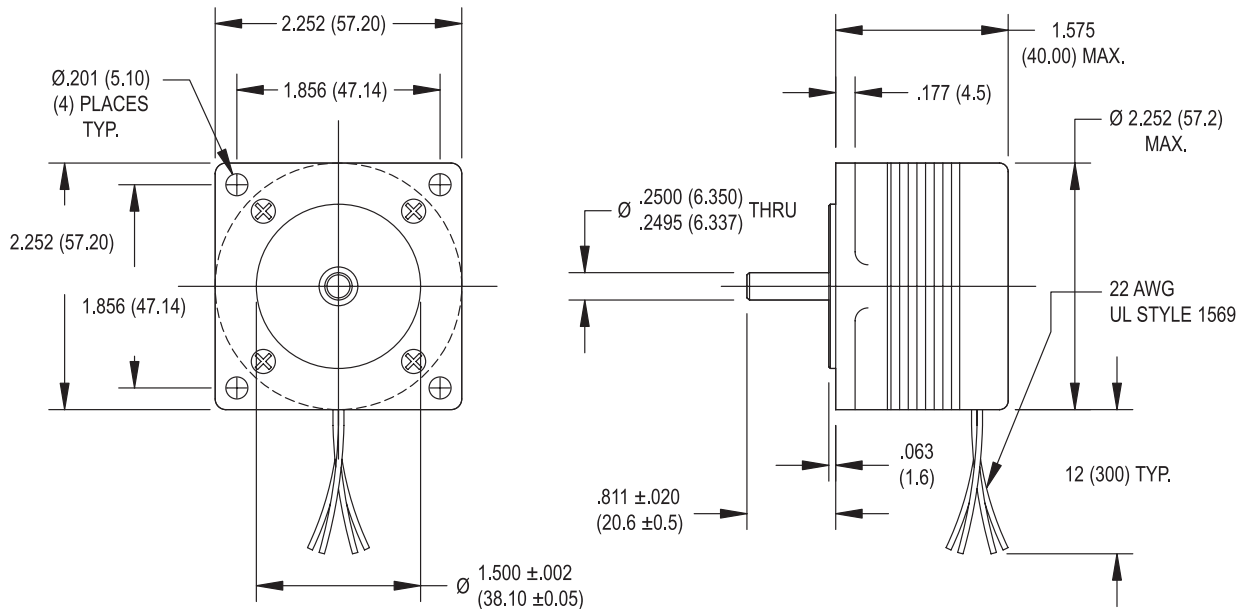
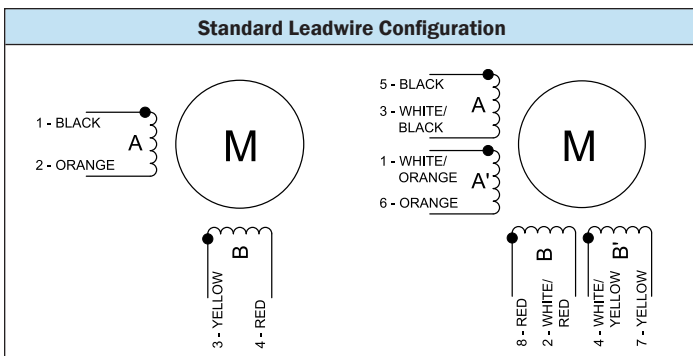
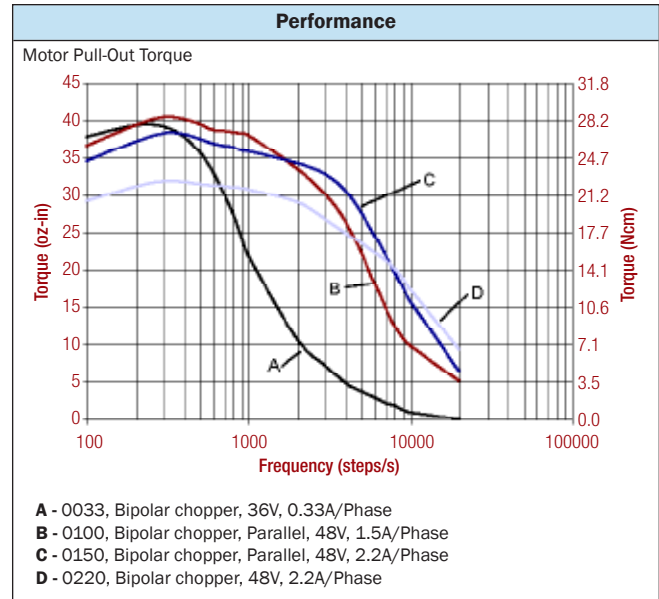


