SERVO AND MACHINE MOTION CONTROLLERS

EASY TO PROGRAM, FAST IMPLEMENTATION

HIGH PERFORMANCE DIGITAL MOTION CONTROL

WHAT MOVES YOUR WORLD
Higher performance machines can mean a real business advantage in your productivity and profitability. Moog offers a full range of high performance servo and machine motion controllers for both electric and hydraulic applications, built with 30 years experience, and adapted to meet even the most challenging environments.
MOOG MOTION CONTROLLERS AND SOFTWARE

EASY TO PROGRAM
Moog Axes Control Software (MACS), our own user-friendly programming tool based on Internationally recognised standard CoDeSys IEC 61131-3 and offers special function blocks for closed loop control.

HIGH PERFORMANCE
With means cycle times for closed-loop axis control as fast at 300 microseconds. Our Motion Controllers can cope with Complex Multi-axis motion control functions, whilst providing users with closed-loop control functions design by Moog experts.

RAPID IMPLEMENTATION
Achieved with industry standard digital interfaces which can interface to multiple products including Moog’s own servodrives, servovalves and pumps, and one easy-to-use software, saving you, time and money.

Controllers in this range are, Servo controllers (MSC I, MSC II), Ruggedized Motion Controllers (MSC-R) and MC 600 Machine Controller.

SERVO CONTROLLERS MSC AND MSC II
The MSC is our highly regarded freely programmable multi axis controllers, which can be programmed with IEC 61131 development environment based on CoDeSys IEC 61131-3 compliant programming system. They have integrated PLC functionality, fast and precise controls for position, speed and force. Because of its’ modular connectivity up to 7 additional modules can be connected to the E-Bus of the MSC via side connectors, ensuring further digital and/or analog inputs and outputs can be added as required.

<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
<th>MOOG SERVO CONTROLLER MSC</th>
<th>MOOG SERVO CONTROLLER MSC II</th>
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</thead>
<tbody>
<tr>
<td>Typical Applications</td>
<td>Closed-loop control of one or two hydraulic axes for analog only interfaces</td>
<td>Closed-loop control with or without profile generation of multiple electric or hydraulic axes</td>
</tr>
<tr>
<td>Processor</td>
<td>PowerPC Processor, 32 Bit, RISC architecture with floating point maths</td>
<td>PowerPC processor, 32 bit, RISC architecture with floating point unit</td>
</tr>
<tr>
<td>Memory</td>
<td>4 MB Flash EEPROM</td>
<td>128 MB RAM, 32 MB Flash EEPROM</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>8 x Digital I/O</td>
<td>4 x Digital I/O</td>
</tr>
<tr>
<td>Built in Analog I/O</td>
<td>8 x analog input, 2 x analog output, all with configurable range and 16 bit resolution</td>
<td>Use analog extension modules QA10 16/4 or QA10 2/2</td>
</tr>
<tr>
<td>Position Transducer Interfaces</td>
<td>2 x Configurable as SSI (Serial Synchronous Interface) or Incremental Encoder</td>
<td>4 x Configurable as SSI (Serial Synchronous Interface) or Incremental Encoder</td>
</tr>
<tr>
<td>Standard BUS interfaces</td>
<td>2 x CAN/CANopen, 2 x TIA/EIA 232, Ethernet, E-bus interface to extension modules</td>
<td>2 x CAN/CANopen, 1 x TIA/EIA 232, Ethernet, Interface to extension modules</td>
</tr>
<tr>
<td>USB</td>
<td>-</td>
<td>2 x USB 1.1 Host (to read/write memory sticks)</td>
</tr>
<tr>
<td>Optional bus interface</td>
<td>Profibus-DP slave</td>
<td>Profibus-DP slave, EtherCAT Master, EtherCAT slave</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>24 Volts</td>
<td></td>
</tr>
</tbody>
</table>
MOTION CONTROLLER
MSC-R

THE TOUGH AND MIGHTY CONTROLLER FOR HARSH ENVIRONMENTS

Sometimes you need a controller designed for high speed control in extreme environmental conditions, such as in Wind Turbines, Presses, Steel Production, Test and Simulation Systems, Chemical Industry and Robotics. The MSC-R is suitable for both electric and hydraulic motion systems, and can be mounted at the machine without the protection of an extra electronic cabinet. The MSC-R comes with the same high performance as our other controllers and is therefore an excellent choice for most high performance embedded control solutions. In addition to being freely programmable with international standard IEC 61131 CoDeSys development software, the MSC-R offers:

