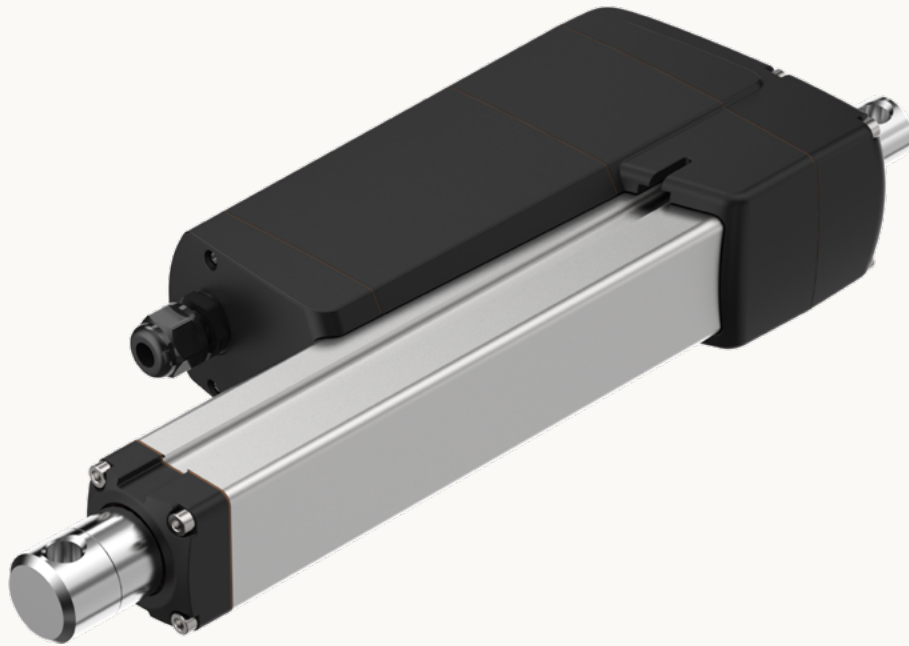


# MA3

series



## Product Segments

- **Industrial Motion**

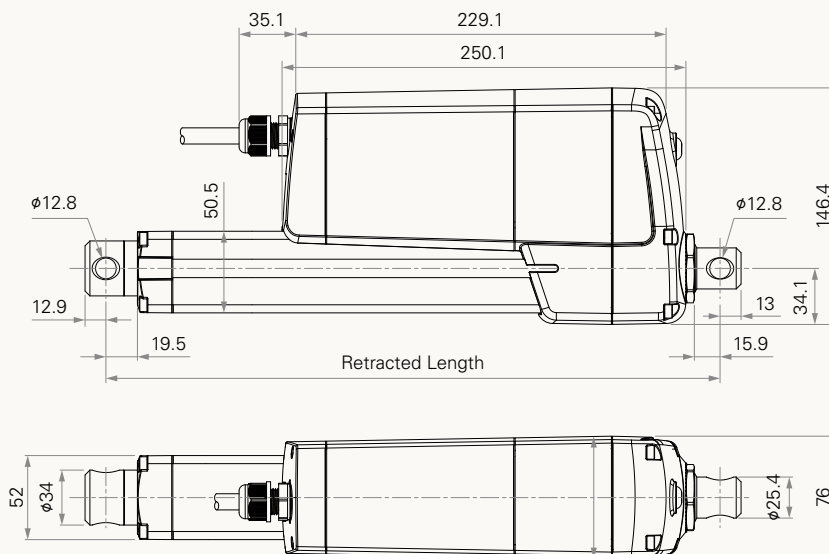
TiMOTION's MA3 was specifically designed for heavy-duty applications and harsh working environments that require durability. Examples of applications suitable for the MA3: Agricultural equipment such as spreaders, harvesters, grain handlers, combines, and tractors. Commercial and industrial applications such as commercial lawn mowers, scrubbers and sweepers, and material handling equipment.

