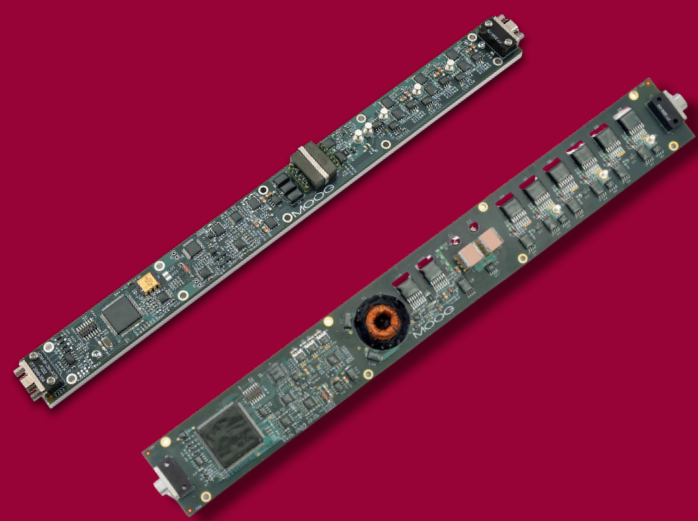


# DOWNHOLE MOTOR CONTROLLERS

Ruggedized design built to reliably operate in the most extreme environments



## HIGH PERFORMANCE MOTOR CONTROLLERS IN A COMPACT PACKAGE

Moog is a leader in motion control technology and has provided innovative products and solutions for a wide range of industries for more than 65 years, including 35 years serving the oil & gas industry. We meet our customers' needs through ruggedized products and by delivering fast, responsive global support.

The Moog Downhole Motor Controllers are designed for high performance, high temperature environments such as downhole drilling which demand exceptionally narrow package diameters. The single axis controller is a closed loop control solution for velocity and position control that complements our Downhole Brushless Servo Motors and Servo Actuators. A low current draw in standby mode maximizes operating time in battery powered applications.

For a complete solution, the software and graphical user interface (GUI) are engineered to expedite the design and test of your product while providing the flexibility to support your application specific requirements. Diagnostic data, accessible via the RS485 serial interface, enables health/life monitoring based on time and temperature in operation.

Features	Benefits
Single PCB design combines both control and power electronics	Lowers cost and footprint by eliminating board to board connectors
Optimized design for high temperature extreme environments	Reliable operation at high temperature for 1000 hrs and avoidance of unexpected equipment failure
Sinusoidal field-oriented control with Resolver feedback	High efficiency, smooth torque control and extended motor speed capability
Six Step Commutation with Hall sensor feedback (optional model)	Support for BLDC motors with hall sensors
Easy to use GUI with built in oscilloscope data logger	Simplified commissioning and troubleshooting of drive system
Compact packaging	Fits in compact diameter downhole tools

## ADVANTAGES

- Tested with Moog downhole motors and actuators to provide a complete motion control solution
- User friendly GUI tools:
  - Data Logging & Oscilloscope up to 4 channels
  - Editable Parameter Database
  - Status and Fault Indication
  - Function Generator
  - Event Logger

