Brush/Brushless Servo Amplifier

B10A04DC

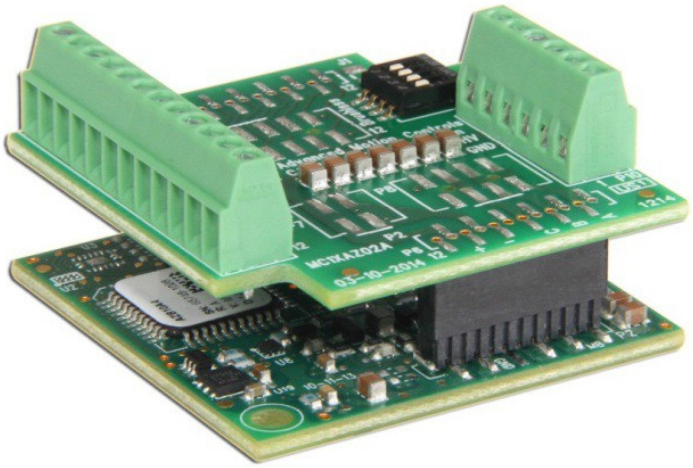
Description

The B10A04DC servo amplifier is designed to drive brushless and brushed DC motors at a high switching frequency. To increase system reliability and to reduce cabling costs, the drive is designed for direct integration into your PCB. The B10A04DC is fully protected against over-voltage, under-voltage, over- current, over-heating, and short-circuits. A single digital output indicates operating status. The drive interfaces with digital controllers that have analog ±10V output. This servo drive requires only a single unregulated isolated DC power supply, and is fully RoHS (Reduction of Hazardous Substances) compliant.

This mounted card offers convenient screw-terminal connectors. Easily accessible test points are available for I/O monitoring. The B10A04DC can be screw-mounted directly to a PCB and is ideal for both prototyping and production. The mounting card also features a keyed connector to prevent misaligned connections.

Power Range

Peak Current	10 A
Continuous Current	5 A
Supply Voltage	10 - 36 VDC



Features

- Four Quadrant Regenerative Operation
- Direct Board-to-Board Integration
- Lightweight
- High Switching Frequency
- Wide Temperature Range
- Differential Input Command
- Digital Fault Output Monitor
- Current Monitor Output
- Single Supply Operation
- Compact Size
- High Power Density
- 12VDC Operation

HARDWARE PROTECTION
- Over-Voltage
- Under-Voltage
- Over-Current
- Over-Temperature
- Short-circuit (phase-phase)
- Short-circuit (phase-ground)

INPUTS/OUTPUTS
- Digital Fault Output
- Digital Inhibit Input
- Analog Current Monitor
- Analog Command Input

FEEDBACK SUPPORTED
- Hall Sensors

MODES OF OPERATION
- Current

COMMUTATION
- Trapezoidal

MOTORS SUPPORTED
- Three Phase (Brushless)
- Single Phase (Brushed, Voice Coil, Inductive Load)

