Installation Instructions

Original Instructions

MP-Series Electric Cylinders (Series B and C)

Catalog Numbers MPAR-x1xxxB, MPAR-x1xxxE, MPAR-x2xxxC, MPAR-x2xxxF, MPAR-x3xxxE, MPAR-x3xxxH

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Summary of Changes

This manual contains new and updated information.

Topic	Page
Replaced the catalog numbers for the Foot mounting kit.	41

About This Publication

An electric-cylinder actuator and accessory supplier change affected the MP-Series™ electric cylinders. MPAR-B1*xxx* and MPAR-B2*xxx* (series C) electric cylinders and MPAR-B3*xxx* (series B) electric cylinders reflect the change.

See MP-Series Electric Cylinders (Series A and B) Installation Instructions, MPAR-IN003, for information regarding MPAR-B1*xxx* and MPAR-B2*xxx* (series A) and MPAR-B3*xxx* (series B) electric cylinders.

Catalog Number Explanation

Catalog numbers consist of various characters, each of which identifies a specific version or option for that component. Use this catalog explanation to understand the configuration of your actuator.

MP AR - *XX XXX X - X X X*

Motor Mounting (1)
A = Axial (in-line)
B = Top (parallel)
D = Left (parallel)
E = Right (parallel)

Holding Brake (1)
2 = No Brake
4 = 24V DC Brake

Feedback (1)
M = Multi-turn, absolute high-resolution encoder, frame size 63 only
V = Multi-turn, absolute high-resolution encoder, frame size 32 and 40 only

Mechanical Drive/Screw Lead, Motor Type
B = 3.0 mm/rev (0.118 in./rev)
C = 5.0 mm/rev (0.197 in./rev)
E = 10.0 mm/rev (0.394 in./rev)
F = 12.7 mm/rev (0.50 in./rev)
H = 20.0 mm/rev (0.787 in./rev)

Rod Stroke Length
100 = 100 mm (3.94 in.)
200 = 200 mm (7.87 in.)
300 = 300 mm (11.81 in.)
400 = 400 mm (15.75 in.)
600 = 600 mm (23.62 in.)
800 = 800 mm (27.56 in.)

Actuator Frame Size
1 = 32
2 = 40
3 = 63

Voltage Class
A = 200V
B = 400V
X = Actuator cylinder replacement part (refer to Actuator Cylinders on page 43 for examples on how to order)

Actuator Type
AR = Actuator Rod

Bulletin Number
MP = MP-Series

(1) This field does not apply to actuator cylinder replacement parts.

MP AR - *XX XXXXXX*

Accessory Item Number

Accessory Type
NA = Axial (In-line) Mounting Accessory
NP = Parallel Mounting Accessory
NE = Rod-end Accessory

Actuator Type
AR = Actuator Rod

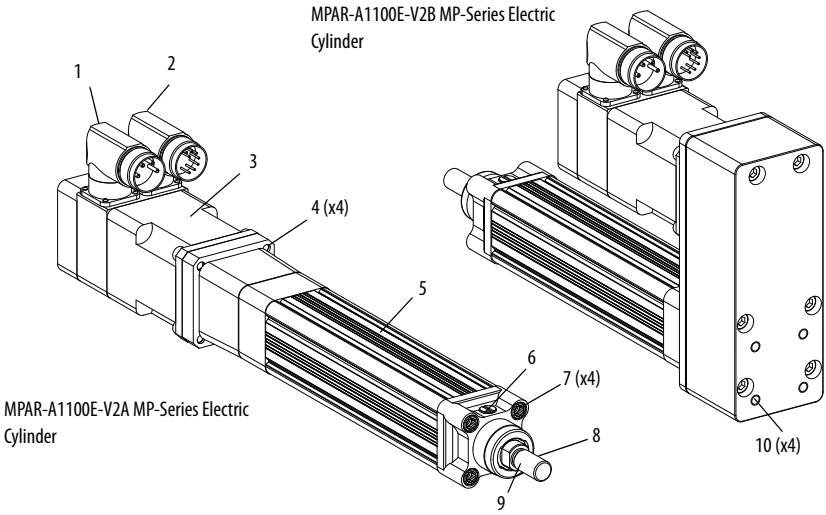
Bulletin Number
MP = MP-Series Actuator Accessory

About the MP-Series Electric Cylinders

MP-Series electric cylinders feature multi-turn high-resolution encoders and are available with 24V DC brakes. The MP-Series motor rotates a ballscrew drive that converts rotary motion into linear movement. This linear movement results in the extension and retraction of the piston rod from the electric cylinder housing

IMPORTANT The MP-A/B*xxxxx-x2x* electric cylinders are non-braking. When there is no input torque, the piston rod can be moved freely. You can achieve self-locking of your motion system by using motors with an integrated brake or with high self-braking torque.

The MP-Series electric cylinders have been designed for exact positioning at high speeds.



Item	Description
1	Power connector
2	Feedback connector
3	MP-Series motor
4	Motor mounting bolts
5	Actuator cylinder
6	Breather port
7	Hollow bolts with internal threads for fastening
8	Piston rod
9	Wrench flats to counteract torque on piston rod
10	Accessories mounting holes

Before You Begin

Remove all packing material, wedges, and braces from within and around the item. After unpacking, verify the nameplate catalog number against the purchase order.

1. Remove packaging polyethylene foil and cardboard.

   The packing materials are recyclable, except for oiled paper, which is waste.
2. Remove the electric cylinder carefully from its shipping container.

   Consider the weight of the electric cylinder. Depending on the design, the electric cylinder can weigh up to 20.6 kg (45.4 lb).
3. Visually inspect the electric cylinder for damage.
4. Examine the electric cylinder frame, piston shaft, and hollow bolts for defects.
5. Notify the carrier of shipping damage immediately

ATTENTION: Do not attempt to open and modify the electric cylinder except to change the motor connector orientation as described on page 12. Only a qualified Allen-Bradley® employee can service the internal working of the electric cylinder or motor. Failure to observe these safety precautions could result in personal injury or damage to equipment.

Planning Your Installation

See the Kinetix® Motion Control Selection Guide, publication KNX-SG001, for the specifications and additional products referenced in this section:

- This product can be operated in compliance with the relevant safety regulations only if the maximum loading limits are observed.

  ATTENTION: The electric-cylinder is not intended to be used in applications where side-loading occurs. Loads must be guided and supported. Aligned load with the line-of-motion of the piston rod.
  Side loading will reduce the lifetime of the electric-cylinder.

- If you are mounting your electric cylinder in a vertical or sloping position, include safety measures that will control the workload if the spindle nut fails.

  ATTENTION: Uncontrolled masses that are in motion can injure or damage property.
  If there is a spindle nut fracture inside the actuator cylinder due to wear, the working mass will drop down.
  Check whether additional external safety measures are required to prevent damage if the spindle nut fractures.

- Corrosive environments reduce the service life of electric cylinders.
- Depending on the workload, the piston rod will bend. See the piston-rod deflection specifications for limitations in Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002.

- Motor feedback, auxiliary feedback, and I/O connector kits are not included, but can be purchased separately.
- Factory manufactured feedback and power cables are available in standard cable lengths. They provide environmental sealing and shield termination. Contact your Allen-Bradley sales office or refer to the selection guide for cables.

Electric Cylinders with Brake Option

The brake option on this servo motor is a spring-set holding brake that releases when voltage is applied to the brake coil. A separate power source is required to disengage the brake. A servo motor controller or manual operator control can apply the power source.

If system main power fails, holding brakes can withstand occasional use as stopping brakes. However, the rotational mechanical backlash that is created can potentially damage to the system, increases brake wear, and reduces brake life.

An unpowered electric cylinder will require a brake to maintain its position if the force on the actuator exceeds the Back Drive Force that is listed in Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002.

A brake can be used to prevent the actuator from backdriving, typically in vertical applications. A brake can be used for safety reasons or to hold the position of the actuator when unpowered for energy savings

IMPORTANT Holding brakes are not designed to stop rotation of the motor shaft, nor are they intended to be used as a safety device. They are designed to hold a motor shaft at 0 rpm for up to the rated brake holding torque.

The recommended method to prevent the motor shaft from rotation is a four-step process:

1. Command the servo drive to 0 rpm.
2. Verify that the motor is at 0 rpm.
3. Engage the brake.
4. Disable the drive.

A disable drive removes the potential for brake wear that shaft oscillations cause when you have a poorly tuned servo system.

Preventing Electrical Noise

Electromagnetic interference (EMI), commonly called electrical noise, can reduce motor performance. Effective techniques to counter EMI include filtering the AC power, by using shielded cables, signal cables separation from power wiring, and the practice of good grounding techniques.

Follow these guidelines to avoid the effects of EMI:

- Isolate the power transformers or install line filters on all AC input power lines.
- Physically separate signal cables from motor cabling and power wiring. Do not route signal cables with motor and power wires, or over the vent openings of servo drives.
- Ground all equipment by using a single-point parallel ground system that employs ground bus bars or large straps. If necessary, use additional electrical-noise reduction techniques to reduce EMI in noisy environments.

See System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001, for additional information on reducing the effects of EMI.

Build and Route Cables

Knowledgeable cable routing and careful cable construction improve system electromagnetic compatibility (EMC).

Follow these steps to build and install cables.

1. Keep wire lengths as short as physically possible.
2. Route signal cables (encoder, serial, analog) away from motor and power wiring.
3. Separate cables by 0.3 m (1 ft) minimum for every 9 m (30 ft) of parallel run.
4. Ground both ends of the encoder cable shield and twist the signal wire pairs to prevent electromagnetic interference (EMI) from other equipment.

ATTENTION: If the shield is not grounded, high voltage can be present on the power cable shield. Make sure that there is a connection to ground for any power cable shield.
Failure to observe these safety precautions could result in personal injury or damage to equipment.

Install the Electric Cylinder

The installation must comply with all local regulations and use of equipment and installation practices that promote electromagnetic compatibility and safety

ATTENTION: Unmounted electric cylinders, disconnected mechanical couplings, and disconnected cables are dangerous if power is applied.
Appropriately identify disassembled equipment (tagged-out) and access to electrical power restricted (locked-out).
Failure to observe these safety precautions could result in personal injury.

ATTENTION: Make sure that cables are installed and restrained to prevent uneven tension or flexion at the cable connectors.
Excessive and uneven lateral force at the cable connectors can cause the environmental seal of the connector to open and close as the cable flexes.
Failure to observe these safety precautions could result in damage to the electric cylinder motor and its components.

ATTENTION: Damage can occur to the electric cylinder bearings and the feedback device if a sharp impact to the piston rod is applied during installation. Do not strike the piston rod with tools during installation or removal.
Do not attempt to rotate the piston rod during installation. If the piston rod rotates, the mechanism that allows the electric cylinder to extend and retract will break.
Failure to observe these safety precautions could result in damage to the electric cylinder and its components.

Follow these steps to install the electric cylinder.

1. Provide sufficient clearances in the area of the electric cylinder for it to stay within its specified operating temperature range.

   See Specifications on page 43 for the operating temperature range. Do not enclose the electric cylinder unless forced air is blown across the electric cylinder for cooling. Keep devices that produce heat away from the electric cylinder.

   IMPORTANT Position the electric cylinder so that all operating parts are accessible and the breather port is not covered.

