

SERVO DRIVE

MODULAR MULTI-AXIS SERVO DRIVE SYSTEM

MSD



The image shows a MOOG MSD servo drive system. It features a vertical panel with various ports and connectors. The panel is labeled with 'MOOG' and 'MSD'. The ports include: MMC X2, USB X2, LAN/EC X2, and DIGITAL I/O X4. The terminal block is labeled with the following connections:

REL	24	17	RS+
REL	23	16	RS-
ISDH	22	15	ENPO
ISOK	21	14	OSOC2
ISOI	20	13	OSOC1
ISOO4	19	12	OSOC0
ISOO3	18	11	ISA1-
ISOO2	17	10	ISA1+
ISOO1	16	9	ISAC-
ISOO0	15	8	ISAC+
+24V	14	7	

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DELIVERING ADVANCED MOTION CONTROL
AND FLEXIBILITY FOR CHALLENGING
INDUSTRIAL APPLICATIONS

A WHOLE NEW LEVEL OF MACHINE PERFORMANCE, PRECISION AND PROCESSING SPEED

Higher performance machines can mean a real advantage in productivity and profitability. The Moog Modular Multi-Axis Programmable Motion Control Servo Drive - also known as MSD - answers the call for a new generation of servo drives that provides the highest levels of dynamic response, smooth performance and application versatility. MSD includes modular servo drives powered by a common shared power supply and a motion controller to coordinate the motion across multiple axes.



MEETING YOUR TOUGHEST MACHINE CHALLENGES

MSD is designed to give machine builders the edge in solving some of the industries' toughest challenges in a wide array of industrial applications. Its user-friendly features, unsurpassed flexibility and high-performance design provide unique advantages including:

- ✓ Higher machine productivity From lowering cycle times in an injection molding machine, to increasing feed rates in a metal forming press, MSD delivers a significant increase in machine output.
- ✓ Improved machine precision More precise motion control results in higher accuracy, virtually no part variations and reduced scrap.
- ✓ Higher machine flexibility The modularity of the MSD coupled with the ability to tailor customer-specific solutions provides the perfect flexible platform for different machine types, putting them at the heart of today's leading-edge designs.

TOTAL FLEXIBILITY

The MSD is designed to work with a wide spectrum of servo motors - from synchronous and asynchronous to linear and torque motors - while ensuring optimal control. Likewise, its rapid commissioning and control optimization afford consistently high manufacturing quality.

The MSD is the ideal complement to Moog's wide array of high-performance servo motors that deliver dynamic performance, power density and reliability in various machine applications.

DESIGNED FOR HIGH-PERFORMANCE APPLICATIONS

Putting the MSD to work on your motion control tasks is simple when you consider the range of performance features this new servo drive offers:

Fast update rates for current, velocity and position control loops enable you to meet the toughest demands for machine precision.

High speed internal communication via EtherCAT allows for control and coordination across multiple axes.

Comprehensive software package with motion control functionality to suit your needs. The MSD supports IEC61131 programming as well as programming of custom control loops using MathWorks/C/C++. Thus enabling the creation of application-specific templates for deeper integration into your machines.

