



Joyce/Dayton Corp.

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## Operation and Maintenance Manual for Multipurpose Actuators



120 VAC Actuator



12 VDC Actuator



12 VDC Actuator

*The recommendations in this manual for installation, operation and maintenance must be followed to ensure safe use. All persons responsible for the installation and use of Joyce/Dayton Multipurpose Actuators must be familiar with the contents of this manual.*

*The customer is responsible for guards and other protective devices and for ensuring that Multipurpose Actuator usage conforms with local and national operating and safety codes appropriate to the class of equipment into which the Multipurpose Actuator is installed.*

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# Section I

## General Information

### 1-1 Contact Joyce/Dayton Corp.

Joyce/Dayton Corp.  
P.O. Box 1630  
Dayton, OH 45401  
(800) 523-5204 (US and Canada)  
(937) 294-6261 (937) 297-7173 Fax  
Email: [sales@joycedayton.com](mailto:sales@joycedayton.com)  
Website: [www.joycedayton.com](http://www.joycedayton.com)

### 1-2 Purpose and Scope

This manual provides installation, operation and maintenance instruction for standard Joyce/Dayton Multipurpose Actuators. For special units not covered, please contact Joyce/Dayton Corp.

### 1-3 Receipt of Product

All equipment should be immediately inspected upon receipt for any damage and to verify correct product and quantities. Any problems should be reported to Joyce/Dayton Corp. and the freight carrier as soon as possible. Products returned without a *Return Goods Authorization (RGA)* form will not be accepted. Contact Joyce/Dayton to obtain an RGA.

### 1-4 Warranty

Seller warrants its products to be free from defects in material and workmanship under normal and proper use in accordance with instruction of seller for a period of one year from the date of shipment to buyer. Seller's liability under such warranty or in connection with any other claim relating to the products shall be limited to the repair, or at seller's option, the replacement or refund of the purchase price of any products or parts or components thereof which are returned to seller freight prepaid and which are defective in material or workmanship. Products or parts or components thereof, which are repaired or replaced by seller will be returned to buyer freight collect. This warranty is not intended to cover consumer products, as defined in the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, 15 U. S. C. Sections 2301-12, which are purchased by buyer for purposes other than resale. If buyer is not intending to resell the products, and if the products are consumer products as defined in the Magnuson-Moss Act, the foregoing warranty, but not the limitation of seller's liability, shall be null and void. EXCEPT AS EXPRESSLY STATED ABOVE, SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, WHETHER OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR USE OR OTHERWISE, ON THE PRODUCTS, OR ON ANY PARTS OR LABOR FURNISHED DURING THE SALE, DELIVERY OR SERVICING OF THE PRODUCTS.

### 1-5 Precautions of Use and Installation

1. Each Multipurpose Actuator includes limit switches, which are preset to the design limits of the unit. Customers who choose to make limit switch position adjustments must ensure the limits remain within the design limits of the actuator. Note that adjustments to the preset positions need to be made before the actuator is installed. Limit switches on MA0513 are not adjustable.
2. It is necessary that appropriate, qualified personnel perform the installation of Joyce/Dayton products. Ensure that all personnel who will service or operate equipment are familiar with its use and limitations.
3. Joyce/Dayton Multipurpose Actuators are not rated for shock-loading or extreme vibration. It is the responsibility of the user to ensure these conditions are not imposed on the actuator.
4. In the event that service or maintenance is required, the load must be secured or removed before any work can begin.

5. Multipurpose actuators can be mounted and operated in any orientation, but the load must be axial to the actuator. No side load is permitted. Refer to Section 1-9 for installation guidelines.
6. Be certain the rating of the actuator meets or exceeds the load.
7. The actuator must be mounted on a rigid structure sufficient to support the maximum possible load. An under-designed structure could lead to premature wear or failure.
8. When fastening the load to an actuator, make sure the actuator is in the retracted position. This positions the load accurately with respect to the lifting screw centerline. Never pull the translating tube to one side to make connection with your structure. Fully extend the actuator to make sure the load is aligned with the translating tube.