2. Make sure that the mounting surface supports the electric cylinder evenly so that it is free of mechanical stress and distortion.

The evenness of support surface must be ≤ 0.2 mm (0.008 in.).

ATTENTION: Do not modify the settings of the screws and the threaded pins.
Do not fasten the electric cylinder by the front cover alone when used with high loads. Heavy tensile strain can cause the screws in the cover to pull out.

3. Attach mounting accessories to the electric cylinder; see Accessories on page 40.

   Tighten the fastening screws evenly.

Attribute	Frame 32	Frame 40	Frame 63
Internal thread of cover screws	M6	M6	M8
Torque, max (1)	5 N•m (3.69 lb•ft)	5 N•m (3.69 lb•ft)	9 N•m (5.90 lb•ft)

(1) Unless otherwise noted, the torque value has a ±20% tolerance.

4. Attach rod-end accessories and the workload.

   Be sure that the workload center of gravity is centric to the piston rod.

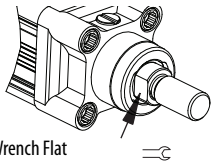
ATTENTION: Damage can occur to the electric cylinder bearings and the feedback device if sharp impact to the piston rod is applied during installation. Do not strike the piston rod with tools during installation or removal.

Failure to observe these safety precautions could result in damage to the electric cylinder and its components.

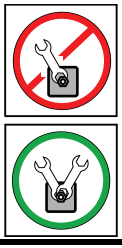
IMPORTANT Do not twist or rotate the piston rod. If the piston rod is rotated, the absolute position of the electric cylinder will be lost and the absolute home position must be re-established.

When fastening a rod-end accessory or workload to the piston rod, use two wrenches. Use one wrench to tighten the mounting nut or rod-end accessory and the other, on the piston-rod wrench flats, to counteract the applied torque. Be sure that the torque is not applied to the piston rod and that the piston rod does not rotate.

Frame Size	Piston Rod Thread	Wrench Flats Width
32	M10 x 1.25	10 mm
40	M12 x 1.25	13 mm
63	M16 x 1.5	17 mm



ATTENTION: Do not rotate the piston rod during installation. If the piston rod rotates, the mechanism that allows the electric cylinder to extend and retract will break.
Use two wrenches to install the workload.
Failure to observe these safety precautions could result in damage to the electric cylinder and its components



If you are using a trunnion mounting kit, catalog number MPAR-NA1635*xx*, see page 42 for torque values.

If you are using a rod guide accessory, catalog number MPAR-NE34*xxx* or MPAR-NE150*xxx*, adjust the guides of the workload and the electric cylinder so that they are exactly parallel. This alignment avoids excessive wear on the guide.

Mount the Electric Cylinder

1. Use stainless steel fasteners to mount your electric cylinder to your application.
2. Attach power and feedback cables after the electric cylinder is mounted, and use a drip loop in the cable to keep liquids away from the connectors.

BURN HAZARD: Outer surfaces of the motor can reach high temperatures, 65 °C (149 °F), during electric cylinder operation. To prevent accidental contact with hot surfaces, take precautions. Failure to observe these safety precautions can result in personal injury.

ATTENTION: Consider electric-cylinder surface temperature when selecting motor-mating connections and cables. Failure to observe these safety precautions can result in personal injury or damage to equipment.

ATTENTION: Keyed connectors must be properly aligned and hand-tightened the recommended number of turns.
The need for excessive force such as the need for the use of tools to fully seat connectors indicates improper connector alignment.
Failure to observe these safety precautions could result in damage to the motor and cable, and their components.

Attach Motor Cables

Follow these steps to attach the power and feedback cables after the electric-cylinder is mounted.

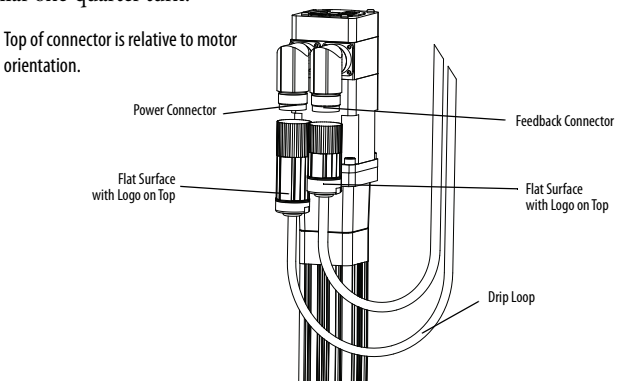
ATTENTION: Consider electric-cylinder surface temperature when selecting motor-mating connections and cables.
Failure to observe these safety precautions can result in personal injury or damage to equipment.

1. Carefully align each cable connector with the respective motor connector as shown in the following diagram.

ATTENTION: Keyed connectors must be properly aligned and hand-tightened the recommended number of turns.
The need for excessive force such as the need for the use of tools to fully seat connectors indicates improper connector alignment.
Failure to observe these safety precautions can result in damage to equipment.

IMPORTANT Remove the O-ring from the motor connector.

2. Fully seat the feedback connector and the power/brake connector and hand tighten the collar one-quarter turn.



ATTENTION: Make sure that cables are installed and restrained to prevent uneven tension or flexion at the cable connectors. Excessive and uneven lateral force at the cable connectors can cause the environmental seal of the connector to open and close as the cable flexes. Failure to observe these safety precautions can result in damage to the electric-cylinder motor and its components.

3. To keep liquids away from the connectors, form a drip loop in the cable.
4. Verify the continuity and functionality of the thermal switch signals, TS+ and TS-.

These signals are transmitted through the feedback cable that connects the motor to its controlling drive.

Change Connector Orientation

You can rotate the circular DIN-connector housings up to 180° in either direction.

ATTENTION: You can rotate the connectors into a fixed position during installation of the electric cylinder and keep them in that position without further adjustment. Strictly limit the applied forces and the number of times the connector is rotated to be sure that connectors meet the requirements of IP66 for the motor portion of the electric cylinder.
Failure to observe these safety precautions can result in damage to the motor and its components

Follow these steps to rotate the DIN connectors.

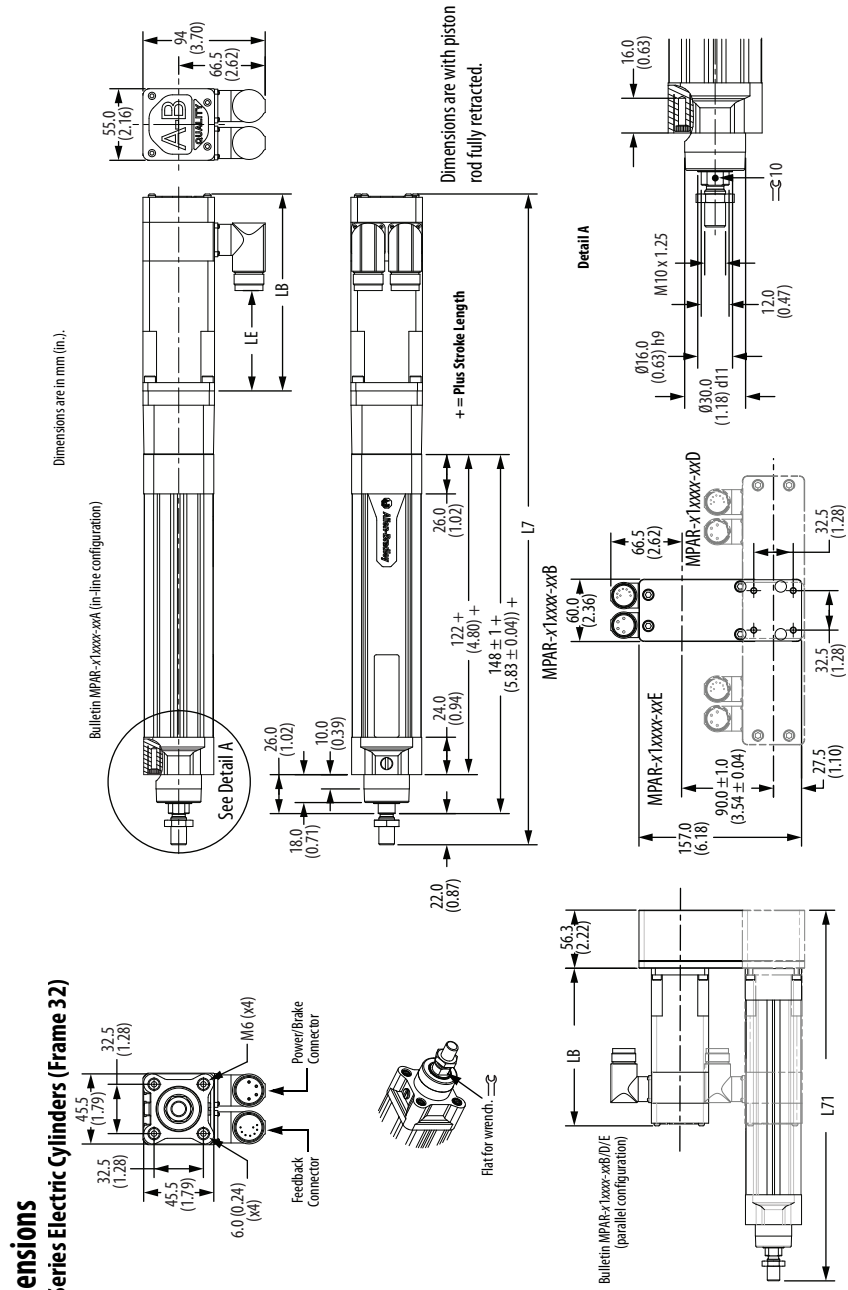
1. Mount and fully seat a mating cable on the connector.
2. Grasp the connector and cable plug by their housings and slowly rotate them to the outside of the motor.

   If necessary, repeat this step for each connector (feedback or power/brake).

   ATTENTION: Apply force only to the connectors; do not apply force to the cable. Do not use tools, for example, pliers and vise-grips, to assist with the rotation of the connector. Failure to observe these safety precautions can result in personal injury or damage to equipment.

Dimensions

MP-Series Electric Cylinders (Frame 32)



MP-Series Electric Cylinder Dimensions (In-line Configuration, Frame 32)

Electric Cylinder Cat. No.	L7[1] mm (in.)	LB [1] mm (in.)	LE [2] mm (in.)
MPAR-*x*1100B-V2A	445.7 (17.55)	126.5 (4.98)	52.4 (2.06)
MPAR-*x*1200B-V2A	545.7 (21.48)		
MPAR-*x*1300B-V2A	645.7 (25.42)		
MPAR-*x*1400B-V2A	745.7 (29.36)		
MPAR-*x*1100E-V2A	470.7 (18.53)	151.5 (5.96)	77.2 (3.04)
MPAR-*x*1200E-V2A	570.7 (22.47)		
MPAR-*x*1300E-V2A	670.7 (26.41)		
MPAR-*x*1400E-V2A	770.7 (30.34)		

(1) If you are ordering an MPAR-*x*1*xxxx*-V4*x* actuator with brake, add 36.1 mm (1.42 in.) to dimensions L7 and LB.