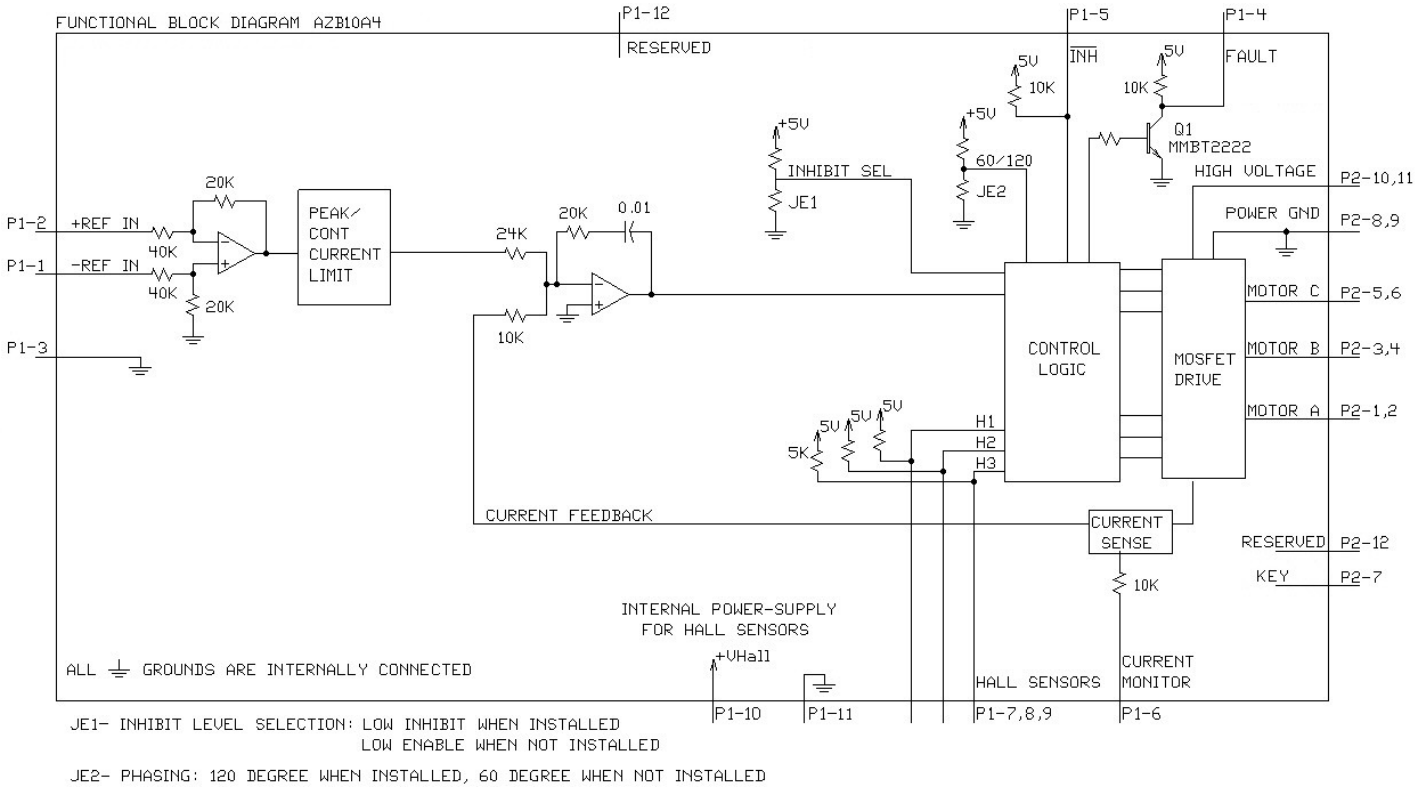
COMMAND SOURCE
- ±10 V Analog

COMPLIANCES & AGENCY APPROVALS
- RoHS
- UL/cUL Pending
- CE Pending

Innovation in Linear Motion

H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com |info@h2wtech.com

BLOCK DIAGRAM



Mechanical Specifications		
Description	Units	Value
Size (H x W x D) (mounting card only)	mm (in)	38.1 x 38.1 x 16.2 (1.5 x 1.5 x 0.64)
Size (H x W x D) (with drive installed)	mm (in)	38.1 x 38.1 x 23.6 (1.5 x 1.5 x 0.93)
Weight (mounting card only)	g (oz)	11.3 (0.4)
Bus Capacitance	µF	33
P4 Connector	-	12-port, 1.27 mm spaced header, vertical mount (pin 7 keyed)
P5 Connector	-	12-port, 1.27 mm spaced header, vertical mount
P10 Connector	-	6-port, 2.54 mm spaced fixed screw terminals
P11 Connector	-	12-port, 2.54 mm spaced fixed screw terminals

Information on Approvals and Compliances	
RoHS COMPLIANCE	RoHS (Reduction of Hazardous Substances) is intended to prevent hazardous substances such as lead from being manufactured in electrical and electronic equipment.

