NPM Nippon Pulse
Your Partner in Motion Control

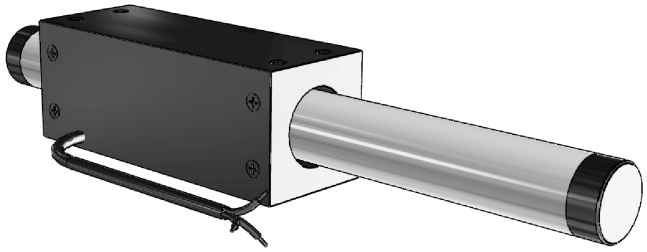
L320
Linear Shaft Motor

	L320D		L320T		L320Q		
Electrical Specs	L320D	L320D-1S	L320T	L320T-1S	L320Q	L320Q-1S	L320Q-2S
Continuous Force[1]	55N (12.4lbs)		82N (18.4lbs)		109N (24.5lbs)		
Continuous Current[1]	1.3Arms	2.5Arms	1.3Arms	3.8Arms	1.3Arms	5.0Arms	2.5Arms
Acceleration Force[2]	218N (49lbs)		327N (73.5lbs)		436N (98lbs)		
Acceleration Current[2]	5.0Arms	10.0Arms	5.0Arms	15.0Arms	5.0Arms	20.0Arms	10.0Arms
Force Constant (K_f)	44N/amp	22N/amp	65N/amp	22N/amp	87N/amp	22N/amp	44N/amp
Back EMF (K_e)	15V/m/s	7.3V/m/s	22V/m/s	7.3V/m/s	29V/m/s	7.3V/m/s	15V/m/s
Resistance 25°C[3]	12Ω	2.9Ω	17Ω	1.9Ω	23Ω	1.4Ω	5.8Ω
Inductance[3]	14mH	3.5mH	21mH	2.3mH	28mH	1.8mH	7.0mH
Electric Time Constant	1.22ms		1.22ms		1.22ms		
Fundamental Motor Constant (K_m)	12.84N√W		15.72N√W		18.15N√W		
Magnetic Pitch (North-North)	120mm		120mm		120mm		

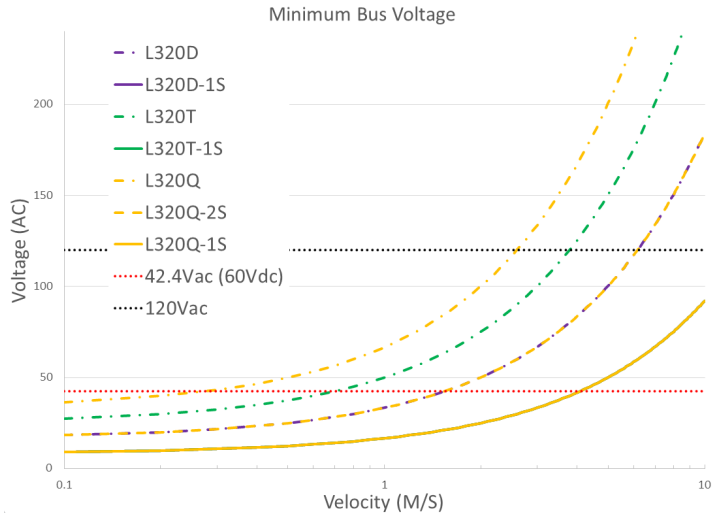
Is this the proper Linear Shaft Motor for your application? Use our SMART sizing program to assist in your decision.
This motor can be customized to fit your application demands; contact your application engineer for more information.
[1] Based on a temp rise of coil surface of 110°K over 25°C ambient 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,
[3] All winding parameters listed are measured line-to-line (phase-to-phase).

	L320D		L320T		L320Q		
Thermal Specs	L320D	L320D-1S	L320T	L320T-1S	L320Q	L320Q-1S	L320Q-2S
Max Phase Temperature[4]	135°C (275°F)						
Thermal Resistance (Coil) (K_q)	6.1°C/W (43°F/W)		4.1°C/W (39.4°F/W)		3.1°C/W (37.6°F/W)		

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



Bus Voltage



Part Numbering System

L	—	Shaft Size	Forcer Size (A)	—	Alt. Winding	—	Parallel Option	—	Usable Stroke (S)	—	Options	—	Options
		320	X		XX		XX		XXXXst		XX		XX
			D: Double (2) windings T: Triple (3) windings Q: Quadruple (4) windings		Blank: Standard _S: Alternate Winding		Blank: Single Motor PL: Parallel Motors		100-2000mm		Blank: Standard WP: Water Resistant HA: Hall Effect CE: CE Type Motor FG: Frame Ground		Blank: Standard FO: Forcer Only SO: Shaft Only

