

MA1

series



Product Segments

• Industrial Motion

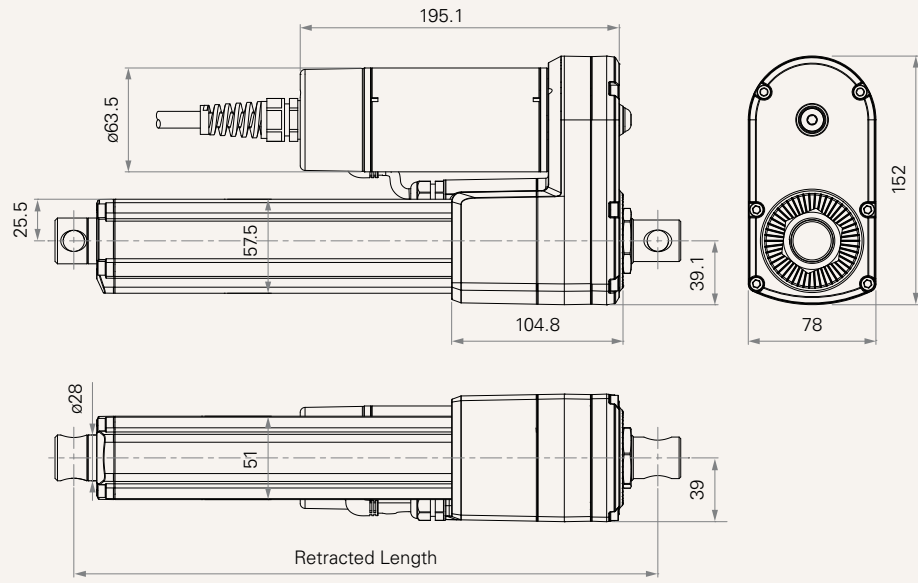
TiMOTION's MA1 series linear actuator is the proven choice for applications requiring a durable, long life solution. Specifically designed for harsh working environments, the MA1 linear actuator is ideal for use in heavy-duty machinery, industrial equipment and off road vehicles. This linear actuator has been certified for applications requiring IP69K 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

Max. load	ACME screw: 2,500N (push / pull) Ball screw: 4,500N (push / pull)
Max. speed at max. load	15mm/s (ACME screw, DC motor) 14.8mm/s (Ball screw, DC motor)
Max. speed at no load	31.2mm/s (ACME screw, DC motor) 59mm/s (Ball screw, DC motor)
Retracted length	≥ Stroke + 160mm (ACME screw, without POT) ≥ Stroke + 201mm (Ball screw, without POT)
IP rating	IP69K
Certificate	UL73, EMC
Stroke	20~1000mm (ACME screw); 50~800mm (Ball screw)
Output Signals	Hall sensors, POT
Options	Overload clutch, electromagnetic brake
Voltage	12 / 24 / 36 / 48V DC; 110 / 220V AC
Spindle	ACME or Ball screw
Color	Black
Operational temperature range	-30°C~+65°C
Operational temperature range at full performance	+5°C~+45°C
Mechanical brake	
Higher duty cycle (25%), corrosion proof	
Manual drive	

Drawing

Standard Dimensions
(mm)



Load and Speed

Rated Load and Self-Lock Force

CODE	Load (N)		Self Locking Force (N)				Duty Cycle	Overload Clutch Range (N)
	Push	Pull	EM Brake		With			
			Without		No Brake	Mechanical Brake		
			No Brake	Mechanical Brake				
A_B	1500	1500	500	1950	1950	1950	25%	2250~3000
A_C	2500	2500	500	3250	3250	3250	25%	3750~5000
B_A	2500	2500	N/A	3250	N/A	3250	25%	3250~4000
B_B	3500	3500	N/A	4550	N/A	4550	25%	5250~7000
B_C	4500	4500	N/A	5850	N/A	5850	25%	6750~9000

