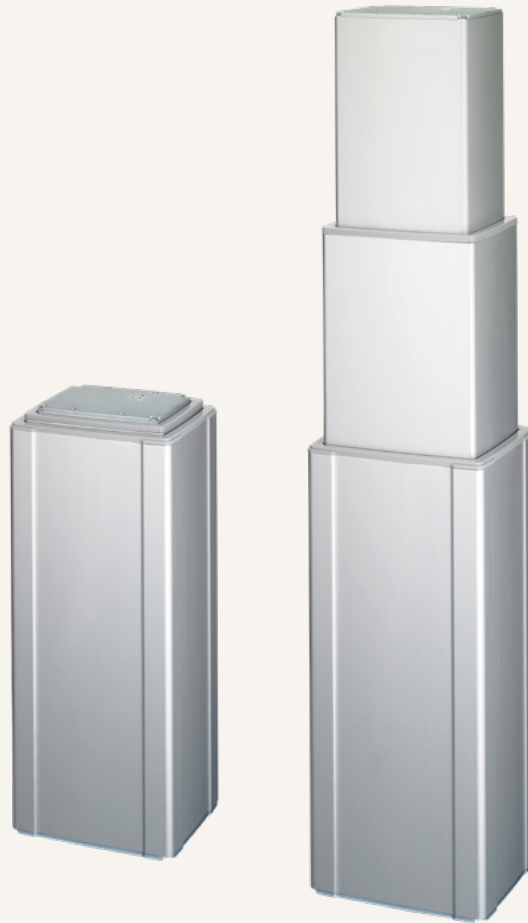


# TL3

series



## Product Segments

- **Care Motion**
- **Comfort Motion**
- **Industrial Motion**

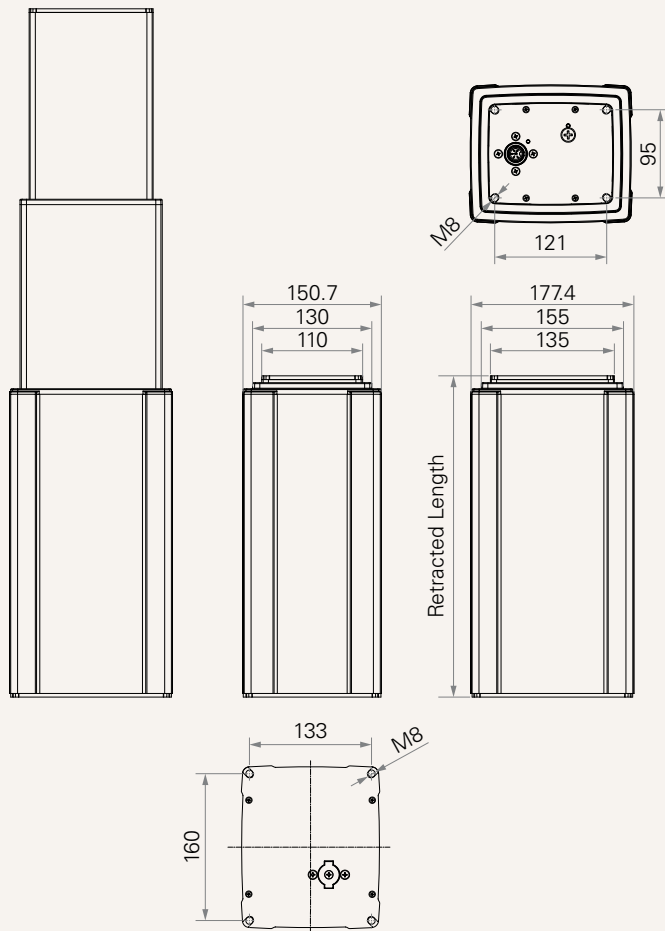
The TL3 columns from TiMOTION are made up of three extruded aluminum tubes of rectangular shape that give the system great stability and a high stroke with reduced retracted length. This electric lifting column allows for an easy integration into many height adjustable workstation applications, such as an exam chair in healthcare industry.

### General Features

|                                     |                                             |
|-------------------------------------|---------------------------------------------|
| Maximum load & self - locking force | 4,000N in push                              |
| Maximum dynamic bending moment      | 1,000Nm                                     |
| Maximum static bending moment       | 2,000Nm                                     |
| Maximum speed at full load          | 24mm/s<br>(with 1,000N in a push condition) |
| Minimum installation dimension      | $\geq \text{Stroke} / 2 + 150\text{mm}$     |
| Dimension of cross section          | 177.4 x 150.7mm                             |
| Stroke                              | 250~1200mm                                  |
| Certificate                         | IEC60601-1, EMC                             |
| Operational temperature range:      | +5°C~+45°C                                  |
| Options                             | POT, Hall sensors, direct cut system        |

**Drawing**

Standard Dimensions (mm)



