

ZEUS

Motor/Generator Controller

Rugged, 600 VDC, 180 Amps



This high power servo controller can drive motors and can act as a **generator controller**. The Zeus incorporates a **Silicon Carbide (SiC) power stage**, offers several feedback options, and is packaged in a **military-grade submersible case**. This versatile controller is ideal for high power aircraft systems where size and weight are at a premium. It is a great fit in **specialized military and industrial applications** that require **operating at high temperatures, in high vibration, or other extreme environmental conditions**.

Features:

- MIL-STD-461 EMI Filter
- 600VDC per MIL-PRF-GCS600A
- 180A Maximum Continuous Output Current
- 100 kW DC Power
- Multiple Feedbacks Supported:
 - BiSS-C (Unidirectional)
 - Quadrature Encoder
 - Resolver
 - Hall
 - Sensorless
- Maximum Motor Speed: 75,000 RPM
- Torque, Velocity, or Position control
- Brake drivers
- Active Inrush Limiter
- Includes configurable, user-friendly GUI with enhanced data collection capability and integrated oscilloscope feature
- Shock/Vibration per MIL-STD-810G:
 - Random Vibration 514.7 Category: 16.3 Grms, 15 – 2,000 Hz (0.20 g²/Hz)
 - Shock 516.7 Procedure 1: 40G Terminal Peak Sawtooth, 11ms
- 28V Electrical power characteristics: MIL-STD-704F
- Optional Software design assurance: DO-178C
- IP67 Compliant

Customization Available

ESI Motion has the expertise to customize a solution for your project's needs. Contact us today at sales@esimotion.com to see how we can tailor a solution for you.

Specifications:

- Operating Case and Coolant Temperature: -40 to 71°C
- Weight: 11.4 kg (25 lbs.)
- Size: 243 x 250 x 129 mm (9.56" L x 9.86" W x 5.08"H)
- Efficiency: >97% (full load)

Compliance:

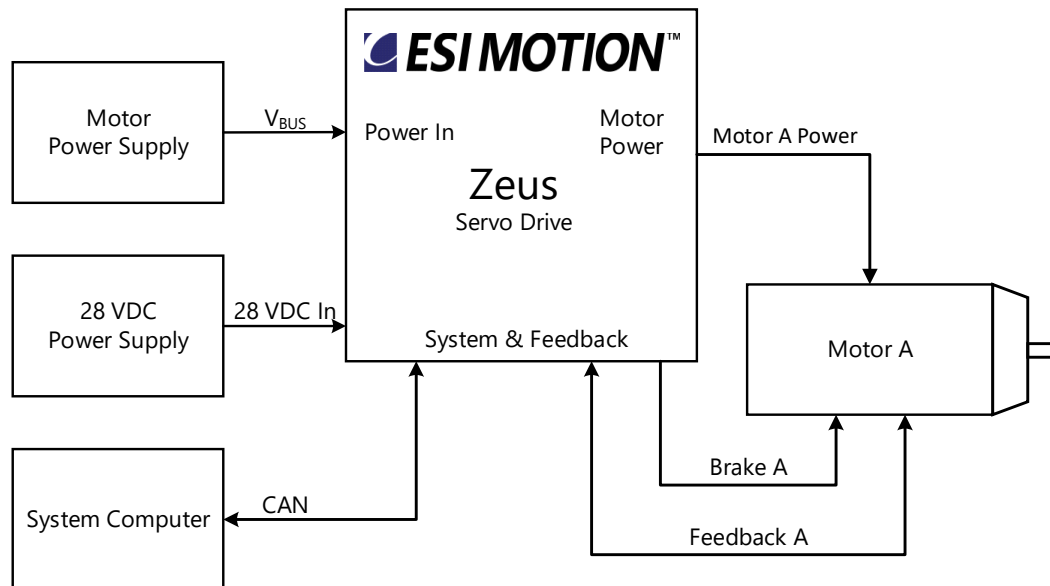
- Electromagnetic interference per MIL-STD-461*:

○ CE102	○ CS116
○ CS101	○ RE101
○ CS114	○ RE102
○ CS115	○ RS103

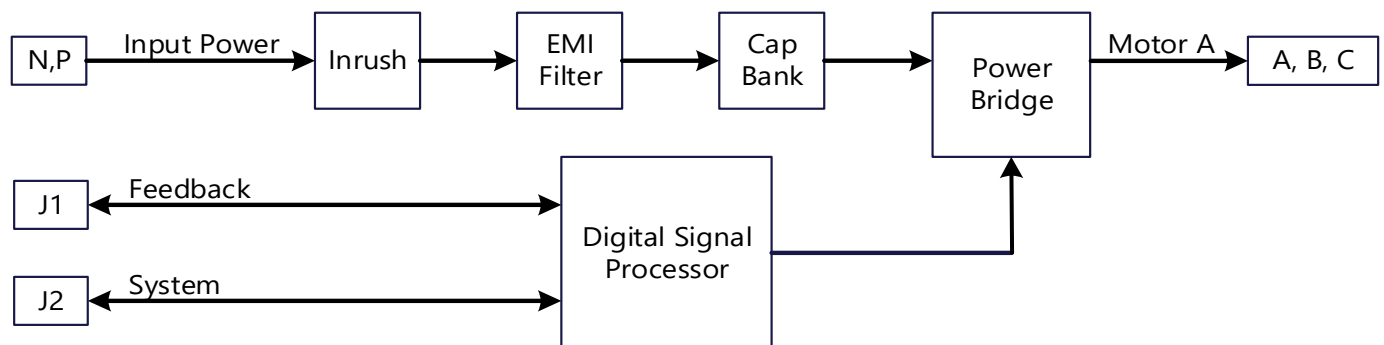
*The EMI features on ESI's Zeus drive are sold AS-IS, without warranty. EMI compliance is a complex requirement involving the controller, cabling, and the motor. All parts in the system will require special consideration in order to fully comply with EMI features. Due to this complexity, ESI does not warrant system level EMI compliance.

ESI offers EMI certification services. Certification services can be customized to your needs and typically include a system EMI review, formal compliance testing, and a compliance report. Please contact ESI for details on how to get your system certified to MIL-STD-461.

