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

Electrical Specs	S350D		S350T		S350Q		
	S350D	S350D 1S	S350T	S350T 1S	S350Q	S350Q 4S	S350Q 1S
Continuous Force[1]	104N (23lbs)		148N (33lbs)		190N (43lbs)		
Continuous Current[1]	1.5Arms	3Arms	1.5Arms	4.5Arms	2.7Arms	1.4Arms	5.4Arms
Acceleration Force[2]	416N (94lbs)		592N (133lbs)		760N (171lbs)		
Acceleration Current[2]	6.0Arms	12Arms	6.0Arms	18Arms	11Arms	5.4Arms	22Arms
Force Constant (K_f)	69N/Arms (15.5lbs/amp)	35N/Arms (7.86lbs/amp)	99N/Arms (22.18lbs/amp)	33N/Arms (7.39lbs/amp)	70N/Arms (15.8lbs/amp)	141N/Arms (31.8lbs/amp)	35N/Arms (7.9lbs/amp)
Back EMF (K_e)	23V/m/s (0.59V/in/s)	12V/m/s (0.31V/in/s)	33V/m/s (0.84V/in/s)	11V/m/s (0.28V/in/s)	23V/m/s (0.58V/in/s)	47V/m/s (1.19V/in/s)	12V/m/s (0.3V/in/s)
Resistance 25°C,[3]	14Ω	3.5Ω	20Ω	2.2Ω	6.9Ω	28Ω	1.7Ω
Inductance[3]	22mH	5.5mH	33mH	3.7mH	11mH	44mH	2.7mH
Electric Time Constant	1.58ms		1.63ms		1.58ms		
Max. Rated Voltage (AC)	240V						
Fundamental Motor Constant (K_m)	18.66N√W		21.95N√W		26.79N√W		
Magnetic Pitch (North-North)	120mm (4.72in)						

Is this the proper Linear Shaft Motor for your application? Use our SMART sizing program to assist in your decision.
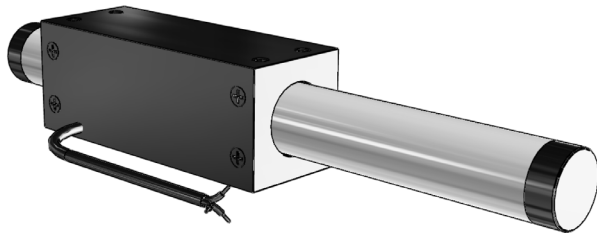This motor can be customized to fit your application demands; contact your application engineer for more information.
[1] Based on a temp rise of coil surface of 110°K over 25°C ambient temperature stalled forcer, and no external cooling or heat sinking.
[2] Can be maintained for a maximum of 40 seconds. Higher forces and current possible for short periods of time, consult Nippon Pulse for more information.
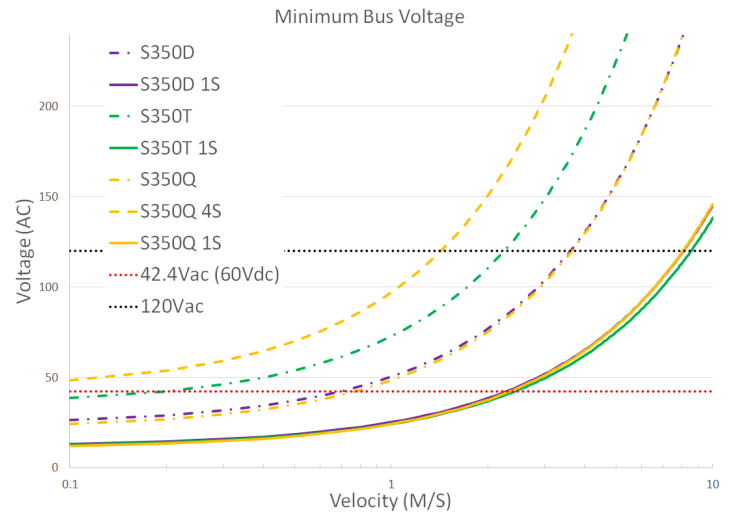[3] All winding parameters listed are measured line-to-line (phase-to-phase).