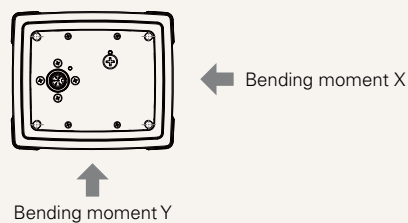
**Load and Speed**

| CODE                                         | Load (N)<br>Push | Self Locking Force (N) | Typical Current (A) |                     | Typical Speed (mm/s) |                     |
|----------------------------------------------|------------------|------------------------|---------------------|---------------------|----------------------|---------------------|
|                                              |                  |                        | No Load<br>32V DC   | With Load<br>24V DC | No Load<br>32V DC    | With Load<br>24V DC |
| <b>Motor Speed (2200RPM, duty cycle 10%)</b> |                  |                        |                     |                     |                      |                     |
| <b>B</b>                                     | 4000             | 4000                   | 2.5                 | 6.3                 | 14.5                 | 7.6                 |
| <b>C</b>                                     | 2000             | 2000                   | 2.5                 | 4.3                 | 22.0                 | 13.0                |
| <b>D</b>                                     | 1000             | 1000                   | 2.5                 | 3.8                 | 39.0                 | 24.0                |
| <b>Motor Speed (2800RPM, duty cycle 10%)</b> |                  |                        |                     |                     |                      |                     |
| <b>E</b>                                     | 4000             | 4000                   | 3.5                 | 7.5                 | 18.5                 | 9.4                 |
| <b>F</b>                                     | 2000             | 2000                   | 3.5                 | 6.3                 | 35.0                 | 20.0                |
| <b>Motor Speed (3800RPM, duty cycle 10%)</b> |                  |                        |                     |                     |                      |                     |
| <b>G</b>                                     | 4000             | 4000                   | 4.0                 | 10.8                | 28.0                 | 13.7                |

**Note**

- Parameters above are from tested average, please refer to approval drawing for final value.
- This self-locking force level is reached only when a short circuit is applied on the terminals of the motor. All the TiMOTION control boxes have this feature built-in.
- The current & speed in table are tested with 24V DC motor. With a 12V DC motor, the current is approximately twice the current measured in 24V DC; speed will be similar for both voltages.
- Bending moment Y direction = X\*0.8
- Static bending moment = dynamic\*2

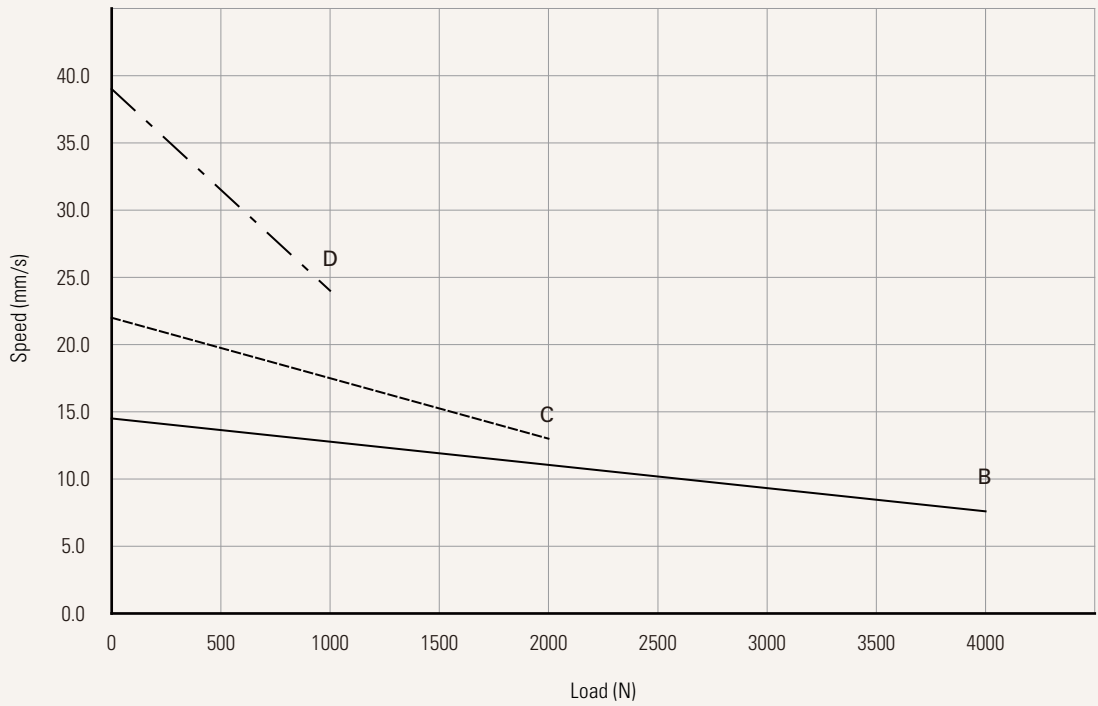
| Dynamic bending moment (Nm)- X direction |         |         |
|------------------------------------------|---------|---------|
| Stroke (mm)                              | S/2+150 | S/2+220 |
| <b>100-300</b>                           | 700     | 1000    |
| <b>301-500</b>                           | 500     | 800     |
| <b>501-700</b>                           | 300     | 500     |
| <b>701-1200</b>                          | 200     | 200     |