# SIZE 23 STEPPER MOTOR DATA



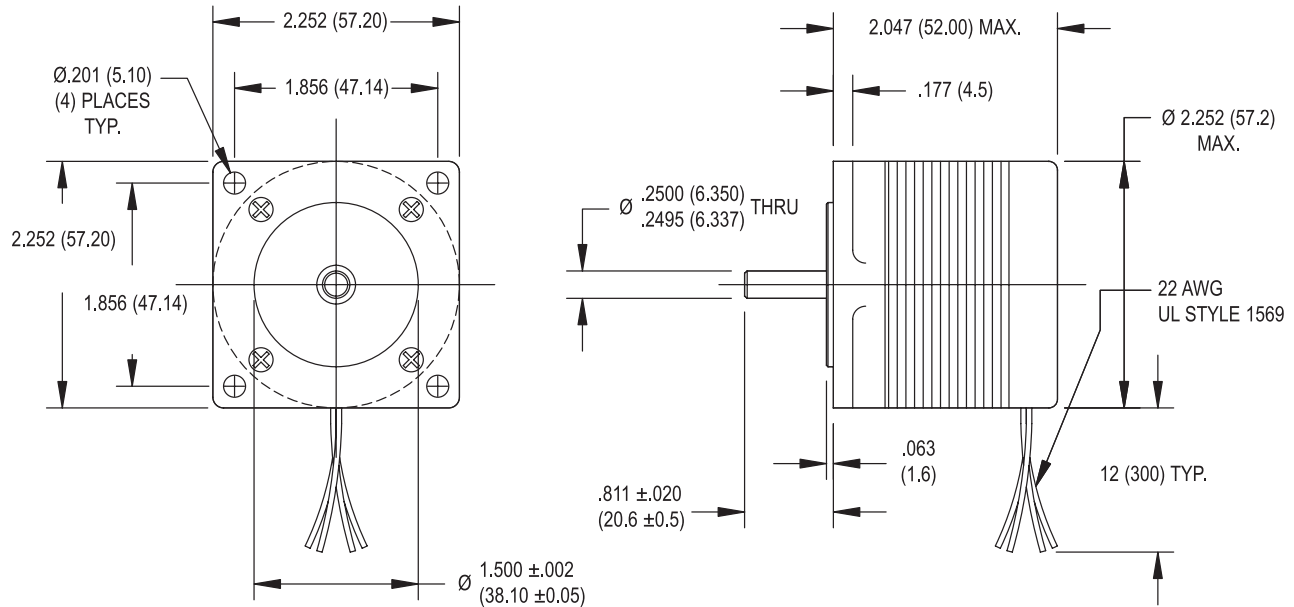
| Specification           | Units   | HY 200 2215  |              |              |              |
|-------------------------|---|--------------|--------------|--------------|--------------|
|                         |   | 0033         | 0100         | 0150         | 0220         |
| Rated Phase Current     | A   | 0.33         | 1.00         | 1.50         | 2.20         |
| Phase Resistance        | $\Omega$  | 33.8         | 3.4          | 1.5          | 0.7          |
| Phase Inductance        | mH  | 54.6         | 3.8          | 1.5          | 1.2          |
| Holding Torque Unipolar | oz-in<br>Ncm  | —            | 38           | 35           | —            |
| Holding Torque Bipolar  | oz-in<br>Ncm  | 45<br>32     | 48<br>34     | 47<br>33     | 44<br>31     |
| Detent Torque           | oz-in<br>Ncm  | 4.8<br>3.4   | 4.8<br>3.4   | 4.8<br>3.4   | 4.8<br>3.4   |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup><br>g-cm <sup>2</sup> | 7.9<br>56    | 7.9<br>56    | 7.9<br>56    | 7.9<br>56    |
| Motor Weight (Mass)     | lb<br>kg  | 0.75<br>0.34 | 0.75<br>0.34 | 0.75<br>0.34 | 0.75<br>0.34 |
| Maximum Voltage         | V   | 75           | 75           | 75           | 75           |
| Std. No. of Leads       | —   | 4            | 8            | 8            | 4            |



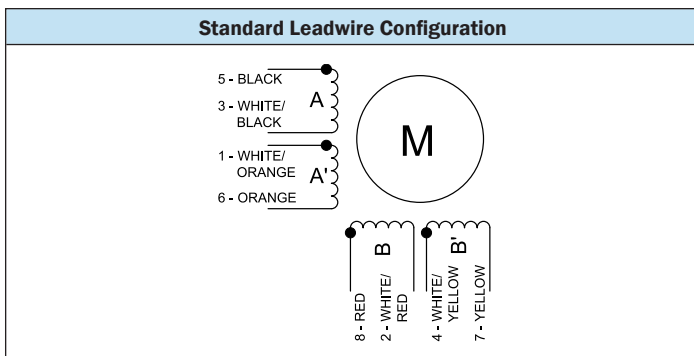
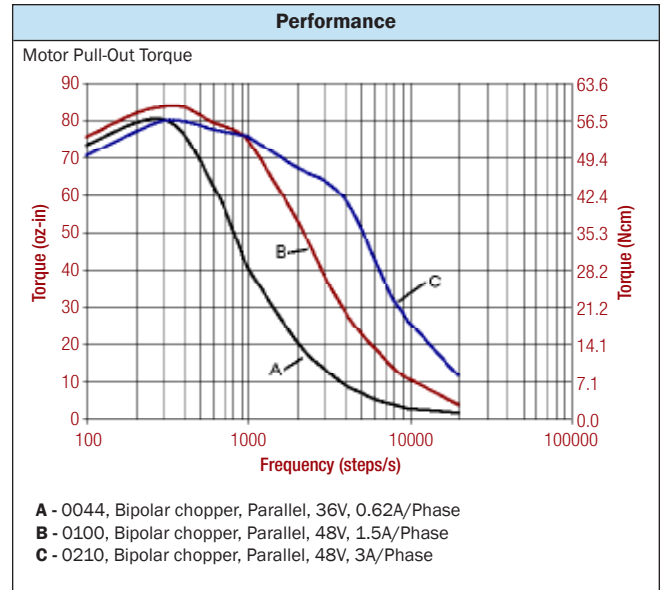
- ### Standard Features
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130 °C)
  - NEMA 23 mounting configuration
  - Additional windings and customization options available
  - CE approved