Typical Zeus Application:



Zeus Block Diagram:



Electrical Specifications

Absolute Maximum Values

The values in the table below should never be exceeded as permanent damage to the controller may result.

PARAMETER		ABSOLUTE MAXIMUM	UNIT
V_BUS (Motor Power), 600V model		900	VDC
28VDC_IN (Logic Power)		50	V
±10 Volt Analog Inputs		±22	V
±5 Volt Analog Inputs (Resolver Inputs)		±22	V
Single Ended Analog Input		±22	V
Open Collector Inputs (Hall Inputs)		±22	V
CAN SIGNALS	Differential (CAN+ – CAN-)	±27	V
	Common-Mode	±27	V
Isolated CAN SIGNALS	Differential (CAN+ – CAN-)	±27	V
	Common-Mode	±250	V
RS-422 Inputs		±14	V
Differential Digital Inputs (Encoder and BiSS-C Inputs)	Differential (Assumes 50% Duty Cycle)	7.6	V
	Common-Mode	±7.0	V
Digital Input		+4.6	V
Temperature Input		-3 to +6	V
Operating case temperature		-40 to +71	°C
Storage Temperature		-55 to +100	°C

Recommended Operating Conditions

Motor Power DC Input Characteristics – 600 VDC Model				
PARAMETER	MIN	NOM	MAX	UNIT
V_BUS (Motor Power)	50	600	725	VDC
V_BUS (Motor Power) Input Current			180	Amps
Input Power		108	130.5	kW
Internal Bus Capacitance		375		µF
Chassis Capacitance (Common Mode)		TBD		µF

Notes:

28 Volt Logic DC Input Characteristics

PARAMETER	MIN	NOM	MAX	UNIT
28VDC_IN Operating Voltage	22	28	36	VDC
28VDC_IN Operating Current w/o Brakes			0.75	A
28VDC_IN Operating Current			4.25	A

Notes: N/A

Motor Power Output Characteristics

PARAMETER (Per Axis)	Continuous	Peak ⁽²⁾	Units
Output current, 180A Model ⁽¹⁾	180	180	Amps Peak-of-Sin

Notes:

- Output power may be limited by the maximum input current
- This drive is not rated for peak power.

I/O Characteristics

PARAMETER	MIN	NOM	MAX	UNIT
±10 Volt Analog Inputs ANALOG_IN_1, ANALOG_IN_2				
Input Range	-10		+10	V
Common Mode Input Range	-8.0	0	+10.0	V
Impedance		20.0		KΩ
Input Bandwidth		100		kHz
Analog Output ANALOG_OUT_1, ANALOG_OUT_2				
Output Range	-3		+3	V
Analog Output Impedance		50		Ω
Update Rate		2X		PWM Frequency
Brake BRAKE+MA, BRAKE-MA				
Output Voltage		98%		Percent of 28VDC_IN
Output Current Limit	1.3	1.4	1.5	Amps
CAN Signals CAN+, CAN-, ISO_CAN+, ISO_CAN-				
Voltage Levels	Compliant to ISO 11898-2			
Standard Bit Rates	100, 250, 500, and 1,000			Kbps
Encoder, Hall, BiSS-C, and Auxiliary Equipment Power Signals 5VDC_OUT, SIGNAL_GND				
Output Voltage	4.75	5.0	5.25	Volts
Output Current (Total for all 5VDC_OUT connections)			500	mA

I/O Characteristics				
PARAMETER	MIN	NOM	MAX	UNIT
Encoder and BiSS-C Signals A+MA, A-MA, B+MA, B-MA, I+MA, I-MA				
Voltage Levels	Compliant to EIA-422-B			
Differential Input Impedance		120		Ohms
Input Frequency			25	MHz
Encoder Power 5VDC_OUT				
Output Voltage	4.75	5.0	5.25	VDC
Output Current		500		mA
Interlock INTERLOCK+MA, INTERLOCK-MA				
Interlock Short Resistance	0		1 K	Ohm
Interlock Open Resistance	1 Meg			Ohm
Motor Temperature MOTOR_TEMP+, MOTOR_TEMP-				
Thermistor Resistance at 25°C	1	5	10	KΩ
Recommended Thermistor	TDK/Epcos PN B57861S0502F040			
Excitation Voltage		3.0		V
Excitation Impedance		2.0		kOhm
Input Bandwidth		1.6		kHz
Open Collector Inputs (Hall Inputs) HALL_A_MA, HALL_B_MA, HALL_C_MA, HALL_A_MB, HALL_B_MB, HALL_C_MB Alternate Function Name DIGITAL_IN_1, DIGITAL_IN_2, DIGITAL_IN_3, DIGITAL_IN_4, DIGITAL_IN_5, DIGITAL_IN_6,				
Input Voltage	0		10	V
Internal Pull Up Voltage	4.5	5.0	5.5	V
Internal Pull Up Impedance		1.0		kOhm
Logic High Voltage		1.95		V
Logic Low Voltage		1.07		V
Input Hysteresis		0.88		V
Resolver Excitation EXE+MA, EXE-MA, EXE+MB, EXE-MB				
Output Voltage	3.8	4	4.2	V _{RMS}
Resolver Excitation Output Frequency ⁽¹⁾		5.0		kHz
Resolver SIN, COS (ANALOG_IN_3 – ANALOG_IN_6) SIN+MA, SIN-MA, COS+MA, COS-MA, SIN+MB, SIN-MB, COS+MB, COS-MB Alternate Function Name ANALOG_IN_3+, ANALOG_IN_3-, ANALOG_IN_4+, ANALOG_IN_4- ANALOG_IN_5+, ANALOG_IN_5-, ANALOG_IN_6+,				

I/O Characteristics				
PARAMETER	MIN	NOM	MAX	UNIT
ANALOG_IN_6-				
Differential Range	2		4.2	V _{RMS}
Differential Impedance		20		KΩ
Input Bandwidth		70		kHz
RS422 Signals RS422_TX, RS422_RX				
Voltage Levels	Compliant to EIA-422-B			
Standard Bit Rates	115.2, 230.4, 460.8, 1000			Kbps
Thermal Information				
Maximum Case Temperature			71	°C
Coolant Temperature			71	°C
Coolant Rate	8	12	16	LMP
Pressure Drop		<5		PSI
Port Used	Parker Hannifin 685HB-8-8 (1/2 in)			

