

# MA1

series



## Product Segments

### • Industrial Motion

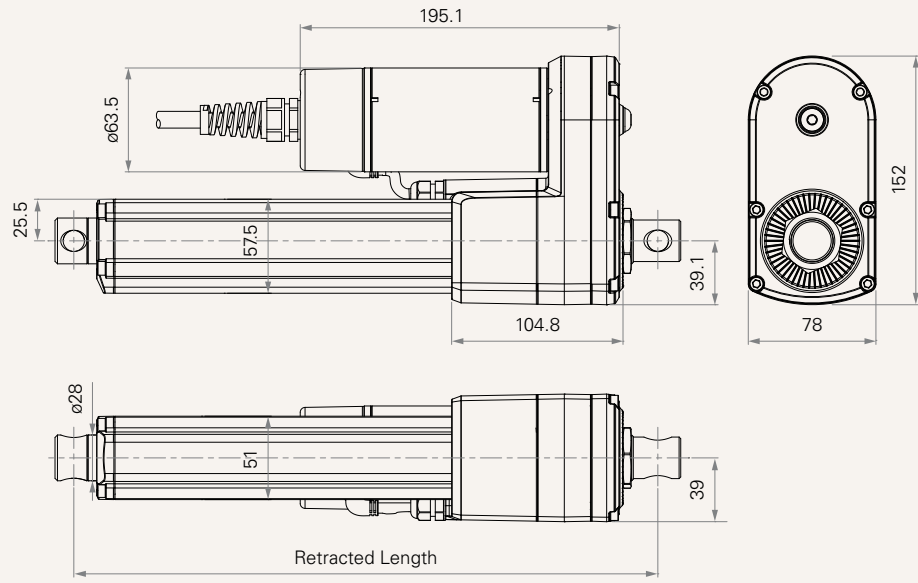
TiMOTION's MA1 series linear actuator is the proven choice for applications requiring a durable, long life solution. Specifically designed for harsh working environments, the MA1 linear actuator is ideal for use in heavy-duty machinery, industrial equipment and off road vehicles. This linear actuator 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: 8,000N (push/pull); Ball screw: 4,500N (push/pull)
Max. speed at max. load	5.7mm/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); 20~800mm (Ball screw)
Output Signals	Mechanical pot., NPN Hall sensors, PNP Hall sensors
Options	Overload clutch, motor brake, mechanical brake
Voltage	12/24/36/48V DC; 115/230V AC
Spindle	ACME or Ball screw
Color	Black
Operational temperature range	-40°C~+85°C
Operational temperature range at full performance	+5°C~+45°C
Electromagnetic brake option	
Higher duty cycle (25%), corrosion proof	
Manual drive	

**Drawing**

Standard Dimensions  
(mm)



## Load and Speed

### Rated Load and Self-Lock Force

Spindle type	Load & speed	Load (N)		Self Lock (N)	Duty Cycle	Overload Clutch Range (N)
		Push	Pull			
ACME screw	B	1500	1500	1950	25%	2250 ~ 3000
	C	2500	2500	3250	25%	3750 ~ 5000
	D	4000	4000	5200	25%	N/A
	E	6000	6000	7800	25%	N/A
	F	8000	8000	10400	10%	N/A
Ball screw	A	2500	2500	3250	25%	3250 ~ 4000
	B	3500	3500	4550	25%	5250 ~ 7000
	C	4500	4500	5850	25%	6750 ~ 9000

### Rated Current and Speed

Spindle type	Load & speed	24VDC				115VAC				230VAC			
		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
ACME screw	B	2.5	7.50	31.2	27.4	1.7	2.0	28.0	24.7	0.8	1.0	23.5	21.0
	C	2.0	6.50	17.0	15.0	1.7	2.0	14.5	12.8	0.8	1.0	12.1	11.2
	D	3.0	9.10	17.3	14.8	-	-	-	-	-	-	-	-
	E	3.0	8.45	8.6	7.6	-	-	-	-	-	-	-	-
	F	3.0	9.10	6.7	5.7	-	-	-	-	-	-	-	-
Ball screw	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	2.5	8.5	31.0	26.0	1.7	2.1	27.5	22.5	1.0	1.1	23.2	19.2
	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