## APPLICATIONS

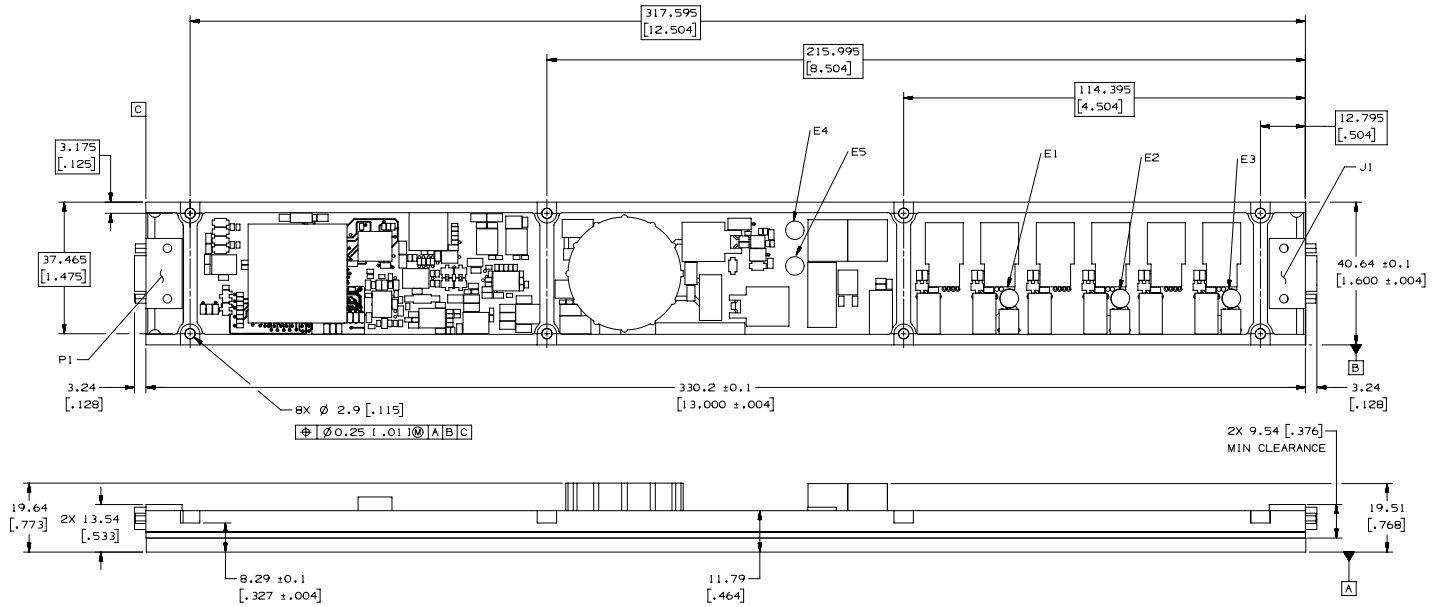
- MWD/LWD
- Rotary Steerable Tools
- Completion Tools
- Tractor Tools
- Pump Applications/Control
- Formation Testing

## MOOG GLOBAL SUPPORT

Moog Global Support is our promise to offer world-class Repair and Maintenance Services with the reliability only available from a leading manufacturer with facilities around the world. Count on Moog to keep your equipment operating as it should.



# SPECIFICATIONS FOR HIGH VOLTAGE CONTROLLER



Designed for high power operation of up to 8kW (continuous), the High Voltage Controller is a robust design ideal for variety of applications ranging from precise motion control (MWD valve positioning) to constant speed operations (hydraulic systems, sidewall coring bit control).

<b>Electrical Connections</b>	
Command Input / Motor Feedback	9 pin Micro MDM connector / 9 pin Micro MDM connector
DC Power Input / Motor Phase Output	Flying Leads / Flying Leadsfo

<b>ELECTRICAL RATINGS</b>	
<b>Bus Voltage Min / Max</b>	100/650 VDC
<b>Motor Phase Current Continuous / Peak</b>	10 Amp (Sine rms) / 20 Amp (Sine rms, 2 sec limit)

<b>INTERFACE</b>	
<b>Serial Protocol/Hardware Interface (GUI/Paramater/Diagnostics)</b>	DMC TRU/RS485-57.6 Kbits/s
<b>Analog Input (Velocity, Current or Position)</b>	0-5V, internal function generator, application specific motion profile (option)
<b>Digital Inputs (2) (Enable, Run default functions)</b>	5V Logic compatible, configurable function
<b>Digital Outputs (2) (Ready, Fauly default functions)</b>	5V Logic compatible active pull up, configurable function

<b>CONTROL</b>	
<b>Motor Control Architecture</b>	Field Orientated Control/6-step Control (120 deg)
<b>Resolver Excitation Voltage/Current</b>	7.2Vpp @ 11kHz/20mA
<b>Resolver Feedback Transformation Ratio</b>	0.5