Notes:

1. Default resolver frequency is 5 kHz (contact ESI for custom frequencies)

Mechanical Characteristics & Connectors

Mechanical Characteristics			
PARAMETER		Value	UNIT
Weight	Liquid-Cooled Zeus	11.4 (25)	Kg (lbs.)
Size	Liquid-Cooled Zeus	243 x 250 x 129 mm	mm

Notes:
N/A

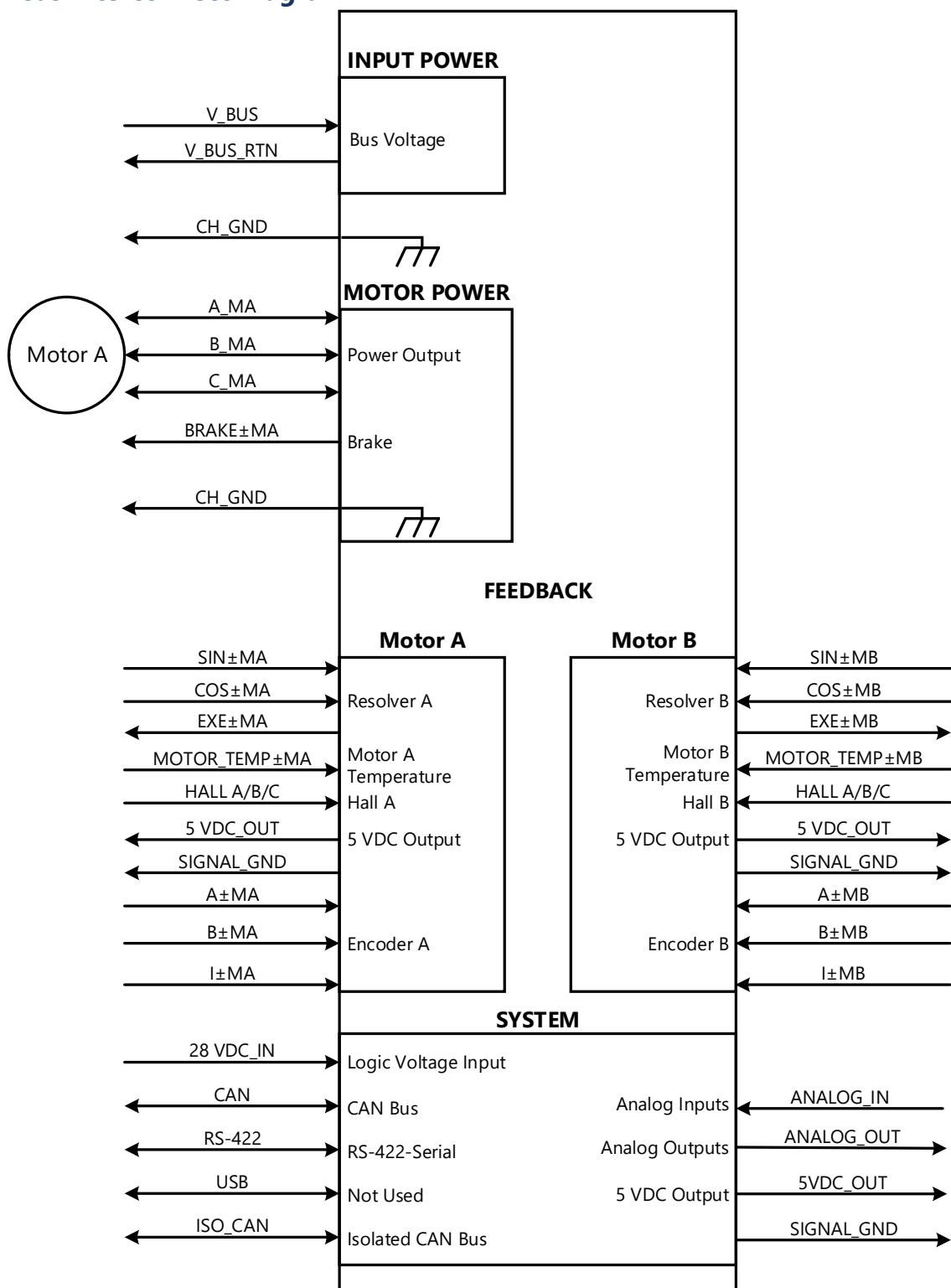
Signal Connectors							
No.	Function	Insert Arrangement	Clocking	Number of contacts	Contact size	Connector Part Number	Mating Connector Part Number
J1	Feedback	17-35	Normal	55	22D	D38999/20FE35AN	D38999/26FE35SN
J2	System	15-35	Normal	37	22D	D38999/20FD35AN	D38999/26FD35SN

Notes:
N/A

Label	Color	Connector Part Number	Mating Connector Part Number
A	Yellow	PL00U-301-10D10	PL18U-301-70
B	Green	PL00V-301-10D10	PL18V-301-70
C	Red	PL00W-301-10D10	PL18W-301-70
N	Black	PL00Y-301-10D10	PL18Y-301-70
P	Orange	PL00X-301-10D10	PL18X-301-70

Notes:
N/A

Zeus Interconnect Diagram



Interfaces Description

Overview

The Zeus Servo Drive is a rugged servo controller with very high-power capability in a small size and low weight package. This section describes the Zeus electrical interfaces by functional group.

Power Input (N, P)

Motor power (V_BUS) is supplied to the Zeus through the Power Input connector. This connector also includes the connection for an external regen resistor.

Motor Feedback (J1)

The motor feedback interface is connected to the Motor Feedback connector.

The Zeus Servo Drive supports the following motor feedback devices:

- Resolver
- Quadrature Encoder
- Hall
- BiSS-C (Unidirectional)
- Sensorless.

Feedback options are software configurable via HiDS.

The connector provides connector for a motor thermistor. It is compatible with a negative temperature coefficient (NTC) thermistor. The temperature vs. resistance can be configured through software.

