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# Ndrive Series

## *Digital Servo Amplifiers*

- Wide output power range from 10 A peak to 150 A peak at 320 VDC
- 2- or 3-phase AC line input or DC input
- CE approval
- PWM and linear power stages
- Digital current, velocity, and position loops for improved motion stability
- Optional integrated encoder multiplier for higher throughput and reduced wiring
- Flexible design provides ability to drive brushless and DC brush-type servomotors as well as stepping motors
- Encoder or resolver feedback



*Ndrive HP*



*Ndrive HL*



*Ndrive CP*



*Ndrive CL*



*Ndrive MP*

The Ndrive family of digital servo amplifiers are the high performance discrete drive options for the Automation 3200 motion system. Capable of driving brushless and DC brush-type servomotors, and stepper motors, the Ndrive amplifiers perform both current loop and servo loop closure to ensure the highest level of positioning performance and rate stability.

The Ndrives are built using high performance DSPs, allowing them to perform complex calculations in real time. This processing capability allows Ndrives to sample the digital current loop and servo loop at a rate of 20 kHz. The Ndrive amplifiers also handle both digital and analog I/O, laser firing, and encoder multiplication.

In order to provide the capability for increased I/O counts for PLC-type applications, the Ndrive HP and Ndrive HL have an optional dedicated Ethernet port to communicate with I/O modules from third-party vendors.

Standard options for the Ndrive include on-board encoder multiplication, three-axis position synchronized output (PSO), brake relay, additional I/O, absolute encoder interface, and separate logic supply inputs for “keep-alive” operation. The Ndrive HP, Ndrive HL, Ndrive CP, and Ndrive CL accept AC input power while the Ndrive MP accepts DC power input.

The Ndrive HL, a linear power amplifier, is available for low noise and ultra-high performance applications. This amplifier is ideal for high bandwidth requirements and maintains superb linearity with zero crossover distortion.

Also included in the Ndrive family is the Ndrive CP, a high performance PWM amplifier for cost-sensitive applications, and the Ndrive CL, which is a high performance linear amplifier for cost-sensitive applications. The Ndrive CP and CL maintain the same level of sophisticated control architecture while eliminating support for optional features.

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## Ndrive Series COMPARISON



***Ndrive HP***
*Width: 99 mm*
*Height: 232.4 mm*



***Ndrive HL***
*Width: 206.9 mm*
*Height: 234.3 mm*



***Ndrive CP***
*Width: 63.5 mm*
*Height: 198.2 mm*



***Ndrive CL***
*Width: 103.7 mm*
*Height: 265.2 mm*



***Ndrive MP***
*Width: 41.1 mm*
*Height: 141.2 mm*

| Ndrive Comparison Chart | Ndrive HP | Ndrive HL | Ndrive CP | Ndrive CL | Ndrive MP |
|---|---|---|---|---|---|
| **PC Interface** | FireWire® | FireWire® | FireWire® | FireWire® | FireWire® |
| **Current Output, Peak** | 10-150 A | 10-20 A | 10-30 A | 10 A | 10 A |
| **Current Output, Continuous** | 5-75 A | 5-10 A | 5-15 A | 5 A | 5 A |
| **Bus Voltage** | 10-320 V | 40-80 V | 10-320 V | 40 V | 10-80 V |
| **Amplifier Type** | PWM | Linear | PWM | Linear | PWM |
| **Input Type** | 2 or 3 Phase AC | 2 Phase AC | 2 Phase AC | 2 Phase AC | DC |
| **Motor Style** | Brush, Brushless, Stepper | Brush, Brushless, Stepper | Brush, Brushless, Stepper | Brush, Brushless, Stepper | Brush, Brushless, Stepper |
| **Base I/O** | 4-DO/6-DI 1-AO/1-AI | 4-DO/6-DI 1-AO/1-AI | 4-DO/6-DI 1-AO/1-AI | 4-DO/6-DI 1-AO/1-AI | 1-AI |
| **Additional I/O (Additional to Base I/O)** | 8-DO/8-DI 1-AO/1-AI | 8-DO/8-DI 1-AO/1-AI | 16-DO/16-DI 1-AO/1-AI | 16-DO/16-DI 1-AO/1-AI | 8-DO/8-DI 1-AO/1-AI |
| **ESTOP Input** | Yes | Yes | Yes | Yes | Yes |
| **Brake Input Capable** | Yes | Yes | Yes | Yes | Yes |
| **Single Axis PSO(1)** | Yes | Yes | Yes | Yes | Yes |
| **Dual Axis PSO(1)** | Yes | Yes | No | No | No |
| **Triple Axis PSO(1)** | Yes | Yes | No | No | No |
| **Ethernet Capable for Third-Party I/O** | Yes | Yes | No | No | No |
| **Auxiliary Keep Alive** | Yes | Yes | Yes | Yes | Yes |

Notes:
1. PSO not available on Ndrive CP/MP when using integral MXU

The Ndrive MP is the smallest amplifier in the Ndrive family. With an overall package measuring under two inches wide and six inches in height, the Ndrive MP is ideal for applications with ultra-compact space requirements.

Any combination of Ndrive amplifiers can be used together on the FireWire® network to allow the system to be customized as needed.



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## Ndrive HP Series SPECIFICATIONS

| Ndrive HP | Units | 10 | 20 | 30 | 50 | 75 | 100 | 150 |
|---|---|---|---|---|---|---|---|---|
| **Output Voltage**[1] | VDC | 10-320[2] | | | | | | |
| **Peak Output Current (1 sec)** | $A_{pk}$ | 10 | 20 | 30 | 50 | 75 | 100 | 150 |
| **Continuous Output Current**[3] | $A_{pk}$ | 5 | 10 | 15 | 25 | 37 | 50 | 75 |
| **Power Amplifier Bandwidth** | kHz | Selectable Through Software | | | | | | |
| **PWM Switching Frequency** | kHz | 20 | | | | | | |
| **Minimum Load Inductance** | mH | 0.1 @ 160 VDC (1.0 mH @ 320 VDC) | | | | | | |
| **Operating Temperature** | °C | 0 to 50 | | | | | | |
| **Storage Temperature** | °C | -30 to 85 | | | | | | |
| **Weight** | kg (lb) | 2 36 (5.2) | | | 6.64 (14.6) | | | 11.06 (24.4) |
| **Maximum Shunt Regulator Dissipation** | W | 40 (Optional) | | 40 | 440 | 440 | 440 | 440 |
| **Power Input** | VAC | Single- or Three-Phase 7-240 VAC, 50-60 Hz[4] | | | | | | |
| **Encoder Input Frequency** | kHz | 200 kHz Amplified Sine (For Onboard Multipliers), 40 MHz TTL Square Wave | | | | | | |
| **Current Loop Update Rate** | kHz | 20 kHz | | | | | | |
| **Servo Loop Update Rate** | kHz | 1 to 20 kHz | | | | | | |
| **Keep Alive/Auxiliary Power Supply**[5] | — | Optional | | | | | | |
| **Brake Output** | — | Optional | | | | | | |
| **Position Synchronized Output** | — | Single Axis Standard, Two/Three Axis Optional | | | | | | |
| **Digital Inputs** | — | 6 Optically-Isolated (2 High Speed) | | | | | | |
| **Digital Outputs** | — | 4 Optically-Isolated | | | | | | |
| **Analog Inputs** | — | One 16-bit Differential | | | | | | |
| **Analog Outputs** | — | One 18-bit Single-Ended | | | | | | |
| **Additional I/O**[6] | — | 8/8 Digital; 1/1 Analog | | | | | | |
| **MXH** | — | Up to x2048 | | | | | | |
| **Ethernet** | — | Optional | | | | | | |
| **Emergency Stop Sense Input (ESTOP)**[7] | — | Yes | | | | | | |
| **Resolver Interface** | — | Optional[8] | | | | | | |
| **Shared Bus for Regen** | — | No | | | | | | Yes |

Notes:
1. Output voltage dependent on input voltage.
2. 10-120 VDC bus requires external transformer and auxiliary power option for logic power.
3. Peak value of the sine wave; rms current for AC motors is 0.707($A_{pk}$).
4. Optional three-phase input available on Ndrive HP models.
5. Auxiliary power option requires single phase 115-240 VAC 50-60 Hz.
6. Requires IO option.
7. Requires external relay to remove AC power.
8. One- or two-channel input.