### General Features

Max. load	16,000N (push/pull)
Max. speed at max. load	6.8mm/s
Max. speed at no load	172.5mm/s
Retracted length	≥ Stroke + 200mm
IP rating	IP69K
Certificate	UL73, EMC
Stroke	25~1000mm
Output signals	Mechanical Pot., adjustable Reed switch, NPN Hall sensors, PNP Hall sensors
Voltage	12/24/36/48V DC; 12/24V DC (thermal switch)
Operational temperature range	-40°C~+85°C
Operational temperature range at full performance	+5°C~+45°C
Manual drive	

**Drawing**

Standard Dimensions  
(mm)



**Load and Speed**

CODE	Load (N)		Self Locking Force (N)	Duty Cycle	Typical Current (A)		Typical Speed (mm/s)		Typical Current (A)		Typical Speed (mm/s)	
	Push	Pull			No Load	With Load	No Load	With Load	No Load	With Load	No Load	With Load
			Mechanical Brake									
					24VDC				12VDC			
<b>Motor Speed (5100RPM)</b>												
<b>F</b>	500	500	650	25%	2.5	10.2	172.5	152.0	5.0	19.0	172.5	127.8
<b>K</b>	1000	1000	1300	25%	2.5	10.2	86.0	76.0	5.0	19.0	86.0	63.7
<b>G</b>	2500	2500	3250	25%	2.5	10.5	43.0	38.0	5.0	19.5	43.0	31.6
<b>H</b>	5000	5000	6500	25%	2.5	10.2	21.5	19.0	5.0	18.9	21.5	16.0
<b>M</b>	7500	7500	9750	25%	2.5	11.4	14.0	12.4	5.0	21.1	14.0	10.2
<b>N</b>	10000	10000	13000	25%	2.5	11.3	10.5	9.3	5.0	21.1	10.5	7.6
<b>J</b>	16000	16000	20800	15%	2.5	12.6	7.2	6.2	5.0	23.5	7.2	4.8
<b>S</b>	4000	4000	5200	25%	3.0	13.0	42.4	35.6	-	-	-	-
<b>P</b>	7500	7500	9750	25%	3.0	12.0	21.3	18.2	6.0	22.3	21.3	14.0
<b>Q</b>	10000	10000	13000	25%	3.0	10.5	14.2	12.5	6.0	19.4	14.2	9.9
<b>R</b>	16000	16000	20800	15%	3.0	13.0	10.6	8.9	6.0	24.1	10.6	6.8

**Note**

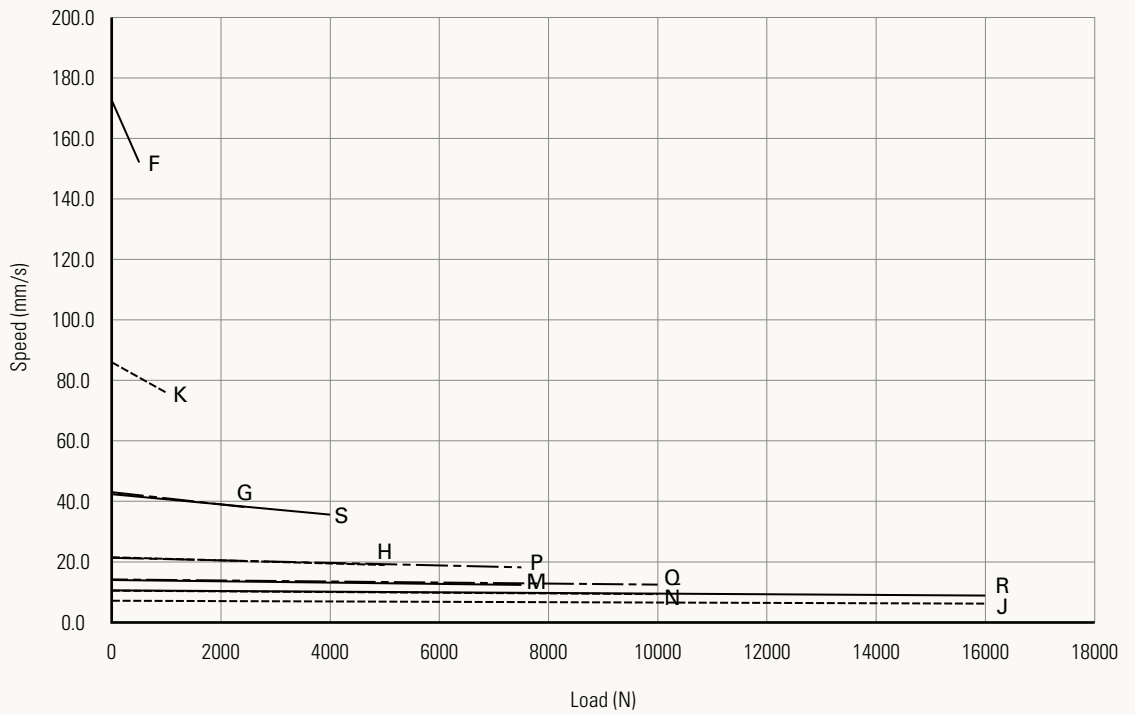
- 1 Please refer to the approved drawing for the final authentic value.
- 2 The current & speed in table are tested with 24V DC motor. With a 12V DC motor, the current is approximately twice the current measured in 24V DC. With a 36V DC motor, the current is approximately two-thirds the current measured 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.
- 3 The current & speed in table are tested when the actuator is extending under push load.
- 4 The current & speed in table and diagram are tested with a stable 24V DC power supply.
- 5 With load, noise level ≤ 78dBA (by TiMOTION test standard, ambient noise level ≤ 36dBA).
- 6 Standard stroke: Min. 25mm, Max. please refer to below table.