H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com |info@h2wtech.com

SPECIFICATIONS

Power Specifications		
Description	Units	Value
DC Supply Voltage Range	VDC	10 - 36
DC Bus Under Voltage Limit	VDC	8
DC Bus Over Voltage Limit	VDC	40
Maximum Peak Output Current[1]	A	10
Maximum Continuous Output Current	A	5
Maximum Continuous Output Power	W	171
Maximum Power Dissipation at Continuous Current	W	9
Minimum Load Inductance (Line-To-Line)[2]	µH	100
Internal Bus Capacitance[3]	µF	23.5
Low Voltage Supply Outputs	-	+5 VDC (30 mA)
Switching Frequency	kHz	40
Control Specifications		
Description	Units	Value
Command Sources	-	±10 V Analog
Feedback Supported	-	Halls
Commutation Methods	-	Trapezoidal
Modes of Operation	-	Current
Motors Supported	-	Three Phase (Brushless), Single Phase (Brushed, Voice Coil, Inductive Load)
Hardware Protection	-	Invalid Commutation Feedback, Over Current, Over Temperature, Over Voltage, Under Voltage, Short Circuit (Phase-Phase & Phase-Ground)
Mechanical Specifications		
Description	Units	Value
Agency Approvals	-	RoHS, UL/cUL Pending, CE Pending
Size (H x W x D)	mm (in)	38.1 x 38.1 x 7.34 (1.50 x 1.50 x 0.29)
Weight	g (oz)	8.5 (0.3)
Operating Temperature Range[4]	℃ (℉)	0 - 85 (32 - 185)
Storage Temperature Range	℃ (℉)	-40 - 85 (-40 - 185)
Relative Humidity	-	0 - 90% Non-Condensing
Form Factor	-	PCB Mounted
P1 Connector	-	12-pin, 1.27 mm spaced header
P2 Connector	-	12-pin, 1.27 mm spaced header

Notes

1. Maximum duration of peak current is ~2 seconds. Peak RMS value must not exceed continuous current rating of the drive.
2. Lower inductance is acceptable for bus voltages well below maximum. Use external inductance to meet requirements.
3. Requires a minimum of 47 µF external bus capacitance between the DC Supply and Power Ground.
4. Additional cooling and/or heatsink may be required to achieve rated performance.

H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com | info@h2wtech.com

PIN FUNCTIONS

P4 – Drive Mounting Power / Motor Connector
12-port vertical header for drive insertion – direct connection to the drive. Pin 7 keyed to avoid incorrect drive orientation. For pin functions refer to the drive datasheet.

P5 – Drive Mounting Signal Connector
12-port vertical header for drive insertion – direct connection to the drive. For pin functions refer to the drive datasheet.

P10 – Power / Motor Connector

Pin	Name	Description / Notes	I/O
1	MOTOR A	Motor Phase Outputs. Current output distributed equally across 2 pins per motor phase, 3A continuous current carrying capacity per pin. For single phase (brushed) motors, set DIP Switch SW1 to ON and use only Motor A and Motor B.	O
2	MOTOR B		O
3	MOTOR C		O
4	PWR GND	Power Ground (Common With Signal Ground). 3A Continuous Current Rating Per Pin	GND
5	HV IN	DC Power Input. 3A Continuous Current Rating Per Pin. Requires a minimum of 47 µF external capacitance between HV IN and PWR GND pins.	I
6	RESERVED	Reserved	-

