Limiter Layout

It appears when pressing the Pit Limiter button in the steering wheel module or when the driver modifies the Pit Limiter speed

It disappears after 2 seconds

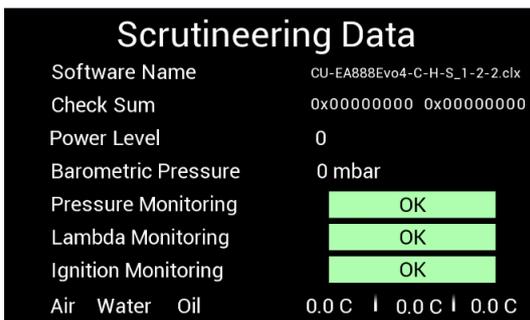


### New Brake Pads

### New Brake Pads Layout

It appears when the mechanic program it after brake pad change

It disappears after a long push of Marker button in the steering wheel module



### Scrutineering Layout

It appears when pressing the mode button of the keypad for 2 seconds.

It disappears after pressing up/down page of the steering wheel module.

### 5.3. SHIFT LIGHTS

Shift lights and alarms can be customizable by the teams, for more information, read the user car user manual. Shift Lights configured by default are the following:

5800	5925	6075	6225	6325	6475	6550	6800	6800	6
5800	5900	6050	6200	6300	6400	6525	6675	6675	5
5600	5800	5925	6150	6275	6400	6525	6675	6675	4
5400	5700	5925	6000	6125	6325	6525	6675	6675	3
5400	5700	5925	6000	6125	6325	6525	6650	6650	2
5400	5700	5925	6000	6125	6325	6525	6650	6650	1
1	2	3	4	5	6	7	8	9	

Shift light LED

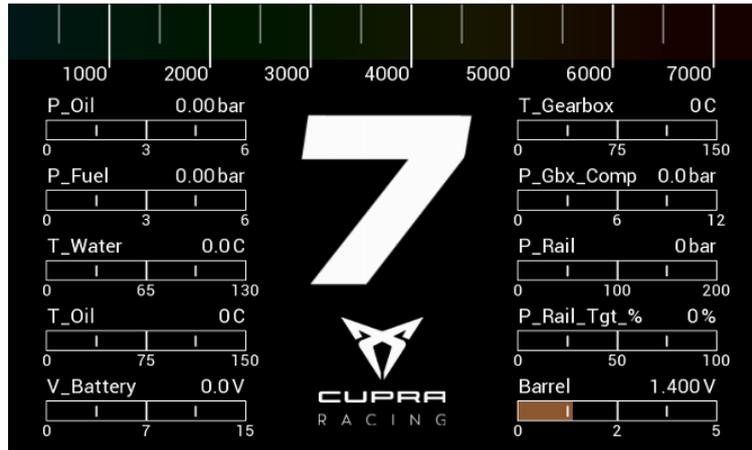
FIGURE 2. SHIFT LIGHTS BY DEFAULT

## 6. GEARBOX OPERATION

GEAR	REMARKS
<b>R - Reverse</b>	It is possible to gear the reverse if the car is completely stopped and the clutch pressed
<b>N - Neutral</b>	<p>Press the Neutral button in the steering wheel module to go from Reverse or 1<sup>st</sup> to Neutral.</p> <p>Clutch pressure is not needed to enter Neutral, but it is needed for exit it</p>
<b>Driving Mode</b>	<p>To go from R to 1<sup>st</sup> gear the car must be completely stopped and the clutch pedal pressed</p> <p>To go from 1<sup>st</sup> to 6<sup>th</sup> gear and the other way around, clutch is not necessary. Use the steering wheel paddle to upshift and downshift</p> <p>Remember that the shifting is completely manual, when the engine reaches maximum rpm, the power is limited but no upshift will happen</p>
<b>Parking Mode</b>	<p>With Neutral geared, lock manually the hand brake by using the locking hook.</p> <p>To lock the gearbox stop the car on 1<sup>st</sup> or Reverse.</p>

\*Note that in exceptional circumstances, from Neutral to Reverse or from first to reverse gear shifting could fails due to gear engagement mechanism could remain in between two gears. This situation could happen when there is a failed gear engagement and the barrel is remaining in between two gears, due to front wheels are lock, due to some dog-to-dog issue or when the gearbox potentiometer is not properly adjusted.

When shifter lock is in between two gears, the display advise driver by showing the number **7** on the display gear window:



The advice to solve the situation when shifter lock is in between two gears, is to push a little bit the car in front or rear (pit-lane scenario) or driver to release a little bit the clutch (smoothly) and at the same time request shifting through paddles (up or down depending on the case).



## 7. DRIVER CONSIDERATIONS

The driver should consider that:

- \ Follow the engine start and stop procedure stated in section 3 of this document.
- \ Learning and memorizing the steering wheel buttons location and function will make them faster as well as able to be more focused on the track
- \ Engine warm up is needed before starting. The minimum water temperature recommended before loading the engine is 80°C
- \ Brake pedal stiffness should be checked when car is stopped
- \ Warm up the tyres before attacking. Without the use of blankets, rear tyres may need two laps to get warm
- \ Shift up gears when shift lights indicates to do so. The shift lights were optimized taking into account gear ratios and engine power
- \ In-laps: cool down brakes and engine water progressively to avoid thermal shocks.
- \ If a **WARNING** appears occupying the whole display, this is a critical message, it is recommended to stop the car as soon as possible on a safe location.
- \ If the car must be abandoned on the track, leave the gearbox in Neutral, to avoid damages in the transmission if the car is towed (consider the regulations).
- \ If fire extinguisher button is pressed, notice that the car will be completely stopped which means that that battery will be disconnected. (FIA regulations)