Thermal Specs	S350D	S350T	S350Q
Max Phase Temperature[4]	135°C (275°F)		
Thermal Resistance (Coil) (K_q)	3.5°C/W	2.4°C/W	2.2°C/W

[4] The standard temperature difference between the coil and the forcer surface is 25°C.

Bus Voltage

Minimum Bus Voltage

- · S350D
- — S350D 1S
- · S350T
- — S350T 1S
- · S350Q
- — S350Q 4S
- — S350Q 1S
- ⋯ 42.4Vac (60Vdc)
- ⋯ 120Vac

Voltage (AC) vs Velocity (M/S)

Part Numbering System

S	Shaft Size 350	Forcer Size (A) X	Parallel Option XX	Usable Stroke (S) XXXXst	Options XX	Options XX
		D: Double (2) windings	Blank: Single Motor	100-2000mm	ST: Standard	Blank: Standard
		T: Triple (3) windings	PL: Parallel Motors		WP: Water Resistant	FO: Forcer Only
		Q: Quadruple (4) windings			HA: Digital Hall Effect	SO: Shaft Only
					CE: CE type motor	
					FG: Frame Ground	

Forcer Specs	S350D	S350T	S350Q
Forcer Length (A)	160mm (6.3in)	220mm (8.7in)	280mm (11.0in)
Forcer Width	60mm (2.36in)		
Forcer Screw Pitch (P)	140mm (5.5in)	200mm (7.9in)	260mm (10.2in)
Forcer Weight	1.3kg (2.9lbs)	1.9kg (4.2lbs)	2.4kg (5.3lbs)
Gap	1.00mm (0.04in)		
Screw	M8		
Tightening Torque	12.5 Nm		
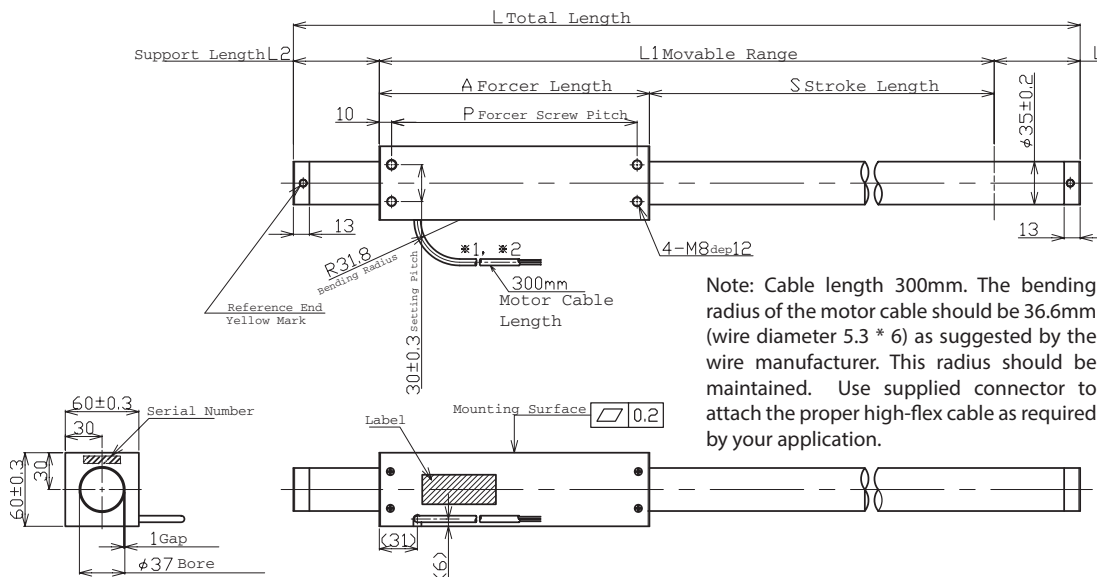
Tolerances are as follows:

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

Note: 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.

