

# MA1

series



## Product Segments

### • Industrial Motion

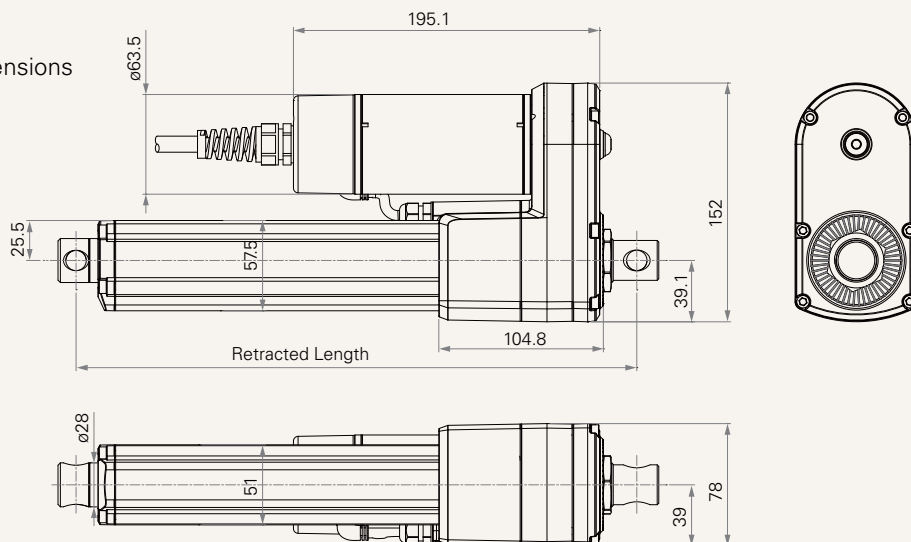
TiMOTION's MA1 series linear actuator is the proven choice for applications requiring a durable, long life solution. Specifically designed for harsh working environments, the MA1 linear actuator is ideal for use in heavy-duty machinery, industrial equipment and off road vehicles. This linear actuator has been certified for applications requiring IP66 dynamic compliance. Available options for the MA1 linear actuator include AC or DC power, ball or acme spindles, mechanical or electrical braking and a load limiting clutch or limit switches.

#### General Features

Spindle	ACME or Ball screw
Voltage of motor	12V DC, 24V DC, 36V DC, 110V AC, or 220V AC
Maximum load	4,500N in push and pull
Maximum speed at full load	48mm/s (Ball screw, DC motor, with 2500N)
Stroke	20~1000mm (ACME screw); 50~800mm (Ball screw)
Minimum installation dimension	≥Stroke+160mm (without POT)
Color	Black
Certificate	UL73, EMC
IP rating	IP69K
Operational temperature range	-30°C~+65°C
Operational temperature range at full performance	+5°C~+45°C
Options	Overload clutch, Hall sensor(s), POT, manual crank function
Mechanical or electromagnetic brake	
Higher duty cycle (25%), corrosion proof	

### Drawing

Standard Dimensions  
(mm)



### Load and Speed

CODE	Load (N)		Typical Current (A)				Typical Speed (mm/s)				Overload clutch Range (N)
	Push	Pull	No Load 12V DC	No Load 24V DC	With Load 12V DC	With Load 24V DC	No Load 12V DC	No Load 24V DC	With Load 12V DC	With Load 24V DC	
<b>ACME Screw, DC Motor (duty cycle 25%)</b>											
<b>B</b>	1500	1500	10.0	5.0	15.4	7.7	29.5	29.5	27.0	27.0	1800~3300
<b>C</b>	2500	2500	5.0	2.5	14.0	7.0	15.8	15.8	14.3	14.3	3000~5500

### Note

- With a 12V motor, the current is approximately twice the current measured in 24V. With a 36V motor, the current is approximately two-thirds the current measured in 24V; speed will be similar for both voltages.
- Current and speed: Tested average value when extending in push direction.
- Standard stroke: Min.  $\geq 20$ mm, Max. please refer to below table

CODE	Load (N)	Max Stroke (mm)
<b>B</b>	1500	1000
<b>C</b>	2500	800

CODE	Load (N)		Typical Current (A)				Typical Speed (mm/s)				Overload clutch Range (N)
	Push	Pull	No Load 12V DC	No Load 24V DC	With Load 12V DC	With Load 24V DC	No Load 12V DC	No Load 24V DC	With Load 12V DC	With Load 24V DC	
<b>Ball Screw, DC Motor (duty cycle 25%)</b>											
<b>A</b>	2500	2500	7.0	3.5	30.0	12.5	58.5	58.5	36.5	48.0	3000~5500
<b>B</b>	3500	3500	5.0	2.5	18.0	9.0	29.8	29.8	25.5	25.5	4200~7700
<b>C</b>	4500	4500	4.0	2.0	13.0	6.5	16.0	16.0	14.0	14.0	5400~9900

### Note

- With a 12V motor, the current is approximately twice the current measured in 24V. With a 36V motor, the current is approximately two-thirds the current measured in 24V; speed will be similar for both voltages.
- Current and speed: Tested average value when extending in push direction.
- Standard stroke: Min.  $\geq 50$ mm, Max. please refer to below table

CODE	Load (N)	Max Stroke (mm)
<b>A</b>	2500	800
<b>B</b>	3500	600
<b>C</b>	4500	600

### Load and Speed

CODE	Load (N)		Typical Current (A)				Typical Speed (mm/s)				Overload clutch Range (N)
	Push	Pull	No Load 110V AC	No Load 220V AC	With Load 110V AC	With Load 220V AC	No Load 110V AC	No Load 220V AC	With Load 110V AC	With Load 220V AC	
<b>ACME Screw, AC Motor (duty cycle 25%)</b>											
<b>B</b>	1500	1500	1.9	0.9	2.0	1.0	26.1	22.5	23.0	21.0	1800~3300
<b>C</b>	2500	2500	1.9	0.9	2.0	1.0	14.1	12.0	12.8	11.2	3000~5500

#### Note

- 1 Current and speed: Tested average value when extending in push direction.
- 2 Standard stroke: Min. ≥20mm, Max. please refer to below table

CODE	Load (N)	Max Stroke (mm)
<b>B</b>	1500	1000
<b>C</b>	2500	800

CODE	Load (N)		Typical Current (A)				Typical Speed (mm/s)				Overload clutch Range (N)
	Push	Pull	No Load 110V AC	No Load 220V AC	With Load 110V AC	With Load 220V AC	No Load 110V AC	No Load 220V AC	With Load 110V AC	With Load 220V AC	
<b>Ball Screw, AC Motor (duty cycle 25%)</b>											
<b>A</b>	2500	2500	2.0	0.9	2.5	1.3	53.0	46.0	38.5	40.0	3000~5500
<b>B</b>	3500	3500	1.9	0.9	2.1	1.1	27.0	23.5	22.5	21.5	4200~7700
<b>C</b>	4500	4500	1.9	0.9	2.0	1.0	14.5	12.0	13.0	11.5	5400~9900