Two 24V brake drivers are provided. The brake drives normally power brakes in application to prevent Z-axis movement while the motor is disabled. The brakes are electrically asserted when the motor is enabled.

An auxiliary 5-volt power supply (5VDC_OUT) is provide to power encoders, hall sensors, or other 5-volt devices. Several 5VDC_OUT signals are provided for ease of connection to multiple devices. Internally, all of the 5VDC_OUT is connected together. The current rating for the 5VDC_OUT is the combined current of all of the 5VDC_OUT signals. The return signal for 5VDC_OUT is SIGNAL_GND.

System Interface (J2)

The connector provides user interface signals. This interface includes 28 VDC power input (28VDC_IN and 28VDC_RTN) to power the Zeus's logic circuits. Do not connect the 28VDC_RTN to the SIGNAL_GND. The

28VDC_RTN is pre-EMI filter while the SIGNAL_GND is post-EMI filter.

ESI recommends communication via a CAN network. CAN is ideal for real-time embedded networking. It is proven to be robust as well as flexible. The supported CAN protocol can be downloaded from the ESI web site. ESI plans to support CANOpen in a future software update.

RS-422 is a good alternate to CAN. It is robust like CAN but not as flexible. The supported RS-422 protocol can be downloaded from the ESI web site.

USB is not supported. Do not connect the USB to a computer while the Zeus is enabled as the USB is highly susceptible to noise and has been known to damage USB ports on the computer.

A separate isolated CAN interface is provided with the following signals:

- ISO_CAN+
- ISO_CAN-
- ISO_GND

The isolated CAN allows communication on system without a common ground.

While ESI recommends a digital system interface such as CAN or RS-422, analog inputs and outputs are provided for legacy systems where digital communication is not possible.

Motor Power (A, B, C)

The Motor Power connector provides three-phase power to the motor.

Interlock connections are provided for each motor connector. The Interlock is safety feature which prevents high voltage from being applied to the motor when the Interlock is broken. Ideally the interlock signals are shorted together inside the motor. If the motor cable is disconnected, the Interlock is broken and the unit will not apply high voltage to the motor power connector. The interlock loop must be shorted on every connector before the user can enable any motor. If the loop is broken, both motors are disabled. The interlock can be enabled via software.

Digital and Analog IO signals can be configured by ESI Motion's "HiDS" motor controller software tool for use in the end application.

Digital units can be configured for various functions such as drive enable. Analog inputs can be configured as inputs to the system as well. For example, the analog inputs can be used to give the Zeus servo drive a torque or velocity command. They can also be used to inject a test signal for use with a Dynamic Signal Analyzer or other test equipment. Analog outputs can be setup in HiDS to represent an analog value for any variable in software in real-time. The unit provides two analog outputs. The user must account for the output impedance of the analog output when using these signals.

This analog input is provided to support legacy analog systems. ESI recommends the use of a digital interface (CAN or RS-422) when possible.

ESI Motion's HiDS Application

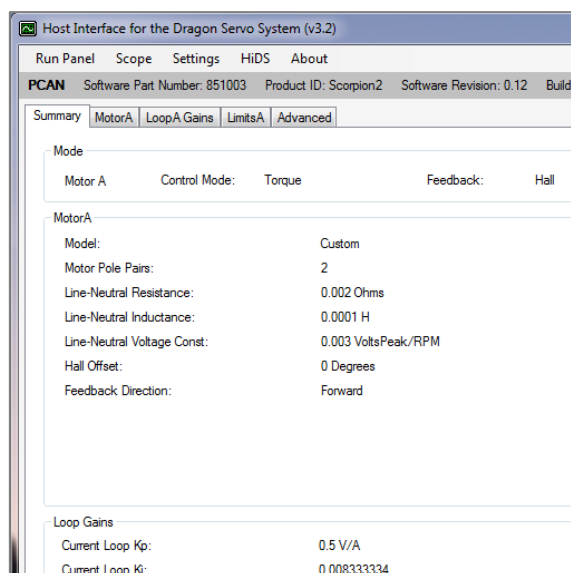
The Host Interface for Drive/Servo Controller (HiDS) is ESI Motion's servo motor controller software tool.

This innovative application allows users to configure a servo motor control system quickly, and with a great deal of flexibility. It's based upon a configurable, user-friendly GUI, with an integrated oscilloscope feature. Extensive data collection and control allows system tuning and troubleshooting.

On Zeus, the HiDS functions can be accessed via CAN. HiDS and the Controller User's Manual can be downloaded from ESI Motion's website at: <https://www.esimotion.com/support/downloads/>

ESI's motion control products employ industry-standard current-loop, velocity-loop, and in some applications, a position-loop. Each of these control loops utilizes Proportional, Integral, and Derivative (PID) error correction to achieve the desired performance. The Controller User's Manual includes a procedure for tuning each control loop to match the intended application. After the tuning is completed, additional initial configuration using feedback is described in detail.

The Controller User's Manual walks you through the steps to set up limits, enter motor parameters, and tune the motor using the desired loop configuration. An excerpt from the summary tab shown below is an example view of key device configuration parameters:

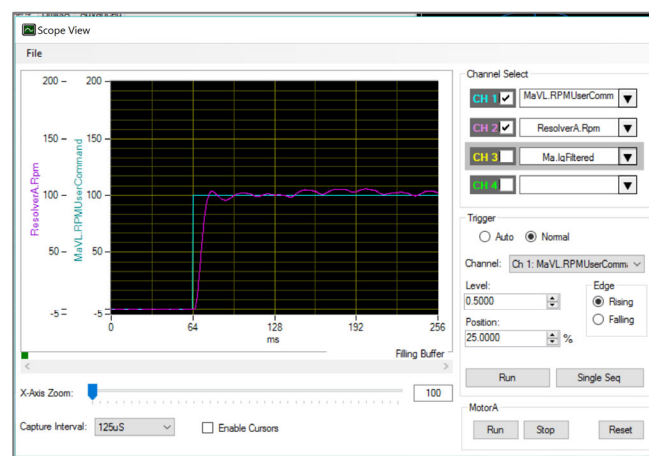


HiDS allows extreme flexibility via simply changing parameters, without the need to reload custom software.