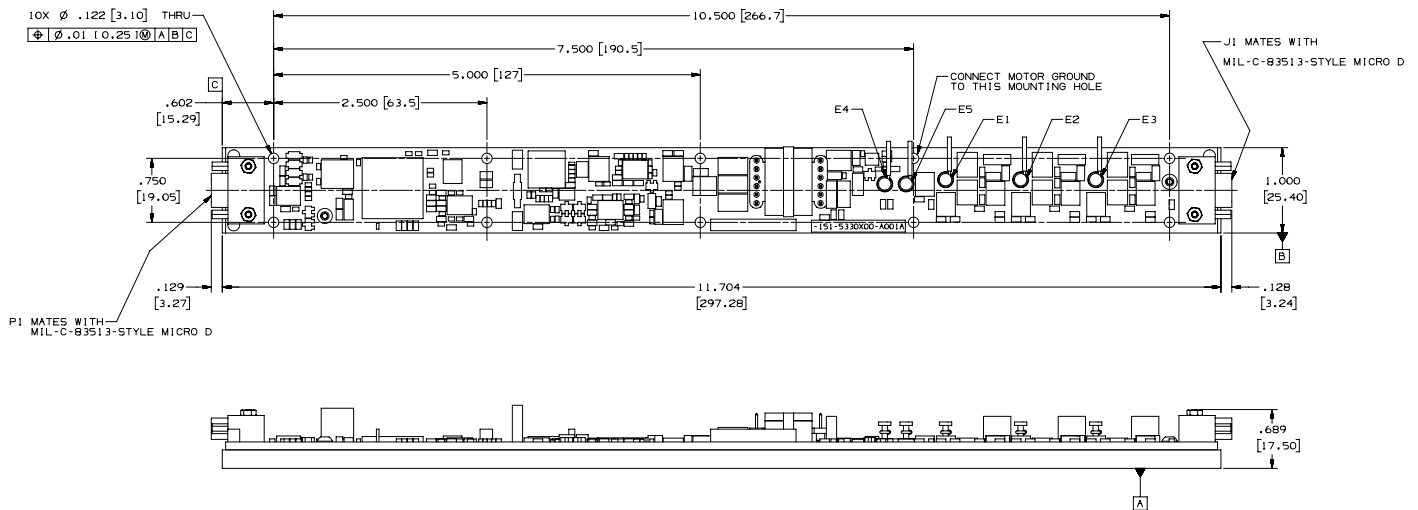
  

<b>DIAGNOSTICS AND FAULT CONTROL</b>	
<b>Controller Temperature Protection</b>	Configurable as Monitor only or Fault Trip
<b>Motor Temperature Protection</b>	RTD Input, configurable as Monitor only or Fault Trip
<b>Current Protection</b>	Motor Stall Detection, Motor Phase Current Limit, Short Circuit Overcurrent Trip
<b>Bus Overvoltage Trip</b>	Programmable (non-latching)
<b>Bus Undervoltage Inhibit</b>	80V
<b>Motor Overspeed Protection</b>	Programmable Overspeed Trip Point

<b>ENVIRONMENT</b>	
<b>Operating Temperature</b>	1000 hours @ 175° C
<b>Shock</b>	250G, 1ms ½ sine wave all three axes
<b>Vibration</b>	20G rms Random, 50-500Hz all three axes

# SPECIFICATIONS FOR LOW VOLTAGE CONTROLLER



The Low Voltage Controller is a robust and versatile controller that enables operation of both PMSM and BLDC motors for downhole applications. Controller is factory configurable to receive resolver and Hall Effect Detector (HED) feedback to optimize application demands.

