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|                                              | L320D         |          | L320T          |          | L320Q          |          |          |
|----------------------------------------------|---------------|----------|----------------|----------|----------------|----------|----------|
| Electrical Specs                             | L320D         | L320D-1S | L320T          | L320T-1S | L320Q          | L320Q-1S | L320Q-2S |
| Continuous Force <sup>1</sup>                | 55N (12.4lbs) |          | 82N (18.4lbs)  |          | 109N (24.5lbs) |          |          |
| Continuous Current <sup>1</sup>              | 1.3Arms       | 2.5Arms  | 1.3Arms        | 3.8Arms  | 1.3Arms        | 5.0Arms  | 2.5Arms  |
| Acceleration Force <sup>2</sup>              | 218N (49lbs)  |          | 327N (73.5lbs) |          | 436N (98lbs)   |          |          |
| Acceleration Current <sup>2</sup>            | 5.0Arms       | 10.0Arms | 5.0Arms        | 15.0Arms | 5.0Arms        | 20.0Arms | 10.0Arms |
| Force Constant (K <sub>f</sub> )             | 44N/amp       | 22N/amp  | 65N/amp        | 22N/amp  | 87N/amp        | 22N/amp  | 44N/amp  |
| Back EMF (K <sub>e</sub> )                   | 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 <sup>3</sup>                 | 12Ω           | 2.9Ω     | 17Ω            | 1.9Ω     | 23Ω            | 1.4Ω     | 5.8Ω     |
| Inductance <sup>3</sup>                      | 14mH          | 3.5mH    | 21mH           | 2.3mH    | 28mH           | 1.8mH    | 7.0mH    |
| Electric Time Constant                       | 1.22ms        |          | 1.22ms         |          | 1.22ms         |          |          |
| Fundamental Motor Constant (K <sub>m</sub> ) | 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.

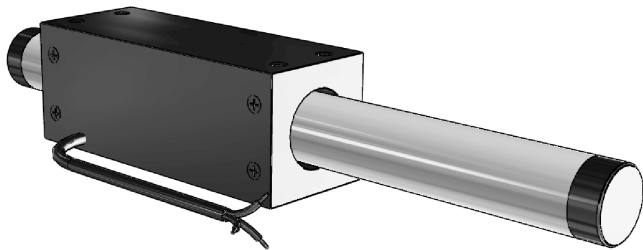
<sup>1</sup> Based on a temp rise of coil surface of 110°K over 25°C ambient temperature stalled forcer, and no external cooling or heat sinking.

<sup>2</sup> Can be maintained for a maximum of 40 seconds. Higher forces and current possible for short periods of time, contact Nippon Pulse for more information.

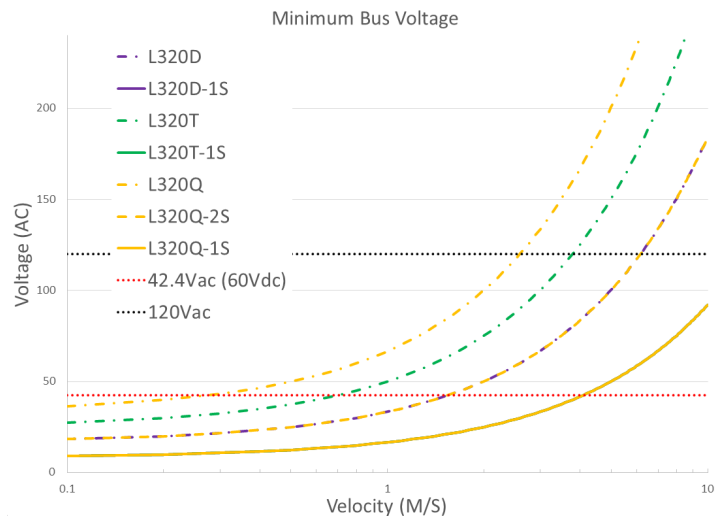
<sup>3</sup> All winding parameters listed are measured line-to-line (phase-to-phase).

