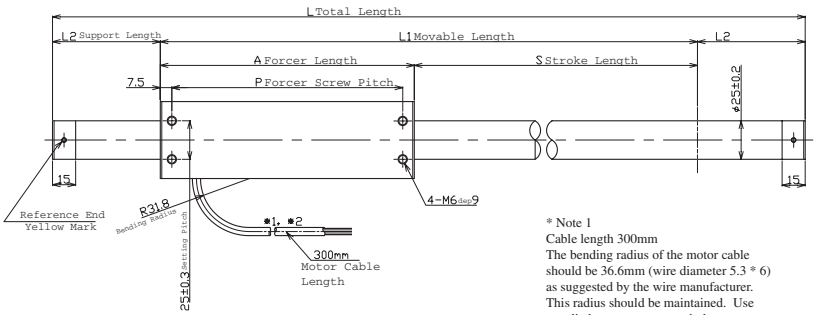
NPM Nippon Pulse
Your Partner in Motion Control

S250
Linear Shaft Motor

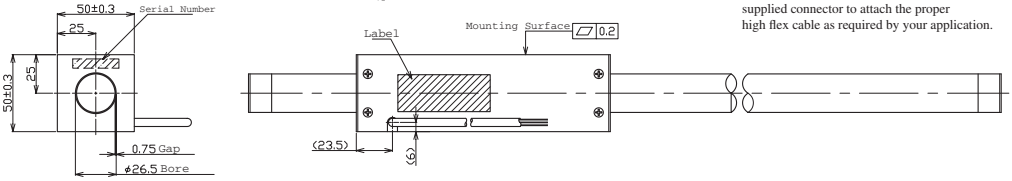
Unless Otherwise Specified:
Dimensions are in mm
Tolerances are as follows:

Dimension (mm)	Tolerance (mm)
- 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 Shaft Support Length
A = See Moving Coil Length
P = See Moving Coil Screw Pitch



* Note 1
Cable length 300mm
The bending radius of the motor cable should be 36.6mm (wire diameter 5.3 * 6) as suggested by the wire manufacturer. This radius should be maintained. Use supplied connector to attach the proper high flex cable as required by your application.



Electrical Specs	S250D	S250T	S250Q	S250X
Continuous Force[1]	40N (9.0lbs)	60N (13.5lbs)	75N (16.9lbs)	140N (31.5lbs)
Continuous Current[1]	1.3Arms	1.3Arms	1.3Arms	2.4Arms
Acceleration Force[2]	160N (36.0lbs)	240N (54.0lbs)	300N (67.4lbs)	560N (125.9lbs)
Acceleration Current[2]	5.1Arms	5.1Arms	5.1Arms	9.6Arms
Force Constant (K_f)	31N/Arms (6.86lbs/amp)	47N/Arms (10.67lbs/amp)	59N/Arms (13.3lbs/amp)	58N/Arms (13.11lbs/amp)
Back EMF (K_e)	10.4V/m/s	16V/m/s	20V/m/s	19V/m/s
Resistance 25°C,[3]	7.8Ω	12Ω	15Ω	7.5Ω
Inductance[3]	9.8mH	15mH	19mH	9.5mH
Electric Time Constant	1.26ms	1.25ms	1.27ms	1.27ms
Rated Voltage (AC)	240V	240V	240V	240V
Fundamental Motor Constant (K_m)	11.19N√W	13.53N√W	15.13N√W	21.30N√W
Magnetic Pitch (North-North)	90mm (3.54lbs)	90mm (3.54lbs)	90mm (3.54lbs)	90mm (3.54lbs)

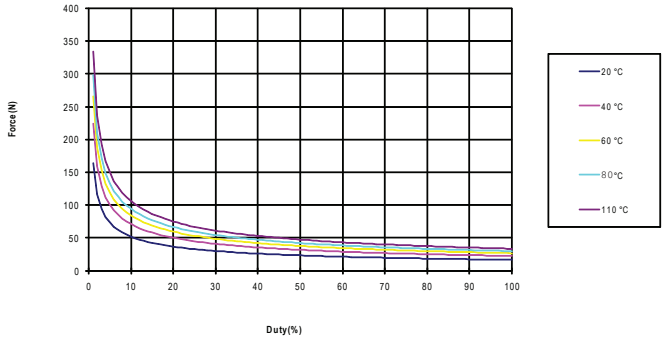
All specifications are for reference only. Specifications may change depending on servo driver selected. Consult Nippon Pulse.
1) Based on a temp rise of coil surface of 110°K over 25°C ambient temperature stalled forcer, and no external cooling or heat sinking
Addition of 25 cm x 25 cm x 2.5 cm aluminum heat sink increases continuous force by 20%
2) Can be maintained for a maximum of 40 seconds, higher forces and current possible for short periods of time, consult Nippon Pulse
3) All winding parameters listed are measured line-to-line (phase-to-phase)