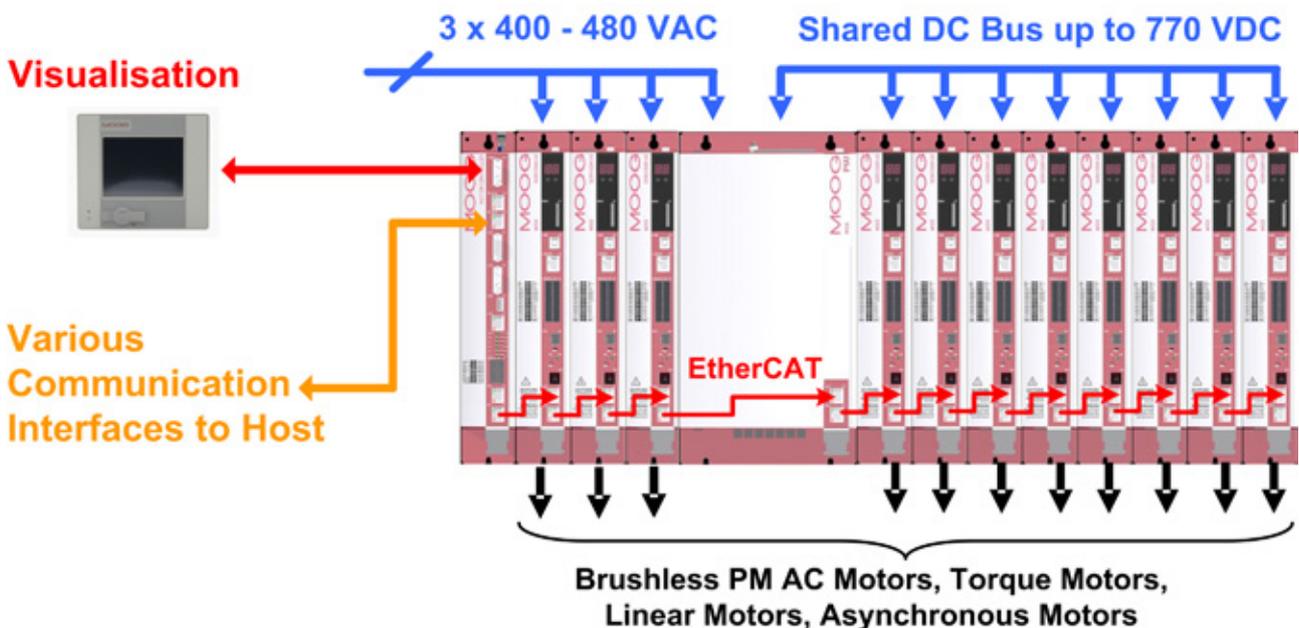
Support for multiple communications protocols via fieldbus connection (SERCOS, EtherCAT, CANopen, Profibus-DP and more) plus the ability to develop custom protocols.

Flexible performance secured by 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.

Safety is crucial - The MSD is designed to implement safety functions according to EN61508.

A size for every application - Servo drives from 4 to 170A_{rms} fan-cooled or even 250A_{rms} liquid-cooled with AC or DC infeed optional (i.e. with the classic AC_{mains} connection or a DC infeed with central infeed unit). This allows the MSD to be applied across a wide range of machine sizes.

Ease of use exemplified via user-friendly GUI for PC supported parameterization, data programming and firmware exchange via MMC card or USB stick. Your PC may be connected through USB locally, TCP/IP for remote access through factory Ethernet or even via Internet or modem.



TECHNICAL DATA

Motion Controller

- 32 bit, 400 MHz microprocessor
- 4 digital Input/Output (I/O) which can be configured as In- or Output
- Real Time Linux based operating system
- Standard communication via EtherCAT master and CAN bus
- Optional communication via Profibus-DP, EtherCAT slave, additional CAN bus
- Velocity and position loop control up to 30 axes

Active Regeneration Power Supply

- Two power sizes (P_{nom}/P_{max}): 50/94kW and 110/160kW with 10s overload capability
- Optimized solution for multi-axis systems with common DC-bus rails
- Cost savings through regeneration of excessive DC-bus energy to the three phase AC_{mains}
- Optimizes electric motor utilization through the DC-bus voltage boost and stabilization at up to 770 V (the AC_{mains} in range of 200 V to 480 V $\pm 10\%$, 50 Hz and 60 Hz)
- Deals in predictable manner with the AC_{mains} disturbances (blackouts, under/over-voltage, spikes, etc.)
- Is based on well mastered and proven advanced control techniques extended by reduction of the Total Harmonic Distortion (THD) and the power factor correction
- Works with the same fieldbusses as the servo drive

Servodrive

- Available in two dedicated hardware options, ready to run efficiently from the three phase AC_{mains} or from a DC_{supply}
- Control loop update rates (current 62.5 μs , velocity and position 125 μs)
- PWM frequency (4, 8, 12 and 16 kHz)
- Supports wide range of feedback devices: Resolver, EnDat2.1, EnDat2.2 with incremental signal, SinCos-Encoder, TTL-Encoder and SSI-Encoder interface
- Works with following fieldbusses: EtherCAT, CANopen, Profibus-DP, SERCOS II (SERCOS III and VARAN in preparation)
- Wide motor current range: 4 A_{rms} up to 170 A_{rms} , air or liquid cooled

