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	S427D		S427T		S427Q		
Electrical Specs	S427D	S427D 1S	S427T	S427T 1S	S427Q	S427Q 2S	S427Q 1S
Continuous Force <sup>1</sup>	100N (22.5lbs)		150N (33.7lbs)		200N (45lbs)	198 (44.6lbs)	
Continuous Current <sup>1</sup>	3.0Arms	5.9Arms	3.0Arms	8.9Arms	3.0Arms	5.9Arms	12Arms
Acceleration Force <sup>2</sup>	400N (90lbs)	395N (88.9lbs)	600N (135lbs)	598N (134.6lbs)	800N (180lbs)	791 (177.98lbs)	
Acceleration Current <sup>2</sup>	12Arms	24Arms	12Arms	36Arms	12Arms	24Arms	47Arms
Force Constant (K <sub>f</sub> )	33N/Arms (7.49lbs/amp)	17N/Arms (3.86lbs/amp)	50N/Arms (11.33lbs/amp)	17N/Arms (3.85lbs/amp)	67N/Arms (14.97lbs/amp)	33N/Arms (7.37lbs/amp)	17N/Arms (3.80lbs/amp)
Back EMF (K <sub>e</sub> )	11V/m/s (0.28V/in/s)	5.6V/m/s (0.14V/in/s)	17V/m/s (0.42V/in/s)	5.6V/m/s (0.14V/in/s)	22V/m/s (0.56V/in/s)	11V/m/s (0.28V/in/s)	5.6V/m/s (0.14V/in/s)
Resistance 25°C <sup>3</sup>	2.7Ω	0.68Ω	3.9Ω	0.43Ω	5.2Ω	1.3Ω	0.33Ω
Inductance <sup>3</sup>	7.3mH	1.8mH	11mH	1.2mH	15mH	3.8mH	0.94mH
Electric Time Constant	2.70ms		2.82ms		2.88ms		
Max. Rated Voltage (AC)	240V						
Fundamental Motor Constant (K <sub>m</sub> )	20.45N√W		25.52N√W		29.51N√W	29.21N√W	
Magnetic Pitch (North-North)	180mm (7.09in)						

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.

<sup>1</sup> 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.

<sup>2</sup> 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.

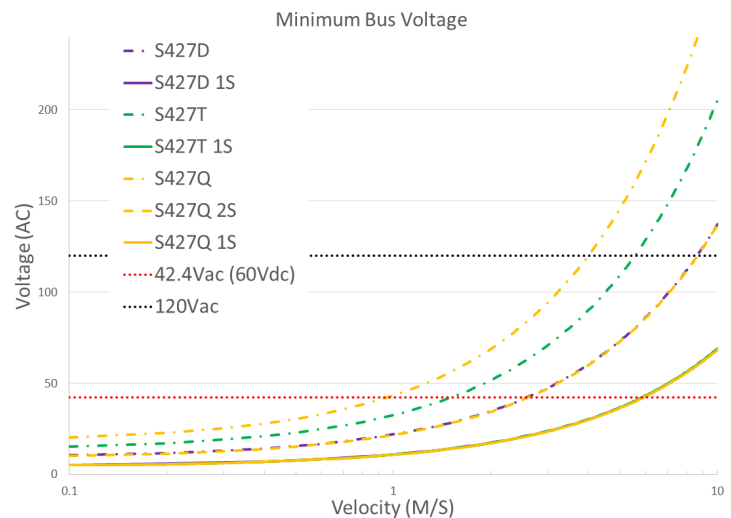
<sup>3</sup> All winding parameters listed are measured line-to-line (phase-to-phase).

Thermal Specs	S427D	S427T	S427Q
Max Phase Temperature <sup>4</sup>	135°C (275°F)		
Thermal Resistance (Coil) (K <sub>θ</sub> )	4.6°C/W (36°F/W)	3.2°C/W (37.8°F/W)	2.4°C/W (36.3°F/W)

<sup>4</sup> The standard temperature difference between the coil and the forcer surface is 25°C.