## 1-6 Features

### 12 VDC Multipurpose Actuator

- 12 volt DC motor
- Preset limit switches (Adjustable, except for MA0513, which are not adjustable)
- Self-locking
- Potentiometer
- Clevis-to-Clevis Mounting Style
- 25% duty cycle
- IP65 protection rating

### 120 VAC Multipurpose Actuators

- 120 volt AC motor
- Preset limit switches (Adjustable)
- Self-locking
- Potentiometer
- Clevis-to-Clevis Mounting Style
- 25% duty cycle
- IP65 protection rating

## 1-7 Limit Switch Adjustment

Limit switches on all Multipurpose Actuators are preset. These instructions are provided in case the preset positions need to be adjusted. Limit switches on MA0513 actuators are not adjustable. Figure 1 and Figure 2 on the following page illustrate the limit switch components. *Exercise reasonable precaution when making adjustments. Do not contact the inner tube while the motor is running.*

1. If the actuator is not already fully retracted (ref. catalog for minimum closed height) operate the actuator until the lower limit is reached and the motor stops. If satisfied with the actuator retract dimension as positioned continue to step # 3.
2. To finely position the retract stopping location rotate the inner actuator tube until the desired stopping location is achieved. Do not rotate the inner tube in a manner to position it lower than the minimum closed height shown in the catalog.
3. From this point on until the actuator is fully mounted in the assembly it is important not to allow the inner tube to rotate. Allowing it to rotate will alter the retracted position location and require repeating steps 1 & 2.

4. To set the upper limit switch position, secure the inner tube from rotating by either gripping it by hand or slide a screwdriver through the clevis hole and lay the actuator down flat on a suitable work surface.
5. Electrically operate the actuator until the desired extend position is reached. If the actuator stops on its own before reaching the desired position the retract position may have been set too high and the physical travel limitations of the actuator have been exceeded. To rectify this problem repeat steps 1 & 2 or modify your assembly/structure geometry.
6. Once the desired extend position is reached. Use an Allen wrench to remove the five hex head cap screws at the base of the actuator housing, and gently pull the limit switch cover off the housing. It may be necessary to straighten the wires in the pigtail to facilitate separation. This will expose the limit switch assembly.
7. Loosen the Philips-head screw on the limit switch cam assembly just enough so the upper cam can separate from the lower cam but not enough where the screw is removed completely. Adjust the upper cam by simultaneously pulling gently away from the lower cam and rotate until the upper cam just depresses the extend limit switch plunger. Take care not to disturb the position of the lower cam and gear.
8. Tighten the Philips-head screw and if desired electrically retract the actuator to confirm the retracted dimension and extend to confirm the fully extended position. If satisfied continue to the next step otherwise repeat the instructions outlined above.
9. Carefully replace the cover, taking care that the gasket is in place and the wires remain tucked inside the cover. Tighten the five socket head cap screws to fasten the cover in place.
10. Once the limit switches are set, the unit can be mounted into the assembly.

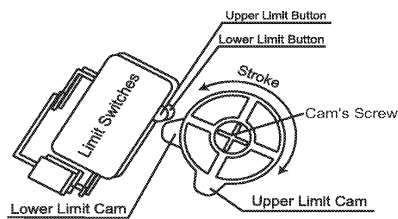


Figure 1 – Limit Switch Schematic

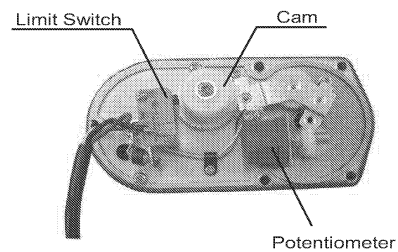


Figure 2 – View of Limit Switch Inside Housing

## 1-8 Wiring Instructions for Motor and Potentiometer

### 12 VDC Motor - MA0513

The actuator will extend when the red wire connects to the positive lead and the black wire connects to the negative lead. It will retract when the black wire connects to the positive lead the red wire connects to the negative lead. See Figure 3 below.

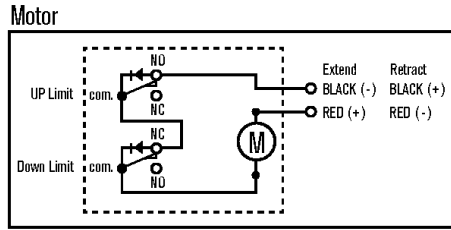


Figure 3 – Motor Schematic MA0513

### 12 VDC Motor - MA1527, MA2547, MA3507, MA3527, MA4514, MA7007

The actuator will extend when the red wire connects to the positive lead and the black wire connects to the negative lead. It will retract when the black wire connects to the positive lead the red wire connects to the negative lead. See Figure 4 below.