DC Input

- Reduces system installation time and effort by use of prefabricated, short circuit protected, DC-bus common rails
- Improves efficiency of a storage process through the DC-bus energy sharing between axes
- Optimized for synchronised operation with an external common PSU (an active front-end/regenerative PSU, a standard diode rectifier or even an AC/AC servo drive with available DC-bus terminals)
- Wide DC-bus input voltage range: 24 V up to 770 V

	Size 1		Size 2		Size 3		Size 4		Size 5			Size 6		Size 6A	
Continuous current effective at 8 kHz PWM	4	6	8	12	16	20	24	32	45	60	72	90	110	143	170
Max. current effective for 10 s	8	12	16	24	32	40	48	64	90	120	144	180	165	215	220
Rated voltage	3 x 230 V, 3 x 400 V, 3 x 460 V or 3 x 480 V $\pm 10\%$														
Certification	CE, cUL														
Dimensions W x H x D	295 x 58.5 x 224 mm (11.6 x 2.3 x 8.8 in)		295 x 90 x 224 mm (11.6 x 3.5 x 8.8 in)		295 x 130 x 224 mm (11.6 x 5.1 x 8.8 in)		295 x 171 x 224 mm (11.6 x 6.7 x 8.8 in)		345 x 190 x 240 mm (13.6 x 7.5 x 9.5 in)			540 x 280 x 242 mm (21.3 x 11 x 9.5 in)		540 x 280 x 322 mm (21.3 x 11 x 12.7 in)	

MOOG GLOBAL SUPPORT

Moog Global Support is our promise to offer world-class Repair and Maintenance Services delivered expertly by our trained technicians. With the reliability only available from a leading manufacturer with facilities around the world, Moog offers you service and expertise you can count on to keep your equipment operating as it should.

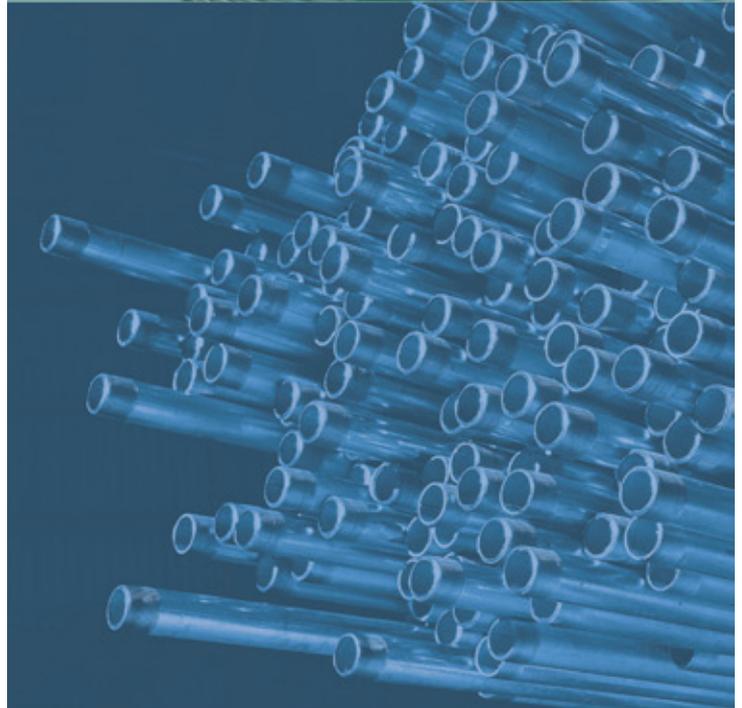
This promise offers many benefits to our customers including:

- Reduce your downtime by keeping critical machines running in peak performance
- Protect your investment by ensuring reliability, versatility and long-life of products
- Better plan your maintenance activities and make systematic upgrades
- Leverage our flexible programs to meet the unique service requirements of your facility

Look to Moog for global support including:

- Repair services using OEM parts are performed by trained technicians to the latest specifications
- Stock management of spare parts and products to prevent unplanned downtime
- Flexible programs, tailored to your needs such as upgrades, preventative maintenance and annual/multi-year contracts
- On-site services bring the expertise to you, providing quicker commissioning, set-up and diagnostics
- Access to reliable services that are guaranteed to offer consistent quality anywhere in the world

For more information on Moog Global Support visit www.moog.com/industrial/service.



TAKE A CLOSER LOOK.

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

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