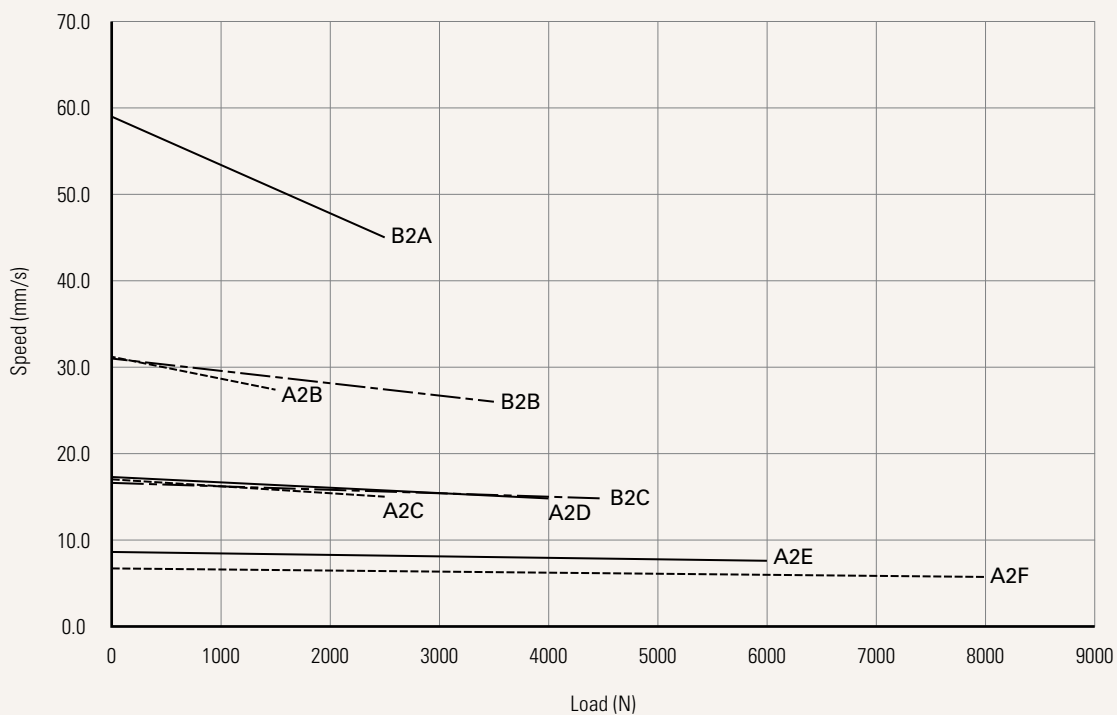
- Please refer to the approved drawing for the final authentic value.
- The self-locking force is a minimum value and can be actually higher.
- The current & speed in table are tested when the actuator is extending under push load.
- The current & speed in table are tested with 24V DC motor. With a 12V 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.
- Without load, noise level  $\leq 78$ dB(A) (by TiMOTION test standard, ambient noise level  $\leq 36$ dB(A))
- Standard stroke: Min. 20mm, Max. please refer to the table below.

SPINDLE TYPE	CODE	Load (N)	Max Stroke (mm)
ACME	B	$\leq 1500$	1000
	C	$\leq 2500$	800
	D, E	$\leq 6000$	600
	F	$\leq 8000$	400
Ball	A	$\leq 2500$	800
	B, C	$\leq 4500$	600

