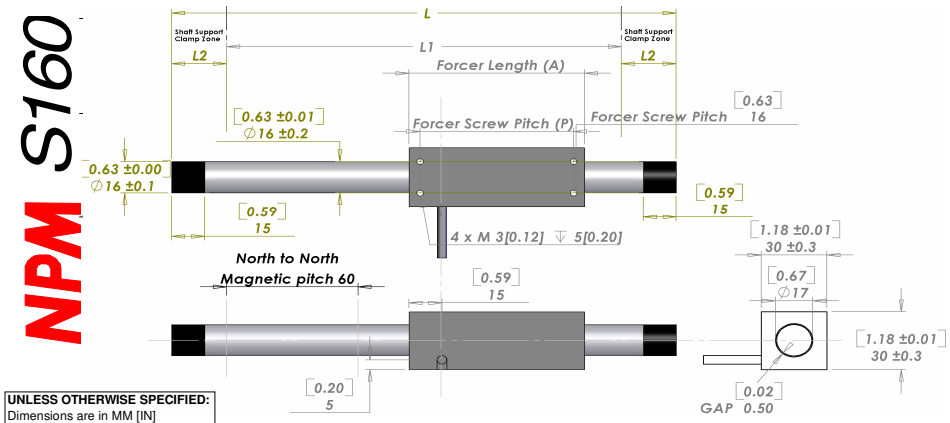
NPM S160



UNLESS OTHERWISE SPECIFIED:
Dimensions are in MM [IN]
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

* Note 1
Cable length 300mm
The bending radius of the motor cable should be 26.4mm (wire diameter 4.4 * 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.

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

Electrical Specifications

		S160D	S160T	S160Q
Continuous Force[1]		10N (2.25lbs)	15N (3.37lbs)	20N (4.50lbs)
Continuous Current[1]		0.6Arms	0.6Arms	0.6Arms
Peak Force[2]		40N (9.0lbs)	60N (13.5lbs)	80N (18.0lbs)
Peak Current[2]		2.5Arms	2.5Arms	2.5Arms
Force Constant	Kf	16N/Arms (3.6lbs/Arms)	24N/Arms (5.4lbs/Arms)	33N/Arms (7.3lbs/Arms)
Back EMF		5.4V/m/s (0.14 V/in/s)	8.1V/m/s (0.21 V/in/s)	11V/m/s (0.28 V/in/s)
Resistance 25℃, [3]		21Ω	33Ω	43Ω
Inductance[3]		8.2mH	12mH	16mH
Electrical Time Constant		0.39ms	0.36ms	0.37ms
Magnetic Pitch (North-North)		60mm (2.36in)	60mm (2.36in)	60mm (2.36in)

All specifications are for reference only. Specifications may change depending on servo driver selected. Consult Nippon Pulse America.

1) Based on a temp rise of coil surface of 110℃ over 25℃ 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, consult Nippon Pulse America.

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

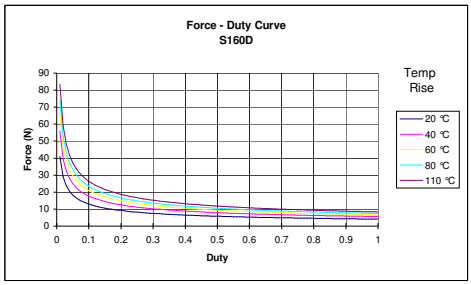
Thermal Specifications

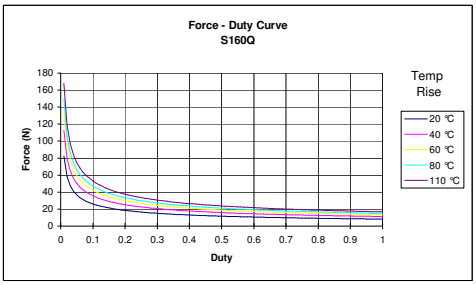
		S160D	S160T	S160Q
Max phase temperature		135℃ (275℉)	135℃ (275℉)	135℃ (275℉)
Thermal Resistance	Kq	13.6℃/W	8.7℃/W	6.7℃/W