- ### Complementary Products
- Gearboxes
  - Encoders

# SIZE 23 STEPPER MOTOR DATA



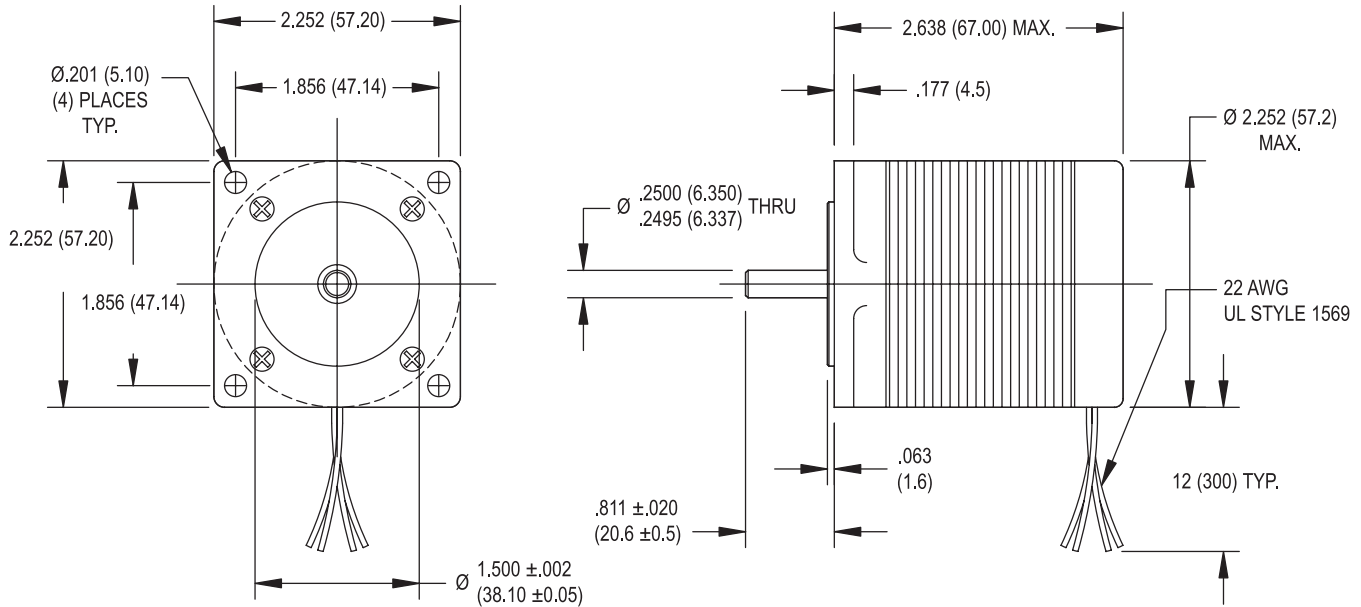
| Specification           | Units                                  | HY 200 2220 |      |      |
|-------------------------|--|-------------|------|------|
|                         |  | 0044        | 0100 | 0210 |
| Rated Phase Current     | A                                      | 0.44        | 1.00 | 2.10 |
| Phase Resistance        | $\Omega$                               | 23.0        | 5.0  | 1.1  |
| Phase Inductance        | mH                                     | 39.2        | 8.0  | 1.7  |
| Holding Torque Unipolar | oz-in                                  | 74          | 75   | 74   |
|                         | Ncm                                    | 52          | 53   | 52   |
| Holding Torque Bipolar  | oz-in                                  | 92          | 98   | 91   |
|                         | Ncm                                    | 65          | 69   | 64   |
| Detent Torque           | oz-in                                  | 7.5         | 7.5  | 7.5  |
|                         | Ncm                                    | 5.3         | 5.3  | 5.3  |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup> | 17.6        | 17.6 | 17.6 |
|                         | g-cm <sup>2</sup>                      | 124         | 124  | 124  |
| Motor Weight (Mass)     | lb                                     | 1.1         | 1.1  | 1.1  |
|                         | kg                                     | 0.50        | 0.50 | 0.50 |
| Maximum Voltage         | V                                      | 75          | 75   | 75   |
| Std. No. of Leads       | —                                      | 8           | 8    | 8    |