|                                             | L320D            |          | L320T              |          | L320Q              |          |          |
|---------------------------------------------|------------------|----------|--------------------|----------|--------------------|----------|----------|
| Thermal Specs                               | L320D            | L320D-1S | L320T              | L320T-1S | L320Q              | L320Q-1S | L320Q-2S |
| Max Phase Temperature <sup>4</sup>          | 135°C (275°F)    |          |                    |          |                    |          |          |
| Thermal Resistance (Coil) (K <sub>θ</sub> ) | 6.1°C/W (43°F/W) |          | 4.1°C/W (39.4°F/W) |          | 3.1°C/W (37.6°F/W) |          |          |

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



### Bus Voltage



### Part Numbering System

L — Shaft Size 320 — Forcer Size (A) X — Alt. Winding XX — Parallel Option XX — Usable Stroke (S) XXXSt — Options XX — Options 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: Digital Hall Effect  
CE: CE Type Motor  
FG: Frame Ground

Blank: Standard  
FO: Forcer Only  
SO: Shaft Only

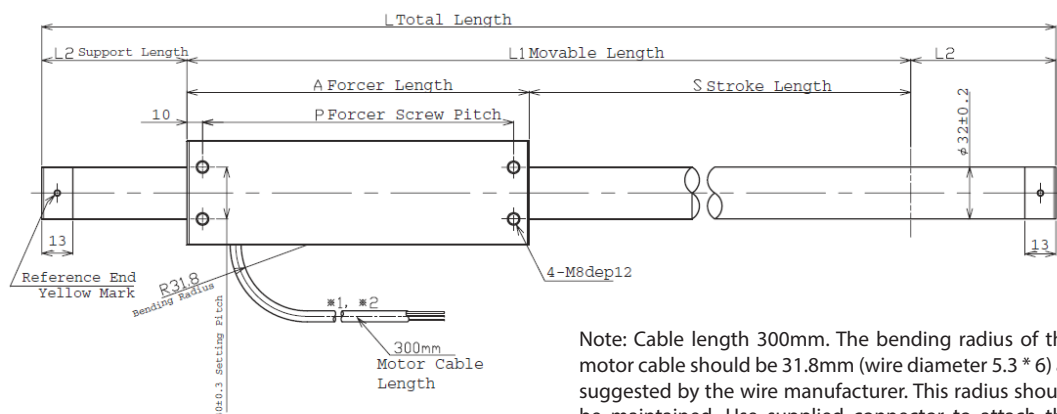
|                        | L320D          |          | L320T          |          | L320Q          |                |          |
|------------------------|----------------|----------|----------------|----------|----------------|----------------|----------|
| Forcer Specs           | L320D          | L320D-1S | 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:

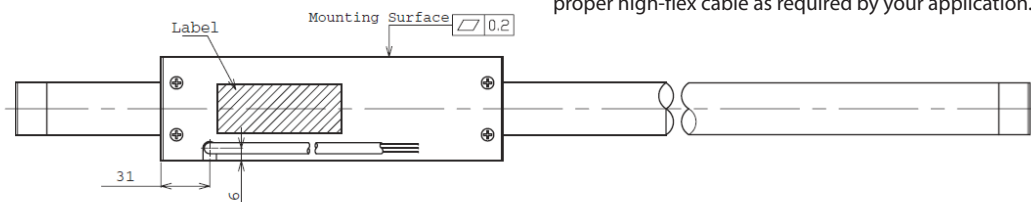
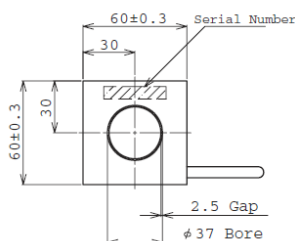
| Dimension (mm) | Tolerance (mm) |
|----------------|----------------|
| 0 - 6          | ±0.1           |
| 7 - 30         | ±0.2           |
| 31 - 120       | ±0.3           |
| 121 - 315      | ±0.5           |
| 316 - 1000     | ±0.8           |
| 1001 - 2000    | ±1.2           |
| 2000 -    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