- Special housing with a high degree of protection (IP67) for use in wet and dirty environments
- High vibration resistance (30 g vibration, 50 g shock) for use in harsh environments
- Extended resistance against fluid contamination and corrosion
- Flexible communication through various fieldbuses
- Advanced computing power
- Integrated PLC functionality

<table>
<thead>
<tr>
<th>Standards</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment requirements and tests</td>
<td>IEC 61131-2</td>
</tr>
<tr>
<td>Electromagnetic compatibility/Interface Emission</td>
<td>EN 61000-6-4/EN 61000-6-2</td>
</tr>
<tr>
<td>Shock/vibration resistance</td>
<td>IEC 60068-2-27/IEC 60068-2-6</td>
</tr>
<tr>
<td>Insulation Strength</td>
<td>IEC 61131-2, test voltage 500 VDC</td>
</tr>
<tr>
<td>Resistance to Corrosion</td>
<td>EN ISO 9227 NSS Resistant to brake fluid, cooling liquid, [glysantin], cutting compound, defrost, diesel, drilling fluid, hydraulic oil (HLPD 32), Isopropanol 100%, machine cleaner, super fuel unleaded, synthetic motor oil, transmission fluid, Water.</td>
</tr>
<tr>
<td>Resistance to fluid contamination</td>
<td>EN ISO 2812-4, drip and blot method</td>
</tr>
<tr>
<td>Adhesiveness of surface coating</td>
<td>EN ISO 2409, cross-cut test</td>
</tr>
</tbody>
</table>

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>161 x 58 x 105 mm (6.3 x 2.3 x 4.1 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Power PC processor, 32 bit, RISC architecture with floating point unit</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-40 °C (-40 °F) to +70 °C (+158 °F)</td>
</tr>
<tr>
<td>Protection System</td>
<td>Ingress Protection IP67</td>
</tr>
<tr>
<td>Shock</td>
<td>50 g, 6 directions, 3 ms</td>
</tr>
<tr>
<td>Vibration</td>
<td>30 g, 3 axis, 10 Hz to 2 kHz, 10 sweeps</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Interface</td>
<td>CAN, Ethernet, EtherCAT Master, Profibus-DP Slave, USB, CAN/CANopen, Ethernet, USB</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>Two signals individually configurable as input or output. Output signal: Maximum 0.5 A, isolated</td>
</tr>
</tbody>
</table>
MACHINE CONTROLLER
MC SERIES 600

A COMPACT, MODULAR, PROGRAMMABLE DESIGN, OFFERING HIGHER PRECISION, MAXIMUM FLEXIBILITY AND FASTER CYCLE TIMES

MC 600. THE SMART CHOICE

If you are a machine builder or designer in today’s unpredictable economic climate, then you will know that the pressure to do “more with less” has never been stronger. Machines have to go faster. Your people need training quicker and application diagnostics need to be more powerful than ever to capture the wealth of machine information and use it to optimise operations performance.

Working with over 30 years of Moog’s know-how in precision closed loop control, and listening to the needs of machine builders the world over, Moog’s MC600 gives you more Machine Control and Power than ever before, but in a compact package that leads the way.