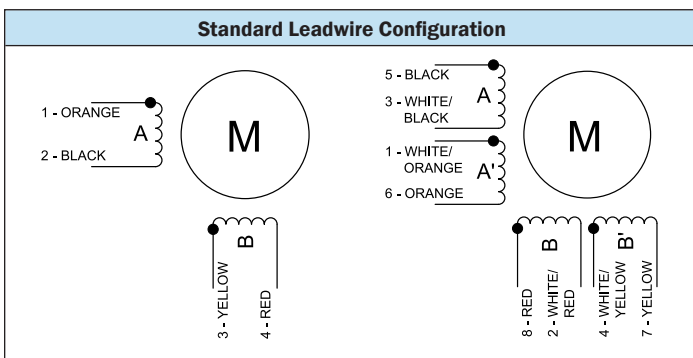
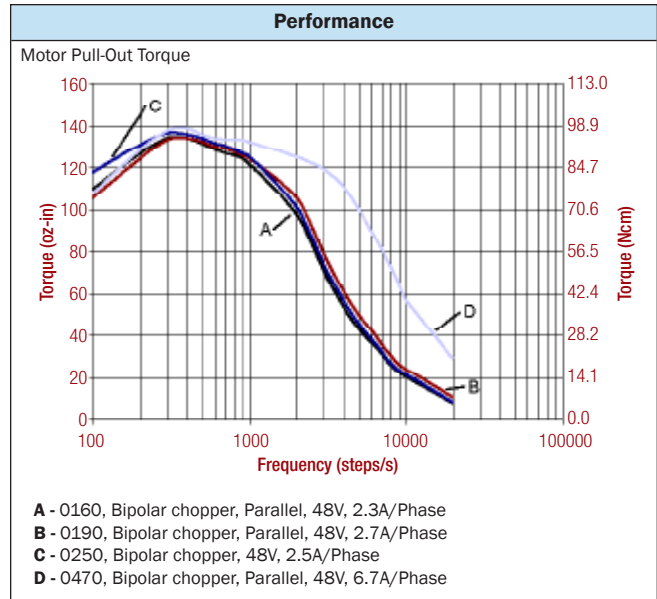
- ### Standard Features
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130°C)
  - NEMA 23 mounting configuration
  - Additional windings and customization options available
  - CE approved

- ### Complementary Products
- Gearboxes
  - Encoders

# SIZE 23 STEPPER MOTOR DATA



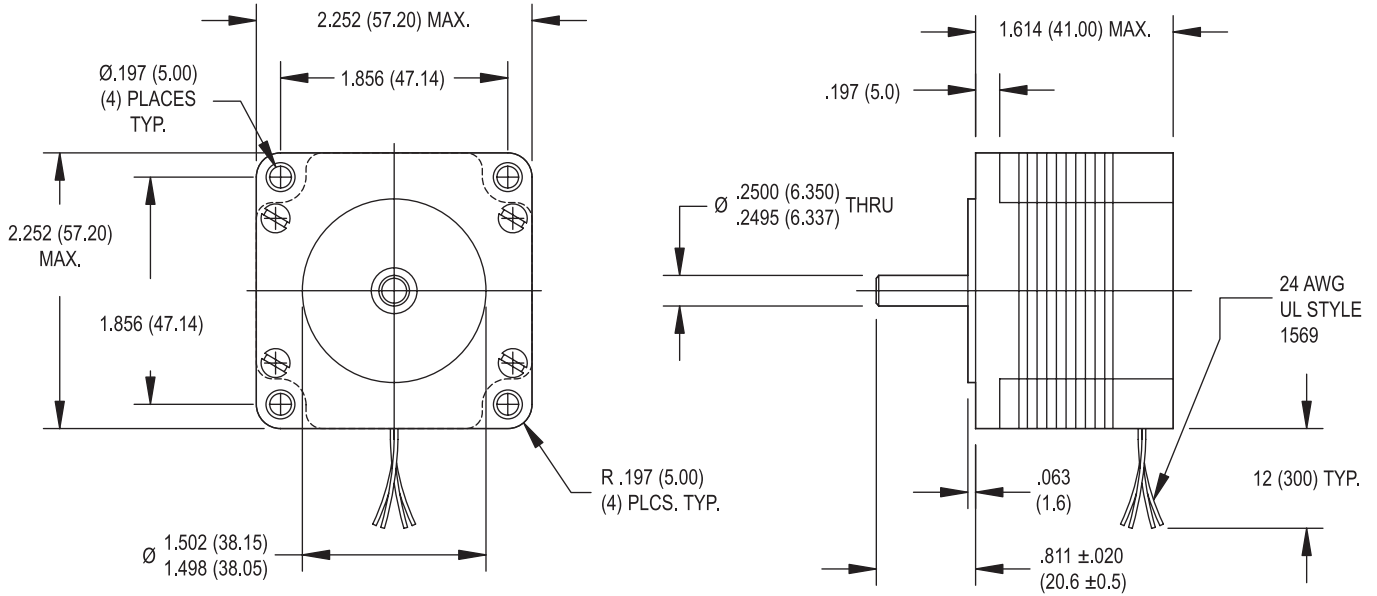
| Specification           | Units                                  | HY 200 2226 |      |      |      |
|-------------------------|--|-------------|------|------|------|
|                         |  | 0160        | 0190 | 0250 | 0470 |
| Rated Phase Current     | A                                      | 1.60        | 1.90 | 2.50 | 4.70 |
| Phase Resistance        | $\Omega$                               | 2.6         | 1.8  | 1.1  | 0.33 |
| Phase Inductance        | mH                                     | 4.7         | 3.3  | 4.0  | 0.5  |
| Holding Torque Unipolar | oz-in                                  | 123         | 126  | —    | 123  |
|                         | Ncm                                    | 87          | 89   | —    | 87   |
| Holding Torque Bipolar  | oz-in                                  | 154         | 160  | 161  | 154  |
|                         | Ncm                                    | 109         | 113  | 114  | 109  |
| Detent Torque           | oz-in                                  | 12.0        | 12.0 | 12.0 | 12.0 |
|                         | Ncm                                    | 8.5         | 8.5  | 8.5  | 8.5  |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup> | 28          | 28   | 28   | 28   |
|                         | g-cm <sup>2</sup>                      | 200         | 200  | 200  | 200  |
| Motor Weight (Mass)     | lb                                     | 1.5         | 1.5  | 1.5  | 1.5  |
|                         | kg                                     | 0.70        | 0.70 | 0.70 | 0.70 |
| Maximum Voltage         | V                                      | 75          | 75   | 75   | 75   |
| Std. No. of Leads       | —                                      | 8           | 8    | 4    | 8    |