CODE	Load (N)	Max Stroke (mm)
<b>F, K, G</b>	≤ 2500	1000
<b>S, H</b>	≤ 5000	800
<b>M, N, P, Q</b>	≤ 10000	600
<b>J, R</b>	≤ 16000	400

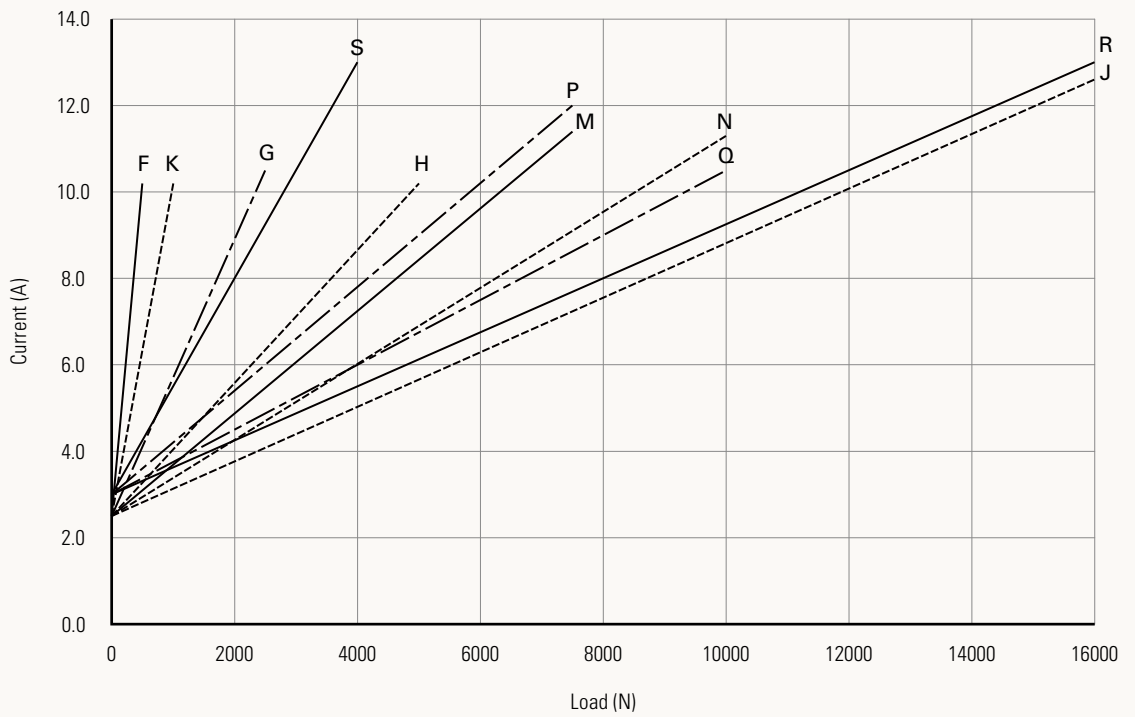
**Performance Data (24V DC Motor)**

Motor Speed (5100RPM)