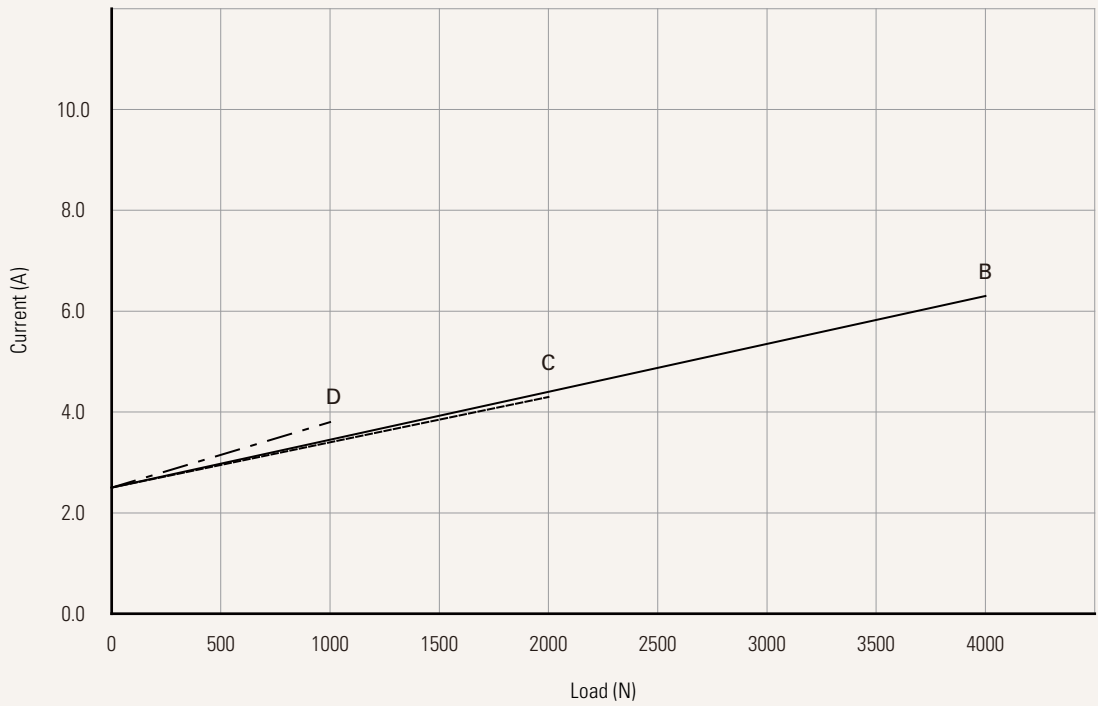
**Performance Data (24V DC Motor)**

Motor Speed (2200RPM, Duty cycle 10%)