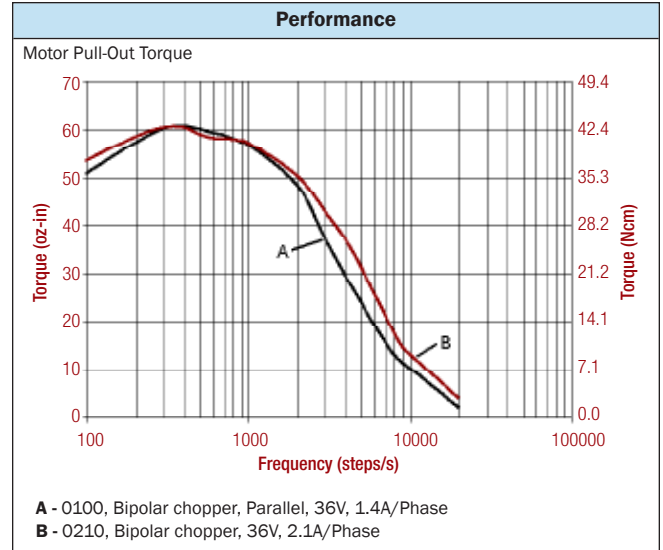
- ### Standard Features
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130 °C)
  - NEMA 23 mounting configuration
  - Additional windings and customization options available
  - CE approved

- ### Complementary Products
- Gearboxes
  - Encoders

**SIZE 23 HIGH PERFORMANCE STEPPER MOTOR DATA**

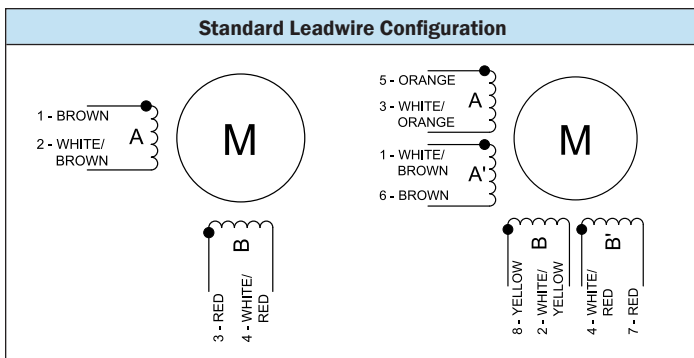


| Specification           | Units                                  | HS 200 2216 |      |
|-------------------------|--|-------------|------|
|                         |  | 0100        | 0210 |
| Rated Phase Current     | A                                      | 1.00        | 2.10 |
| Phase Resistance        | Ω                                      | 4.6         | 1.0  |
| Phase Inductance        | mH                                     | 4.6         | 2.1  |
| Holding Torque Unipolar | oz-in                                  | 52          | —    |
|                         | Ncm                                    | 37          | —    |
| Holding Torque Bipolar  | oz-in                                  | 67          | 67   |
|                         | Ncm                                    | 47          | 47   |
| Detent Torque           | oz-in                                  | 3.0         | 3.0  |
|                         | Ncm                                    | 2.1         | 2.1  |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup> | 11          | 11   |
|                         | g-cm <sup>2</sup>                      | 77          | 77   |
| Motor Weight (Mass)     | lb                                     | 1.1         | 1.1  |
|                         | kg                                     | 0.50        | 0.50 |
| Maximum Voltage         | V                                      | 75          | 75   |
| Std. No. of Leads       | —                                      | 8           | 4    |

