

Electrified units for eco-friendly municipal vehicles

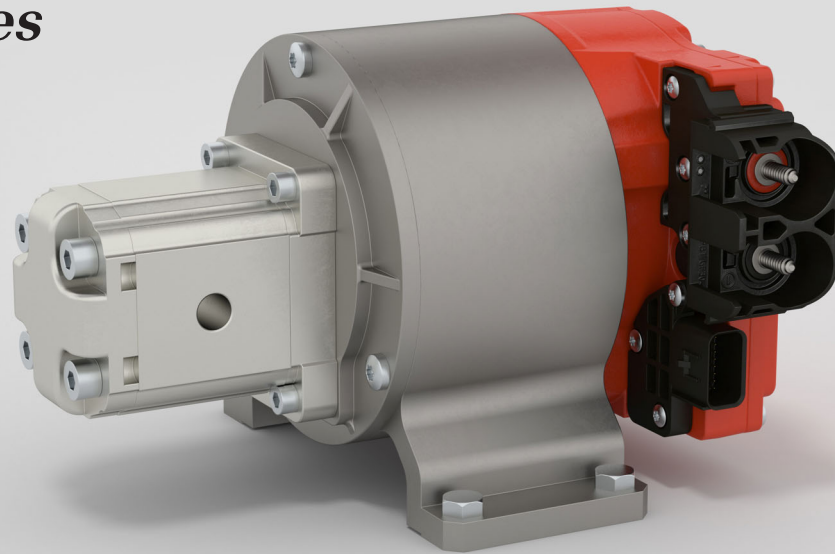


Figure 1: The CPM90 motor mounted on a hydraulic pump (Source: Sonceboz)

Electric motors with CAN protocol allow applications on vehicle bodies to be electrically driven for use during winter, for sweeping machines, or for refuse collection vehicles. They enable a range of auxiliary units to be electrically powered.

New Euro standards, stricter regulations regarding fine dust pollution and concern for citizens' health mean that cities and local authorities are looking for more eco-friendly ways to operate their municipal vehicles. Older vehicles are no longer energy efficient enough to comply with the latest standards. Sonceboz offers a means of achieving environmentally friendlier, more powerful operation – by switching to electric units. Modern CPM90 high-performance electric motors with CAN protocol allow various applications on vehicle bodies to be fully electrically driven for use during winter, for sweeping machines, or for refuse collection vehicles, and enable a range of auxiliary units to be electrically powered. The Swiss company recommends the CPM90 product range, which boasts a degree of efficiency higher than 90 %, specifically for drive work in industrial and mobility applications.

With the CPM90, hydraulic pumps can be driven and controlled as needed at variable speeds in hydraulic systems that are complicated to control, completely independent of the combustion engine. One application example is activating lifting devices. It even allows fully autonomous "piggyback structures" to be fitted on vehicles – these replace components which were previously driven by external mobile hydraulics. Electrification as an addition to industrial drives such as planetary gears or worm gears for linear or rotating drive applications is also an advantageous alternative that can be implemented using the CPM90 24 V or 48 V versions due to their compact design. Even the fans

in suction units on smaller municipal vehicles can be electrically driven in this manner.

CPM90 for electrohydraulic pumps

The compact, lightweight, robust BLDC electric motor is also ideal for driving hydraulic pumps at variable speeds. It enables needs-based energy provision for mobile working machines' hydraulic systems that are complicated to control. In doing so, it solves the core problem posed by previous drives – that the pumps are continuously mechanically driven by a combustion engine and therefore hydraulic power is continually generated even when it is not required. It also eliminates inefficient pump operation in the partial load range, caused by the pump needing to provide the system with sufficient volume flow at all combustion engine speeds. The highly efficient BLDCs, disconnect the hydraulic pump from the combustion engine and provide needs-based regulation, even on battery power when the engine is switched off. This reduces overall emissions and energy demand.

The robust CPM90 systems also enable easier construction when compared to valve-controlled drives. The mechanical disconnection of the components and the electric operation – independent of the combustion engine – eliminate the need for decentralized hydraulic supply using long hydraulic hoses in mobile systems and the resulting hydraulic losses. ▶

CAN protocol for implementation

The CPM90 systems guarantee optimum energy efficiency thanks to their extremely high power density. They are based on a brushless DC motor with external rotors and an integrated CAN-capable controller. The CAN protocol features a configurable data transfer rate from 50 kbit/s to 1 Mbit/s. The standard is 500 Kbit/s. The CAN interface operates as CAN extended base frame format standard – with extended IDs – in Intel format. CPM90 is compatible with the J1939 network protocol for communication in commercial vehicles. It therefore makes it possible to read out and process information relating to engine control (speed, rotational speed, and position), to configure maximum or minimum limits and to perform diagnostics regarding the temperature, engine status, faults or warnings.