#### Note

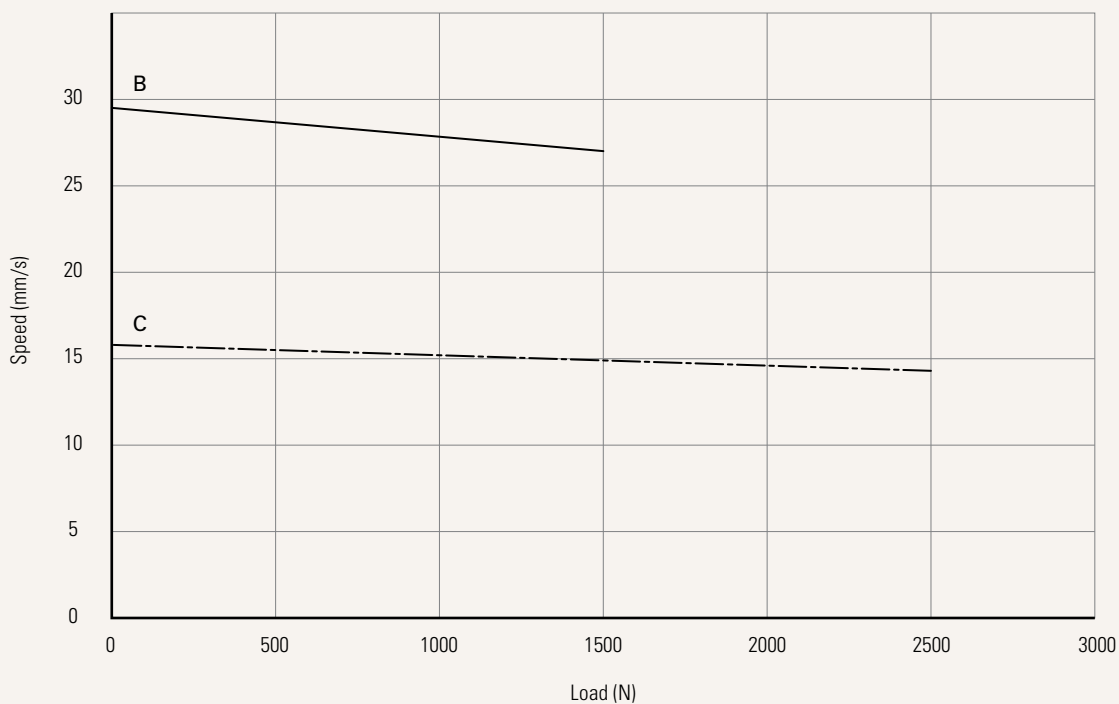
- 1 Current and speed: Tested average value when extending in push direction.
- 2 Standard stroke: Min. ≥50mm, Max. please refer to below table

CODE	Load (N)	Max Stroke (mm)
<b>A</b>	2500	800
<b>B</b>	3500	600
<b>C</b>	4500	600