Rated Current and Speed

CODE	24VDC				110VAC				220VAC			
	Typical Current (A)		Typical speed (mm/s)		Typical Current (A)		Typical speed (mm/s)		Typical Current (A)		Typical speed (mm/s)	
	No Load	With Load	No Load	With Load	No Load	With Load	No Load	With Load	No Load	With Load	No Load	With Load
	Motor Speed (4100RPM)				Motor Speed (3600RPM)				Motor Speed (2900RPM)			
A_B	2.5	7.5	31.2	27.4	1.7	2.0	28.0	24.7	0.8	1.0	23.5	21.0
A_C	2.0	6.5	17.0	15.0	1.7	2.0	14.5	12.8	0.8	1.0	12.1	11.2
B_A	3.5	14.0	59.0	45.0	1.8	2.4	56.5	38.5	1.0	1.3	46.0	40.0
B_B	2.5	8.5	31.0	26.0	1.7	2.1	27.5	22.5	1.0	1.1	23.2	19.2
B_C	2.0	6.3	16.6	14.8	1.7	2.0	14.2	13.0	1.0	1.0	12.1	11.0

Note

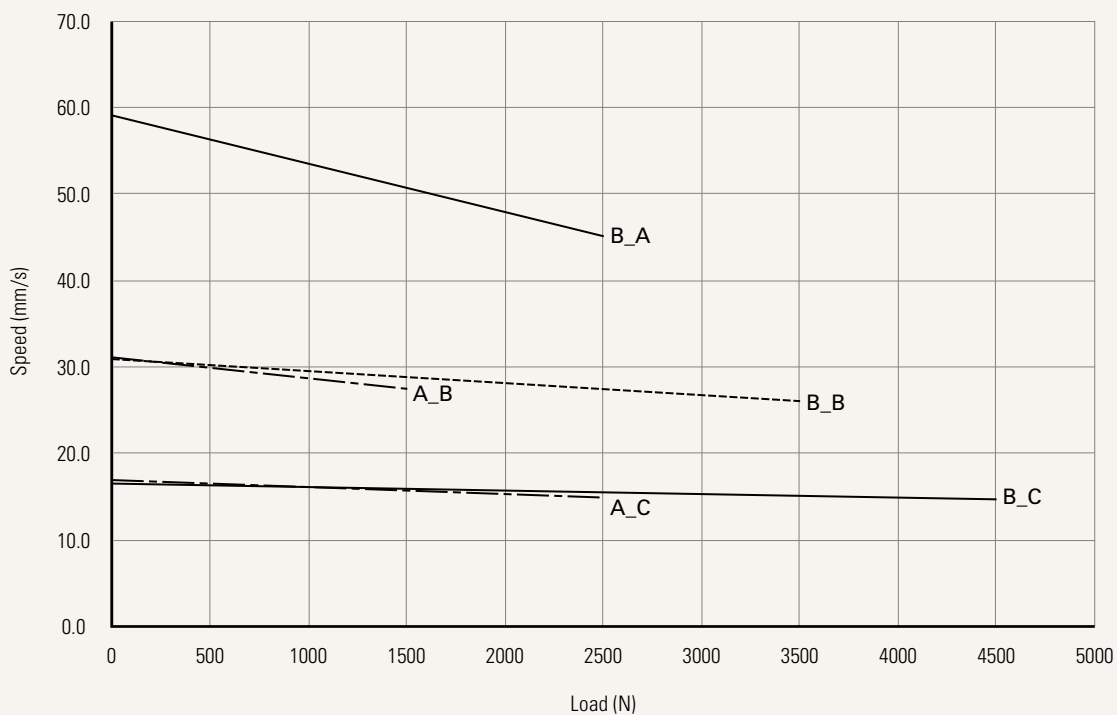
- 1 Please refer to the approved drawing for the final authentic value.
- 2 This self-locking force level is reached only when a short circuit is applied on the terminals of the motor. All the TiMOTION control boxes have this feature built-in.
- 3 The self-locking force is a minimum value and can be actually higher.
- 4 The current & speed in table are tested when the actuator is extending under push load.
- 5 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. With a 36V DC motor, the current is approximately two-thirds the current measured in 24V DC. With a 48V DC motor, the current is approximately half the current measured in 24V DC. Speed will be similar for all the voltages.
- 6 Standard stroke: Min. 20mm, Max. please refer to below table.

