MSD SERVO DRIVES
PRECISION, SPEED AND FLEXIBILITY

REACH A NEW LEVEL OF MACHINE PERFORMANCE
Higher performance machines can mean a real business advantage in your productivity and profitability. The Moog Modular Multi-Axis Programmable Motion Control Servodrive - MSD - answers the call for a new generation of servodrives that provides the highest levels of precision, dynamic response, along with application flexibility.

WHAT IS MSD?

- A range of powerful and modular servo drives powered by a stand alone or common shared power supply
- Incorporates “MSD Compact” which combines cost optimisation with minimal footprint and high functionality
- A Motion Controller to coordinate motion across multiple axes

TOTAL MACHINE FLEXIBILITY

The modularity of the MSD range guarantees you optimum integration into the machine process at all times. A coordinated single-axis and energy-efficient multi-axis system meets the needs of any application across a wide power range. Whether controlled with the multi-axis machine controller via a high-speed fieldbus, or with distributed Motion Control intelligence in the drive controller – the MSD is a master of both. Flexible performance allows up to three feedback devices like sin/cos single and multi-turn encoders used simultaneously for precise positioning with added ability to support any customized position feedback devices.

SERVO MOTOR INTEGRATION

Best-in-class and truly optimised motion performance comes when integrating MSD with Moog’s wide range of high performance AC Servomotors and AC Linear Actuators.

However, as you’d expect from a global company, MSD is also designed to work with a wide range of synchronous and asynchronous servo motors along with linear and torque motors. For rapid start up, MSD offers rapid commissioning whilst control optimisation provides consistently high manufacturing quality.
MSD is designed to give you a genuine edge in solving some of the industry’s toughest challenges for a wide array of industrial machine applications. Its high-performance design, user-friendly features and unsurpassed flexibility provide a unique blend of capabilities ready for almost any machine control challenge.

**PRECISE**

Fast processing for current, velocity and position control loops enables your machine designers to meet the toughest demands for machine performance and cycle time. This results in:

- Improved machine precision – Moog's significant motion control expertise is embedded into the MSD which results in higher accuracy, virtually no part variations and reduced scrap
- Safety - designed to implement safety functions according to IEC 61508
- Support for multiple communications (SERCOS, EtherCAT, CANOpen, PROFIBUS and more) plus the ability to develop custom protocols, gives the ultimate in precision control

**FAST**

If you need higher machine productivity, MSD can lower your total cycle times. For example, when used in an injection moulding machine, it supports increased feed rates and in a metal forming press, MSD can deliver a significant increase in machine output. Coupled with the very high speed CoDeSys architecture and real-time motion engines, you have the most powerful tool to help support your machine control needs. For connecting to an Automation network, the high speed internal communication via EtherCAT allows for unrivalled control and coordination across multiple axes.

**FLEXIBLE**

Comprehensive software with motion control functionality supports IEC 61131 programming as well as programming of custom control loops using MathWorks/C/C++, enables creation of application-specific templates for deeper integration into your machines. The modularity of the MSD coupled with the ability to tailor customer-specific solutions, provides the perfect flexible platform for different machine types. MSD’s range covers output ratings from 4 to 170 A (air cooled) or when size is really critical, you can increase to 450A with liquid-cooled derivatives. For global applications, MSD offers you power supply options ranging from regular multi-voltage AC or DC bus feed as options.

For the ultimate in efficiency and where multiple axes are being used, the MSD’s comprehensive common DC bus modules and low harmonic regenerative options, can be used to save panel space and energy at the same time.

Finally, user-friendly GUI supports PC based parameterization, data programming and firmware exchange. Your PC can connect (via USB) locally, using TCP/IP for remote access through factory Ethernet, or even via Internet or modem.
HOW MSD PERFORMS - TECHNICAL DATA

Putting the MSD to work on your machine based motion control challenges is simple when you consider the power and performance that this new servodrive offers:

**PRECISE**

- High control rates of 16 kHz for current and 8 kHz for speed and position control result in minimal dead times and so guarantee optimum motor performance.
- PWM frequency (4, 8, 12 and 16 kHz).
- Built in PLC as per IEC61131 provides functions matched to your application with direct access to drive controller peripherals, single and multi axis operating units.

**FAST**

- Control loop update rates (current 62.5 µs, velocity and position 125 µs)
- High-speed communications based on a wide range of configurable interfaces (EtherCAT, SERCOS II & III, PROFINET IRT, CANopen)
- Predictive feed forward control loops for speed and torque result in optimum machine performance.