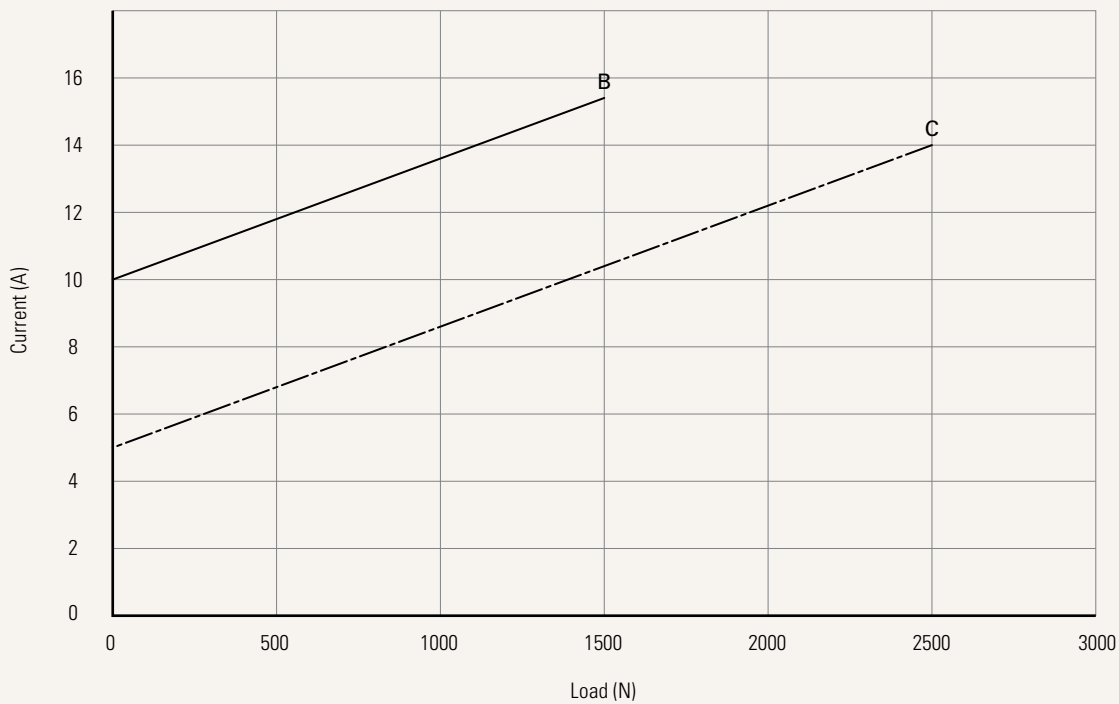
**Performance Data (12V DC Motor)**

ACME Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



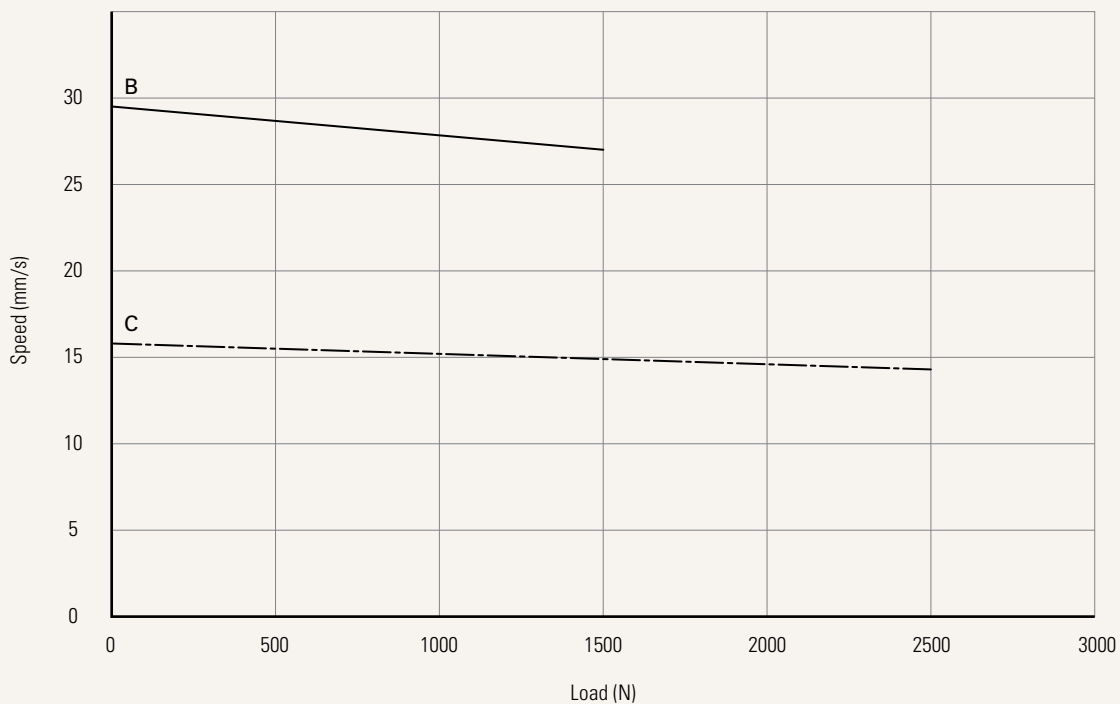
**Note**

1 The performance data in the curve charts shows theoretical value.

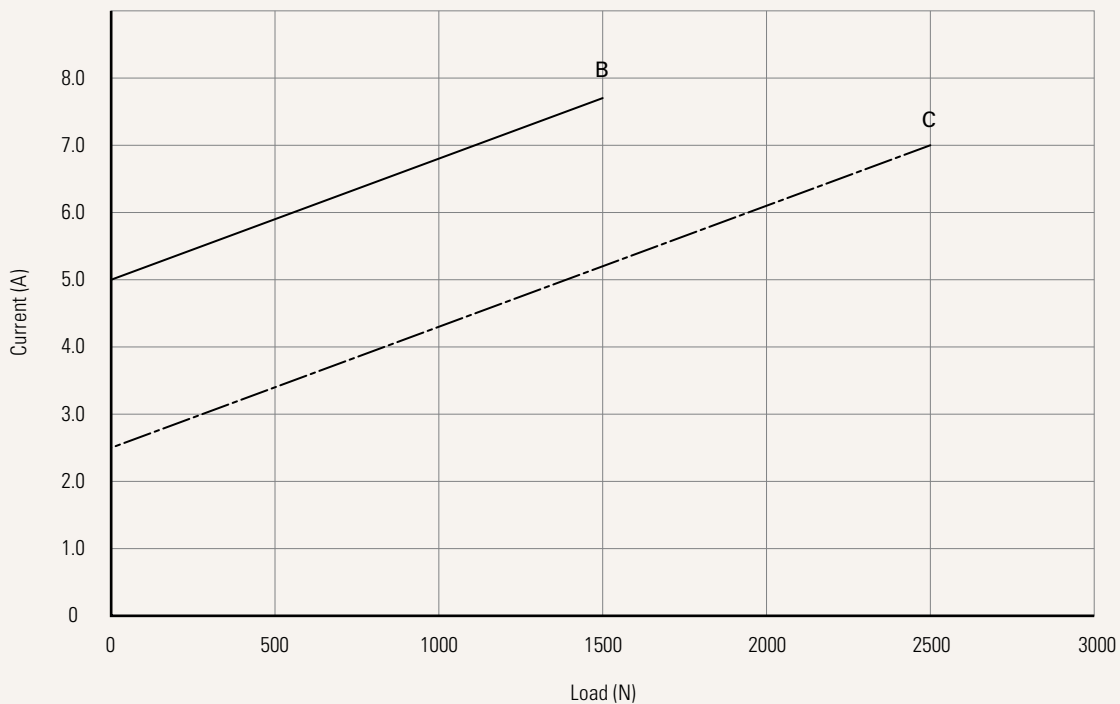
**Performance Data (24V DC Motor)**

ACME Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



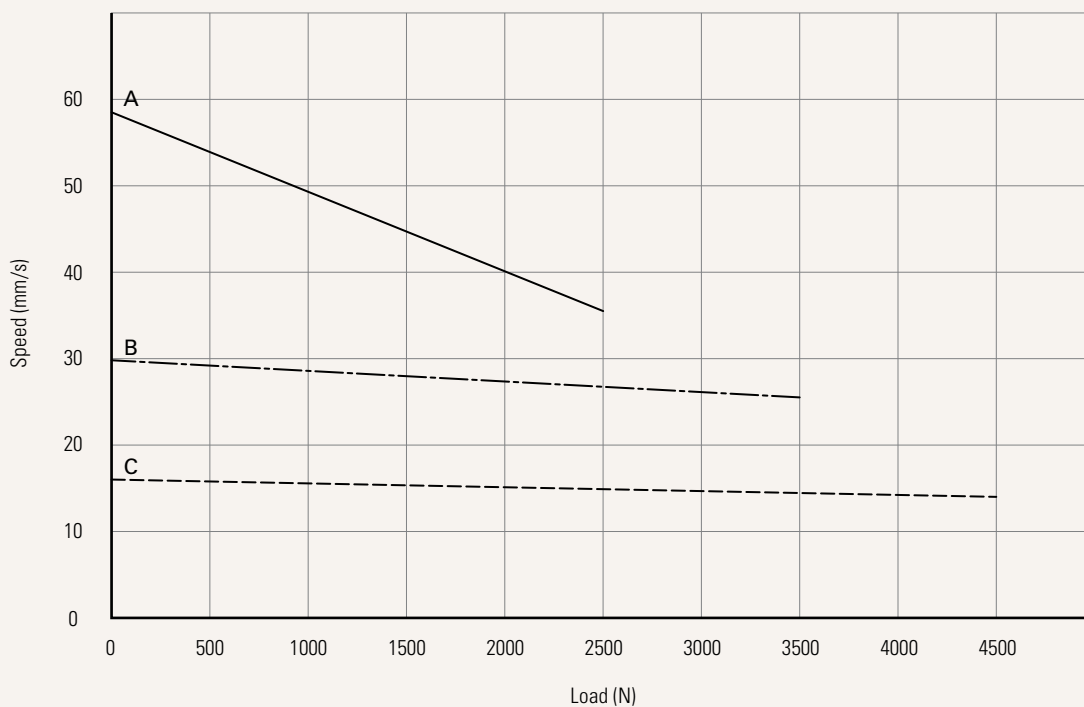