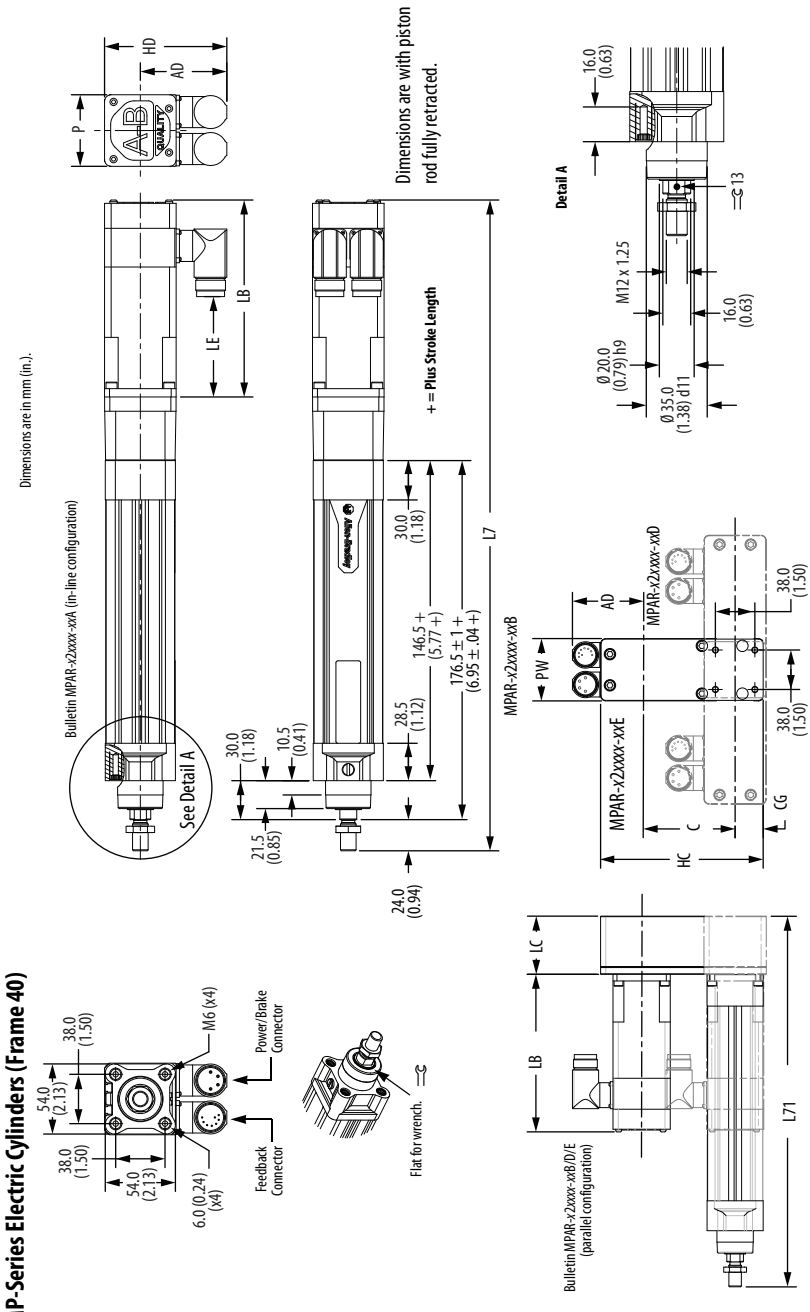
(2) If you are ordering an MPAR-*x*1*xxxx*-V4*x* actuator with brake, add 33.4 mm (1.31 in.) to dimension LE.

MP-Series Electric Cylinder Dimensions (Parallel Configuration, Frame 32) [1]

Electric Cylinder Cat. No.	L71 mm (in.)
MPAR-*x*1100B-V2B/D/E	326.3 (12.8)
MPAR-*x*1200B-V2B/D/E	426.3 (16.8)
MPAR-*x*1300B-V2B/D/E	526.3 (20.7)
MPAR-*x*1400B-V2B/D/E	626.3 (24.6)

(1) For the complete dimension of the parallel configuration electric cylinders, use the in-line dimensions for an electric cylinder with the same rod-stroke length and the dimensions from this table.

MP-Series Electric Cylinders (Frame 40)



MP-Series Electric Cylinder Dimensions (In-line, Frame 40)

Electric Cylinder Cat. No.	L7 (1) mm (in.)	LB (1) mm (in.)	LE (2) mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)
MPAR-*x*2100C-V2A	501.2 (19.73)	151.5 (5.96)	77.2 (3.04)	55.0 (2.17)	66.5 (2.62)	94.0 (3.70)
MPAR-*x*2200C-V2A	601.2 (23.67)					
MPAR-*x*2300C-V2A	701.2 (27.61)					
MPAR-*x*2400C-V2A	801.2 (31.54)					
MPAR-*x*2600C-V2A	1001.2 (39.42)					
MPAR-*x*2100F-V2A	489.8 (19.28)	140.1 (5.52)	65.1 (2.56)	70.0 (2.76)	74.0 (2.91)	109.0 (4.29)
MPAR-*x*2200F-V2A	589.8 (23.22)					
MPAR-*x*2300F-V2A	689.8 (27.16)					
MPAR-*x*2400F-V2A	789.8 (31.09)					
MPAR-*x*2600F-V2A	989.8 (38.97)					

(1) If you are ordering an MPAR-*x*2*xxx*C-V4*x* actuator with brake, add 36.1 mm (1.42 in.) to dimensions L7 and LB.
If you are ordering an MPAR-*x*2*xxx*F-V4*x* actuator with brake, add 39.0 mm (1.54 in.) to dimensions L7 and LB.

(2) If you are ordering an MPAR-*x*2*xxx*C-V4*x* actuator with brake, add 33.4 mm (1.31 in.) to dimension LE.
If you are ordering an MPAR-*x*2*xxx*F-V4*x* actuator with brake, add 24.7 mm (0.97 in.) to dimension LE.

MP-Series Electric Cylinder Dimensions (Parallel, Frame 40) (1)

Electric Cylinder Cat. No.	L71 mm (in.)	LC mm (in.)	HC mm (in.)	C (2) mm (in.)	CG mm (in.)	PW mm (in.)
MPAR-*x*2100C-V2B/D/E	356.8 (14.05)	56.3 (2.22)	157.0 (6.18)	90.0 (3.54)	27.0 (1.06)	60.0 (2.36)
MPAR-*x*2200C-V2B/D/E	456.8 (17.98)					
MPAR-*x*2300C-V2B/D/E	556.8 (21.92)					
MPAR-*x*2400C-V2B/D/E	656.8 (25.86)					
MPAR-*x*2600C-V2B/D/E	856.8 (33.73)					
MPAR-*x*2100F-V2B/D/E	369.8 (14.56)	69.3 (2.73)	188.5 (7.42)	100.0 (3.94)	38.0 (1.50)	86.0 (3.39)
MPAR-*x*2200F-V2B/D/E	469.8 (18.50)					
MPAR-*x*2300F-V2B/D/E	569.8 (22.43)					
MPAR-*x*2400F-V2B/D/E	669.8 (26.37)					
MPAR-*x*2600F-V2B/D/E	356.8 (14.05)					

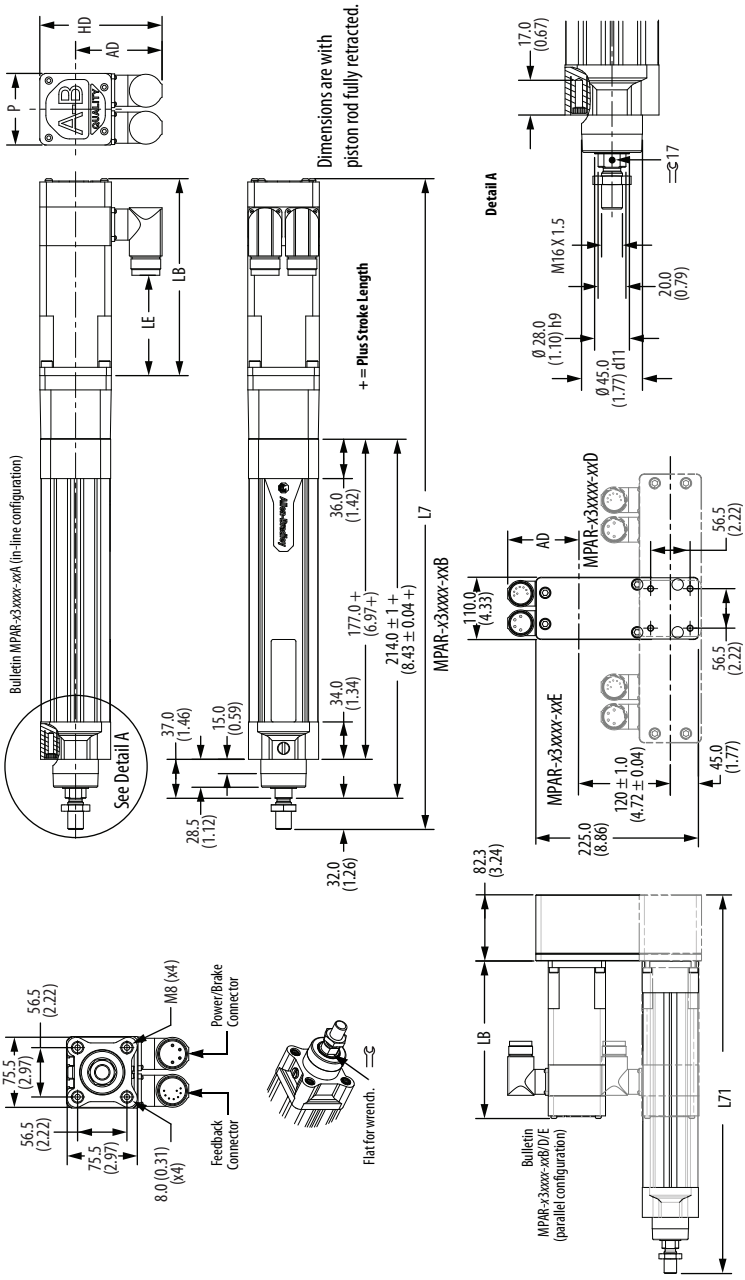
(1) For complete dimensions of the parallel configuration electric cylinders, use the in-line dimensions for an electric cylinder with the same rod-stroke length and the dimensions from this table.

(2) The tolerance for this dimension is ±1.0 mm (0.04 in.).

Actuators are designed to metric dimensions. Inch dimensions are approximate conversions from millimeters. Dimensions without tolerances are for reference.

MP-Series Electric Cylinders (Frame 63)

Dimensions are in mm (in.).