Hall Effect Specs

Note: 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.

Standard 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.

FGA/CE Option Lead Wire

Wire Type	UL 1330
Wire AWG	20
U Phase	Red
V Phase	White
W Phase	Black

Ground Wire	CE
Wire Type	UL 1330
Wire AWG	18
Frame Ground	Green/Yellow

300mm lead wire bare leads. The bending radius of the motor cable should be 41.3mm as suggested by the wire manufacturer. FG type with insulating sheet between coils and case. Meets all requirements of EN60034-1 (1998).

Forcer Spacing Distance

Spec	S350T	S350Q
Forcer Spacing Distance	20mm	
Pole (N/S) Distance	60mm	
Forcer Length	220mm	280mm
Flip Forcers	No	Yes

Tandem S350D forcers are possible, but are equivalent to one (1) S350Q forcer and thus are not listed above.

Shaft Length (L)

| Stroke	S350D	S350T	S350Q
100	Stroke is less than the electrical cycle length. Contact Nippon Pulse.		
150	410mm (16.1in)	470mm (18.5in)	530mm (20.9in)
200	460mm (18.1in)	520mm (20.5in)	580mm (22.8in)
250	510mm (20.1in)	570mm (22.4in)	630mm (24.8in)
300	560mm (22in)	620mm (24.4in)	680mm (26.8in)
350	610mm (24in)	670mm (26.4in)	730mm (28.7in)
400	660mm (26in)	720mm (28.3in)	780mm (30.7in)
450	710mm (28in)	770mm (30.3in)	830mm (32.7in)
500	760mm (29.9in)	820mm (32.3in)	880mm (34.6in)
550	810mm (31.9in)	870mm (34.3in)	930mm (36.6in)
600	860mm (33.9in)	920mm (36.2in)	980mm (38.6in)
650	910mm (35.8in)	970mm (38.2in)	1030mm (40.6in)
700	960mm (37.8in)	1020mm (40.2in)	1080mm (42.5in)
750	1010mm (39.8in)	1070mm (42.1in)	1130mm (44.5in)
800	1100mm (43.3in)	1160mm (45.7in)	1220mm (48in)
850	1150mm (45.3in)	1210mm (47.6in)	1270mm (50in)
900	1200mm (47.2in)	1260mm (49.6in)	1320mm (52in)
950	1250mm (49.2in)	1310mm (51.6in)	1370mm (53.9in)
1000	1300mm (51.2in)	1360mm (53.5in)	1420mm (55.9in)
1050	1350mm (53.1in)	1410mm (55.5in)	1470mm (57.9in)
1100	1400mm (55.1in)	1460mm (57.5in)	1520mm (59.8in)
1150	1450mm (57.1in)	1510mm (59.4in)	1570mm (61.8in)
1200	1500mm (59.1in)	1560mm (61.4in)	1620mm (63.8in)
1250	1550mm (61in)	1610mm (63.4in)	1670mm (65.7in)
1300	1600mm (63in)	1660mm (65.4in)	1720mm (67.7in)
1350	1650mm (65in)	1710mm (67.3in)	1770mm (69.7in)
1400	1700mm (66.9in)	1760mm (69.3in)	1820mm (71.7in)
1450	1750mm (68.9in)	1810mm (71.3in)	1870mm (73.6in)
1500	1800mm (70.9in)	1860mm (73.2in)	1920mm (75.6in)
1550	1910mm (75.2in)	1970mm (77.6in)	2030mm (79.9in)
1600	1960mm (77.2in)	2020mm (79.5in)	2080mm (81.9in)
1650	2010mm (79.1in)	2070mm (81.5in)	2130mm (83.9in)
1700	2060mm (81.1in)	2120mm (83.5in)	2180mm (85.8in)
1750	2110mm (83.1in)	2170mm (85.4in)	2230mm (87.8in)
1800	2160mm (85in)	2220mm (87.4in)	2280mm (89.8in)
1850	2210mm (87in)	2270mm (89.4in)	2330mm (91.7in)
1900	2260mm (89in)	2320mm (91.3in)	2380mm (93.7in)
1950	2310mm (90.9in)	2370mm (93.3in)	2430mm (95.7in)
2000	2360mm (92.9in)	2420mm (95.3in)	2480mm (97.6in)