CODE	Load (N)	Max Stroke (mm)
A_B	≤1500	1000
A_C, B_A	≤2500	800
B_B, B_C	≤4500	600

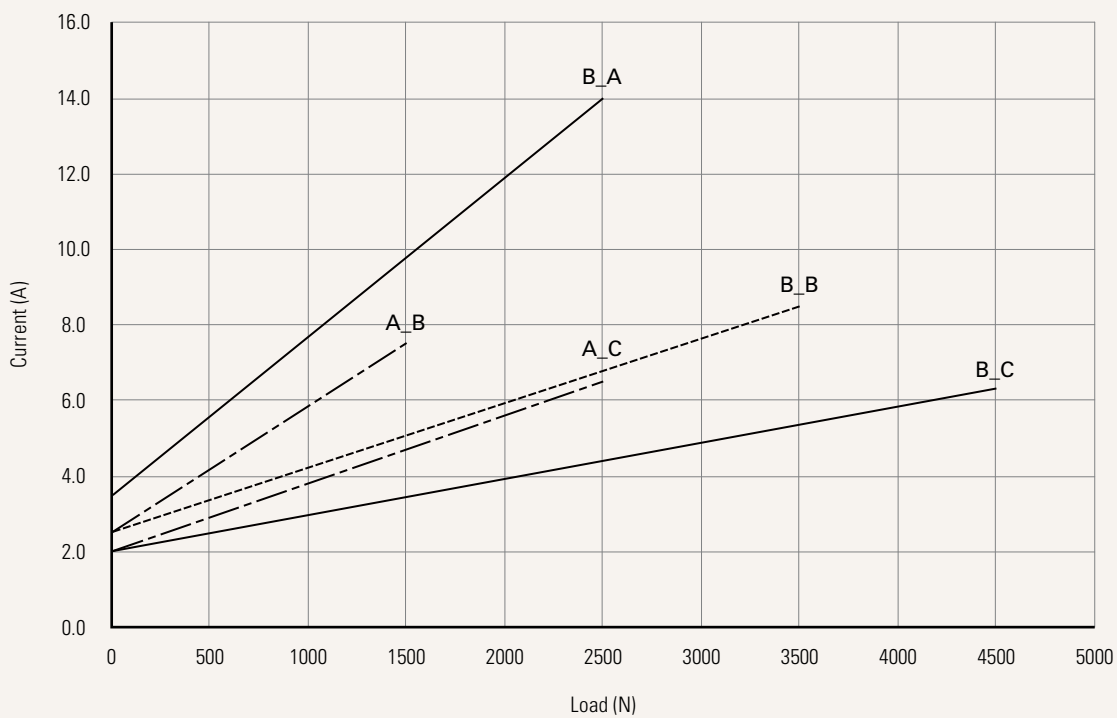
Performance Data (24V DC Motor)

Motor Speed (4100RPM)