Speed vs. Load



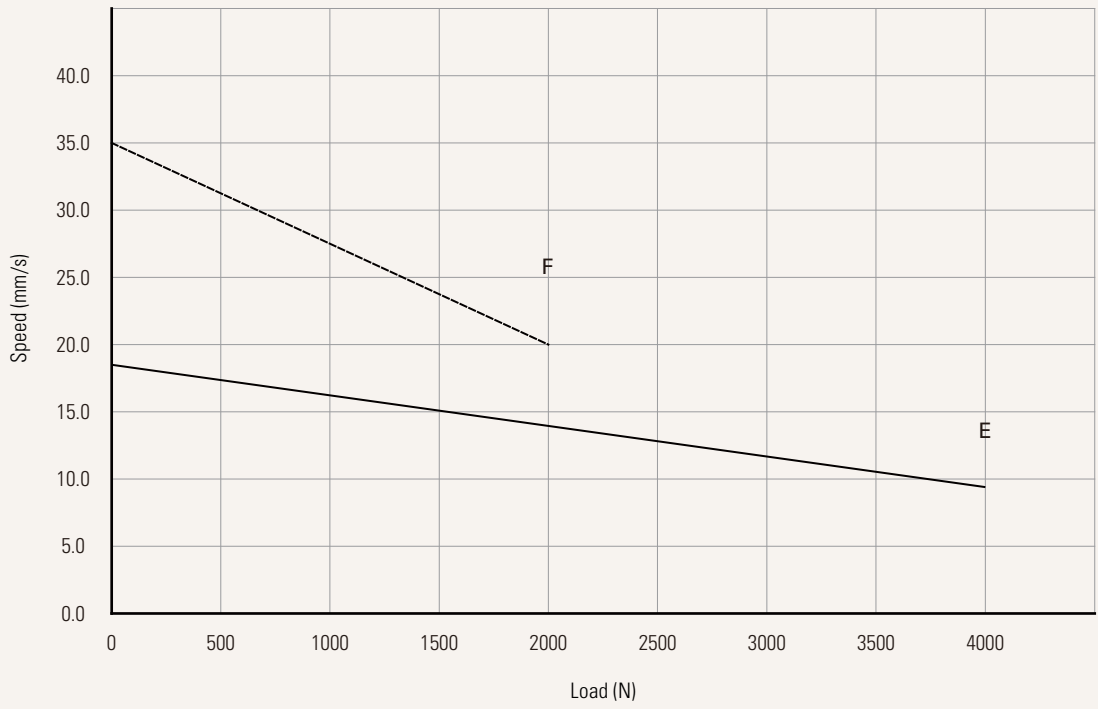
Current vs. Load



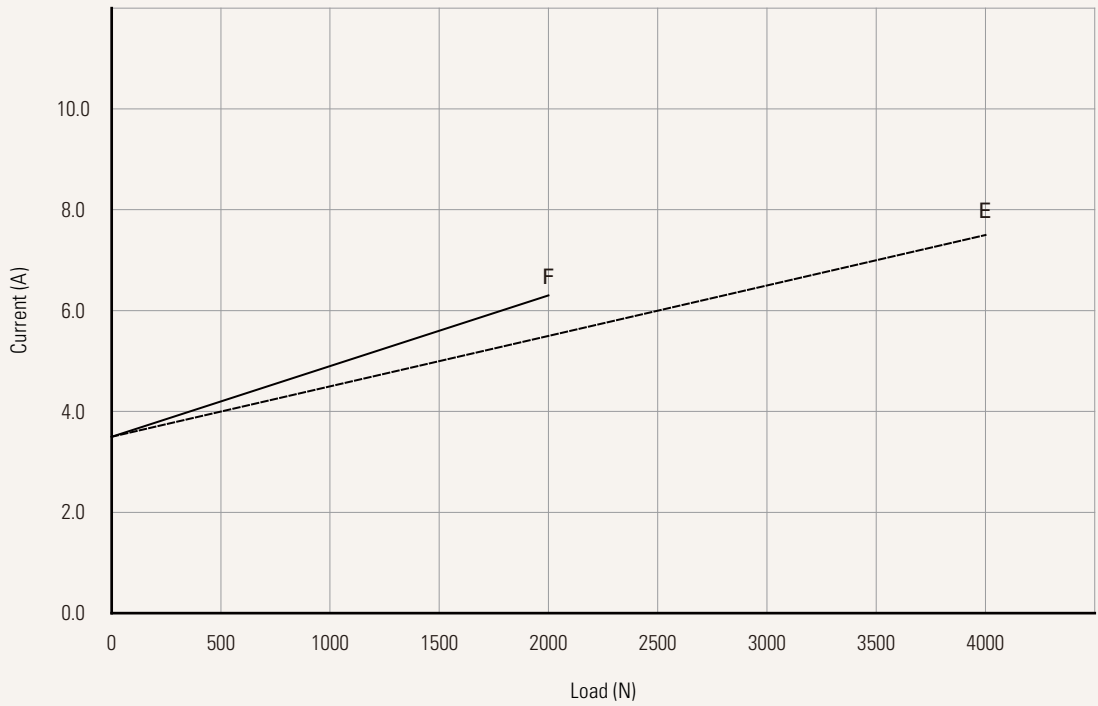
**Performance Data (24V DC Motor)**

Motor Speed (2800RPM, Duty cycle 10%)