**Note**

1 The performance data in the curve charts shows theoretical value.

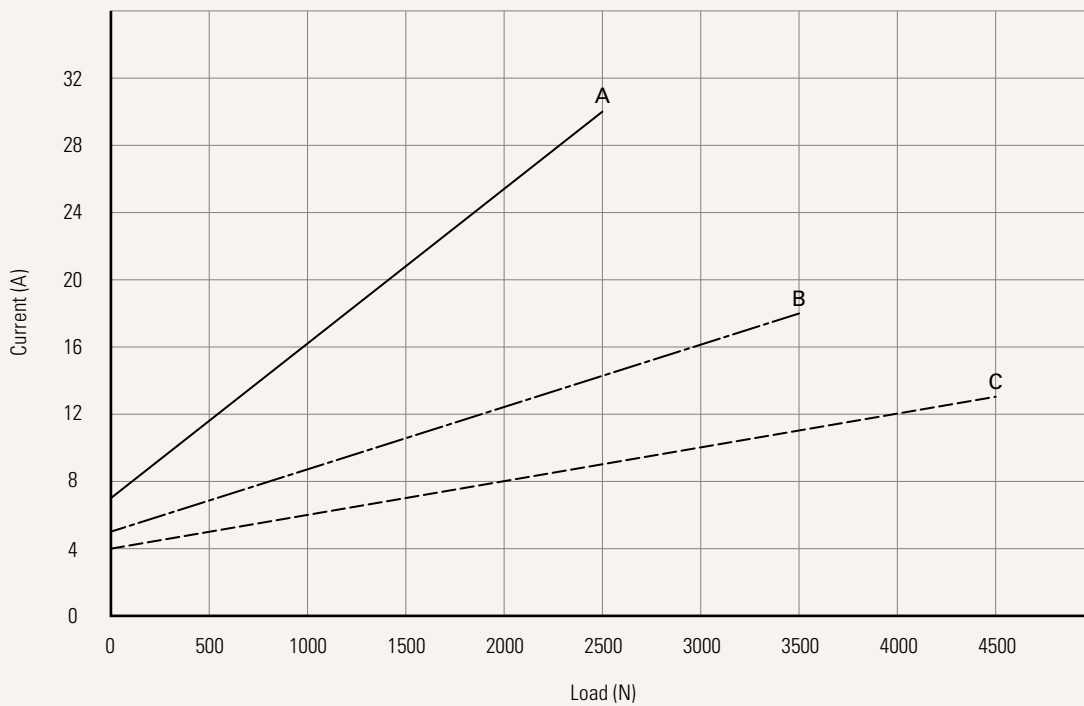
Performance Data (12V DC Motor)

Ball Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



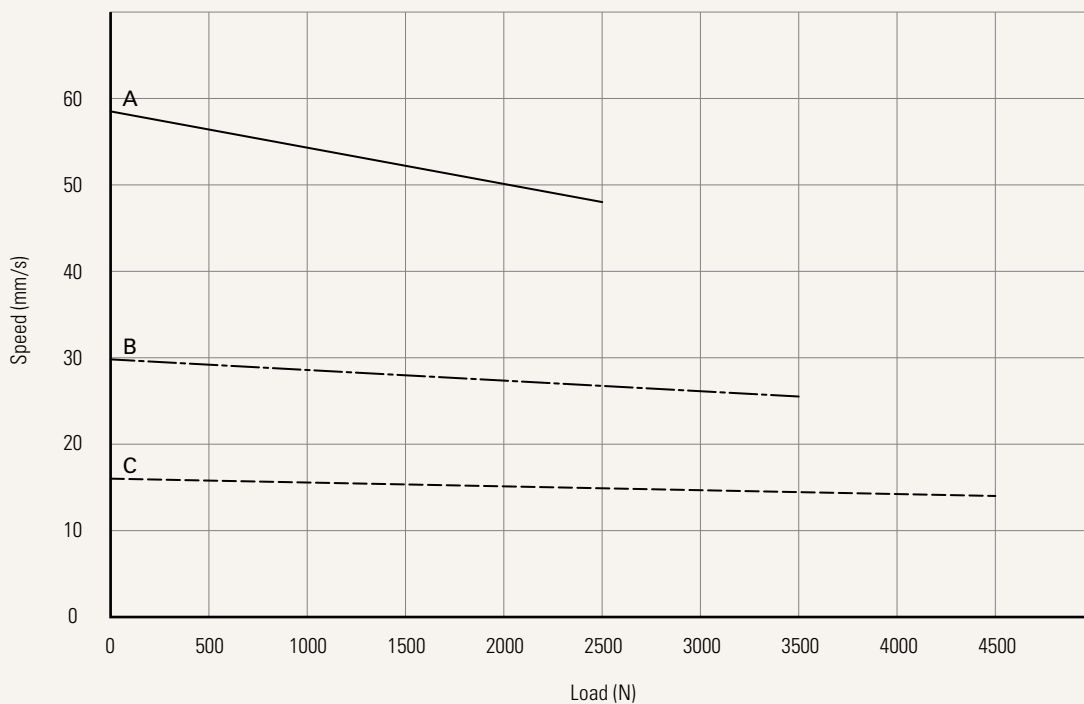
Note

1 The performance data in the curve charts shows theoretical value.

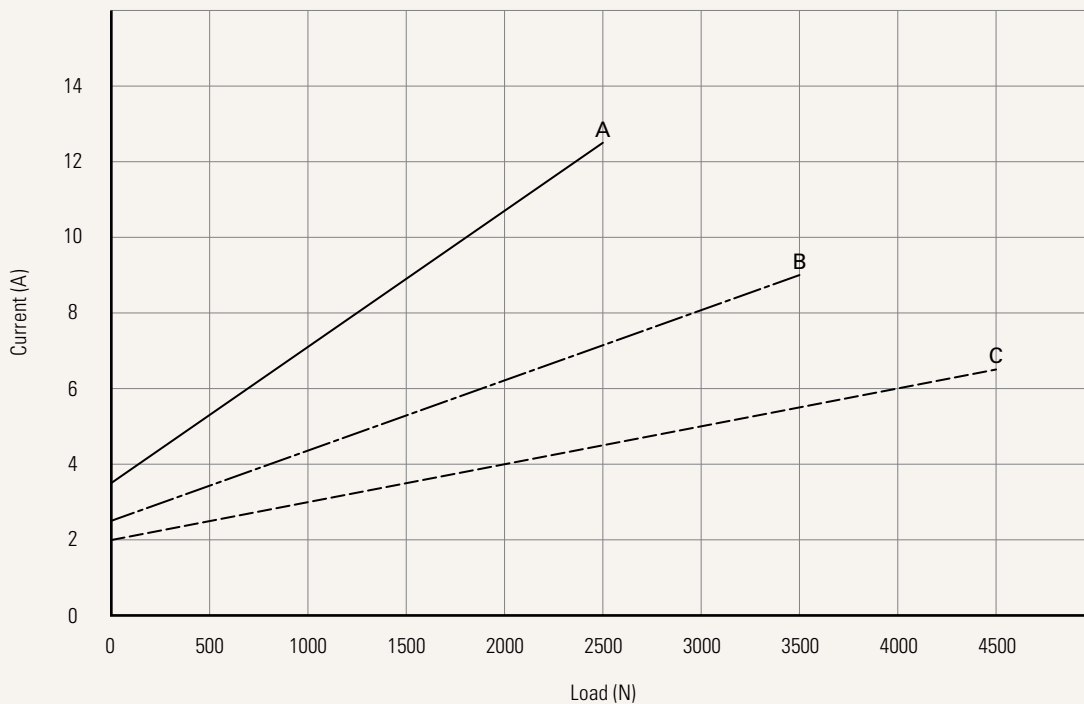
Performance Data (24V DC Motor)

