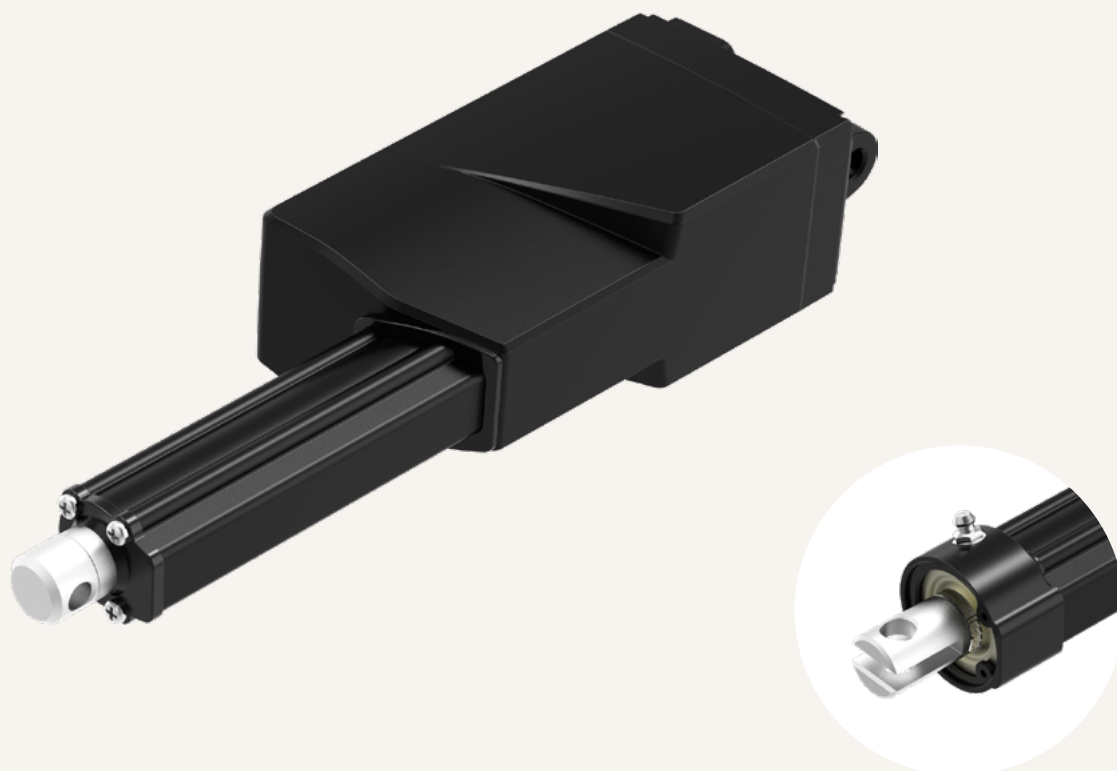


# MA5

series



## Product Segments

### • Industrial Motion

TiMOTION's MA5 electric linear actuator is specifically designed for applications that face harsh working environments and require ruggedness and durability. Its IP69K (static) protection can withstand high-pressure water jets, and the ingress of dust and other solid contaminants. The MA5 can also be customized with various feedback options depending on the application requirements; moreover, it can be equipped with a grease nipple to increase the protection degree and life cycle. Suitable applications for MA5 include agricultural equipment, such as valves, spreaders, harvesters, and grain handlers.

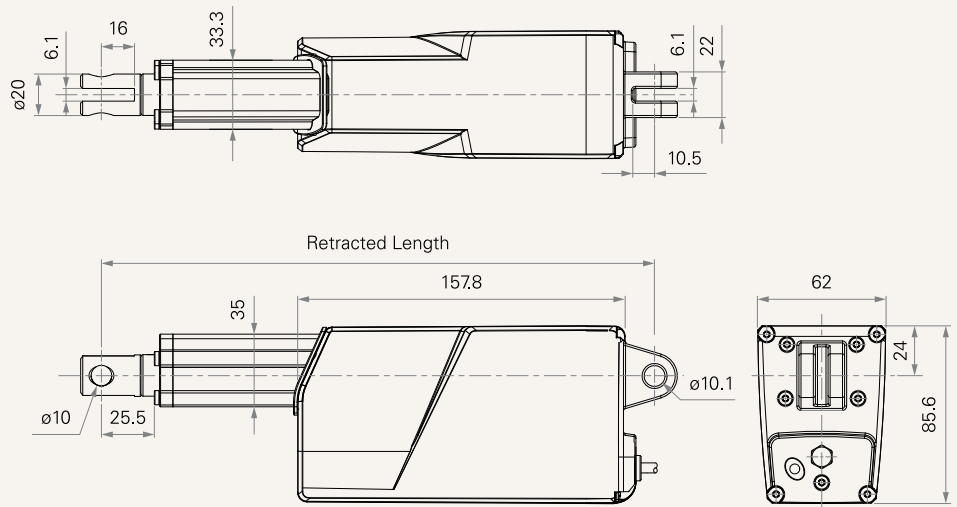
#### General Features

Max. load	3,500N (push); 2,000N (pull)
Max. speed at max. load	2.4mm/s
Max. speed at no load	56.5mm/s
Retracted length	≥ 200mm (depending on chosen options)
IP rating	IP69K (static)
Stroke	20~1000mm
Output signals	Mechanical pot., Hall sensor * 2 (5-36V input)
Options	Grease chamber
Voltage	12/24/48V DC; 12/24/48V DC (PTC)
Operational temperature range	-25°C~+65°C
Operational temperature range at full performance	+5°C~+45°C

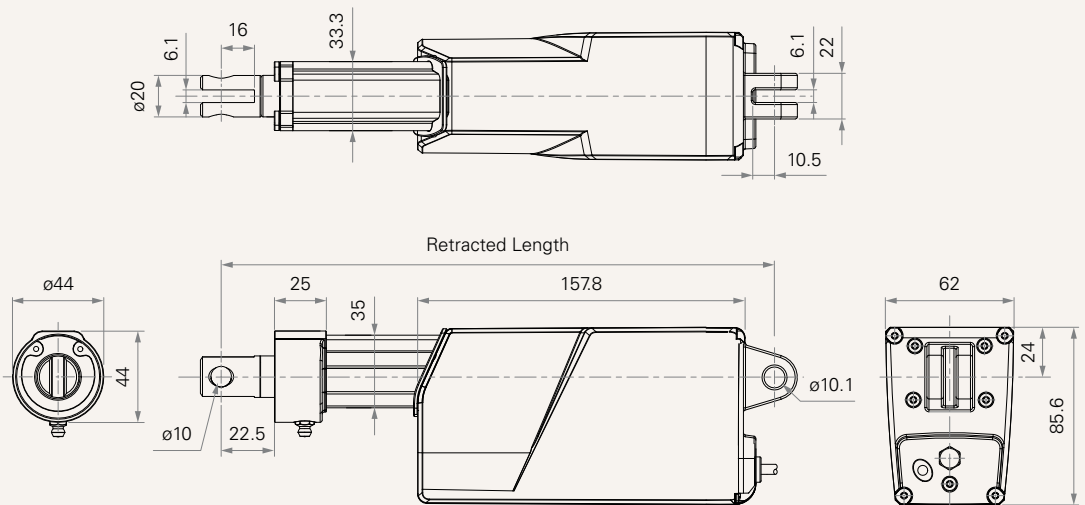
**Drawing - Standard Dimensions (mm)**

**Wiper Set & Grease Nipple**

0 = Normal wiper, without grease chamber



1 = Enhanced wiper set, with grease chamber, grease nipple \* 1



**Note**

1 In this dimensional illustration, the front attachment is specified as #3, and the rear attachment is specified as #6.

**Load and Speed (12V DC)**

CODE	Load (N)		Self Locking Force (N)	Typical Current (A)		Typical Speed (mm/s)	
	Push	Pull		No Load	With Load	No Load	With Load
<b>Motor Speed (5200RPM, Duty Cycle 25%)</b>							
<b>A</b>	250	250	250	2.3	4.3	41	38
<b>B</b>	500	500	500	2.2	4.7	29	26
<b>C</b>	1000	1000	1000	2.2	5	14	13.5
<b>D</b>	1500	1500	1500	2.0	5.1	9	8
<b>E</b>	2000	2000	2000	2.0	5.1	7.1	6
<b>W</b>	500	500	500	2.5	8.5	54	35
<b>Motor Speed (6600RPM, Duty Cycle 25%)</b>							
<b>F</b>	250	250	250	2.8	4.9	55.5	44.2
<b>G</b>	500	500	500	2.7	5.2	31.6	26.5
<b>H</b>	1000	1000	1000	2.6	5.5	16.5	14
<b>K</b>	1500	1500	1500	2.6	5.5	11.1	9.5
<b>L</b>	2000	2000	2000	2.6	5.5	9	7.5
<b>Motor Speed (3800RPM, Duty Cycle 25%)</b>							
<b>S</b>	3500	2000	3500	1.6	4.8	3.2	2.4
<b>Motor Speed (2200RPM, Duty Cycle 25%)</b>							
<b>T</b>	2000	2000	2000	0.6	1.2	3.2	2.3