## Ndrive HL SPECIFICATIONS

| Ndrive HL | Units | 10-40 | 20-40 | 10-80 |
|---|---|---|---|---|
| **Output Voltage**[1] | VDC | ±40 | ±40 | ±80 |
| **Peak Output Current (1 sec)**[8] | $A_{pk}$ | 10 | 20 | 10 |
| **Continuous Output Current**[2,8] | $A_{pk}$ | 5 | 10 | 5 |
| **Power Amplifier Bandwidth** | kHz | Selectable Through Software | | |
| **Minimum Load Inductance** | mH | 0 | | |
| **Operating Temperature** | °C | 0 to 50 | | |
| **Storage Temperature** | °C | -30 to 85 | | |
| **Weight** | kg (lb) | 10.36 (22.8) | | |
| **Maximum Shunt Regulator Dissipation** | W | N/A | | |
| **Power Input** | VAC | Single-Phase 7-240 VAC, 50-60 Hz | | |
| **Encoder Input Frequency** | kHz | 200 kHz Amplified Sine (For Onboard Multipliers), 40 MHz TTL Square Wave | | |
| **Current Loop Update Rate** | kHz | 20 kHz | | |
| **Servo Loop Update Rate** | kHz | 1 to 20 kHz | | |
| **Keep Alive/Logic Power Input**[4] | — | Optional | | |
| **Brake Output** | — | Optional | | |
| **Position Synchronized Output** | — | Single Axis Standard, Two/Three Axis Optional | | |
| **Digital Inputs** | — | 6 Optically-Isolated (2 High Speed) | | |
| **Digital Outputs** | — | 4 Optically-Isolated | | |
| **Analog Inputs** | — | One 16-bit Differential | | |
| **Analog Outputs** | — | One 18-bit Single-Ended | | |
| **Additional I/O**[5] | — | 8/8 Digital; 1/1 Analog | | |
| **MXH** | — | Up to x2048 | | |
| **Ethernet** | — | Optional | | |
| **Emergency Stop Sense Input (ESTOP)**[6] | — | Yes | | |
| **Resolver Interface** | — | Optional[7] | | |

Notes:
1. Output voltage dependent upon input voltage.
2. Peak value of the sine wave; rms current for AC motors is 0.707($A_{pk}$).
3. 10-120 VDC bus requires external transformer and auxiliary power option for logic power.
4. Auxiliary power option requires single phase 115-240 VAC 50-60 Hz.
5. Requires IO option.
6. Requires external relay to remove AC power.
7. One- or two-channel input.
8. Load dependent.



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## Ndrive CP, CL, and MP SPECIFICATIONS

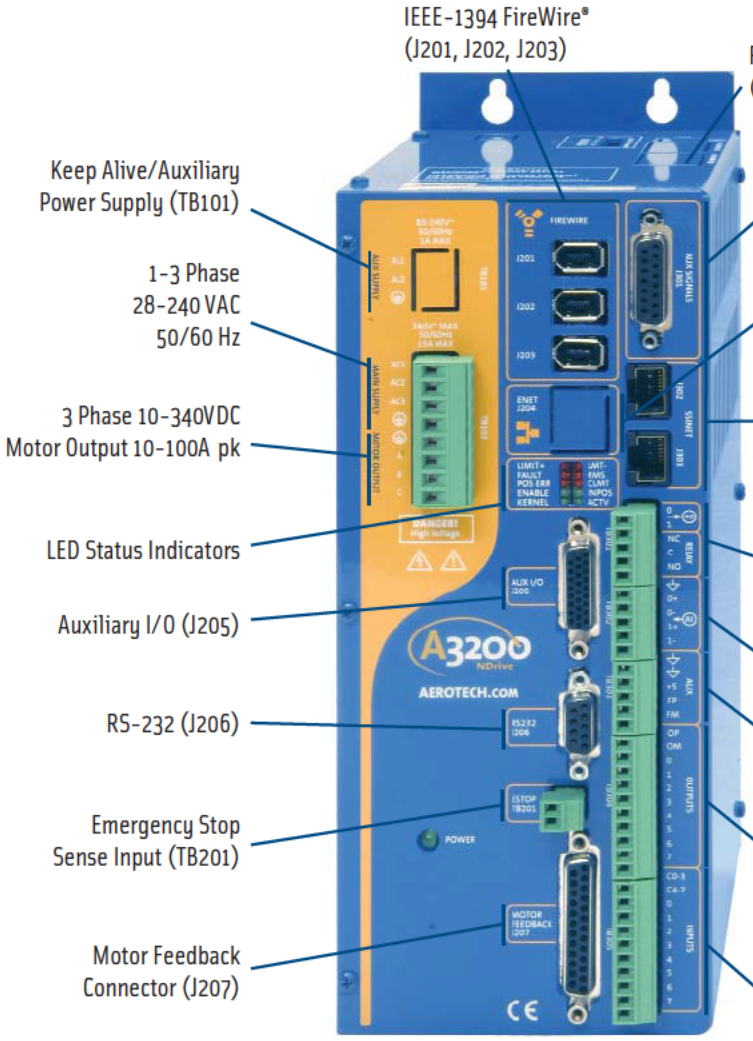
| Ndrive CP, CL, and MP | Units | CP10 | CP20 | CP30 | CL | MP10 |
|---|---|---|---|---|---|---|
| **Output Voltage**[1] | VDC | 10-320[2] | 10-320[2] | 10-320[2] | 40 V | 10-80 |
| **Peak Output Current (2 sec)** | $A_{pk}$ | 10 | 20 | 30 | 10 | 10 |
| **Continuous Output Current**[3] | $A_{pk}$ | 5 | 10 | 15 | 5 | 5 |
| **Power Amplifier Bandwidth** | kHz | Selectable Through Software | | | | |
| **PWM Switching Frequency** | kHz | 20 | | | N/A | 20 |
| **Minimum Load Inductance** | mH | 0.1 @ 160 VDC (1.0 mH @ 320 VDC) | | | 0 | 0.1 @ 80 VDC |
| **Operating Temperature** | °C | 0 to 50 | | | | |
| **Storage Temperature** | °C | -30 to 85 | | | | |
| **Weight** | kg (lb) | 1.64 (3.6) | | | 3.54 (7.8) | 0.45 (1.0) |
| **Maximum Shunt Regulator Dissipation** | W | 40 (Optional) | | | N/A | N/A |
| **Power Input** | VAC | Single-Phase 7-240 VAC, 50-60 Hz | | | 56 VAC Motor Supply (center tapped transformer; two 28 VAC windings); 85-240 VAC Logic Supply | 10-80 VDC Motor Supply; 24-80 VDC Logic Supply |
| **Encoder Input Frequency** | kHz | 400 kHz Amplified Sine (For Onboard Multipliers), 40 MHz TTL Square Wave | | | | |
| **Current Loop Update Rate** | kHz | 20 kHz | | | | |
| **Servo Loop Update Rate** | kHz | 8 to 20 kHz | | | | |
| **Keep Alive/Logic Power Input** | — | Optional[4] | | | Yes | Yes |
| **Brake Output** | — | Optional | | | | |
| **Position Synchronized Output**[5,6] | — | Single Axis Only | | | | |
| **Digital Inputs** | — | 6 Optically-Isolated (2 High Speed) | | | | N/A |
| **Digital Outputs** | — | 4 Optically-Isolated | | | | N/A |
| **Analog Inputs** | — | One 12-bit Differential | | | One 16-bit | One 12-bit Differential |
| **Analog Outputs** | — | One 16-bit Single-Ended | | | | N/A |
| **Additional I/O**[7] | — | 16/16 Digital; 1/1 Analog | | | | 8/8 Digital; 1/1 Analog |
| **MXU** | — | Up to x1024 | | | Up to x4096 | Up to x1024 |
| **Ethernet** | — | N/A | | | | |
| **Emergency Stop Sense Input (ESTOP)**[8] | — | Yes | | | | |
| **Resolver Interface** | — | N/A | | | | |

Notes:
1. Output voltage dependent upon input voltage.
2. 10-120 VDC bus requires external transformer and auxiliary power option for logic power.
3. Peak value of the sine wave; rms current for AC motors is 0.707($A_{pk}$).
4. Ndrive CP auxiliary power option requires single phase 115-240 VAC 50-60 Hz.
5. Not available with MXU option.
6. Requires IO board with Ndrive MP.
7. Requires IO option.
8. Requires external relay to remove AC power.

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## Ndrive HP10/20/30 COMPONENTS