Mechanical Specifications

Forcer

		S160D	S160T	S160Q
Forcer Length	A	80mm (3.15in)	110mm (4.33in)	140mm (5.51in)
Forcer Width		30mm±0.3 (1.18in)	30mm±0.3 (1.18in)	30mm±0.3 (1.18in)
Forcer Screw Pitch	P	70mm (2.8in)	100mm (3.9in)	130mm (5.1in)
Forcer Weight		0.15kg (0.33lb)	0.20kg (0.44lb)	0.30kg (0.66lb)
Gap		0.50mm (0.019in)	0.50mm (0.019in)	0.50mm (0.019in)





Mechanical Specifications

Shaft

Shaft Diameter (D) 16 ±0.1mm (0.63in)

Shaft Length (L) **Maximum Stroke length 1750mm (68.9in)**

Stroke \ Motor Type	S160D	S160T	S160Q
100	230mm (9.06in)	260mm (10.24in)	290mm (11.42in)
150	280mm (11.02in)	310mm (12.2in)	340mm (13.39in)
200	330mm (12.99in)	360mm (14.17in)	390mm (15.35in)
250	380mm (14.96in)	410mm (16.14in)	440mm (17.32in)
300	430mm (16.93in)	460mm (18.11in)	490mm (19.29in)
350	480mm (18.9in)	510mm (20.08in)	540mm (21.26in)
400	560mm (22.05in)	590mm (23.23in)	620mm (24.41in)
450	610mm (24.02in)	640mm (25.2in)	670mm (26.38in)
500	660mm (25.98in)	690mm (27.17in)	720mm (28.35in)
550	710mm (27.95in)	740mm (29.13in)	770mm (30.31in)
600	760mm (29.92in)	790mm (31.1in)	820mm (32.28in)
650	810mm (31.89in)	840mm (33.07in)	870mm (34.25in)
700	860mm (33.86in)	890mm (35.04in)	920mm (36.22in)
750	910mm (35.83in)	940mm (37.01in)	970mm (38.19in)
800	960mm (37.8in)	990mm (38.98in)	1020mm (40.16in)
850	1050mm (41.34in)	1080mm (42.52in)	1110mm (43.7in)
900	1100mm (43.31in)	1130mm (44.49in)	1160mm (45.67in)
950	1150mm (45.28in)	1180mm (46.46in)	1210mm (47.64in)
1000	1200mm (47.24in)	1230mm (48.43in)	1260mm (49.61in)
1050	1250mm (49.21in)	1280mm (50.39in)	1310mm (51.57in)
1100	1300mm (51.18in)	1330mm (52.36in)	1360mm (53.54in)
1150	1350mm (53.15in)	1380mm (54.33in)	1410mm (55.51in)
1200	1400mm (55.12in)	1430mm (56.3in)	1460mm (57.48in)
1250	1450mm (57.09in)	1480mm (58.27in)	1510mm (59.45in)
1300	1500mm (59.06in)	1530mm (60.24in)	1560mm (61.42in)
1350	1550mm (61.02in)	1580mm (62.2in)	1610mm (63.39in)
1400	1600mm (62.99in)	1630mm (64.17in)	1660mm (65.35in)
1450	1650mm (64.96in)	1680mm (66.14in)	1710mm (67.32in)
1500	1700mm (66.93in)	1730mm (68.11in)	1760mm (69.29in)
1550	1750mm (68.9in)	1780mm (70.08in)	1810mm (71.26in)
1600	1800mm (70.87in)	1830mm (72.05in)	1860mm (73.23in)
1650	1850mm (72.83in)	1880mm (74.02in)	1910mm (75.2in)
1700	1900mm (74.8in)	1930mm (75.98in)	1960mm (77.17in)
1750	1950mm (76.77in)	1980mm (77.95in)	2010mm (79.13in)

