BLDC Motors & Drives

- High performance, low cost, brushless speed control systems
- 30 to 105 watts continuous shaft output
- Operates from 12 to 48V DC power supply
- Driver can supply up to 6.25A continuous, 12.5A peak
- Excellent speed stability
- Eight digital inputs for commanding a variety of functions
- Two digital outputs for interfacing to other equipment
- Two on board potentiometers plus 12 bit analog input for setting speed, acceleration, deceleration

Accessories

Power Supplies
Applied Motion offers the following DC power supplies for use with the brushless DC drives and motors.
- PS50A24: 50 Watts at 24 VDC, recommended for BL030-H03-G motor.
- PS150A24: 150 Watts at 24 VDC, recommended for BL060-H03-G motor.
- PS320A48: 320 Watts at 48 VDC, recommended for BL105-H03-G motor.

RC-050 Regeneration Clamp
The RC-050 regeneration clamp is for use where regeneration from the motor may be excessive for the power supply. In these cases the RC-050 is connected between the drive and power supply and absorbs regenerated energy.

Extension Cable
For applications where motors and drives are separated by more than 30cm (1 foot):
- 3004-272-1H: 1 Meter
- 3004-272-3H: 3 Meters

For more information visit: www.applied-motion.com/BLDC
**BD5 Drive**

- High performance, low cost speed control drive
- Operates from 12 to 48V DC power supply
- Output current: up to 6.25Arms continuous, 12.5A peak
- Eight digital inputs for commanding a variety of functions
- Two digital outputs for interfacing to other equipment
- Two on board potentiometers plus 12 bit analog input for setting speed, acceleration, deceleration

For more information go to [www.applied-motion.com/BLDC](http://www.applied-motion.com/BLDC)

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**BD5 Dimensions**

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**IO Connections**

<table>
<thead>
<tr>
<th>DIGITAL INPUTS</th>
<th>ANALOG INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEEDSEL2</td>
<td>INCOM</td>
</tr>
<tr>
<td>SPEEDSEL1</td>
<td>ANA_GND</td>
</tr>
<tr>
<td>SPEEDSEL0</td>
<td>ANA_IN</td>
</tr>
<tr>
<td>STOP</td>
<td>5V</td>
</tr>
<tr>
<td>SPEEDSET</td>
<td>SPDOUT-</td>
</tr>
<tr>
<td>ENABLE</td>
<td>SPDOUT+</td>
</tr>
<tr>
<td>STOPMODE</td>
<td>FAULT-</td>
</tr>
<tr>
<td>DIR</td>
<td>FAULT+</td>
</tr>
<tr>
<td>5V</td>
<td>GND</td>
</tr>
</tbody>
</table>
BD5 Drive

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For more information go to www.applied-motion.com/BLDC
Brushless Drive Technical Specifications

**POWER AMPLIFIER:**

<table>
<thead>
<tr>
<th>AMPLIFIER TYPE</th>
<th>AMPLIFIER TYPE</th>
<th>CURRENT CONTROL</th>
<th>OUTPUT CURRENT</th>
<th>POWER SUPPLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triple half bridge, 4 quadrant</td>
<td>4 state PWM at 10 kHz</td>
<td>BDS-G1-AH: 1.75Arms cont, 3.5Arms peak (5 seconds max)</td>
<td>External 12-48 VDC power supply required</td>
<td>Under-voltage alarm: 8.5 VDC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BDS-G2-AH: 3.6Arms cont, 7.2Arms peak (5 seconds max)</td>
<td>Over-voltage shutdown: 62 VDC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>BDS-G3-AH: 6.25Arms cont, 12.5Arms peak (5 seconds max)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONTROLLER:**