### Ndrive HP10/20/30 with Optional I/O

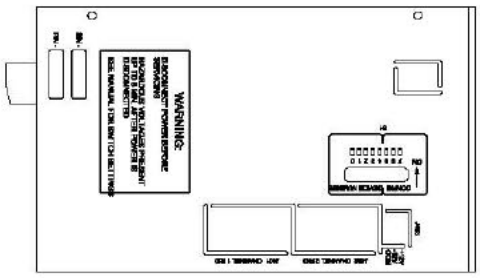


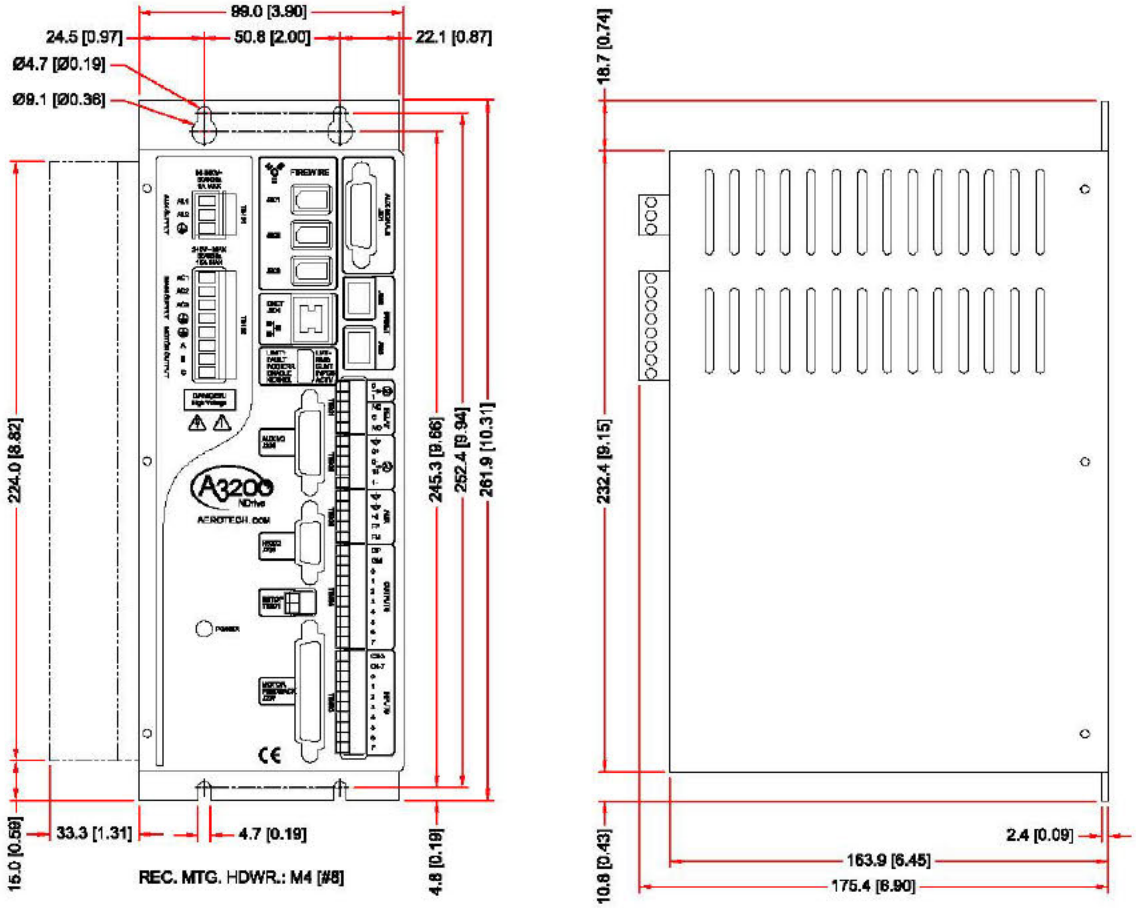



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## Ndrive HP10/20/30 DIMENSIONS

### Ndrive HP10/20/30 with Optional I/O

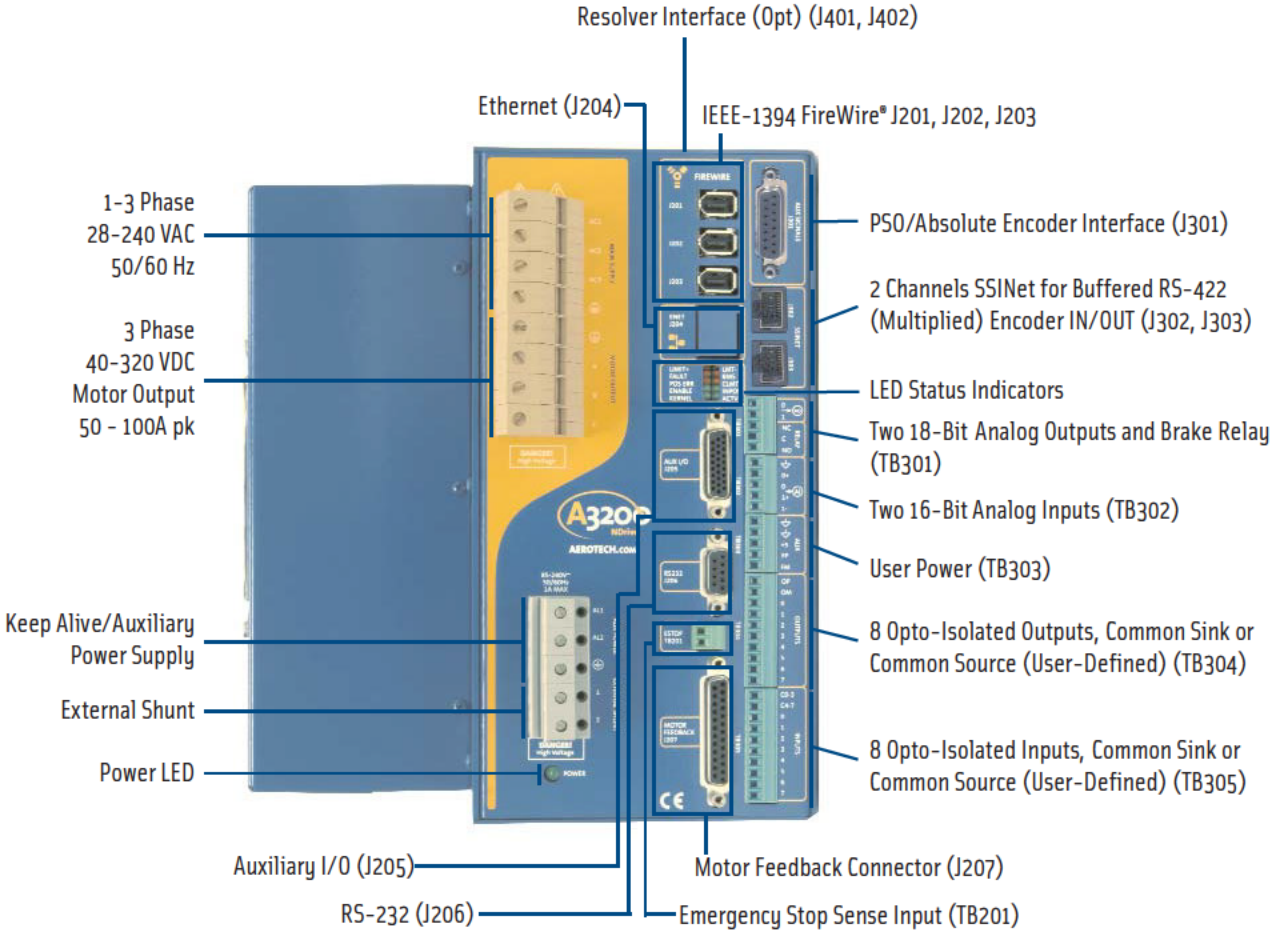





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## Ndrive HP50/75/100 COMPONENTS