Speed vs. Load



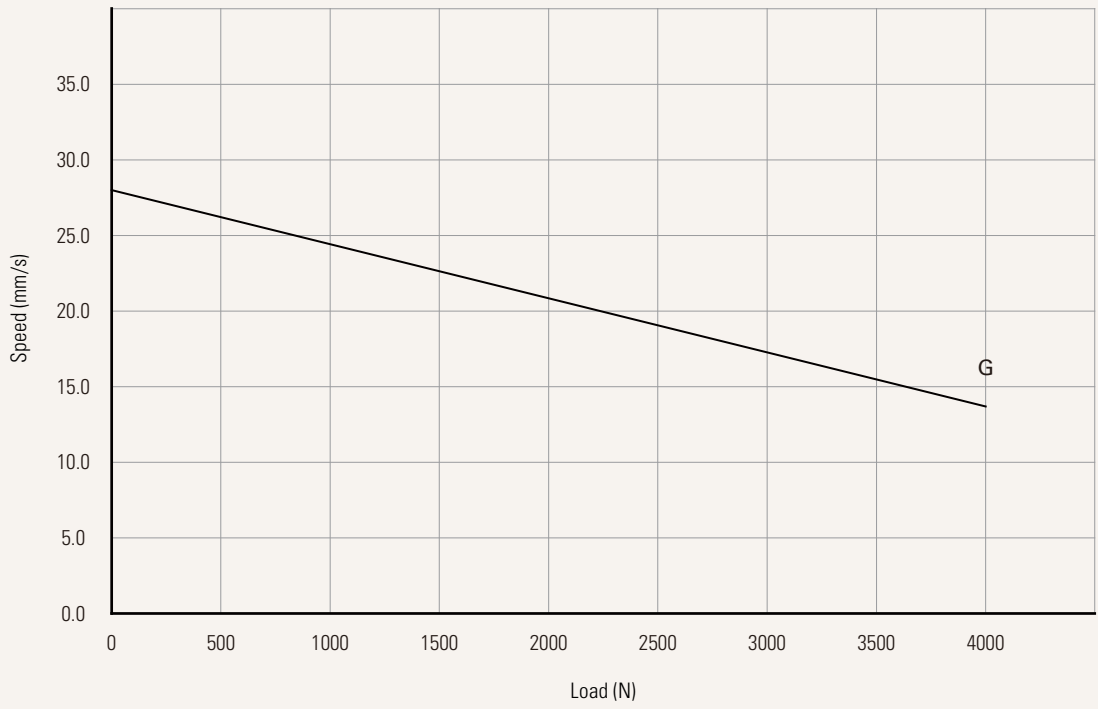
Current vs. Load



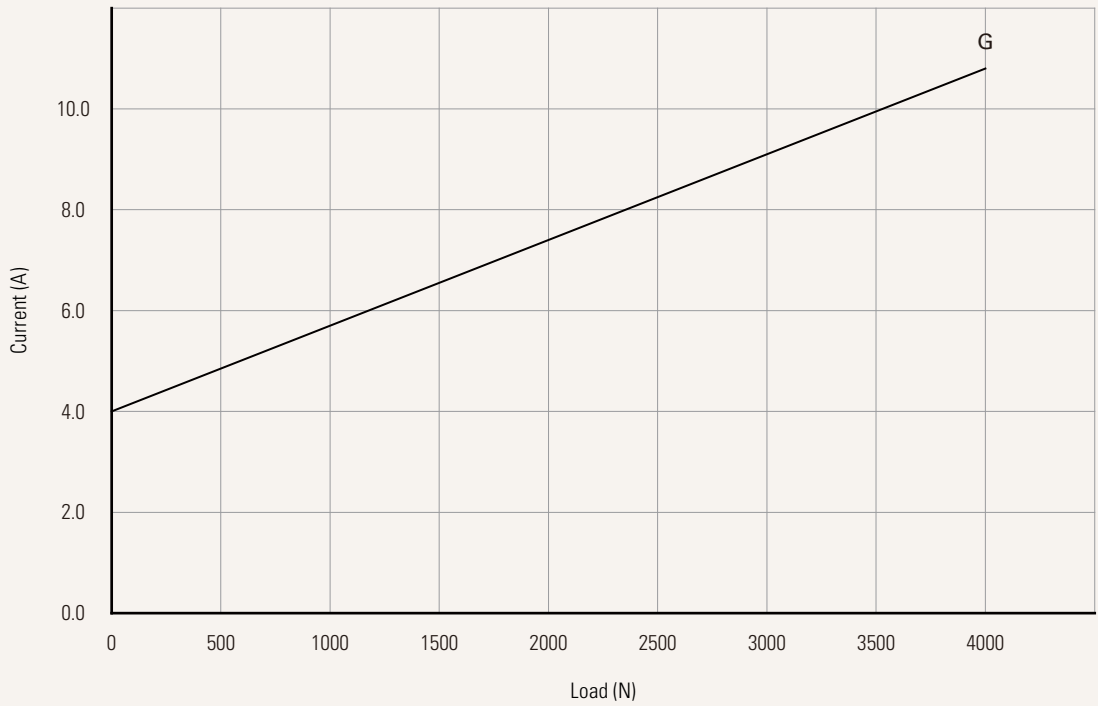
### Performance Data (24V DC Motor)

Motor Speed (3800RPM, Duty cycle 10%)

