SERVER UPDATE · DRIVECORE

How Your Car Drives Now

Real engines, real gearboxes, tyres that heat up and wear out, and a class system built on what your car can actually do.

01 What's changed

Every car on the server now runs on **drivecore**, our own driving physics. It replaces GTA's arcade handling with a car built from real-world numbers: a real engine with a torque curve, real gear ratios, tyres that heat up and wear out, brakes that fade, and a body that leans and dives.

The goal is simple. A car should drive like the car it is. A light 90s coupe should feel nimble and a bit loose, a modern AWD rocket should feel planted and brutal, and the difference between them should come from physics, not from a hidden multiplier.

You don't need to install anything or turn it on. Get in any car and it's already running. This guide walks through each part of it, with a few quick sums along the way so you can see what's going on under the hood.

02 The engine

Every car has a real torque curve: how hard the engine pulls at each rpm, from idle up to its redline. A turbo car pulls hard in the middle and fades near the top; an old naturally aspirated engine builds slowly and peaks late. That curve is why two cars with the same horsepower can feel completely different coming out of a hairpin.

Horsepower isn't a separate number. It falls straight out of torque and revs:

$$\text{hp} = \frac{\text{torque (Nm)} \times \text{rpm}}{7121}$$

So an engine making 260 Nm at 5,500 rpm is putting out 260 × 5,500 ÷ 7,121 ≈ **201 hp** at that moment. Rev it past the peak and power drops, which is exactly why shifting at the right point matters.

Hit the redline and the rev limiter cuts fuel, like a real one. You'll hear it bounce and the car stops pulling. No more brake taps or sudden kicks at the limiter.

03 The gearbox

Each car keeps its real gear ratios and its real type of gearbox. A dual-clutch snaps through gears in a blink, an old automatic takes its time, and a manual sits in between. You'll feel that difference on every upshift.

Gears are torque multipliers. The push at the tyres works out like this:

$$\text{force at the wheels} = \frac{\text{torque} \times \text{gear ratio} \times \text{final drive} \times 0.85}{\text{tyre radius}}$$

Take that 260 Nm engine in 1st (3.5:1) with a 4.0 final drive and a 0.32 m tyre: 260 × 3.5 × 4.0 × 0.85 ÷ 0.32 ≈ **9,700 N**. In a 1,300 kg car that's about 7.4 m/s², roughly three quarters of a g. In 4th (1.0:1) the same engine gives about a quarter of that. That's why 1st gear feels violent and 5th feels lazy.

Automatic or manual. Automatic is the default and shifts for you. Switch to manual in the tablet under **Profile > Transmission**, then shift with `E` / `Q` on keyboard or `B` / `X` on a controller.

Reverse. In automatic, hold the brake at a standstill and it drops into reverse. In manual, shift down from 1st while stopped.

04 Turbo, launch control and sound

Turbo. Boost takes a moment to build. Floor it at low revs and you'll feel the lag, then the shove as the turbo spools. Lift off and the boost bleeds away, so a turbo car rewards keeping the revs up. A turbo forces more air in, and more air means more torque, roughly in proportion to the pressure:

$$\text{torque gain} \approx \frac{14.7 + \text{boost (psi)}}{14.7}$$

14.7 psi is normal air pressure, so a turbo kit running 8 psi on an engine that had none gives about (14.7 + 8) ÷ 14.7 ≈ **1.54×** the torque once it's spooled. The boost gauge on your speedo shows it live.

Launch control. Press `Backslash` to arm it, then hold the handbrake and the throttle on the line. The revs hold steady, and on a turbo car the boost builds while you wait. Let go of the handbrake and power comes in smoothly over a couple of seconds, trimming itself back if the tyres start to spin.

Sound. Lift off at high revs and you'll get pops, crackles and the odd flame from the exhaust. Cars with a turbo fitted also get a blow-off valve hiss between gears.

05 Tyres

The tyres are where drivecore does most of its work. Each wheel has its own grip, its own load and its own temperature, every frame. Grip builds as you turn in, peaks, then falls away as the tyre starts to slide. Push past the peak and the car lets go, progressively on a good tyre and suddenly on a worn one.

