## series



## Product Segments

## - Industrial Motion

TiMOTION's MA2 series electric linear actuator was specifically designed for applications that face harsh working environments and require heavy-duty and durability. Its IP69K protection ensures it will withstand high-pressure water jets and the ingress of dust and other solid contaminants. The MA2 electric cylinder actuator also has optional Reed switches along the outer tube which allow users to adjust the stroke length. For improved control and accuracy of motion, the MA2 can be customized with many different feedback options depending on your application requirements. Example applications suitable for the MA2: Agricultural equipment such as spreaders, harvesters, grain handlers, combines, and tractors. Commercial and industrial applications such as commercial lawn mowers,
scrubbers and sweepers, material handling equipment and livestock ventilation systems.

## General Features

Max. load
Max. speed at max. load
Max. speed at no load
Retracted length
IP rating
Certificate
Stroke
Output Signals

Voltage

Operational temperature range
Operational temperature range
8,000N (push); 4,000N (pull)
$5.5 \mathrm{~mm} / \mathrm{s}$
$52.5 \mathrm{~mm} / \mathrm{s}$
$\geq$ Stroke +131 mm
IP69K
UL73, EMC
25~1000mm
Hall sensors, POT, Reed sensor on the outer tube
12 / 24 / 36 / 48V DC; 12 / 24 / 36 / 48V DC (thermal control)
$-30^{\circ} \mathrm{C} \sim+65^{\circ} \mathrm{C}$
$+5^{\circ} \mathrm{C} \sim+45^{\circ} \mathrm{C}$

## Drawing

Standard Dimensions (mm)


## Load and Speed

| CODE | Load (N) |  | Self Lock (N) Duty Cycle |  | Typical Current (A) |  | Typical Speed (mm/s) |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Push | Pull | Moto |  | No Load 24V DC | With Load 24V DC | No Load 24V DC | With Load 24V DC |
| Motor Speed (5200RPM) |  |  |  |  |  |  |  |  |
| F | 1000 | 1000 | 1300 | 25\% | 2.7 | 6.8 | 52.5 | 44.2 |
| G | 2000 | 2000 | 2600 | 25\% | 2.4 | 6.7 | 25.5 | 21.8 |
| H | 4000 | 4000 | 5200 | 25\% | 2.3 | 6.9 | 13.2 | 11.0 |
| J | 6000 | 4000 | 8000 | 25\% | 2.0 | 5.8 | 6.6 | 5.8 |
| K | 8000 | 4000 | 8000 | 15\% | 2.0 | 6.9 | 6.6 | 5.5 |

## 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 current \& speed in table are tested with 24 V DC motor. With a 12 V DC motor, the current is approximately twice the current measured in 24 V DC. With a 36V DC motor, the current is approximately two-thirds the current measured in 24 V DC. Speed will be similar for all the voltages.

4 The current \& speed in table are tested when the actuator is extending under push load.
5 The current \& speed in table and diagram are tested with a stable 24V DC power supply.
6 Standard stroke: Min. $\geq 25 \mathrm{~mm}$, Max. please refer to below table.

| CODE | Load (N) | Max Stroke (mm) |
| :--- | :--- | :--- |
| F | $\leq 1000$ | 1000 |
| G | $\leq 2000$ | 800 |
| H, J | $\leq 6000$ | 600 |
| K | $\leq 8000$ | 200 |

Performance Data (24V DC Motor)

Motor Speed (5200RPM)