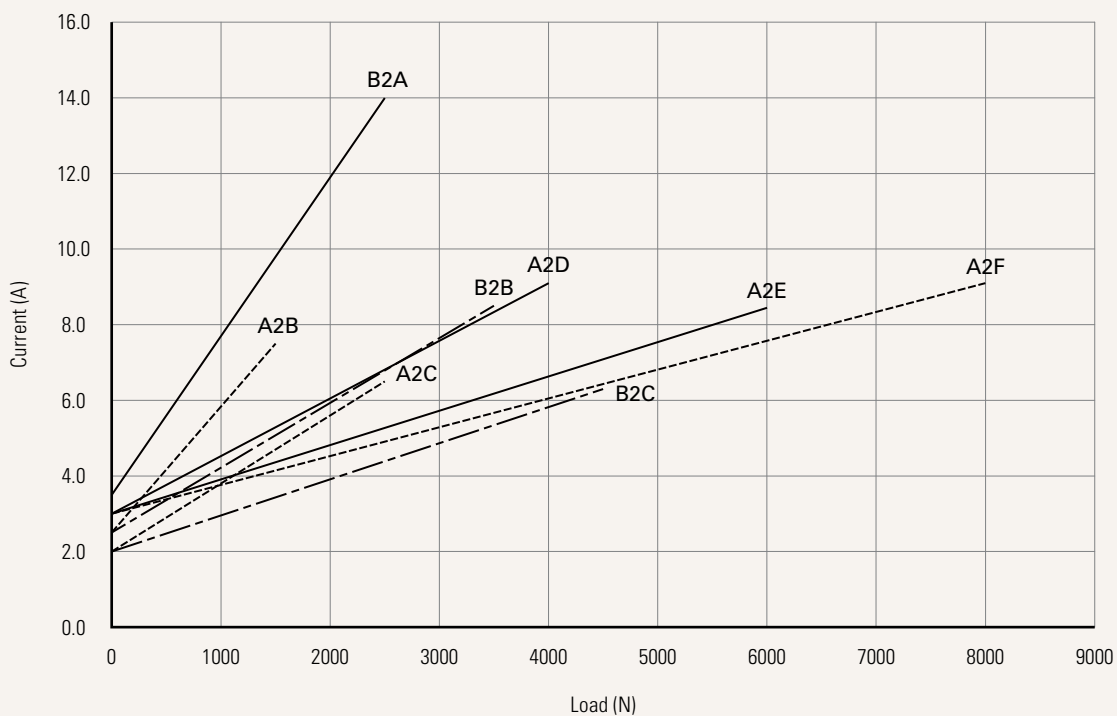
Performance Data (24V DC Motor)

Motor Speed (4100RPM)