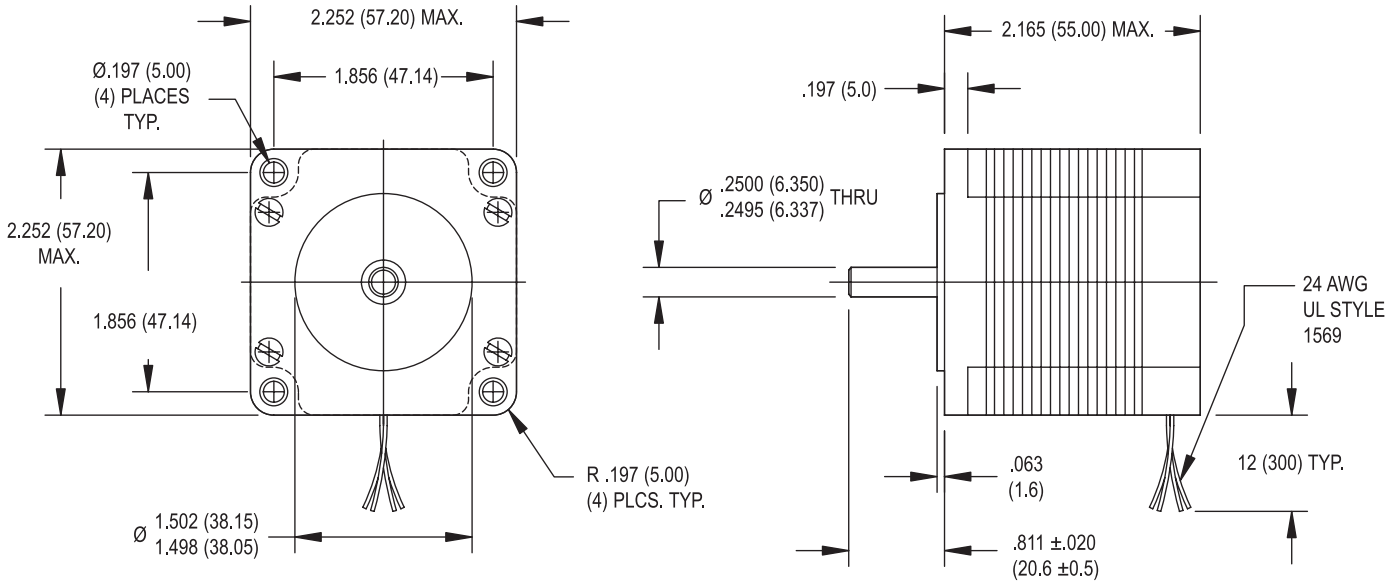


- Standard Features**
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130 °C)
  - Optimized for microstep operation
  - NEMA 23 mounting configuration
- Additional windings and customization options available  
 • CE approved

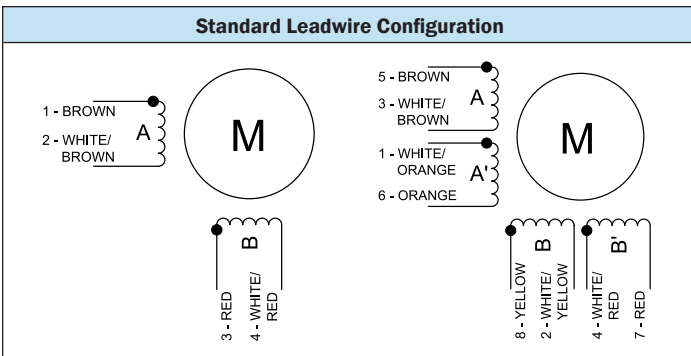
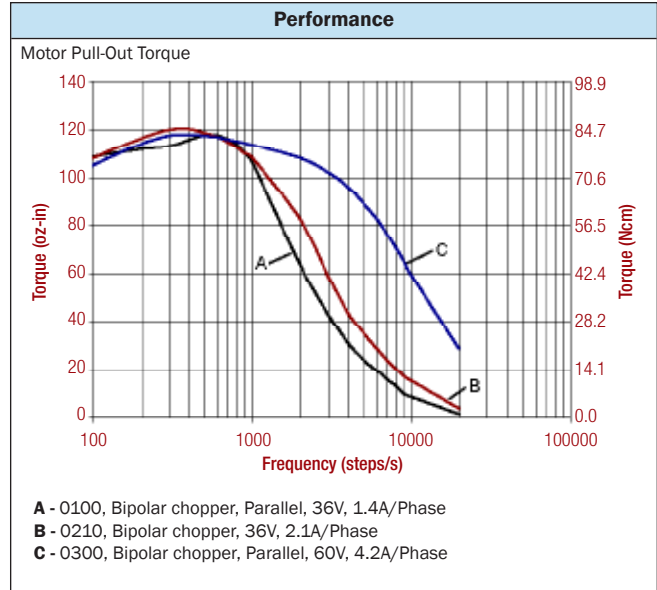
- Complementary Products**
- Gearboxes
  - Encoders