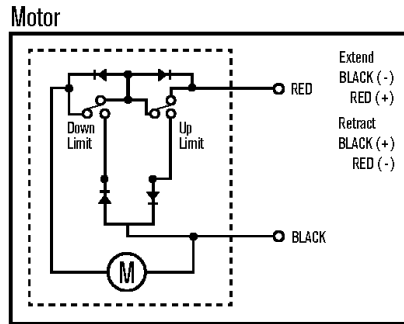


Figure 4 – 12 VDC Motor Schematic MA1527, MA2547, MA3507, MA3527, MA4514, MA7007

### 120 VAC Motor - MA1527, MA2547, MA3507, MA3527, MA4514, MA7007

The AC actuator will extend when the red wire connects to the white lead. It will retract when the red wire connects to the black lead. See Figure 5 below.

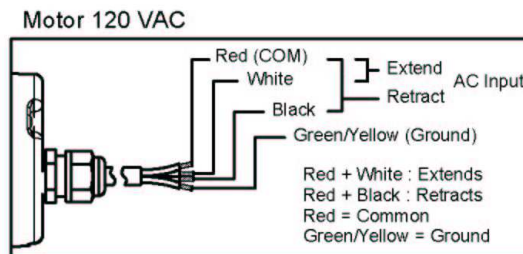


Figure 5 – 120 VAC Motor Schematic

**Potentiometer (for 12 VDC and 120 VAC Actuators)**

The potentiometer has a 0 -10 K Ohm resistance range. The actual resistance value is a variable that is based on the stroke length. It is measured between the blue and white wires. Values have a +/-0.3 K Ohm tolerance. Refer to the Figure 6 for the potentiometer schematic.

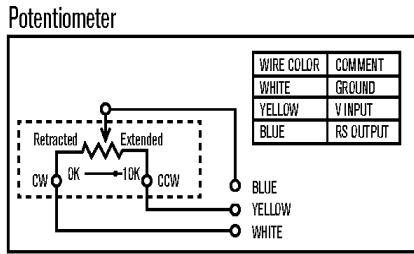


Figure 6 – Potentiometer schematic

Ohm value between blue & white wire	
Stroke (mm)	Approximate Resistance (Ohm)
100	0.3 – 8.0 K
150 or 153	0.3 – 8.5 K
200	0.3 – 9.1 K
300 or 305	0.3 – 8.6 K
457	0.3 – 9.2 K
Tolerance ±0.3K	

Figure 7 – Resistance values

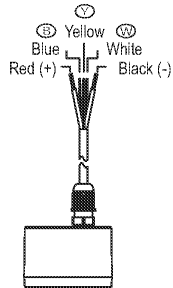


Figure 8 – DC Wiring

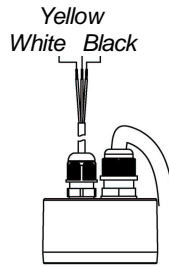


Figure 9 – AC Wiring

**1-9 Mounting Guidelines**

**Installation Guidelines**

The actuator can be mounted in any orientation but the load should be attached to the actuator and mounted axially so no side load is imposed on the actuator. Figure 10 below shows an axial load in a horizontal plane. Vertical loads can also be mounted axially.

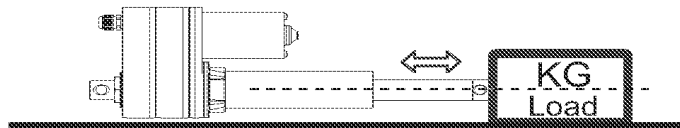


Figure 10 –Example of Axial Load

Figure 11 illustrates a horizontal side load, but it is also possible to impose a side load on a vertically mounted actuator. Side loading is **not** recommended in any orientation.