Ball Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



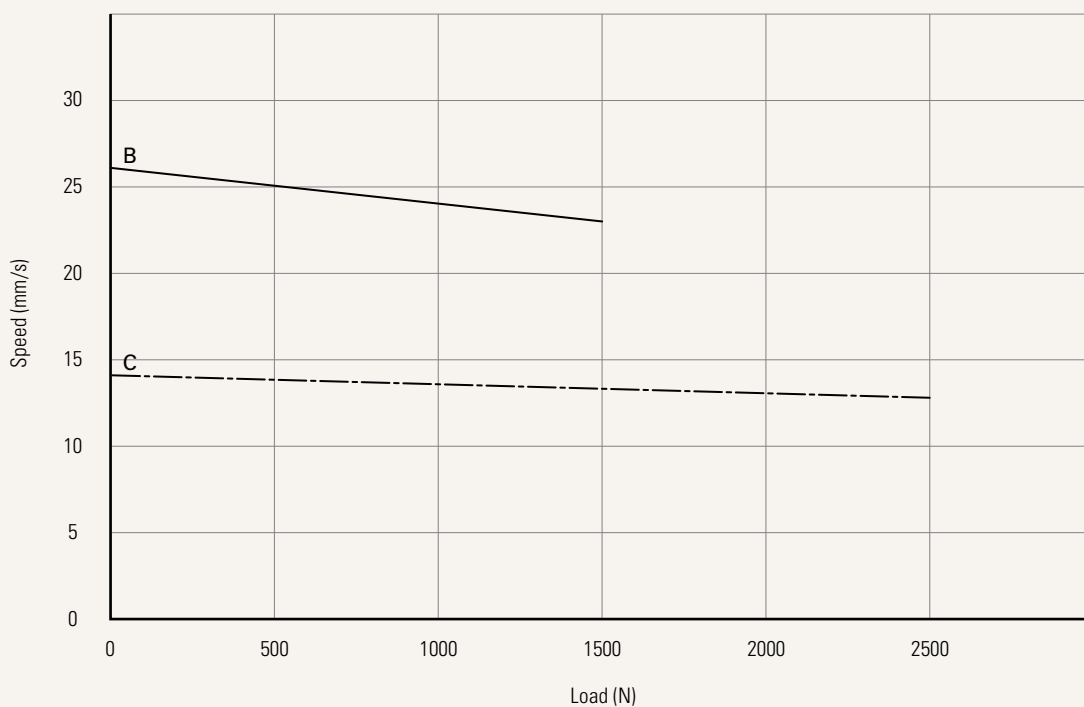
Note

1 The performance data in the curve charts shows theoretical value.

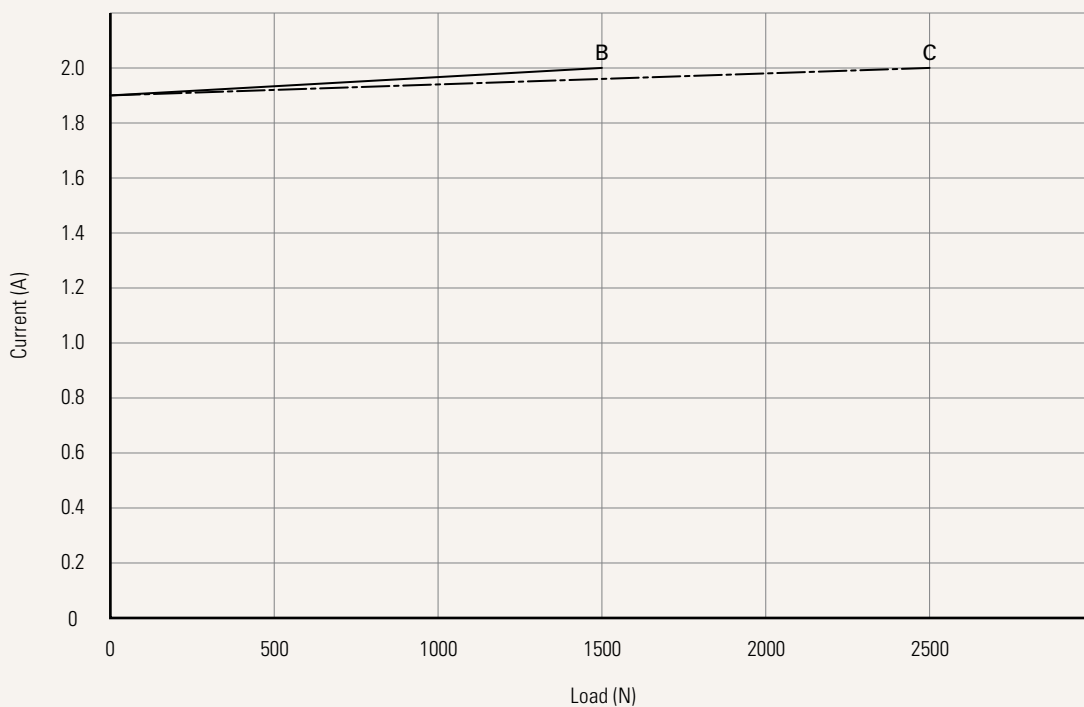
Performance Data (110V AC Motor)

ACME Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



Note

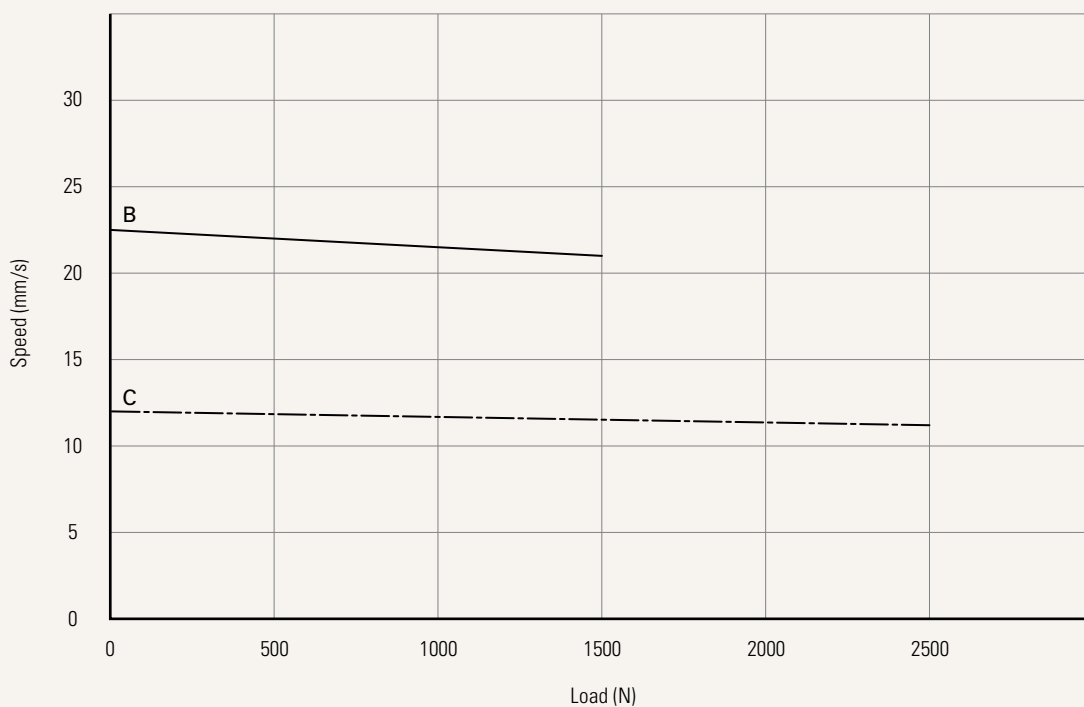
1 The performance data in the curve charts shows theoretical value.