How fast through a corner. A tyre's grip number is roughly how many g it can hold sideways. The fastest speed through a corner of radius r is:

$$v_{max} = \sqrt{\mu \times 9.81 \times r}$$

On a 50 m bend, a street tyre (μ 0.98) tops out around 79 km/h. Semi-slicks (μ 1.22) take the same bend at about 88 km/h. That 9 km/h is the whole reason people pay for better rubber.

Tyre (shop name)	Grip (μ)	Character
Standard	0.80 to 1.08	What the car came on. Older cars get period tyres, newer ones modern rubber
Street	0.98	Modern road tyre
Sport	1.08	Performance road tyre
Semi-Slick	1.22	Track-day grip
Slick	1.30	Racing slick, the most grip there is once hot. Weak when cold
Drift	0.92	Less peak grip, a long and easy-to-hold slide
Drag Slick	1.15	Huge launch grip, lets go sharply when you turn

Temperature. Tyres work best between **70 and 90 °C**. Cold tyres have about 10% less grip, so the first corners after leaving the garage need care. Hard driving warms them into the window in a couple of minutes. Long slides or burnouts push them past it, and grip drops again. Your speedo shows each corner: blue is cold, green is right, orange and red are too hot. Slicks are the exception: they need 80 to 100 °C and have about a quarter less grip until they get there, just like real racing slicks. Time trials start you on warm tyres; races start you lightly warmed, so slicks take a few corners to come in.

Wear. Tyres wear as you drive, much faster when you slide them. A worn tyre doesn't just grip less, it lets go with less warning. At 60% worn you're down to about 82% grip; at fully worn it's 56%.

06 Brakes, differential and assists

Brakes are limited by the tyres, not the pedal. Stopping distance comes down to grip:

$$d = \frac{v^2}{2 \times \mu \times 9.81 \times 0.92}$$

From 100 km/h (27.8 m/s) on street tyres that's $27.8^2 \div (2 \times 0.98 \times 9.81 \times 0.92) \approx$ **44 m**. On warm slicks it drops to about 33 m. Brakes also heat up: lean on them lap after lap and they start to fade, giving less bite until they cool down. Push hard enough at night and you'll see the discs glow.

Differential. The diff decides how power is shared between the driven wheels. An **open** diff sends it to the wheel with less grip, so the inside wheel spins up out of tight corners. A **limited-slip diff** (1-way, 1.5-way or 2-way) locks the wheels together under power, so the car drives out harder and rotates more. A **locked** diff ties them together all the time. You fit the diff at customs, and switch an LSD on or off on the move with `Left Alt` or `D-pad up`.

Traction and stability control each have levels 1 to 5, or off. They're real systems with real costs: traction control cuts power when the wheels spin, and stability control brakes the car and cuts power to stop a slide. Higher levels are safer and slower. Step through them with `Left / Right arrow` or `D-pad left / right`.

07 Body roll, weight transfer and steering

Cars lean in corners and dip their nose under braking, and how much depends on the era. A 70s car rolls about 4.4° for every g of cornering, a modern road car about 2.6°, a sports car 2° and a race car barely moves. Each model learns its own suspension setup to match, so they all feel the way they look.

That lean isn't just for show. When you corner, weight shifts onto the outside tyres:

$$\Delta F = \frac{\text{mass} \times \text{lateral g} \times 9.81 \times \text{centre of gravity height}}{\text{track width}}$$

A 1,300 kg car pulling 1 g, with its centre of gravity 0.5 m up and wheels 1.5 m apart, moves about **4,250 N** (433 kg) onto the outside wheels. Loaded tyres grip more, unloaded ones less, which is why smooth inputs are faster than stabbing at the wheel. The same thing happens front to back: brake hard and the nose dips, loading the front tyres for turn-in.

Steering gets less lock as speed rises, so the car is agile in a hairpin and calm on a fast straight, with extra room to catch a slide. The handbrake unsettles the rear for a flick without swinging the camera around.