MP-Series Electric Cylinder Dimensions (In-line, Frame 63)

Electric Cylinder Cat. No.	L7 (1) mm (in.)	LB (1) mm (in.)	LE (2) mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)
MPAR-*x*3100E-M2A	595.9 (23.46)	178.8 (7.04)	121.5 (4.78)	89.4 (3.52)	80.9 (3.19)	125.7 (4.95)
MPAR-*x*3200E-M2A	695.9 (27.40)					
MPAR-*x*3300E-M2A	795.9 (31.33)					
MPAR-*x*3400E-M2A	895.9 (35.27)					
MPAR-*x*3600E-M2A	1095.9 (43.15)					
MPAR-*x*3800E-M2A	1295.9 (51.02)					
MPAR-*x*3100H-M2A	574.8 (22.63)	149.8 (5.90)	92.5 (3.64)	98.3 (3.87)	83.9 (3.30)	132.8 (5.23)
MPAR-*x*3200H-M2A	674.8 (26.57)					
MPAR-*x*3300H-M2A	774.8 (30.50)					
MPAR-*x*3400H-M2A	874.8 (34.44)					
MPAR-*x*3600H-M2A	1074.8 (42.31)					
MPAR-*x*3800H-M2A	1274.8 (50.19)					

(1) If you are ordering an MPAR-*x*3*xxx*E-M4*x* actuator with brake, add 34.5 mm (1.36 in.) to dimensions L7 and LB.
If you are ordering an MPAR-*x*3*xxx*H-M4*x* actuator with brake, add 48.5 mm (1.91 in.) to dimensions L7 and LB.

(2) If you are ordering an MPAR-*x*3*xxx*E-M4*x* actuator with brake, add 34.5 mm (1.36 in.) to dimension LE.
If you are ordering an MPAR-*x*3*xxx*H-M4*x* actuator with brake, add 48.5 mm (1.91 in.) to dimension LE.

MP-Series Electric Cylinder Dimensions (Parallel, Frame 63)

Electric Cylinder Cat. No.	L71 mm (in.)
MPAR-*x*3100*x*-M2B/D/E	428.3 (16.86)
MPAR-*x*3200*x*-M2B/D/E	528.3 (20.80)
MPAR-*x*3300*x*-M2B/D/E	628.3 (24.74)
MPAR-*x*3400*x*-M2B/D/E	728.3 (28.67)
MPAR-*x*3600*x*-M2B/D/E	928.3 (36.55)
MPAR-*x*3800*x*-M2B/D/E	1128.3 (44.42)

Connector Data

This table lists the signal descriptions for feedback, power, and brake connector pins on the electric cylinder.

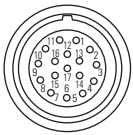
Feedback

Pin	Signal Name MPAR-A*xxxxx* (200V Class)	Signal Name MPAR-B*xxxxx* (400V Class)
1	Sin+	Sin+
2	Sin-	Sin-
3	Cos+	Cos+
4	Cos-	Cos-
5	Data+	Data+
6	Data-	Data-
7	Reserved	Reserved
8		
9	+5V DC	
10	Common	
11	Reserved	+9V DC
12		Common
13	TS+	TS+
14	TS-	TS-
15	Reserved	Reserved
16		
17		
Case	Shield	Shield

Power and Brake

Pin	Signal Name
A	Phase U (1)
B	Phase V (1)
C	Phase W (1)
D	Ground (1)
E	Reserved (1)
F	MBRK+ (1) (2)
G	MBRK- (1) (2)
H	Reserved
L	
Case	Cable shield and GND

Intercontec P/N
BEDC0091NN00000217000



Intercontec P/N
AEDC113NN00000222000

(1) Power pins A, B, C, and D can be labeled as U, V, W, and GND respectively. Brake pins F and G can be labeled as + and - respectively. Reserved pins E and H can be numbered 1 or 2.

(2) Brake+ and Brake- are available only on electric cylinders with a brake.

ATTENTION: Be sure that cables are installed and restrained to prevent uneven tension or flexion at the cable connectors. Excessive and uneven force at the cable connector can result in damage to the housing and contacts as the cable flexes. Failure to observe these safety precautions can result in damage to the motor and its components.

Mating Cables

Connector	Cable Type	Cable Cat. No.
Feedback	Premolded	2090-CFBM7DD-CEAAxx (standard) or 2090-CFBM7DD-CEAFxx (continuous-flex)
	Flying lead	2090-CFBM7DF-CEAAxx (standard) or 2090-CFBM7DF-CEAFxx (continuous-flex)
Power	With brake wires	2090-CPBM7DF-xxAAxx (standard) or 2090-CPBM7DF-xxAFxx (continuous-flex)
	Without brake wires	2090-CPWM7DF-xxAAxx (standard) or 2090-CPWM7DF-xxAFxx (continuous-flex)

Commissioning

This section provides guidelines for using Studio 5000 Logix Designer® application to configure your electric-cylinder servo drive system.

Configure Your Electric Cylinder

Configure the electric-cylinder by using the basic parameter settings that are described in this section. Use the procedure appropriate for your motion axis

Drive	See:
Kinetix 350 Kinetix 2000 Kinetix 6000 Kinetix 6200	Configure Your Electric Cylinder and Kinetix 350, 2000, 6000, or 6200 Servo Drive on page 21, and Tune Your Electric Cylinder and Kinetix 350, 2000, 6000, or 6200 Servo Drive on page 26.
Kinetix 5500 Kinetix 5700 Kinetix 6500	Configure Your Electric Cylinder with a Kinetix 5500, 5700, or 6500 Servo Drive on page 29, and Tune You Electric Cylinder with a Kinetix 6500, 5500 or 5700 Servo Drive on page 31
Ultra™ 3000	Configure Your Electric Cylinders with Ultraware Software on page 32.
Kinetix 300	Configure the Kinetix 300 Drive for Electric Cylinders on page 34

ATTENTION: Parts that move can cause injuries. Before running the electric cylinder, make sure that all components are secure and safeguards are in place to prevent access to the path of machinery in motion.
Safeguards must prevent access to the electric cylinder until all motion has stopped.
Check that the electric cylinder is clear of foreign matter and tools. Objects hit by the moving piston rod can become projectiles that can cause personal injury or damage equipment.

IMPORTANT It is your responsibility to verify that the servo control system safely controls the electric cylinder regarding maximum force, acceleration, and speed.

Configure Your Electric Cylinder and Kinetix 350, 2000, 6000, or 6200 Servo Drive

This procedure assumes the electric-cylinder and the Kinetix 350, Kinetix 2000, Kinetix 6000, or Kinetix 6200 servo drive are installed and wired as one axis of the motion system.

ATTENTION: Incorrect parameter settings can result in uncontrolled motion with the potential for damage to the electric cylinder.
If you initiate a motion command on an electric cylinder with an incorrect Position mode setting, you can damage the electric cylinder and the machine in which it is installed.

To configure the drive for your electric-cylinder, do the following.

1. Enter these parameters in the Axis Properties tabs of Logix Designer application for the electric cylinder.

Axis Properties Tab	Parameter	Entry/Selection
Drive/Motor	Motor Catalog Number	Select one from the list MPAR-A1*xxx*B-V2*x* MPAR-A1*xxx*B-V4*x* MPAR-A1*xxx*E-V2*x* MPAR-A1*xxx*E-V4*x* MPAR-A2*xxx*C-V2*x* MPAR-A2*xxx*C-V4*x* MPAR-A2*xxx*F-V2*x* MPAR-A2*xxx*F-V4*x* MPAR-A3*xxx*E-M2*x* MPAR-A3*xxx*E-M4*x* MPAR-A3*xxx*H-M2*x* MPAR-A3*xxx*H-M4*x* MPAR-B1*xxx*B-V2*x* MPAR-B1*xxx*B-V4*x* MPAR-B1*xxx*E-V2*x* MPAR-B1*xxx*E-V4*x* MPAR-B2*xxx*C-V2*x* MPAR-B2*xxx*C-V4*x* MPAR-B2*xxx*F-V2*x* MPAR-B2*xxx*F-V4*x* MPAR-B3*xxx*E-M2*x* MPAR-B3*xxx*E-M4*x* MPAR-B3*xxx*H-M2*x* MPAR-B3*xxx*H-M4*x*
	Drive Resolution	200,000
	Drive Counts per	Motor Rev

Axis Properties Tab	Parameter	Entry/Selection (with Applicable Distance Unit Settings)	
		Metric	**English**
Conversion	Positioning Mode	Linear If you set the Positioning Mode to Rotary, you can damage the electric cylinder or the machine due to incorrect positioning	
	Conversion Constant	66,666.667 drive cnts/1.0 mm for	1,693,333.3 drive cnts/1.0 in. for
		MPAR-*x*1*xxx*B-V2*x* MPAR-*x*1*xxx*B-V4*x*	
	Conversion Constant	20,000 drive cnts/1.0 mm for	508,000 drive cnts/1.0 in. for
		MPAR-*x*1*xxx*E-V2*x* MPAR-*x*1*xxx*E-V4*x* MPAR-*x*3xxxE-M2*x* MPAR-x3xxxE-M4*x*	
	Conversion Constant	40,000 drive cnts/1.0 mm for	1,016,000 drive cnts/1.0 in. for
		MPAR-*x*2*xxx*C-V2*x* MPAR-*x*2*xxx*C-V4*x*	
	Conversion Constant	15,748.0315 drive cnts/1.0 mm for	400,000 drive cnts/1.0 in. for
		MPAR-*x*2*xxx*F-V2*x* MPAR-*x*2*xxx*F-V4*x*	
	Conversion Constant	10,000 drive cnts/1.0 mm for	254,000 drive cnts/1.0 in. for
		MPAR-*x*3*xxx*H-M2*x* MPAR-*x*3*xxx*H-M4*x*	
Dynamics	Maximum Speed(1)	150 mm/s (default 157.5 mm/s)	5.91 in/s (default 6.20 in/s)
		MPAR-*x*1*xxx*B-*xxx*	
		500 mm/s (default 525 mm/s)	19.68 in/s (default 20.67 in/s)
		MPAR-*x*1*xxx*E-*xxx*	
		250 mm/s (default 262.5 mm/s)	9.82 in/s (default 10.33 in/s)
		MPAR-*x*2*xxx*C-*xxx*	
		640 mm/s (default 672 mm/s)	24.61 in/s (default 25.84 in/s)
		MPAR-*x*2*xxx*F-*xxx*	
		500 mm/s (default 525 mm/s)	19.68 in/s (default 20.67 in/s)
		MPAR-*x*3*xxx*E-*xxx*	
		1000 mm/s (default 1050 mm/s)	41.34 in/s (default 43.41 in/s)
		MPAR*x*3*xxx*H-*xxx*	
	Maximum Acceleration (2)	6000 mm/s/s	236.22 in/s/s
	Maximum Deceleration (2)	6000 mm/s/s	236.22 in/s/s
	Maximum Acceleration Jerk	Use default values, or adjusted for your application	
	Maximum Deceleration Jerk	Use default values, or adjusted for your application	

(1) The default value is 5% more than your actuator-rated maximum speed. Do not command maximum speed in your application in excess of the rated speed.

(2) Accelerations in excess of these values can lead to reduction of the life of your actuator.

2. Click the Homing tab.
3. Set parameters for either absolute homing or torque level-to-marker homing as shown on this table.

Parameter	Absolute Homing Value	Torque Level-to-marker Homing Value
Mode	Absolute	Active
Position	0, typical	0, typical
Offset	N/A	0 mm (0 in.)
Sequence	Immediate	Torque level-to-marker
Direction	N/A	Reverse bidirectional
Torque Level	N/A	30%, min Greater if the system friction, force, or weight exceeds 30% of the Continuous Force Rating at any point in the range of motion
Speed	N/A	10 mm/s (1.97 in/s)
Return Speed	N/A	10 mm/s (0.39 in/s)

ATTENTION: Avoid excessive force while homing the electric cylinder. Do not exceed 10 mm/s (0.4 in/s) during a home routine.
Speeds greater than 10 mm/s (0.4 in/s) can damage the electric cylinder when the piston rod reaches the end of travel.

