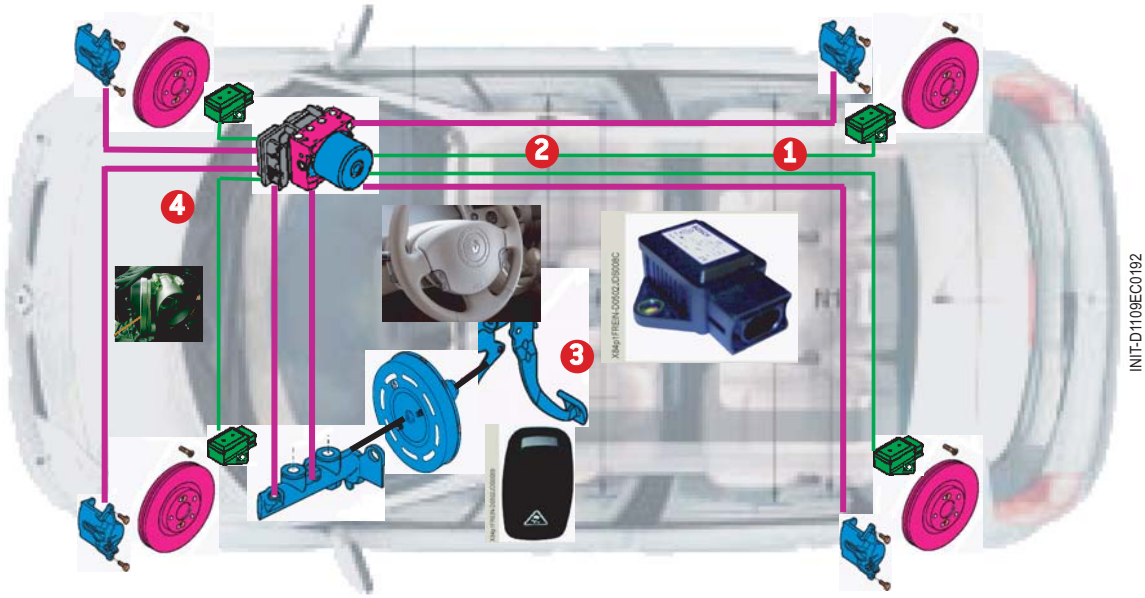
ESP (Electronic Stability Program)

Dynamic trajectory control, also known as ESP (Electronic Stability Program), assists the driver to **retain control of his vehicle** in the event of a loss of grip. Traction control operates alongside ESP.



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Hydraulic link

Electric link

Components of the ESP system include:

1 | a sensor which combines two piece of information: lateral acceleration and rate of yaw
2 | a steering wheel angle sensor
3 | a disconnection switch
4 | specific management of engine torque

RENAULT COMMUNICATION

BASIC FACTS

The aim of ESP is to maintain the trajectory of the vehicle as the driver wishes it to be in turning the steering wheel. An abrupt emergency manœuvre, a bend taken too fast and even a damaged road surface can result in a loss of tyre grip, meaning that the driver is barely, if at all, in control of his trajectory. By detecting the warning signs of such phenomena, ESP helps the driver by attempting to correct the trajectory.

IN SHORT

Using data supplied by seven sensors, the ESP computer acts selectively on the wheels so that the car returns to the intended trajectory. It does this by working in close conjunction with the ABS system.

: HOW DOES IT WORK?

1 THE COMPUTER

To avoid sudden loss of adherence, ESP works selectively on each wheel and, if necessary, on engine torque. Take the case of a right-hand bend. If the car is tending to go straight on or is in understeer, ESP will force it to take the bend by applying braking pressure to the right rear wheel, and possibly the right front wheel. This creates a fulcrum which forces the car to take the bend (figure 1). In the same right-hand bend, if the car is tending to go into a spin or is in oversteer, ESP then acts on the front left wheel. By applying brake pressure to it, it creates purchase which forces the car to rectify its trajectory (figure 2).

To perform these operations, ESP analyses the data provided by seven sensors and compares them with a reference model of the vehicle's behaviour stored in its memory. The first sensor transmits the angle of the steering wheel. To verify whether the real trajectory of the car is complying with that desired by the driver, it processes the information fed to it by the other six sensors.

First of all, the computer determines the speed of the vehicle by analysing the data provided by each wheel's tachometers (those of the ABS). The computer also checks that the difference in speed of rotation between the right and left wheels conforms to the bend that the vehicle is negotiating. The analysis is further refined by data supplied by a sixth sensor, a gyrometer, which detects the vehicle's rotational movements around its vertical axis, also known as the rate of yaw. Finally, an accelerometer enables it to detect the onset of lateral slipping. Any discrepancy detected by the computer results from a deviation between the car's real trajectory and that desired by the driver.

The computer then acts selectively, applying brakes to one or more wheels. Here again, the system employs ABS circuits, and the selective braking of wheels is made possible by a constant dialogue between ESP and ABS functions. If the selective braking of wheels is insufficient to force the vehicle to adopt the correct trajectory, the computer then acts on engine torque by way of the throttle, injection or ignition.

2 UNDERSTEER CONTROL STRENGTHENS THE ACTION OF ESP

On Renault vehicles, the use of CSV Understeer Control further improves the action of ESP. Understeer Control can act on all four wheels at the same time. In view of the fact that, in certain extreme situations, this can lead to a sharp deceleration of the car, the hazard warning lights are automatically activated to alert other drivers.