### Load and Speed (24V DC)

CODE	Load (N)		Self Locking Force (N)	Typical Current (A)		Typical Speed (mm/s)	
	Push	Pull		No Load	With Load	No Load	With Load
<b>Motor Speed (5200RPM, Duty Cycle 25%)</b>							
<b>A</b>	250	250	250	1.2	2.0	43.0	36.0
<b>B</b>	500	500	500	1.1	2.2	25.8	23.0
<b>C</b>	1000	1000	1000	1.1	2.4	14.0	11.8
<b>D</b>	1500	1500	1500	1.0	2.5	9.0	8.0
<b>E</b>	2000	2000	2000	1.0	2.3	7.1	6.2
<b>W</b>	500	500	500	1.2	4.5	54.0	35.0
<b>Motor Speed (6600RPM, Duty Cycle 25%)</b>							
<b>F</b>	250	250	250	1.6	2.7	56.5	45.0
<b>G</b>	500	500	500	1.5	2.9	32.5	28.5
<b>H</b>	1000	1000	1000	1.5	2.9	16.5	14.3
<b>K</b>	1500	1500	1500	1.3	2.9	11.1	10.0
<b>L</b>	2000	2000	2000	1.3	2.9	8.8	7.7
<b>Motor Speed (3800RPM, Duty Cycle 25%)</b>							
<b>S</b>	3500	2000	3500	0.8	2.5	3.2	2.4
<b>Motor Speed (2200RPM, Duty Cycle 25%)</b>							
<b>T</b>	2000	2000	2000	0.3	0.9	3.2	2.4

### Note

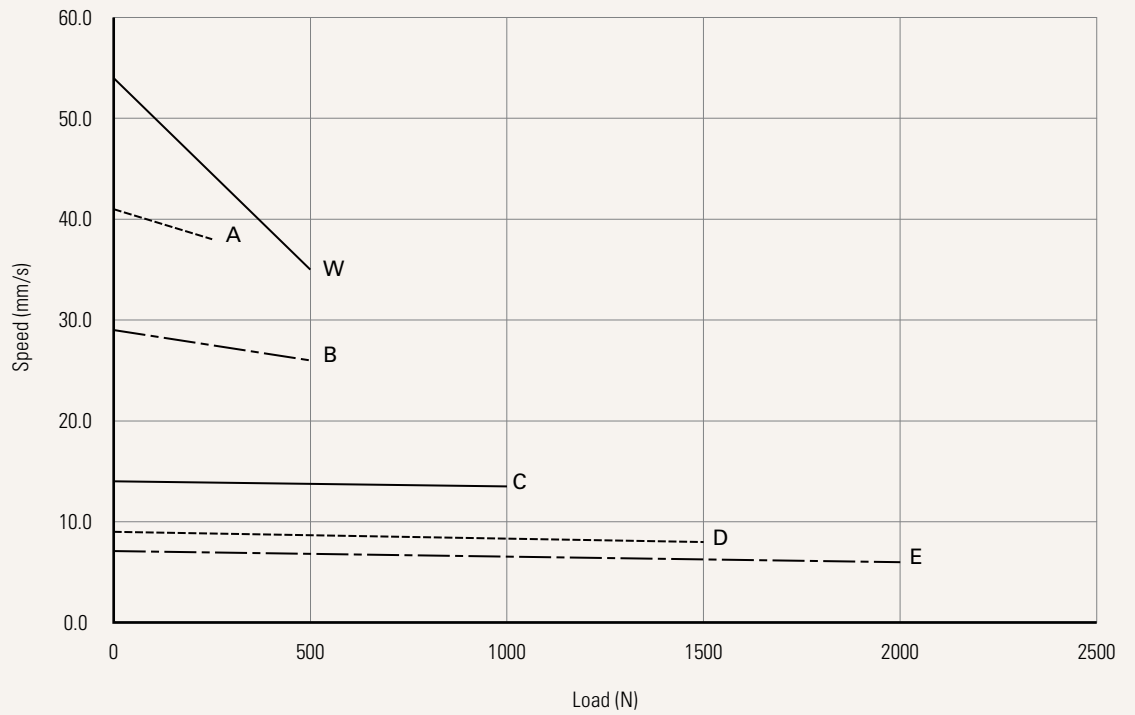
- Parameters above are from tested average, please refer to approval drawing for final value.
- This self locking force level is reached only when a short circuit is applied on the terminals of the motor. All the TiMOTION control boxes have this feature built-in.
- The current & speed in table are tested when the actuator is extending under push load.
- The current & speed in table and diagram are tested with a stable 24V DC power supply.
- Without load, noise level  $\leq 71\sim 83$  dBA (by TiMOTION test standard, ambient noise level  $\leq 36$  dBA).
- Standard stroke: Min.  $\geq 20$ mm, Max. please refer to below table.

CODE	Load (N)	Max Stroke (mm)
<b>A, F</b>	$\leq 250$	1000
<b>B, G, W</b>	$\leq 750$	800
<b>C, H</b>	$\leq 1000$	600
<b>D, K</b>	$\leq 1500$	500
<b>E, L, T</b>	$\leq 2000$	450
<b>S</b>	$\leq 3500$	300

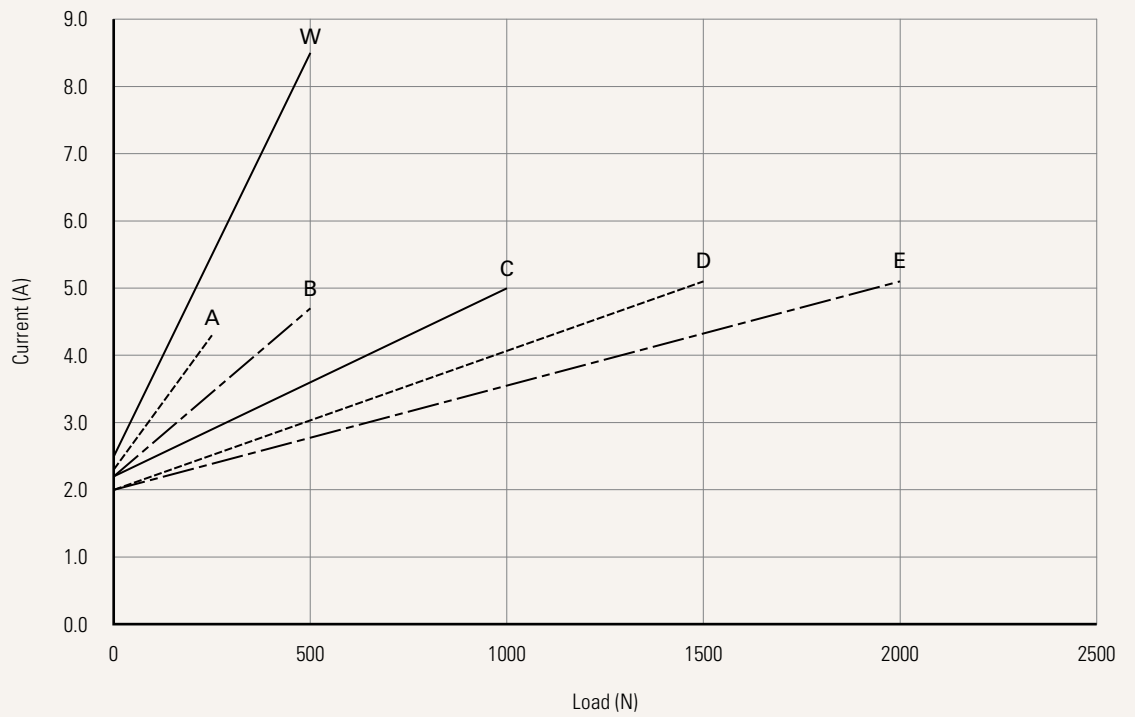
**Performance Data (12V DC Motor)**

Motor Speed (5200RPM)

