Motion control platforms suitable for CiA 402

Dunkermotoren has developed hardware and software platforms for motion controllers. They comprise dMove and dPro designed for efficiency respectively for applications without host controllers.

(Photo: Dunkermotoren)

The company located in the Germany's Black Forest develops and produces integrated DC servomotors based on brushless DC motors for about 20 years. During this time, a variety of functions has been created, developed and optimized. "All these existing functions, now called 'features', were examined carefully in a first step. Already this step has made it clear how extensive a new motor base must be," wrote Michael Bungert from Dunkermotoren in a white paper. "Away from a rigid system that adds one function after another to a modular system where features can be combined when required. Our new platform was not only shown in the software, but also for the hardware. Flexibility came to the fore during development. This resulted in a motor control platform that, on the one hand, reflects all previous functions and, on the other hand, can react flexibly to new requirements," he added.

The company' engineers choose the latest generation of 32-bit micro-controllers to design the future-proof platform. This allows to use existing functions even more effectively and new ones, previously not possible functions, to be introduced. Electronic labels are only the beginning. In addition to the motor data, the labels also indicate the overall data of the whole drive, including the gearbox, encoder, and brake. In the future, the platform will provide functional safety. In order to meet different application requirements, there are two types of platforms:

- *dMove:* This platform is designed for economic efficiency, dMove drives can control speed, positioning without high-resolution encoders and can assign functions to digital inputs and outputs. CANopen communication with profile CiA 402 is possible. On request, even less demanding communication via an EIA 485-based interface is provided.

Robots keep artificial turf green

There is a trend in sport courts: Artificial turf pitches replace hard courts. Also an artificial turf needs cultivation. Due to the Turfrob by Melos, sophisticated cultivation belongs to the past. The robot was developed in cooperation with Dunkermotoren, Konpro, and the University of Applied Science in Dortmund. The service robot vacuums and hackles the artificial turf. It comprises a vacuum cleaner for removing leaves and small branches. Dunkermotoren provided three drives, which are responsible for the cleaning. The drives from Dunkermotoren are used for the adjustment of the vacuum and nozzle unit. They are connected via their CANopen interfaces to gyroscopes and I/O devices as well as the embedded PC-based host controller.

The Turfrob is equipped with three drives, which communicate with the host controller via CANopen (Photo: Dunkermotoren)

Furthermore, during the match the infill gets compressed. To ensure constant match conditions, the artificial turf needs to be slackening regularly. With the robot this is made without more ado. Visualize a soccer match: The penalty area gets hard burdened through the soccer shoes. Duels, corners, and goal box scenes – the maximum density of soccer players is there. Imagine how extreme the mechanical load is which comes down to the fiber of the artificial turf – then it's inevitable to cultivate them to ensure the durability of the artificial turf. The BLDC motors enable the adjustments of the brushes in the front and of the currycomb unit in the back.

Two more drives are used for the driving operation. To keep the control about the robot anytime it is controlled by an app. It enables the simple programming and selecting of programs according to the type and cultivation intensity. Afterwards the app connects automatically with the robot and starts its program.

With an efficiency of up to 90 percent and the possibility of regenerative operation BLDC motors make a demand-based distribution of energy possible and so long battery life.

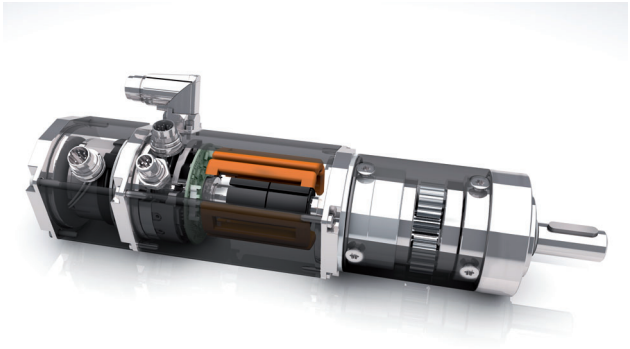

Figure 1: BG66 dMove application (Photo: Dunkermotoren)

- *dPro:* Customers who want to outsource all or only parts of their PLC functions to the motor will find their solution in dPro drives. These drives are also used for interpolation, communication via Industrial Ethernet, jerk-optimized ramps, absolute encoders, and high-end motion functions. Of course, they are also available with CANopen (CiA 402) connectivity.