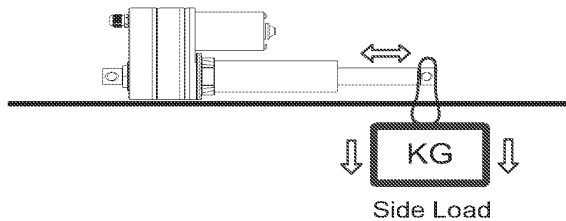
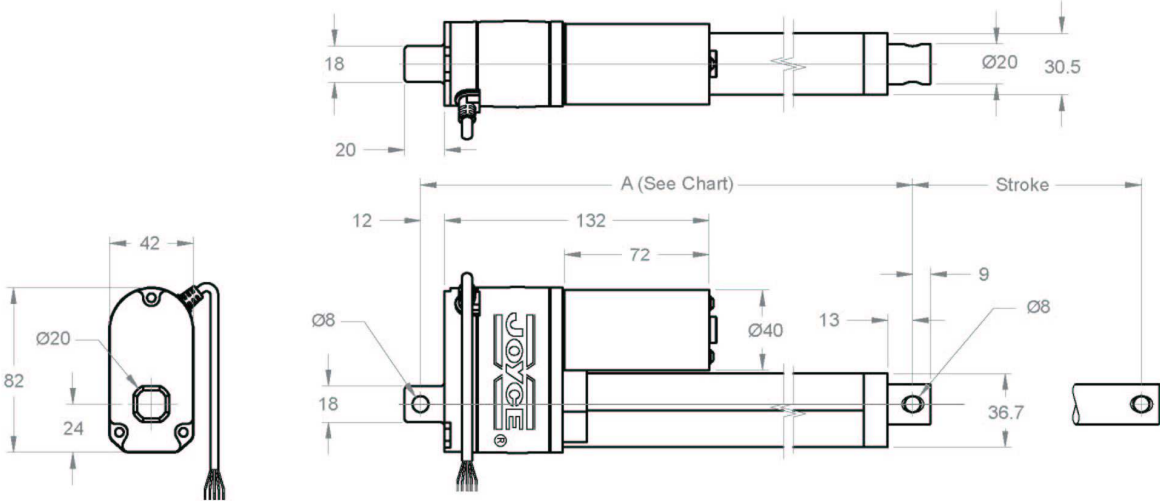


Figure 11 – Example of Side Load - NOT recommended

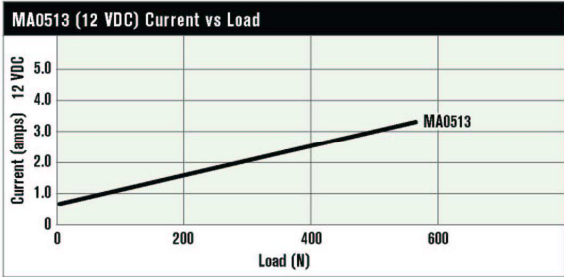
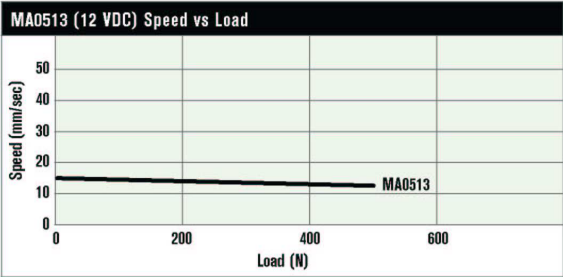
# Section II Multipurpose Actuator Drawings