Speed vs. Load



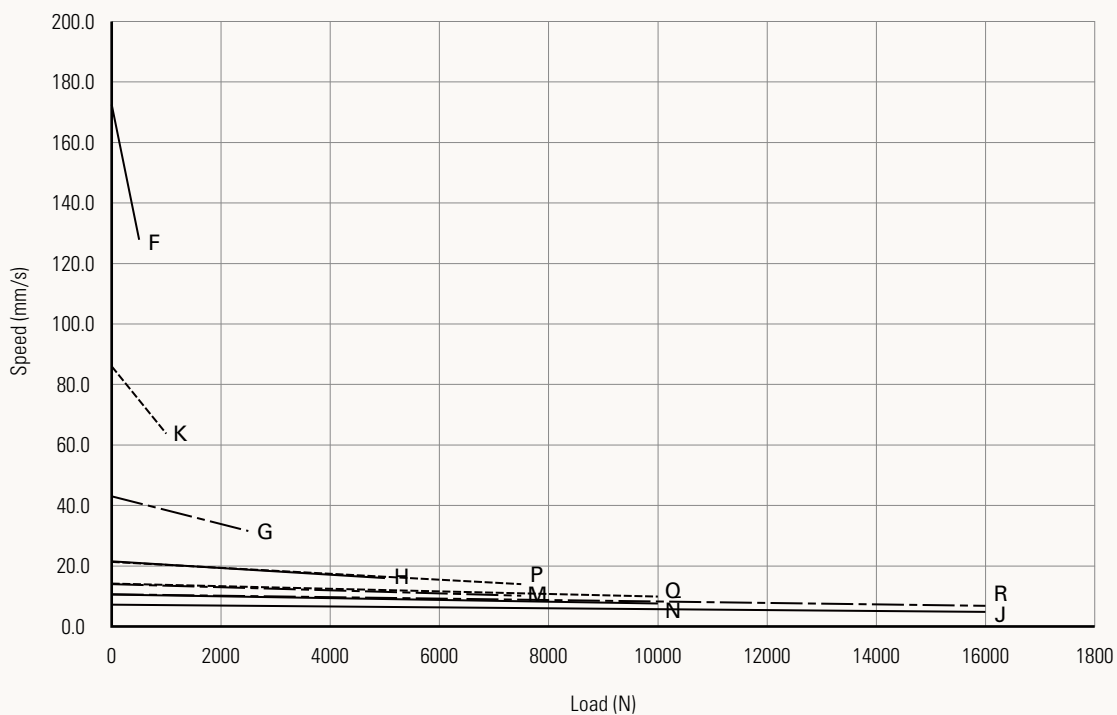
Current vs. Load



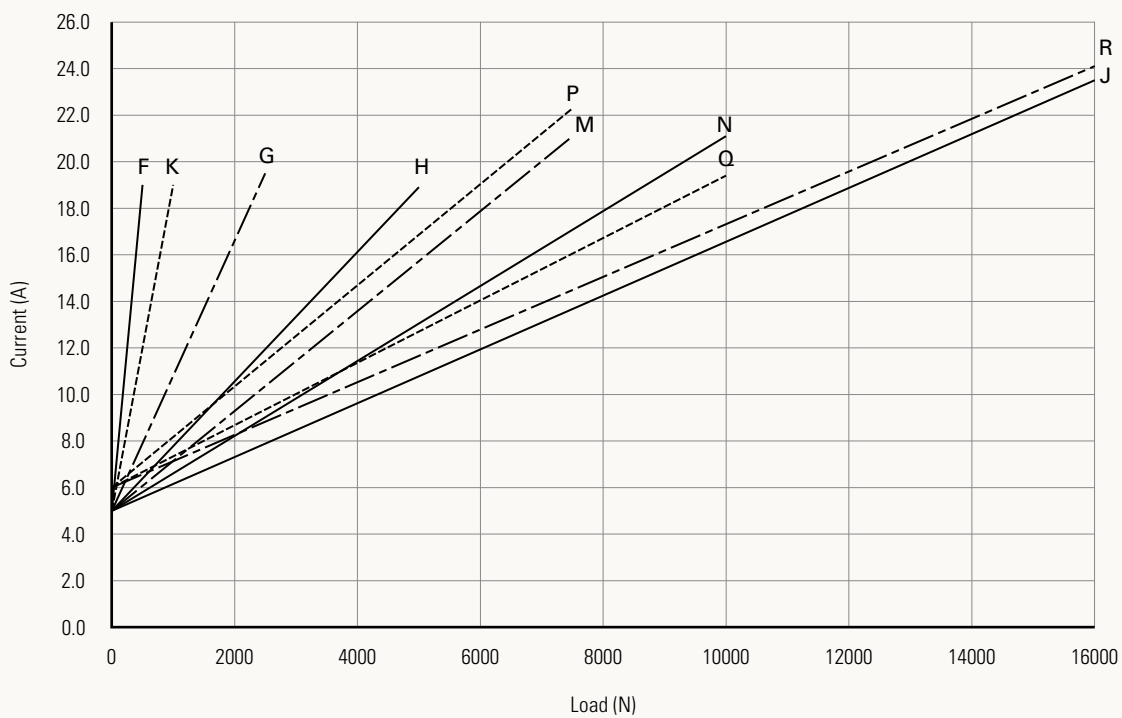
Performance Data (12V DC Motor)

Motor Speed (5100RPM)

Speed vs. Load



Current vs. Load



<b>Type</b>	N = Normal			
<b>Voltage</b>	1 = 12V DC 2 = 24V DC	3 = 36V DC 4 = 48V DC	6 = 12V DC, thermal switch 5 = 24V DC, thermal switch	
<b>Load &amp; Speed</b>	<a href="#">See page 2</a>			
<b>Stroke (mm)</b>	<a href="#">See page 2</a>			
<b>Retracted Length (mm)</b>	<a href="#">See page 6</a>			
<b>Rear Attachment (mm)</b> <a href="#">See page 7</a>	1 = #45 Steel, slotless, hole 10.2 2 = #45 Steel, slotless, hole 12.8 3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 5 = Stainless Steel, slotless, hole 10.2		6 = Stainless Steel, slotless, hole 12.8 7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 9 = #45 Steel, slotless, hole 16.2	
<b>Front Attachment (mm)</b> <a href="#">See page 7-8</a>	1 = #45 Steel, slotless, hole 10.2 2 = #45 Steel, slotless, hole 12.8 3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 5 = Stainless Steel, slotless, hole 10.2		6 = Stainless Steel, slotless, hole 12.8 7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2 8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8 9 = #45 Steel, slotless, hole 16.2 K = Rod end bearing, hole 12.8	
<b>Direction of Rear Attachment (Counterclockwise)</b> <a href="#">See page 8</a>	1 = 0°	2 = 45°	3 = 90°	4 = 135°
