

Modular Multi-Axis Servo System Simplifies the Complexity

FREE IN MOTION

With the new DIAS Drive generation MDD 2000, the automation technology manufacturer SIGMATEK is launching a highly flexible multi-axis servo system with a space-saving construction that leads the field in terms of power density. The drive technology stands out with its easy handling.

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In the development of production machines today, efficiency and flexibility set the tone. A key factor thereby, is the drive technology and their simple integration into the machine process. According to a market study from Quest TechnoMarketing, an average of 7.6 servo drives per machine are used – tendency rising.

The MDD 2000 drives from SIGMATEK are designed for dynamic multi-axis applications, as often found in serial machine manufacturing. While developing the generation of drives, SIGMATEK engineers focused on creating a highly flexible system with an extraordinarily high power density that provides room for individualization and customized drive concepts. The DIAS Drives from the MDD 2000 series combine dynamics and precision with very compact packaging, simple connection technology and numerous Safety functions. In size 1, the 3-axis device with a power rating of 8,5 kVA measures just 75 x 240 x 219 mm – including supply and power filter.

Quick Start without Extra Wiring

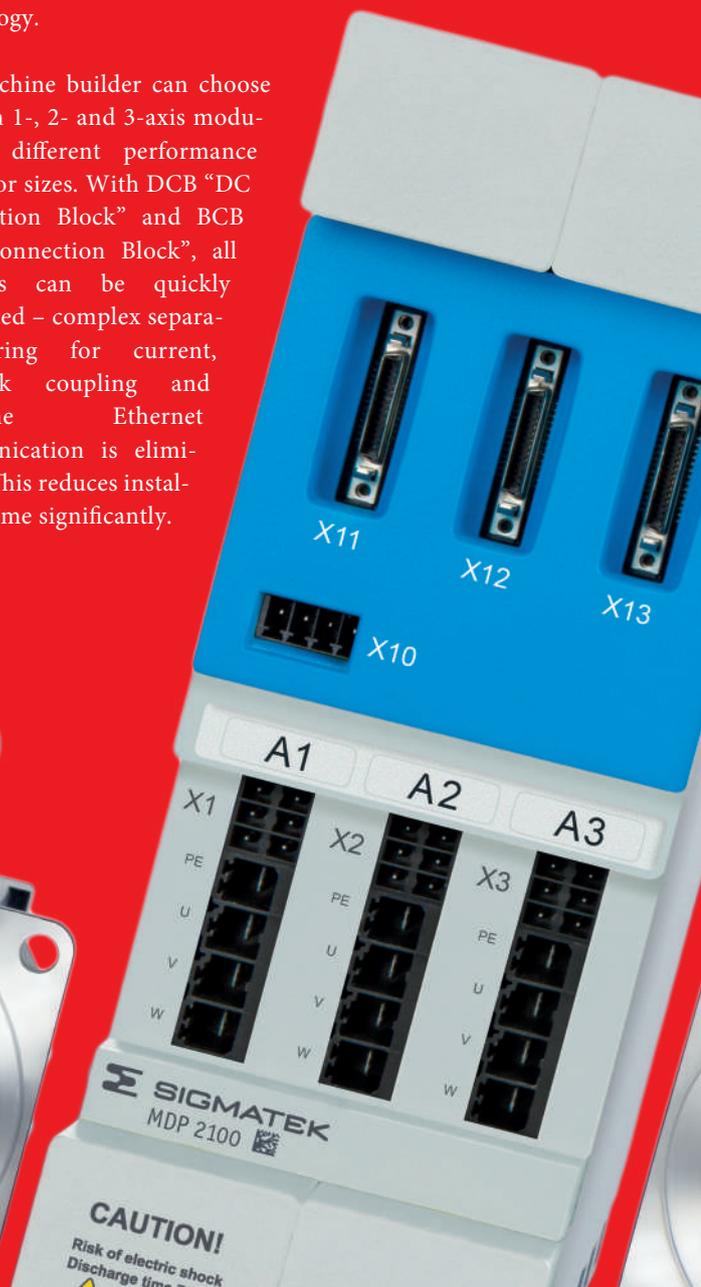
A backplane was deliberately excluded from the design, making it unnecessary to provide options. In the combined supply and axis module MDP 2000, up to 3 axes are integrated.