### Ndrive HP50/75/100 with Optional I/O

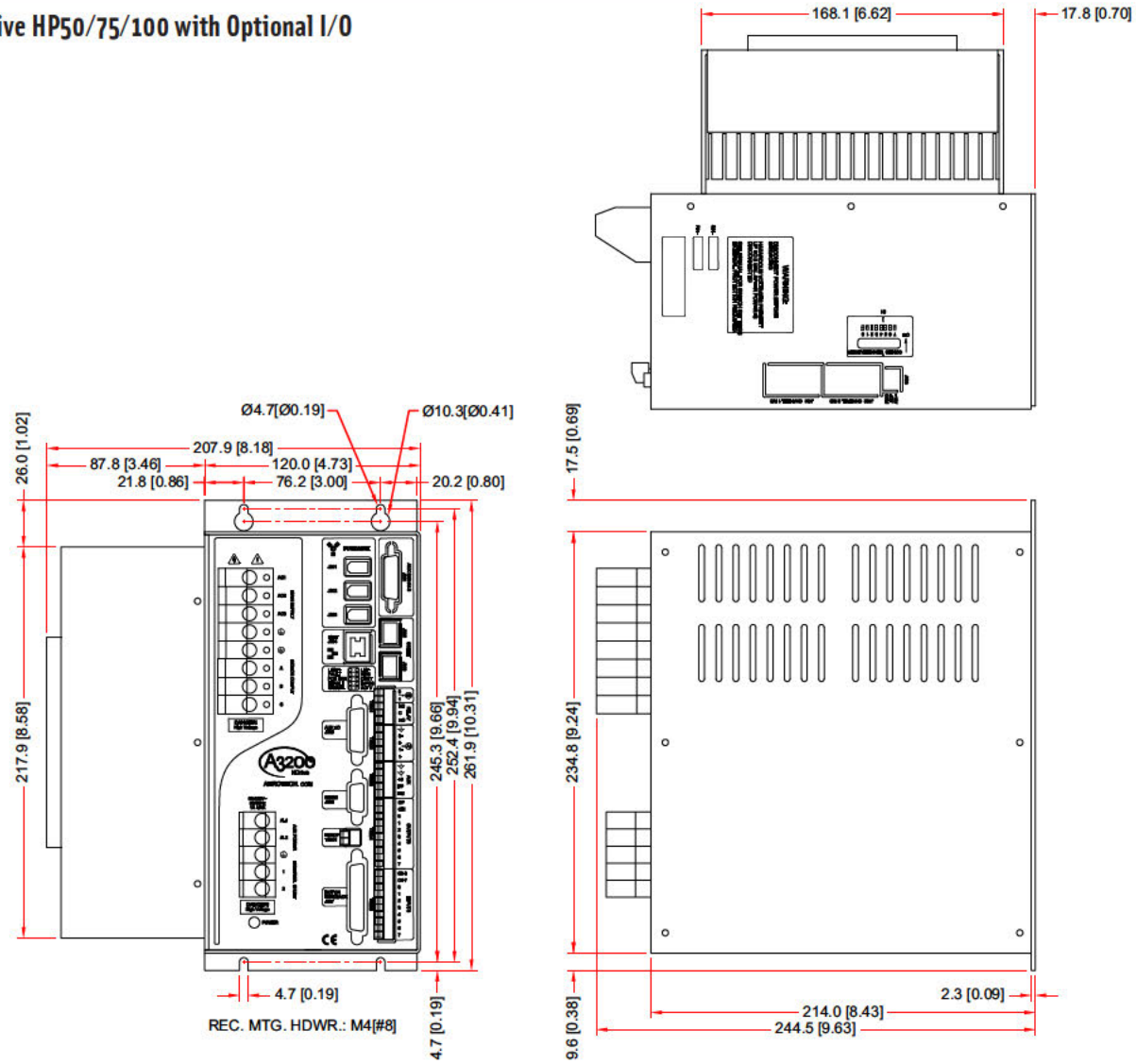





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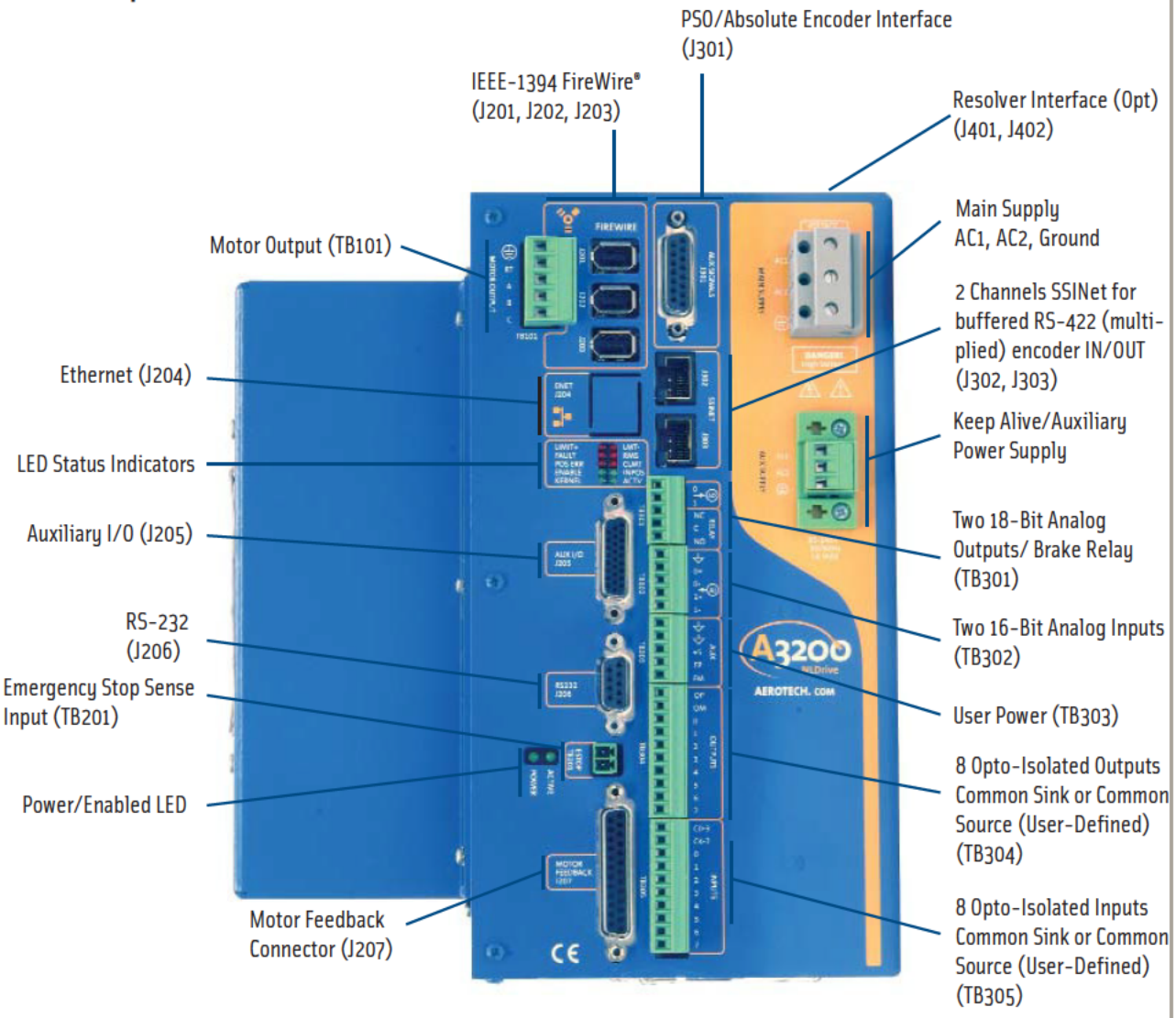
## Ndrive HP50/75/100 DIMENSIONS