## 2-1 (12 VDC) MA0513 Drawing and Charts



Drawing dimensions shown in millimeters

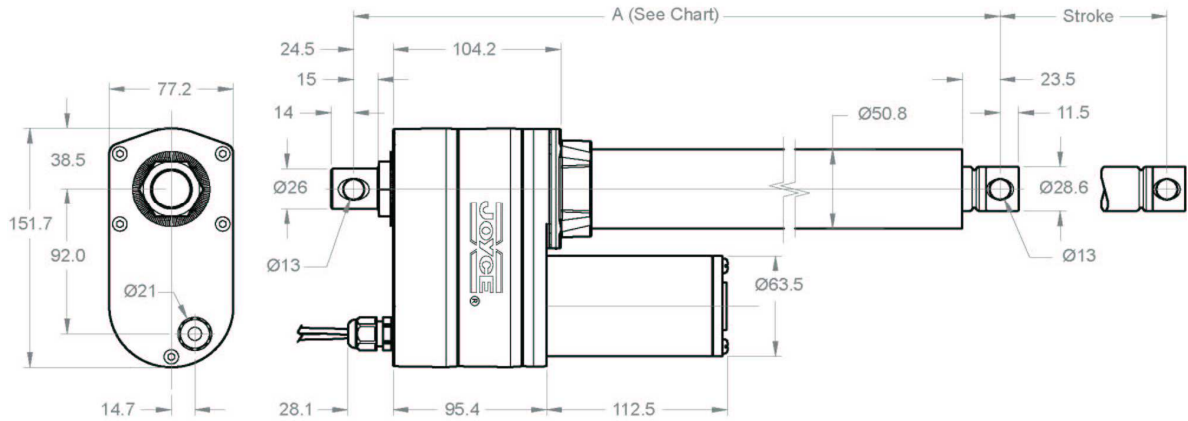
Part Number (VDC)	Capacity N (lb)	Stroke Mm (in)	Travel speed mm/sec (in/min)	Retracted (A) mm (in)
MA0513B1110	500 (112)	100 (3.9)	13 (31)	246 (9.7)
MA0513B1115	500 (112)	150 (5.9)	13 (31)	297 (11.7)
MA0513B1125	500 (112)	250 (9.8)	13 (31)	399 (15.7)
MA0513B1130	500 (112)	300 (11.8)	13 (31)	450 (17.7)



Plot values based on 100% (64°C)



## 2-2 (12 VDC) MA1527 & MA3507 Drawing and Charts



Drawing dimensions shown in millimeters

Part Number (VDC)	Capacity N (lb)	Stroke mm (in)	Travel speed mm/sec (in/min)	Retracted (A) Mm (in)
MA1527B1115	1500 (337)	153 (6.0)	27 (64)	410 (16.1)
MA1527B1130	1500 (337)	305 (12.0)	27 (64)	613 (24.1)
MA1527B1145	1500 (337)	457 (18.0)	27 (64)	765 (30.1)
MA3507B1115	3500 (787)	153 (6.0)	7 (17)	410 (16.1)
MA3507B1130	3500 (787)	305 (12.0)	7 (17)	613 (24.1)
MA3507B1145	3500 (787)	457 (18.0)	7 (17)	765 (30.1)

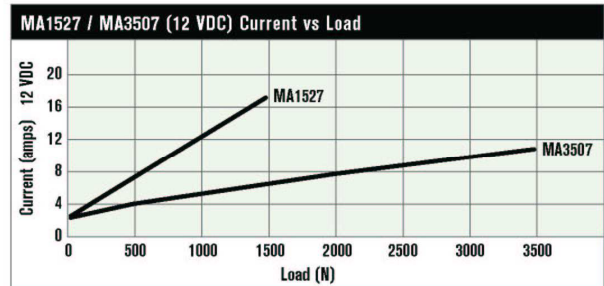
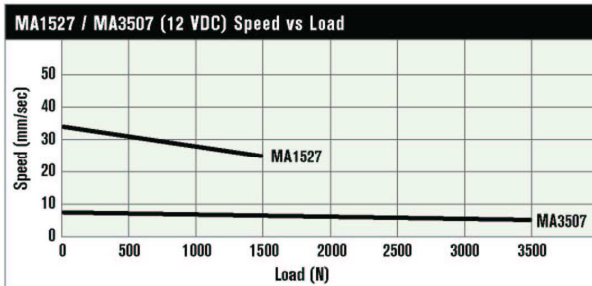
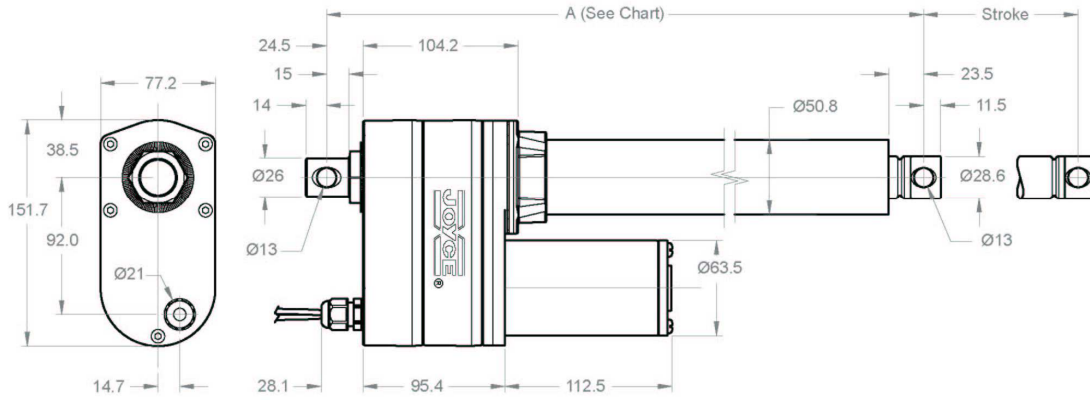


Chart values based on 18°C (64°F).