The HiDS Run Panel facilitates control commands and monitoring of parameters such as motor speed and current:



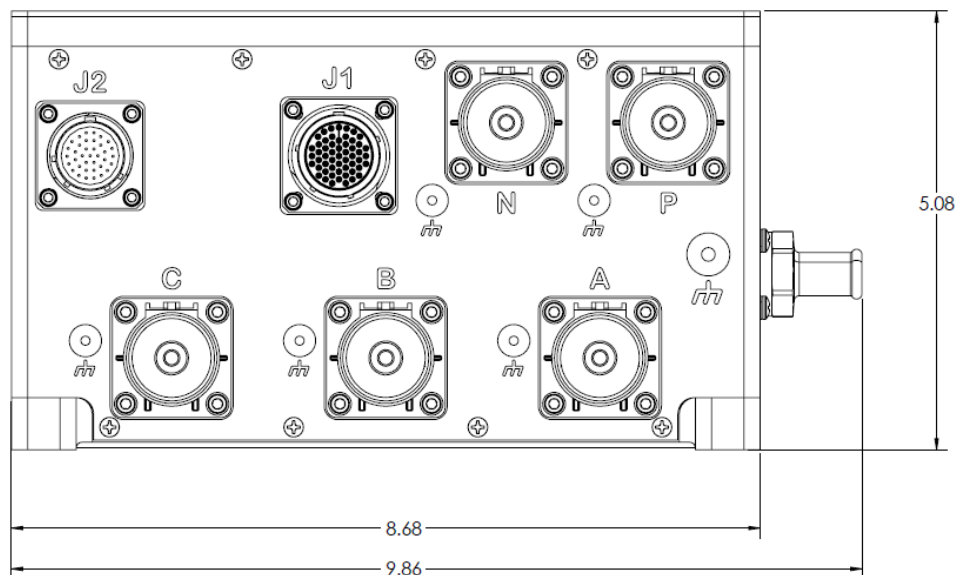
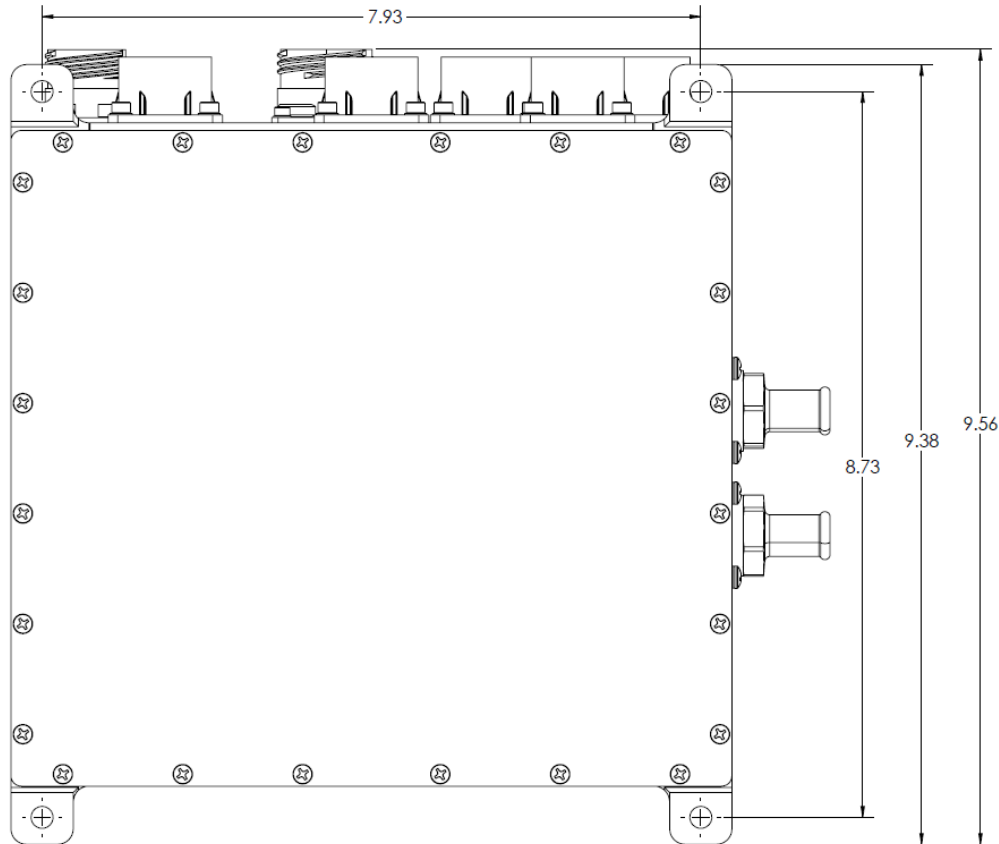
A typical velocity-loop step response, displayed on the built-in oscilloscope function, is shown below:

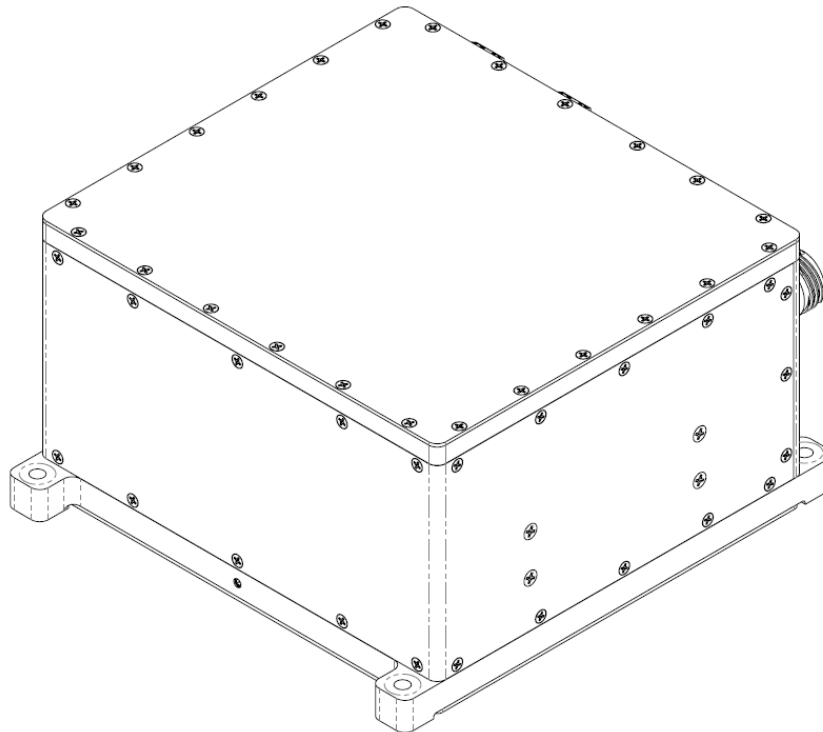
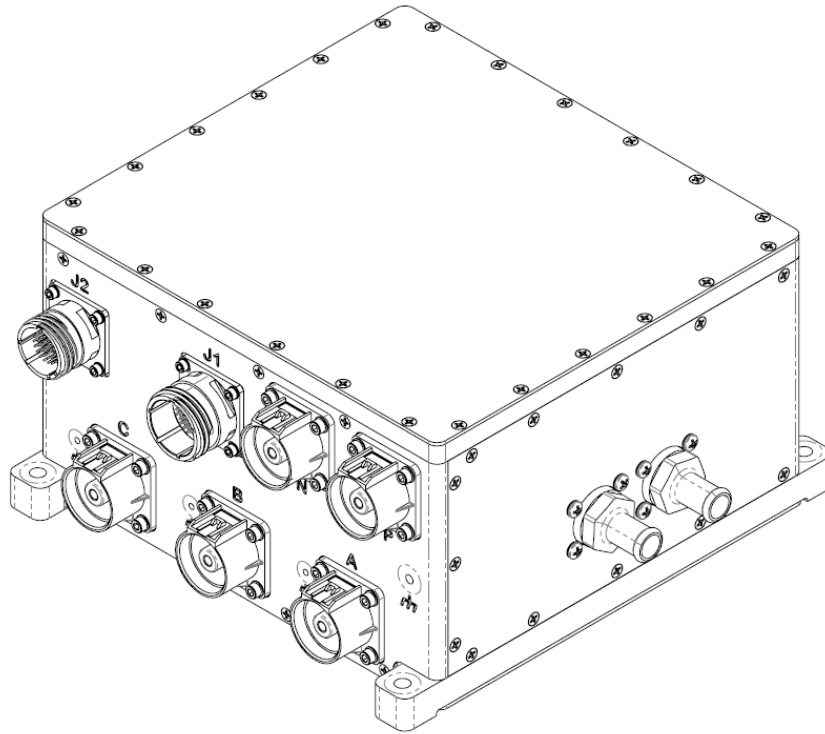


The design of the ESI Motion Zeus Servo Controller and HiDS tool allow for tremendous flexibility and capabilities in motor control and monitoring, to ensure success of the most challenging motion control applications.

Envelope and Dimensions

Mechanical Dimensions - Chassis Cooled
All Dimensions are in Inch. Tolerance: +- 0.01"

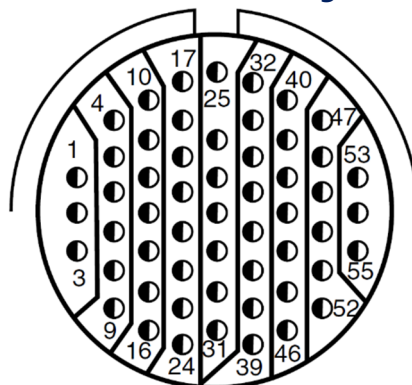




Connector Pinouts

Interfaces for each of the six connectors are shown in this section. See each respective diagram for the pinout numbering.

J1 Feedback Pinout Assignments



View looking into connector

J1 Pin	Name	I/O	Description	Type
1	CH_GND	---	Chassis Ground ⁽¹⁾	Chassis Ground
2	EXE+MA	OUT	Resolver Excitation Output Positive Motor A	Resolver
3	EXE-MA	OUT	Resolver Excitation Output Negative Motor A	Resolver
4	SIN+MA (ANALOG_IN_3+)	IN	Resolver SIN Positive Motor A, can be used as ANALOG_IN_3+	Resolver Input ±5 Volt Analog Input
5	SIN-MA (ANALOG_IN_3-)	IN	Resolver SIN Negative Motor A, can be used as ANALOG_IN_3-	Resolver Input ±5 Volt Analog Input
6	COS+MA (ANALOG_IN_4+)	IN	Resolver COS Positive Motor A, can be used as ANALOG_IN_4+	Resolver Input ±5 Volt Analog Input
7	COS-MA (ANALOG_IN_4-)	IN	Resolver COS Negative Motor A, can be used as ANALOG_IN_4-	Resolver Input ±5 Volt Analog Input
8	EXE+MB	OUT	Resolver Excitation Positive Motor B	Resolver Output
9	EXE-MB	OUT	Resolver Excitation Negative Motor B	Resolver Output
10	SIN+MB (ANALOG_IN_5+)	IN	Resolver SIN Positive Motor B, <i>can be used as</i> ANALOG_IN_5+	Resolver Input ±5 Volt Analog Input
11	SIN-MB (ANALOG_IN_5-)	IN	Resolver SIN Negative Motor B, <i>can be used as</i> ANALOG_IN_5-	Resolver Input ±5 Volt Analog Input
12	COS+MB (ANALOG_IN_6+)	IN	Resolver COS Positive Motor B, <i>can be used as</i> ANALOG_IN_6+	Resolver Input ±5 Volt Analog Input
13	COS-MB (ANALOG_IN_6-)	IN	Resolver COS Negative Motor B, <i>can be used as</i> ANALOG_IN_6-	Resolver Input ±5 Volt Analog Input
14	MOTOR_TEMP+MA	IN	Temperature Positive Motor A	Temperature Input
15	MOTOR_TEMP-MA	IN	Temperature Negative Motor A	Temperature Input
16	MOTOR_TEMP+MB	IN	Temperature Positive Motor B	Temperature Input
17	MOTOR_TEMP-MB	IN	Temperature Negative Motor B	Temperature Input
18	5VDC_OUT	OUT	5 Volt Encoder/Hall/Aux Power	Low Voltage Power
19	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference ⁽²⁾	Ground
20	Reserved	---	Do not connect	
21	Reserved	---	Do not connect	