Speed vs. Load



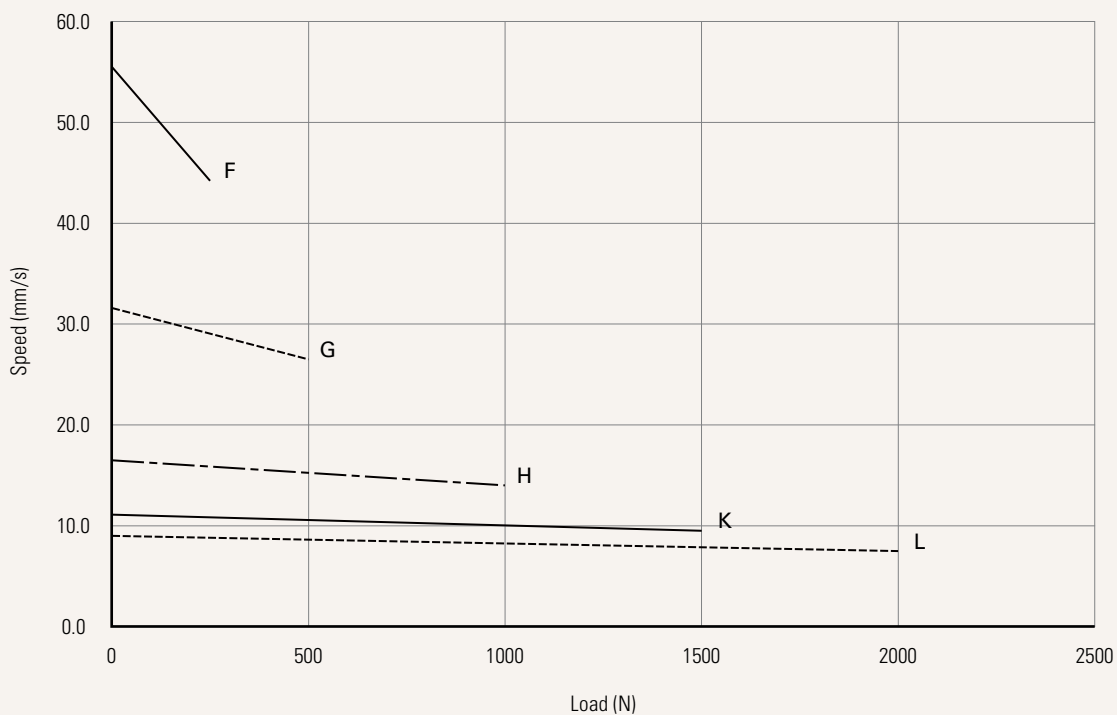
Current vs. Load



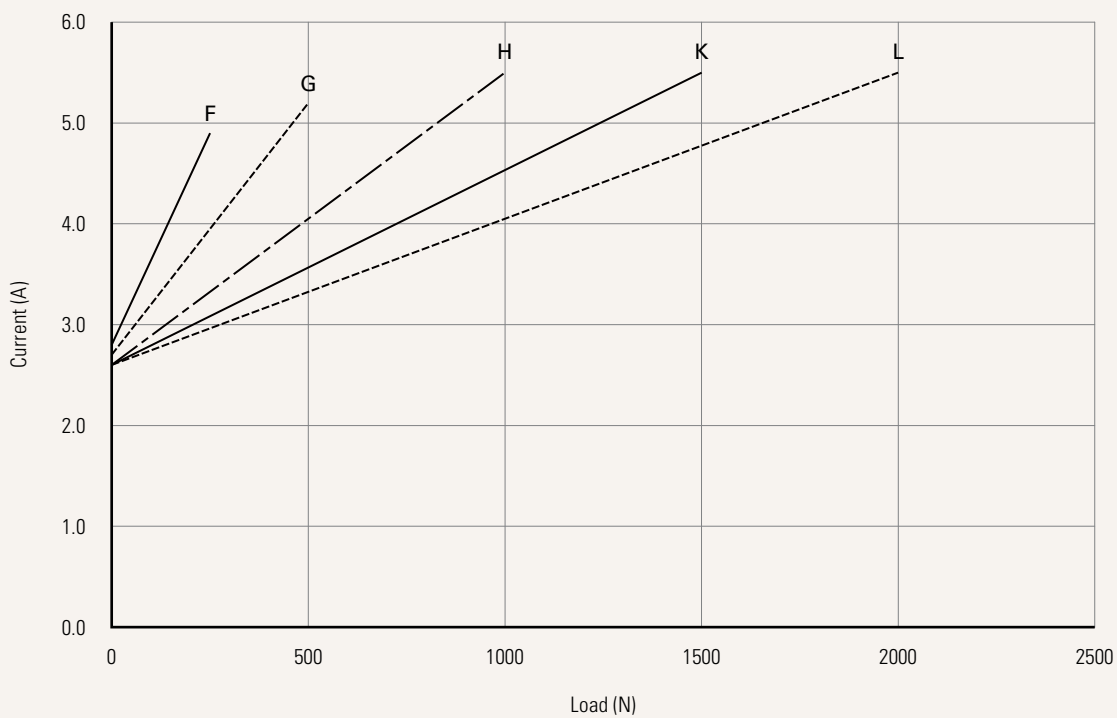
**Performance Data (12V DC Motor)**

Motor Speed (6600RPM)