# SIZE 23 HIGH PERFORMANCE STEPPER MOTOR DATA



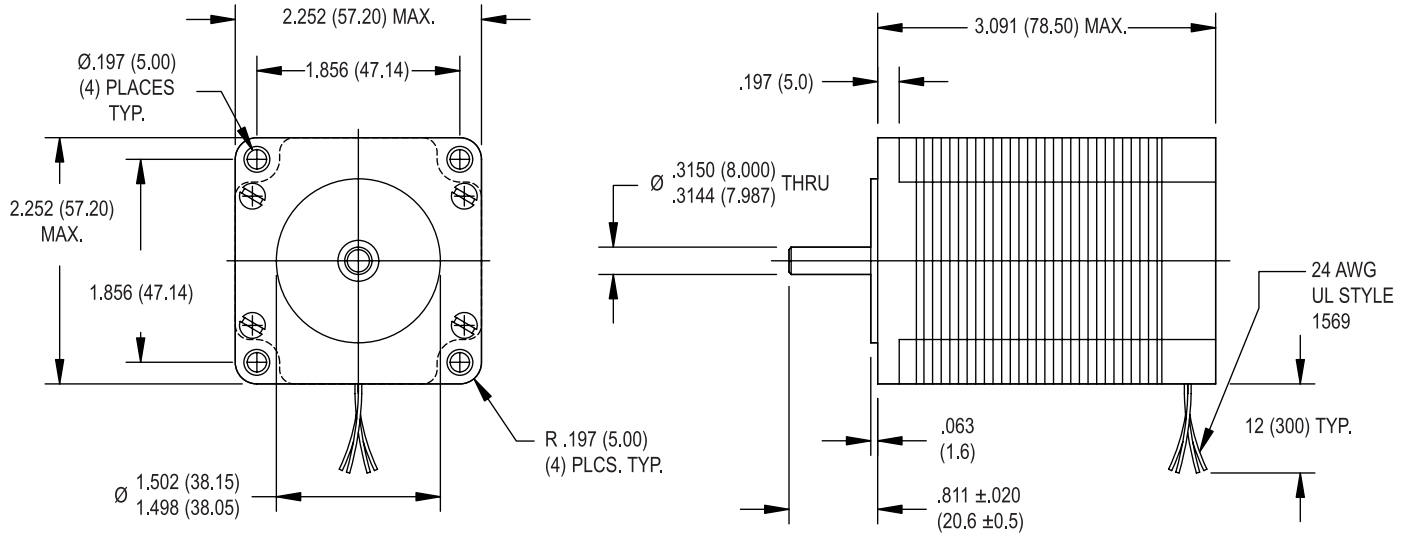
| Specification           | Units                                  | HS 200 2221 |      |      |
|-------------------------|--|-------------|------|------|
|                         |  | 0100        | 0210 | 0300 |
| Rated Phase Current     | A                                      | 1.00        | 2.10 | 3.00 |
| Phase Resistance        | $\Omega$                               | 6.2         | 1.4  | 0.7  |
| Phase Inductance        | mH                                     | 8.8         | 3.9  | 0.9  |
| Holding Torque Unipolar | oz-in                                  | 106         | —    | 106  |
|                         | Ncm                                    | 75          | —    | 75   |
| Holding Torque Bipolar  | oz-in                                  | 139         | 139  | 139  |
|                         | Ncm                                    | 98          | 98   | 98   |
| Detent Torque           | oz-in                                  | 5.7         | 5.7  | 5.7  |
|                         | Ncm                                    | 4.0         | 4.0  | 4.0  |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup> | 31          | 31   | 31   |
|                         | g-cm <sup>2</sup>                      | 220         | 220  | 220  |
| Motor Weight (Mass)     | lb                                     | 1.5         | 1.5  | 1.5  |
|                         | kg                                     | 0.70        | 0.70 | 0.70 |
| Maximum Voltage         | V                                      | 75          | 75   | 75   |
| Std. No. of Leads       | —                                      | 8           | 4    | 8    |



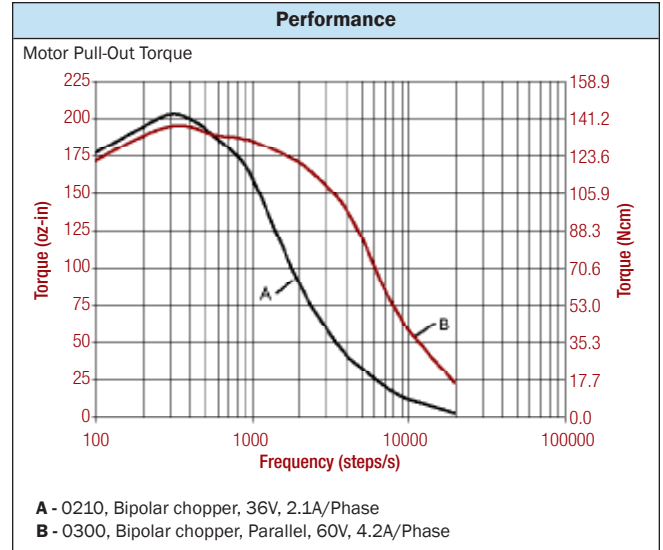
- ### Standard Features
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130°C)
  - Optimized for microstep operation
  - NEMA 23 mounting configuration
  - Additional windings and customization options available
  - CE approved

- ### Complementary Products
- Gearboxes
  - Encoders

# SIZE 23 HIGH PERFORMANCE STEPPER MOTOR DATA

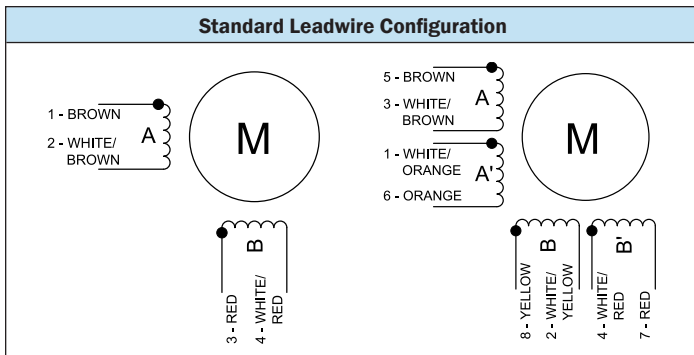


| Specification           | Units   | HS 200 2231 |            |
|-------------------------|---|-------------|------------|
|                         |   | 0210        | 0300       |
| Rated Phase Current     | A   | 2.10        | 3.00       |
| Phase Resistance        | $\Omega$  | 2.0         | 1.1        |
| Phase Inductance        | mH  | 6.5         | 1.7        |
| Holding Torque Unipolar | oz-in<br>Ncm  | —           | 177<br>125 |
| Holding Torque Bipolar  | oz-in<br>Ncm  | 228<br>161  | 231<br>163 |
| Detent Torque           | oz-in<br>Ncm  | 9.6<br>6.8  | 9.6<br>6.8 |
| Rotor Inertia           | oz-in-s <sup>2</sup> x10 <sup>-4</sup><br>g-cm <sup>2</sup> | 48<br>340   | 48<br>340  |
| Motor Weight (Mass)     | lb<br>kg  | 2.2<br>1.0  | 2.2<br>1.0 |
| Maximum Voltage         | V   | 75          | 75         |
| Std. No. of Leads       | —   | 4           | 8          |

