

Visit nipponpulse.com to download 3D CAD drawings and 2D prints of this motor.

| | S160D | | S160T | | S160Q | | |
|--|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|----------------------------|
| Electrical Specs | S160D | S160D 1S | S160T | S160T 1S | S160Q | S160Q 2S | S160Q 1S |
| Continuous Force ¹ | 10N (2.25lbs) | | 15N (3.37lbs) | | 20N (4.5lbs) | | |
| Continuous Current ¹ | 0.62Arms | 1.2Arms | 0.62Arms | 1.9Arms | 0.62Arms | 1.2Arms | 2.5Arms |
| Acceleration Force ² | 40N (9.0lbs) | | 60N (13.5lbs) | | 81N (17.78lbs) | | |
| Acceleration Current ² | 2.5Arms | 5Arms | 2.5Arms | 7.4Arms | 2.5Arms | 5Arms | 9.9Arms |
| Force Constant (K _f) | 16N/Arms (3.71lbs/amp) | 8.1N/Arms (1.88lbs/amp) | 24N/Arms (5.43lbs/amp) | 8.1N/Arms (1.83lbs/amp) | 33N/Arms (7.31lbs/amp) | 16N/Arms (3.54lbs/amp) | 8.1N/Arms (1.79lbs/amp) |
| Back EMF (K _e) | 5.4V/m/s (0.14V/in/s) | 2.7V/m/s (0.07V/in/s) | 8.1V/m/s (0.2V/in/s) | 2.7V/m/s (0.067V/in/s) | 11V/m/s (0.28V/in/s) | 5.4V/m/s (0.14V/in/s) | 2.7V/m/s (0.069V/in/s) |
| Resistance 25°C ³ | 21Ω | 5.3Ω | 33Ω | 3.7Ω | 43Ω | 11Ω | 2.7Ω |
| Inductance ³ | 8.2mH | 2.1mH | 12mH | 1.3mH | 16mH | 4mH | 1mH |
| Electric Time Constant | 0.39ms | | 0.36ms | | 0.37ms | | |
| Max. Rated Voltage (AC) | 240V | | | | | | |
| Fundamental Motor Constant (K _m) | 3.52N√W | | 4.21N√W | | 4.92N√W | | |
| Magnetic Pitch (North-North) | 60mm (2.36in) | | | | | | |

Is this the proper Linear Shaft Motor for your application? Use our [SMART sizing program](#) to assist in your decision.

This motor can be customized to fit your application demands; contact your application engineer for more information.

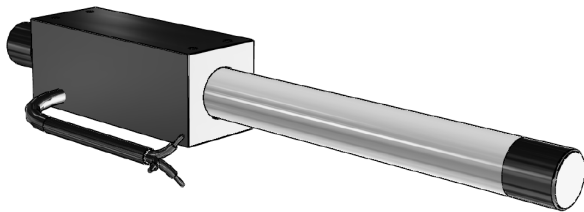
¹ Based on a temp rise of coil surface of 110°K over 25°C ambient temperature stalled forcer, and no external cooling or heat sinking.

² Can be maintained for a maximum of 40 seconds. Higher forces and current possible for short periods of time, consult Nippon Pulse for more information.

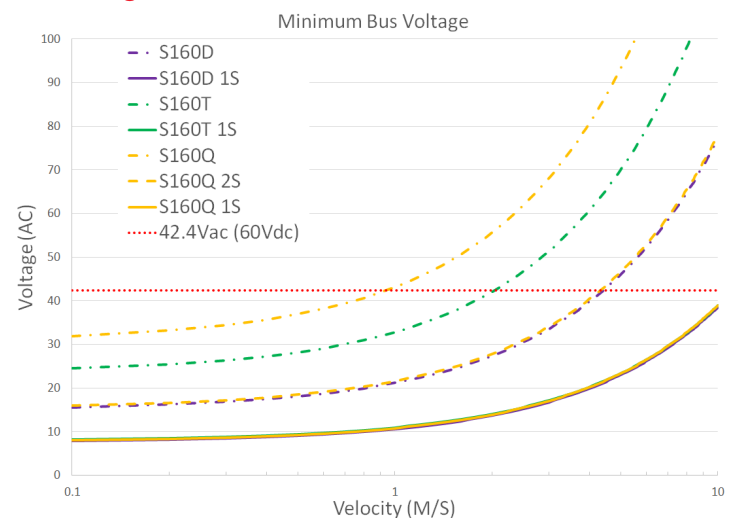
³ All winding parameters listed are measured line-to-line (phase-to-phase).

| Thermal Specs | S160D | S160T | S160Q |
|---|-------------------|------------------|------------------|
| Max Phase Temperature ⁴ | 135°C (275°F) | | |
| Thermal Resistance (Coil) (K _q) | 13.6°C/W (56°F/W) | 8.7°C/W (48°F/W) | 6.7°C/W (44°F/W) |

⁴ The standard temperature difference between the coil and the forcer surface is 15°C.