### Ndrive HP50/75/100 with Optional I/O



## Ndrive HL COMPONENTS

### Ndrive HL with Optional I/O

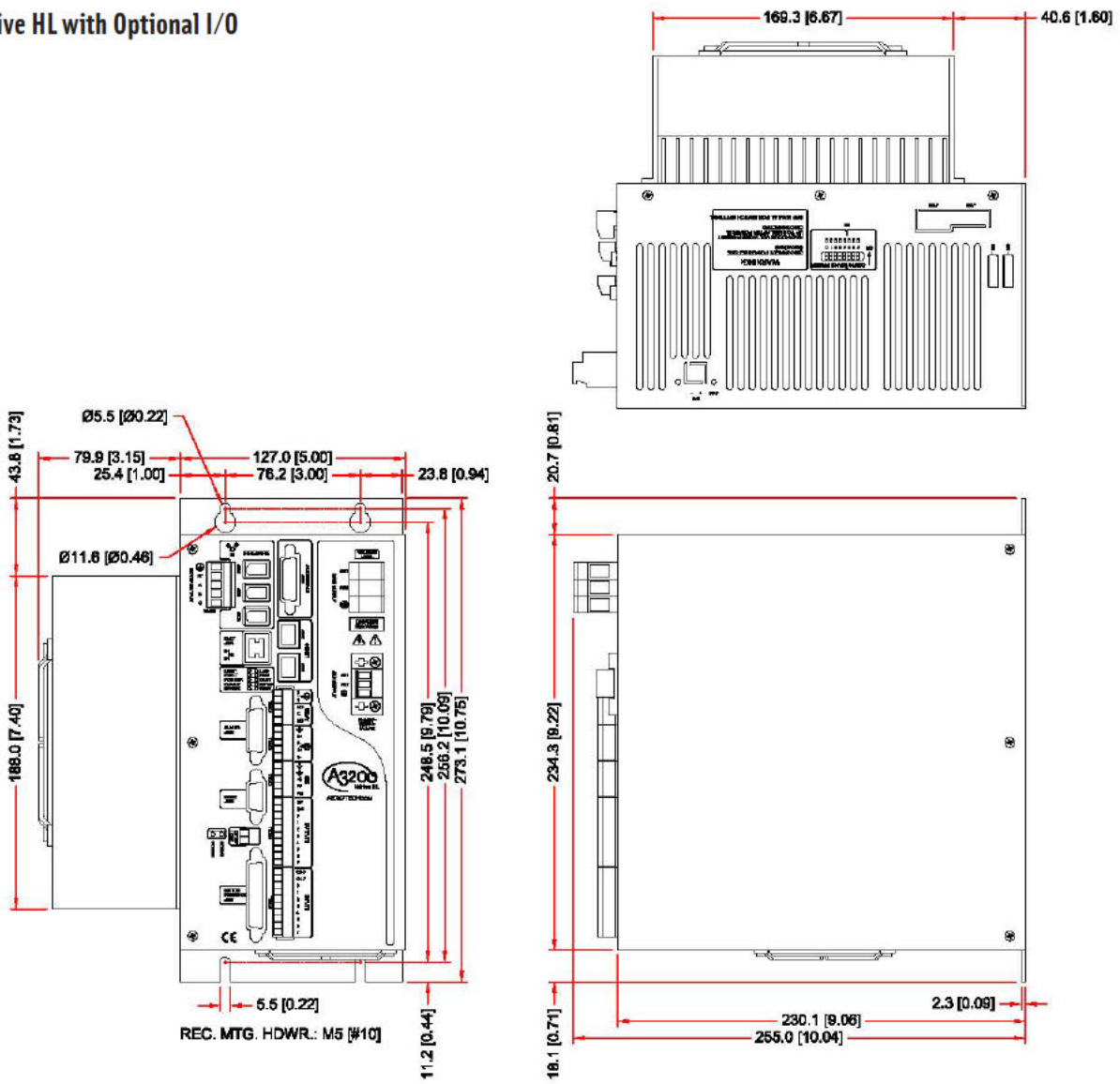





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## Ndrive HL DIMENSIONS

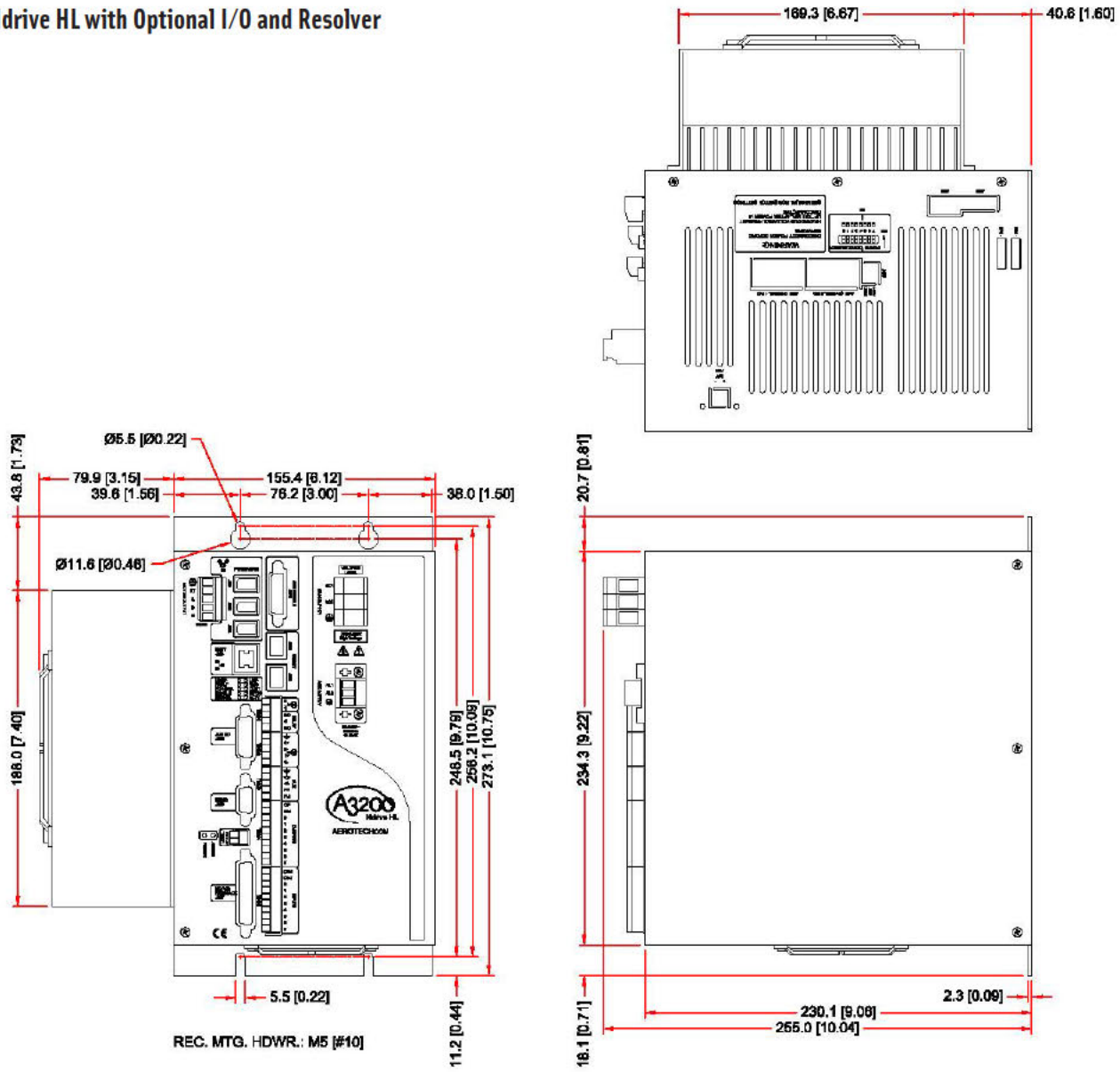
### Ndrive HL with Optional I/O




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## Ndrive HL DIMENSIONS

