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# BA Series

## *Low-Cost, Compact Modular Amplifier*

- Wide output power range from 10 A peak to 100 A peak at 320 VDC
- No transformer required; direct connection to AC line
- Capable of running brushless or single-phase DC brush motors
- Velocity, torque, and dual-phase mode input command
- Accepts both encoder or tachometer feedback for velocity control
- Can be externally commutated
- CE approval on low-power models




*BA10, 20, 30 Models*




*BA50, 75, 100 Models*

The BA series amplifiers are Aerotech's stand-alone drive for three-phase AC brushless and single-phase DC brush motors. This versatile amplifier can run in velocity mode or torque mode using a self-commutating, low ripple, modified six-step algorithm.

All BA amplifiers accept a standard ±10 VDC as a velocity or torque (current) command from any motion controller.

| Amplifier Series | BAS | BA | BL |
|---|---|---|---|
| Rotary Brushless Motors | x | x | x |
| DC Brush-Type Motors | | x | x |
| Linear Brushless Motors | x | x | x |
| Rotary Slotless Motors | x | x | x |
| Power Stage | PWM | PWM | Linear |

The dual-phase mode is used for external commutating controllers such as Aerotech's U100I, U500, and U600 position controllers to bypass the BA's commutation and perform sinusoidal commutation. This provides the smoothest velocity control.

The BA amplifier is based on a 20 kHz IGBT for reliable operation in a compact package. It is completely self-contained, requiring only AC line power, and the amplifier is fully protected. The DC-isolated power stage minimizes loop noise. The amplifier accepts a quadrature encoder or tachometer input for velocity feedback. The encoder signal is converted to a voltage representing speed.

The BA is available in six models up to 100A peak to match your application power requirements. Standard models are delivered from stock, and custom versions can be engineered to your requirements in minimal lead times.


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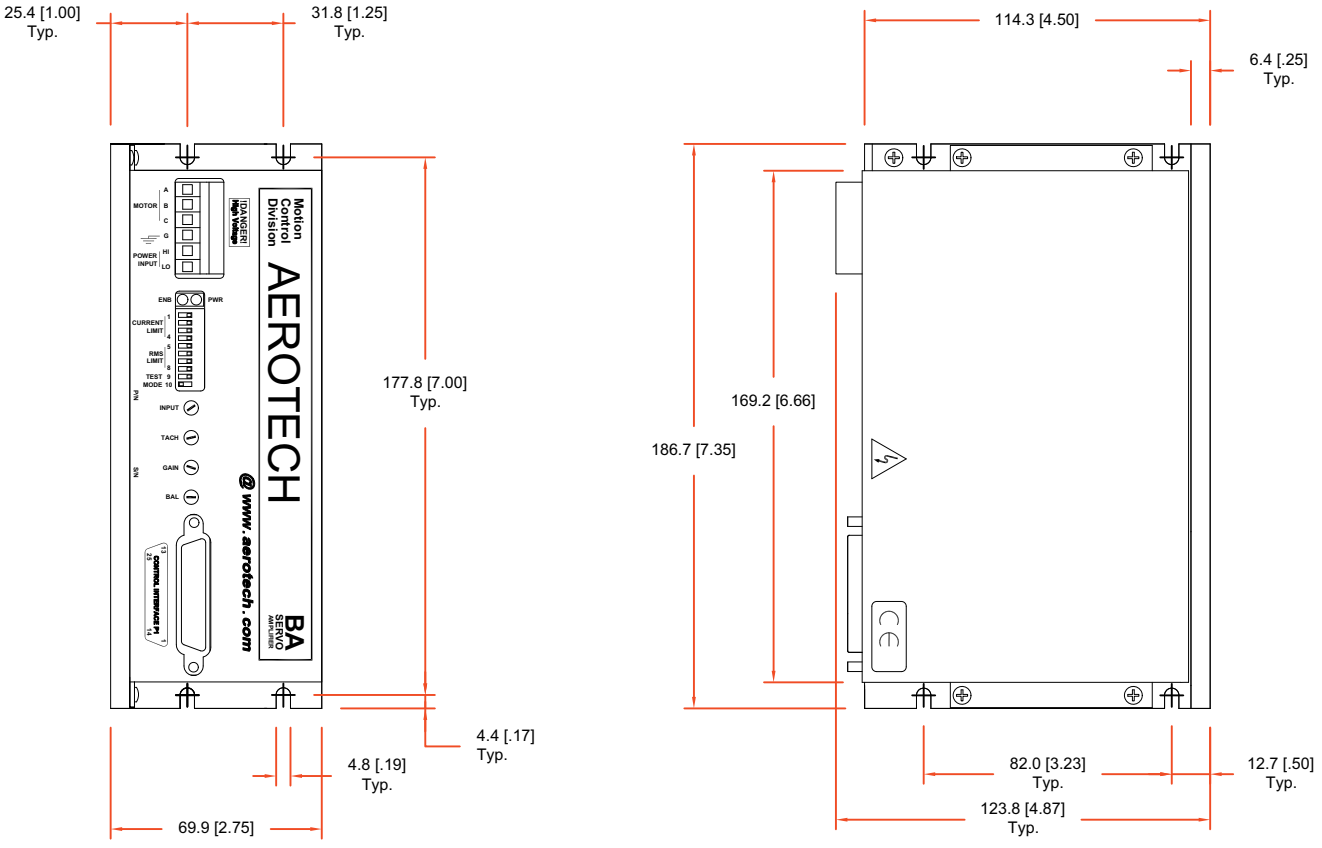
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## BA Series SPECIFICATIONS and DIMENSIONS