P11 – I/O Connector

Pin	Name	Description	I/O
1	-REF IN	Differential Reference Input (±10 V Operating Range, ±15 V Maximum Input)	I
2	+REF IN	Differential Reference Input (±10 V Operating Range, ±15 V Maximum Input)	I
3	SIGNAL GND	Signal Ground (Common With Power Ground).	GND
4	FAULT OUT	TTL level (+5 V) output becomes high when power devices are disabled due to at least one of the following conditions: inhibit, invalid Hall state, output short circuit, over voltage, over temperature, power-up reset.	O
5	$\overline{\text{INHIBIT IN}}$	TTL level (+5 V) inhibit/enable input. Leave open to enable drive. Pull to ground to inhibit drive. Inhibit turns off all power devices.	I
6	CURRENT MONITOR	Current Monitor. Analog output signal proportional to the actual current output. Scaling is 2 A/V. Measure relative to signal ground.	O
7	HALL 3	Single-ended Hall/Commutation Sensor Inputs (+5 V logic level). For single phase (brushed) motors, set DIP Switch SW1 to ON and leave all Hall signals open.	I
8	HALL 2		I
9	HALL 1		I
10	+V HALL OUT	Low Power Supply For Hall Sensors (+5 V @ 30 mA). Referenced to signal ground. Short circuit protected.	O
11	SIGNAL GND	Signal Ground (Common With Power Ground).	GND
12	RESERVED	Reserved	-

Note: P1 and P2 are identical 12-pin headers. To avoid damage to the drive, be sure when plugging or soldering the drive into a PCB or interface card that the drive orientation is correct. P1 and P2 are labeled on the PCB silkscreen. Pin 7 on P2 is keyed to differentiate it from P1.

H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com | info@h2wtech.com

HARDWARE NOTES

DIP Switch Settings

When set to the ON position, DIP Switch SW1 internally shorts Hall 2 to ground for use with single phase (brushed) motors. Note that in this configuration, all Hall signal pins should be left open, and only motor phase outputs A and B should be used. Default switch setting is OFF (three phase / brushless motors).

DIP Switches SW2, SW3, SW4 are reserved.

Jumper Settings

Jumpers are SMT, 0 ohm resistors located on the underside of the drive PCB. By default, the drive is configured with the jumpers installed. Typical drive operation will not require the jumpers to be removed. Please contact the factory before jumper removal.

Jumper	Description	Configuration	
	SMT Jumper (0Ω Resistor)	Not Installed	Installed
JE1	Inhibit logic. Sets the logic level of inhibit pins. Labeled JE1 on the PCB of the drive.	Low Enable	Low Inhibit
JE2	Hall Sensor phasing. Selects 120 or 60 degree commutation phasing. Labeled JE2 on the PCB of the drive.	60 degree	120 degree

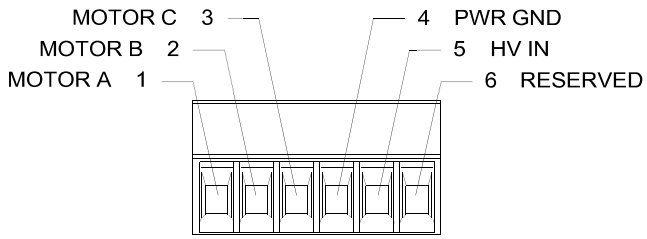
H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com | info@h2wtech.com

MECHANICAL INFORMATION

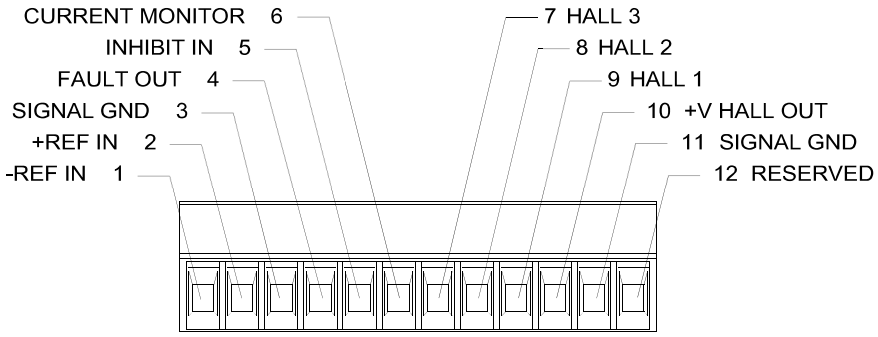
P4 – Drive Mounting Power / Motor Connector	
Connector Information	12-port, 1.27 mm spaced header, vertical mount
Mating Connector	No mating connector required. Mate directly to drive.