Bus Voltage



Part Numbering System

S — Shaft Size 160

Forcer Size (A) — X

Parallel Option — XX

Usable Stroke (S) — XXXXst

Options — XX

Options — XX

D: Double (2) windings
T: Triple (3) windings
Q: Quadruple (4) windings

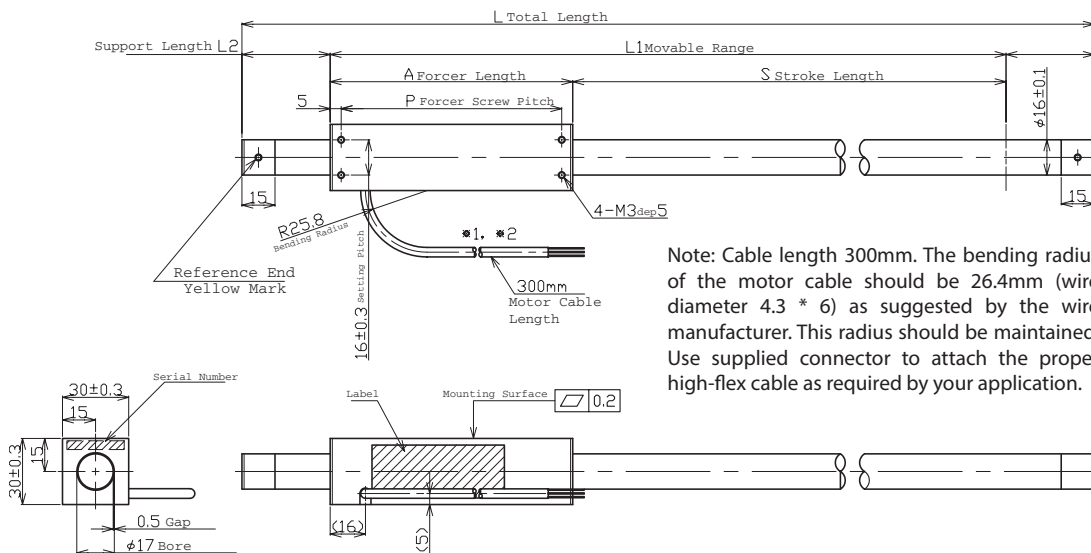
Blank: Single Motor
PL: Parallel Motors

100-1800mm

Blank: Standard
WP: Water Resistant
HA: Digital Hall Effect
CE: CE type motor
FG: Frame Ground

Blank: Standard
FO: Forcer Only
SO: Shaft Only

| Forcer Specs | S160D | S160T | S160Q |
|------------------------|--------------------|------------------|------------------|
| Forcer Length (A) | 80mm (3.15in) | 110mm (4.33in) | 140mm (5.51in) |
| Forcer Width | 30mm ±0.3 (1.18in) | | |
| Forcer Screw Pitch (P) | 70mm (2.76in) | 100mm (3.94in) | 130mm (5.12in) |
| Forcer Weight | 0.15kg (0.33lbs) | 0.20kg (0.44lbs) | 0.30kg (0.66lbs) |
| Gap | 0.50mm (0.02in) | | |



Tolerances are as follows:

| Dimension (mm) | Tolerance (mm) |
|----------------|----------------|
| 0 - 6 | ±0.1 |
| 7 - 30 | ±0.2 |
| 31 - 120 | ±0.3 |
| 121 - 315 | ±0.5 |
| 316 - 1000 | ±0.8 |
| 1001 - 2000 | ±1.2 |
| 2000 - | ±1.5 |