Speed vs. Load



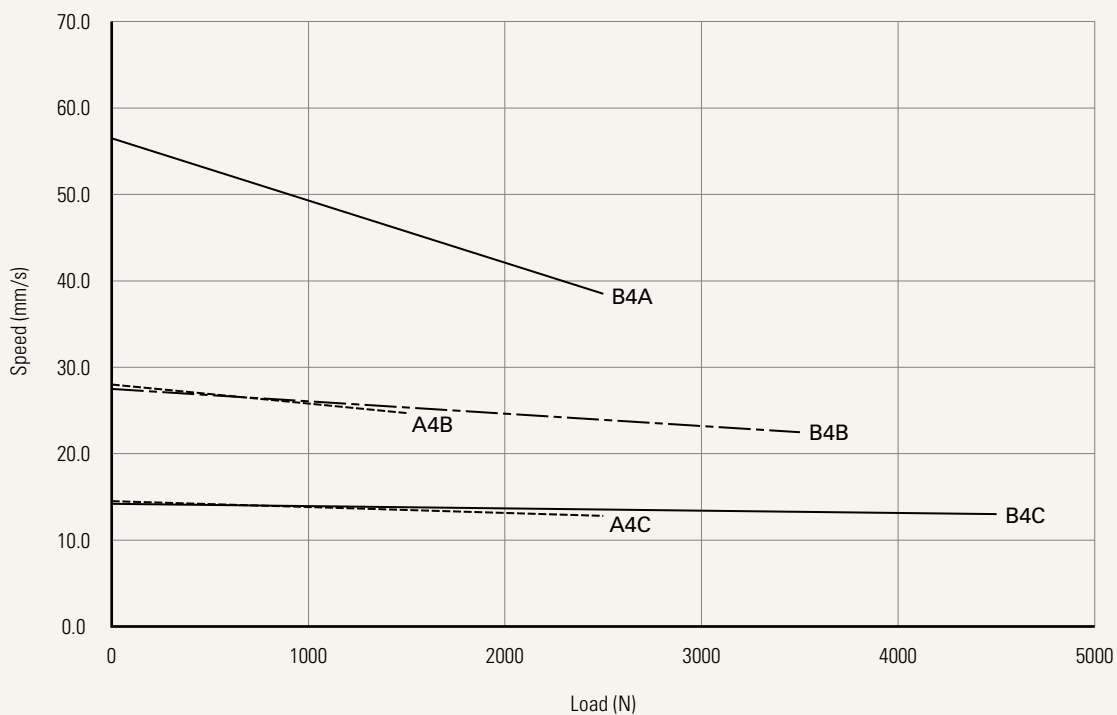
Current vs. Load



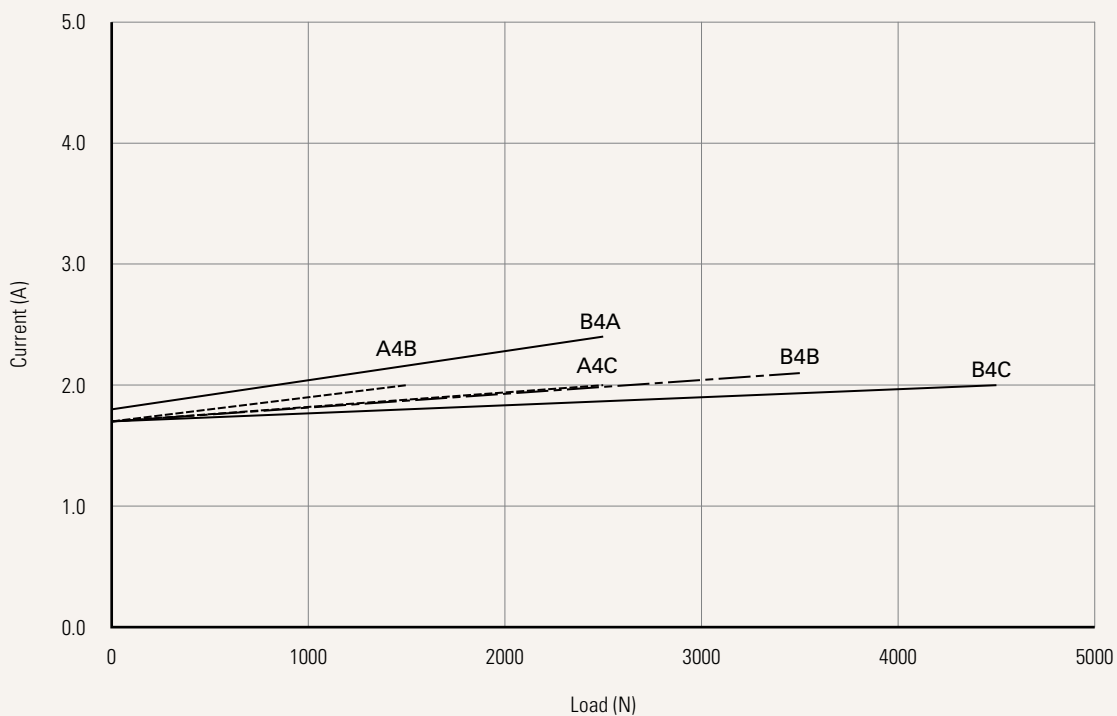
Performance Data (115V AC Motor)

Motor Speed (3600RPM)