08 Parts and tuning

Performance parts and setups have been rebuilt around drivecore, so every car starts fresh: old parts and tunes have been reset. Each part now changes the car's real figures, and customs shows you exactly what it does to your car before you buy, for example *PI 452 → 489 (B) · 0-100 5.3 s*.

System	Tiers	What it does
Engine	Street, Sport, Race, Full race	+7% up to +40% torque; higher tiers rev 300 to 900 rpm higher
Turbo	Kit, Big	8 or 16 psi of boost; the big one hits harder with more lag
Weight reduction	1, 2, 3	5%, 10% or 15% lighter
Brakes	Sport, Race	15% or 30% more stopping force, slower to fade
Suspension	Sport, Race	Less roll and dive
Transmission	Close-ratio, Race	Closer gears; the race box also shifts much faster
Differential	Open, 1-way, 1.5-way, 2-way, Locked	How power is shared between the driven wheels

Tyres are bought at the tyre shop as before.

Tuning. The setup sliders now do exactly what they say, with real trade-offs instead of a hidden sweet spot to hunt for. A few to know:

- **Camber:** more negative camber adds cornering grip up to about 60% of the slider, then starts losing it again. It also costs a little braking and runs the tyres warmer.
- **Tyre pressure:** lower pressure grips more but feels lazier and heats the tyres faster. Higher is sharper and cooler.
- **Final drive:** shorter accelerates harder and tops out lower. Every 10% shorter costs roughly 10% top speed in each gear.
- **Springs and anti-roll bars:** stiffer at the front adds understeer, stiffer at the rear adds rotation.
- **Power output:** turns your engine parts down when the car has more than the road can use.

More sliders unlock as you level up, and the tuning page shows your class and PI changing as you move them.

09 PI and classes

Every car gets a **Performance Index** from 100 to 999, and its race class comes from that number. PI is worked out from your actual car: its engine, weight, parts, setup and tyres. Two cars of the same model can sit in different classes if one is built and the other isn't.

drivecore runs a quick simulated test of the car and scores four things from 0 to 1: acceleration (0-100 time), top speed, cornering grip and braking. They're blended like this, with acceleration and grip counting most:

$$\text{score} = 0.36 \times \text{accel} + 0.20 \times \text{speed} + 0.30 \times \text{grip} + 0.14 \times \text{brakes}$$
$$\text{PI} = 100 + 899 \times \text{score}^{0.85}$$

A real example: a car doing 0-100 in 5.4 s, 238 km/h flat out, 0.88 g of grip and a 46 m stop scores 0.70, 0.35, 0.24 and 0.24. That blends to 0.43, which comes out at **PI 537, class C**.

Class	PI	Class	PI
D	up to 500	S1	801 to 900
C	501 to 600	S2	901 to 998
B	601 to 700	X	999
A	701 to 800		

The garage and tuning pages also show a quick card with Speed, Handling, Acceleration, Launch and Braking rated out of 10.

10 Controls and settings

Action	Keyboard	Controller
Shift up / down (manual)	E / Q	B / X
Traction control level	Left arrow	D-pad left
Stability control level	Right arrow	D-pad right
LSD on / off	Left Alt	D-pad up
Launch control	Backslash	-

You can change any of these in **Settings > Key Bindings > FiveM**. In the tablet under **Profile** you'll find Transmission (automatic or manual), Shift animation (your driver's hand on the gear lever) and the drivecore HUD (speed, revs, tyre temperatures and grip, brakes and assists).

A few tips to get going

- Give the tyres a lap to warm up before you push. Cold tyres are the most common reason for a surprise spin.
- Shift near peak power, not at the limiter. The limiter cuts fuel, so you lose time sitting on it.
- Be smooth. Weight transfer rewards gentle inputs, and a calm car carries more speed through a corner.
- Watch the tyre colours on your speedo. If a corner goes orange or red, back off for a bit.
- Not sure which part to buy? Check the PI line at customs. It shows exactly what each upgrade does to your car.