Speed vs. Load



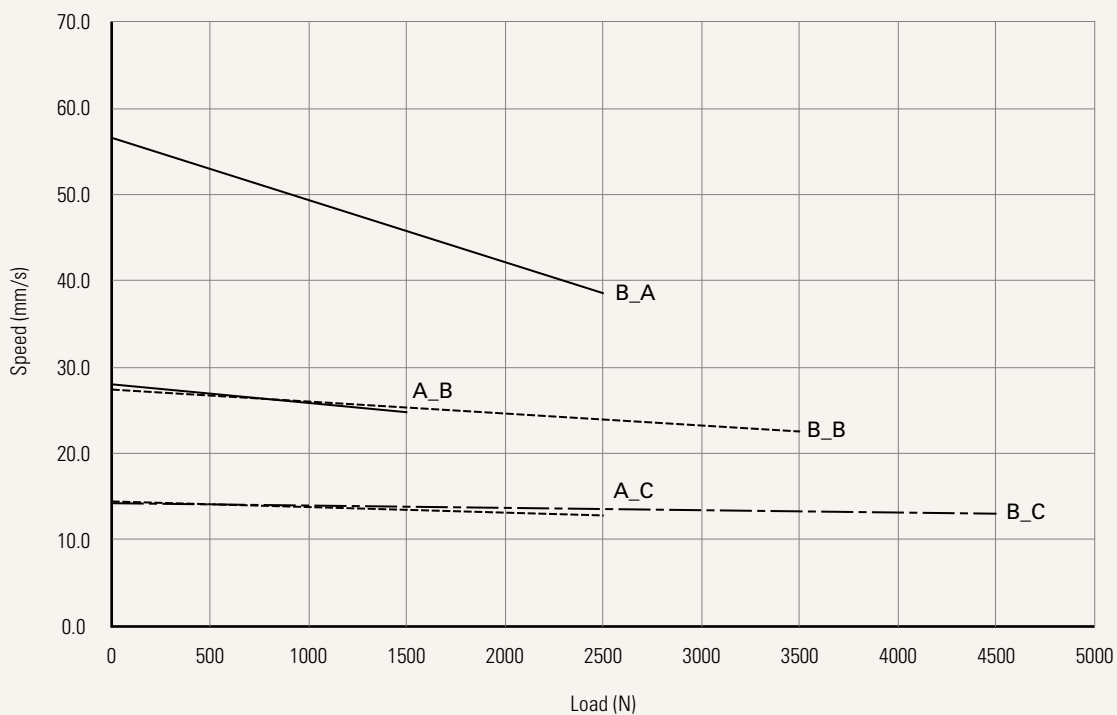
Current vs. Load



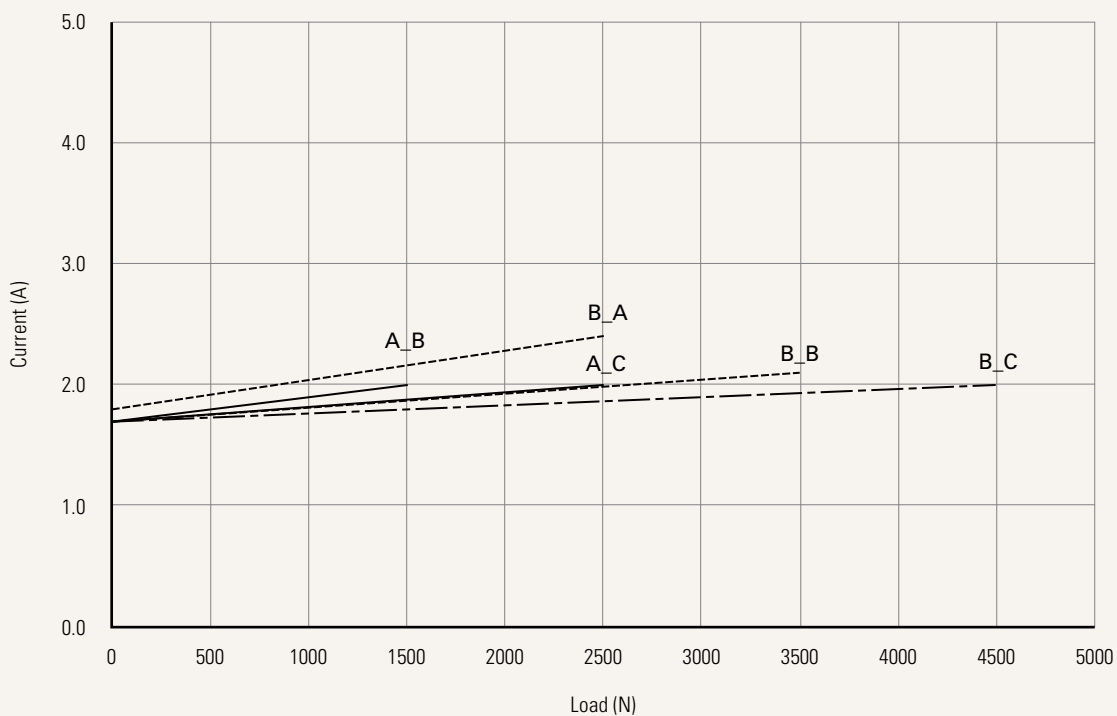
Performance Data (110V AC Motor)