## 2-3 (12 VDC) MA2547, MA3527, MA4514, MA7007 Drawing and Charts



Drawing dimensions shown in millimeters

Part Number (VDC)	Capacity N (lb)	Stroke (S) mm (in)	Travel speed mm/sec (in/min)	Retracted (A) mm (in)
MA2547B1115	2500 (562)	153 (6.0)	47 (111)	450 (17.7)
MA2547B1130	2500 (562)	305 (12.0)	47 (111)	680 (26.8)
MA2547B1145	2500 (562)	457 (18.0)	47 (111)	832 (32.8)
MA3527B1115	3500 (787)	153 (6.0)	27 (64)	450 (17.7)
MA3527B1130	3500 (787)	305 (12.0)	27 (64)	680 (26.8)
MA3527B1145	3500 (787)	457 (18.0)	27 (64)	832 (32.8)
MA4514B1115	4500 (1012)	153 (6.0)	14 (33)	450 (17.7)
MA4514B1130	4500 (1012)	305 (12.0)	14 (33)	680 (26.8)
MA4514B1145	4500 (1012)	457 (18.0)	14 (33)	832 (32.8)
MA7007B1115	7000 (1574)	153 (6.0)	7 (17)	450 (17.7)
MA7007B1130	7000 (1574)	305 (12.0)	7 (17)	680 (26.8)
MA7007B1145	7000 (1574)	457 (18.0)	7 (17)	832 (32.8)

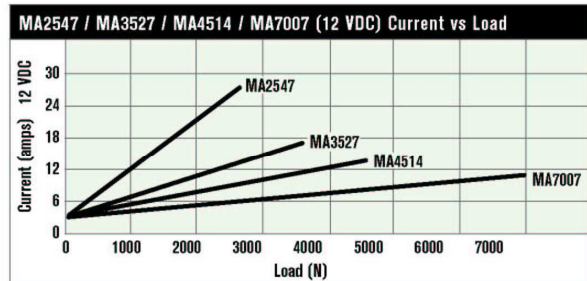
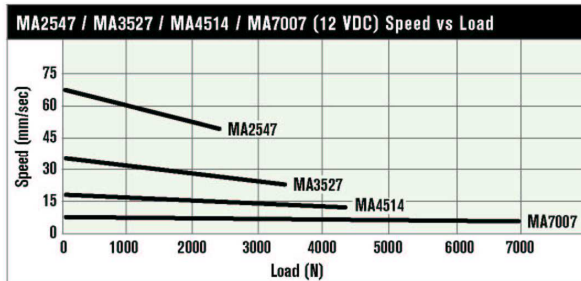
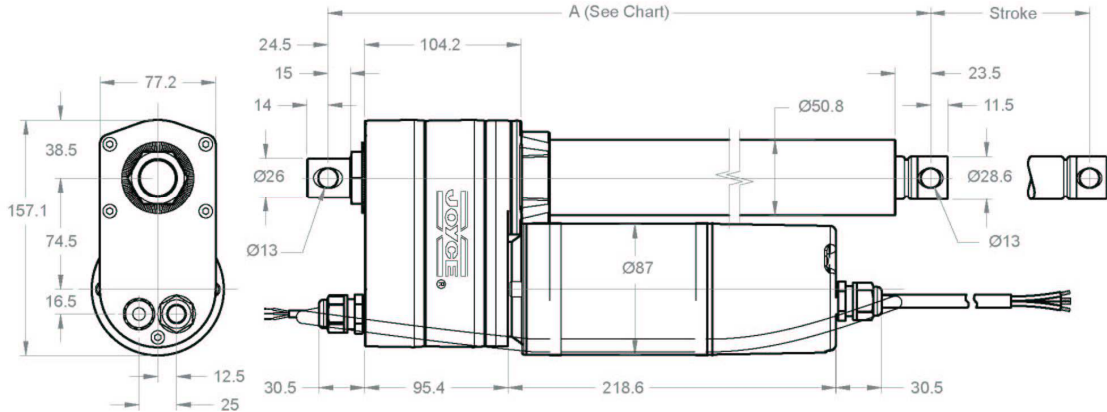


Chart values based on 18°C (64°F).