### Bus Voltage



### Part Numbering System

S	—	Shaft Size 427	—	Forcer Size (A) <u>X</u>	—	Parallel Option <u>XX</u>	—	Usable Stroke (S) <u>XXXXst</u>	—	Options <u>XX</u>	—	Options <u>XX</u>
				D: Double (2) windings T: Triple (3) windings Q: Quadruple (4) windings		Blank: Single Motor PL: Parallel Motors		100-2000mm		ST: Standard WP: Water Resistant HA: Digital Hall Effect CE: CE type motor FG: Frame Ground		Blank: Standard FO: Forcer Only SO: Shaft Only

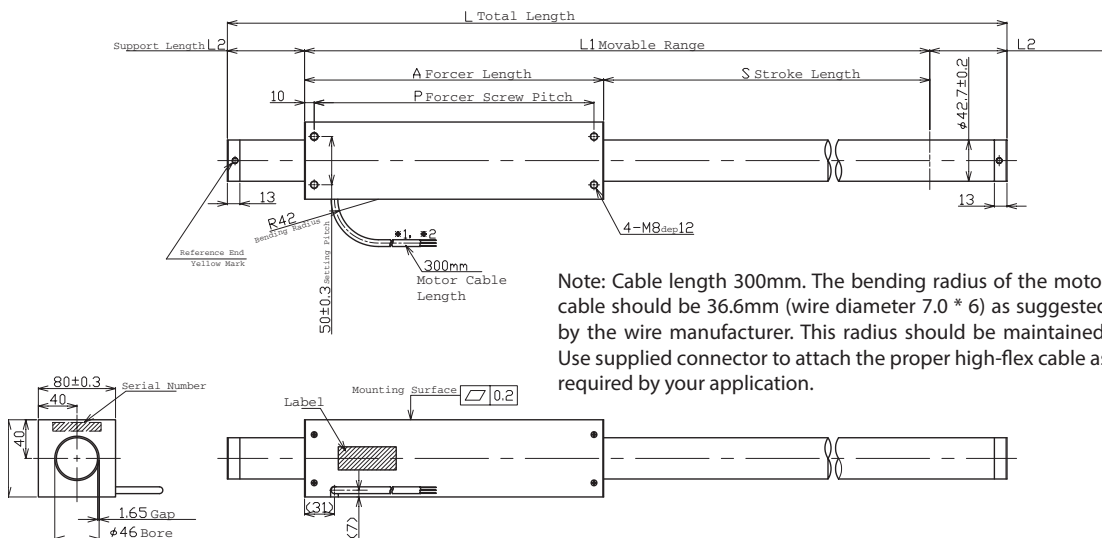
Forcer Specs	S427D	S427T	S427Q
Forcer Length (A)	220mm (8.66in)	310mm (12.2in)	400mm (15.75in)
Forcer Width	80mm (3.15in)		
Forcer Screw Pitch (P)	200mm (7.9in)	290mm (11.4in)	380mm (15in)
Forcer Weight	3.0kg (6.61lbs)	4.2kg (9.3lbs)	5.4kg (11.9lbs)
Gap	1.65mm (0.06in)		
Screw	M8		
Tightening Torque	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



## Hall Effect Specs

Forcer Length (A)  
Forcer Screw Pitch (P)  
Forcer Screw Pitch 50  
1.97  
3.15  
80  
3.15  
80  
3.15 ± 0.01  
80 ± 0.3  
3.15 ± 0.01  
80 ± 0.3

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.

## Forcer Spacing Distance

Spec	S427T	S427Q
Forcer Spacing Distance	50mm	
Pole (N/S) Distance	90mm	
Forcer Length	310mm	400mm
Flip Forcers	No	Yes

Tandem S427D forcers are possible, but are equivalent to one (1) S427Q forcer and thus are not listed above.

## Support and Bending

Stroke	Support Length (L2)	Max. Bending
0~550	60mm	0.00mm
551~1000	80mm	0.15mm
1001~1500	100mm	0.60mm
1501~2000	100mm	1.10mm
2001~2500	100mm	2.00mm
2501~max	100mm	2.10mm

Shaft Diameter (D) - 42.7mm ± 0.2

Total Length (L) = Stroke (S) + Forcer Length (A) + (Support Length (L2) x 2)

Stroke lengths available from 100mm to 4600mm. Contact Nippon Pulse for more information.

## 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.

## FG/FGA Type Motor Cable

### Standard Lead Wire

Wire Type	UL 2570FA
Wire AWG	16
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.