### Ndrive HL with Optional I/O and Resolver

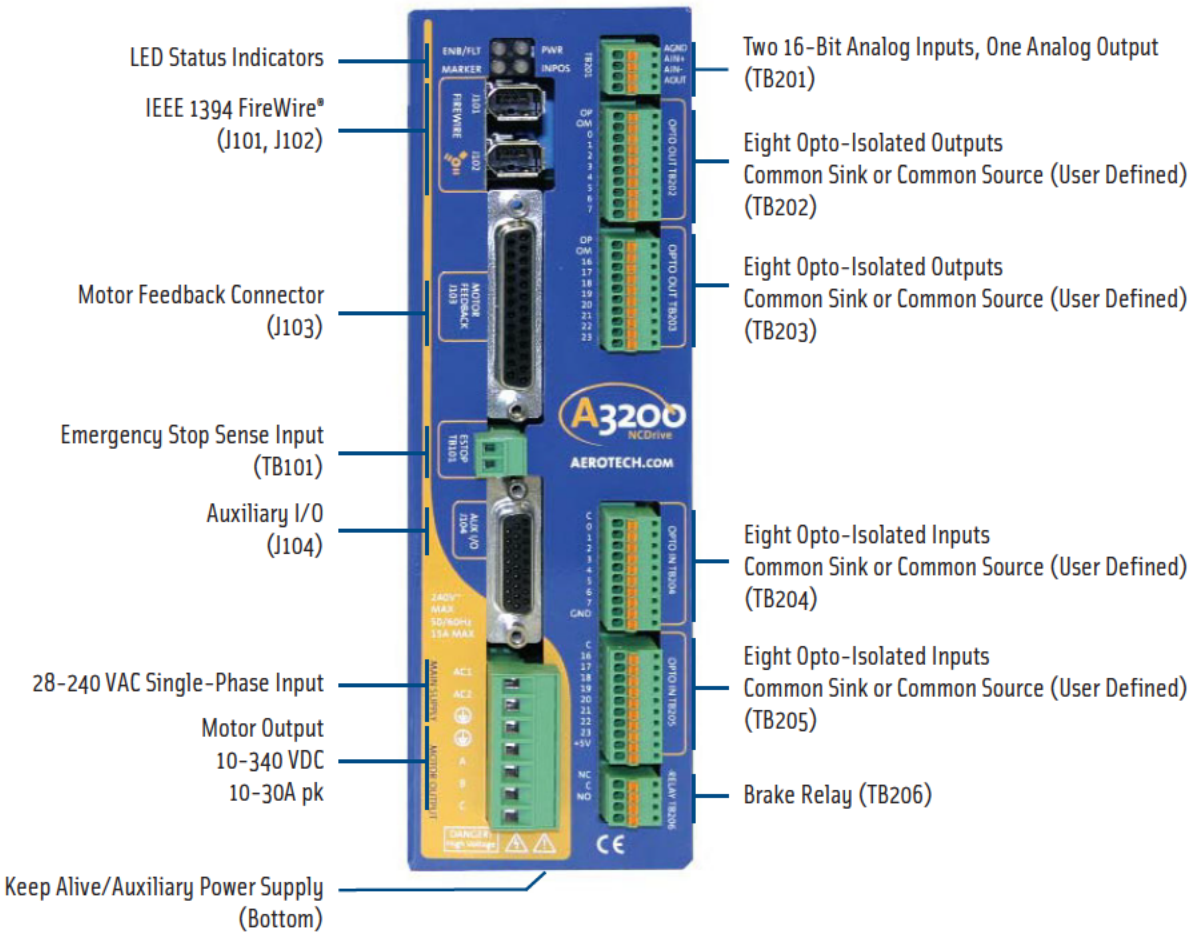





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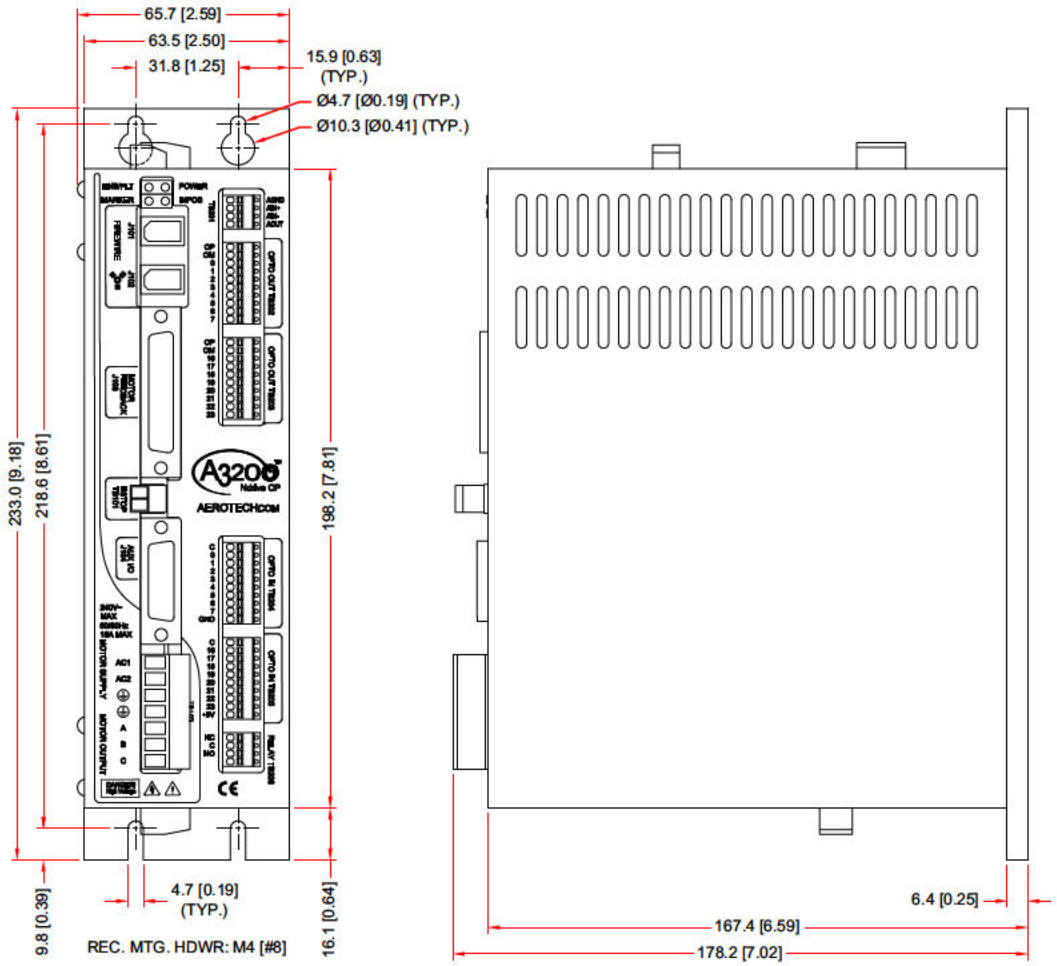
## Ndrive CP COMPONENTS

### Ndrive CP with Optional I/O



## Ndrive CP DIMENSIONS

### Ndrive CP with Optional I/O

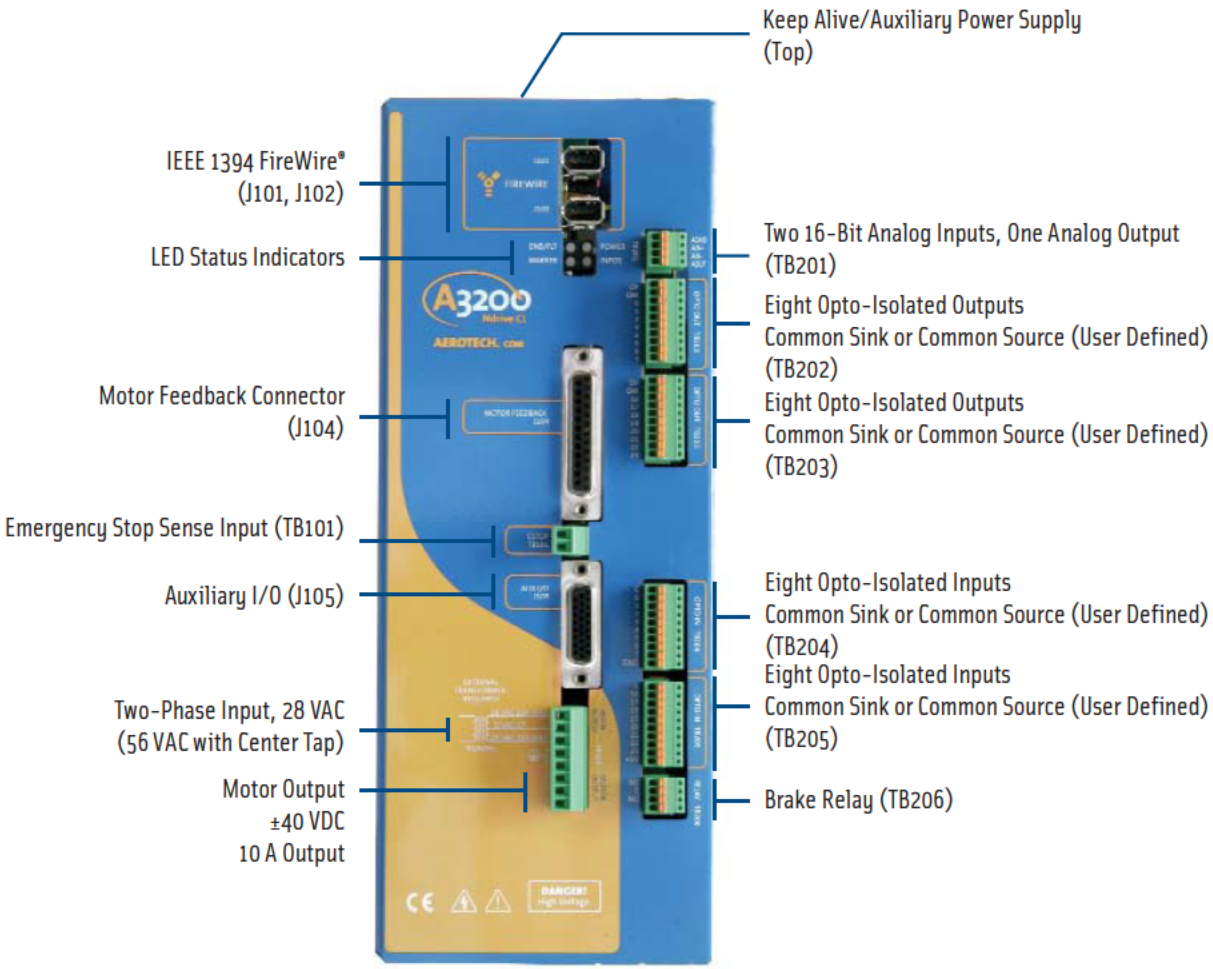





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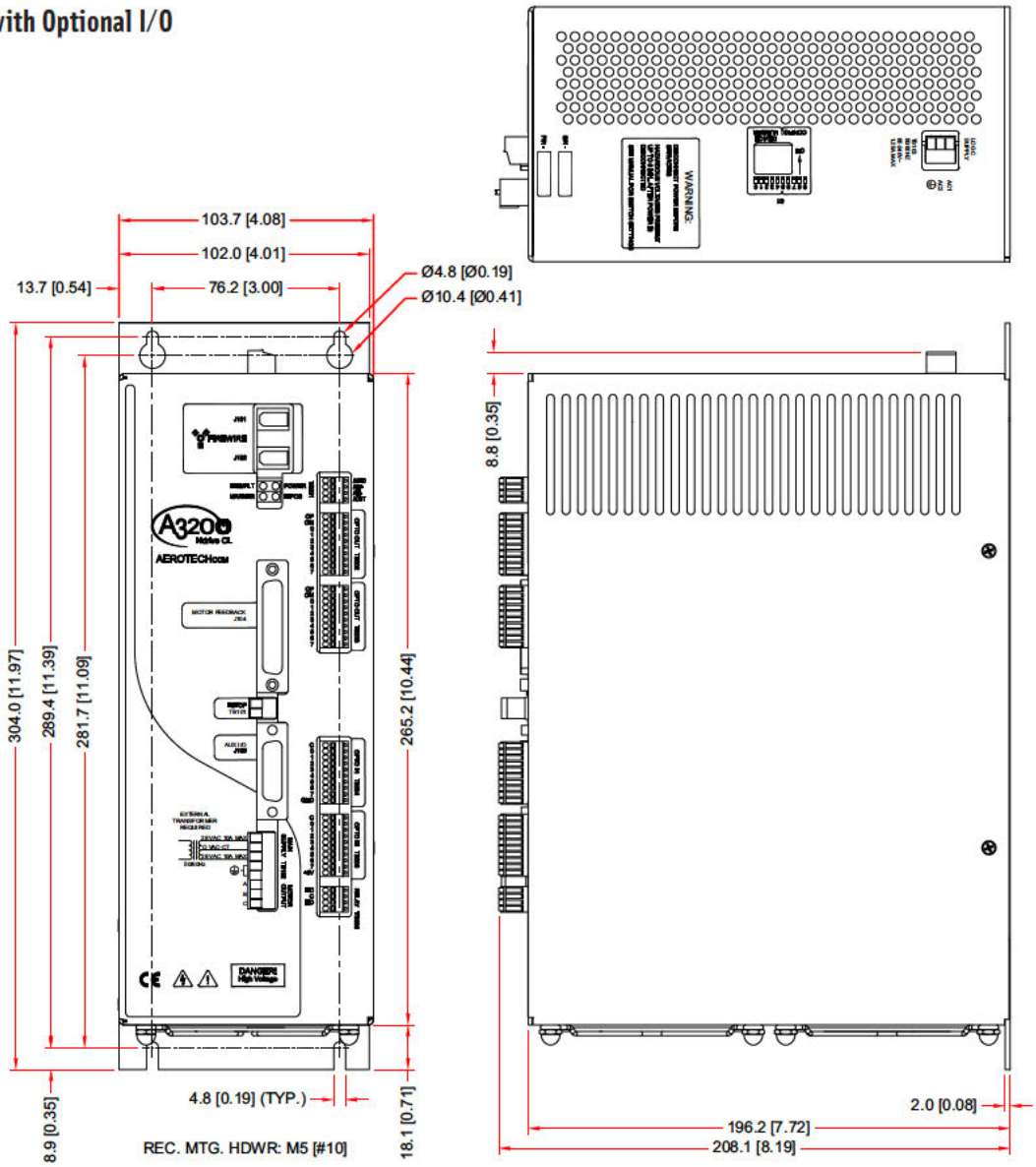
## Ndrive CL COMPONENTS