The CPM90 drive has an integrated controller with corresponding application and diagnostic software that enables simple implementation in existing systems and adaptation to customer-specific parameters. The power and control electronics make four-quadrant operation possible. This enables a number of functions, such as demand-controlled bidirectional pump operation and generative recuperation. Due to its modular construction concept, customized highly efficient electric drives with integrated control electronics can be implemented in no time.

Powerful battery operation

The BLDC electric motors with embedded motor control and control electronics in an integrated design are the ideal solution for mobile applications and battery-operated machines. They are therefore particularly suitable for all areas that require high-power in low-voltage operation, with strict requirements when it comes to robustness. CPM90 can drive pumps, function as a drive motor, perform other drive and adjustment tasks, and contribute to electrification for the future. For use in mobile working machines with a 24-V or 48-V on-board network, Sonceboz offers, for example, motors with a peak output of up to 6 kW at a power density of up to 2 kW/kg and peak torque of up to 14 Nm. The hydraulic power corresponds to a pressure of up to 200 bar at 25 l/min.

Autonomous drive system for industrial applications

In combination with modern lithium batteries, the system can be operated fully autonomously and independent of the carrier vehicle's supply. Modifications to other suitable vehicles can be made quickly and easily because no hydraulic connections are present. By using the CPM90-48V, manufacturers also achieve highly efficient energy management. What's more, disconnecting the system from the vehicle eliminates additional adaptations to the carrier vehicle. The "piggyback structure" can be conveniently fitted on any commercial vehicle with sufficient capacity.

Additional subsystems such as supply systems and dosing units can also be electrified by adding a planetary ▾



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Figure 2: The brushless DC with integrated control unit for low-voltage applications combined high-power and best in class efficiency in a compact design (Source: Sonceboz)

gear or worm gear using the CPM90 24-V or 48-V product range; this makes it possible to achieve energy-efficient solutions with high power density. The BLDC motor can be adapted for all standard gears using a flange adapter. This allows the 24-V and 48-V versions to be variably, flexibly designed for application-specific speed and torque requirements because the motor's software can be configured for a range of speed and torque requirements.

Integration in existing systems

The CPM90, a combination of an efficient motor with integrated motor control and a CAN network controller, enables the motor to be easily integrated into the functional network of a platform using specific configuration software. The integrated high-efficiency controller optimizes system performance without the need for additional motor control hardware. The product is available with a starter kit that enables access to the technology and makes it possible to start up the motor. It includes the Motion Workbench configuration software, a connection cable with PCAN-to-USB interface and a Quick Start guide.

The CPM90 motor is easy to control using Motion Workbench. This proprietary user interface software enables the CPM90 to be started, adapted, analyzed, and updated easily. This means that development engineers can set up independent test assemblies, read out power curves or test the motor's characteristics under a range of conditions. The compact, quiet, robust CPM90 with IP6K9K protection are the key components for energy efficiently performing drive tasks – and they result in improved performance and more eco-friendly operation under demanding conditions. They offer high potential energy savings, all while guaranteeing optimum precision, safety, and economic efficiency. ◀

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CAN Newsletter Online: Actuators



Control cabinet inverter
Frequency inverter with CANopen interface

With the Nordac PRO SK 500P, Nord Drivesystems has launched a control cabinet inverter with the latest component technology and levels of functionality, connectivity, and modularity.

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Solenoid valve array
Designed for commercial vehicles

IMI Precision Engineering has developed the IMI Norgren latching solenoid valve array. It comes with CAN connectivity.

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AC/DC power supply
5-kW device provides CANopen connectivity

XP Power has developed the HPT5K0 series of power supply. They are suitable for industrial and medical applications.

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75 mm diameter
Brushless DC motor with optional CANopen interface

Allied Motion Technologies has introduced the Enduramax 75i Series, a 75 mm diameter brushless DC motor with an all-digital integrated drive. CANopen is optional available as an input.

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Battery charger
Converting 3-phase AC to DC voltage

Bel Power Solutions offers the BCN25-700-8 on-board battery charger. It provides J1939-connectivity.