Wire Type	UL 1330
Wire AWG	16
Frame Ground	Green/Yellow

### FGA/CE Type Lead Wire

Ground Wire	
Wire Type	UL 1330
Wire AWG	16
U Phase	Red
V Phase	White
W Phase	Black

300mm lead wire bare leads. The bending radius of the motor cable should be 18.96mm as suggested by the wire manufacturer. FG type with insulating sheet between coils and case. Meets all requirements of EN60034-1 (1998).

## Shaft Length (L)

Stroke	S427D	S427T	S427Q
100	Stroke is less than the electrical cycle length.		
150	Contact Nippon Pulse.		
200	540mm (21.3in)	630mm (24.8in)	720mm (28.3in)
250	590mm (23.2in)	680mm (26.8in)	770mm (30.3in)
300	640mm (25.2in)	730mm (28.7in)	820mm (32.3in)
350	690mm (27.2in)	780mm (30.7in)	870mm (34.3in)
400	740mm (29.1in)	830mm (32.7in)	920mm (36.2in)
450	790mm (31.1in)	880mm (34.6in)	970mm (38.2in)
500	840mm (33.1in)	930mm (36.6in)	1020mm (40.2in)
550	890mm (35in)	980mm (38.6in)	1070mm (42.1in)
600	980mm (38.6in)	1070mm (42.1in)	1160mm (45.7in)
650	1030mm (40.6in)	1120mm (44.1in)	1210mm (47.6in)
700	1080mm (42.5in)	1170mm (46.1in)	1260mm (49.6in)
750	1130mm (44.5in)	1220mm (48in)	1310mm (51.6in)
800	1180mm (46.5in)	1270mm (50in)	1360mm (53.5in)
850	1230mm (48.4in)	1320mm (52in)	1410mm (55.5in)
900	1280mm (50.4in)	1370mm (53.9in)	1460mm (57.5in)
950	1330mm (52.4in)	1420mm (55.9in)	1510mm (59.4in)
1000	1380mm (54.3in)	1470mm (57.9in)	1560mm (61.4in)
1050	1470mm (57.9in)	1560mm (61.4in)	1650mm (65in)
1100	1520mm (59.8in)	1610mm (63.4in)	1700mm (66.9in)
1150	1570mm (61.8in)	1660mm (65.4in)	1750mm (68.9in)
1200	1620mm (63.8in)	1710mm (67.3in)	1800mm (70.9in)
1250	1670mm (65.7in)	1760mm (69.3in)	1850mm (72.8in)
1300	1720mm (67.7in)	1810mm (71.3in)	1900mm (74.8in)
1350	1770mm (69.7in)	1860mm (73.2in)	1950mm (76.8in)
1400	1820mm (71.7in)	1910mm (75.2in)	2000mm (78.7in)
1450	1870mm (73.6in)	1960mm (77.2in)	2050mm (80.7in)
1500	1920mm (75.6in)	2010mm (79.1in)	2100mm (82.7in)