Speed vs. Load



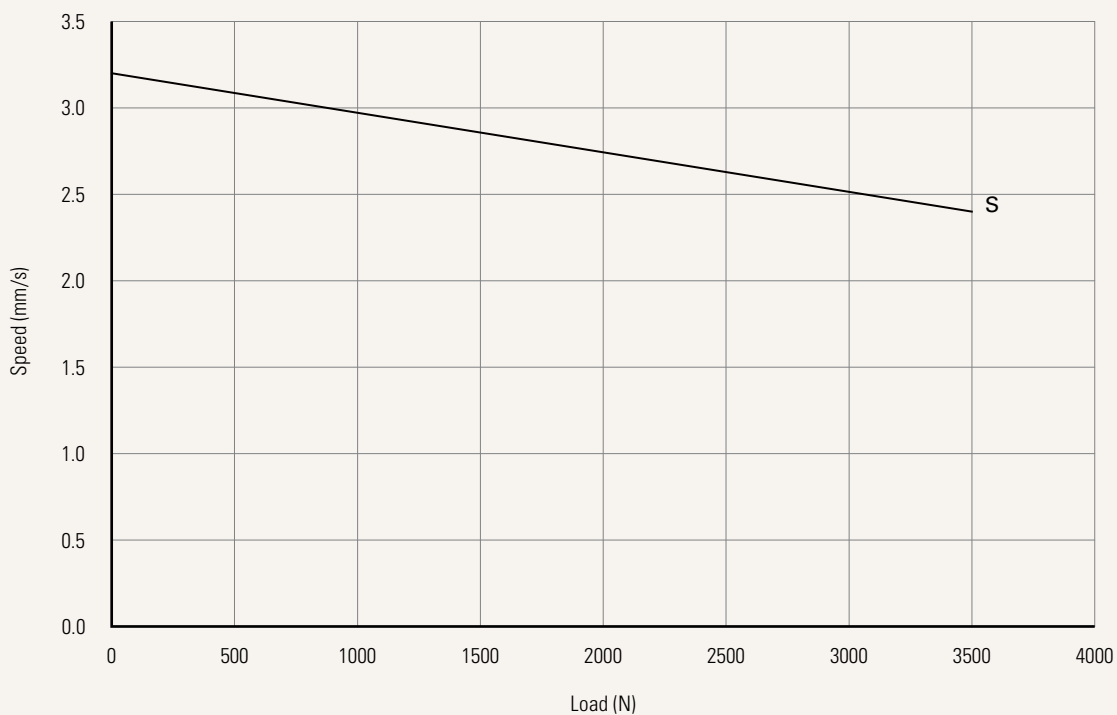
Current vs. Load



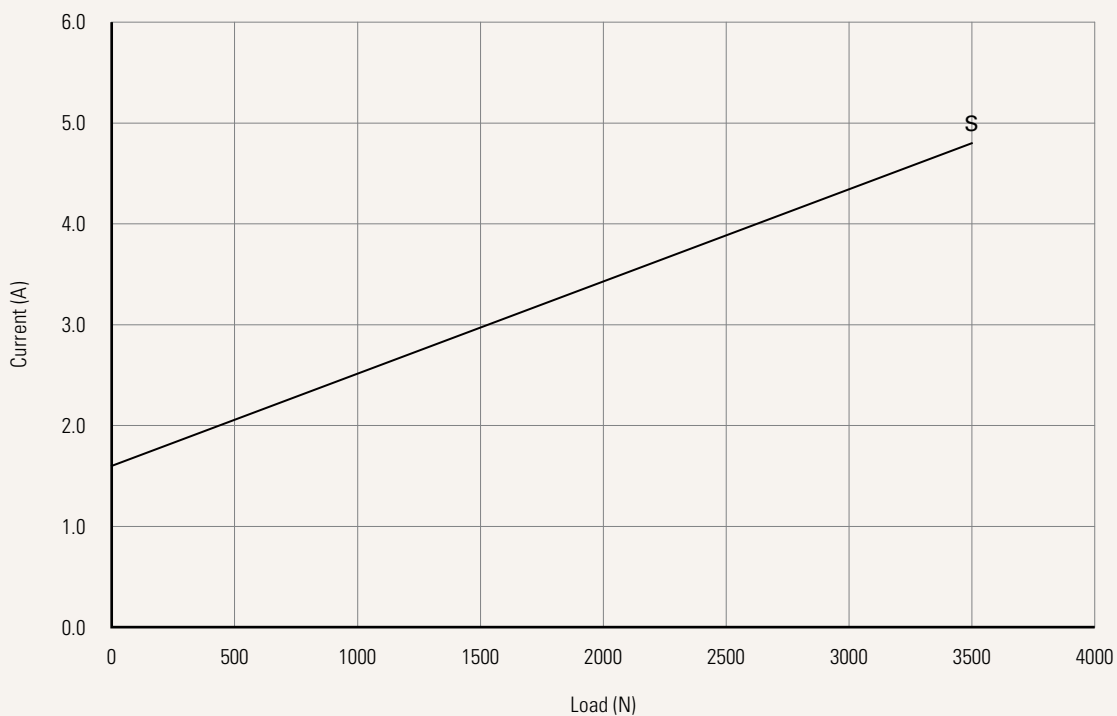
**Performance Data (12V DC Motor)**

Motor Speed (3800RPM)

Speed vs. Load



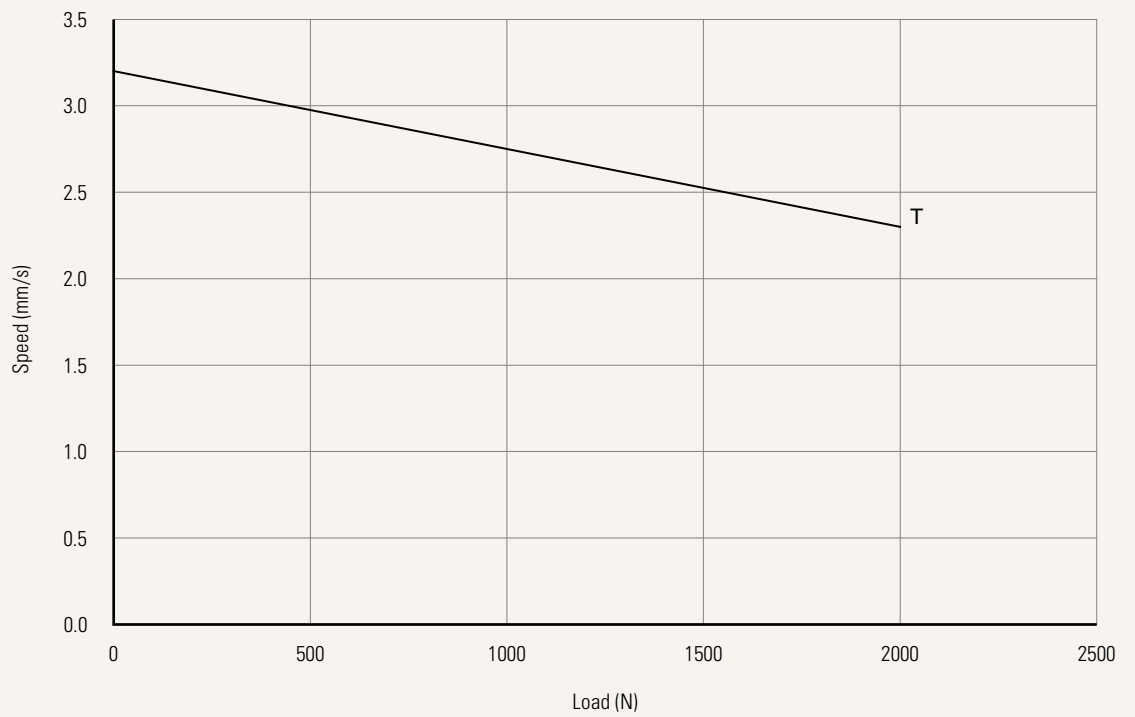
Current vs. Load



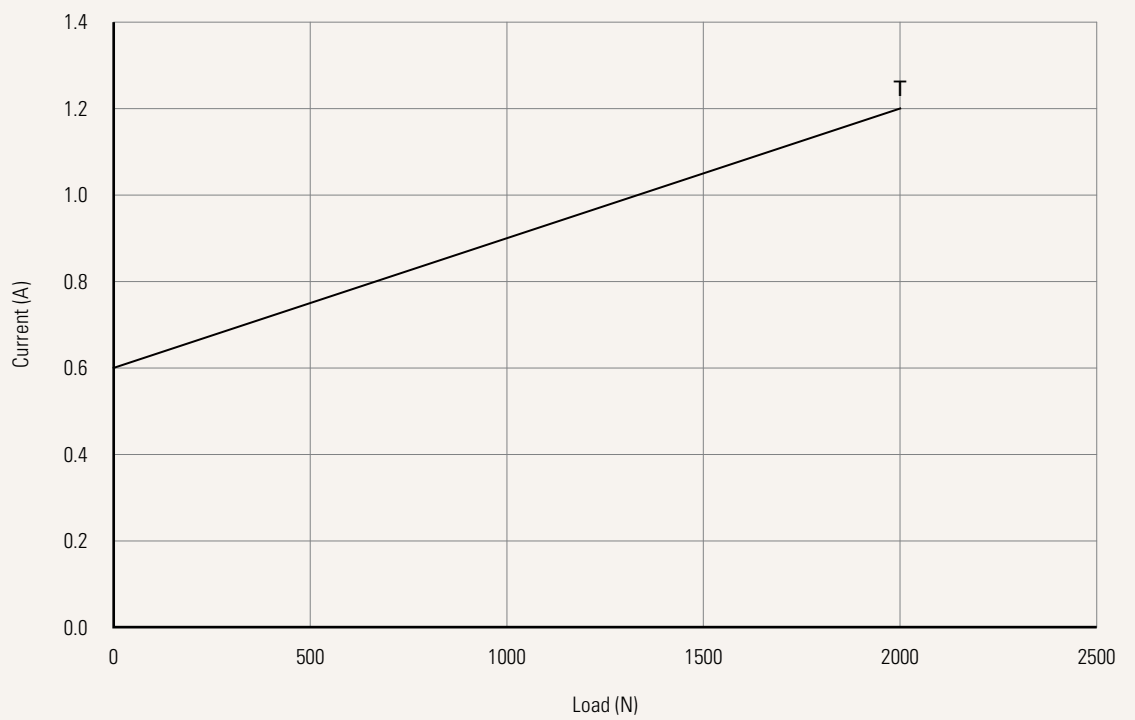
**Performance Data (12V DC Motor)**

Motor Speed (2200RPM)