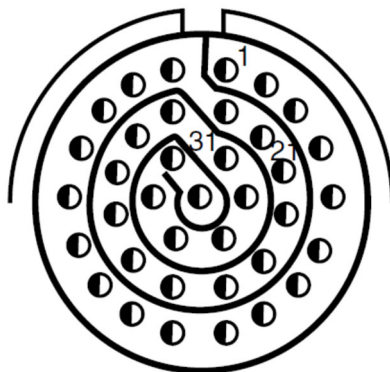
J1 Pin	Name	I/O	Description	Type
22	Reserved	---	Do not connect	
23	Reserved	---	Do not connect	
24	Reserved	---	Do not connect	
25	Reserved	---	Do not connect	
26	Brake-MA	OUT	Motor A Brake Driver	Brake
27	Brake+MA	OUT	Motor A Brake Driver	Brake
28	Reserved	---	Do not connect	---
29	Reserved	---	Do not connect	Brake
30	5VDC_OUT	OUT	5 Volt Encoder/Hall/Aux Power	Low Voltage Power
31	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference ⁽²⁾	Ground
32	A+MA	IN	Quadrature Encoder A Positive	Differential Digital Input
33	A-MA	IN	Quadrature Encoder A Negative	Differential Digital Input
34	B+MA	IN	Quadrature Encoder B Positive Motor A	Differential Digital Input
35	B-MA	IN	Quadrature Encoder B Negative Motor A	Differential Digital Input
36	I+MA	IN	Quadrature Encoder I Positive	Differential Digital Input
37	I-MA	IN	Quadrature Encoder I Negative	Differential Digital Input
38	HALL_A_MB (DIGITAL_IN_4)	IN	Hall A Motor B DIGITAL_IN_4	Open Collector Input
39	HALL_B_MB (DIGITAL_IN_5)	IN	Hall B Motor B DIGITAL_IN_5	Open Collector Input
40	HALL_C_MB (DIGITAL_IN_6)	IN	Hall C Motor B DIGITAL_IN_6	Open Collector Input
41	5VDC_OUT	OUT	5 Volt Encoder/Hall/Aux Power	Low Voltage Power
42	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference	Ground
43	HALL_A_MA (DIGITAL_IN_1)	IN	Hall A Motor A DIGITAL_IN_1	Open Collector Input
44	HALL_B_MA (DIGITAL_IN_2)	IN	Hall B Motor A DIGITAL_IN_2	Open Collector Input
45	HALL_C_MA (DIGITAL_IN_3)	IN	Hall C Motor A DIGITAL_IN_3	Open Collector Input
46	5VDC_OUT	OUT	5 Volt Encoder/Hall/Aux Power	Low Voltage Power
47	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference ⁽²⁾	Ground
48	BISS_CLK+MA	OUT	BiSS-C Clock Positive Motor A	Differential Digital Output
49	BISS_CLK-MA	OUT	BiSS-C Clock Negative Motor A	Differential Digital Output
50	BISS_DATA+MA	IN	BiSS-C data Positive Motor A	Differential Digital Input
51	BISS_DATA-MA	IN	BiSS-C Data Negative Motor A	Differential Digital Input

J1 Pin	Name	I/O	Description	Type
52	BISS_CLK+MB	OUT	BiSS-C Clock Positive Motor B	Differential Digital Output
53	BISS_CLK-MB	OUT	BiSS-C Clock Negative Motor B	Differential Digital Output
54	BISS_DATA+MB	IN	BiSS-C Data Positive Motor B	Differential Digital Input
55	BISS_DATA-MB	IN	BiSS-C data Negative Motor B	Differential Digital Input

Notes:

1. ESI recommends terminating all shields in the connector back-shell if possible. Chassis connection are included for systems without back-shell termination.

J2 System Pinout Assignments



View looking into connector

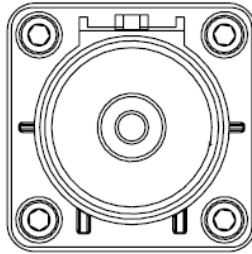
J2 Pin	Name	I/O	Description	Type
1	CH_GND	---	Chassis Ground ⁽¹⁾	Chassis Ground
2	28VDC_IN	IN	28 VDC In	Low Voltage Power
3	28VDC_IN	IN	28 VDC In	Low Voltage Power
4	OPTO_IN-	---	Optically Isolated Digital Input Return	
5	28VDC_RTN	---	28 VDC Return	Low Voltage Power
6	RS422_TX+	OUT	RS422 Tx (+)	RS-422
7	RS422_TX-	OUT	RS422 Tx (-)	RS-422
8	RS422_RX+	IN	RS422 Rx (+)	RS-422
9	RS422_RX-	IN	RS422 Rx (-)	RS-422
10	Reserved	---	Do not connect	
11	Reserved	---	Do not connect	
12	28VDC_RTN	---	28 VDC Return	Low Voltage Power
13	OPTO_IN_1+	IN	Optically Isolated Digital Input 1	
14	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference	Ground
15	ANALOG_IN_1+ (CMD+_MA)	IN	Analog In 1 (+), <i>can be used as Command Positive Motor A</i>	±10 Volt Analog Input
16	ANALOG_IN_1- (CMD-_MA)	IN	Analog In 1 (-), <i>can be used as Command Negative Motor A</i>	±10 Volt Analog Input
17	ANALOG_IN_2+ (CMD+_MB)	IN	Analog In 2 (+), <i>can be used as Command Positive Motor B</i>	±10 Volt Analog Input
18	ANALOG_IN_2- (CMD-_MB)	IN	Analog In 2 (-), <i>can be used as Command Negative Motor B</i>	±10 Volt Analog Input
19	SIGNAL_GND	---	Ground Reference for all interface signals except the Isolated CAN	Ground
20	USB_D+	I/O	USB D+	USB
21	USB_D-	I/O	USB D-	USB
22	BOOTn	IN	Ground this to Modify Firmware	Low Voltage Power
23	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference	Ground
24	OPTO_IN_2+	IN	Optically Isolated Digital Input 2	
25	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference	Ground
26	OPTO_OUT-	---	Optically Isolated Digital Output Return	
27	ANALOG_OUT_1	OUT	Analog Output 1 can be bound to any internal variable	Analog Output