| Model | Units | BA10 | BA20 | BA30 | BA50 | BA75 | BA100 |
|---|---|---|---|---|---|---|---|
| **Output Voltage**[1] | VDC | 40-320[2] | | | | | |
| **Peak Output Current** | $A_{pk}$ | 10 | 20 | 30 | 50 | 75 | 100 |
| **Continuous Output Current** | $A_{pk}$ | 5 | 10 | 15 | 25 | 37 | 50 |
| **Peak Output Power** | W | 2,720 | 5,440 | 8,160 | 13,600 | 20,160 | 28,800 |
| **Continuous Output Power** | W | 1,360 | 2,720 | 4,080 | 6,800 | 10,080 | 14,400 |
| **Power Amplifier Bandwidth** | kHz | 2 | | | | | |
| **PWM Switching Frequency** | kHz | 20 | | | | | |
| **Minimum Load Inductance** | mH | 0.8 @ 160 VDC (1 mH @ 320 VDC) | | | | | |
| **Operating Temperature** | °C | 0 to 50 | | | | | |
| **Storage Temperature** | °C | -30 to 85 | | | | | |
| **Weight** | kg (lb) | 1.1 (2.5) | | | 3.9 (8.5) | 5.7 (12.5) | |
| **Maximum Shunt Regulator Dissipation** | W | 40 (optional) | 40 (optional) | 40 | 100 (10 A Ext.) | | |
| **Brushless Operation** | | Torque (Current), Velocity, Dual Phase | | | | | |
| **Brush-Type Operation** | | Torque, Velocity | | | | | |
| **Power Input** | | 28-230 VAC, Single Phase, 50-60 Hz | | | 28-230 VAC, 50-60 Hz, 1-3 Phase | | |
| **Protection** | | Output Short Circuit (Phase-to-Phase and Phase-to-Ground); Peak Overcurrent, RMS Overcurrent; DC Bus Overvoltage; Overtemp; Control or Power Stage Bias Power Supply Undervoltage; Galvanic Isolation Between Signal and Power Stages | | | | | |
| **Indicators** | | Drive Enable LED Indicator, Power-On LED. | | | Drive Enable LED Indicator, Power-On LED. Fault & Overload LEDs | | |

Notes:
1. Depends on AC input voltage
2. 40-80 VDC bus requires external transformer, 110 VAC auxiliary input for control input power