### Ndrive CL with Optional I/O



## Ndrive CL DIMENSIONS

### Ndrive CL with Optional I/O

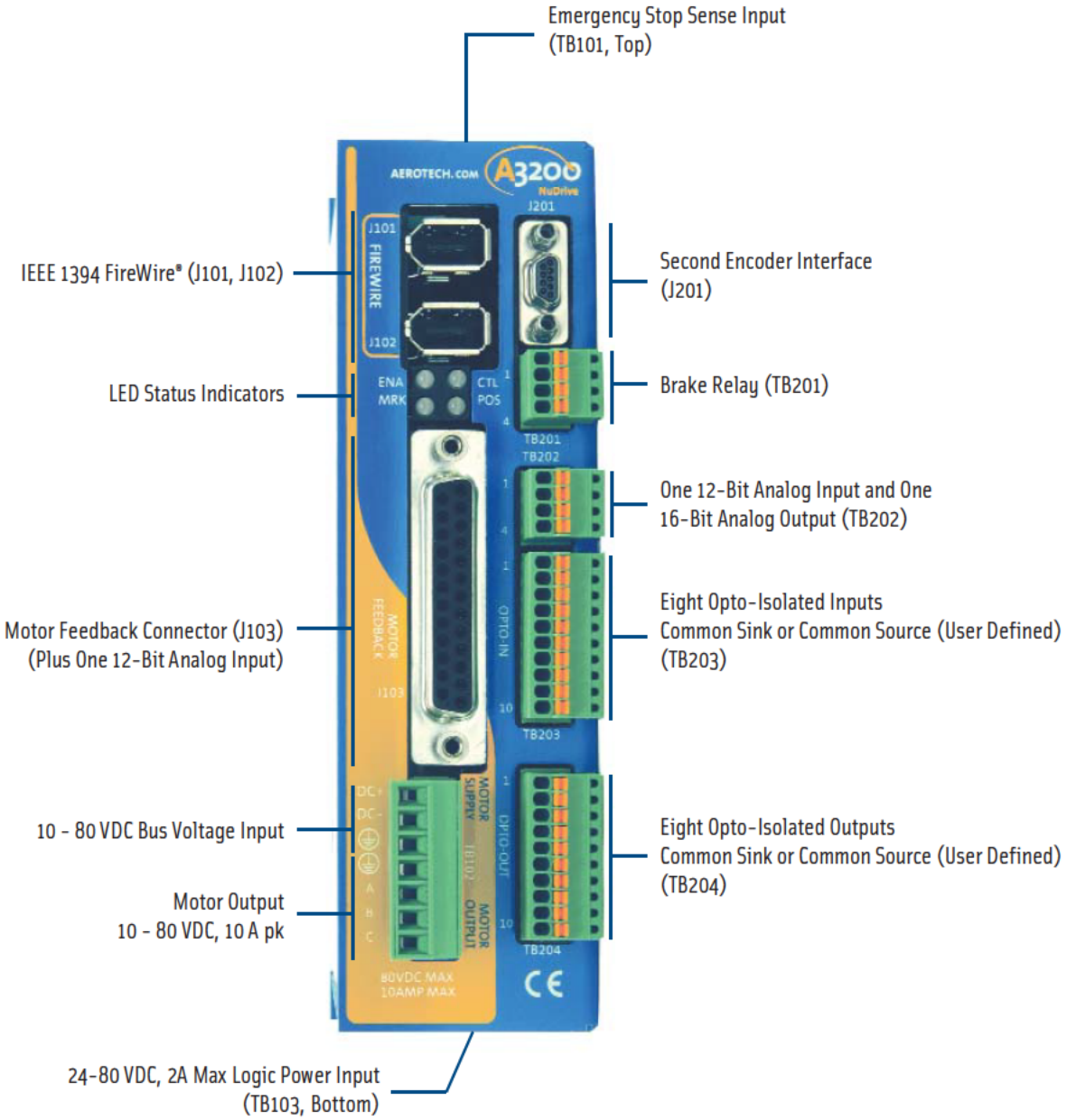





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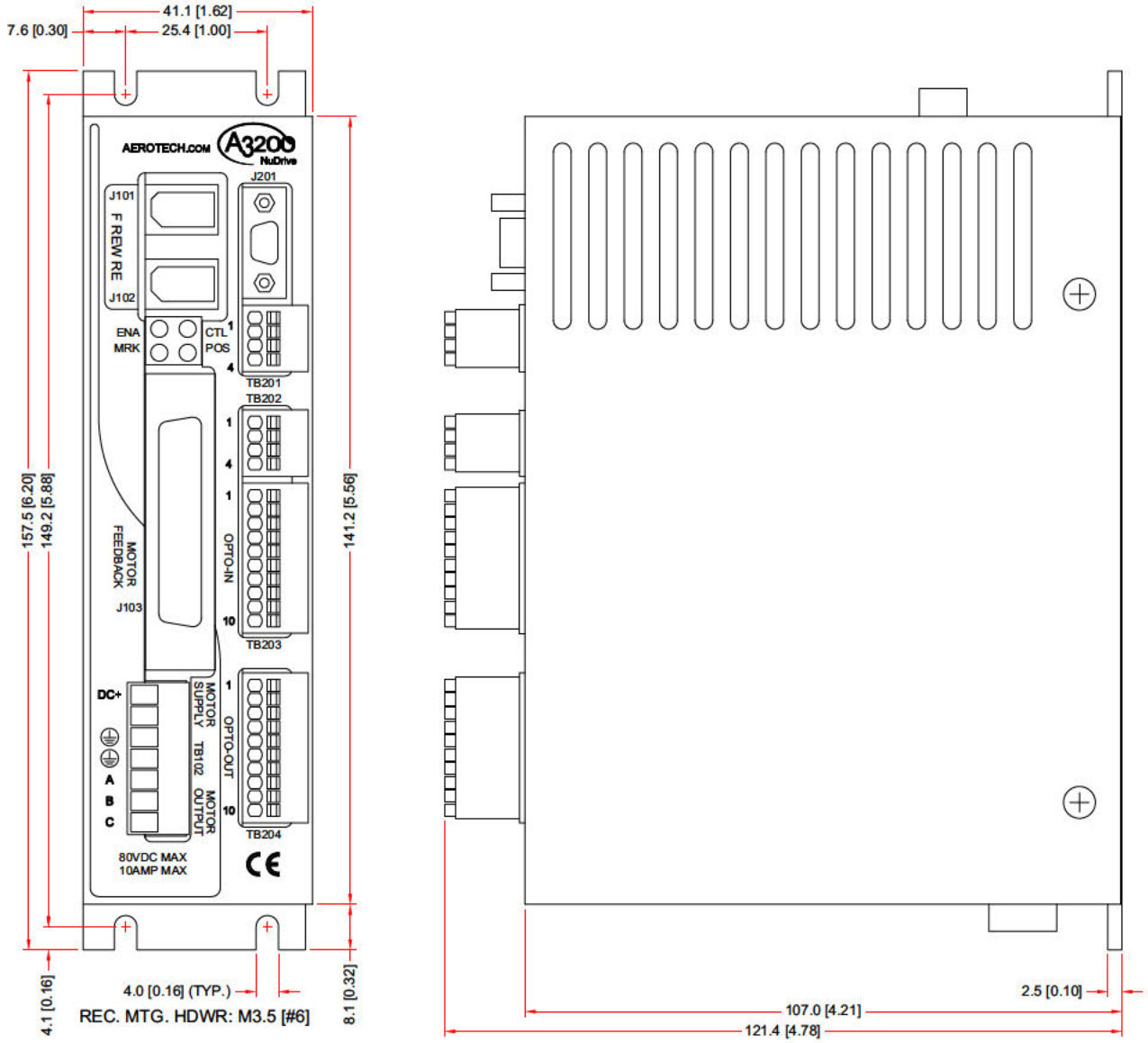
## Ndrive MP10 COMPONENTS

### Ndrive MP10 with Optional I/O



## Ndrive MP10 DIMENSIONS

### Ndrive MP10 with Optional I/O






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## Ndrive Series ORDERING INFORMATION

