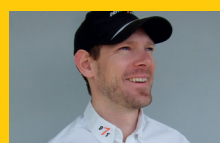




SAFETY FIRST

Porsche Driving Consultant, Neil Furber, examines the driver aids working to ensure you and your car stay safe...

Over the years, Porsche production sports cars have become ever more powerful. Today, they're also safer than they've ever been, a characteristic achieved without sacrificing the superior driving experience we all know and love. Much of how this careful balance of performance and security is achieved can be attributed to how a continually increasing number of driver safety systems are introduced and, more importantly, tuned by Porsche.



DRIVING FORCE

Neil Furber is *GT Porsche's* resident driving expert. With a technical background as a mechanical engineer in the Formula One industry, Neil brings a unique technical insight to driver coaching. Splitting his time between the French Alps and the UK, he coaches drivers through his brand, Drive 7Tenths (drive7tenths.com), and is also a Porsche Driving Consultant at Porsche Experience Centre Silverstone.

DRIVER-INTERACTIVE SAFETY SYSTEMS

The very latest vehicles feature blind spot indicators, active/passive lane departure warnings, emergency braking, seatbelt pre-tensioning, brake pressure pre-fill and various other clever bits of technology. These are, however, 'last resort' safety systems, although they're hugely helpful in ensuring less attentive drivers avoid problems in traffic. Of more relevance to *GT Porsche* readers in charge of cars from the 996-generation 911 onwards are driver-focused systems – technologies that can complement the purer end of the Porsche driving experience. Principally, I'm referring to Anti-lock Braking System (ABS) and Porsche Stability Management (PSM). In reality, there is an overlap, where PSM makes use of the ABS system and its integral Electronic Brakeforce Distribution (EBD). Let's take a look at each system, what they do, how they work and how they interact with one another.

ABS

This technology has been a constant feature of production cars for decades, yet it still confuses drivers. Contrary to what many believe, the purpose of ABS is not to reduce stopping distance, though it can do so for an average driver. The core function of ABS is to retain steering control during emergency braking. It does this by preventing the wheels from under-rotating excessively (or locking fully) during an emergency stop or when heavy braking is applied on a loose surface. A central computer reads data from rotational wheel speed sensors at each corner. If excessive under-rotation of the wheel(s) is detected, the system will release brake pressure until the wheel(s) rotates fast enough.

Once optimal, the pressure is reapplied. Whilst you maintain excess brake pedal pressure, this process is repeated (up to forty times per second!). In older or simpler vehicles, drivers can use cadence braking (a rhythmic pumping of the brakes) to achieve a similar, yet somewhat less-refined result. When ABS is operating, you'll feel a rapid pulsing through the brake pedal whilst the system applies and releases pressure to prevent wheel locking. In a Porsche, this generates a somewhat gravelly sensation, although cars from lesser marques may feel agricultural by comparison.



EBD

ABS is a high-level system name, but EBD is the really clever bit! This sub-system enables application and release of brake pressure to each wheel independently, even if the brake pedal isn't depressed. This makes the simple ABS function far more effective through system balancing to maximise each tyre's contribution. It can also introduce a steering effect by braking one side harder than

the other. Additionally, it can adapt to different conditions at each tyre e.g. three wheels on asphalt and one on gravel.

PSM

This system is made up of two parts: Traction Control (TC) and Electronic Stability Control (ESC). TC deals with wheel spin. If too much power is applied due to driver exuberance or loss of grip, TC electronically cuts or reduces throttle input until a suitable wheel speed is achieved, even if the driver persists at full throttle. TC can also brake individual wheels to slow or provide additional traction.

ESC can improve the directional stability of the car and uses the braking system (via ABS hardware and EBD) to brake individual wheels to help steer (skew) the vehicle. The simplest analogy is to imagine a tank driving in a straight line and then starting to turn. By slowing (or even stopping) the track on one side, the tank will skid-steer. The ESC part of PSM behaves in a similar fashion, but in a far more delicate manner.





NEXT MONTH

Road vs track:
same or
different?

TUNING AND INTERACTION

Now for the best bit! Most car manufacturers use the same raw hardware for the technology we've described, but it's the tuning of these systems that makes the difference. This is where Porsche excels. Tuning includes the total amount of assistance, how progressive interaction is when a system is triggered and, of course, the development of driving modes for specific environments.

ABS

We can treat ABS as an emergency safety system, but even the sensation of pedal pulsing requires tuning. It needs enough drama to alert the driver to its operation, but with enough refinement to ensure full pedal pressure is maintained in an emergency.

PSM

PSM's blend of TC and ESC is important for driving pleasure, and Porsche owners benefit from it being a reactive system. By this, I mean it will await a situation before operating,

but will allow the driver full freedom until that point. This is in contrast to a system limiting available performance proactively. If a driver starts to run out of talent, PSM will kick-in and aim to deal with the problem. For example, a harshly-applied excess of power during cornering in a Cayman may lead to oversteer (the rear of the car sliding wide). PSM will cut throttle input (TC) to prevent the rear wheels spinning, thereby quelling drama and preventing unexpected spin. At the same time, PSM may engage the ABS/EBD system (ESC) to apply braking to the required wheel(s) to help bring the car back to where it should be. As a bonus, this braking reduces the speed and momentum of the car, which makes it easier to control.

PSM MODES

PSM was a cost option on earlier Porsches. It's now standard equipment on all of the manufacturer's cars. Thanks to the introduction of various Sport driving modes,

the PSM system relaxes in progressive steps as the host vehicle's modes are changed from Normal to Sport to Sport Plus. The latest Porsches with the desirable Sport Chrono Package feature an additional PSM Sport mode. This is a track-suitable setting with limited interaction to satisfy the circuit dwellers among us, whilst leaving a little intervention at extremes should we get into trouble behind the wheel. The new 992 even features a Wet Mode for added peace of mind in challenging road conditions.

The track-focused GT range provides further options to separate TC from ESC with 'ESC off' and 'TC + ESC off'. Of course, these are the models most likely to be driven flat-out by highly skilled drivers on a circuit, where maximum or partial safety system interaction isn't always desired. For now, at least, all of the range allows the driver to deactivate PSM, even though the system is always observing driver behaviour and road conditions, and in extreme cases, can reactivate itself.

THE CRUTCH OF IRONY

This all sounds great, doesn't it?! Lots of support, a range of driving modes and an option for freedom. The most important thing is to remember these safety systems are merely driver aids. I like to compare them to a crutch rather than a full safety net. After all, the maximum abilities of ABS

and the ESC portion of PSM rely on the level of grip available at the tyre(s). Ironically, the less grip you have, the less effective they will be – least strong when you may need them the most.

Similarly, on dry asphalt, you can lean heavily on a crutch, but it's wise to be

tentative when that crutch is on an icy hill!

Prevention is better than cure. In other words, good driving technique will always be the best line of defence. The safety systems in your Porsche then become a welcome backup rather than the only thing keeping you on the road... or not, as the case may be!