Shaft Mass

Stroke	S350D	S350T	S350Q
100	Stroke is less than the electrical cycle length. Contact Nippon Pulse.		
150	2.7kg (6lb)	3.1kg (6.8lb)	3.5kg (7.7lb)
200	3kg (6.7lb)	3.4kg (7.6lb)	3.8kg (8.4lb)
250	3.4kg (7.4lb)	3.8kg (8.3lb)	4.2kg (9.2lb)
300	3.7kg (8.1lb)	4.1kg (9lb)	4.5kg (9.9lb)
350	4kg (8.9lb)	4.4kg (9.8lb)	4.8kg (10.6lb)
400	4.4kg (9.6lb)	4.8kg (10.5lb)	5.1kg (11.4lb)
450	4.7kg (10.3lb)	5.1kg (11.2lb)	5.5kg (12.1lb)
500	5kg (11.1lb)	5.4kg (11.9lb)	5.8kg (12.8lb)
550	5.3kg (11.8lb)	5.7kg (12.7lb)	6.1kg (13.5lb)
600	5.7kg (12.5lb)	6.1kg (13.4lb)	6.5kg (14.3lb)
650	6kg (13.2lb)	6.4kg (14.1lb)	6.8kg (15lb)
700	6.3kg (14lb)	6.7kg (14.8lb)	7.1kg (15.7lb)
750	6.7kg (14.7lb)	7.1kg (15.6lb)	7.5kg (16.4lb)
800	7.3kg (16lb)	7.7kg (16.9lb)	8.1kg (17.8lb)
850	7.6kg (16.7lb)	8kg (17.6lb)	8.4kg (18.5lb)
900	7.9kg (17.5lb)	8.3kg (18.3lb)	8.7kg (19.2lb)
950	8.3kg (18.2lb)	8.6kg (19.1lb)	9kg (19.9lb)
1000	8.6kg (18.9lb)	9kg (19.8lb)	9.4kg (20.7lb)
1050	8.9kg (19.6lb)	9.3kg (20.5lb)	9.7kg (21.4lb)
1100	9.2kg (20.4lb)	9.6kg (21.2lb)	10kg (22.1lb)
1150	9.6kg (21.1lb)	10kg (22lb)	10.4kg (22.8lb)
1200	9.9kg (21.8lb)	10.3kg (22.7lb)	10.7kg (23.6lb)
1250	10.2kg (22.6lb)	10.6kg (23.4lb)	11kg (24.3lb)
1300	10.6kg (23.3lb)	11kg (24.2lb)	11.4kg (25lb)
1350	10.9kg (24lb)	11.3kg (24.9lb)	11.7kg (25.8lb)
1400	11.2kg (24.7lb)	11.6kg (25.6lb)	12kg (26.5lb)
1450	11.6kg (25.5lb)	11.9kg (26.3lb)	12.3kg (27.2lb)
1500	11.9kg (26.2lb)	12.3kg (27.1lb)	12.7kg (27.9lb)
1550	12.6kg (27.8lb)	13kg (28.7lb)	13.4kg (29.5lb)
1600	12.9kg (28.5lb)	13.3kg (29.4lb)	13.7kg (30.3lb)
1650	13.3kg (29.3lb)	13.7kg (30.1lb)	14.1kg (31lb)
1700	13.6kg (30lb)	14kg (30.9lb)	14.4kg (31.7lb)
1750	13.9kg (30.7lb)	14.3kg (31.6lb)	14.7kg (32.5lb)
1800	14.3kg (31.4lb)	14.7kg (32.3lb)	15.1kg (33.2lb)
1850	14.6kg (32.2lb)	15kg (33lb)	15.4kg (33.9lb)
1900	14.9kg (32.9lb)	15.3kg (33.8lb)	15.7kg (34.6lb)
1950	15.2kg (33.6lb)	15.6kg (34.5lb)	16kg (35.4lb)
2000	15.6kg (34.3lb)	16kg (35.2lb)	16.4kg (36.1lb)