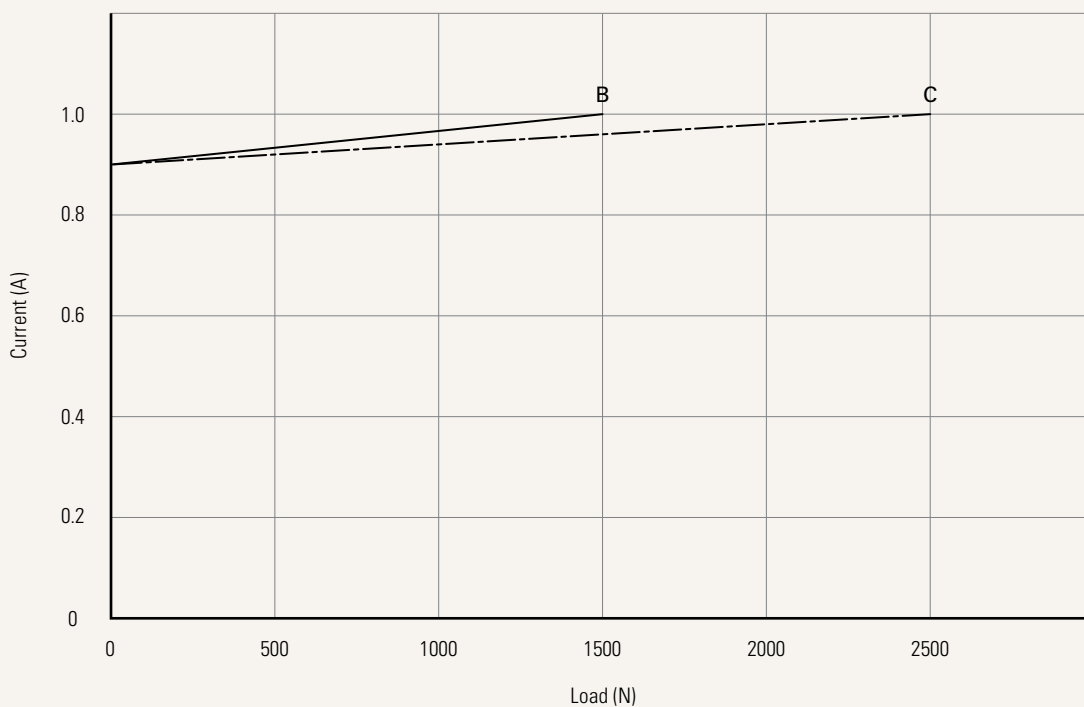
Performance Data (220V AC Motor)

ACME Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



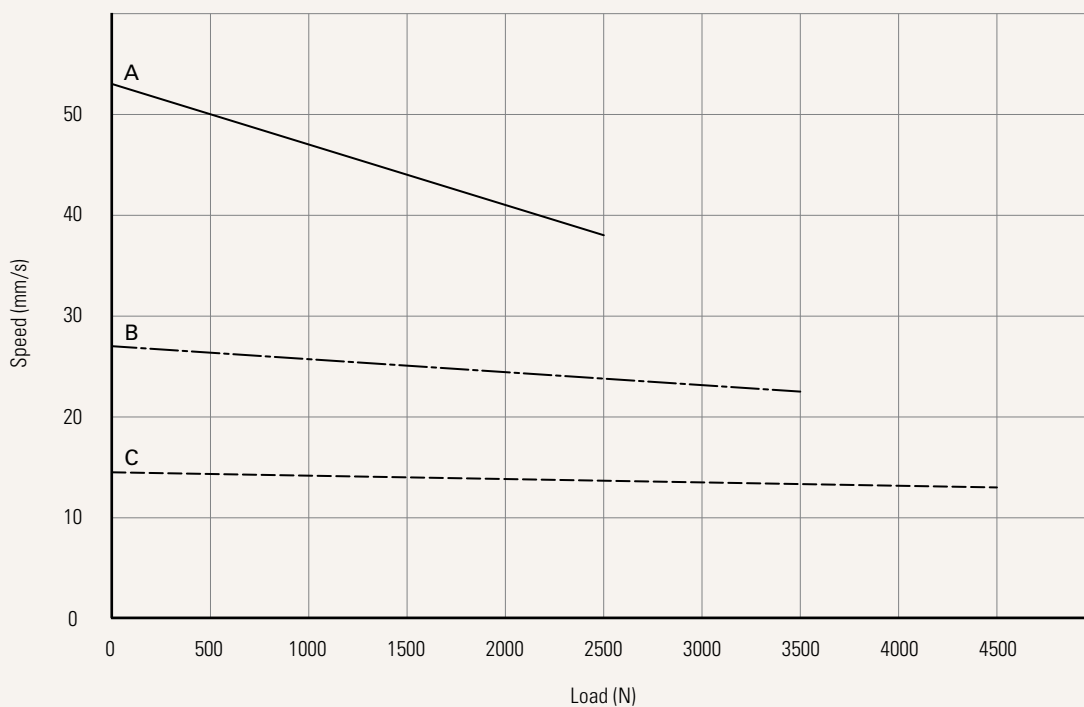
Note

1 The performance data in the curve charts shows theoretical value.

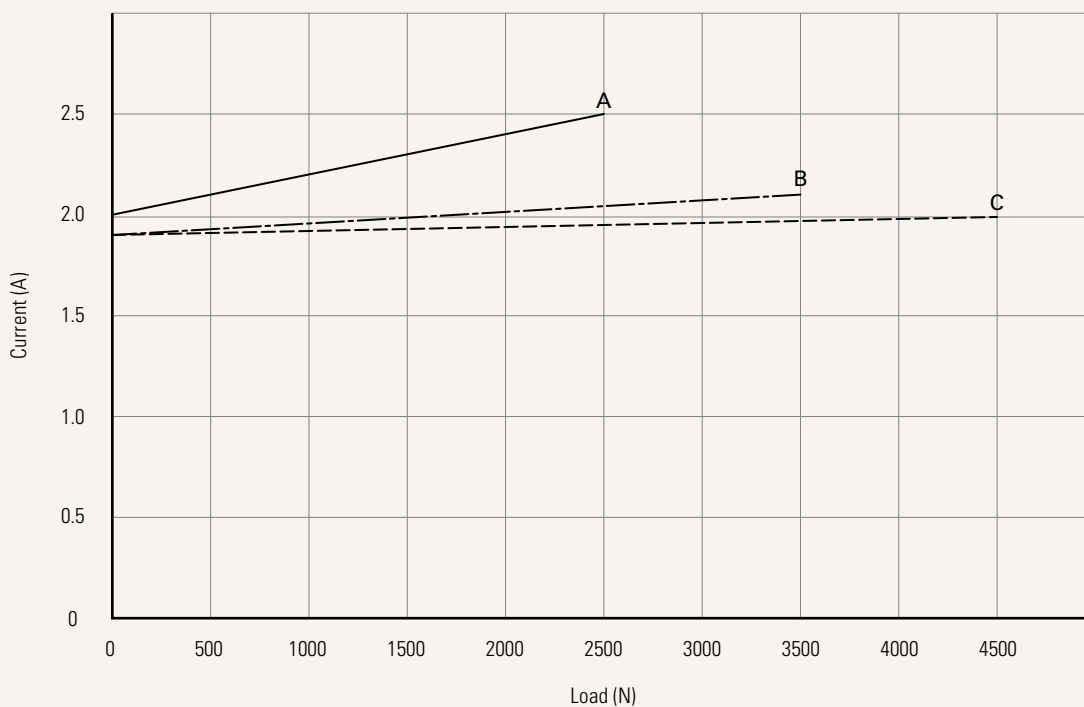
Performance Data (110V AC Motor)