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Synchronous generator
CAN-connectable to host controller and service tool

KWG (Germany) presented at Bauma 2019 its synchronous generators. They communicate optionally via CAN with the host controller and the service tool.

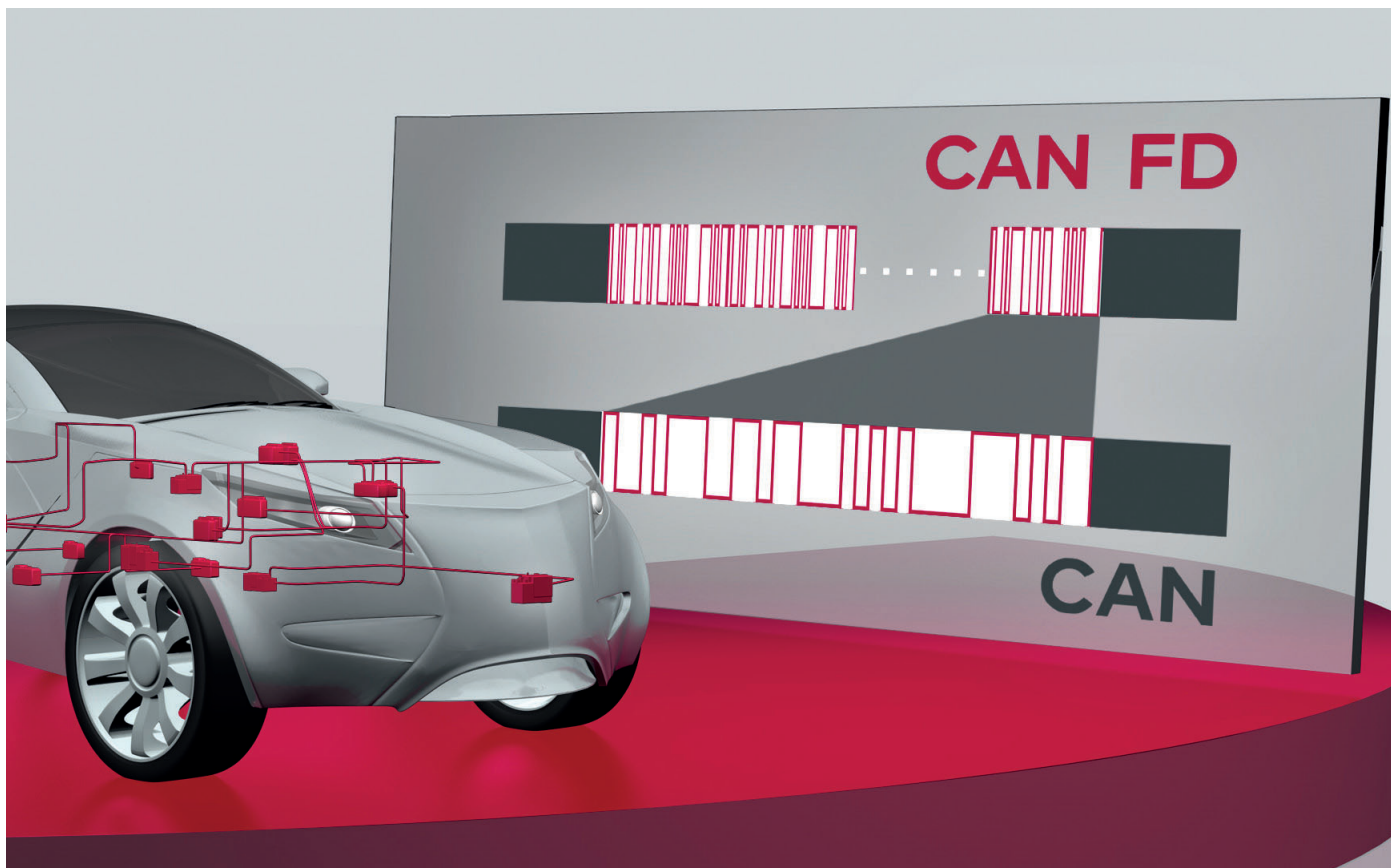
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Servo controller
Moons' acquires Technosoft

The Swiss CiA member Technosoft Motion becomes a wholly owned subsidiary of Moons' (China). Another CiA member, Applied Motion Products is part of the Chinese company since 2014.

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