4. Complete these steps for absolute homing.
   a. Use motion direct commands to jog your axis slowly to the home position of your application, being sure not to exceed 10 mm/s (0.4 in/s).
   b. Issue the Motion Direct Command (MAH) to set the home position on your axis.
5. Click the Limits tab.
6. Enter these parameters.

Parameter	Entry/Selection (With Applicable Distance Unit Settings)
Hard Travel Limits	Check if hardware limits are in use. Use the Motion Analyzer software to determine the maximum stopping distance in your application to set negative and positive limits.
Soft Travel Limits	Check if software limits are in use. Use the Motion Analyzer software to determine the maximum stopping distance in your application to set negative and positive limits.
Maximum Positive	Enter value that is within the piston-rod mechanical travel.
Maximum Negative	Enter value that is within the piston-rod mechanical travel.

7. Set overtravel limits according to the maximum speed of the servo drive system and the payload of the application

IMPORTANT Set travel limits and direction of tuning moves with reference to piston-rod starting position. Leave adequate travel for the piston rod to complete its moves while tuning.

ATTENTION: Software overtravel must be set before you initiate the tuning process. Check the starting position of the piston rod and allow for adequate travel. Insufficient travel while auto tuning will trigger the software overtravel or cause an end-stop impact.

ATTENTION: Take care not to exceed the physical travel limits of the electric cylinder. If you do, the electric cylinder can reach the mechanical end of stroke. An impact at the end of stroke can physically damage the screw and internal components of the electric cylinder.

You can determine the deceleration distance before the piston rod contacts the end of travel. The distance is based on the deceleration rate of the load, and the available peak force from the motor/ballscrew combination. Use the Motion Analyzer software to calculate the minimum deceleration distance at the maximum speed of your application

IMPORTANT Do not exceed the maximum energy that is specified for end-of-travel impacts.

Cat. No.	Impact Energy, Max
MPAR-*x*1*xxxx*-*xxx*	0.0001 J
MPAR-*x*2*xxxx*-*xxx*	0.0002 J
MPAR-*x*3*xxxx*-*xxx*	0.0004 J

Maximum Velocity for End-stop Impact with No Load

Cat. No.	Extended Mass g (oz)	Impact Velocity, Max mm/s (in/s)
MPAR-*x*1100B-*xxx*	239 (8.4)	28.9 (1.14)
MPAR-*x*1200B-*xxx*	308 (10.8)	25.5 (1.00)
MPAR-*x*1300B-*xxx*	377 (13.9)	23.0 (0.91)
MPAR-*x*1400B-*xxx*	446 (15.7)	21.2 (0.83)
MPAR-*x*1100E-*xxx*	269 (9.5)	27.3 (1.07)
MPAR-*x*1200E-*xxx*	338 (11.9)	24.3 (0.96)
MPAR-*x*1300E-*xxx*	407 (14.36)	22.2 (0.87)
MPAR-*x*1400E-*xxx*	476 (16.8)	20.5 (0.81)

Maximum Velocity for End-stop Impact with No Load (Continued)

Cat. No.	Extended Mass g (oz)	Impact Velocity, Max mm/s (in/s)
MPAR-*x*2100C-*xxx*	399 (14.1)	31.7 (1.25)
MPAR-*x*2200C-*xxx*	488 (17.2)	28.6 (1.12)
MPAR-*x*2300C-*xxx*	577 (20.4)	26.3 (1.03)
MPAR-*x*2400C-*xxx*	666 (23.5)	24.5 (0.96)
MPAR-*x*2600C-*xxx*	844 (29.8)	21.8 (0.86)
MPAR-*x*2100F-*xxx*	469 (16.5)	29.2 (1.15)
MPAR-*x*2200F-*xxx*	558 (19.7)	26.8 (1.05)
MPAR-*x*2300F-*xxx*	647 (22.82)	24.9 (0.98)
MPAR-*x*2400F-*xxx*	736 (26.0)	23.3 (0.92)
MPAR-*x*2600F-*xxx*	914 (32.2)	20.9 (0.82)
MPAR-*x*3100E-*xxx*	938 (33.1)	29.2 (1.15)
MPAR-*x*3200E-*xxx*	1066 (37.6)	27.4 (1.08)
MPAR-*x*3300E-*xxx*	1194 (42.1)	25.9 (1.02)
MPAR-*x*3400E-*xxx*	1322 (46.6)	24.6 (0.97)
MPAR-*x*3600E-*xxx*	1578 (55.7)	22.5 (0.86)
MPAR-*x*3800E-*xxx*	1834 (64.7)	20.9 (0.82)
MPAR-*x*3100H-*xxx*	938 (33.1)	29.2 (1.149)
MPAR-*x*3200H-*xxx*	1066 (37.6)	27.4 (1.08)
MPAR-*x*3300H-*xxx*	1194 (42.1)	25.9 (1.02)
MPAR-*x*3400H-*xxx*	1322 (46.6)	24.6 (0.97)
MPAR-*x*3600H-*xxx*	1578 (55.7)	22.5 (0.88)
MPAR-*x*3800H-*xxx*	1834 (64.7)	20.9 (0.82)

IMPORTANT Absolute position is maintained while the motor feedback cable is connected to the drive. If the cable is disconnected or if the drive reports a motor fault, the absolute home position must be re-established.

Tune Your Electric Cylinder and Kinetix 350, 2000, 6000, or 6200 Servo Drive

This section shows the steps to tune electric cylinders with Logix Designer application, version 16:

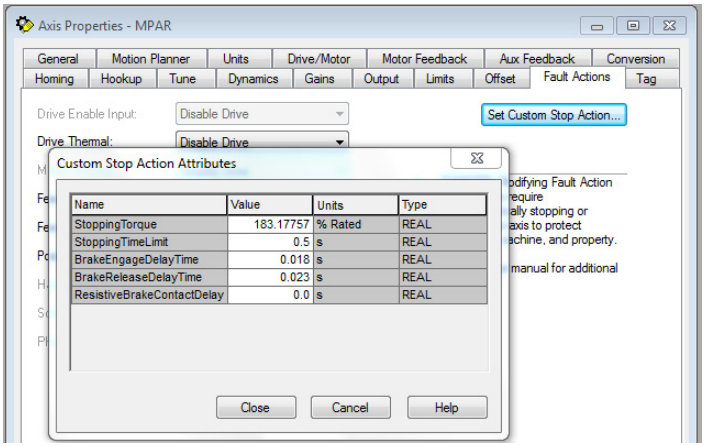
- Tuning your electric cylinder requires you to calculate and configure the loop gain based on the actual measured inertia.
- By setting travel limits, your application minimum deceleration is defined.

Follow these steps to tune your electric cylinder.

1. In the Axis Properties dialog box, click the Fault Actions tab.
2. Click Set Custom Stop Action

TIP If the electric cylinder is installed in a horizontal (table top) or a wall mount (vertical) orientation, these parameter settings work best.

3. In the Custom Stop Action Attributes dialog box, set the Brake Engage and the Brake Release delay times to the values listed in Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002.
4. Reduce the default Stopping Time Limit from 10 seconds to 0.5 seconds



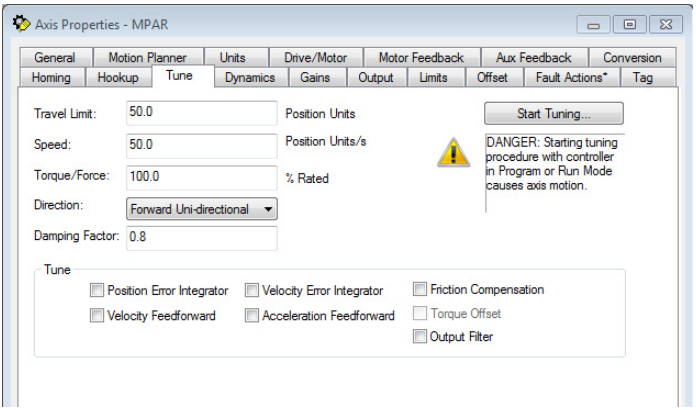
IMPORTANT To prevent the rod from moving or falling when installed in a vertical orientation, the Stopping Time Limit must be set to 0.99 seconds or less.

5. Click the Tune tab and enter these parameters:
   - Travel Limit - Set to within software limits
   - Speed (velocity)
   - Torque/Force

IMPORTANT Set travel limits and direction of tuning moves with reference to the piston-rod start position. Leave adequate travel for the piston rod to complete its moves while tuning.

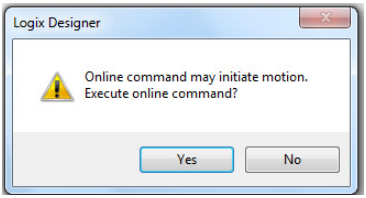
ATTENTION: Software overtravel must be set before you initiate the tuning process. Check the piston-rod start position and allow for adequate travel.
Insufficient travel while auto tuning will trigger the software overtravel or cause an end-stop impact.

IMPORTANT Check Torque Offset, as shown here, only if the electric cylinder is installed in a non-horizontal mount position.



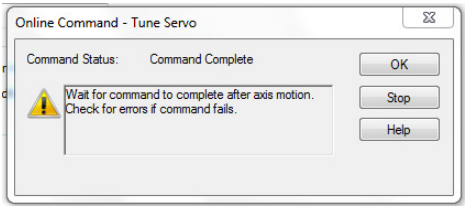
6. Click Start Tuning to access the Motion Initiation dialog box.

7. To begin tuning the electric cylinder, click Yes.



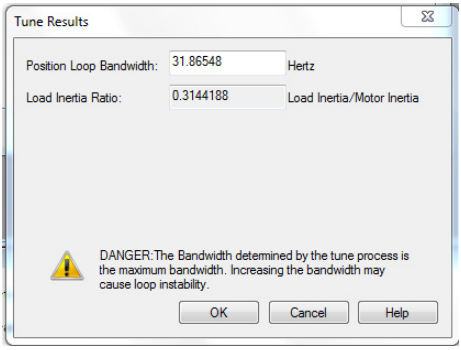
ATTENTION: Motion occurs immediately after clicking Yes.

Tuning is complete when the Tune Servo dialog box opens.



8. To exit Tuning, click OK.

   The Tune Results dialog box is displayed.



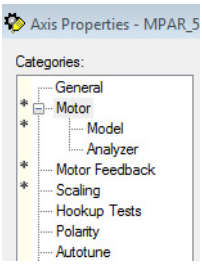
9. If you are satisfied with the tuning results, click OK.

Configure Your Electric Cylinder with a Kinetix 5500, 5700, or 6500 Servo Drive

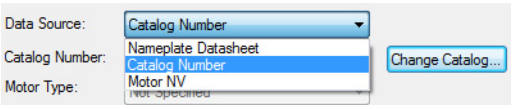
The procedure assumes the electric-cylinder and the Kinetix 5500, 5700, or 6500 servo drives are installed and wired as one axis of the motion system.

To configure your drive, do the following.