Ball Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



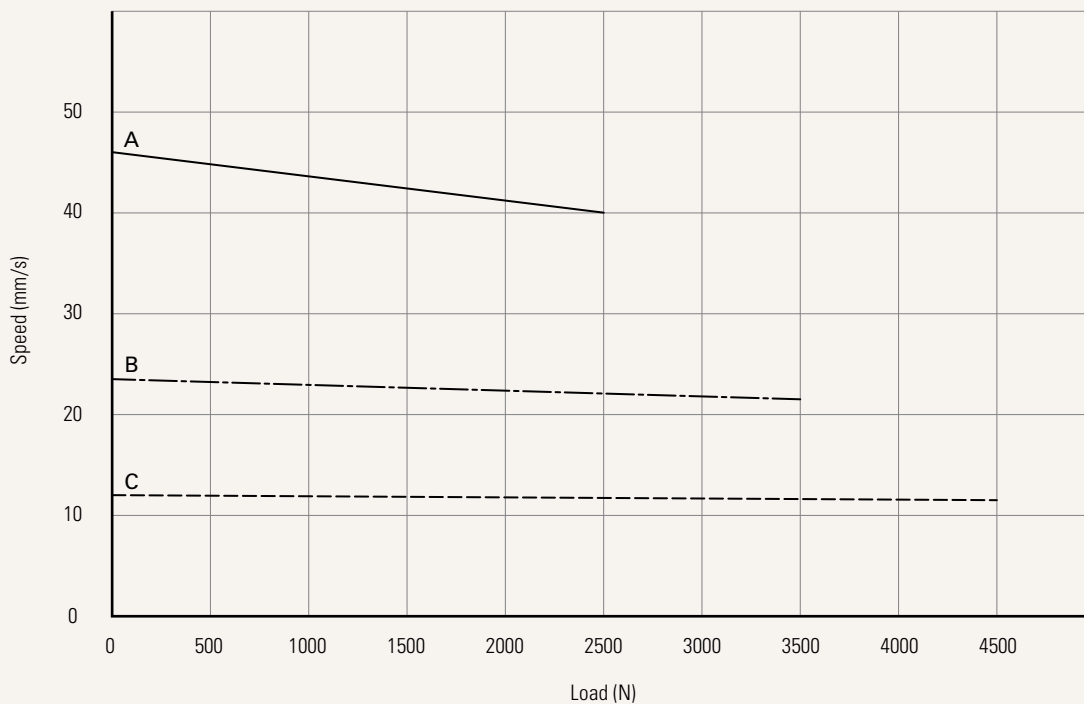
Note

1 The performance data in the curve charts shows theoretical value.

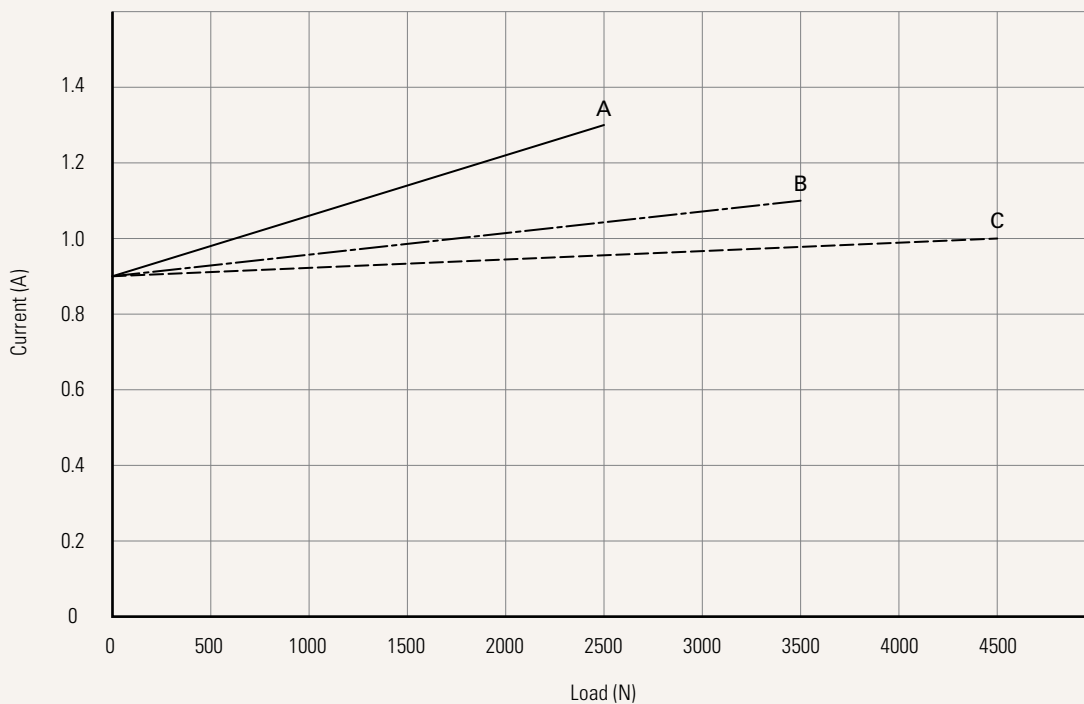
Performance Data (220V AC Motor)

Ball Screw (duty cycle 25%)

