Linear actuators for agriculture machinery

Timotion has developed J1939-connectable linear drives that are designed for agriculture equipment.

(Source: Adobe Stock)

The linear actuators come in an IP69K-rated enclosure. This makes them compatible with high-pressure cleaning, which is common in agricultural machinery maintenance. They are robust and have a high-load capacity of up to 16 000 N. According to the supplier, they are leak-free and maintenance-free. They can also be equipped with various position sensors allowing feedback and thus synchronizing two devices. The products are compatible with several control systems and communicate with them via the CAN interface supporting the J1939 application layer.

The products are configurable by the system designer. They are preconfigured to a 100-percent speed. An H-bridge motor drive circuit can adjust this to fulfill the PWM (pulse-width modulation) speed control. The recommended value is between 60-percent and 100-percent speed, as lower values could reduce the actuator performance. With the implemented T-Smart solution, the user can set up to eight actuators in synchronous movement. Without worrying about different loads and complicated cabling, the actuators stay aligned when moving. The T-Smart actuator can set a distance to begin decelerating before the end of the stroke (0 mm to 20 mm). The deceleration ensures that the actuator reaches zero velocity at the point of contact with the end of the stroke, preventing any impact loading at the end of the stroke.

There is also a configurable virtual stroke function, which limits the movement in the middle of the stroke, in extending or retracting direction. Once the virtual stroke limit has been set up, the actuator will stop and won't surpass the designated position. With soft start and soft stop, the actuator slowly accelerates to the full speed or slows down from the full speed. This helps to provide smooth operation of the application. Apart from using the default current limit value for overcurrent protection, the current limit value can also be down-adjusted to let overcurrent protection occur in lighter applications. And, it could set up different values for extending and retracting directions.

The MA2T drive with integrated T-Smart controller allows for integration in SAE J1939 networks. It is compatible with the supplier's PGMA programming environment. In addition to configure the drive, the PGMA also provides status monitoring, capturing usage and performance data for development or maintenance purposes.

The MA2T electric linear actuator for agricultural machinery can push up to 8000 N. The MA3 actuator features up to 16000 N. The MA4 electric drive for agricultural vehicles can push up to 2000 N. It is particularly compact and fits into small spaces. The actuators can also be used in the cabs of agricultural machines. Because of the difficulty of the tasks and the danger of the machines, the profession of farmer involves a significant number of possible accidents. Ergonomics is, therefore, an essential aspect of modern agricultural machinery cabs in order to optimize the safety of farmers. By allowing the adjustment of seats, ▷

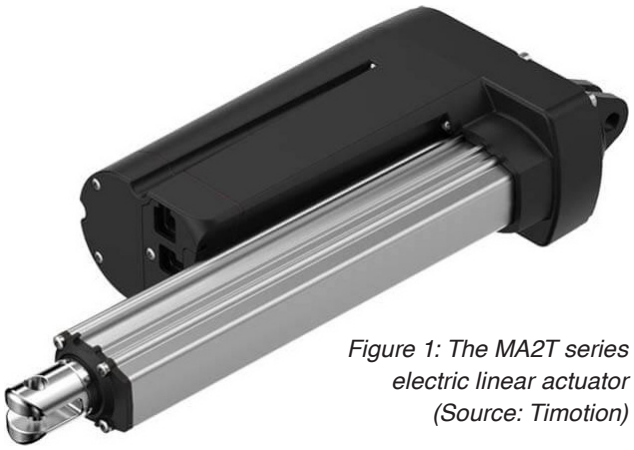

Figure 1: The MA2T series electric linear actuator (Source: Timotion)

steps, hoods, windows, and hatches in an automated way, electric linear actuators for agricultural cabs bring more comfort and safety to farmers and improve their working conditions.

Usage benefits of linear actuators

Electric linear actuators are also used in automated agricultural machines. They made a significant contribution to the automation of agricultural machinery. They have been integrated into balers, combines, seeders, sprayers, fertilizer spreaders, and tractors. One of the benefits is that they do not leak oil, which could pollute the soil. Without a hose or compressor, they are particularly easy to install, explained the supplier.

Electric linear actuators for modern agricultural machines can precisely operate spreading systems and spouts. The programmable opening systems allow the precise release of the desired amount of products and optimize profitability by reducing losses. With a high level of control, they can also operate agricultural wrappers, crop blades, and agricultural AGVs (automated guided vehicles). Traditionally equipped with pneumatic or hydraulic actuators, agricultural equipment is gradually seeing its systems replaced by electric actuators. Such electric solutions are also maintenance-free. This is particularly appreciated in the context of more environmentally friendly agricultural practices, stated the drive supplier. ◀

hz (based on information from Timotion's website)