<b>Function of Limit Switches</b> <a href="#">See page 9</a>	1 = Two micro switches cut off the actuator at EOS ( with MCU embedded) 3 = Two micro switches send signal at EOS (signal type: normally closed) D = Two micro switches send signal at EOS (only for TID1)			
<b>Adjustable Reed Switch</b>	0 = Without	1 = Reed switch*1, tinned leads	2 = Reed switch*2, tinned leads	
<b>Output Signal</b>	0 = Without	1 = Mechanical Pot.	N = NPN Hall sensor*2	P = PNP Hall sensor*2
<b>IP Rating</b>	1 = Without 6 = IP66M	7 = IP67 8 = IP68	9 = IP69K	
<b>Cable Exit</b>	1 = Single cable			
<b>A1 / P1 Connector (mm)</b> <a href="#">See page 8</a>	01 = Tinned leads, unsheathed wire 50, stripped wire 10			
<b>A1 / P1 Cable Length (mm)</b>	0500 = 500	1000 = 1000	1500 = 1500	2000 = 2000
<b>P2 Connector</b>	00 = Without			
<b>P2 Cable Length (mm)</b>	0000 = Without			
<b>P3 Connector</b>	00 = Without			
<b>P3 Cable Length (mm)</b>	0000 = Without			
<b>Alternative</b>	N = Normal			
<b>Packaging (mm<sup>2</sup>)</b>	0 = Sample packaging C = Standard package, US fumigated pallet (1219*1016) 1 = Standard package, EU fumigated pallet (1200*800) 2 = Standard package, EU fumigated pallet (1500*800)		E = Standard package, US plywood pallet (1219*1016) 5 = Standard package, EU plywood pallet (1200*800) 6 = Standard package, EU plywood pallet (1500*800)	