## Shaft Mass

Stroke	S427D	S427T	S427Q
100	Stroke is less than the electrical cycle length.		
150	Contact Nippon Pulse.		
200	4.9kg (10.8lb)	5.8kg (12.8lb)	6.7kg (14.8lb)
250	5.4kg (11.9lb)	6.3kg (13.9lb)	7.2kg (15.9lb)
300	5.9kg (13lb)	6.8kg (15lb)	7.7kg (17lb)
350	6.4kg (14.1lb)	7.3kg (16.1lb)	8.2kg (18.1lb)
400	6.9kg (15.2lb)	7.8kg (17.2lb)	8.7kg (19.2lb)
450	7.4kg (16.3lb)	8.3kg (18.3lb)	9.2kg (20.3lb)
500	7.9kg (17.5lb)	8.8kg (19.4lb)	9.7kg (21.4lb)
550	8.4kg (18.6lb)	9.3kg (20.5lb)	10.2kg (22.5lb)
600	9.1kg (20lb)	10kg (22lb)	10.9kg (24lb)
650	9.6kg (21.1lb)	10.5kg (23.1lb)	11.4kg (25.1lb)
700	10.1kg (22.2lb)	11kg (24.2lb)	11.9kg (26.2lb)
750	10.6kg (23.4lb)	11.5kg (25.3lb)	12.4kg (27.3lb)
800	11.1kg (24.5lb)	12kg (26.4lb)	12.9kg (28.4lb)
850	11.6kg (25.6lb)	12.5kg (27.6lb)	13.4kg (29.5lb)
900	12.1kg (26.7lb)	13kg (28.7lb)	13.9kg (30.6lb)
950	12.6kg (27.8lb)	13.5kg (29.8lb)	14.4kg (31.8lb)
1000	13.1kg (28.9lb)	14kg (30.9lb)	14.9kg (32.9lb)
1050	13.8kg (30.4lb)	14.7kg (32.4lb)	15.6kg (34.3lb)
1100	14.3kg (31.5lb)	15.2kg (33.5lb)	16.1kg (35.4lb)
1150	14.8kg (32.6lb)	15.7kg (34.6lb)	16.6kg (36.6lb)
1200	15.3kg (33.7lb)	16.2kg (35.7lb)	17.1kg (37.7lb)
1250	15.8kg (34.8lb)	16.7kg (36.8lb)	17.6kg (38.8lb)
1300	16.3kg (35.9lb)	17.2kg (37.9lb)	18.1kg (39.9lb)
1350	16.8kg (37lb)	17.7kg (39lb)	18.6kg (41lb)
1400	17.3kg (38.1lb)	18.2kg (40.1lb)	19.1kg (42.1lb)
1450	17.8kg (39.2lb)	18.7kg (41.2lb)	19.6kg (43.2lb)
1500	18.3kg (40.3lb)	19.2kg (42.3lb)	20.1kg (44.3lb)

Additional stroke length information on next page.

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

## Shaft Length, continued

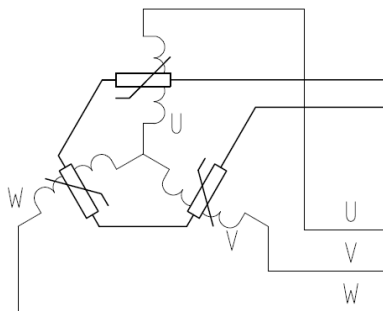
Stroke	S427D	S427T	S427Q
1550	1970mm (77.6in)	2060mm (81.1in)	2150mm (84.6in)
1600	2020mm (79.5in)	2110mm (83.1in)	2200mm (86.6in)
1650	2070mm (81.5in)	2160mm (85in)	2250mm (88.6in)
1700	2120mm (83.5in)	2210mm (87in)	2300mm (90.6in)
1750	2170mm (85.4in)	2260mm (89in)	2350mm (92.5in)
1800	2220mm (87.4in)	2310mm (90.9in)	2400mm (94.5in)
1850	2270mm (89.4in)	2360mm (92.9in)	2450mm (96.5in)
1900	2320mm (91.3in)	2410mm (94.9in)	2500mm (98.4in)
1950	2370mm (93.3in)	2460mm (96.9in)	2550mm (100.4in)
2000	2420mm (95.3in)	2510mm (98.8in)	2600mm (102.4in)
2050	2470mm (97.2in)	2560mm (100.8in)	2650mm (104.3in)
2100	2520mm (99.2in)	2610mm (102.8in)	2700mm (106.3in)
2150	2570mm (101.2in)	2660mm (104.7in)	2750mm (108.3in)
2200	2620mm (103.1in)	2710mm (106.7in)	2800mm (110.2in)
2250	2670mm (105.1in)	2760mm (108.7in)	2850mm (112.2in)
2300	2720mm (107.1in)	2810mm (110.6in)	2900mm (114.2in)
2350	2770mm (109.1in)	2860mm (112.6in)	2950mm (116.1in)
2400	2820mm (111in)	2910mm (114.6in)	3000mm (118.1in)
2450	2870mm (113in)	2960mm (116.5in)	3050mm (120.1in)
2500	2920mm (115in)	3010mm (118.5in)	3100mm (122in)
2550	2970mm (116.9in)	3060mm (120.5in)	3150mm (124in)
2600	3020mm (118.9in)	3110mm (122.4in)	3200mm (126in)
2650	3070mm (120.9in)	3160mm (124.4in)	3250mm (128in)
2700	3120mm (122.8in)	3210mm (126.4in)	3300mm (129.9in)
2750	3170mm (124.8in)	3260mm (128.3in)	3350mm (131.9in)
2800	3220mm (126.8in)	3310mm (130.3in)	3400mm (133.9in)
2850	3270mm (128.7in)	3360mm (132.3in)	3450mm (135.8in)
2900	3320mm (130.7in)	3410mm (134.3in)	3500mm (137.8in)
2950	3370mm (132.7in)	3460mm (136.2in)	3550mm (139.8in)
3000	3420mm (134.6in)	3510mm (138.2in)	3600mm (141.7in)