Speed vs. Load



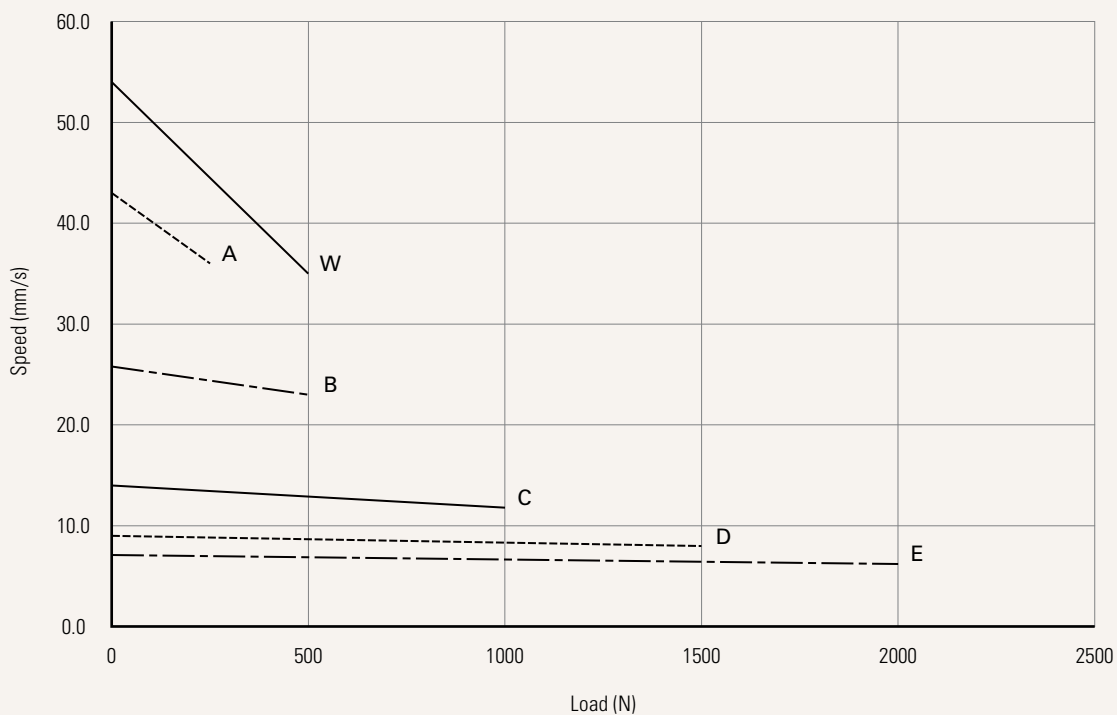
Current vs. Load



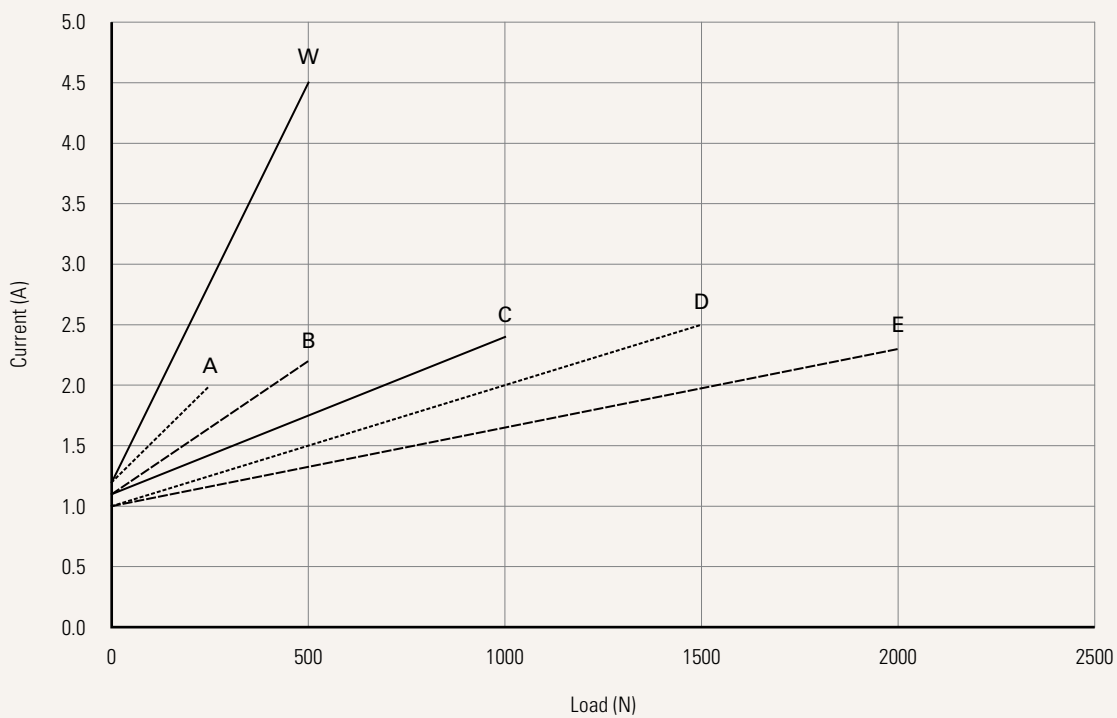
**Performance Data (24V DC Motor)**

Motor Speed (5200RPM)