## Retracted Length (mm)

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

Important notice:

Depending on the attachments, the motor cover might interfere with the customer's device, when retracted length is between 225~318mm. Please confirm before placing order.

### A.

Front Attach.	Rear Attach.		
	1, 2, 5, 6	3, 4, 7, 8	3, 4, 7, 8
<b>1, 2, 5, 6</b>	+200	+208	+205
<b>3, 4, 7, 8</b>	+207	+215	+212
<b>9</b>	+203	+211	+208
<b>K</b>	+225	+233	+230

### B.

Stroke (mm)	Load & speed type(N)
	F, K, G, H, M, N, J, P, Q, R
<b>25~150</b>	-
<b>151~200</b>	-
<b>201~250</b>	+10
<b>251~300</b>	+20
<b>301~350</b>	+30
<b>351~400</b>	+40
<b>401~450</b>	+50
<b>451~500</b>	+60
<b>501~550</b>	+70
<b>551~600</b>	+80
<b>601~650</b>	+90
<b>651~700</b>	+100
<b>701~750</b>	+110
<b>751~800</b>	+120
<b>801~850</b>	+130
<b>851~900</b>	+140
<b>901~950</b>	+150
<b>951~1000</b>	+160

### C. Output Signal

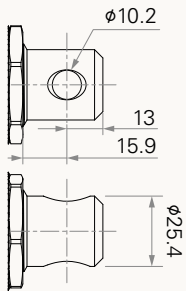
<b>0, 4, 5, N, P</b>	-
<b>1</b>	+18

### D. Load and Speed

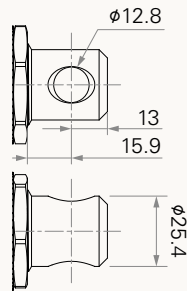
<b>K, G, H, M, N, J</b>	-
<b>F</b>	+13
<b>S, P, Q, R</b>	+20

## Rear Attachment (mm)

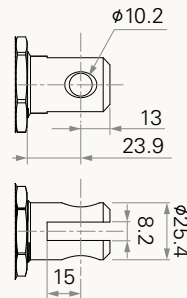
1 = #45 Steel, slotless, hole 10.2



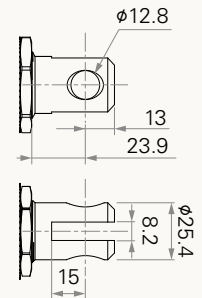
2 = #45 Steel, slotless, hole 12.8



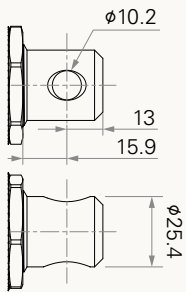
3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



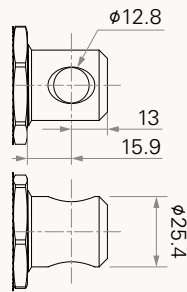
4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8



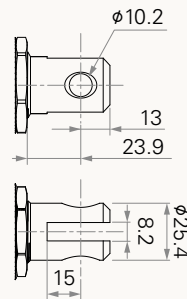
5 = Stainless Steel, slotless, hole 10.2