<table>
<thead>
<tr>
<th>MODE OF OPERATION</th>
<th>DIGITAL INPUTS</th>
<th>DIGITAL OUTPUTS</th>
<th>APPROVALS</th>
<th>PHYSICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity control.</td>
<td>Eight inputs, 5-24 VDC, bidirectional (can be driven by sinking or sourcing signals) 2 kHz max freq response. Common terminal (INCOM) can be connected to an external power supply (5 to 24 VDC), or internally connected to 5V or GND (selected by internal DIP switches). CW/CDW: selects direction of motor shaft rotation. STP: commands motor to stop quickly using electromagnetic braking. EN/RE: removes power from motor windings. M0,M1,M2: selects one of seven preset speeds. STMD: selects which mode of stopping is used. SPST: selects whether speed is set by on-board pot or external analog signal</td>
<td>30 VDC max, 80 mA max, open collector, open emitter. FLT is a dedicated fault output. SPO is a dedicated tachometer output (30 pulses per revolution). Both outputs can be reconfigured at the factory for qualified OEM applications. 4N referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits. 5V = 4500 rpm. RS-232 (for factory configuration only)</td>
<td>RoHS</td>
<td>0 to 100°C (32 to 212°F) Internal temperature of the electronics section</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CE PENDING</td>
<td>AMBIENT TEMPERATURE 0 to 40°C (32 to 104°F) When mounted to a suitable heat sink. HUMIDITY 90% max, non-condensing</td>
</tr>
</tbody>
</table>

**Motor Specifications**

<table>
<thead>
<tr>
<th>PART #</th>
<th>POWER</th>
<th>RELATED VOLTAGE</th>
<th>RATED CURRENT</th>
<th>RATED TORQUE</th>
<th>KE</th>
<th>ROTOR INERTIA</th>
<th>MASS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W cont.</td>
<td>VDC</td>
<td>A cont.</td>
<td>A peak</td>
<td>N-M cont.</td>
<td>N-M peak</td>
<td>V/krpm</td>
</tr>
<tr>
<td>BL030-H03-G</td>
<td>30</td>
<td>24</td>
<td>1.75</td>
<td>3.5</td>
<td>0.065</td>
<td>0.13</td>
<td>3.65</td>
</tr>
<tr>
<td>BL060-H03-G</td>
<td>60</td>
<td>24</td>
<td>3.6</td>
<td>7.2</td>
<td>0.13</td>
<td>0.26</td>
<td>2.7</td>
</tr>
<tr>
<td>BL105-H03-G</td>
<td>105</td>
<td>24</td>
<td>6.25</td>
<td>12.5</td>
<td>0.225</td>
<td>0.45</td>
<td>2.65</td>
</tr>
</tbody>
</table>

**Motor Dimensions**

- **Motor Length (L):**
  - BL030-H03-G: 46mm
  - BL060-H03-G: 70mm
  - BL105-H03-G: 100mm

- **Motor Length (L):**
  - BL030-H03-G: 46mm
  - BL060-H03-G: 70mm
  - BL105-H03-G: 100mm
Brushless Drive Technical Specifications

**POWER AMPLIFIER:**

**AMPLIFIER TYPE**
Triple half bridge, 4 quadrant

**CURRENT CONTROL**
4 state PWM at 10 kHz

**OUTPUT CURRENT**
- BDS-G1-AH: 1.75Arms cont, 3.5Arms peak (5 seconds max)
- BDS-G2-AH: 3.6Arms cont, 7.2Arms peak (5 seconds max)
- BDS-G3-AH: 6.25Arms cont, 12.5Arms peak (5 seconds max)

**POWER SUPPLY**
External 12 - 48 VDC power supply required
Under-voltage alarm: 8.5 VDC
Over-voltage shutdown: 62 VDC

**CONTROLLER:**

**MODE OF OPERATION**
Velocity control. Speed can be selected by digital input from on-board potentiometer, external analog signal, or 7 preset speeds. Accel/decel rate set by on-board potentiometer

**DIGITAL INPUTS**
Eight inputs, 5-24 VDC, bidirectional (can be driven by sinking or sourcing signals) 2 kHz max freq response. Common terminal (INCOM) can be connected to an external power supply (5 to 24 VDC), or internally connected to 5V or GND (selected by internal DIP switches)

**CW/CCW**
selects direction of motor shaft rotation

**STP**
commands motor to stop quickly using electromagnetic braking

**EN/RE**
removes power from motor windings

**M0,M1,M2**
selects one of seven preset speeds

**STMD**
selects which mode of stopping is used

**SPST**
selects whether speed is set by on-board pot or external analog signal

**DIGITAL OUTPUTS**
30 VDC max, 80 mA max, open collector, open emitter. FLT is a dedicated fault output.
SPO is a dedicated tachometer output (30 pulses per revolution).
Both outputs can be reconfigured at the factory for qualified OEM applications.