Motor Speed (3600RPM)

Speed vs. Load



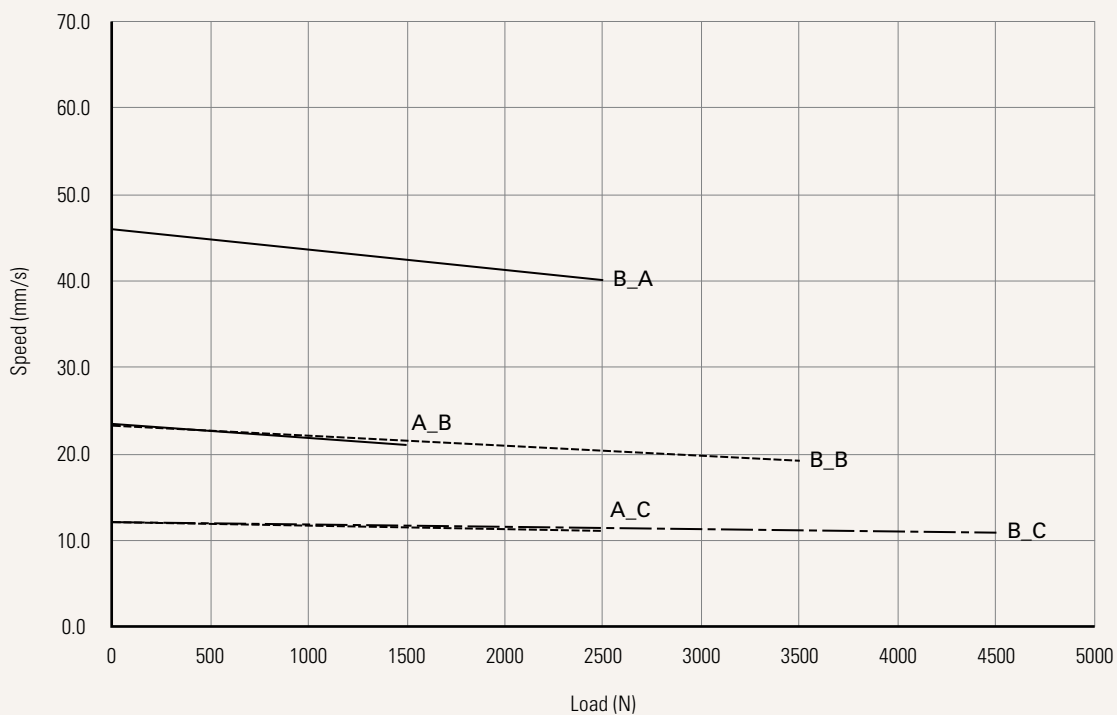
Current vs. Load



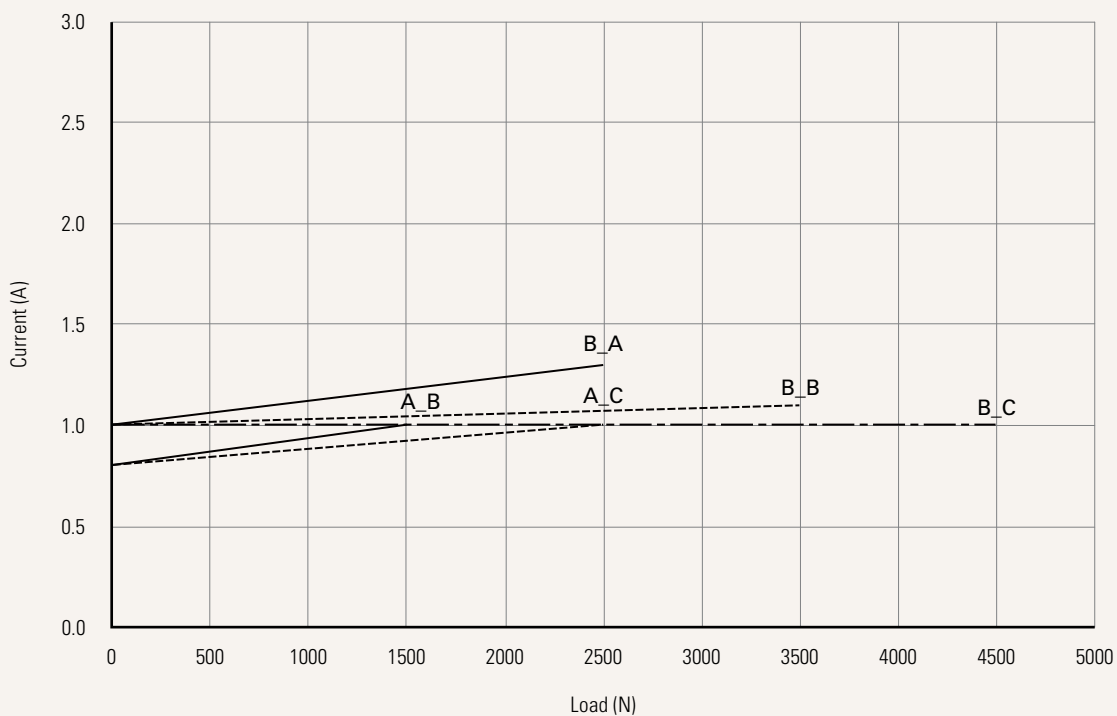
Performance Data (220V AC Motor)

Motor Speed (2900RPM)

Speed vs. Load



Current vs. Load



Spindle Type	A = ACME Screw	B = BALL Screw		
Voltage	1 = 12V DC 2 = 24V DC	3 = 36V DC 9 = 48V DC	4 = 110V AC 60Hz 5 = 220V AC 50Hz	
Load and Speed	See page 3			
Stroke (mm)	See page 3			
Retracted Length (mm)	See page 8			
Rear Attachment (mm)	1 = #45 Steel CNC, without slot, hole 13.0 See page 8			
Front Attachment (mm)	1 = #45 Steel CNC, without slot, hole 13.0 See page 8			
Direction of Rear Attachment (Counterclockwise)	1 = 90° (Standard)	2 = 0° See page 9		
Functions for Limit Switches	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			
Overload Clutch	0 = Without	1 = With		
Mechanical Brake	0 = Without	1 = With (Ball Screw's standard option) See page 9		
Electromagnetic Brake	0 = Without (Standard)	1 = With (Not support the control box with PWM speed adjustment function, such as slow start / stop or sync) See page 9		
IP Rating	6 = IP66D	8 = IP69K		
Manual Drive	1 = With			
Output Signals	0 = Without	1 = POT	5 = Hall sensors*2 See page 10	
Connector	1 = Tinned leads			
Cable Length (mm)	1 = Straight, 500	2 = Straight, 1000	3 = Straight, 1500	4 = Straight, 2000

Retracted Length (mm)

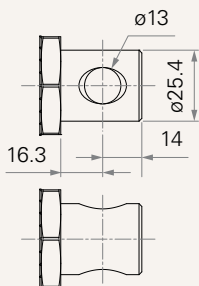
1. Calculate $A+B+C = Y$
2. Retracted length needs to \geq Stroke + Y