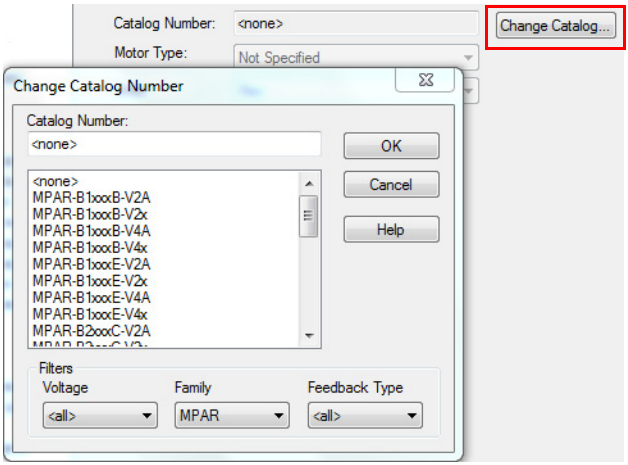
1. From Axis Properties select, Motor category.



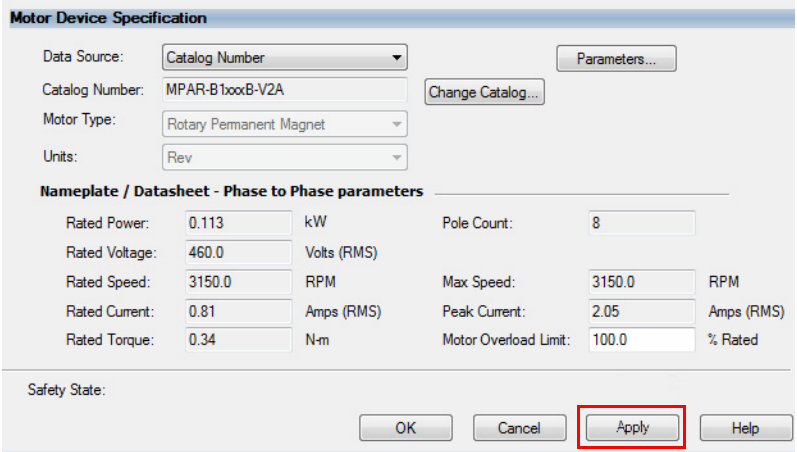
2. From the Data Source pull-down menu, choose Catalog Number.



3. Click Change Catalog.
4. Select your MPAR Cylinder catalog number, click OK.

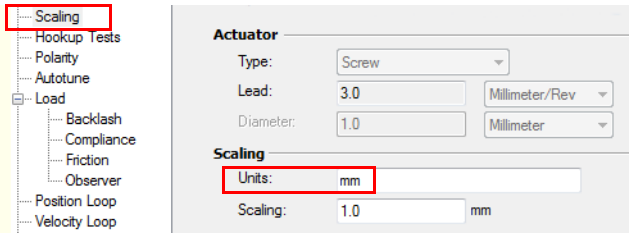


5. Click Apply.



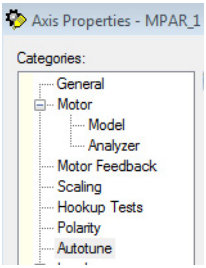
ATTENTION: Incorrect parameter settings can result in uncontrolled motion that can damage to the electric cylinder. If you initiate a motion command on an electric cylinder with an incorrect Position mode, you can damage to the electric cylinder and the application in which it is installed.

6. From Axis Properties, select Scaling category.
7. Under Scaling, enter mm (millimeters) for Units.

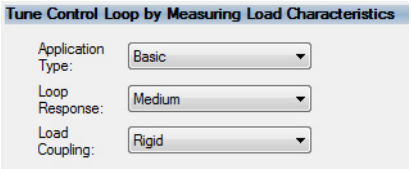


Tune You Electric Cylinder with a Kinetix 6500, 5500 or 5700 Servo Drive

1. From Axis Properties, select Autotune.



2. Under Tune Control Loop by Measuring Load Characteristics, choose the following from the pull-down menus.
   a. Application Type, choose Basic.
   b. Loop Response, choose Medium.
   c. Load Coupling, choose Rigid.

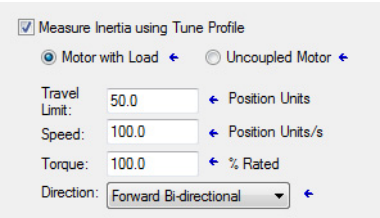


3. Check Measure Inertia by using Tune Profile.
4. Click Motor with Load or Uncouple Motor, which ever applies.
5. Enter the following values.

Parameter	Value
Travel Limit	A value less than the cylinder travel length.
Speed	A speed less than the cylinder rated speed.
Torque	100

See Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002 for cylinder travel length and rated speed.

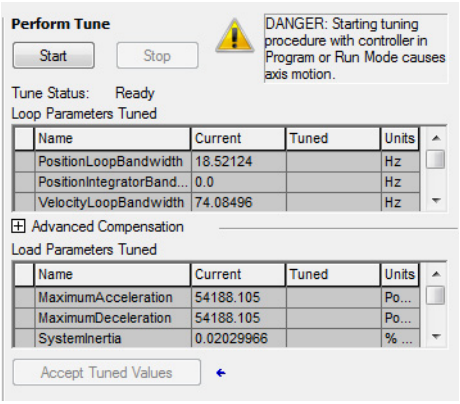
6. From Direction pull-down menu, select Forward Bi-directional.



7. To Perform Tune, click Start.

   Wait for autotune to complete.

8. To apply values, click Accept Tune Values.



Configure Your Electric Cylinders with Ultraware Software

These steps assume that an electric cylinder and an Ultra3000 drive are installed and wired as one axis of a motion system.

For help using Ultraware software as it applies to how to configure your electric cylinder, refer to Additional Resources on page 45. This procedure assumes that you are familiar with Ultraware software.

1. Connect a serial cable, catalog number 2090-DAPC-D09*xx*, to the CN3 connector on your Ultra3000 drive.
2. Apply AC input power to the Ultra3000 drive.

   When communication with the Ultra3000 drive is established, the Ultra3000 Motor Database dialog box opens.
3. Click Cancel.

Ultraware software begins scanning for online drives. When a drive is found, an Online Drive icon opens in the Workspace.

4. To view the main Drive Set-up dialog box, double-click the Online Drive icon.
5. Verify that the data in the Model Field is correct for your electric cylinder.
6. From the Displayed Units pull-down menu, choose User.

   This programs Ultraware software to make distance moves in User Units (mm or in.).
7. Expand the Motor Encoder Units menu and enter the appropriate values from the table.

   The drive default User Units are in motor revolutions. The table converts the displayed User Units into units that are used for linear motion, either millimeters or inches.

   Accelerations in excess of 6000 mm/s/s (236.2 in/s/s) can shorten the life of your actuator. Use the values in this table to limit the acceleration and deceleration of your actuators to 6000 mm/s/s (236.2 in/s/s).

Cat. No.	**Screw** mm/rev (in./rev)	**Encoder** periods/rev	**Velocity Scale** mm/s (in/s)	**Position Scale** mm (in.)	**Acceleration Scale** mm/s/s (in/s/s)
MPAR-*x*1*xxx*B	3.0 (0.12)	128	43690.67 (1109742.93)	43960.67 (1116601.02)	43960.67 (1116601.02)
MPAR-*x*1*xxxx*E	10.0 (0.39)	128	13107.20 (332922.88)	13107.20 (332922.88)	13107.20 (332922.88)
MPAR-*x*2*xxx*C	5.0 (0.20)	128	26214.40 (665845.76)	26214.40 (665845.76)	26214.40 (665845.76)
MPAR-*x*2*xxx*F	12.7 (0.50)	128	10320.63 (262144.00)	10320.63 (262144.00)	10320.63 (262144.00)
MPAR-*x*3*xxx*E	10.0 (0.39)	1024	104857.60 (2663383.04)	104857.60 (2663383.04)	104857.60 (2663383.04)
MPAR-*x*3*xxx*H	20.0 (0.79)	1024	52428.80 (1331691.52)	52428.80 (1331691.52)	52428.80 (1331691.52)

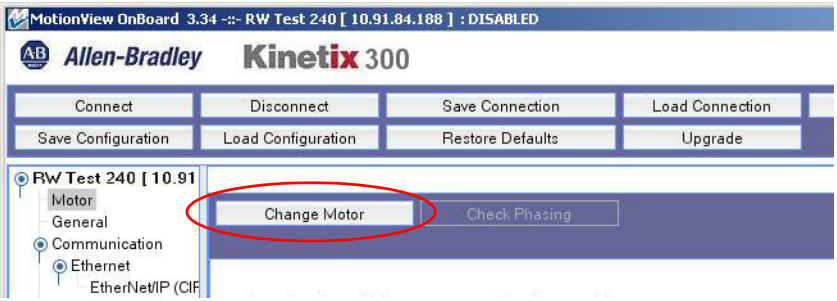
Configure the Kinetix 300 Drive for Electric Cylinders

These steps assume that an electric cylinder and the Kinetix 300 drive are installed and wired as one axis of a motion system.

For help using the Kinetix 300 drive as it applies to how to configure your electric cylinder, refer to Additional Resources on page 45. This procedure assumes that you are familiar with the Kinetix 300 drive.

1. Run MotionView Onboard software.
2. From the Drive Organizer, click Motor.
3. Verify that your electric cylinder model is displayed in the Motor Model field.
4. Click Change Motor.

   The motor model will automatically update to the correct model number.



5. Click Yes twice.
6. Verify that the motor model matches the electric cylinder model that is connected to the drive
7. Click OK.
8. From the Drive Organizer, click General.
9. Enter Accel Limit, Decel Limit, and User Units by using values from the following table.

   User Units can be entered in rev/mm or rev/in. Your choice determines the unit of measure for the axis

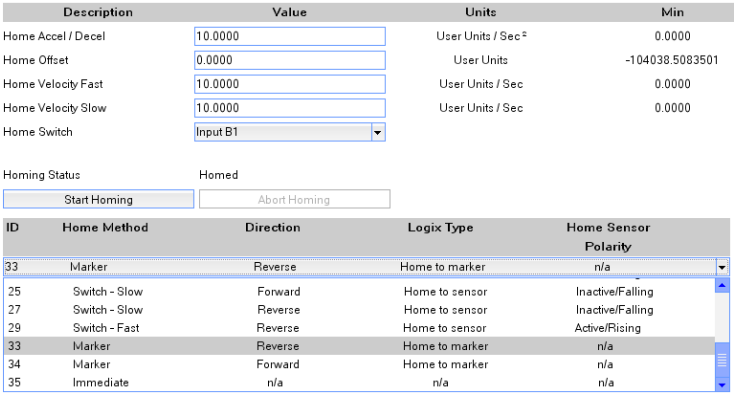
Cat. No.	Accel/Decel Limits rpm/s	User Units rev/mm (rev/in.)
MPAR-x1xxxB-Vxx	120000	0.33333 (8.46667)
MPAR-x1xxxE-Vxx	36000	0.10000 (2.54000)
MPAR-x2xxxC-Vxx	72000	0.20000 (5.08000)
MPAR-x2xxxF-Vxx	28346	0.07874 (2.00000)
MPAR-x3xxxE-Mxx	36000	0.10000 (2.54000)
MPAR-x3xxxH-Mxx	18000	0.05000 (1.27000)

10. From the Drive Organizer, click Homing.
11. Enter values from the following table.

    These values are recommended; your application can require different values.