Speed vs. Load



Current vs. Load



# TL3 Ordering Key - Top End Socket

TL3

Version: 20191121-S

|                                                                    |                                                                                                                                                  |                             |          |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|
| <b>Voltage</b>                                                     | 1 = 12V DC                                                                                                                                       | 5 = 24V DC, thermal control |          |
| <b>Load and Speed</b>                                              | <a href="#">See page 2</a>                                                                                                                       |                             |          |
| <b>Stroke (mm)</b>                                                 | 250-1200                                                                                                                                         |                             |          |
| <b>Retracted Length (mm)</b>                                       | <a href="#">See page 9</a>                                                                                                                       |                             |          |
| <b>Cable Exit</b><br><a href="#">See page 9</a>                    | 1 = Top end socket                                                                                                                               |                             |          |
| <b>Special Functions for Spindle Sub-assembly</b>                  | 0 = Without (Standard)                                                                                                                           | 1 = Safety nut              |          |
| <b>Functions for Limit Switches</b><br><a href="#">See page 10</a> | 1 = Two switches at full retracted / extended positions to cut current<br>3 = Two switches at full retracted / extended positions to send signal |                             |          |
| <b>IP Rating</b>                                                   | 1 = Without                                                                                                                                      | 2 = IPX4                    | 3 = IPX6 |
| <b>Output Signals</b>                                              | 0 = Without                                                                                                                                      | 2 = Hall sensors*2          | 3 = POT  |
| <b>Connector</b><br><a href="#">See page 10</a>                    | 1 = DIN 6P, socket                                                                                                                               |                             |          |
| <b>Cable Length (mm)</b>                                           | 0 = Without (The corresponding extension cable TEC needs to be ordered seperately*)<br>Note: please contact TiMOTION before making an order      |                             |          |
| <b>Color</b>                                                       | 1 = Black                                                                                                                                        | 2 = Matte silver            |          |
| <b>Tubes Direction</b><br><a href="#">See page 11</a>              | 0 = Thinner on top                                                                                                                               | 1 = Wider on top            |          |
| <b>Grounding Function</b>                                          | 0 = Without                                                                                                                                      | 1 = With                    |          |

## Note

1 The TL3 is designed especially for push applications, not suitable for pull applications.

# TL3 Ordering Key - Side Cable

TL3

Version: 20191121-S

|                                                                    |                                                                        |                             |                                                                                      |                    |
|--------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------|--------------------|
| <b>Voltage</b>                                                     | 1 = 12V DC                                                             | 5 = 24V DC, thermal control |                                                                                      |                    |
| <b>Load and Speed</b>                                              | <a href="#">See page 2</a>                                             |                             |                                                                                      |                    |
| <b>Stroke (mm)</b>                                                 | 250-1200                                                               |                             |                                                                                      |                    |
| <b>Retracted Length (mm)</b>                                       | <a href="#">See page 9</a>                                             |                             |                                                                                      |                    |
| <b>Cable Exit</b><br><a href="#">See page 9</a>                    | 2 = Bottom side cable                                                  | 3 = Top side cable          | B = Top + Bottom side cable (Please contact engineers for details of cable types)    |                    |
|                                                                    | Note: please contact TiMOTION before making an order                   |                             |                                                                                      |                    |
| <b>Special Functions for Spindle Sub-assembly</b>                  | 0 = Without (Standard)                                                 | 1 = Safety nut              |                                                                                      |                    |
| <b>Functions for Limit Switches</b><br><a href="#">See page 10</a> | 1 = Two switches at full retracted / extended positions to cut current |                             |                                                                                      |                    |
|                                                                    | 3 = Two switches at full retracted / extended positions to send signal |                             |                                                                                      |                    |
| <b>IP Rating</b>                                                   | 1 = Without                                                            | 2 = IPX4                    | 3 = IPX6                                                                             |                    |
| <b>Output Signals</b>                                              | 0 = Without                                                            | 2 = Hall sensors*2          | 3 = POT                                                                              |                    |
| <b>Connector</b><br><a href="#">See page 10</a>                    | 1 = DIN 6P, 90° plug                                                   | F = DIN 6P, 180° plug       | H = Molex 8P 180°                                                                    |                    |
|                                                                    | 2 = Tinned leads                                                       | G = Molex 8P 90°            |                                                                                      |                    |
| <b>Cable Length (mm)</b>                                           | 1 = Straight, 500                                                      | 3 = Straight, 1000          | 5 = Straight, 1500                                                                   | 7 = Straight, 2000 |
|                                                                    | 2 = Straight, 750                                                      | 4 = Straight, 1250          | 6 = Straight, 1750                                                                   |                    |
| <b>Color</b>                                                       | 1 = Black (Black cable set)                                            |                             | 3 = Silver (Black cable set)                                                         |                    |
|                                                                    | 2 = Silver (428C color cable set)                                      |                             |                                                                                      |                    |
| <b>Tubes Direction</b><br><a href="#">See page 11</a>              | 0 = Thinner on top                                                     | 1 = Wider on top            | Note: If "top+bottom cable" in Cable Exit section is selected , could only select #0 |                    |
| <b>Grounding Function</b>                                          | 0 = Without                                                            | 1 = With                    |                                                                                      |                    |

