DS2000XP-Power Generation
High Performance Servodrives

Customizable Integrated Axis Motion Control for Brushless Servomotors and Actuators within the Power Generation Industry
OVERVIEW

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HALF A CENTURY OF EXCELLENCE IN MOTION CONTROL

Moog has provided superior motion control solutions for the industrial marketplace for over 50 years. A leading designer and manufacturer of electric control products for over 20 years, Moog Electro-Mechanical Actuators, Servomotors, and Servodrives are known for reliability and accurate control. The Servodrive product line is a proven option for customers that need high dynamic performance and control accuracy. Moog Servodrives are user-friendly for easy installation and maintenance, and reliable for use in heavy-duty applications.

THE DS2000XP-POWER GENERATION SERVODRIVE CONTROL SOLUTION

The DS2000XP-Power Generation Servodrive is a self-contained, fully digital stand-alone motion control drive for control of brushless servomotors and actuators in high performance closed-loop applications. It is specially designed for the power generation industry.

This Servodrive has a high performance 32-bit floating-point Motorola MPC555 RISC CPU on board to provide strong embedded real-time motion control capability. This servodrive has a unique cold plate heat dissipation design, which allows the servodrive to be installed into an explosion-proof enclosure and mounted in a high ambient temperature hazardous environment. The maximum ambient temperature could be as high as 60°C (140°F).

The DS2000XP-Power Generation Servodrive accepts a wider range of AC or DC power supply. The bus voltage could be from 60 Vdc to 300 Vdc. No auxiliary power supply is needed. A 3000 uF internal capacitor helps maintain a stable bus voltage.

The DS2000XP-Power Generation Servodrive can operate a broad range of brushless servomotors and Electro-Mechanical Actuators with resolver or encoder feedback devices. An easy access terminal strip is provided to give a quick and reliable connection to customer’s host controller.
FEATURES AND BENEFITS

THE MOOG DS2000XP-POWER GENERATION SERVODRIVE DESIGN

The DS2000XP-Power Generation Servodrive has flexible motion control capabilities, very high performance, high resolution, absolute position feedback and built-in motion template for ease of use. It is highly customizable. This high performance servodrive is ideal on applications that require high bandwidth and very smooth motion. The DS2000XP-Power Generation features axis motion control, flexible control architecture, easy to use motion template for Electro-Mechanical Actuators and very high performance SERCOS interfaces.

• ADVANCED CONTROL DESIGN
The DS2000XP-Power Generation Servodrive has a state-of-the-art control design. The typical three-loops basic control algorithm provides excellent torque, speed and position loop closure. In addition, Application Engineers can use the widely recognized industrial simulation and control software Simulink™/Stateflow™ (Mathworks Co.) to generate sophisticated application control model and motion sequences. These sequences are developed, tested and debugged offline on a PC. The working model is then automatically converted to real-time code and downloaded to the DS2000XP-Power Generation Servodrive. This allows for added convenience, more uptime and rapid prototyping of advanced control algorithms.

• FLEXIBLE CONTROL MODEL TEMPLATE
Moog has developed model-based control templates to meet specific customer and market needs. Application parameters such as stroke length, homing method, motion limits and motion profile are used to customize a template to a specific application requirement. Some of the available template features are:
- Closed-loop position and velocity control loops up to 5KHz sampling rate
- Real-time trajectory control of position, velocity and acceleration limits
- Acceleration limiting
- Home sequencing with stroke limit verification
- Emergency stop sequencing
- IT current motor torque limiting
- Position following error detection
- Digital I/O handling
- Common units for application definition (ex: inches, mm, rpm, volts)
- Application input error checking (range, polarity)
- Special control functions

• GRAPHICAL USER INTERFACE (GUI)
A Windows-based GUI is available to help customer access the DS2000XP-Power Generation Servodrive over the RS232 port. GUI functions include:
- Control model downloading
- System configuration parameters downloading and uploading
- Application parameters downloading and uploading
- System tuning and diagnostics
- Servodrive status and fault status monitoring
- Graphical display of data logged variables

• DIAGNOSTICS AND TUNING
The local LCD display on the servodrive provides basic servodrive status and possible fault occurrence. It has the following functions:
- Motor automatic phasing
- Error detecting
- Basic parameter access and monitoring

• FIELDBUS
High-speed serial bus interfaces provide a fully digital link for receiving motion commands, providing feedback of status and initializing controller parameters.
TECHNICAL DATA

PERFORMANCE SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
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<tbody>
<tr>
<td>Bus Voltage Range</td>
<td>60 Vdc to 300 Vdc</td>
</tr>
<tr>
<td>Auxiliary Power Supply</td>
<td>24 Vdc (optional)</td>
</tr>
<tr>
<td>Internal Capacitor</td>
<td>3000 µF</td>
</tr>
<tr>
<td>Internal Brake Resistor</td>
<td>20 Ohm/50 W (external brake resistor 33 Ohm/250 W optional)</td>
</tr>
<tr>
<td>PWM Frequency</td>
<td>10 kHz</td>
</tr>
<tr>
<td>Continuous Peak Output Current</td>
<td>14A to 42A (see chart below)</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL DATA