Speed vs. Load



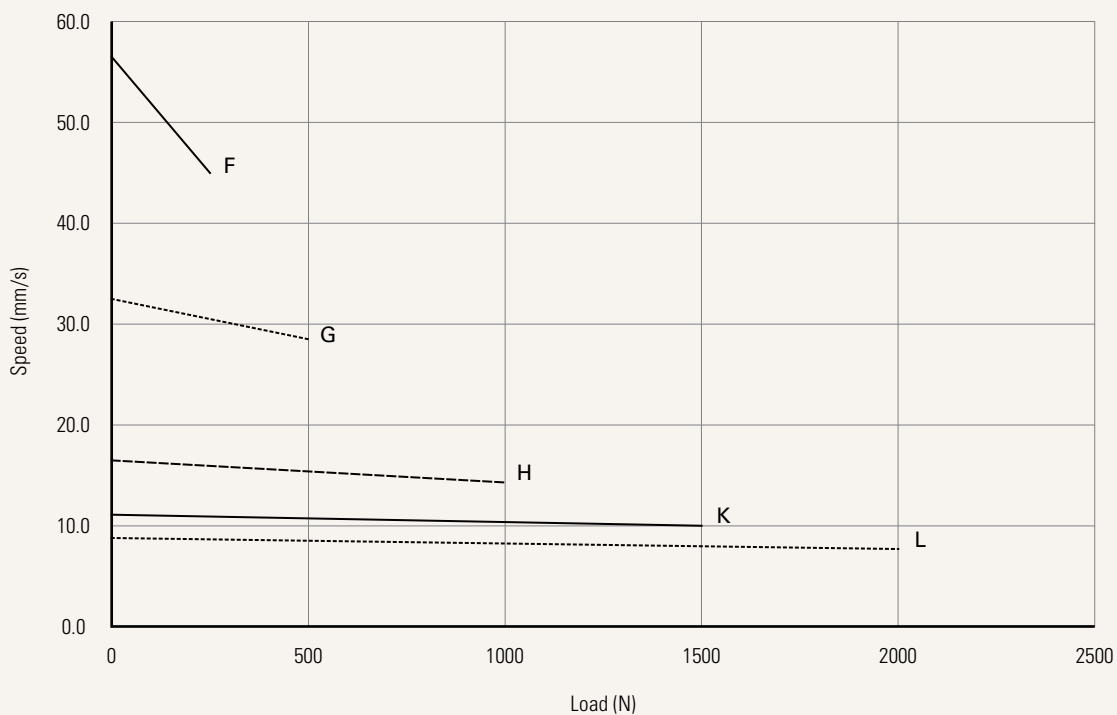
Current vs. Load



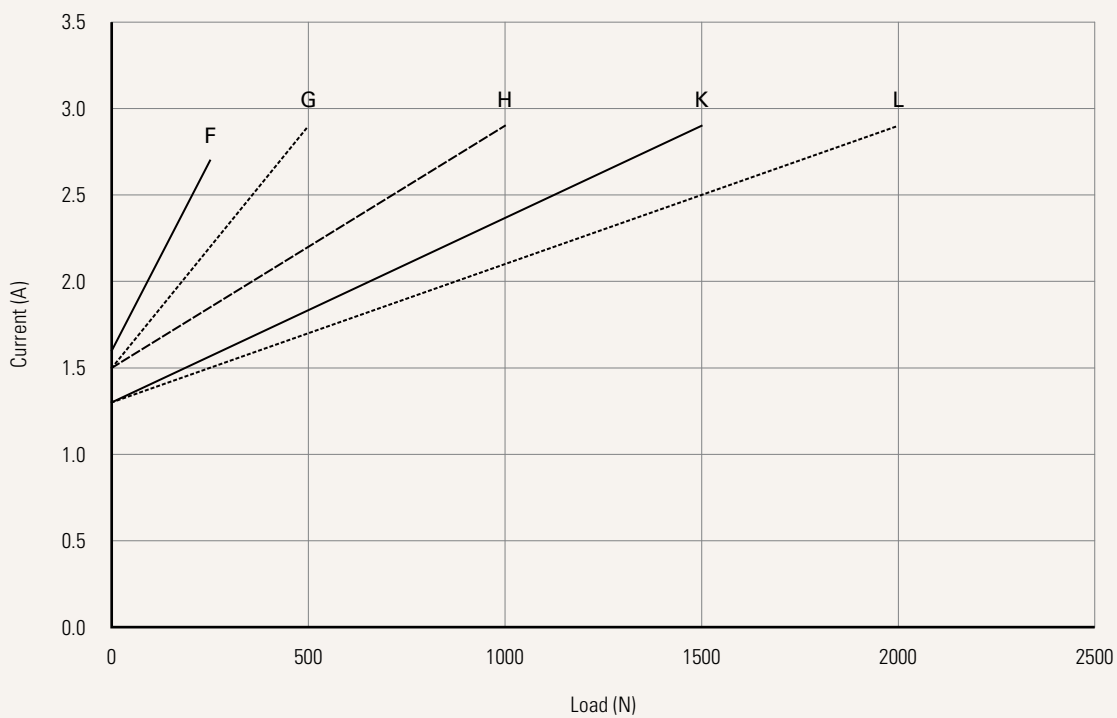
**Performance Data (24V DC Motor)**

Motor Speed (6600RPM)

Speed vs. Load



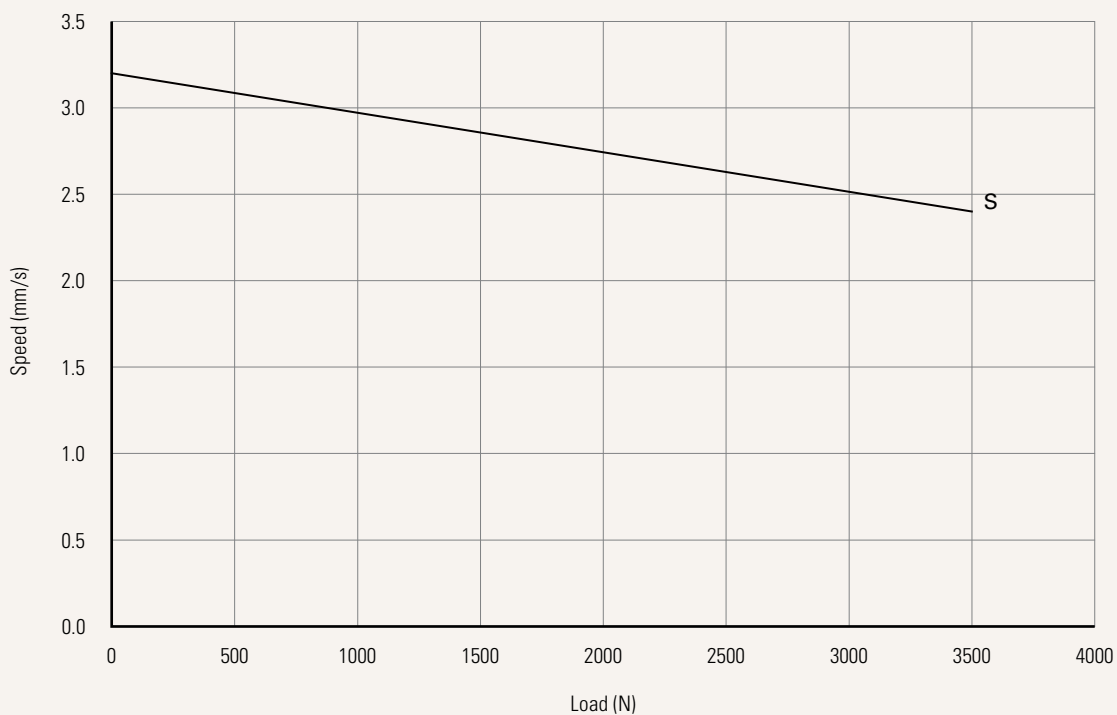
Current vs. Load



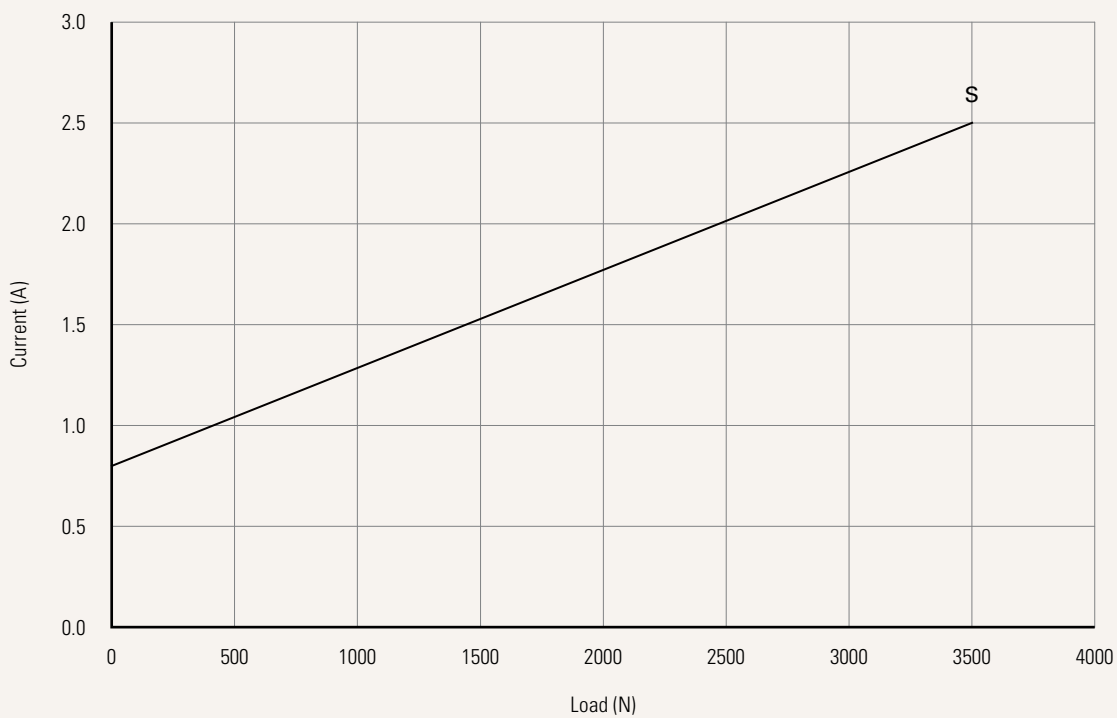
**Performance Data (24V DC Motor)**

Motor Speed (3800RPM)