### BA 10, 20, 30 Series





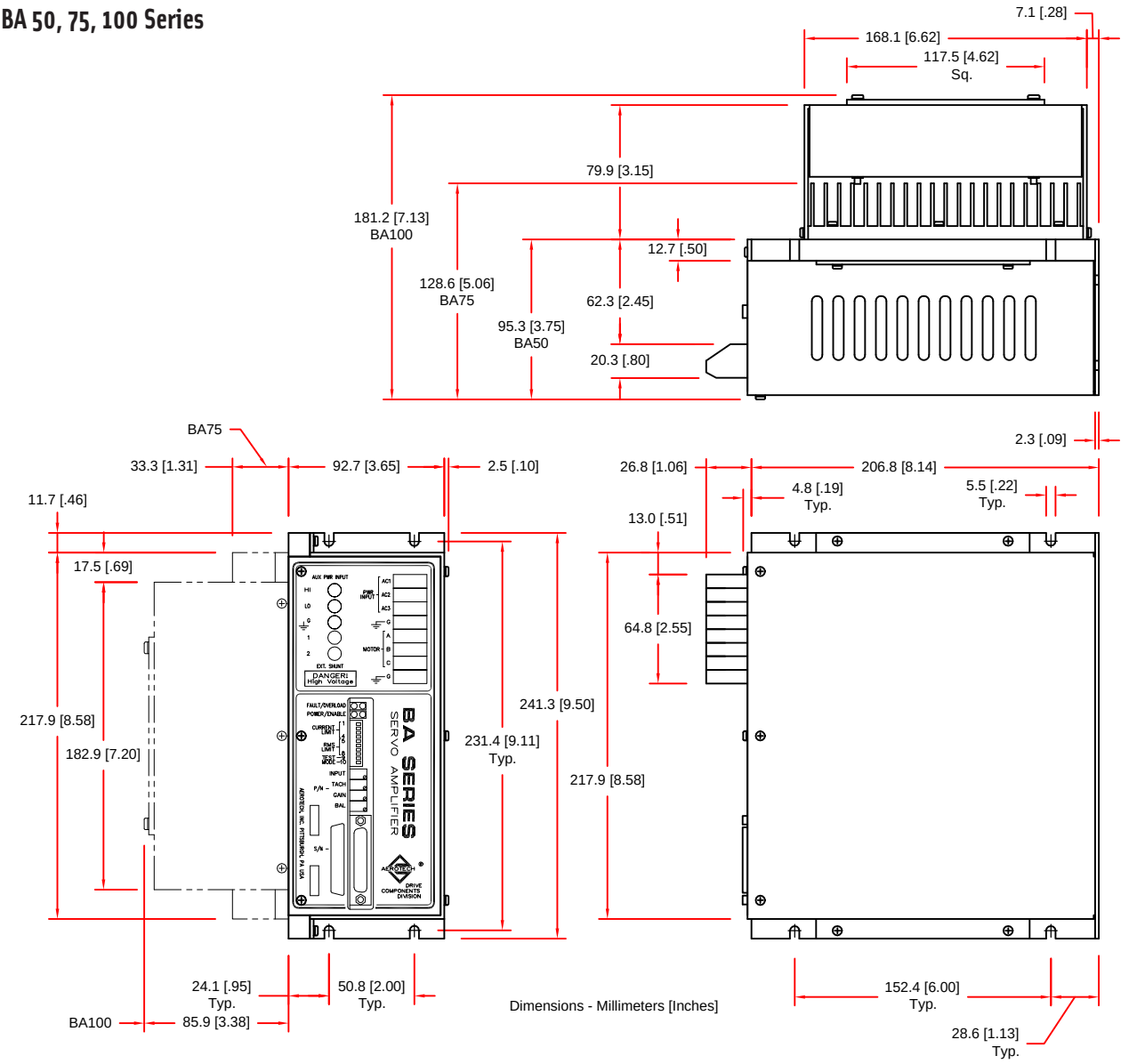

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## BA Series DIMENSIONS

### BA 50, 75, 100 Series






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## BA Series ORDERING INFORMATION

### Ordering Example

| BA | 20 | -160 | -S |
|---|---|---|---|
| Series | Output Current, Peak | Operating Bus Voltage | Internal Shunt Power Resistor |
| | 10, 20, 30, 50, 75, 100 | 40<br>80<br>160<br>320 | S |