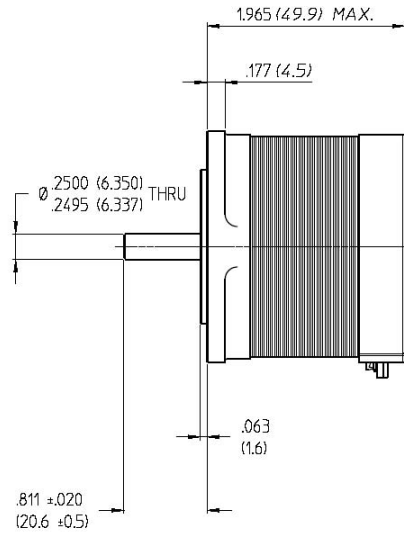
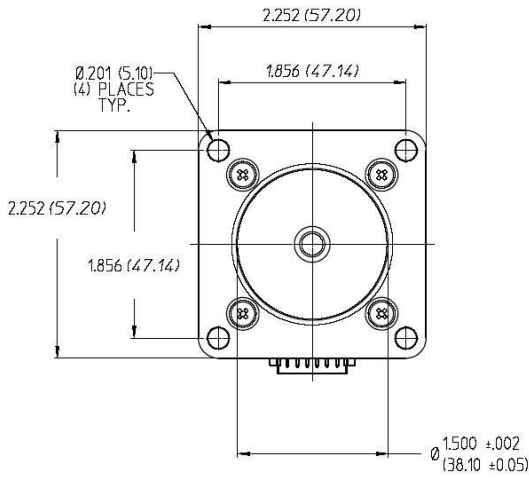


- ### Standard Features
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130 °C)
  - Optimized for microstep operation
  - NEMA 23 mounting configuration
  - Additional windings and customization options available
  - CE approved

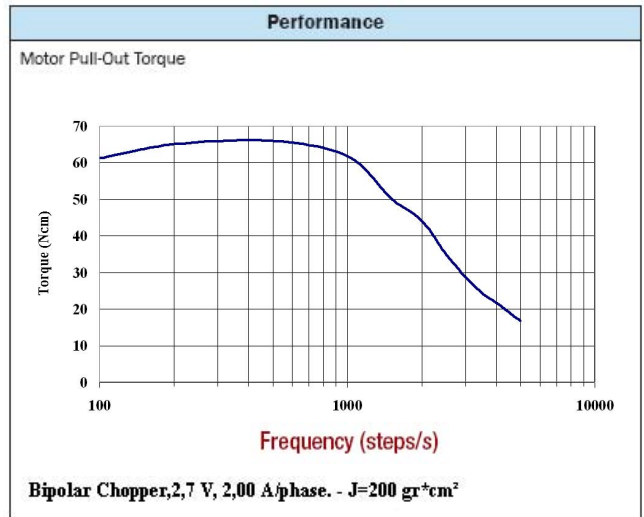
- ### Complementary Products
- Gearboxes
  - Encoders



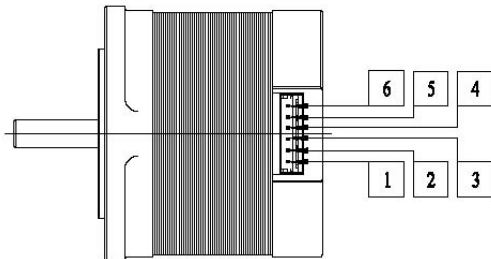
**SIZE 23 HIGH PERFORMANCE STEPPER MOTOR DATA**



| Specification          | Symbol                 | HT200 2220                                |       |
|------------------------|------------------------|---|-------|
|                        |                        | Units                                     | Value |
| Rated Phase Current    | I                      | A   | 2.00  |
| Phase Resistance       | R <sub>res</sub>       | Ω   | 1.20  |
| Phase Inductance       | L                      | mH  | 3.40  |
| Holding Torque Bipolar | T <sub>H bipolar</sub> | oz-in                                     | 113   |
|                        |                        | Ncm                                       | 80    |
| Detent Torque          | T <sub>detent</sub>    | oz-in                                     | 8.5   |
|                        |                        | Ncm                                       | 6     |
| Rotor Inertia          | J                      | oz-in sec <sup>2</sup> × 10 <sup>-4</sup> | 18.7  |
|                        |                        | g-cm <sup>2</sup>                         | 132   |
| Motor Weight (Mass)    | w <sub>tot</sub>       | lb  | 1.1   |
|                        |                        | kg  | 0.5   |
| Maximum Voltage        | V <sub>max</sub>       | V   | 75    |
| Connector              | S6B-EH "JST"           |   |       |



- Standard Features**
- Step angle: 1.8°
  - Step angle accuracy: 5%
  - Insulation class: B (130 °C)
  - NEMA 23 mounting configuration
  - Additional windings and customization options available



| Step # | Coil excitation:<br>The current is flowing in direction of: |
|--------|---|
| 1      | A : D   |
| 1      | A : C   |
| 1      | B : C   |
| 1      | B : D   |

CCW rotation from front side using commutation sequence as table above