Support and Bending

Stroke	Shaft Support length (L2)	Max Bending
0 → 350	25mm (0.98in)	0.00mm (0.00in)
351 → 500	40mm (1.57in)	0.30mm (0.012in)
501 → 800	40mm (1.57in)	0.50mm (0.019in)
801 → Max	60mm (2.36in)	0.50mm (0.019in)

Shaft Mass

Stroke \ Motor Type	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)
1100	1.7kg (3.8lb)	1.8kg (3.9lb)	1.8kg (4lb)
1150	1.8kg (4lb)	1.9kg (4.1lb)	1.9kg (4.2lb)
1200	1.9kg (4.2lb)	1.9kg (4.3lb)	2kg (4.4lb)
1250	2kg (4.3lb)	2kg (4.4lb)	2kg (4.5lb)
1300	2kg (4.5lb)	2.1kg (4.6lb)	2.1kg (4.7lb)
1350	2.1kg (4.7lb)	2.2kg (4.7lb)	2.2kg (4.8lb)
1400	2.2kg (4.8lb)	2.2kg (4.9lb)	2.3kg (5lb)
1450	2.3kg (5lb)	2.3kg (5.1lb)	2.3kg (5.2lb)
1500	2.3kg (5.1lb)	2.4kg (5.2lb)	2.4kg (5.3lb)
1550	2.4kg (5.3lb)	2.4kg (5.4lb)	2.5kg (5.5lb)
1600	2.5kg (5.5lb)	2.5kg (5.6lb)	2.6kg (5.7lb)
1650	2.6kg (5.6lb)	2.6kg (5.7lb)	2.6kg (5.8lb)
1700	2.6kg (5.8lb)	2.7kg (5.9lb)	2.7kg (6lb)
1750	2.7kg (6lb)	2.7kg (6lb)	2.8kg (6.1lb)

Lead Wire

Motor Cable

Wire Type	UL 2464
Wire AWG	24
U phase	Orange
V phase	White
W phase	Gray

300mm lead wire bare leads

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

Supplied 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)

Hall Effect Cable (Optional)

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
No Connection	Gray / Black

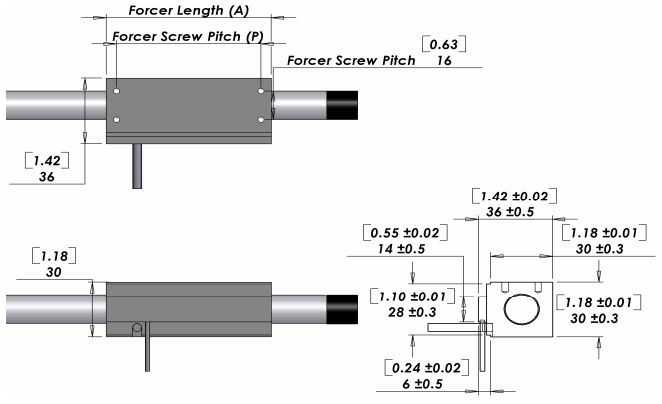
400mm lead wire bare leads

The bending radius of the hall effect cable should be 27.6mm as suggested by the wire manufacturer.

Connector (Hall Effect Cable)

None supplied

Hall Effect (Optional)



* Note 2
Sensor Cable (Lead wires) Specifications
HP-SB20276SR
Wire Type UL758
Wire AWG 28
Length 400 mm (bare leads)
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 27.6 (wire diameter 4.6 * 6) as suggested by the wire manufacturer.
This radius should be maintained. Attach the proper high flex cable as required by your application.

* Note 1
The bending radius of the motor cable should be 26.4 mm (wire diameter 4.4 * 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.

Dual Forcer

Forcer spacing distance

	S160T	S160Q
Forcer spacing distance	10	10
Pole (North-South) distance	30	30
Forcer length	110	140
Flip forcers	No	Yes

2007/2/28