P5 – Drive Mounting Signal Connector	
Connector Information	12-port, 1.27 mm spaced header, vertical mount
Mating Connector	No mating connector required. Mate directly to drive.

P10 – Power / Motor Connector		
Connector Information		6-port, 2.54 mm spaced fixed screw terminal
Mating Connector	Details	Not Applicable
	Included with Drive	Not Applicable

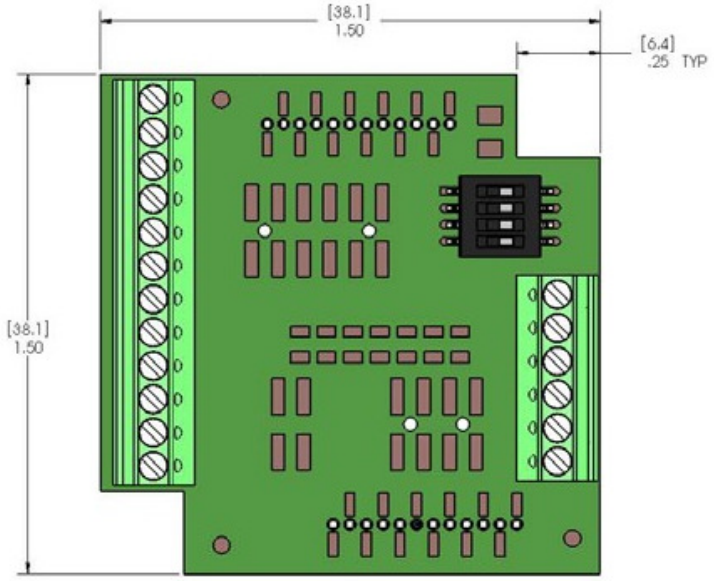


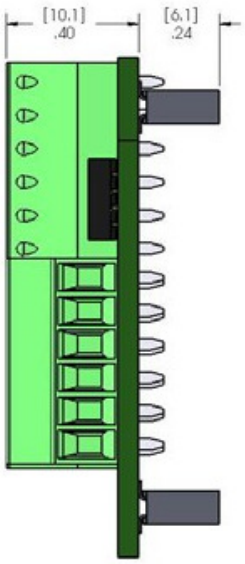
P11 – I/O Connector		
Connector Information		12-port, 2.54 mm spaced fixed screw terminal
Mating Connector	Details	Not Applicable
	Included with Drive	Not Applicable

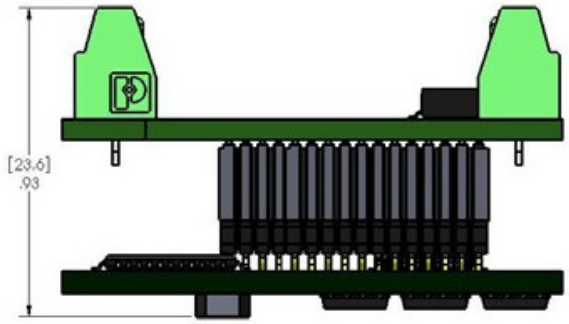


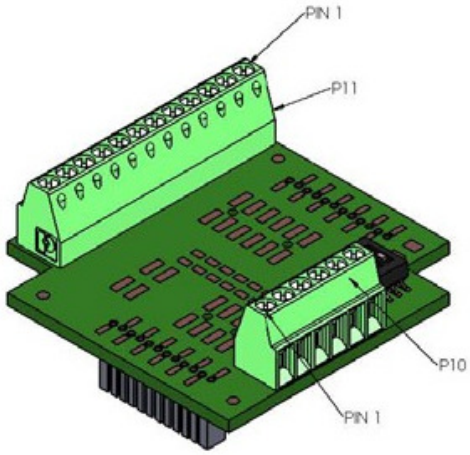
H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com | info@h2wtech.com

MOUNTING DIMENSIONS









H2W Technologies, Inc. | 26380 Ferry Court | Santa Clarita | CA | 91350 | USA
888.702.0540 | 661.291.1620 Main | 661.291.1626 Fax | www.h2wtech.com | info@h2wtech.com