## 2-4 (120 VAC) MA1527 & MA3507 Drawing and Charts



Part Number (VAC)	Capacity N (lb)	Stroke mm (in)	Travel speed mm/sec (in/min)	Retracted (A) Mm (in)
MA1527B8115	1500 (337)	153 (6.0)	23 (54)	410 (16.1)
MA1527B8130	1500 (337)	305 (12.0)	23 (54)	613 (24.1)
MA1527B8145	1500 (337)	457 (18.0)	23 (54)	765 (30.1)
MA3507B8115	3500 (787)	153 (6.0)	6 (14)	410 (16.1)
MA3507B8130	3500 (787)	305 (12.0)	6 (14)	613 (24.1)
MA3507B8145	3500 (787)	457 (18.0)	6 (14)	765 (30.1)

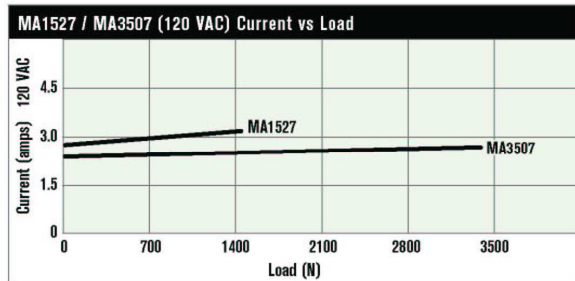
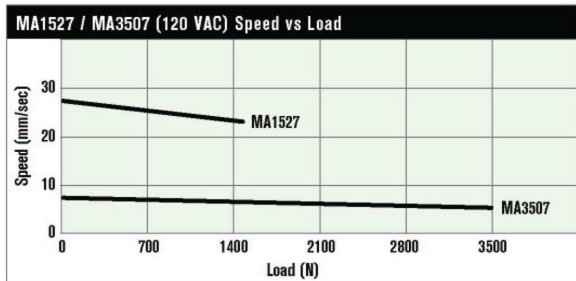
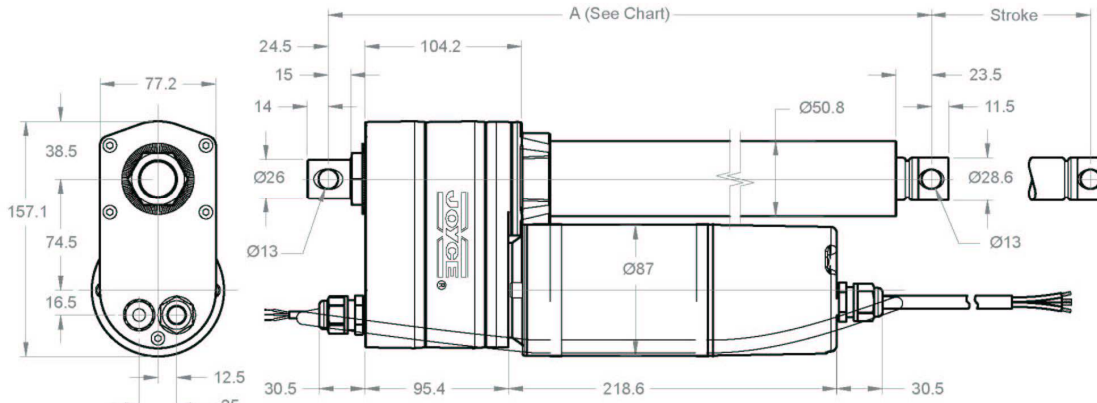


Chart values based on 18°C (64°F).