L = See Shaft Length

L1 = Usable Stroke + A

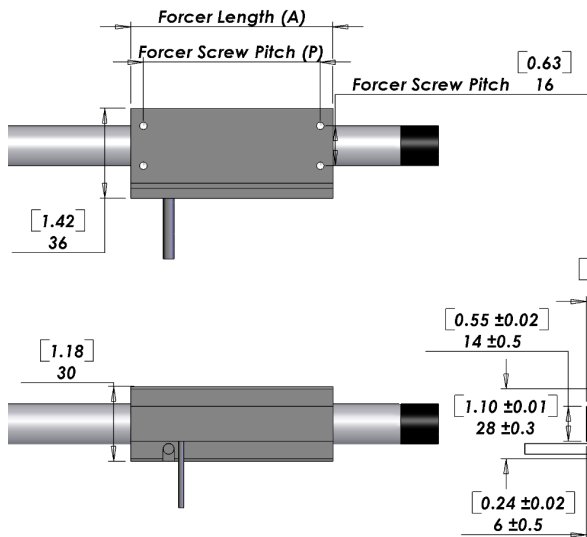
L2 = See Support Length

A = See Forcer Length

P = See Forcer Screw Pitch

Unless otherwise specified, dimensions are in mm

Hall Effect Specs

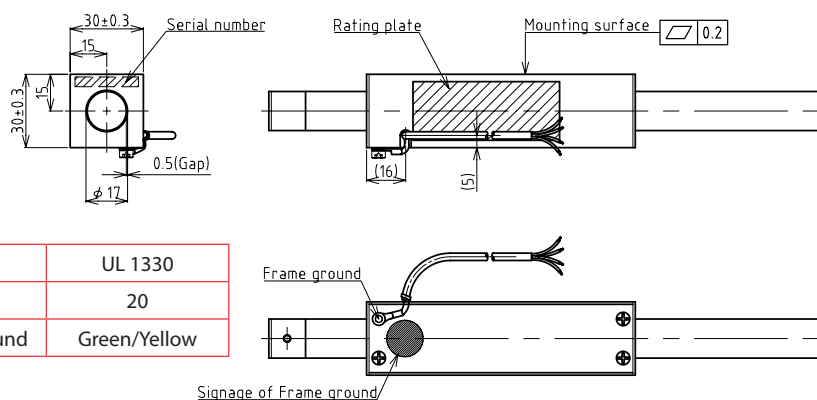


Sensor Cable Specs

| | |
|-----------|--------------|
| Wire Type | UL 758 |
| Wire AWG | 28 |
| VCC | White/Red |
| GND | White/Black |
| Sensor 1 | Orange/Red |
| Sensor 2 | Orange/Black |
| Sensor 3 | Gray/Red |

The bending radius of the sensor cable should be R 27.6mm (wire diameter 4.4 * 6) as suggested by the wire manufacturer. This radius should be maintained. Attach the proper high flex cable as required by your application.

FG/FGA Type Motor Cable



Shaft Length (L)

| Stroke | S160D | S160T | S160Q |
|--------|-----------------|-----------------|-----------------|
| 100 | 230mm (9.1in) | 260mm (10.2in) | 290mm (11.4in) |
| 150 | 280mm (11.0in) | 310mm (12.2in) | 340mm (13.4in) |
| 200 | 330mm (3.0in) | 360mm (14.2in) | 390mm (15.4in) |
| 250 | 380mm (15.0in) | 410mm (16.1in) | 440mm (17.3in) |
| 300 | 430mm (16.9in) | 460mm (18.1in) | 490mm (19.3in) |
| 350 | 480mm (18.9in) | 510mm (20.1in) | 540mm (21.3in) |
| 400 | 560mm (22.1in) | 590mm (23.2in) | 620mm (24.4in) |
| 450 | 610mm (24.0in) | 640mm (25.2in) | 670mm (26.4in) |
| 500 | 660mm (26.0in) | 690mm (27.2in) | 720mm (28.4in) |
| 550 | 710mm (28.0in) | 740mm (29.1in) | 770mm (30.3in) |
| 600 | 760mm (29.9in) | 790mm (31.1in) | 820mm (32.3in) |
| 650 | 810mm (31.9in) | 840mm (33.1in) | 870mm (34.3in) |
| 700 | 860mm (33.9in) | 890mm (35.0in) | 920mm (36.2in) |
| 750 | 910mm (35.8in) | 940mm (37.0in) | 970mm (38.2in) |
| 800 | 960mm (37.8in) | 990mm (39.0in) | 1020mm (40.2in) |
| 850 | 1050mm (41.3in) | 1080mm (42.5in) | 1110mm (43.7in) |
| 900 | 1100mm (43.3in) | 1130mm (44.5in) | 1160mm (45.7in) |
| 950 | 1150mm (45.3in) | 1180mm (46.5in) | 1210mm (47.6in) |
| 1000 | 1200mm (47.2in) | 1230mm (48.4in) | 1260mm (49.6in) |
| 1050 | 1250mm (49.2in) | 1280mm (50.4in) | 1310mm (51.6in) |

Shaft Diameter (D) - 16mm ±0.1

Total Length (L)=Stroke (S)+Forcer Length (A)+(Support Length (L2)x2)

Additional stroke lengths are available. For longer strokes, see the datasheet for L160 Linear Shaft Motor. Contact Nippon Pulse for more information.