Electrical Connections	
Command Input / Motor Feedback	9 pin Micro MDM connector / 9 pin Micro MDM connector
DC Power Input / Motor Phase Output	Flying Leads / Flying Leads

ELECTRICAL RATINGS	
Bus Voltage Min / Max	16 / 60 VDC - 28 VDC Nominal
Motor Phase Current Continuous / Peak	3 Amp (Sine rms) / 4 Amp (Sine rms, 2 sec limit)

INTERFACE	
Serial Protocol / Hardware Interface (GUI/Parameter/Diagnostics)	DMC RTU/RS485 - 57.6 Kbits/s
Analog Input (Velocity, Current or Position)	0-5V, internal function generator, application specific motion profile (option)
Digital Inputs (2)	5V Logic compatible, configurable function
Digital Outputs (2)	5V Logic compatible Active pullup, configurable function

CONTROL	
Motor Control Architecture	Field Oriented Control/6-Step Control (120°)
Resolver Excitation Voltage/Current	7.2Vpp @ 11kHz / 20mA
Resolver Feedback Transformation Ratio	0.5
Hall Sensor Excitation Voltage/Current	5V / 50mA

DIAGNOSTICS AND FAULT CONTROL	
Controller Temperature Protection	Configurable as Monitor only or Fault Trip
Motor Temperature Protection	RTD Input, configurable as Monitor only or Fault Trip
Current Protection	Motor Stall Detection, Motor Phase Current Limit, Short Circuit Overcurrent Trip
Bus Overvoltage Trip	Programmable Trip up to 65V non-latching
Bus Undervoltage Inhibit	16V
Motor Overspeed Protection	Programmable Overspeed Trip Point

ENVIRONMENT	
Operating Temperature	1000 hours @ 175° C
Shock	250G, 1ms ½ sine wave all three axes
Vibration	20G rms Random, 50-500Hz all three axes

# TAKE A CLOSER LOOK.

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

Australia  
+61 3 9561 6044  
Service + 61 3 8545 2140  
info.australia@moog.com  
service.australia@moog.com

Brazil  
+55 11 3572 0400  
info.brazil@moog.com  
service.brazil@moog.com

Canada  
+1 716 652 2000  
info.canada@moog.com

China  
+86 21 2893 1600  
Service +86 21 2893 1626  
info.china@moog.com  
service.china@moog.com

France  
+33 1 4560 7000  
Service +33 1 4560 7015  
info.france@moog.com  
service.france@moog.com

Germany  
+49 7031 622 0  
Service +49 7031 622 197  
info.germany@moog.com  
service.germany@moog.com

Hong Kong  
+852 2 635 3200  
info.hongkong@moog.com

India  
+91 80 4057 6666  
Service +91 80 4057 6604  
info.india@moog.com  
service.india@moog.com

Ireland  
+353 21 451 9000  
info.ireland@moog.com

Italy  
+39 0332 421 111  
Service 800 815 692  
info.italy@moog.com  
service.italy@moog.com

Japan  
+81 46 355 3767  
info.japan@moog.com  
service.japan@moog.com

Korea  
+82 31 764 6711  
info.korea@moog.com  
service.korea@moog.com

Luxembourg  
+352 40 46 401  
info.luxembourg@moog.com

The Netherlands  
+31 252 462 000  
info.thenetherlands@moog.com  
service.netherlands@moog.com

Singapore  
+65 677 36238  
Service +65 651 37889  
info.singapore@moog.com  
service.singapore@moog.com

South Africa  
+27 12 653 6768  
info.southafrica@moog.com

Spain  
+34 902 133 240  
info.spain@moog.com

Sweden  
+46 31 680 060  
info.sweden@moog.com

Turkey  
+90 216 663 6020  
info.turkey@moog.com

United Kingdom  
+44 (0) 1684 858000  
Service +44 (0) 1684 278369  
info.uk@moog.com  
service.uk@moog.com

USA  
+1 716 652 2000  
info.usa@moog.com  
service.usa@moog.com

For product information, visit [www.moog.com/industrial](http://www.moog.com/industrial)  
For service information, visit [www.moogglobalsupport.com](http://www.moogglobalsupport.com)

Moog is a registered trademark of Moog Inc. and its subsidiaries.  
All trademarks as indicated herein are the property of Moog Inc. and its subsidiaries.  
©2021 Moog Inc. All rights reserved. All changes are reserved.

Downhole Motor Controllers  
STS/Rev. B, April 2024, CDL27378-en