## 2-6 (120 VAC) MA2547, MA3527, MA4514, MA7007 Drawing and Charts



Drawing dimensions shown in millimeters

Part Number (VAC)	Capacity N (lb)	Stroke (S) mm (in)	Travel speed mm/sec (in/min)	Retracted (A) mm (in)
MA2547B8115	2500 (562)	153 (6.0)	47 (111)	450 (17.7)
MA2547B8130	2500 (562)	305 (12.0)	47 (111)	680 (26.8)
MA2547B8145	2500 (562)	457 (18.0)	47 (111)	832 (32.8)
MA3527B8115	3500 (787)	153 (6.0)	27 (64)	450 (17.7)
MA3527B8130	3500 (787)	305 (12.0)	27 (64)	680 (26.8)
MA3527B8145	3500 (787)	457 (18.0)	27 (64)	832 (32.8)
MA4514B8115	4500 (1012)	153 (6.0)	14 (33)	450 (17.7)
MA4514B8130	4500 (1012)	305 (12.0)	14 (33)	680 (26.8)
MA4514B8145	4500 (1012)	457 (18.0)	14 (33)	832 (32.8)
MA7007B8115	7000 (1574)	153 (6.0)	7 (17)	450 (17.7)
MA7007B8130	7000 (1574)	305 (12.0)	7 (17)	680 (26.8)
MA7007B8145	7000 (1574)	457 (18.0)	7 (17)	832 (32.8)

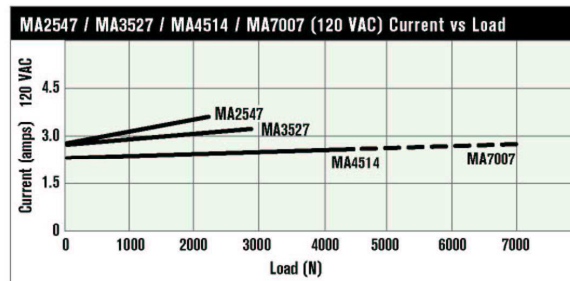
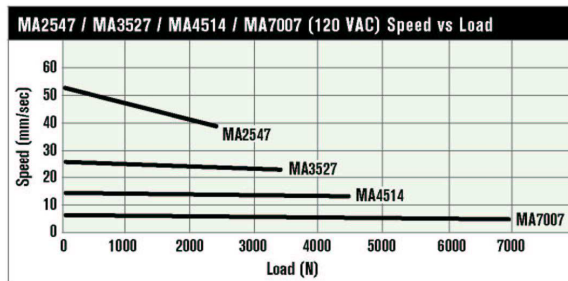


Chart values based on 18°C (64°F).

## Section III Order information

### 3-1 Part Number Description

#### ORDERING INFORMATION

**Instructions:** Select a model number from this chart.

500N (112 lb) DC	1500N (337 lb) AC & DC	2500N (562 lb) AC & DC	3500N (787 lb) AC & DC	4500N (1012 lb) AC & DC	7000N (1574 lb) AC & DC
MA0513	MA1527	MA2547	MA3507 MA3527	MA4514	MA7007

Sample Part Number: **MA1527-B-1-1-15**

Type of switch
B = Potentiometer and preset limit switches

Stroke		
Code	MA0513	All Other Models
10	100 mm (3.9 in)	---
15	150 mm (5.9 in)	153 mm (6 in)
25	250 mm (9.8 in)	---
30	300 mm (11.8 in)	305 mm (12 in)
45	---	457 mm (18 in)

IP Rating
1 = IP65 Dust-tight and protected against water jets

Voltage		
1 = VDC		8 = VAC
12 VDC	12 VDC	120 VAC
 MA0513	 MA1527, MA2547, MA3507, MA3527, MA4514, MA7007	 MA1527, MA2547, MA3507, MA3527, MA4514, MA7007

### 3-2 Serial Number

The serial number is etched on the front of each actuator, just below the Joyce Logo. Use the serial number to positively identify the actuator when reordering or when communicating with Joyce/Dayton.

**Joyce/Dayton Corporation**  
**P.O. Box 1630**  
**Dayton, Ohio 45401**  
**Phone (800) 523-5204 (U.S. & Canada); (937) 294-6261 Fax (937) 297-7173**  
**[www.joycedayton.com](http://www.joycedayton.com) E-mail: [sales.jacks@joycedayton.com](mailto:sales.jacks@joycedayton.com)**

FB0254 – 10/12





Manual available at  
[www.joycedayton.com](http://www.joycedayton.com)