Speed vs. Load



Current vs. Load



Note

1 The performance data in the curve charts shows theoretical value.

<b>Spindle Type</b>	A = ACME Screw	B = BALL Screw	
<b>Voltage</b>	1 = 12V DC 2 = 24V DC	3 = 36V DC 4 = 110V AC 60Hz	5 = 220V AC 50Hz
<b>Load and Speed</b>	<a href="#">See page 2</a>	<a href="#">See page 3</a>	
<b>Stroke (mm)</b>			
<b>Retracted Length (mm)</b>	<a href="#">See page 2</a>		
<b>Rear Attachment (mm)</b>	1 = #45 Steel CNC, without slot, hole 13 <a href="#">See page 14</a>		
<b>Front Attachment (mm)</b>	1 = #45 Steel CNC, without slot, hole 13 <a href="#">See page 14</a>		
<b>Direction of Rear Attachment (Counterclockwise)</b>	1 = 90° (Standard)	2 = 0° <a href="#">See page 14</a>	
<b>Functions for Limit Switches</b>	0 = Without (Needs to choose overload clutch) 1 = Two switches at full retracted/extended positions to cut current 2 = Two switches at full retracted/extended positions to send signal <a href="#">See page 15</a>		
<b>Overload Clutch</b>	0 = Without	1 = With (Standard)	
<b>Mechanical Brake</b>	0 = Without	1 = With (Ball Screw's standard option) <a href="#">See page 14</a>	
<b>Electromagnetic Brake</b>	0 = Without (Standard)	1 = With <a href="#">See page 15</a>	
<b>IP Rating</b>	6 = IP66D	8 = IP69K	
<b>Manual Drive</b>	0 = Without	1 = With	
<b>Output Signals</b>	0 = Without	1 = POT	5 = Hall sensors*2 <a href="#">See page 13</a>
<b>Connector</b>	1 = Tinned leads		
<b>Cable Length (mm)</b>	1 = Straight, 500		

## Retracted Length (mm)

1. Calculate  $A+B+C+D = Y$
2. Retracted length needs to  $\geq$  Stroke + Y

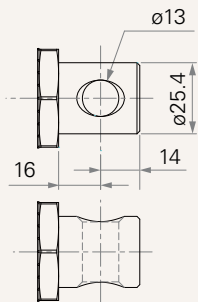
<b>A. Type</b>				
	ACME, DC	Ball, DC	ACME, AC	Ball, AC
	+160	+201	+160	+201

<b>C. Output Signals</b>				
	ACME, DC	Ball, DC	ACME, AC	Ball, AC
<b>0</b>	-	-	-	-
<b>1</b>	+36	+40	+36	+40
<b>5</b>	-	-	+36	+40

<b>B. Mechanical Brake</b>				
	ACME, DC	Ball, DC	ACME, AC	Ball, AC
<b>0</b>	-	-	-	-
<b>1</b>	+35	-	+35	-

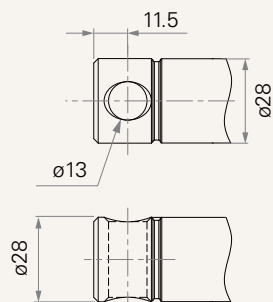
## Rear Attachment (mm)

1 = #45 Steel CNC, without slot, hole 13



## Front Attachment (mm)

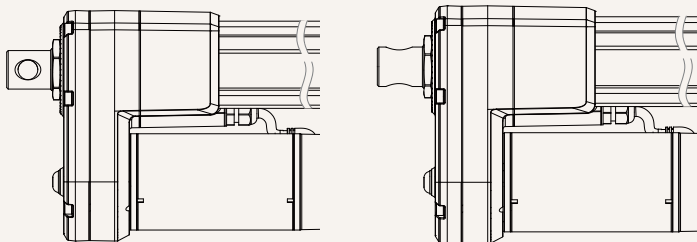
1 = #45 Steel CNC, without slot, hole 13



## Direction of Rear Attachment (Counterclockwise)

1 = 90° (Standard)

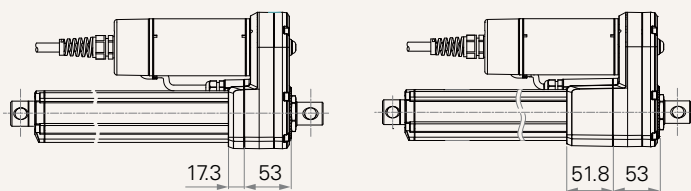
2 = 0°



## Mechanical Brake

0 = Without

1 = With (Ball Screw's standard option)

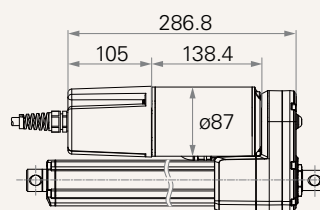
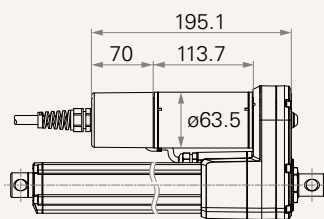
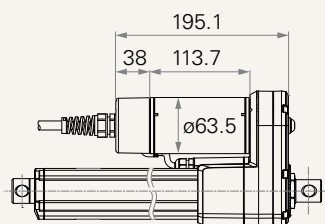


## Electromagnetic Brake

0 = Without (DC)

1 = With (DC)

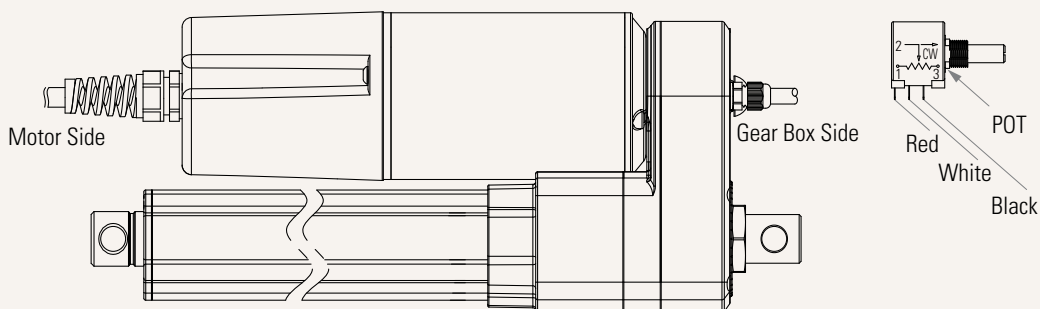
0 = Without (AC)



## Functions for Limit Switches

### Motor Type

Motor Type	Motor Side	Color	AWG	Output Signal Code			
				0. Without	1. POT	4. 1 Hall	5. 2 Hall
DC Motor	Motor Side	Black	26	-	-	GND	GND
		Blue	26	-	-	-	S2
		White	26	-	-	S1	S1
		Red	26	-	-	+5V	+5V
		Red	14	Extend+	Extend+	Extend+	Extend+
		Black	14	Retract+	Retract+	Retract+	Retract+
	Gear Box Side	Red	26	-	Pin1	-	-
		White	26	-	Pin2	-	-
		Black	26	-	Pin3	-	-
AC Motor	Motor Side	Black	18	Retract+	Retract+	Retract+	Retract+
		Grey	18	Extend+	Extend+	Extend+	Extend+
		Brown	18	PCBA+	PCBA+	PCBA+	PCBA+
		Blue	18	Neutral	Neutral	Neutral	Neutral
		Green/Yellow	18	GND	GND	GND	GND
		Gear Box Side	Red	20	-	Pin1	+5V
	White		20	-	Pin2	S1	S1
	Blue		20	-	-	-	S2
	Black		20	-	Pin3	GND	GND



## Terms of Use

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