This module can be used stand alone as a compact drive or it can be expanded into a multi-axis network with any number of MDD 2000 axis modules. They are assembled modularly in a toolkit system with clever connection technology.

The machine builder can choose between 1-, 2- and 3-axis modules in different performance classes or sizes. With DCB “DC Connection Block” and BCB “Bus Connection Block”, all modules can be quickly connected – complex separate wiring for current, DC-Link coupling and real-time Ethernet communication is eliminated. This reduces installation time significantly.



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Flexible Complete System

The modular servo system is operated in single or three-phase with 380-480 VAC. A power filter and brake resistor are also on board of the compact drive modules. For the market launch, the DIAS Drives of the MDD 2000 series are available in two sizes: MDD 2100 and MDD 2200. The height and depth of the modules are identical, only the width varies. Size 1 measures a compact 75 mm in width, 240 mm in height and 219 mm in depth, and provides a connected load of up to 8.5 kVA per combined supply/axis module. Currently, it is available with 3x 5 A of rated current and a 15 A peak current. Depending on the number of axes, up to 10 A rated and 25 A peak current will be available with this size in the future. With 150 mm, the supply/axis module in size 2 is twice as wide and provides up to 17.25 kVA. For the market launch, the 3-axis module is available with 3x 10 A rated current and 30 A peak current. Depending on the number of axes, up to 20 A rated current and a peak current of 45 A are planned for this size. Size 3 will be available next year as the MDD 2300. Here as well, only the width changes (225 mm). The first module will have three axes with 3x 20 A rated and 3x 60 A peak current. All series provide an overload factor of up to 300 percent. The modularity allows machine builders to optimally integrate the drive technology into the machine constructions. With a depth of just 219 mm, the DIAS MDD 2000 drive system fits in small 300 mm deep control cabinets that are often located directly under the machine.

“When it comes to power density, we are currently leading the industry with the new generation of drives and we are proud of that”, says Managing Director Alexander Melkus. “We put more power and modern controller performance in an even more compact package, plus new Safety functions, a fast, toolless module connection as well as single-cable technology”, points out Alexander Melkus the advantages of the DIAS Drives MDD 2000.

More Safety Integrated into the Drive

Besides the stop functions Safe Torque Off (STO) and Safe Stop 1 (SS1), the MDD 2000 series includes Safe Operating Stop (SOS), Safe Brake Control (SBC), as well as Safely Limited Speed (SLS).

The Safety functions integrated into the drive can be used for applications up to SIL 3, PL e, Cat. 4. In the new generation of drives, the Hiperface DSL motor feedback interface is a standard feature. The single-cable solution for power and feedback eliminates the encoder line and therewith, the cable clutter in the control cabinet or machine and saves time with the initial start-up. In addition to the single cable solution, various encoder types are supported: EnDat 2.1 and 2.2, Hiperface, Resolver, Sin/Cos, TTL, BiSS-C, SanyoDenki, Tamagawa.

High Servo Performance

The position settings are made in the control and then sent to the drive via the real-time capable Ethernet bus system VARAN. Very short controller cycle times (62.5 μ s) give the DIAS Drives very good servo performance. To achieve an attractive price/performance ratio and avoid unnecessary overhead, the functionality of the drives are consciously limited to current, speed and position control. The positioning and regulating algorithms are processed by the controller integrated into the drive, which also communicates with the primary control system and ensures fast data traffic in the drive. On board are 6 digital capture inputs, which allow storing the position in the μ s range. The three 2-channel safe 24 V inputs can be configured specifically for the application.

Quick Initial Startup: Autotune

The autotuning function simplifies the initial start-up enormously. In the engineering suite LASAL, an autotuning tool is provided for this purpose: As soon as the user defines the rated and maximum current, as well as the permissible process space and the drive has a connected motor, the tool can automatically start optimizing the motor. In addition to the control parameter calculation, the Bode plot and the step response are also visible. When needed, the dynamics of the current regulator, as well as the speed controller can be adjusted.

In the internal data analyzer of the DIAS Drives, data can be recorded with scan rates of 62.5 μ s and displayed in the software tool online. Since the configuration parameters are centrally managed in the control system, configuring the drive components individually is unnecessary. When exchanging a servo drive, the parameters are loaded automatically. The initial start-up times are thereby further reduced and errors avoided.