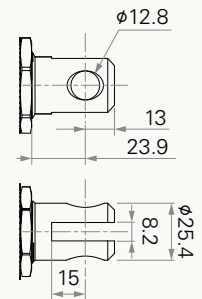
6 = Stainless Steel, slotless, hole 12.8



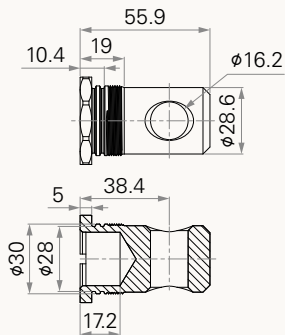
7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8

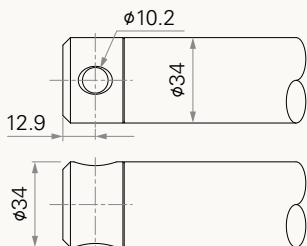


9 = #45 Steel, slotless, hole 16.2

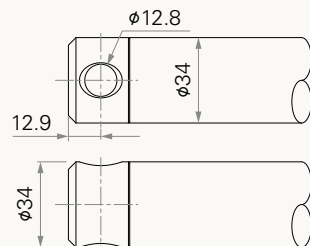


## Front Attachment (mm)

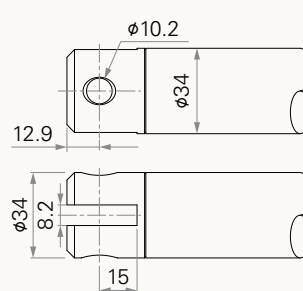
1 = #45 Steel, slotless, hole 10.2



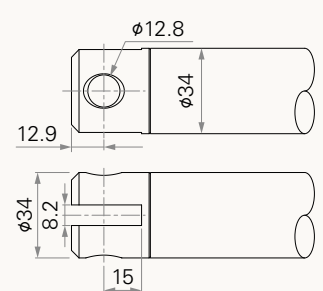
2 = #45 Steel, slotless, hole 12.8



3 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 10.2

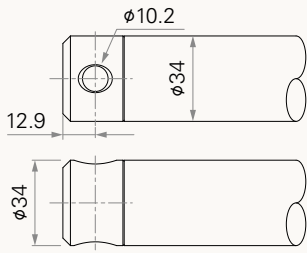


4 = #45 Steel, U clevis, slot 8.2, depth 15.0, hole 12.8

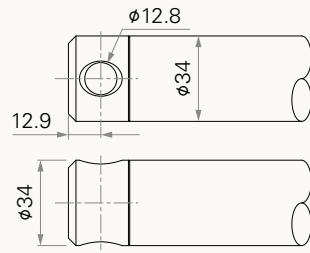


## Front Attachment (mm)

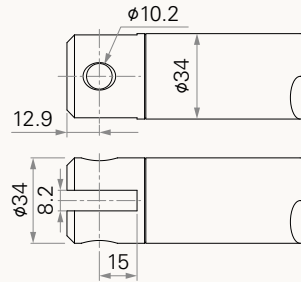
5 = Stainless Steel, slotless, hole 10.2



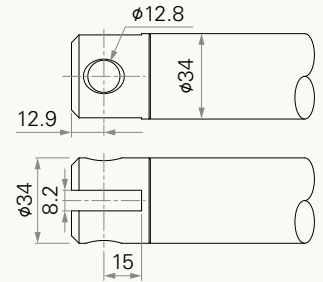
6 = Stainless Steel, slotless, hole 12.8



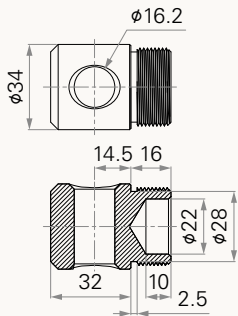
7 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 10.2



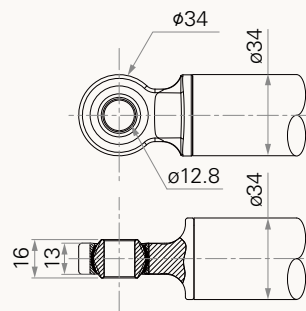
8 = Stainless Steel, U clevis, slot 8.2, depth 15.0, hole 12.8