J2 Pin	Name	I/O	Description	Type
28	ANALOG_OUT_2	OUT	Analog Output 2 can be bound to any internal variable	Analog Output
29	OPTO_OUT_1+	OUT	Optically Isolated Digital Output 1	
30	OPTO_OUT_2+	OUT	Optically Isolated Digital Output 2	
31	ISO_GND	---	Isolated CAN Ground Reference	Low Voltage Power
32	SIGNAL_GND	---	5VDC_OUT Return and Ground Reference	Ground
33	CAN+	I/O	CAN_A High ⁽²⁾	CAN
34	CAN-	I/O	CAN_A Low ⁽²⁾	CAN
35	ISO_CAN+	I/O	Isolated CAN High	ISO_CAN
36	ISO_CAN-	I/O	Isolated CAN Low	ISO_CAN
37	5VDC_OUT	OUT	5 Volt Encoder/Hall/Aux Power	Low Voltage Power

Notes:

1. ESI recommends terminating all shields in the connector back-shell if possible. Chassis connection are included for systems without back-shell termination.
2. CAN bus required for Software Upgrades

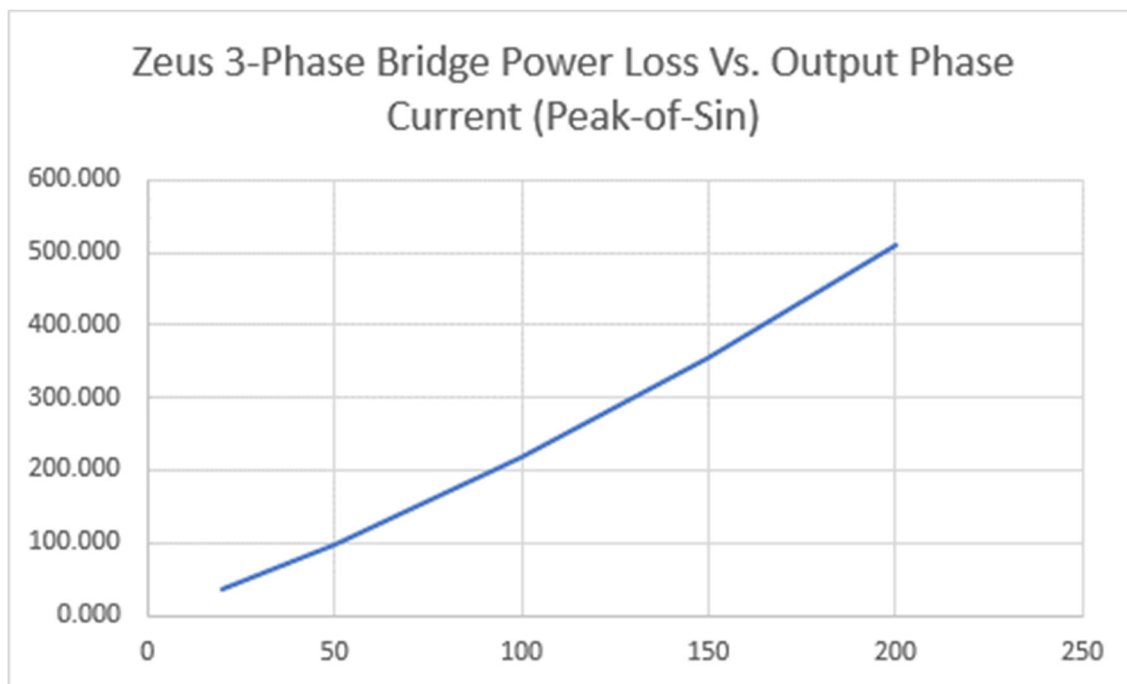
Motor Connector Assignments



View looking into connector

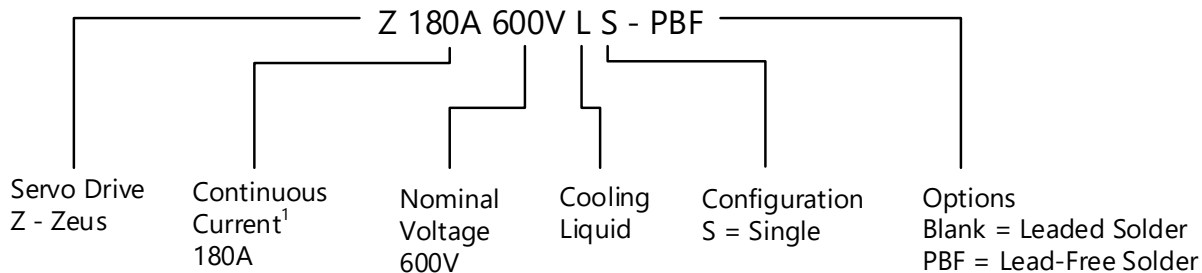
Label	Name	I/O	Description	Type
A	A_MA	IN	Motor Phase A	Motor Power
B	B_MA	IN	Motor Phase B	Motor Power
C	C_MA	IN	Motor Phase C	Motor Power
N	V_BUS_RTN	IN	Motor Power Return	Power
P	V_BUS	IN	Motor Power	Power

Power Loss Curves



Ordering Information

Zeus Servo Drive Configuration Options



¹ Motor Phase Current, Peak Sine Wave, per Axis

Example

Part Number: Z180A600VLS-PBF
 Servo Drive: Zeus
 Continuous Current: 180A
 Nominal Voltage: 600V
 Cooling: Liquid Cooling
 Configuration: Single-Axis
 Options: Lead-Free Solder



Model Availability List

Zeus Servo Drive

Rated Current	600V
180A	Z180A600VLS Z180A600VLS-PBF

Notes:

1. Standard Products are shown in **bold** and have expedited lead times.