## Note

1 The TL3 is designed especially for push applications, not suitable for pull applications.

|                                                                    |                                                                                                                                                                                                                                                                                                 |                                         |          |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------|
| <b>Voltage</b>                                                     | 5 = 24V DC, thermal protector                                                                                                                                                                                                                                                                   |                                         |          |
| <b>Load and Speed</b>                                              | <a href="#">See page 2</a>                                                                                                                                                                                                                                                                      |                                         |          |
| <b>Stroke (mm)</b>                                                 | 100-1200                                                                                                                                                                                                                                                                                        |                                         |          |
| <b>Retracted Length (mm)</b>                                       | <a href="#">See page 9</a>                                                                                                                                                                                                                                                                      |                                         |          |
| <b>Cable Exit</b><br><a href="#">See page 9</a>                    | B = Top side - for TH; Bottom side - for TP<br>C = Bottom side - Y cable, for TH + TP<br>D = Top side - for the 2nd column; Bottom side - for TH & TP; direct cut operation with 2 columns<br>E = Top side - for the 2nd column & TH; Bottom side - for TP; direct cut operation with 2 columns |                                         |          |
| <b>Special Functions for Spindle Sub-assembly</b>                  | 0 = Without (Standard)                                                                                                                                                                                                                                                                          | 1 = Safety nut                          |          |
| <b>Functions for Limit Switches</b><br><a href="#">See page 10</a> | 1 = Two switches at full retracted / extended positions to cut current                                                                                                                                                                                                                          |                                         |          |
| <b>IP Rating</b>                                                   | 1 = Without                                                                                                                                                                                                                                                                                     | 2 = IPX4                                | 3 = IPX6 |
| <b>Output Signals</b>                                              | 0 = Without                                                                                                                                                                                                                                                                                     |                                         |          |
| <b>Connector</b><br><a href="#">See page 10</a>                    | C = Direct cut, water proof, anti-pull                                                                                                                                                                                                                                                          |                                         |          |
| <b>Cable Length (mm)</b><br><a href="#">See page 11</a>            | B = Cable exit #B, L2 = L3 = 100                                                                                                                                                                                                                                                                | D = Cable exit #D, L2 = L3 = L4 = 100   |          |
|                                                                    | C = Cable exit #C, L1 = L2 = L3 = 100                                                                                                                                                                                                                                                           | E = Cable exit #E, L2 = L3 = L4 = 100   |          |
| <b>Color</b>                                                       | 1 = Black (With black cable set)                                                                                                                                                                                                                                                                | 3 = Matte silver (With black cable set) |          |
|                                                                    | 2 = Matte silver (With 428C color cable set)                                                                                                                                                                                                                                                    |                                         |          |
| <b>Tubes Direction</b><br><a href="#">See page 11</a>              | 0 = Thinner on top                                                                                                                                                                                                                                                                              | 1 = Wider on top                        |          |
| <b>Grounding Function</b>                                          | 0 = Without                                                                                                                                                                                                                                                                                     | 1 = With                                |          |

### Note

1 The TL3 is designed especially for push applications, not suitable for pull applications.



## Retracted Length (mm)

1. Retracted length needs to  $\geq A+B+C$

| A. Load (N) | 1000                             | 2000 | 4000 |
|-------------|----------------------------------|------|------|
|             | Stroke / 2+150 or Stroke / 2+220 |      |      |

### Note

1 The minimum retracted length generated by the formula - Stroke / 2+150 applies to the minimum bending moment rating. Please refer to the left column of the "Dynamic bending moment chart" [on page 2](#).

### B. Cable Exit

| CODE    | Top End Socket | Bottom Side Cable | Top Side Cable | Top + Bottom side cable | Direct Cut |
|---------|----------------|-------------------|----------------|-------------------------|------------|
| 1       | -              | -                 | -              | -                       | -          |
| 2       | -              | -                 | -              | -                       | -          |
| 3       | -              | -                 | +15            | -                       | -          |
| B       | -              | -                 | -              | +35                     | -          |
| B, D, E | -              | -                 | -              | -                       | +35        |
| C       | -              | -                 | -              | -                       | -          |

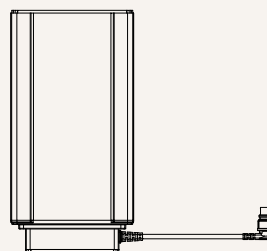
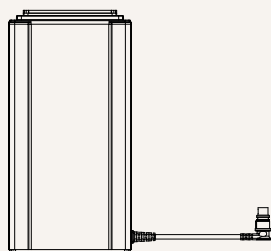
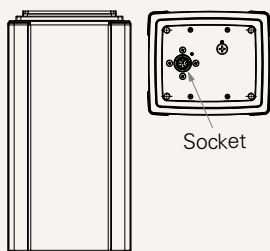
### C. When with POT (When without POT, C = 0)

| Cable Exit Code | Top End Socket | Bottom Side Cable | Top Side Cable |
|-----------------|----------------|-------------------|----------------|
| 1               | +40            | -                 | -              |
| 2               | -              | +40               | -              |
| 3               | -              | -                 | +40            |

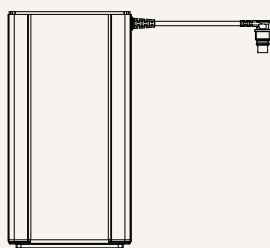
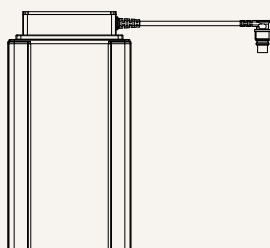
### Cable Exit