Additional stroke lengths are available (up to 2120mm for S350D, and up to 2060mm for S350T). Contact Nippon Pulse for more information.

Tandem Forcer

Forcer Spacing Distance

THM Option
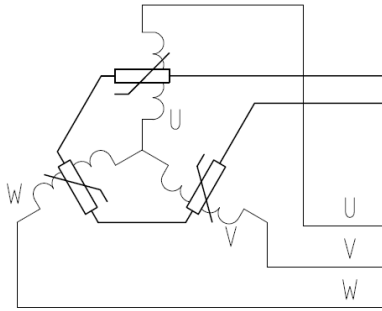
Circuit Diagram

4. Thermistor
   PTCSL20T071DBE(Vishay)

Thermocouple

Thermal sensor
Thermocouple K type (marked each phase name)
Attached to the surface of inside of coil
Length 3000mm

Connector (Motor Cable)

Receptacle Housing	VLR-03V
Plug Housing	VLP-03V
Retainer	VLS-03V
Pin Contact	SVM-61T-P2.0
Socket Contact	SVF-61T-P2.0

To be installed by the user.

Support and Bending

Stroke	Support Length (L2)	Max. Bending
0~750	50mm	0.00mm
751~1000	70mm	0.30mm
1001~1500	70mm	0.90mm
1501~max	100mm	1.00mm

Shaft Diameter (D) - 35mm ±0.2
Total Length (L)=Stroke (S)+Forcer Length (A)+(Support Length (L2)x2)
Stroke lengths available from 100mm to 2500mm. Contact Nippon Pulse for more information.

These motors have not received a CE Declaration of Conformity, and as such are designated FGA.

