

# The elephant of off-highway vehicles



(Photo: Fendt)

*Micro-controller based and in a robust housing, the 8960 actuator series by Sonceboz is like an elephant. It was specially developed for transmissions in off-highway vehicles.*

Agricultural and construction machinery is becoming increasingly complex. Today, motors and components do not only need to have the essential attributes but they are also increasingly required to have additional analytical and diagnostic functions. They must also be able to withstand the harshest environmental conditions. Intelligent actuators such as the 8960 smart actuator series by Sonceboz are the answer.

Maximum resistance to mechanical, magnetic, and thermal loads as well as to weather conditions and moisture: components in agricultural and construction machinery in particular must rise to these challenges - without compromising functional safety, performance, or precision. The robust actuators from Sonceboz, featuring clever electronics and corresponding interfaces, have been designed to meet the requirements of harsh environments and can thus provide increased efficiency, safety, and comfort for off-highway machines. Thanks to their electronic systems and the corresponding interfaces, they can be used as self-sufficient components within the system of a mobile machine.

The biggest challenge when developing the 8960 actuators was to guarantee high positional precision and reproducibility in any situation. The challenging environmental conditions to which the components in agricultural machinery are exposed have increased the complexity of the developmental process. Reactive forces complicate position holding enormously. In order to guarantee the position even under these conditions, a dynamic torque of more than 2,5 Nm is essential. At the same time, the residual torque when inactive should not fall below 1 Nm. That is

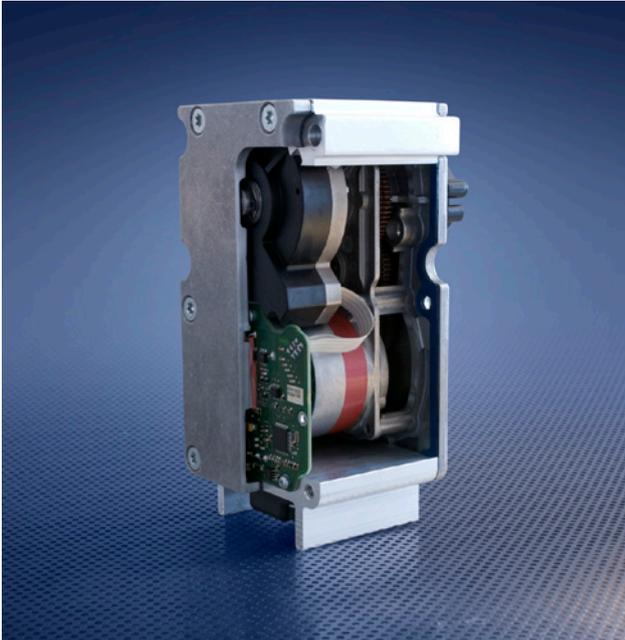
why Sonceboz uses a hybrid stepper motor with 200 steps per rotation. Even at low speed, the motor can provide high torque, ensuring the necessary failsafe functions thanks to its minimal residual torque.

## Reliable even in the harshest conditions

The 8960 series is particularly well suited for use in CVT (Continuously Variable Transmission) transmissions in tractors. This actuator can handle dirt, vibration, and extreme temperatures. Fastened to the outside of the transmission housing on the tractor, it has already been tested under the harshest conditions. In the CVT transmission, the system must respond quickly and accurately to a position signal. The actuator acts as the connection between the electronic transmission controller and the hydrostatic split transmission. Drivers use their joysticks to give the drive command from the driver's cab and the tractor's ECU then transmits the command to the actuator via CAN. The actuator then converts it into mechanical actuation in the transmission. In other words, it independently converts the CAN command into a precise angular position and thus determines the angle of the axial piston pump in the power unit. Meanwhile, a redundant control system ensures the reliability of the actuator.

## Availability thanks to OBD

In the series, various measuring and testing routines of the intelligent control system ensure safety and



The 8960 smart actuator series (Photo: Sonceboz)

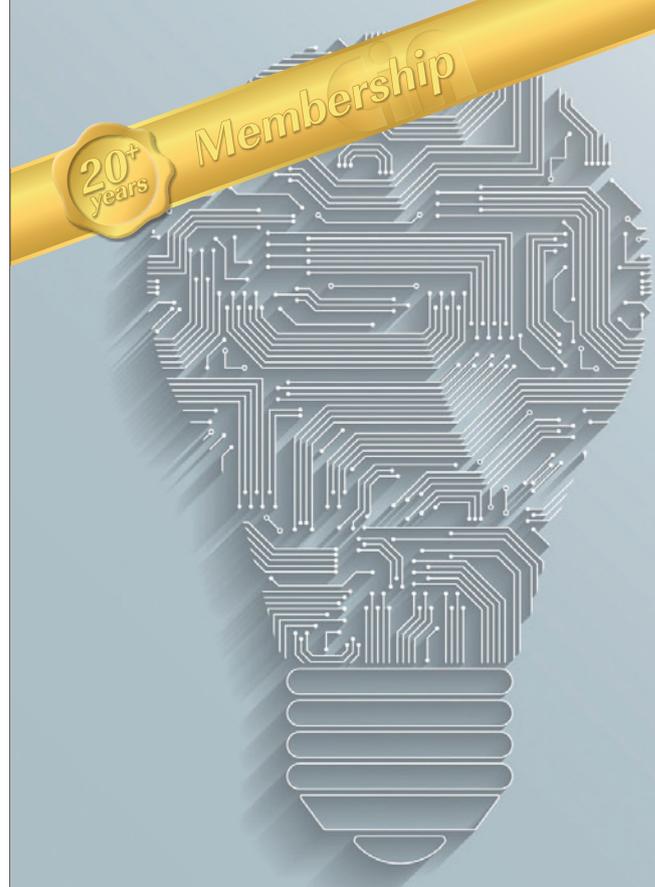
reliability. They enable on-board diagnostics via the CAN interface as required. Using a magnetic and optical sensor with a resolution of 8000 steps/rotation, a redundant measuring system controls the precise positioning of the output shaft. If the output shaft is blocked, the OBD (On-Board Diagnose) initiates a quick diagnosis and sends feedback to the unit. The unit responds by independently reducing the speed and increasing the torque for a short period of time to overcome the mechanical hurdle. The diagnostic system also detects critical situations when it comes to environmental temperature, supply voltage and power consumption. If necessary, the system switches to a reduced operating mode and independently sets priorities to guarantee the safety of the drive.

Sonceboz specializes in the development of innovative solutions for challenging drive problems. The core area of expertise of the Swiss company is integrating electronics, motors and mechanics. The company has years of experience in the mechanical and electronic development of actuators, particularly those used in harsh environmental conditions. One of the particular strengths of Sonceboz is the development of individual, efficient drives based on a comprehensive and modular standard product range. Vibrations, dirt, moisture, temperature fluctuations, tight space constraints, and adaptation to a wide variety of control electronics and communication systems are all just part of everyday life for the Swiss company. ◀

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