Speed vs. Load



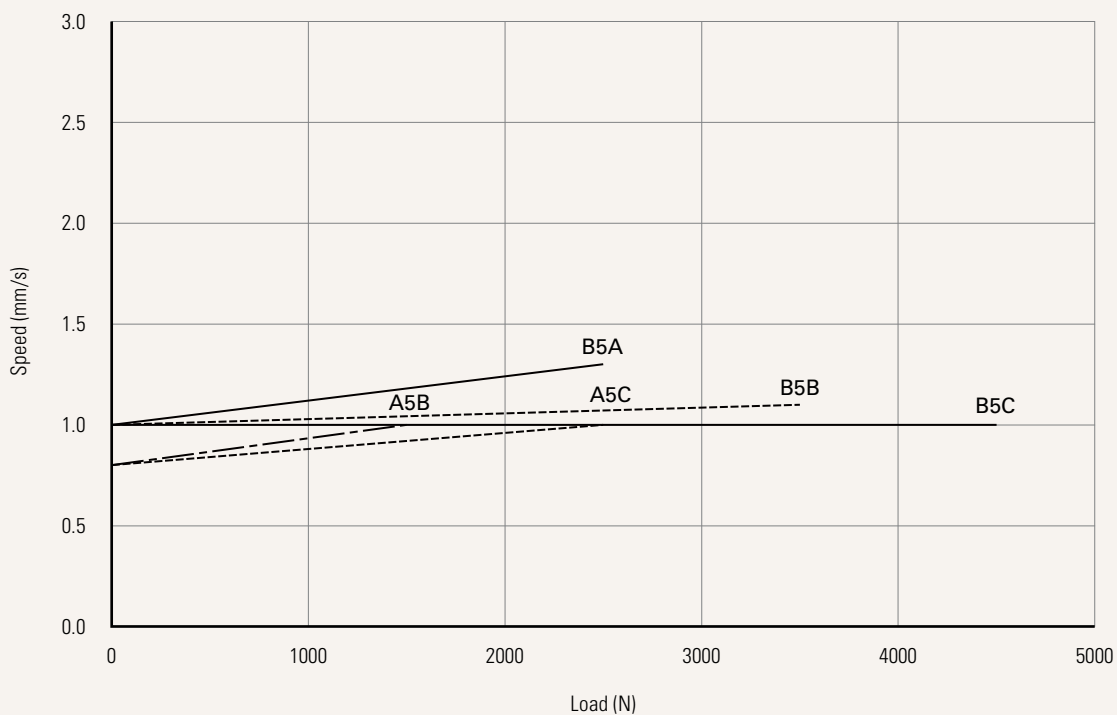
Current vs. Load



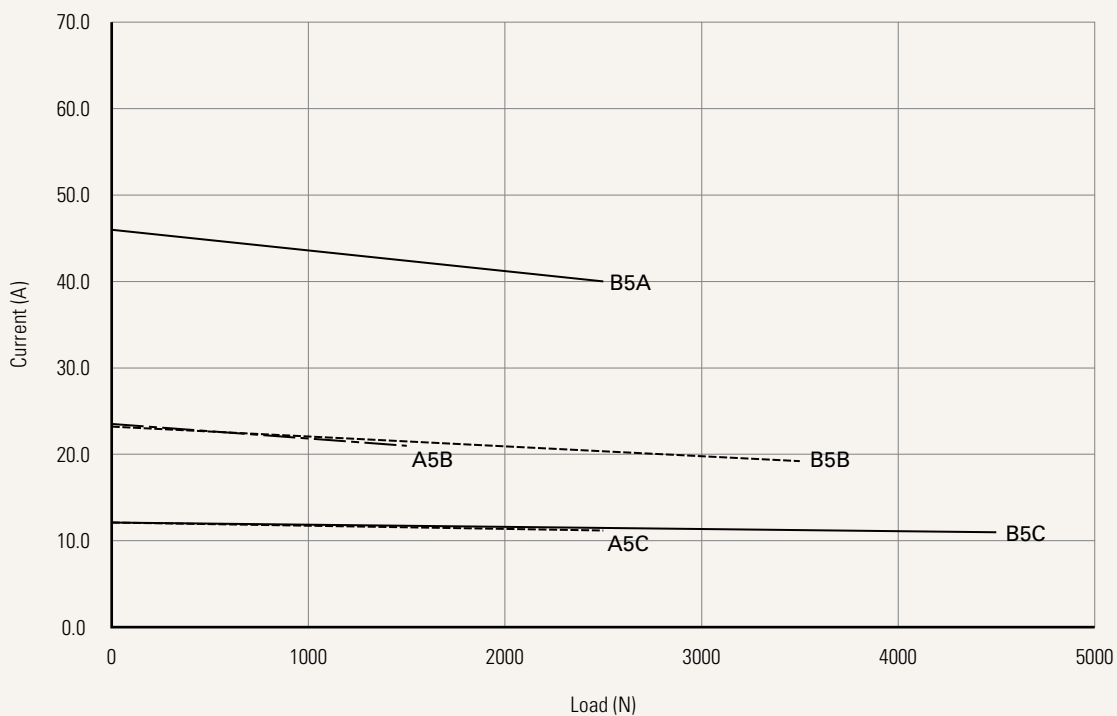
Performance Data (230V AC Motor)