**ANALOG INPUT**
AIN referenced to GND. Range = 0 to 5 VDC. Resolution = 12 bits, 5v = 4500 rpm.

**COMMUNICATION INTERFACE**
RS-232 (for factory configuration only)

**APPROVALS:**
RoHS
CE PENDING

**PHYSICAL:**

**OPERATING TEMPERATURE**
0 to 100°C (32 to 212°F) Internal temperature of the electronics section

**AMBIENT TEMPERATURE**
0 to 40°C (32 to 104°F) When mounted to a suitable heatsink

**HUMIDITY**
90% max, non-condensing

**MASS**
8.0 oz (170 g)

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### Motor Specifications

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<tr>
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<th>POWER</th>
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<td>A peak</td>
<td>N-M cont.</td>
<td>N-M peak</td>
<td>Vkrpm</td>
</tr>
<tr>
<td>BL030-H03-G</td>
<td>30</td>
<td>24</td>
<td>1.75</td>
<td>3.5</td>
<td>0.065</td>
<td>0.13</td>
<td>3.65</td>
</tr>
<tr>
<td>BL060-H03-G</td>
<td>60</td>
<td>24</td>
<td>3.6</td>
<td>7.2</td>
<td>0.13</td>
<td>0.26</td>
<td>2.7</td>
</tr>
<tr>
<td>BL105-H03-G</td>
<td>105</td>
<td>24</td>
<td>6.25</td>
<td>12.5</td>
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<td>0.45</td>
<td>2.65</td>
</tr>
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</table>

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### Motor Dimensions

Motor Specifications

Motor Dimensions

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Made in China
24VDC
6.25A
105W

Ins.Class E
4500r/min
No.xxxxxx
YY-MM-DD
IP40

0 - ±0.1
0.025
90°
±0.1
6 - 0.006
0
0.025
42
37.6 h7
0.025
42
37.6 h7

Motor Length (L)
BL030-H03-G 46mm
BL060-H03-G 70mm
BL105-H03-G 100mm

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Motor (BL030-H03-G)
Motor (BL060-H03-G)
Motor (BL105-H03-G)
BLDC Drive Part Numbering System

**BD5-G1-AH**
- **Series**: BLDC Series
- **Output Current**
  - 5 = 5 A rms cont
  - 10 = 10 A rms cont
- **Motor Frame Size**
  - G = 42 mm
- **Feedback**: H = Hall devices
- **Communication**
  - A = RS-232 (for factory configuration only)

**Order this BD5 model...**
1. BD5-G1-AH
2. BD5-G2-AH
3. BD5-G3-AH

**For use with this BL motor...**
1. BL030-H03-G
2. BL060-H03-G
3. BL105-H03-G

BLDC Motor Part Numbering System

**BL000-000-0**
- **Series**: BL = Brushless DC Motor
- **Wattage Rating**
  - 030 = 30 watts
  - 060 = 60 watts
  - 105 = 105 watts
- **Frame Size**: G = 42mm
- **Voltage**: 3 = 24 VDC
- **Feedback**: H = Hall devices only

**Standard Part Numbers:**
- BL030-H03-G
- BL060-H03-G
- BL105-H03-G
BLDC Drive Part Numbering System

**BD5-G1-AH**

- **Series**: BLDC Series
- **Output Current**
  - 5 = 5 A rms cont
  - 10 = 10 A rms cont
- **Motor Frame Size**
  - G = 42 mm
- **Feedback**: H = Hall devices
- **Communication**: A = RS-232 (for factory configuration only)

**Order this BD5 model…**
1. BD5-G1-AH
2. BD5-G2-AH
3. BD5-G3-AH

**For use with this BL motor…**
1. BL030-H03-G
2. BL060-H03-G
3. BL105-H03-G

BLDC Motor Part Numbering System

**BL000-000-0**

- **Series**: BL = Brushless DC Motor
- **Wattage Rating**
  - 030 = 30 watts
  - 060 = 60 watts
  - 105 = 105 watts
- **Frame Size**
  - G = 42 mm
- **Feedback**: H = Hall devices only
- **Voltage**: 3 = 24 VDC

**Standard Part Numbers:**
- BL030-H03-G
- BL060-H03-G
- BL105-H03-G

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**Speed Torque Curves**

BL030-H03-G

BL060-H03-G

BL105-H03-G
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