## Shaft Mass, continued

Stroke	S427D	S427T	S427Q
1550	18.8kg (41.4lb)	19.7kg (43.4lb)	20.6kg (45.4lb)
1600	19.3kg (42.5lb)	20.2kg (44.5lb)	21.1kg (46.5lb)
1650	19.8kg (43.6lb)	20.7kg (45.6lb)	21.6kg (47.6lb)
1700	20.3kg (44.7lb)	21.2kg (46.7lb)	22.1kg (48.7lb)
1750	20.8kg (45.8lb)	21.7kg (47.8lb)	22.6kg (49.8lb)
1800	21.3kg (46.9lb)	22.2kg (48.9lb)	23.1kg (50.9lb)
1850	21.8kg (48lb)	22.7kg (50lb)	23.6kg (52lb)
1900	22.3kg (49.1lb)	23.2kg (51.1lb)	24.1kg (53.1lb)
1950	22.8kg (50.3lb)	23.7kg (52.2lb)	24.6kg (54.2lb)
2000	23.3kg (51.4lb)	24.2kg (53.3lb)	25.1kg (55.3lb)
2050	23.8kg (52.3lb)	24.7kg (54.5lb)	25.6kg (56.4lb)
2100	24.3kg (53.6lb)	25.2kg (55.6lb)	26.1kg (57.5lb)
2150	24.8kg (54.7lb)	25.7kg (56.7lb)	26.6kg (58.6lb)
2200	25.3kg (55.8lb)	26.2kg (57.8lb)	27.1kg (59.7lb)
2250	25.8kg (56.9lb)	26.7kg (58.9lb)	27.6kg (60.8lb)
2300	26.3kg (58lb)	27.2kg (60lb)	28.1kg (61.9lb)
2350	26.8kg (59.1lb)	27.7kg (61.1lb)	28.6kg (63.1lb)
2400	27.3kg (60.2lb)	28.2kg (62.2lb)	29.1kg (64.2lb)
2450	27.8kg (61.3lb)	28.7kg (63.3lb)	29.6kg (65.3lb)
2500	28.3kg (62.4lb)	29.2kg (64.4lb)	30.1kg (66.4lb)
2550	28.8kg (63.5lb)	29.7kg (65.5lb)	30.6kg (67.5lb)
2600	29.3kg (64.6lb)	30.2kg (66.6lb)	31.1kg (68.6lb)
2650	29.8kg (65.7lb)	30.7kg (67.7lb)	31.6kg (69.7lb)
2700	30.3kg (66.8lb)	31.2kg (68.8lb)	32.1kg (70.8lb)
2750	30.8kg (67.9lb)	31.7kg (69.9lb)	32.6kg (71.9lb)
2800	31.3kg (69lb)	32.2kg (71lb)	33.1kg (73lb)
2850	31.8kg (70.1lb)	32.7kg (72.1lb)	33.6kg (74.1lb)
2900	32.3kg (71.2lb)	33.2kg (73.2lb)	34.1kg (75.2lb)
2950	32.8kg (72.3lb)	33.7kg (74.3lb)	34.6kg (76.3lb)
3000	33.3kg (73.4lb)	34.2kg (75.4lb)	35.1kg (77.4lb)

Additional stroke lengths are available. For longer strokes, see datasheet for L427 linear shaft motor. Contact Nippon Pulse for more information.

## 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

## Tandem Forcer



Not all motors on this datasheet have received a CE Declaration of Conformity. Only the standard S427D, S427T and S427Q 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: S427D-1S, S427T-1S, S427Q-2S, S427Q-1S, any S427 motor with Hall Effects, Thermistor or Thermocouple options.

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