9 = #45 Steel, slotless, hole 16.2

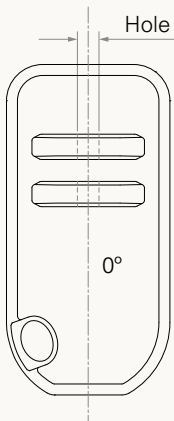


K = Rod end bearing, hole 12.8

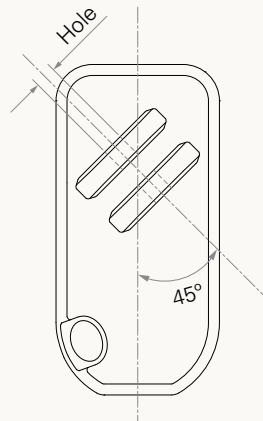


## Direction of Rear Attachment (Counterclockwise)

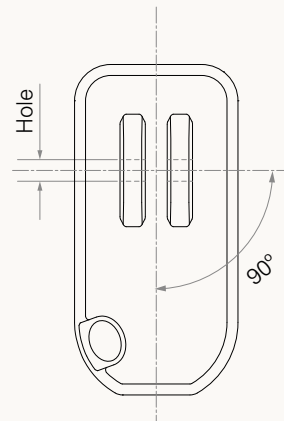
1 = 0°



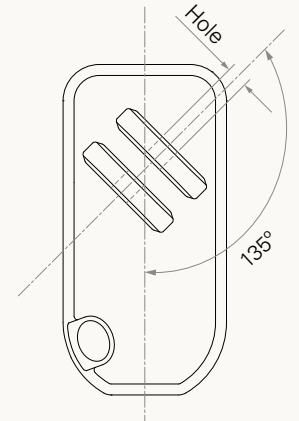
2 = 45°



3 = 90°

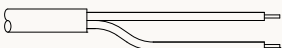


4 = 135°



## Connector (mm)

01 = Tinned leads, unsheathed wire 50, stripped wire 10

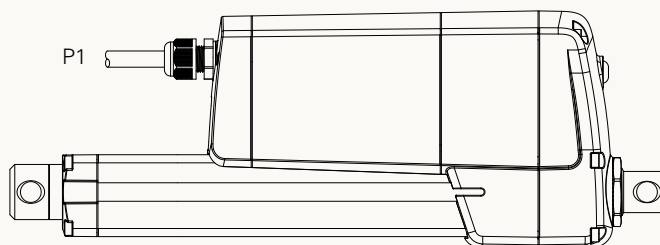




## Wire Definition

### DC, Normal

Port	Function of Limit Switches	Wire Color	Wire Gauge (AWG)	Position Feedback			
				0. Without	1. Mechanical Pot.	N. NPN Hall*2	P. PNP Hall*2
<b>P1</b>	Two Micro Switches Cut off The Actuator at EOS	● RD	14	EXT+	EXT+	EXT+	EXT+
		● BK	14	RET+	RET+	RET+	RET+
		● RD	20	-	V-out	Vcc	Vcc
		○ WH	20	-	V-in	S1	S1
		● BU	20	-	-	S2	S2
		● BK	20	-	GND	GND	GND
		● BN	20	-	-	-	-
		● OG	20	-	-	-	-
		● VT	20	-	-	-	-
<b>P1</b>	Two Micro Switches Send Signal at EOS	● RD	14	EXT+	EXT+	EXT+	EXT+
		● BK	14	RET+	RET+	RET+	RET+
		● RD	20	COM	COM	Vcc	Vcc
		○ WH	20	EOS-extended	EOS-extended	S1	S1
		● BU	20	EOS-retracted	EOS-retracted	S2	S2
		● BK	20	-	GND	GND	GND
		● BN	20	-	V-in	EOS-extended	EOS-extended
		● OG	20	-	V-out	EOS-retracted	EOS-retracted
		● VT	20	-	-	COM	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.