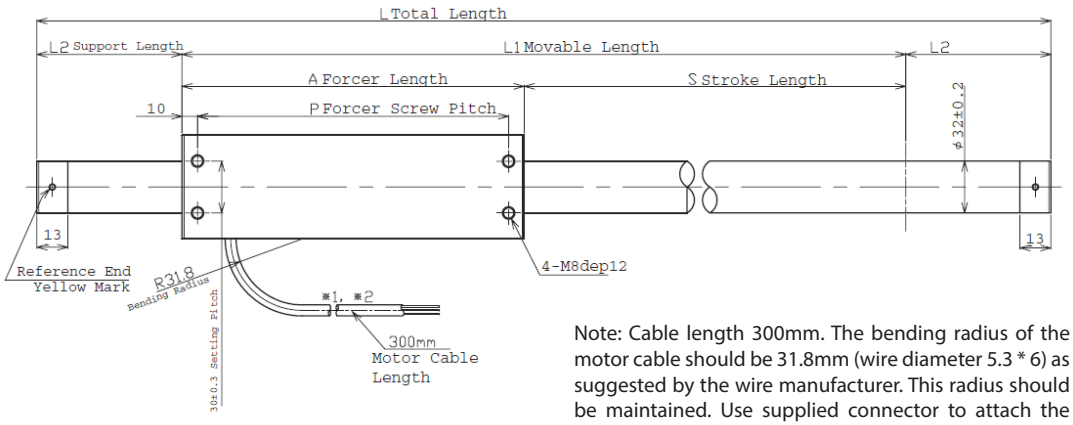
	L320D		L320T		L320Q		
Forcer Specs	L320D	L320D-1S	L320T	L320T-1S	L320Q	L320Q-1S	L320Q-2S
Forcer Length (A)	160mm (6.3in)		220mm (8.7in)		280mm (11.0in)		
Forcer Width	60mm (2.4in)						
Forcer Screw Pitch (P)	140mm (5.5in)		200mm (7.9in)		260mm (10.2in)		
Forcer Weight	1.3kg (2.9lbs)		1.9kg (4.2lbs)		2.6kg (5.7lbs)	2.4kg (5.3lbs)	
Gap	2.5mm (0.1in)						

Tolerances are as follows:

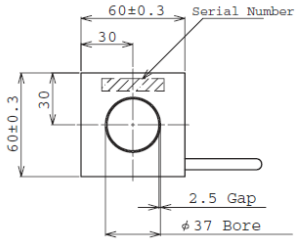
Dimension (mm)	Tolerance (mm)
0 - 6	±0.1
7 - 30	±0.2
31 - 120	±0.3
121 - 315	±0.5
316 - 1000	±0.8
1001 - 2000	±1.2
2000 -	±1.5

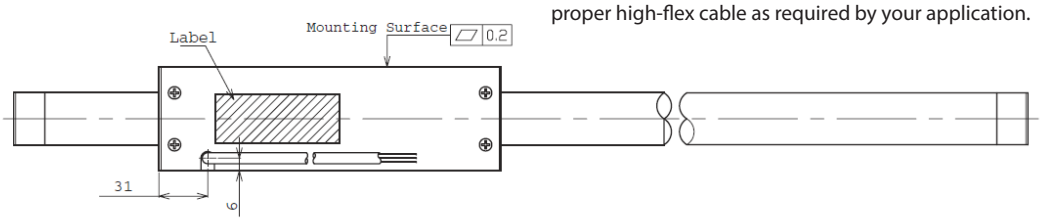
L = See Shaft Length
L1 = Usable Stroke + A
L2 = See Support Length
A = See Forcer Length
P = See Forcer Screw Pitch