### Ordering Example

| Ndrive HP | 20 | -ENET | RDP1-10K | -AUXPWR |
|---|---|---|---|---|
| **Base** | **Output Current** | **Control Option** | **Resolver Options** | **Power Stage Option** |
| Ndrive HP | 10<br>20<br>30<br>50<br>75<br>100<br>150 | -IO<br>-IOH<br>-DUALPSO<br>-TRIPLEPSO<br>-PSOPTO2<br>-PSOPTO3<br>-PSOPTO4<br>-MXH<br>-ENET | RDP1-10K<br>RDP1-7.5K<br>RDP1-5K<br>RDP2-10K<br>RDP2-7.5K<br>RDP2-5K | -S<br>-EXTSHUNT<br>-AUXPWR<br>-HS<br>-3P<br>-FAN-115<br>-FAN-230 |
| Ndrive HL | 10-40-X<br>20-40-X<br>10-80-X | -IO<br>-IOH<br>-DUALPSO<br>-TRIPLEPSO<br>-PSOPTO2<br>-PSOPTO3<br>-PSOPTO4<br>-MXH<br>-ENET | RDP1-10K<br>RDP1-7.5K<br>RDP1-5K<br>RDP2-10K<br>RDP2-7.5K<br>RDP2-5K | -AUXPWR |
| Ndrive CP | 10<br>20<br>30 | -IO<br>-MXU | | -S |
| Ndrive CL | 10 | -IO<br>-MXU | | |
| Ndrive MP | 10 | -IO<br>-MXU | | |

## NDRIVE HP (PWM)

| | |
|---|---|
| NDRIVE HP10 | 10 A peak, 5 A continuous, 115/240 VAC input, PWM digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE HP20 | 20 A peak, 10 A continuous, 115/240 VAC input, PWM digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE HP30-S | 30 A peak, 15 A continuous, 115/240 VAC, input digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 100 watt internal shunt resistor |
| NDRIVE HP50-S | 50 A peak, 25 A continuous, 115/240 VAC input, digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 400 watt internal shunt resistor |
| NDRIVE HP75-S | 75 A peak, 37 A continuous, 115/240 VAC input, digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing ); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 400 watt internal shunt resistor |
| NDRIVE HP100-S | 100 A peak, 50 A continuous, 115/240 VAC input, digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 400 watt internal shunt resistor |
| NDRIVE HP150-S | 150 A peak, 75 A continuous, 115/240 VAC input, digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 400 watt internal shunt resistor |

## Ndrive Series ORDERING INFORMATION

### NDRIVE HL (Linear)

| | |
|---|---|
| NDRIVE HL10-40-x | 10 A peak, 5 A continuous, ±40 VDC bus linear digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE HL20-40-x | 20 A peak, 10 A continuous, ±40 VDC bus linear digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE HL10-80-x | 10 A peak, 5 A continuous, ±80 VDC bus linear digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking only); six opto-isolated digital inputs (sinking or sourcing); one 18-bit analog output; one 16-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |

### NDRIVE HL Line Voltage (-x) Options

| | |
|---|---|
| -A | 115 VAC input |
| -B | 230 VAC input |
| -C | 100 VAC input |
| -D | 200/208 VAC input |

### NDRIVE HP/HL Control Options

| | |
|---|---|
| -IO | Expansion board with 8 opto-isolated inputs (sinking or sourcing) and 8 outputs (sinking or sourcing ); two 18-bit analog outputs; two 16-bit differential analog inputs; SSINET; absolute encoder interface and brake relay; includes HCPL2601 opto-isolator |
| -IOH | High power expansion board with 8 opto-isolated inputs (sinking or sourcing) and 8 outputs (sinking or sourcing ) rated at 1 A per channel; two 18-bit analog outputs; two 16-bit differential analog inputs; SSINET; absolute encoder interface and brake relay; includes HCPL2601 opto-isolator |
| -DUALPSO | Two-axis PSO firing; second encoder input through AUX connection on NDRIVE or through SSINET on IO board; includes HCPL2601 opto-isolator |
| -TRIPLEPSO | Three-axis PSO firing; requires IO option to provide connections for three axes of encoder feedback; includes HCPL2601 opto-isolator |
| -PSOPTO2 | Opto-isolator for PSO; requires IO/IOH option (<+15 V, high speed, low current, 6N136) |
| -PSOPTO3 | Opto-isolator for PSO; requires IO/IOH option (<+30 V, low speed, high current, 4N33) |
| -PSOPTO4 | Opto-isolator for PSO; requires IO/IOH option (TIL117-M, 40 kHz, 5-25 VDC, 50 mA) |
| -MXH | Programmable encoder multiplier up to x2048; supports single/dual-axis PSO and real-time encoder quadrature output |
| -ENET | 10/100 BASE-T Ethernet port |

### NDRIVE HP/HL Resolver Options

| | |
|---|---|
| RDP1-10K | Ndrive 1-channel resolver to digital feedback card with dynamic resolution switching capability; 10 kHz carrier frequency |
| RDP1-7.5K | Ndrive 1-channel resolver to digital feedback card with dynamic resolution switching capability; 7.5 kHz carrier frequency |
| RDP1-5K | Ndrive 1-channel resolver to digital feedback card with dynamic resolution switching capability; 5 kHz carrier frequency |
| RDP2-10K | Ndrive 2-channel resolver to digital feedback card with dynamic resolution switching capability; 10 kHz carrier frequency |
| RDP2-7.5K | Ndrive 2-channel resolver to digital feedback card with dynamic resolution switching capability; 7.5 kHz carrier frequency |
| RDP2-5K | Ndrive 2-channel resolver to digital feedback card with dynamic resolution switching capability; 5 kHz carrier frequency |


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# Ndrive Series ORDERING INFORMATION

## NDRIVE HP/HL Power Stage Options

| | |
|---|---|
| -S | 100 W internal shunt resistor network<br>Note: Not valid with NdriveHL |
| -EXTSHUNT | 2-pin connector for external shunt. External shunt not provided<br>Note: Only valid with NdriveHP50/75/100 |
| -HS | Heat sink with fins<br>Note: Not valid with Ndrive HL; standard on Ndrive HP50/75/100 |
| -3P | 3-phase AC input, standard on Ndrive HP50/75/100<br>Note: Not valid with Ndrive HL |
| -FAN-115 | 115 VAC external cooling fan<br>Note: Only valid with Ndrive HP50/75; included on Ndrive HP100 |
| -FAN-230 | 230 VAC external cooling fan<br>Note: Only valid with Ndrive HP50/75; included on Ndrive HP100 |

## NDRIVE CP (PWM)

| | |
|---|---|
| NDRIVE CP10 | 10 A peak, 5 A continuous, 115/240 VAC, input PWM digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking or sourcing); six opto-isolated digital inputs (sinking or sourcing); one 16-bit analog output; one 12-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE CP20 | 20 A peak, 10 A continuous, 115/240 VAC, input PWM digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking or sourcing); six opto-isolated digital inputs (sinking or sourcing); one 16-bit analog outputs; one 12-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |
| NDRIVE CP30-S | 30 A peak, 15 A continuous, 115/240 VAC input, PWM digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking or sourcing); six opto-isolated digital inputs (sinking or sourcing); two 16-bit analog outputs; one 12-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input; 40 W internal shunt resistor |

## NDRIVE CP Control Options

| | |
|---|---|
| -IO | Expansion board with 16 opto-isolated inputs (sinking or sourcing); 16 outputs (sinking or sourcing ); one 12-bit analog input; one 16-bit analog output and brake relay |
| -MXU | Programmable encoder multiplier up to x1024; no real-time output |

## NDRIVE CP Power Stage Options

| | |
|---|---|
| -S | 100 W internal shunt resistor network |

## NDRIVE CL (Linear)

| | |
|---|---|
| NDRIVE CL10-40 | 10 A peak, 5 A continuous, ±40 VDC input linear digital drive with FireWire interface; supports brush and brushless motors; includes: four opto-isolated digital outputs (sinking or sourcing); six opto-isolated digital inputs (sinking or sourcing); one 16-bit analog output; one 12-bit differential analog input; single-axis PSO capability; two quadrature encoder input channels; ESTOP sense input |

## NDRIVE CL Control Options

| | |
|---|---|
| -IO | Expansion board with 16 opto-isolated inputs (sinking or sourcing); 16 outputs (sinking or sourcing); one 12-bit analog input; one 16-bit analog output and brake relay |
| -MXU | Programmable encoder multiplier up to x1024; no real-time output |

## NDRIVE MP (PWM)

| | |
|---|---|
| NDRIVE MP10 | 10 A peak, 5 A continuous, 10-80 VDC input, PWM digital drive with FireWire interface; supports brush and brushless motors; includes: single-axis PSO capability (requires I/O board); 1 quadrature encoder input channel; ESTOP sense input; 24-80 VDC logic power input |

## NDRIVE MP Control Options

| | |
|---|---|
| -IO | Expansion board with 8 opto-isolated inputs (sinking or sourcing); 8 outputs (sinking or sourcing); one 12-bit analog input; one 16-bit analog output and brake relay; PSO output |
| -MXU | Programmable encoder multiplier up to x1024; no real-time output |

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