Motor Speed (2900RPM)

Speed vs. Load



Current vs. Load



<b>Spindle Type</b>	A = ACME screw	B = Ball screw		
<b>Voltage</b>	1 = 12V DC 2 = 24V DC	3 = 36V DC 9 = 48V DC	4 = 115V AC 60Hz 5 = 230V AC 50Hz	
<b>Load and Speed</b>	<a href="#">See page 3</a>			
<b>Stroke (mm)</b>	<a href="#">See page 3</a>			
<b>Retracted Length (mm)</b>	<a href="#">See page 8</a>			
<b>Rear Attachment (mm)</b>	1 = #45 Steel CNC, slotless, hole 13.0 <a href="#">See page 8</a>			
<b>Front Attachment (mm)</b>	1 = #45 Steel CNC, slotless, hole 13.0 <a href="#">See page 8</a>			
<b>Direction of Rear Attachment (Counterclockwise)</b>	1 = 90° (Standard)	2 = 0° <a href="#">See page 9</a>		
<b>Function of Limit Switches</b>	0 = Without (For overload clutch must choose #1_With) 1 = Two micro switches cut off the actuator at end of stroke 2 = Two micro switches send signal at end of stroke (signal type: normally closed)			
<b>Overload Clutch</b>	0 = Without	1 = With		
<b>Brake</b>	0 = Without M = Motor brake (load and speed #D, E, F default option, unavailable to other load and speed options) 1 = Mechanical brake (ball screw's default option)			
<b>Electromagnetic Brake</b>	0 = Without (Standard) 1 = With (does not support control boxes with PWM speed adjustment functions, such as soft start/stop or synchronization) <a href="#">See page 9</a>			
<b>IP Rating</b>	6 = IP66M	8 = IP69K		
<b>Manual Drive</b>	1 = With			
<b>Output Signal</b>	0 = Without <a href="#">See page 10</a> 1 = Mechanical pot.	N = NPN Hall sensor*2 (Standard) P = PNP Hall sensor*2		
<b>Connector (mm)</b>	1 = Tinned leads, unsheathed wire 50, stripped wire 10			
<b>Cable Length (mm)</b>	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

ACME	Ball
+160	+201

### C. Output Signal

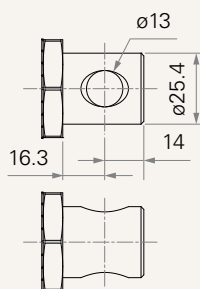
	ACME, DC	ACME, AC	Ball, DC	Ball, AC
<b>0</b>	-	-	-	-
<b>1</b>	+36	+36	+40	+40
<b>5</b>	-	+36	-	+40

### B. Mechanical Brake

	ACME	Ball
<b>0</b>	-	-
<b>1</b>	+35	-

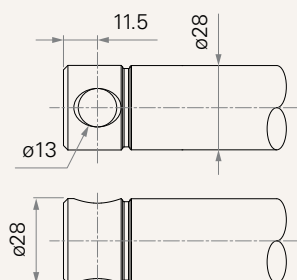
## Rear Attachment (mm)