Parameter	Metric	English
Home Accel/Decel	10.0000 mm/s^2	0.3937 in/s^2
Home Offset	0.0000 mm	0.0000 in.
Home Velocity Fast	10.0000 mm/s	0.3937 in/s
Home Velocity Slow	10.0000 mm/s	0.3937 in/s
Home Switch	Input B1	

12. Select recommend homing method ID = 33, Home to marker, Reverse



13. Set overtravel limits according to the maximum speed of the servo drive system and the payload of the application

IMPORTANT Set travel limits and direction of tuning moves with reference to piston rod start position. Leave adequate travel for the piston rod to complete its moves while tuning.

ATTENTION: Software overtravel must be set before you initiate the tuning process. Check the starting position of the piston rod and allow for adequate travel. Insufficient travel while auto tuning will cause the software overtravel to trigger an end-stop impact.

ATTENTION: Take care not to exceed the physical travel limits of the electric cylinder. If you do, the electric cylinder can reach the mechanical end of stroke. An impact at the mechanical end-of-stroke can physically damage the screw and internal components of the electric cylinder.

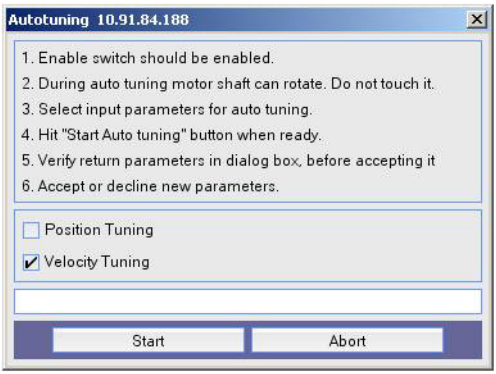
You can determine the deceleration distance before the piston rod contacts the end of travel. The distance is based on the deceleration rate of the load, and the available peak force from the motor/ballscrew combination. Use the Motion Analyzer software to calculate the minimum deceleration distance at the maximum speed of your application.

IMPORTANT A positive-direction move command denotes a rod extend operation, a negative-direction move command denotes a retract operation.

Tune Your Electric Cylinder with MotionView OnBoard Software

1. From the Drive Organizer, select General.
2. From the Drive Mode pull-down menu, choose Autotune.
3. Enable the motor.
4. From the Drive Organizer, select Dynamics.
5. Click Autotune.

   The Autotune dialog box opens with the default set to Velocity Tuning.



6. Check Velocity Tuning or Position Tuning or both.
7. Follow the instructions in the dialog box.

Maintenance

Follow these steps to maintain your electric cylinder.

1. Remove power to the electric cylinder and lock-out tag-out the power source.
2. Check the axial play of the piston rod for wear of the spindle nut.

   Wear on the electric cylinder leads to increased noise.

   ATTENTION: If a worn spindle nut breaks on an electric cylinder that is mounted vertically or diagonally, the workload falls. Uncontrolled mass in motion can cause personal injury or damage equipment.

3. Clean the electric cylinder with a soft cloth, if necessary, by using any non-abrasive cleaning solution.
4. Lightly dampen a soft cloth with isopropyl alcohol and wipe the piston rod and seal.
5. Lubricate the piston rod with a fine layer of Centroplex 2 EP grease from Klüeber at http://www.klueber.com/.

Storage

Store your electric cylinder for a minimal amount of time in a clean and dry location within Specifications on page 43.

Troubleshooting

This table describes some possible anomalies and steps you can take to correct them.

Troubleshooting

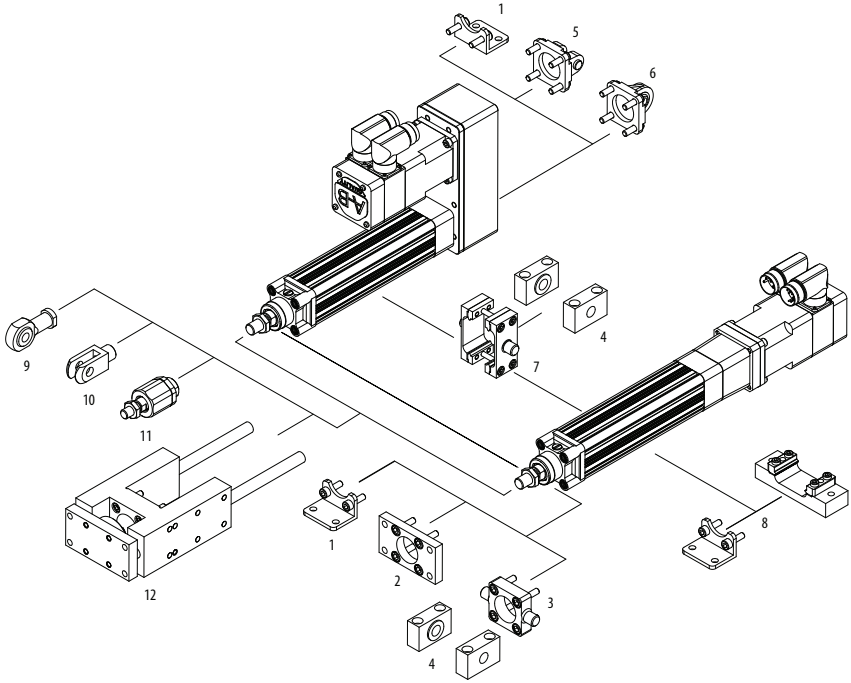
Description	Possible Cause	Corrective Action
Axial play too large.	Wear.	Replace actuator cylinder. Send to Rockwell Automation for repair.
Squeaking noises or vibrations.	Distortions.	Check that the electric cylinder is free of stress and evenly supported ≤ 0.2 mm (0.008 in.). Lubricate piston rod. See Maintenance on page 37. Modify positioning speed.
	Needs tuning.	Modify control parameters.
	Running noises of the spindle support (with strokes 300 mm (11.81 in.) and high positioning speeds).	Normal, no impairment of function.
Piston rod does not move.	Jamming in mechanical end position, after traveling at excessive speed or into end position.	Loosen jamming manually. 1. Switch off power supply. 2. Remove motor and coupling housing. 3. Turn drive shaft. Reduce speed for reference travel. Provide software end positions, at least 0.25 mm (0.01 in.) from the mechanical end positions (stops).
	Load is too large.	Reduce load mass. Reduce positioning speed. Return for repairs.
	Ambient temperature too low (increased breakaway torque in initial run due to increased viscosity of the lubricants in the spindle system).	Reduce load mass. Reduce positioning speed. If necessary, allow higher current with servo motors (see operating instructions for the motor). Increase ambient temperature.
No response from electric cylinder.	Controller/drive not enable.	Enable controller/drive.
	Controller/drive faulted.	Reset the controller/drive.
	Improper/failed wiring.	Check the wiring.

Troubleshooting (Continued)

Description	Possible Cause	Corrective Action
Electric cylinder is enabled but not operating or is operating erratically.	Feedback cable can be damaged.	Test the feedback cable.
	Feedback wiring can be incorrect.	Verify correct feedback wiring.
Electric cylinder is operating but is not up to rated speeds/forces.	Motor phases are wired incorrectly or in incorrect order.	Verify correct motor power wiring.
	Drive can be improperly tuned.	Check gain settings.
	Drive can be configured improperly for electric cylinder used.	Check amplifier setting for number of poles, voltage, current, resistance, inductance, inertia, and other motor settings.
Actuator cannot move load.	Force is too large for the capacity of the electric cylinder or too much friction is present.	Verify force requirements.
	Misalignment of piston rod to load.	Verify load alignment.
	Drive has too low of a current capacity or is limited to too low of a current capacity.	Verify correct amplifier and settings.
Electric cylinder moves or vibrates when piston rod is in motion.	Loose mounting.	Check actuator mounting.
	Drive is improperly tuned- wrong gain setting.	Tune amplifier.
Actuator is overheating.	Duty cycle is higher than actuator rating.	Verify load forces and electric cylinder rating.
	Actuator is being operated outside of continuous rating.	Adjust operation to be within continuous operation rating.
	Drive is poorly tuned and excessive current to be applied to motor.	Check gain settings.

Accessories

The following diagram and tables show the available accessories and their weights. See the Kinetix Motion Control Selection Guide, publication GMC-SG001, for dimensions.



Accessories

Accessory Item		Series	Frame	Cat. No.	Weight, Approx g (oz)
1	Foot mount attachment	A	32	MPAR-NP622640	90 (3.17)
			40	MPAR-NP622641	110 (3.53)
			63	MPAR-NP622642	250 (8.82)
2	Flange mounting	B	32	MPAR-NA174376	240 (8.46)
			40	MPAR-NA174377	280 (9.88)
			63	MPAR-NA174379	690 (24.34)
3	Trunnion flange	A	32	MPAR-NA622625	190 (6.70)
			40	MPAR-NA622626	450 (15.87)
			63	MPAR-NA622627	1130 (39.86)

Accessories (Continued)

Accessory Item		Series	Frame	Cat. No.	Weight, Approx g (oz)
4	Trunnion support	A	32	MPAR-NA622628	280 (9.88)
			40	MPAR-NA622629	460(16.23)
			63	MPAR-NA622630	620 (21.87)
5	Swivel flange (pin, narrow)	B	32	MPAR-NP174383	90 (3.17)
			40	MPAR-NP174384	140 (4.94)
			63	MPAR-NP174386	320 (11.29)
6	Swivel flange (spherical bearing)	A	32	MPAR-NP622637	90 (3.17)
			40	MPAR-NP622638	130 (4.58)
			63	MPAR-NP622639	280 (9.88)
7	Trunnion mounting kit	B	32	MPAR-NA163525	230 (8.11)
			40	MPAR-NA163526	400 (14.11)
			63	MPAR-NA163528	920 (32.45)
8	Foot mounting kit	A	32	MPAR-NA622685	240 (8.47)
			40	MPAR-NA622686	310 (10.93)
			63	MPAR-NA622687	510 (17.99)

MP-Series Electric Cylinders Rod-end Accessories

Accessory Item		Series	Frame	Cat. No.	Weight, Approx g (oz)
9	Rod eye	A	32	MPAR-NE622631	100 (3.53)
			40	MPAR-NE622632	150 (5.29)
			63	MPAR-NE622633	300 (10.58)
10	Rod clevis	A	32	MPAR-NE622634	80 (2.82)
			40	MPAR-NE622635	140 (4.94)
			63	MPAR-NE622636	340 (11.99)
11	Self-aligning rod coupler	A	32	MPAR-NE6140	210 (7.41)
			40	MPAR-NE6141	220 (7.76)
			63	MPAR-NE6142	650 (22.93)

MP-Series Electric Cylinders Rod Guide (Item 12) Accessories

Cat. No.	Series	Frame	Stroke Length mm (in.)	Weight, Approx kg (lb)
MPAR-NE34494	A	32	100 (3.9)	1.7 (3.75)
MPAR-NE34496			200 (7.9)	1.9 (4.19)
MPAR-NE34497			320 (12.6)	2.1 (4.63)
MPAR-NE150290			400 (15.7)	2.3 (5.07)
MPAR-NE34500		40	100 (3.9)	2.7 (5.95)
MPAR-NE34502			200 (7.9)	3.0 (6.61)
MPAR-NE34504			320 (12.6)	3.4 (7.50)
MPAR-NE150291			400 (15.7)	3.7 (8.16)
MPAR-NE34505			500 (19.7)	4.0 (8.82)
MPAR-NE34514		63	100 (3.9)	5.9 (13.01)
MPAR-NE34516			200 (7.9)	6.4 (14.11)
MPAR-NE34518			320 (12.6)	7.0 (15.43)
MPAR-NE34519			400 (15.7)	7.4 (16.31)
MPAR-NE34520			500 (19.7)	7.9 (17.42)