The development of this motor control platform has now been largely completed. At last, the product launch can begin. Already available is the BG 95 dPro. A powerful motor with integrated electronics and a maximum output power of 2,6 kW, which offers the maximum functionality with the "dPro" characteristic. It can operate as a slave in the CANopen network, can be controlled directly via digital inputs without a communication interface or, can be freely programmed similar to a PLC (programmable logic controller). The BG 95 dPro has already demonstrated that the concept of the new Motor Control Platform has proven itself in practice. Typical applications included intralogistics systems, electromechanical presses, mechanical test equipment, door drives, and special pumps.

The next products to be rolled out are BG 65 and BG 66 dMove. These two DC servo motor series' have the same size but different output power. BG 65 features 120 W (continuous) respectively 260 W (peak). Due to high-quality neodymium magnets, the BG 66 provides a 170-W (continuous) output power and more than 400 W of maximum output power. For the first time, the modularity of the motion control platform has been exploited in these series.

In the medium term, BG 65 and BG 66 dMove will primarily replace the hundred thousand times installed classic BG 65 SI drives. In addition to the basic functionality, namely the speed control, functions such as fixed speeds, preset positions or values for current limitation can be assigned to the digital inputs in the future with the "Drive Assistant 5" commissioning software. Since the control is done via the digital inputs, this version is called dMove IO. If even greater flexibility is required, dMove CO motors (CO - CANopen) can operate as a slave via a CANopen interface. If no high-resolution encoder is required, it is in many cases also possible to replace existing BG 65 CI motors.

The modularity does not end with the motor electronics. Gearboxes, encoders, and brakes from the company's modular system also turn a DC servo motor into a DC servo drive. The electronics adapts to the expansion ▷

CAN Newsletter Online: CiA 402

Frequency converter

Used in water-based refrigeration unit

The refrigeration unit eChiller from Efficient Energy integrates Sieb & Meyer's SD2S drive amplifiers with Classical CAN and CANopen support. The chiller uses pure water as refrigerant and operates in a capacity range of 35 kW.

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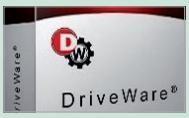

Software tool

Configures servo drives

Advanced Motion Controls announced the release of the Driveware 7.4.2 software for commissioning, troubleshooting, and integrating the company's Digiflex Performance servo drives. CANopen (CiA 402) is supported.

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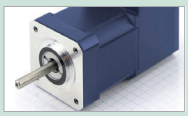

Brushless DC servo motor

With integrated controller

For use in harsh environmental conditions, Nanotec (Germany) developed the PD2-C-IP. It is a brushless DC servo motor with integrated controller and 42 mm flange size in protection class IP65.

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Stepper motor drive

Positioning with up to 5000 min^{-1}

Trinamic (Germany) has announced the extension of the Pandrive product line by the PD42-3-1241 and the TMCM-1241 modules. They provide CAN connectivity.

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Positioning controller

With CANopen interface

Maxon Motor (Switzerland) has developed the Epos4 70/15 positioning controller, the most powerful model of this series. It provides a maximum output of 2,1 kW.

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Motion controller

Driving up to three DC motors

Roboteq offers the FDC3260 motion controller, which supports the CiA 402 profile. It is able to control up to three motors.

Read on

components and thus protect the complete drive and the application against critical operating conditions. Sophisticated algorithms ensure that the drives can be overloaded by a multiple of the continuous output power for a certain period, without getting damaged. ◀

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