

## Porsche Stability Management System: A racer's perspective By Jack Miller

April 29, 2001 marked the official return to Formula One of electronic driver aids, including traction control. In racing as elsewhere, technology that enhances (or interferes with, depending on your perspective) human performance is controversial. Potential Porsche buyers face a similar controversy in deciding whether or not to purchase Porsche Stability Management System (PSM) in the new Carrera 2, Boxster, or Boxster S. PSM is standard in the Carrera 4 and Turbo and unavailable in the new GT2.

If you never intend to race your new Porsche, the decision to purchase PSM is simple. If you can afford it, buy it. It provides a level of safety impossible to achieve by driver skill alone. Here's why. PSM monitors the ABS sensors (which measure the speed of each wheel), engine speed (RPM), throttle position (via E-Gas), gear selection, lateral acceleration (side to side), yaw (the car spinning in a circle), and steering wheel position. This enables the PSM to detect oversteer and understeer. It basically determines the slip angle of the front and rear tires, or more simply, when the car is not going where the steering wheel is pointed. Oversteer is minimized by automatically applying the brake on the outer front wheel in a bend, slowing the rotation of the car; understeer is minimized by applying the brake on the inner rear wheel, speeding the car's rotation. No driver will be able to do that until Porsche develops a car with four brake pedals. However, PSM is not only a braking system. If you lift off the throttle in a low traction situation (wet, snow, etc.) and the back of the car gets loose, PSM will increase the engine speed (blip the throttle) to keep the car in line. Also, if traction is low, PSM can use engine braking (EDC – engine drag torque control) to slow the car. PSM can calculate the amount of available traction by comparing wheel speeds at all four corners of the car.

Recognizing that even street drivers expect excitement from their Porsches, PSM allows approximately seven percent slip angle before intervening. Five to seven percent is generally agreed to be the limit for modern, high performance tires. The biggest difference between PSM and the other systems on the market today (Mercedes Benz, BMW, Jaguar, etc.) is that PSM is programmed to allow a good deal of slip, as you can see. All of these other systems clamp down the moment any slip (i.e., fun driving) is detected.

However, if you require more fun, you can turn the PSM off. When you "turn it off," you are taking only the outputs offline. The PSM system is still collecting data from the ABS system, the yaw sensor, the lateral acceleration sensors and the steering wheel position sensor. If you have PSM off, and the levels of slip are exceeded, and you do not touch the brakes, the car will continue to slide. If the levels of slip allowed are not exceeded and you apply the brakes (no matter how hard), PSM will not activate its outputs. However, if you have exceeded the levels, AND apply the brakes (no matter how hard), PSM will activate until the car has regained control or you get off the brakes, at which point PSM stops outputting. PSM assumes that since you hit the brakes that you are not comfortable with the level of sliding and that you want it to help. This answers the question, posed by Mike Furnish on the PCASD forum that inspired this article, "what happens in a spin when you put both feet in?" Presuming that you put in the correct two pedals, PSM will activate.