Speed vs. Load



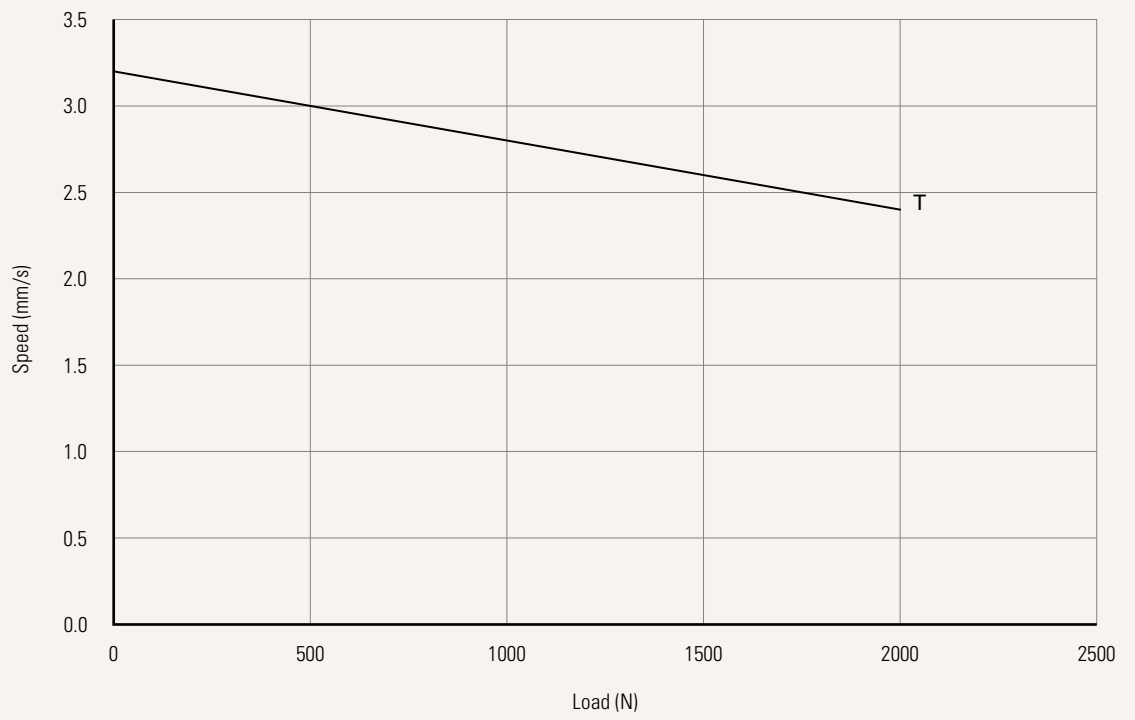
Current vs. Load



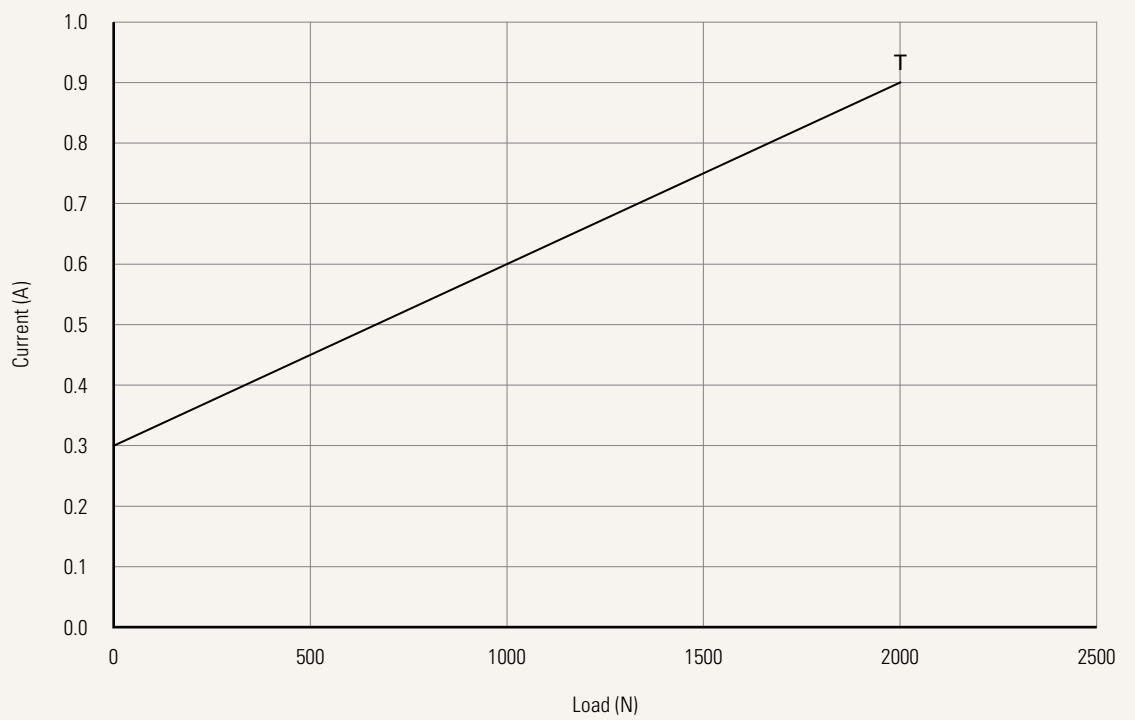
**Performance Data (24V DC Motor)**

Motor Speed (2200RPM)

Speed vs. Load



Current vs. Load



<b>Voltage</b>	1 = 12V DC 2 = 24V DC	4 = 48V DC 6 = 12V DC, PTC	5 = 24V DC, PTC 8 = 48V DC, PTC
<b>Load and Speed</b>	<a href="#">See page 3-4</a>		
<b>Stroke (mm)</b>	<a href="#">See page 4</a>		
<b>Retracted Length (mm)</b>	<a href="#">See page 14</a>		
<b>Rear Attachment (mm)</b> <a href="#">See page 15</a>	4 = Aluminum, U clevis, slot 6.0, width 10.5, hole 6.4, one piece casting with gearbox 5 = Aluminum, U clevis, slot 6.0, width 10.5, hole 8.0, one piece casting with gearbox	6 = Aluminum, U clevis, slot 6.0, width 10.5, hole 10.1, one piece casting with gearbox	
<b>Front Attachment (mm)</b> <a href="#">See page 15</a>	1 = Aluminum, slotless, hole 6.4 2 = Aluminum, slotless, hole 8.0 6 = Aluminum, slotless, hole 10.0 3 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 10.0 4 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 6.4 5 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 8.0	7 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 10.0 8 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 6.4 9 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 8.0	
<b>Direction of Rear Attachment (Counterclockwise)</b> <a href="#">See page 16</a>	1 = 90°	2 = 0°	
<b>Functions for Limit Switches</b> <a href="#">See page 17</a>	1 = Two switches cut off the actuator at end of stroke (EOS) 2 = Two switches cut off the actuator at EOS + in-between third one sends signal 3 = Two switches send signal at EOS 4 = Two switches send signal at EOS + third one in between sends signal		
<b>Output Signals</b>	0 = Without 1 = Mechanical pot.	N = Hall sensor * 2 (5-36V input)	
<b>Connector (mm)</b> <a href="#">See page 16</a>	1 = DIN 6P, 90° plug 2 = Tinned leads	S = AMP superseal 1.5, 2 pins plug	
<b>Cable Length (mm)</b>	1 = Straight, 300	2 = Straight, 600	3 = Straight, 1000
<b>IP Rating</b>	6 = IP66M	9 = IP69K	
<b>Wiper Set &amp; Grease Nipple</b> <a href="#">See page 2</a>	0 = Standard wiper, without grease chamber 1 = Enhanced wiper set, with grease chamber, grease nipple * 1 2 = Enhanced wiper set, with grease chamber, grease nipple * 2 3 = Enhanced wiper set, with grease chamber, without grease nipple Note: no grease injected in chamber by factory default, contact RD if specific request needed		

## Retracted Length (mm)

1. Calculate  $A+B+C = Y$
2. Retracted length needs to  $\geq$  Stroke + Y
3. The total Retracted length calculated must be equal or longer than below minimum value
  - (1) When choosing the wiper set #0: And the front attachment is #1, #2, #6 min retracted length  $\geq$  200mm, And the front attachment is #3, #4, #5, min retracted length  $\geq$  212mm
  - (2) When choosing the wiper set #1, #2, #3: And the front attachment is #1, #2, #6 min retracted length  $\geq$  238mm, And the front attachment is #3, #4, #5 min retracted length  $\geq$  250mm