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

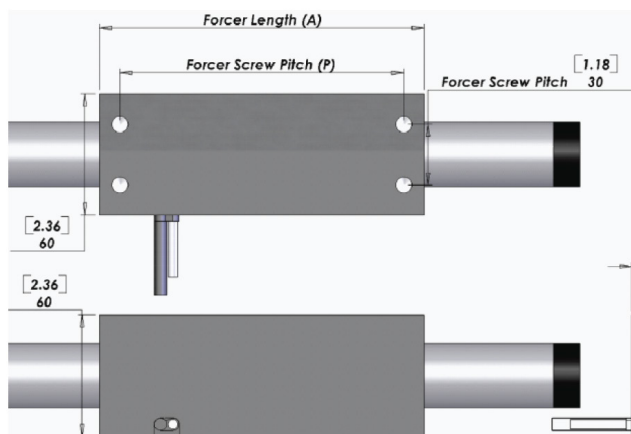
Unless otherwise specified, dimensions are in mm



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     |

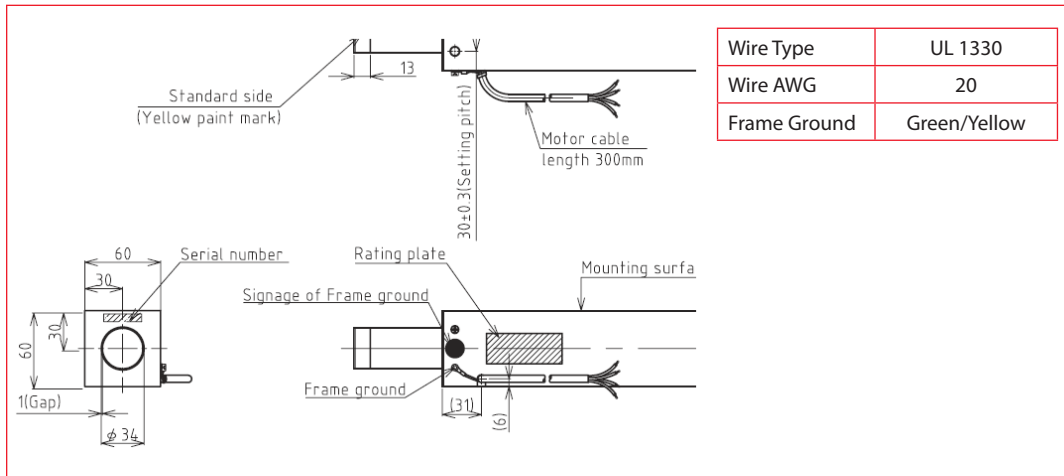
The bending radius of the sensor cable should be R27.6mm (wire diameter 5.3 \* 6) as suggested by the wire manufacturer. This radius should be maintained. Attach the proper high flex cable as required by your application.

## 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



## 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       |

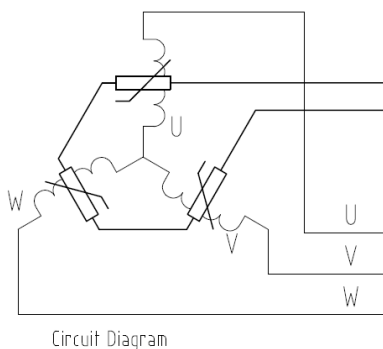
Shaft Diameter (D) - 32mm ±0.2

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

## Tandem Forcer

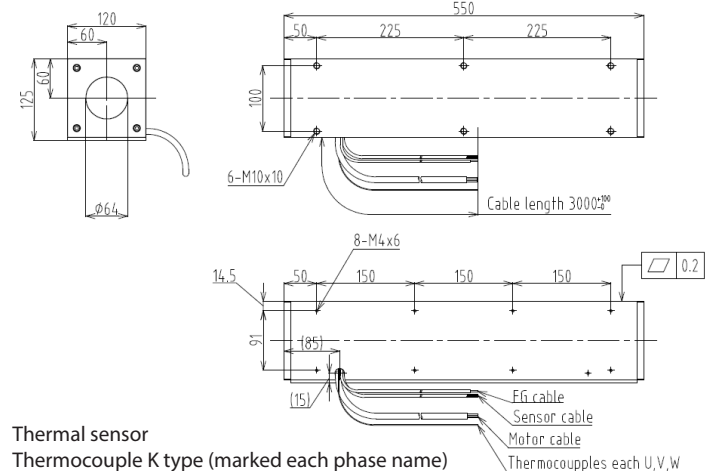


## THM Option



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). Contact Nippon Pulse for more information.

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

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