Unless otherwise specified, dimensions are in mm

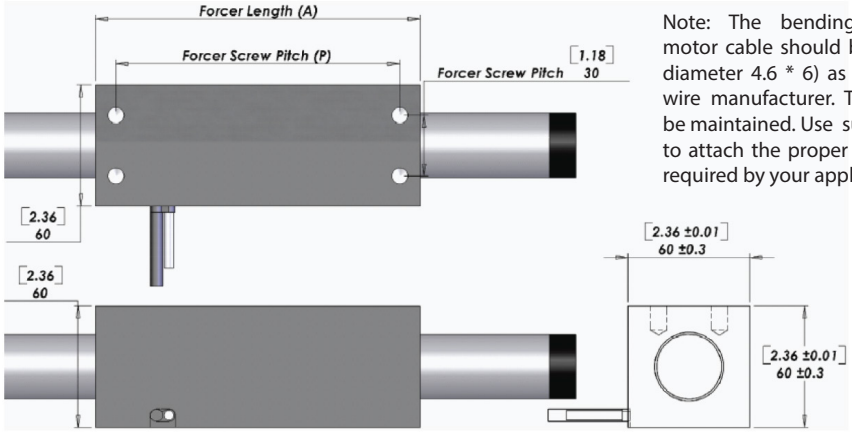


Note: Cable length 300mm. The bending radius of the motor cable should be 31.8mm (wire diameter 5.3 * 6) as suggested by the wire manufacturer. This radius should be maintained. Use supplied connector to attach the proper high-flex cable as required by your application.





Hall Effect Specs



Note: The bending radius of the motor cable should be R31.8mm (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

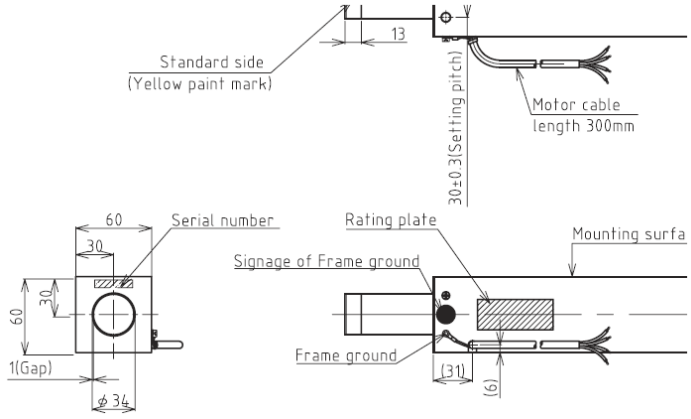
The bending radius of the sensor cable should be R27.6mm (wire diameter 5.3 * 6) as suggested by the wire manufacturer. This radius should be maintained. Attach the proper high flex cable as required by your application.

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.

FG Type Motor Cable



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

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 31.8mm as suggested by the wire manufacturer.

CE Option - 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 1.96mm 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	L320T	L320Q
Forcer Spacing Distance	20mm	
Pole (N/S) Distance	60mm	
Forcer Length	220mm	280mm
Flip Forcers	No	Yes

Tandem L320D forcers are possible, but are equivalent to one (1) L320Q forcer and thus are not listed above.

Support and Bending

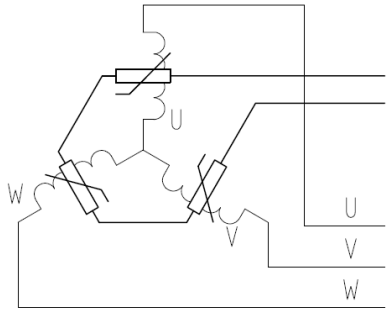
Stroke	Support Length (L2)	Max. Bending
0~750	50mm	0.00mm
751~1000	70mm	0.30mm
1001~1500	70mm	0.70mm
1501~max	100mm	0.70mm

Shaft Diameter (D) - 32mm ±0.2
Total Length (L)=Stroke (S)+Forcer Length(A)+(Support Length (L2)x2)

Tandem Forcer

Forcer Spacing Distance

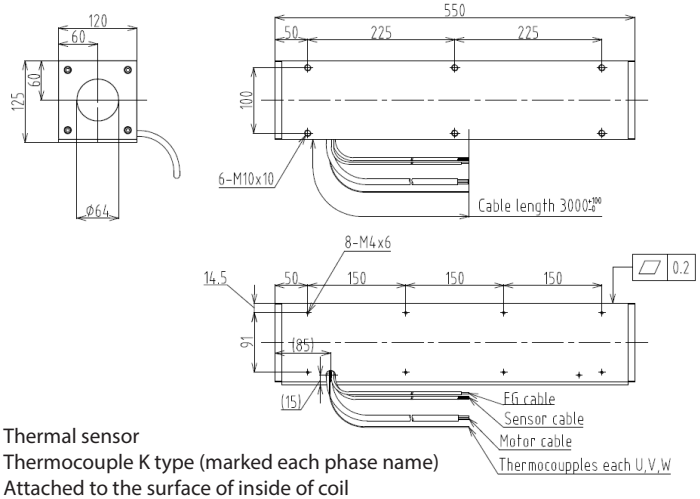
THM Option



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

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

Shaft Length (L)