A. Type		B. Mechanical Brake	
	ACME		Ball
	+160		+201
0	-	0	-
1	+36	1	+35

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

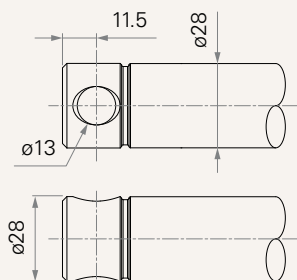
Rear Attachment (mm)

1 = #45 Steel CNC, without slot, hole
13.0



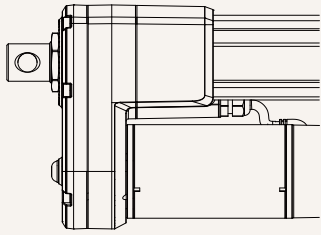
Front Attachment (mm)

1 = #45 Steel CNC, without slot, hole
13.0

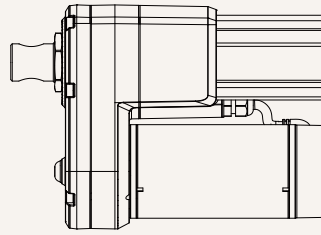


Direction of Rear Attachment (Counterclockwise)

1 = 90° (Standard)

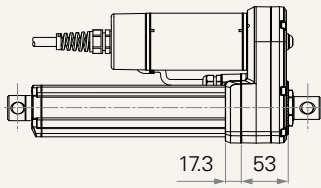


2 = 0°

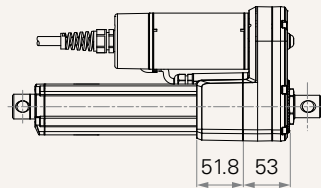


Mechanical Brake

0 = Without

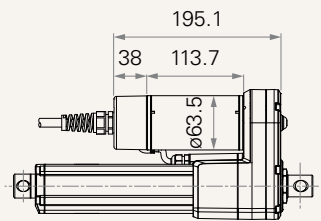


1 = With (Ball Screw's standard option)

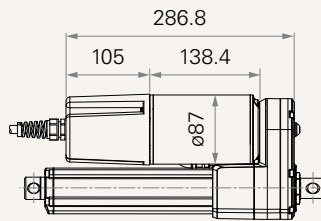


Electromagnetic Brake

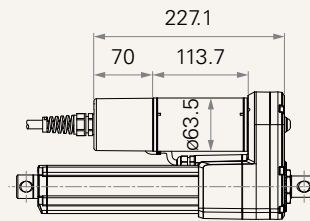
0 = Without (Standard, DC)



0 = Without (Standard, AC)

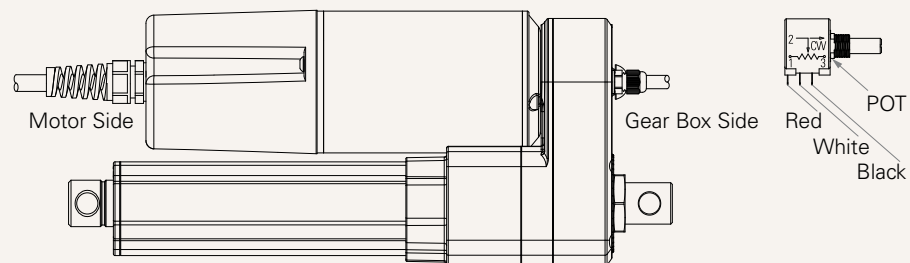


1 = With (DC)



Output Signals

Wire Definitions			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/Green	14	Extend+	Extend+	Extend+	Extend+
		● Black/Yellow	14	Retract+	Retract+	Retract+	Retract+
	Gear Box Side	● Red	26	-	pin 1	-	-
		○ White	26	-	pin 2	-	-
		● Black	26	-	pin 3	-	-
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

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