Trunnion Mounting Kit

Cat. No.	Frame Size	Torque N•m (lb•ft)
MPAR-NA163525	32	4…5 (2.9…3.7)
MPAR-NA163526	40	8…9 (5.9…6.6)
MPAR-NA163528	63	18…20 (13.3…14.5)

Actuator Cylinders (Weight of Replacement Cylinder)

Actuator Cylinder [1] Cat. No.	Weight, Approx kg (lb)
MPAR-X1100B	1.1 (2.43)
MPAR-X1200B	1.4 (3.09)
MPAR-X1300B	1.7 (3.75)
MPAR-X1400B	2.1 (4.63)
MPAR-X1100E	1.1 (4.63)
MPAR-X1200E	1.4 (3.09)
MPAR-X1300E	1.8 (3.97)
MPAR-X1400E	2.1 (4.63)

Actuator Cylinder[1] Cat. No.	Weight, Approx kg (lb)
MPAR-X2100C	1.7 (3.75)
MPAR-X2200C	2.2 (4.85)
MPAR-X2300C	2.6 (5.73)
MPAR-X2400C	3.1 (6.83)
MPAR-X2600C	4.0 (8.82)
MPAR-X2100F	1.8 (3.97)
MPAR-X2200F	2.3 (5.07)
MPAR-X2300F	2.8 (6.17)
MPAR-X2400F	3.2 (7.05)
MPAR-X2600F	4.2 (9.26)

Actuator Cylinder[1] Cat. No.	Weight, Approx kg (lb)
MPAR-X3100E	3.8 (8.38)
MPAR-X3200E	4.6 (10.14)
MPAR-X3300E	5.4 (11.90)
MPAR-X3400E	6.3 (13.89)
MPAR-X3600E	7.9 (17.46)
MPAR-X3800E	9.5 (20.94)
MPAR-X3100H	3.8 (8.38)
MPAR-X3200H	4.6 (10.14)
MPAR-X3300H	5.4 (11.90)
MPAR-X3400H	6.3 (13.89)
MPAR-X3600H	7.9 (17.42)
MPAR-X3800H	9.5 (20.94)

(1) Replacement actuator cylinder example, if ordering a replacement cylinder for electric cylinder catalog number MPAR-A2100C-V2A the replacement actuator cylinder is catalog number MPAR-X2100C.

See the MP-Series Replacement Parts Installation Instructions, publication MPAR-IN002, for procedures to replace electric cylinder parts and to obtain other replacement part catalog numbers.

Specifications

In this section, you will find environmental specifications. For all other specifications see the Kinetix Linear Motion Specifications Technical Data, Publication KNX-TD002

Environmental Specifications

Attribute	Value
Temperature, ambient	0…40 °C (32…104 °F)
Temperature, storage	-25…60 °C (-13…140 °F)
Relative humidity (noncondensing)	5…95%
Shock	20 g peak, 6 ms duration
Vibration	2.5 g peak @ 30…2000 Hz

Electric Cylinders (Weight of Cylinder with Non-brake Motor)

Electric Cylinder Cat. No.	Weight, Approx (1) kg (lb)
MPAR-*x*1100B-V2A	2.6 (5.73)
MPAR-*x*1100B-V2B/D/E	3.5 (7.72)
MPAR-*x*1200B-V2A	2.9 (6.39)
MPAR-*x*1200B-V2B/D/E	3.8 (8.377)
MPAR-*x*1300B-V2A	3.2 (7.05)
MPAR-*x*1300B-V2B/D/E	4.1 (9.04)
MPAR-*x*1400B-V2A	3.5 (7.72)
MPAR-*x*1400B-V2B/D/E	4.5 (9.92)
MPAR-*x*1100E-V2A	3.0 (6.61)
MPAR-*x*1100E-V2B/D/E	3.8 (8.377)
MPAR-*x*1200E-V2A	3.3 (7.27)
MPAR-*x*1200E-V2B/D/E	4.1 (9.04)
MPAR-*x*1300E-V2A	3.6 (7.94)
MPAR-*x*1300E-V2B/D/E	4.5 (9.92)
MPAR-*x*1400E-V2A	4.0 (8.82)
MPAR-*x*1400E-V2B/D/E	4.8 (10.58)

Electric Cylinder Cat. No.	Weight, Approx kg (lb)
MPAR-*x*2100C-V2A	3.7 (8.16) (1)
MPAR-*x*2100C-V2B/D/E	4.4 (9.70) (1)
MPAR-*x*2200C-V2A	4.1 (9.04) (1)
MPAR-*x*2200C-V2B/D/E	4.9 (10.80) (1)
MPAR-*x*2300C-V2A	4.6 (10.14) (1)
MPAR-*x*2300C-V2B/D/E	5.3 (11.68) (1)
MPAR-*x*2400C-V2A	5.0 (11.02) (1)
MPAR-*x*2400C-V2B/D/E	5.8 (12.79) (1)
MPAR-*x*2600C-V2A	6.0 (11.02) (1)
MPAR-*x*2600C-V2B/D/E	6.7 (14.77) (1)
MPAR-*x*2100F-V2A	4.2 (9.26) (2)
MPAR-*x*2100F-V2B/D/E	6.5 (14.33) (2)
MPAR-*x*2200F-V2A	4.7 (10.36) (2)
MPAR-*x*2200F-V2B/D/E	7.0 (15.43) (2)
MPAR-*x*2300F-V2A	5.2 (11.46) (2)
MPAR-*x*2300F-V2B/D/E	7.5 (16.53) (2)
MPAR-*x*2400F-V2A	5.6 (12.34) (2)
MPAR-*x*2400F-V2B/D/E	7.9 (17.42) (2)
MPAR-*x*2600F-V2A	6.6 (14.55) (2)
MPAR-*x*2600F-V2B/D/E	8.9 (19.62) (2)

Electric Cylinder Cat. No.	Weight, Approx kg (lb)
MPAR-*x*3100E-M2A	9.5 (20.94) (3)
MPAR-*x*3100E-M2B/D/E	13.6 (29.98) (3)
MPAR-*x*3200E-M2A	10.3 (22.71) (3)
MPAR-*x*3200E-M2B/D/E	14.4 (31.75) (3)
MPAR-*x*3300E-M2A	11.1 (24.47) (3)
MPAR-*x*3300E-M2B/D/E	15.2 (33.51) (3)
MPAR-*x*3400E-M2A	11.9 (26.23) (3)
MPAR-*x*3400E-M2B/D/E	16.1 (35.49) (3)
MPAR-*x*3600E-M2A	13.5 (29.76) (3)
MPAR-*x*3600E-M2B/D/E	17.7 (39.02) (3)
MPAR-*x*3800E-M2A	15.2 (33.51) (3)
MPAR-*x*3800E-M2B/D/E	19.3 (42.55) (3)
MPAR-*x*3100H-M2A	9.3 (20.50) (4)
MPAR-*x*3100H-M2B/D/E	13.2 (29.10) (4)
MPAR-*x*3200H-M2A	10.1 (22.27) (4)
MPAR-*x*3200H-M2B/D/E	14.0 (30.86) (4)
MPAR-*x*3300H-M2A	10.9 (24.03) (4)
MPAR-*x*3300H-M2B/D/E	14.8 (32.63) (4)
MPAR-*x*3400H-M2A	11.7 (25.79) (4)
MPAR-*x*3400H-M2B/D/E	15.7 (34.61) (4)
MPAR-*x*3600H-M2A	13.4 (29.54) (4)
MPAR-*x*3600H-M2B/D/E	17.3 (38.14) (4)
MPAR-*x*3800H-M2A	15.0 (33.07) (4)
MPAR-*x*3800H-M2B/D/E	18.9 (41.67) (4)

(1) If you are ordering an MPAR-x1*xxxx*-V4x or MPAR-x2*xxx*C-V4x electric cylinder with brake, add 0.2 kg (0.4 lb).

(2) If you are ordering an MPAR-x2*xxx*F-V4x electric cylinder with brake, add 0.4 kg (0.9 lb).

(3) If you are ordering an MPAR-x3*xxx*E-V4x electric cylinder with brake, add 1.0 kg (2.2 lb).

(4) If you are ordering an MPAR-x3*xxx*H-M4x electric cylinder with brake, add 1.7 kg (3.7 lb).

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Kinetix Linear Motion Specifications Technical Data, publication KNX-TD002	This document provides catalog numbers and product specifications, including power, performance, environmental, certifications, dimension drawings, and accessories for Allen-Bradley® linear motion products.
Kinetix Servo Drives Specifications Technical Data, publication KNX-TD003	This document provides catalog numbers and product specifications, including power, performance, environmental, certifications, dimension drawings, and accessories for Allen-Bradley® servo drives.
MP-Series Electric Cylinder Replacement Parts Installation Instructions, publication MPAR-IN002	Information on replacing actuator cylinders, motors, couplings, and belts.
MP-Series Brushless Servo Motor Installation Instructions, publication MP-IN001	Information for the installation of 100…165 mm frame size MP-Series low-inertia motors.
MP-Series Brushless Servo Motor Installation Instructions, publication MP-IN006	Information for the installation of small frame (≤75 mm) MP-Series low-inertia motors.
Kinetix 2000 Multi-axis Servo Drive User Manual, publication 2093-UM001	Information on how to install, configure, start up, and troubleshoot a servo drive system with an electric cylinder and a Kinetix 2000 drive.
Ultra3000 Digital Servo Drives Installation Manual, publication 2098-IN003	How to install, configure, and troubleshoot an Ultra3000 drive.
Ultra3000 Digital Servo Drives Integration Manual, publication 2098-IN005	
Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001	Information on how to install, configure, start up, and troubleshoot a servo drive system with an electric cylinder and a Kinetix 6000 drive.
Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001	Information on how to install, configure, start up, and troubleshooting a servo drive system with an electric cylinder and a Kinetix 300 drive.
Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drive User Manual, publication 2094-UM002	Information on how to install, configure, start up, and troubleshooting a servo drive system with an electric cylinders and a Kinetix 6200 or Kinetix 6500 drive.
Motion Analyzer Software, download at https://motionanalyzer.rockwellautomation.com/	Drive and motor sizing with application analysis software.
SERCOS and Analog Motion Configuration and Startup User Manual, publication MOTION-UM001	Information on how to configure and troubleshoot your ControlLogix® and CompactLogix™ SERCOS interface modules, and how to use the home to torque-level sequence.
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Information, examples, and techniques that are designed to minimize system failures that are caused by electrical noise.

You can view or download publications at http://www.rockwellautomation.com/global/literature-library/overview.page. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Notes:

Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	https://rockwellautomation.custhelp.com/
Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	http://www.rockwellautomation.com/global/support/pcdc.page

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the How Are We Doing? form at http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf.

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