1 = Top end socket

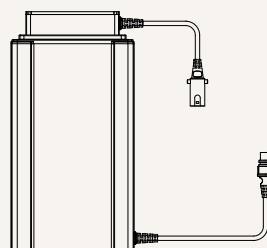
2 = Bottom side cable



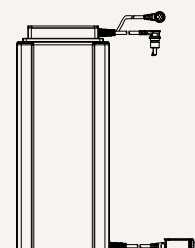
3 = Top side cable



B = Top side - for TH; Bottom side - for TP



B = Top (to TC) + Bottom (to TH) side cable

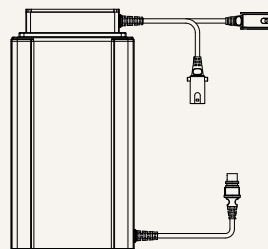
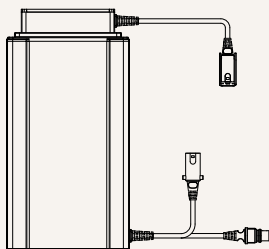
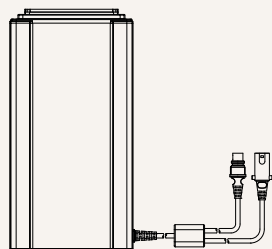


## Cable Exit

C = Bottom side - Y cable, for TH + TP

D = Top side - for the 2nd column;  
Bottom side - for TH & TP; direct cut operation with 2 columns

E = Top side - for the 2nd column & TH; Bottom side - for TP; direct cut operation with 2 columns



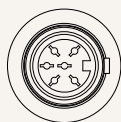
## Functions for Limit Switches

### Wire Definitions

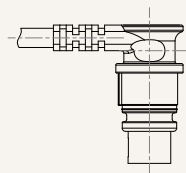
| CODE | Pin           | 1 (Green) | 2 (Red)            | 3 (White) | 4 (Black)      | 5 (Yellow)         | 6 (Blue) |
|------|---------------|-----------|--------------------|-----------|----------------|--------------------|----------|
| 1    | extend (VDC+) | N/A       | N/A                | N/A       | N/A            | retract (VDC+)     | N/A      |
| 3    | extend (VDC+) | common    | upper limit switch | N/A       | retract (VDC+) | lower limit switch |          |

## Connector

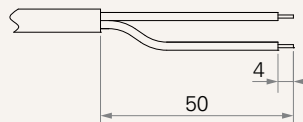
1 = DIN 6P, socket (Top end socket)



1 = DIN 6P, 90° plug (Side cable)



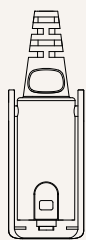
2 = Tinned leads



F = DIN 6P, 180° plug



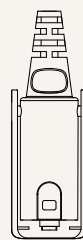
C = Direct cut, water proof, anti-pull



For TH:  
long DIN 5P (Pin array 240°),  
180° socket (with anti-pull clip)

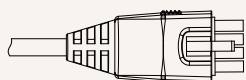


For TP:  
long DIN 5P (Pin array 240°),  
180° plug (with O-ring)

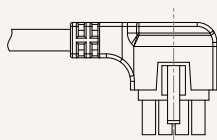


For Column 2:  
long DIN 6P (Pin array 240°),  
180° plug (with anti-pull clip)

G = Molex 8P 90°

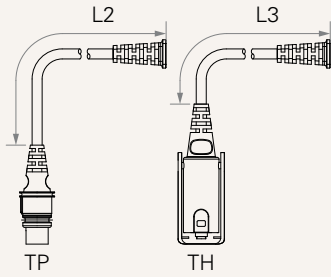


H = Molex 8P 180°

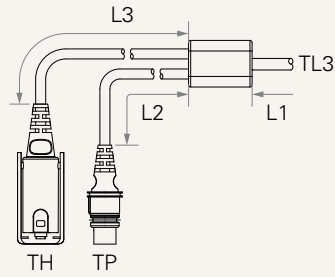


## Cable Length (mm)

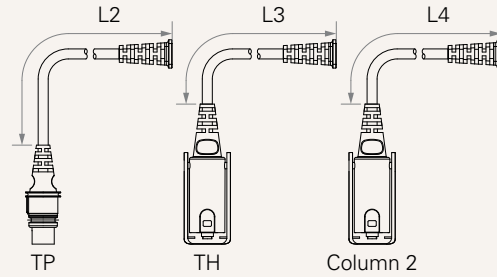
B = Cable exit #B, L2 = L3 = 100



C = Cable exit #C, L1 = L2 = L3 = 100

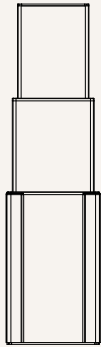


D, E = Cable exit #D, #E, L2 = L3 = L4 = 100

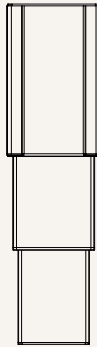


## Tubes Direction

0 = Thinner on top



1 = Wider on top



## Terms of Use

The user is responsible for determining the suitability of TiMOTION products for a specific application. TiMOTION products are subject to change without prior notice.