### BA Series Amplifiers

| | |
|---|---|
| BA10-x | 5 A cont., 10 A peak servo amplifier/power supply |
| BA20-x | 10 A cont., 20 A peak servo amplifier/power supply |
| BA30-320-S | 15 A cont., 30 A peak servo amplifier/power supply, w/shunt regulator |
| BA50-320-S | 25 A cont., 50 A peak servo amplifier/power supply, w/shunt regulator 230 VAC, 1 phase input |
| BA75-320-S | 37 A cont., 75 A peak servo amplifier/power supply, w/shunt regulator 230 VAC, 3 phase input |
| BA100-320-S | 50 A cont., 100 A peak servo amplifier/power supply, w/shunt regulator 230 VAC, 3 phase input |

### Bus Voltage

| | |
|---|---|
| -40* | 40 VDC bus; 28 VAC input required (use TV0.3-28) |
| -80* | 80 VDC bus; 56 VAC input required (use TV0.3-56) |
| -160 | 160 VDC bus; 100-115 VAC input, direct line operation (for 80 VDC bus use TV0.3-56 transformer) |
| -320 | 320 VDC bus; 230 VAC input, direct line operation (includes shunt regulator) |

Note: Requires transformer such as TV0.3-28 OR TV0.3-56 for 56VAC input voltage.

### BA Series Amplifier Options

| | |
|---|---|
| -S | Add shunt resistor network for BA10 or BA20 (standard on the BA30, BA50, BA75, BA100) EX: BA20-160-S |

### BA Accessories

| | |
|---|---|
| TV0.3-28 | 0.3 kVA autotransformer; 28 or 56 VAC out for 40 or 80 VDC bus, 115/230 VAC, 50/60 Hz input |
| TV0.3-56 | 0.3 kVA autotransformer; 56 or 115 VAC out for 80 or 160 VDC bus, 115/230 VAC, 50/60 Hz input |
| TV1.5 | 1.5 kVA isolation transformer, 115/230 VAC input; 28, 43, 56, 70, 115 VAC output |
| TV2.5 | 2.5 kVA isolation transformer, 115/230 VAC input; 28, 43, 56, 70, 115 VAC output |
| TV5 | 5 kVA isolation transformer, 115/230 VAC input; 28, 43, 56, 70, 115 VAC output |
| TB | Screw terminal block for BA DB25 control connector |
| LF | AC line filter, general noise supression (not for CE Compliance) |
| UFM | AC line filter module (required for BA amplifiers to meet CE compliance) |

### Motor Feedback Cables (Brushless)

| | |
|---|---|
| C15291-50 | Feedback cable, BM series brushless motor to controller, 15 ft., MS, DB25 |
| PFC-15 | Feedback cable, BM series brushless motor to controller, 15 ft., MS, FL |
| C18391-50 | Feedback cable, BMS series slotless motor to controller, 15 ft., DB25, DB25 |

### Motor Power Cables (Brushless)

| | |
|---|---|
| C15801-50 | Motor power cable, BA amplifier to: BM75, BM130, BM200, BM250, 15 ft. |
| C15811-50 | Motor power cable, BA amplifier to: BM500, BM800, BM1400, 15 ft. |
| PMC2-15 | Motor power cable, BA amplifier to: BM2000, BM3400, BM4500, 15 ft. |
| C17891-50 | Motor power cable, BA amplifier to BMS series motors, 15 ft. |

### Motor Feedback & Power Cables (DC brush-type)

| | |
|---|---|
| BADC-MSO-15 | Integral cable, BAS to 1017, 1035, 1050, 1075, 1135, 1210, 1410 DC motor with MSO1, 15 ft, MS -> DB25, FL |
| BAMS-O-15 | Integral cable, BAS to 1580, 1960 DC motor with MSO1, 15 ft, MS -> DB25, FL |

### Control Cables

| | |
|---|---|
| BAC2-3 | Amplifier cable, BA amplifier to control for brushless series motors, 3 ft. |
| BAC6-3 | Amplifier cable, BA amplifier to control for DC brush series motors, 3 ft. |



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