Speed vs. Load


Current vs. Load


MA2

| Voltage | $1=12 \mathrm{~V}$ DC $\quad 5=24 \mathrm{VDC}$, thermal protector |
| :---: | :---: |
|  | $2=24 \mathrm{~V}$ DC $6=12 \mathrm{VDC}$, thermal protector |
|  | $3=36 \mathrm{~V}$ DC $7=36 \mathrm{VDC}$, thermal protector |
|  | $4=48 \mathrm{~V}$ DC $\quad 8=48 \mathrm{~V}$ DC, thermal cutoff |
| Load and Speed | See page 2 |
| Stroke (mm) | See page 2 |
| Retracted Length (mm) | See page 5 |
| Rear Attachment (mm) <br> See page 6 | 1 = Aluminum casting, clevis U , slot 8.2 , depth 12.5 , hole 10.2 <br> 2 = Aluminum casting, clevis U , slot 8.2 , depth 15.0 , hole 10.2 <br> 3 = Aluminum casting, clevis U , slot 8.2 , depth 15.0 , hole 12.8 <br> 4 = Aluminum casting, clevis $U$, slot 8.2 , depth 15.0 , hole 12.2 |
| Front Attachment (mm) <br> See page 6 | 1 = Iron inner tube with punched hole, without slot, hole 10.2 <br> 2 = Iron inner tube with punched hole, without slot, hole 12.2 <br> $3=$ Iron inner tube with punched hole, without slot, hole 12.8 <br> 4 = Aluminum casting, clevis U , slot 8.2 , depth 15.0 , hole 10.2 <br> 5 = Aluminum casting, clevis $U$, slot 8.2 , depth 15.0 , hole 12.2 <br> $6=$ Aluminum casting, clevis $U$, slot 8.2 , depth 15.0 , hole 12.8 <br> $\mathrm{K}=$ Rod end bearing, hole 12.8 |
| Direction of Installation (Counterclockwise) <br> See page 7 | $1=90^{\circ} \quad 2=0^{\circ}$ |
| Functions for Limit Switches | 1 = Two switches at full retracted / extended positions to cut current <br> 2 = Two switches at full retracted / extended positions to cut current + third one in between to send signal <br> 3 = Two switches at full retracted / extended positions to send signal <br> 6 = Two switches at full retracted / extended positions to cut current + send signal |


| Reed Sensor on the Outer Ttube | $0=$ Without | 1 = Reed sensor*1 | 2 = Reed sensor*2 |  |
| :---: | :---: | :---: | :---: | :---: |
| Output Signal | $0=$ Without | 1 = POT | 5 = Hall sensor*2 |  |
| Connector | $2=$ Tinned leads |  |  |  |
| See page 7 |  |  |  |  |
| Cable Length (mm) | 1 = Straight, 500 | $2=$ Straight, 1000 | 3 = Straight, 1500 | 4 = Straight, 2000 |
| IP Rating | 1 = Without | 3 IP66 | $8=$ IP69K |  |
|  | 2 = IP54 | $6=1 \mathrm{P} 66 \mathrm{D}$ |  |  |
| Manual Drive | 1 = With |  |  |  |
| T-Smart | $0=$ Without |  |  |  |

## MA2 Ordering Key Appendix

## Retracted Length (mm)

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

## A. Rear/ Front Attachment

| Front | Rear Attachment |  |
| :--- | :--- | :--- |
| Attachment | 1 | $2,3,4$ |
| $\mathbf{1 , 2 , 3}$ | +131 | +134 |
| $\mathbf{4 , 5 , 6}$ | +161 | +164 |
| K | +178 | +181 |

## C. Output Signal

0, 5
1 $+20$

| B. Stroke (mm) |  |
| :---: | :---: |
| 25~150 | - |
| 151~200 | - |
| 201~250 | +10 |
| 251~300 | +20 |
| 301~350 | +30 |
| 351~400 | +40 |
| 401~450 | +50 |
| 451~500 | +60 |
| 501~550 | +70 |
| 551~600 | +80 |
| 601~650 | +90 |
| 651~700 | +100 |
| 701~750 | +110 |
| 751~800 | +120 |
| 801~850 | +130 |
| 851~900 | +140 |
| 901~950 | +155 |
| 951~1000 | +160 |

## Rear Attachment (mm)

1 = Aluminum casting, clevis U , slot
8.2, depth 12.5 , hole 10.2


2 = Aluminum casting, clevis U , slot 8.2, depth 15.0, hole 10.2


3 = Aluminum casting, clevis U , slot 8.2, depth 15.0, hole 12.8


4 = Aluminum casting, clevis U , slot 8.2, depth 15.0 , hole 12.2


## Front Attachment (mm)

1 = Iron inner tube with punched hole, without slot, hole 10.2

$\varnothing 10.2$


2 = Iron inner tube with punched hole, without slot, hole 12.2


6 = Aluminum casting, clevis U , slot 8.2, depth 15.0, hole 12.8


3 = Iron inner tube with punched hole, without slot, hole 12.8

$\mathrm{K}=$ Rod end bearing, hole 12.8


4 = Aluminum casting, clevis U , slot 8.2, depth 15.0 , hole 10.2


5 = Aluminum casting, clevis U , slot 8.2 , depth 15.0 , hole 12.2


## MA2 Ordering Key Appendix

## Direction of Rear Attachment (Counterclockwise)

$$
1=90^{\circ}
$$

$$
2=0^{\circ}
$$



## Connector

$2=$ Tinned leads


## 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.