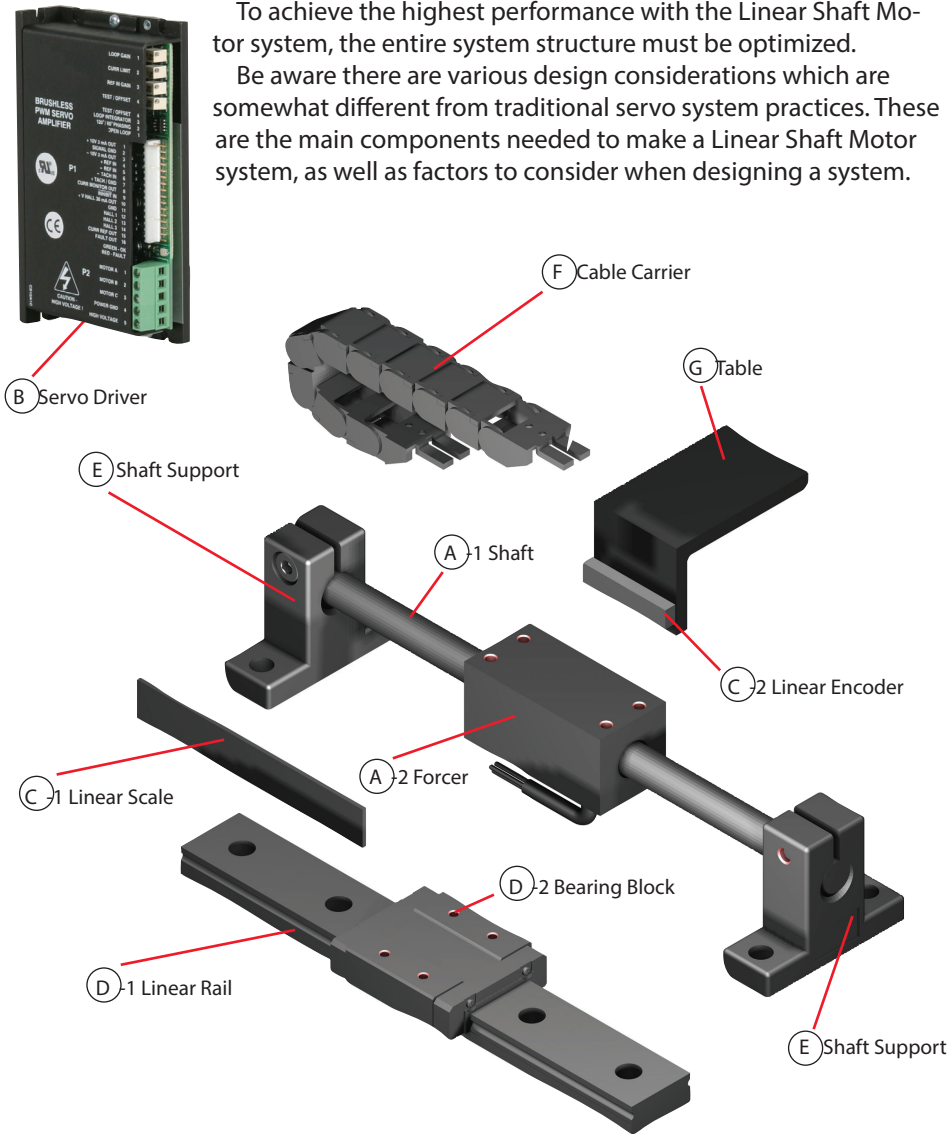Note: Metric units guaranteed. Imperial (United States customary) units are calculated.

For assistance in selecting the best motor for your application, contact Nippon Pulse
to speak with an applications engineer. 1-540-633-1677

www.nipponpulse.com

The design of the Linear Shaft Motor allows you to replace traditional linear motion systems, such as a standard ball screw, with the Linear Shaft Motor and achieve higher speed and resolution.

To achieve the highest performance with the Linear Shaft Motor system, the entire system structure must be optimized.

Be aware there are various design considerations which are somewhat different from traditional servo system practices. These are the main components needed to make a Linear Shaft Motor system, as well as factors to consider when designing a system.

Steps to putting together a Linear Shaft Motor System

Choose the Linear Shaft Motor based on force and stroke requirements.

Choose the shaft supports based on design and motor specifications.

Choose the linear guide (bearings) based on cost and smoothness (performance) constraints.

Choose the linear encoder to achieve the required position resolution.

Choose the servo driver to match the power requirements of the Linear Shaft Motor.

Choose the OTL, limit switches/other components and assemble the Linear Shaft Motor system.

B — Servo Driver
F — Cable Carrier
G — Table
E — Shaft Support
A-1 Shaft
C-2 Linear Encoder
C-1 Linear Scale
A-2 Forcer
D-2 Bearing Block
D-1 Linear Rail
E — Shaft Support

Configuring the Linear Shaft Motor

To configure a system using the Linear Shaft Motor, the following peripheral devices are required:

A. Linear Shaft Motor
B. Servo Driver
C. Linear encoder (optical or magnetic)

Item D (Linear Guide) is a necessary part of a system, but consideration must be given to the application, demand specifications, environmental conditions, and which will be moving--the forcer or the shaft.

The other items, E through G, are optional and will need to be selected depending on the application.