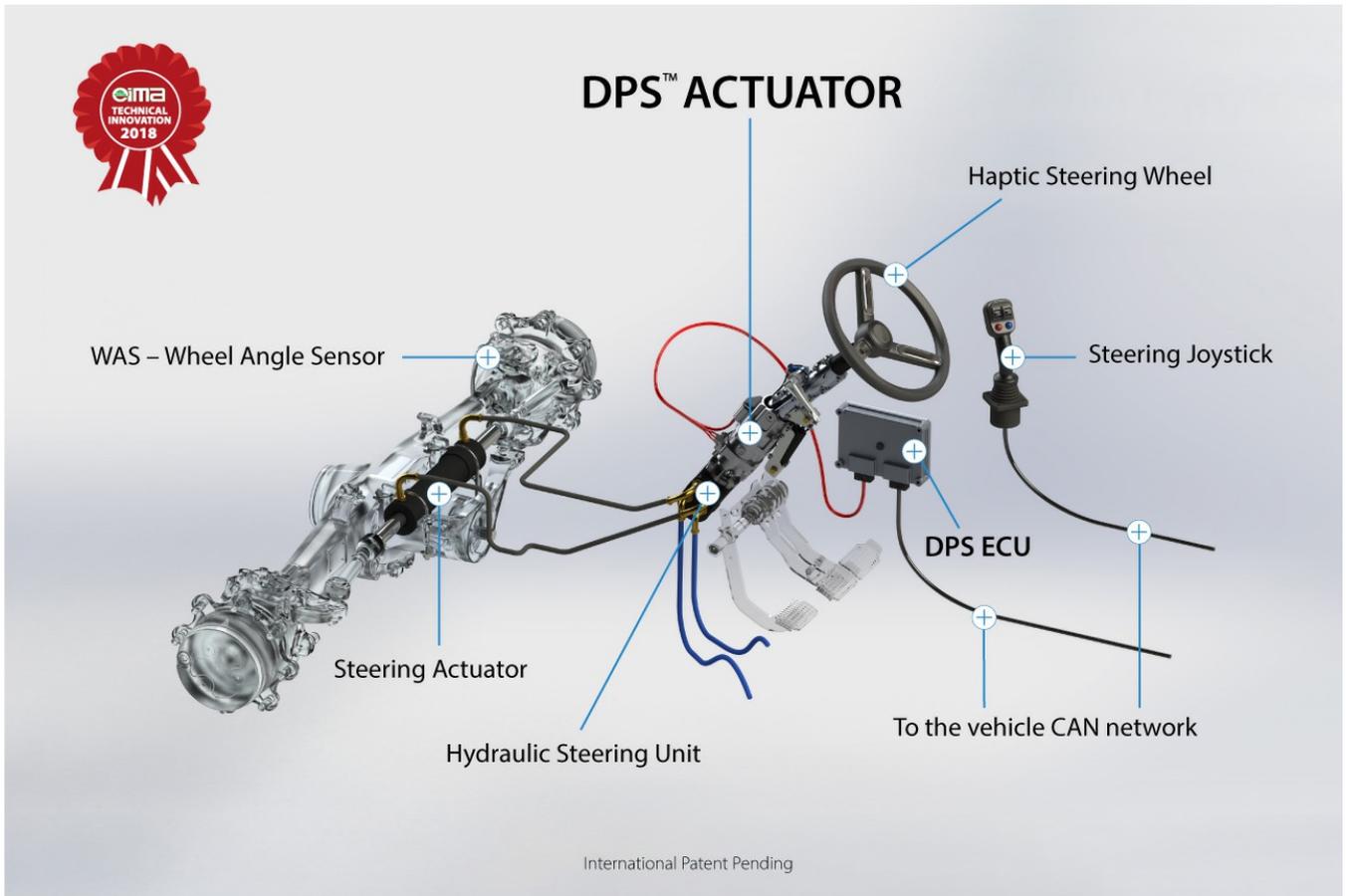


Connectable to the CAN-based in-vehicle network

Ognibene (Italy) has developed the Digital Power Steering (DPS) system. It improves maneuverability and can be used even for autonomous driving vehicles.



In 2018, the DPS has received the Eima international innovation award (Photo: Ognibene)

Due to the low-power motor designed coaxially with the steering shaft, the system, first on the market, can be integrated in the steering column. These features enable an ergonomic assembling inside the cab rather than an electrohydraulic solution, which is mounted externally normally in the engine bay. Because of the brushless technology, this system requires no maintenance.

The DPS electronic control unit (ECU) is connected to the vehicle by means of the CAN-based in-vehicle network. GPS modules, steering joystick, and radar as well as lidar sensors are also connected to the CAN network. With the steering joystick is possible to do a fast spinning of the steering wheel at the end of the field to reduce driver stress and the total number of steering maneuvers in a working day. When the haptic steering wheel is used, the automatic wheel alignment on both directions reduces the driver effort by putting down the number of the steering wheel movements.

Due to the modularity of the system, it is possible to have a range of smart steering column with the same integrated DPS module. The steering column is customizable with different type of regulations like tilting and telescopic workable with lever/pedal or remote disengage in order to obtain the best ergonomics and to fulfill all the constraints in the cab. With the launched system it is possible to change the feeling effort handled by the driver, making the steering stiffer or softer. Level of assistance can be speed dependent and selected by the driver acting on the ECU settings through the HMI device.

For the first time, the driver has a state-of-the-art automotive steering experience, just like a last generation car. The DPS reduces tension and stress on the repetitive driver's work. The supplier estimates that, at low speeds, the effort on the steering wheel can be reduced by 75 %, helping the driver to face tight bends, roundabouts and other demining, maneuvers feeling relaxed and confident.

With the introduction of a smart system on the steering is now possible to obtain new functionalities such as haptic signals (for example the steering wheel can shake in order to indicate a specific vehicle status) and customizable steering wheel feedback. The modularity and flexibility of the system allow to the OEM (original equipment manufacturer) to fit the vehicle to the user needs.

Normally, the vehicle is equipped with DPS from factory, so it is a homologated steering system for on-road and off-road vehicles. The driver has always the possibility to "override" the system and keep control of the vehicle through steering wheel, in any situation. The system is designed to reach AgPL (ISO 25119) or PL (ISO 13849) performance level.

Key features and main benefits are:

- GPS guidance integration
- Active steering wheel return also in reverse (re-centering)
- Speed dependent steering assistance
- Free programmable steering rules (synthetic boost curve)
- Active haptic feedback on steering wheel
- Steering joystick or mini-wheel easy integration

Ognibene's steering products are used in off-highway vehicles including agricultural tractors, construction equipment, material handling, lawn, and garden equipment. The DPS system was presented at Eima Exhibition in Bologna (Italy) in November. The system allows to the OEM to fit the vehicle to the user needs. Ognibene Power develops hydraulic steering system components (actuators and steering units) since 1953. Beginning with the start of the millennia, the company has undergone a major global expansion by adding manufacturing sites in Brazil, India and China, a logistics center in North Carolina (USA) and a sales office in Japan.

The DPS system comprises a brushless electric motor integrated coaxially in the steering column, between steering wheel and the hydraulic steering unit. The integrated sensors inside the electric motor are designed to measure the angle and driver's applied torque. This data is used by the ECU to process the steering response and related haptic feedback, based also on the vehicle speed signal and the position of the front wheel position.

[hz](#)