Thermal Specs	S250D	S250T	S250Q	S250X
Max Phase Temperature[4]	135°C (275°F)	135°C (275°F)	135°C (275°F)	135°C (275°F)
Thermal Resistance (Coil) (K_q)	8.6°C/W (47.5°F/W)	5.6°C/W (42.1°F/W)	4.5°C/W (40.1°F/W)	2.5°C/W (36.5°F/W)

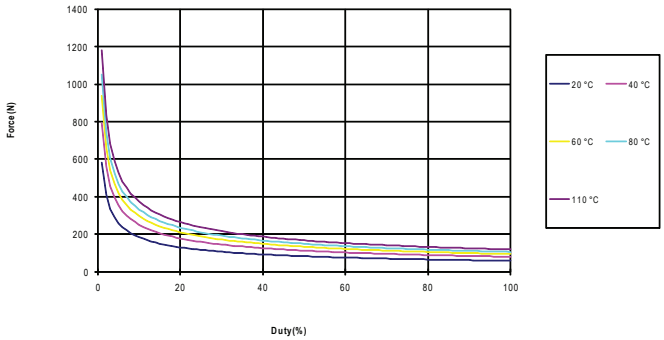
4) The standard temperature difference between the coil and the forcer surface is 20°C

Forcer Specs	S250D	S250T	S250Q	S250X
Forcer Length (A)	120mm (4.72in)	165mm (6.5in)	210mm (8.27in)	390mm (15.35in)
Forcer Width	50mm (1.97in)	50mm (1.97in)	50mm (1.97in)	50mm (1.97in)
Forcer Screw Pitch (P)	105mm (4.13in)	150mm (5.91in)	195mm (7.68in)	375mm (14.76in)
Forcer Weight	0.80kg (1.76lbs)	1.1kg (2.43lbs)	1.5kg (3.31lbs)	2.9kg (6.39lbs)
Gap	0.75mm (0.03in)	0.75mm (0.03in)	0.75mm (0.03in)	0.75mm (0.03in)

S250D Force Duty Curve



S250Q Force Duty Curve



S250
Linear Shaft Motor

Shaft Length (mm)

Stroke	S250D	S250T	S250Q	S250X
100	320	365	410	590
150	370	415	460	640
200	420	465	510	690
250	470	515	560	740
300	520	565	610	790
350	570	615	660	840
400	620	665	710	890
450	670	715	760	940
500	720	765	810	990
550	770	815	860	1080
600	820	865	910	1130
650	870	915	960	1180
700	920	965	1010	1230
750	1010	1055	1100	1280
800	1060	1105	1150	1330
850	1110	1155	1200	1380
900	1160	1205	1250	1430
950	1210	1255	1300	1480
1000	1260	1305	1350	1530
1050	1310	1355	1400	1580
1100	1360	1405	1450	1630
1150	1410	1455	1500	1680
1200	1460	1505	1550	1730
1250	1510	1555	1600	1780
1300	1560	1605	1650	1830
1350	1610	1655	1700	1940
1400	1660	1705	1750	1990
1450	1710	1755	1800	2040
1500	1760	1805	1850	2090
1550	1870	1915	1960	2140
1600	1920	1965	2010	2190
1650	1970	2015	2060	2240
1700	2020	2065	2110	2290
1750	2070	2115	2160	2340
1800	2120	2165	2210	2390
1850	2170	2215	2260	2440
1900	2220	2265	2310	2490
1950	2270	2315	2360	2540
2000	2320	2365	2410	2590

Shaft Mass (kg)

Stroke	S250D	S250T	S250Q	S250X
100	0.9	1.1	1.2	1.8
150	1.1	1.2	1.4	2
200	1.2	1.4	1.6	2.2
250	1.4	1.6	1.7	2.3
300	1.6	1.7	1.9	2.5
350	1.8	1.9	2.1	2.7
400	1.9	2.1	2.2	2.9
450	2.1	2.3	2.4	3
500	2.3	2.4	2.6	3.2
550	2.4	2.6	2.8	3.4
600	2.6	2.8	2.9	3.5
650	2.8	2.9	3.1	3.7
700	3	3.1	3.3	3.9
750	3.2	3.4	3.5	4.1
800	3.4	3.5	3.7	4.3
850	3.5	3.7	3.8	4.5
900	3.7	3.9	4	4.6
950	3.9	4	4.2	4.8
1000	4.1	4.2	4.4	5
1050	4.2	4.4	4.5	5.2
1100	4.4	4.6	4.7	5.3
1150	4.6	4.7	4.9	5.5
1200	4.7	4.9	5.1	5.7
1250	4.9	5.1	5.2	5.8
1300	5.1	5.2	5.4	6
1350	5.3	5.4	5.6	6.2
1400	5.4	5.6	5.7	6.4
1450	5.6	5.8	5.9	6.5
1500	5.8	5.9	6.1	6.7
1550	6	6.2	6.3	7
1600	6.2	6.3	6.5	7.1
1650	6.3	6.5	6.6	7.3
1700	6.5	6.7	6.8	7.4
1750	6.7	6.8	7	7.6
1800	6.9	7	7.2	7.8
1850	7	7.2	7.3	8
1900	7.2	7.4	7.5	8.1
1950	7.4	7.5	7.7	8.3
2000	7.6	7.7	7.9	8.5