THE BIG HEARTED CONTROLLER WITH A MICRO SIZED FOOTPRINT

We might have increased the processing power of our MC600, but we’ve managed to do this in a space that is at the cutting edge of packaging technology. As a result, you are assured that whether you are retrofitting MC600 into an existing space, or designing into your new, low footprint control panel, MC600 gives you all the power you need, in a fraction of the space normally taken by a standard PLC and Motion controller. Finally, with a low thermal impact, this really is the most flexible controller for panel mounting.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>428 x 335 x 90 mm (16.85 x 13.1 x 3.5 in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Language</td>
<td>Programming is completed with the Moog Axis Control Software (MACs), an integrated development environment, based on Codeysys IEC 61131-3 compliant programming system.</td>
</tr>
<tr>
<td>Main CPU Modules</td>
<td>CPU: 400 MHz processor, 128 MB RAM</td>
</tr>
<tr>
<td>Auxiliary CPU Modules</td>
<td>CPU: 400 MHz processor, 128 MB RAM</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB RAM, 64 MB Flash EEPROM</td>
</tr>
<tr>
<td>Analog Input Modules</td>
<td>4 or 8 inputs; 16 bit resolution; 10 VDC at 10 mA</td>
</tr>
<tr>
<td>Analog Output Modules</td>
<td>4 or 8 outputs; ranges: +5 V, +10 V, +10.8V, ±5 V, ±10 V, ±10.8 V, 10 mA</td>
</tr>
<tr>
<td>Digital Input Modules</td>
<td>16 digital inputs (2 groups of 8); 0.5 A</td>
</tr>
<tr>
<td>Digital Output Modules</td>
<td>12 or 16 digital outputs at 24 VDC; source type: PNP; 2 A</td>
</tr>
<tr>
<td>Temperature Input Modules</td>
<td>Up to 8 Inputs</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>24 V</td>
</tr>
<tr>
<td>Standard BUS Interfaces</td>
<td>EtherCAT master, Ethernet, USB 2.0, serial port, remote bus master, LCD/keyboard (optional); connectors: license key, power supply</td>
</tr>
<tr>
<td>Human Machine Interfaces</td>
<td>PC-based HMI, PLC-operated HMI, Portable HMI</td>
</tr>
<tr>
<td>Optional bus interface</td>
<td>EtherCAT master, Ethernet, USB 2.0, serial port, remote bus IN/OUT; connectors: power supply</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-20 °C (-4 °F) to +70 °C (+158 °F, non condensing)</td>
</tr>
</tbody>
</table>
MOTION CONTROLLER
MSD

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).

The MSD Motion Controller is based on a 32-bit, 400 MHz microprocessor. The Motion Controller co-ordinates and synchronizes axes, and communicates with host computers and other PLCs via multiple fieldbus protocols. With its PLC functionality, it can itself control processes of the machine or parts of it.

It is designed to close velocity and position loops for up to 30 axes. Additionally, it is able to control input and visualization devices. It supports various communication protocols such as EtherCAT, CANopen and PROFIBUS DP to any host controller.

- 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 parameterized via MACs software
- Real Time Linux based Operating system
- CoDeSys Operating architectures
- Integrated PLC functionality
- Simple wiring with terminal strips
- Low maintenance design.
- Sustained short circuit protection for digital outputs.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Processor</th>
<th>Power PC processor, 32 bit, RISC architecture with floating point unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>128 MB RAM, 32 MB Flash EEPROM; data maintenance typically 10 years</td>
</tr>
<tr>
<td>Voltage supply of module electronics</td>
<td>24 V DC (18 – 36 V DC) SELV pursuant to DIN EN 60950-1</td>
</tr>
<tr>
<td>Standard BUS Interfaces</td>
<td>Ethernet, EtherCAT/, CAN Interfaces, USB 1.1</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>4 x Digital I/O</td>
</tr>
<tr>
<td>Optional Interface</td>
<td>PROFIBUS DP Slave</td>
</tr>
</tbody>
</table>
In addition to our range of motion and machine controllers, we offer a range of high performance test controllers, incorporating advanced safety checks to ensure your test article and test data are always protected. Our test controllers can be found in all types of applications from aerospace, automotive to general durability and fatigue testing, vibration and performance evaluation in applications such as wind turbine blades, providing a solution for both basic and complex applications.

Our test controllers have been designed based on input from our customers based in leading test laboratories around the world, making them the ideal choice simple, efficient operation of an array of testing functions. We provide controller reliability globally with well over 5,000 control channels currently installed.

Our Portable Test Controller offers unsurpassed flexibility for user-friendly, cost-effective operation in a range of testing applications and incorporates our unique control loop channel to handle general purpose tests of up to 4 servo control channels, with or without a pc. Its operator flexibility, high-performance handling of complex testing formulas and ability to run without offline external software, making indispensible tool for automotive and aerospace testing labs.

Armed with up to 32 Servo Channels this controller provides high –performance operation for both basic and complex applications such as 4 to 8 poster test systems, 6 Degree of Freedom (DOF) suspension rigs and simulation tables, for durability and fatigue testing, Vibration and performance evaluation and for multi-axis test rigs.

This test controller can handle up to 500 servo channels and has a loop update rate of 2,500 Hz for ultimate response and higher if required, and can be used to provide static and fatigue testing ranging from complete aircraft such as airframe to sub assemblies and components.
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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