Shaft Mass

| Stroke | S160D | S160T | S160Q |
|--------|-----------------|-----------------|-----------------|
| 100 | 0.28kg (0.63lb) | 0.33kg (0.72lb) | 0.37kg (0.81lb) |
| 150 | 0.35kg (0.78lb) | 0.4kg (0.87lb) | 0.44kg (1lb) |
| 200 | 0.42kg (0.94lb) | 0.47kg (1lb) | 0.51kg (1.1lb) |
| 250 | 0.49kg (1.1lb) | 0.54kg (1.2lb) | 0.58kg (1.3lb) |
| 300 | 0.56kg (1.2lb) | 0.61kg (1.3lb) | 0.65kg (1.4lb) |
| 350 | 0.64kg (1.4lb) | 0.68kg (1.5lb) | 0.72kg (1.6lb) |
| 400 | 0.72kg (1.6lb) | 0.77kg (1.7lb) | 0.81kg (1.8lb) |
| 450 | 0.79kg (1.8lb) | 0.84kg (1.8lb) | 0.88kg (1.9lb) |
| 500 | 0.86kg (1.9lb) | 0.91kg (2lb) | 0.95kg (2.1lb) |
| 550 | 0.93kg (2.1lb) | 1kg (2.2lb) | 1kg (2.2lb) |
| 600 | 1kg (2.2lb) | 1kg (2.3lb) | 1.1kg (2.4lb) |
| 650 | 1.1kg (2.4lb) | 1.1kg (2.5lb) | 1.2kg (2.6lb) |
| 700 | 1.1kg (2.5lb) | 1.2kg (2.6lb) | 1.2kg (2.7lb) |
| 750 | 1.2kg (2.7lb) | 1.3kg (2.8lb) | 1.3kg (2.9lb) |
| 800 | 1.3kg (2.8lb) | 1.3kg (2.9lb) | 1.4kg (3lb) |
| 850 | 1.4kg (3lb) | 1.4kg (3.1lb) | 1.5kg (3.2lb) |
| 900 | 1.5kg (3.2lb) | 1.5kg (3.3lb) | 1.5kg (3.4lb) |
| 950 | 1.5kg (3.4lb) | 1.6kg (3.4lb) | 1.6kg (3.5lb) |
| 1000 | 1.6kg (3.5lb) | 1.6kg (3.6lb) | 1.7kg (3.7lb) |
| 1050 | 1.7kg (3.7lb) | 1.7kg (3.8lb) | 1.7kg (3.9lb) |

Connector (Motor Cable)

| | |
|--------------------|---------------|
| Receptacle Housing | XMR-03V |
| Plug Housing | XMP-03V |
| Retainer | XMS-03V |
| Pin Contact | SXM-001T-P0.6 |
| Socket Contact | SXA-001T-P0.6 |

To be installed by the user.

Support and Bending

| Stroke | Support Length (L2) | Max. Bending |
|---------|---------------------|--------------|
| 0~350 | 25mm | 0.00mm |
| 351~500 | 40mm | 0.30mm |
| 501~800 | 40mm | 0.50mm |
| 801~max | 60mm | 0.50mm |

Forcer Spacing Distance

| Spec | S160T | S160Q |
|-------------------------|-------|-------|
| Forcer Spacing Distance | 10mm | |
| Pole (N/S) Distance | 30mm | |
| Forcer Length | 110mm | 140mm |
| Flip Forcers | No | Yes |

Tandem S160D forcers are possible, but are equivalent to one (1) S160Q forcer and thus are not listed above.

Standard Lead Wire

| | |
|-----------|-----------|
| Wire Type | UL 2464FA |
| Wire AWG | 25 |
| U Phase | Red |
| V Phase | White |
| W Phase | Black |

300mm lead wire bare leads. The bending radius of the motor cable should be 26.4mm as suggested by the wire manufacturer.

Note: Metric units guaranteed.
Imperial (United States customary)
units are calculated.

FGA/CE Type Lead Wire

| Ground Wire | CE |
|-------------|---------|
| Wire Type | UL 1330 |
| Wire AWG | 24 |
| U Phase | Red |
| V Phase | White |
| W Phase | Black |

300mm lead wire bare leads. The bending radius of the motor cable should be 16.96mm as suggested by the wire manufacturer. FG type with insulating sheet between coils and case. Meets all requirements of EN60034-1 (1998).

Tandem Forcer



Not all motors on this datasheet have received a CE Declaration of Conformity. Only the standard S160D, S160T and S160Q motors have been certified to CE standards. The motors and motor options with the following designations have not received a CE Declaration of Conformity, and as such are designated FGA: S160D-1S, S160T-1S, S160Q-2S, S160Q-1S, any S160 motor with Hall Effects.