Lead Wire

Wire Type	UL 2464FA
Wire AWG	20
U Phase	Red
V Phase	White
W Phase	Black

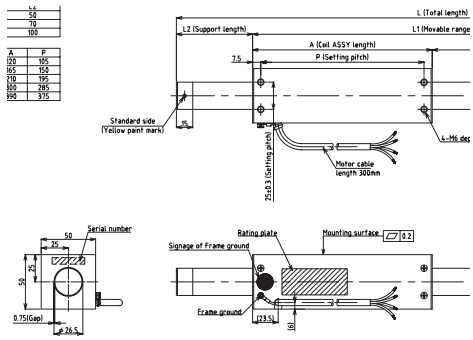
300mm lead wire bare leads
The bending radius of the motor cable should be 36.6mm as suggested by the wire manufacturer.

Connector (Motor Cable)

Receptacle Housing	HLR-03V
Plug Housing	HLP-03V
Retainer	HLS-03V
Pin Contact	SSM-21T-P1.4
Socket Contact	SSF-21T-P1.4

To be installed by the user

CE Type Motor Cable



300mm lead wire bare leads. The bending radius of the motor cable should be 18.96mm as suggested by the wire manufacturer.

Wire Type	UL 1330
Wire AWG	24
U Phase	Red
V Phase	White
W Phase	Black

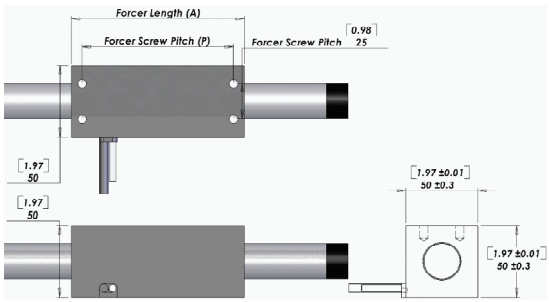
Ground Wire	CE
Wire Type	UL 1330
Wire AWG	20
Frame Ground	Green/Yellow

Support and Bending

Stroke D/T/Q	Stroke X	Support Length	Max. Bending
0~700	0~500	50mm	0.00mm
701~1000	501~800	70mm	0.30mm
1001~1500	801~1300	70mm	0.70mm
1501~max	1301~max	100mm	0.70mm

Shaft Diameter (D) - 25mm ±0.2
Total Length (L)=Stroke (S)+Forcer Length (A)+(Support Length (L2)x2)
Stroke lengths available up to 2550mm. Contact Nippon Pulse for more information.

Hall Effect Specs



* Note 1
The bending radius of the motor cable should be R36.6mm (wire diameter 4.6 * 6) as suggested by the wire manufacturer. This radius should be maintained. Use supplied connector to attach the proper high flex cable as required by your application.

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 R27.6mm (wire diameter 6.1 * 6) as suggested by the wire manufacturer. This radius should be maintained. Attach the proper high flex cable as required by your application.

Tandem Forcer

Forcer Spacing Distance

Forcer Spacing Distance

Spec	S250T	S250X
Forcer Spacing Distance	15mm	15mm
Pole (N/S) Distance	45mm	45mm
Forcer Length	165mm	390mm
Flip Forcers	No	Yes

Tandem S250D forcers are possible, but are equivalent to one (1) S250Q forcer and thus are not listed above. Tandem S250Q forcers are possible, but are equal to one (1) S250X forcer.

Part Numbering System

	Shaft Size (D)	Forcer Size (A)	Parallel Option	Usable Stroke	Options	Options	# of Forcers
S —	250 —	X —	XX —	XXXXst —	XX —	XX —	XX
		D: Double (2) windings T: Triple (3) windings Q: Quadruple (4) windings X: Octuple (8) windings	Blank: Single Motor PL: Parallel Motors	100-2000mm	Blank: Standard WP: Water Resistant HA: Digital Hall Effect CE: CE type motor	Blank: Standard FO: Forcer Only SO: Shaft Only	Two or more