### A. Front Attachment

<b>1, 2, 6</b>	+112
<b>3, 4, 5</b>	+124

### B. Load VS. Stroke

Stroke (mm)	Load (N)	
	< 3500	= 3500
<b>20 ~150</b>	-	+5
<b>151~200</b>	+2	+7
<b>201~250</b>	+2	+7
<b>251~300</b>	+2	+7
<b>301~350</b>	+12	+17
<b>351~400</b>	+22	+27
<b>401~450</b>	+32	+37
<b>451~500</b>	+42	+47
<b>501~550</b>	+52	+57
<b>551~600</b>	+62	+67
<b>601~650</b>	+72	+77
<b>651~700</b>	+82	+87
<b>701~750</b>	+92	+97
<b>751~800</b>	+102	+107
<b>801~850</b>	+112	+117
<b>851~900</b>	+122	+127
<b>901~950</b>	+132	+137
<b>951~1000</b>	+142	+147

### C. Output Signals

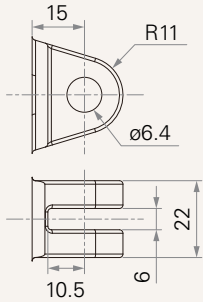
<b>0, N</b>	-
<b>1</b>	+30

### D. Wiper Set & Grease Nipple

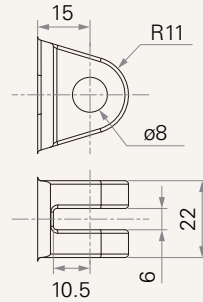
<b>0</b>	-
<b>1, 2, 3</b>	+10

## Rear Attachment (mm)

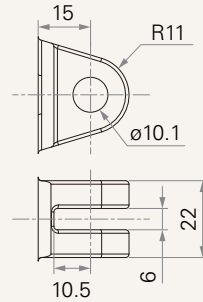
4 = Aluminum, U clevis, slot 6.0, width 10.5, hole 6.4, one piece casting with gearbox



5 = Aluminum, U clevis, slot 6.0, width 10.5, hole 8.0, one piece casting with gearbox

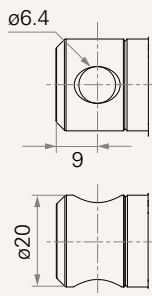


6 = Aluminum, U clevis, slot 6.0, width 10.5, hole 10.1, one piece casting with gearbox

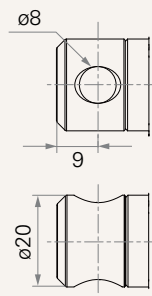


## Front Attachment (mm)

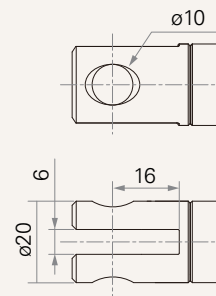
1 = Aluminum, slotless, hole 6.4



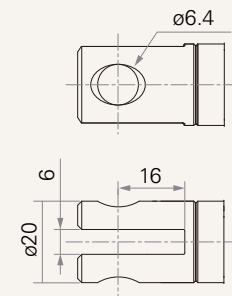
2 = Aluminum, slotless, hole 8.0



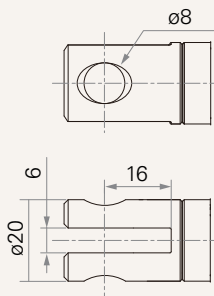
3 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 10.0



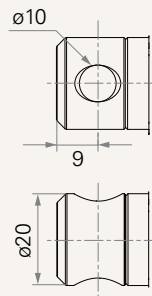
4 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 6.4



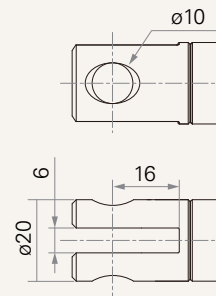
5 = Aluminum, U clevis, slot 6.0, depth 16.0, hole 8.0



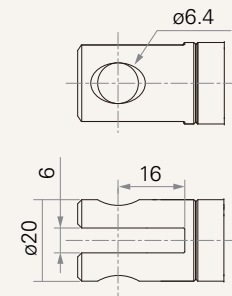
6 = Aluminum, slotless, hole 10



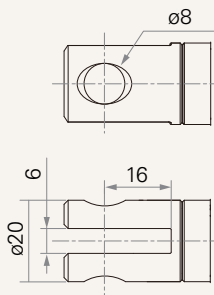
7 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 10.0



8 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 6.4



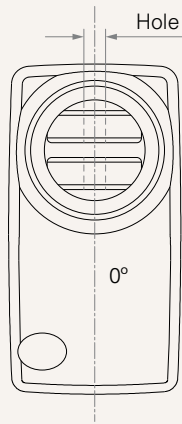
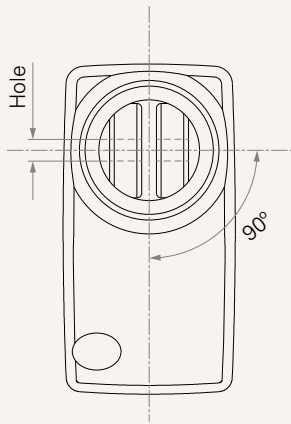
9 = Stainless Steel 304, U clevis, slot 6.0, depth 16.0, hole 8.0



## Direction of Rear Attachment (Counterclockwise)

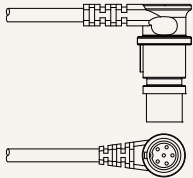
1 = 90°

2 = 0°

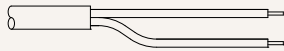


## Connector (mm)

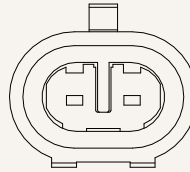
1 = DIN 6P, 90° plug



2 = Tinned leads



S = AMP superseal 1.5, 2 pins plug



Connector IP = IP66

## Wire Definition

Port Number	Functions for Limit Switches	Wire Color	Wire Gauge (AWG)	Position Feedback		
				0. Without	1. Mechanical pot.	N. Hall sensor*2
A1	1. Two micro switches cut off the actuator at end of stroke (EOS)	● GR	20	EXT+	EXT+	EXT+
		● YE	20	RET+	RET+	RET+
		● RD	26	-	POT-out	Vcc+
		○ WH	26	-	POT-Vin (+5V)	S1
		● BK	26	-	GND	Hall-GND
		● BU	26	-	-	S2
		● BN	26	-	-	-
		● GY	26	-	-	-
		● OG	26	-	-	-
		● VT	26	-	-	-
A1	2. Two micro switches cut off the actuator at EOS + in-between third one sends signal	● GR	20	EXT+	EXT+	EXT+
		● YE	20	RET+	RET+	RET+
		● RD	26	-	-	Vcc+
		○ WH	26	3rd LS pin1	POT-Vout	S1
		● BK	26	3rd LS pin2	POT-Vin (+5V)	Hall-GND
		● BU	26	-	POT-GND	S2
		● BN	26	-	3rd LS pin2	3rd LS pin1
		● GY	26	-	3rd LS pin1	-
		● OG	26	-	-	3rd LS pin2
		● VT	26	-	-	-
A1	3. Two micro switches send signal at end of stroke	● GR	20	EXT+	EXT+	EXT+
		● YE	20	RET+	RET+	RET+
		● RD	26	LS-COM	LS-COM	Vcc+
		○ WH	26	UP LS	UP LS	S1
		● BK	26	-	POT-GND	Hall-GND
		● BU	26	LOW LS	LOW LS	S2
		● BN	26	-	POT-Vin (+5V)	UP LS
		● GY	26	-	-	-
		● OG	26	-	POT-Vout	LOW LS
		● VT	26	-	-	LS-COM
A1	4. Two micro switches send signal at end of stroke + in-between third one sends signal	● GR	20	EXT+	EXT+	EXT+
		● YE	20	RET+	RET+	RET+
		● RD	26	LS-COM	LS-COM	Vcc+
		○ WH	26	UP LS	UP LS	S1
		● BK	26	3rd LS pin1	3rd LS pin1	Hall-GND
		● BU	26	LOW LS	LOW LS	S2
		● BN	26	-	POT-Vin (+5V)	UP LS
		● GY	26	-	-	3rd LS
		● OG	26	-	POT-Vout	LOW LS
		● VT	26	-	POT-GND	LS-COM

## 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.