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Specification</th>
</tr>
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<tbody>
<tr>
<td>Operating Ambient Temperature</td>
<td>0 to 60°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-10 to +70°C</td>
</tr>
<tr>
<td>Thermal Protection</td>
<td>70°C to de-rating the drive</td>
</tr>
</tbody>
</table>

I/O INTERFACES

- 2 analog inputs 0-20 mA current, 14 bit DAC (0-10 V optional)
- 2 analog outputs 0-20 mA current, 14 bit DAC (0-10 V optional)
- 2 basic monitoring output (1 velocity, 1 programmable)
- 5 digital input, isolated 24 Vdc
- 3 digital output, isolated 24 Vdc
- 1 relay output (COM, NO, NC)
- 1 simulation encoder output

FIELDBUS

- CANopen; SERCOS; RS485 - Modbus

MOTOR POLE RANGE

- 2 to 24 poles

SINUSOIDAL ENCODER RANGE

- up to 24-bit resolution

<table>
<thead>
<tr>
<th>Model Code</th>
<th>Output Currents</th>
</tr>
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<tbody>
<tr>
<td>Code</td>
<td>Nominal (Arms)</td>
</tr>
<tr>
<td>G366-X 014</td>
<td>14</td>
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</table>

Customized models are also available with different rating.

Note: Please refer to ordering code on page 7 for complete order numbers.
FUNCTIONAL BLOCK DIAGRAM FOR TEMPLATE CONTROL SYSTEM

HOST INTERFACE

STATE MACHINE SEQUENCE CONTROLLER

- CAN i Discrete Control / Status
- CAN or Analog Command
- Command Selection
- Trajectory Control
- Position Command Endpoint Limiting / Velocity Limiting
- Home Sequence Position Command
- Home Command Generator / Control
- Actual Position Output Control
- Actual Position Feedback Control
- Delta Position
- System Absolute Position
- Encoder Absolute Position
- Stegmann Sine-Cos Position Encoder or Resolver
- Velocity Feedforward
- Position Loop Compensator / Velocity Limiter
- Torque Limit
- Current Loop / Power Control
- Torque Demand

Current Limit
Current Demand
DS2000XP-POWER GENERATION CONNECTORS AND DESCRIPTION

J1 RS232 Communication
J2 Servodrive Enable and monitoring
J4 Motor Encoder feedback
J5 Motor Resolver feedback
J6 Digital Input
J7 Digital Output
J9 Sin/Cos Encoder feedback (optional)
J10 CAN in (or SERCOS/FireWire)
J11 CAN out (or SERCOS/FireWire)

POWER AC or DC power supply and motor connection

TERMINALS
Wiring interface to user’s host controller.
*Internal cables from terminals to J1 to POWER connectors are not shown. Internal cables are subject to change per different applications.

DIMENSIONS

5.75 [145.96]
Ø .312 [7.92]
8.60 [218.44]
12.60 [320.04]
11.81 [299.92]
7.88 [200.23]
### ORDERING INFORMATION

**Model Series Designator**
- G366

**Current Model Design Status**
- Letter: E (Prototype)
- - (Standard)

**Drive Current Rating**
- No. 014, Power Stage Rating (Acont/Apk): 14/42

**Drive Control Stage**

<table>
<thead>
<tr>
<th>No.</th>
<th>Control Stage Part Number</th>
<th>Control Stage Description</th>
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</thead>
<tbody>
<tr>
<td>111</td>
<td>C27345-111</td>
<td>SERCOS Communications ±10 V Analog I/O</td>
</tr>
<tr>
<td>122</td>
<td>C27345-122</td>
<td>SERCOS Communications 0-20 mA Analog I/O</td>
</tr>
<tr>
<td>133</td>
<td>C27345-133</td>
<td>SERCOS Communications ±10 V &amp; 0-20 mA Analog I/O</td>
</tr>
<tr>
<td>211</td>
<td>C27345-211</td>
<td>CANopen Communications ±10 V Analog I/O</td>
</tr>
<tr>
<td>222</td>
<td>C27345-222</td>
<td>CANopen Communications 0-20 mA Analog I/O</td>
</tr>
<tr>
<td>233</td>
<td>C27345-233</td>
<td>CANopen Communications ±10 V &amp; 0-20 mA Analog I/O</td>
</tr>
</tbody>
</table>

**Current Hardware Revision**
- Letter: A

**Customer Identifier**

<table>
<thead>
<tr>
<th>No.</th>
<th>Customer software version and revision</th>
</tr>
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<tbody>
<tr>
<td>000</td>
<td>Generic customer configuration</td>
</tr>
<tr>
<td>0XX</td>
<td>Specific customer configuration</td>
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