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



## Front Attachment (mm)

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

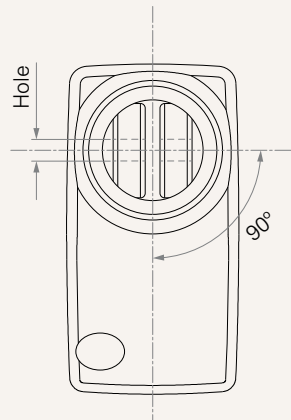
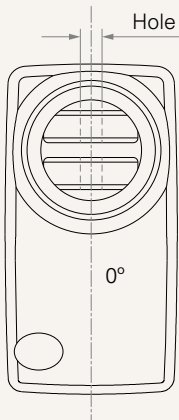




## Direction of Rear Attachment (Counterclockwise)

1 = 90° (Standard)

2 = 0°



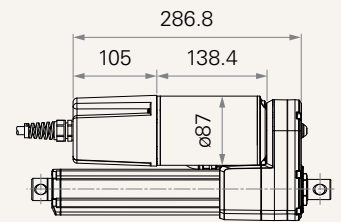
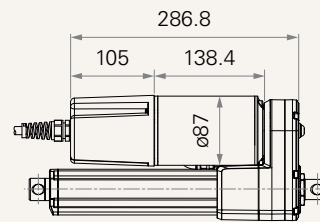
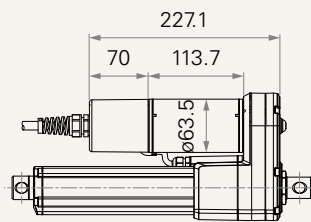
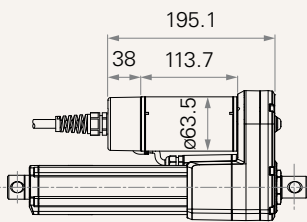
## Electromagnetic Brake

0 = Without (Standard, DC)

1 = With (DC)

0 = Without (Standard, AC)

1 = With (AC)



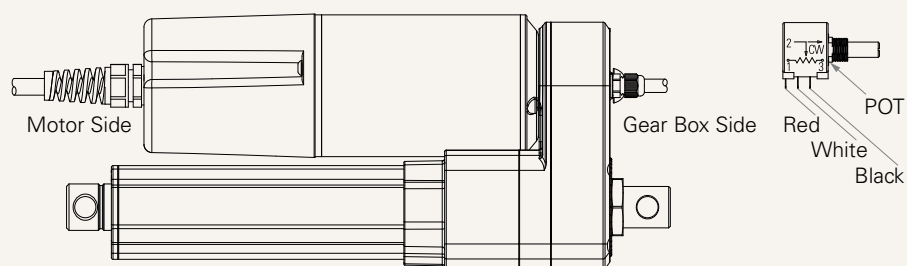
## Wire Definition

### DC Motor

Port	Wire Color	Wire Gauge (AWG)	Output Signal			
			0. Without	1. Mechanical pot.	N. NPN Hall*2	P. PNP Hall*2
<b>Motor Exit</b>	● BK	26	X	X	GND	GND
	● BU	26	X	X	X	S2
	○ WH	26	X	X	S1	S1
	● RE	26	X	X	Vcc	Vcc
	● RE/GR	14	EXT+	EXT+	EXT+	EXT+
	● BK/YE	14	RET+	RET+	RET+	RET+
<b>Gearbox Exit</b>	● RE	26	X	pin 1	X	X
	○ WH	26	X	pin 2	X	X
	● BK	26	X	pin 3	X	X

### AC Motor

Port	Wire Color	Wire Gauge (AWG)	Output Signal			
			0. Without	1. Mechanical pot.	N. NPN Hall*2	P. PNP Hall*2
<b>Motor Exit</b>	● BK	18	RET+	RET+	GND	GND
	● GY	18	EXT+	EXT+	X	S2
	● BN	18	PCBA+	PCBA+	S1	S1
	● BU	18	N	N	Vcc	Vcc
	● GR/YE	18	GND	GND	EXT+	EXT+
<b>Gearbox Exit</b>	● RE	20	X	pin 1	RET+	RET+
	○ WH	20	X	pin 2	X	X
	● BU	20	X	X	X	X
	● BK	20	X	pin 3	X	X



## 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.