Stroke	L320D	L320T	L320Q
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	L320D	L320T	L320Q
100	Stroke is less than the electrical cycle length. Contact Nippon Pulse.		
150	2.1kg (4.6lb)	2.4kg (5.3lb)	2.8kg (6.2lb)
200	2.4kg (5.3lb)	2.7kg (6lb)	3kg (6.6lb)
250	2.7kg (6lb)	3kg (6.6lb)	3.3kg (7.3lb)
300	2.9kg (6.4lb)	3.3kg (7.3lb)	3.6kg (7.9lb)
350	3.2kg (7.1lb)	3.6kg (7.9lb)	3.9kg (8.6lb)
400	3.5kg (7.7lb)	3.8kg (8.4lb)	4.2kg (9.3lb)
450	3.8kg (8.4lb)	4.1kg (9lb)	4.5kg (9.9lb)
500	4.1kg (9lb)	4.4kg (9.7lb)	4.7kg (10.4lb)
550	4.3kg (9.5lb)	4.7kg (10.4lb)	5kg (11lb)
600	4.6kg (10.1lb)	5kg (11lb)	5.3kg (11.7lb)
650	4.9kg (10.8lb)	5.2kg (11.5lb)	5.6kg (12.3lb)
700	5.2kg (11.5lb)	5.5kg (12.1lb)	5.9kg (13lb)
750	5.5kg (12.1lb)	5.8kg (12.8lb)	6.1kg (13.4lb)
800	5.8kg (12.8lb)	6.2kg (13.7lb)	6.5kg (14.3lb)
850	6.1kg (13.4lb)	6.5kg (14.3lb)	6.8kg (15lb)
900	6.4kg (14.1lb)	6.7kg (14.8lb)	7.1kg (15.7lb)
950	6.7kg (14.8lb)	7kg (15.4lb)	7.4kg (16.3lb)
1000	7kg (15.4lb)	7.3kg (16.1lb)	7.6kg (16.8lb)
1050	7.3kg (16.1lb)	7.6kg (16.8lb)	7.9kg (17.4lb)
1100	7.5kg (16.5lb)	7.9kg (17.4lb)	8.2kg (18lb)
1150	7.8kg (17.2lb)	8.2kg (18lb)	8.5kg (18.7lb)
1200	8.1kg (17.9lb)	8.4kg (18.5lb)	8.8kg (19.4lb)
1250	8.4kg (18.5lb)	8.7kg (19.2lb)	9.1kg (20.1lb)
1300	8.7kg (19.2lb)	9kg (19.8lb)	9.3kg (20.5lb)
1350	8.9kg (19.6lb)	9.3kg (20.5lb)	9.6kg (21.2lb)
1400	9.2kg (20.3lb)	9.6kg (21.2lb)	9.9kg (21.8lb)
1450	9.5kg (20.9lb)	9.8kg (21.6lb)	10.2kg (22.5lb)
1500	9.8kg (21.6lb)	10.1kg (22.3lb)	10.5kg (23.1lb)
1550	10.2kg (22.5lb)	10.5kg (23.1lb)	10.9kg (24lb)
1600	10.5kg (23.1lb)	10.8kg (23.8lb)	11.2kg (24.7lb)
1650	10.8kg (23.8lb)	11.1kg (24.5lb)	11.5kg (25.4lb)
1700	11.1kg (24.5lb)	11.4kg (25.1lb)	11.7kg (25.8lb)
1750	11.3kg (24.9lb)	11.7kg (25.8lb)	12kg (26.5lb)
1800	11.6kg (25.6lb)	12kg (26.5lb)	12.3kg (27.1lb)
1850	11.9kg (26.2lb)	12.2kg (26.9lb)	12.6kg (27.8lb)
1900	12.2kg (26.9lb)	12.5kg (27.6lb)	12.9kg (28.4lb)
1950	12.5kg (27.6lb)	12.8kg (28.2lb)	13.1kg (28.9lb)
2000	12.7kg (28lb)	13.1kg (28.9lb)	13.4kg (29.5lb)

Additional stroke lengths are available (up to 3640 for L320D, 3580 for L320T and 3520 for L320Q).