**FLEXIBLE**

- 4-450 A output current in either classic AC mains connection or a DC feed with a centralised supply unit
- Supports wide range of encoders and field bus
- Suitable for 300 mm control cubicle (d), extremely small drive widths, for the best possible space utilisation
- Built in functional safety - EN 61508, EN 62061, EN ISO13849-1, IEC 61800-5-2, personnel safety directly into the drive controller

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**Ratings and Dimensions**

<table>
<thead>
<tr>
<th>Output Current* [A rms]</th>
<th>Size 1</th>
<th>Size 2</th>
<th>Size 3</th>
<th>Size 4</th>
<th>Size 5</th>
<th>Size 6</th>
<th>Size 6a</th>
<th>Size 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>6</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>32</td>
<td>45</td>
</tr>
<tr>
<td>Max Output** [A rms]</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
<td>64</td>
</tr>
<tr>
<td>WxHxD (mm) Without connector</td>
<td>58.5x295 x224</td>
<td>90x295 x224</td>
<td>130x295 x224</td>
<td>171x295 x224</td>
<td>190x345 x240</td>
<td>280x540 x242</td>
<td>280x540 x322</td>
<td>380x900 x300</td>
</tr>
</tbody>
</table>

Drives can be rated for 3 x 230 V, 3 x 400 V or 3 x 480 V ± 10%
Certification for all drives - CE, cUL
* at 8kHz PWM
**for 10 seconds at 8kHz
***for 30 seconds at 4kHz
**MSD COMPACT**

**MSD COMPACT. POWER PACKED MICRO DRIVE**

The MSD Compact is the latest generation of Moog drives which has been optimised for the needs of low power machine applications. However, MSD-Compact comes with all the DNA of our larger MSD range and is fully compatible with the general concepts of its bigger brothers. Available in 3 sizes, it features all the classic elements of Moog’s servo drives know how.

- Fast control loop update for high machine performance
- Large range of mains Voltages and Rated Currents
- Supports simultaneous feedback sensors for universal use
- Compatibility with existing MSD Servo Drive Series
- Availability of Multiple Fieldbuses to support existing systems
- Built in STO safety functions
- Internal PLC
- 24 V motor brake interface with fault monitoring (open circuit and short Circuit).

All in all, MSD-Compact is big on features but offers exceptional value for lower cost machine control.

<table>
<thead>
<tr>
<th>Rated Voltage</th>
<th>1 x 230 v (with power reduction) / 3 x 230 V – 20 %, +15 %</th>
<th>3 x 400 V – 25%, +32 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>C2</td>
<td>C3</td>
</tr>
<tr>
<td>Output current* [A rms] for 10s</td>
<td>6.0</td>
<td>11.8</td>
</tr>
<tr>
<td>Output current [Ams] for 0.08s</td>
<td>9.0</td>
<td>17.7</td>
</tr>
<tr>
<td>Certification</td>
<td>CE conformity, UL certification, EMV approvals, STO approvals</td>
<td></td>
</tr>
</tbody>
</table>

* 8 Khz PWM
MSD MOTION CONTROLLER

ULTIMATE PROGRAMMABILITY SUITS YOUR TOUGHEST DEMANDS

As well as modular servodrives, the MSD range has a high speed motion controller specifically designed to co-ordinate motion across multiple machine axes. MSD Motion, is a highly programmable multi-axis motion controller with an IEC 61131 Programming environment based on Moog’s world-beating MACS (Moog Axis Control Software).

PRECISE

• Precision customised controller structures with cycle times from 100 µs -
• Very low jitter (variation of time base) for optimum closed loop accuracy
• Hardware functionality can be parameterised via MACS software

FAST

• EtherCAT Realtime Ethernet interface
• Real Time Linux based Operating system
• CoDeSys Operating architectures

FLEXIBLE

• PROFIBUS DP slave as option
• Integrated PLC functionality
• Simple wiring with terminal strips
• Low maintenance design.
• Sustained short circuit protection for digital outputs.

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<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
</tr>
<tr>
<td>Memory</td>
</tr>
<tr>
<td>Voltage supply of module electronics</td>
</tr>
<tr>
<td>Ethernet (100BaseT)</td>
</tr>
<tr>
<td>EtherCAT</td>
</tr>
<tr>
<td>PROFIBUS DP slave (optional)</td>
</tr>
<tr>
<td>USB 1.1 interface</td>
</tr>
</tbody>
</table>
CONTRoL AND AUToMArION MADE EASY

MSD’s flexibility, gives easy integration into control and automation networks and also supports a wide range of encoders and fieldbus topologies.

Open architectures - CodeSys v3 Programming System

With CoDeSys V3 embedded in its core, MSD can be programmed in all languages of IEC 61131-3. The careful application of international standards supports a familiar and uniform programming environment, which also minimises engineers and users training and project planning workload.

Safety to the Core - “Safe Monitoring PLC”

As a machine builder, you know how critical safety is. So do we. As a result, we equipped MSD with a programming interface known as “Safe Monitoring PLC” which provides you with a high-quality programming environment. Via its graphical and dedicated on-screen format, you can configure, set parameters and validate them all in accordance with the recognised safety standards. For ultimate flexibility, you are also able to configure and parameterize the connection, monitoring and processing requirements of safety sensors and actuators suitable to the safety level of the machine application.

This Moog tool now gives you a straightforward way to select and configure the optimum machine safety setup.
TAKE A CLOSER LOOK.

Moog designs a range of products that complement the performance of those featured in this catalogue. Visit our website for more information and the Moog facility nearest you.

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MSD Brochure