

## Kinetix VP Electric Cylinders

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

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### Summary of Changes

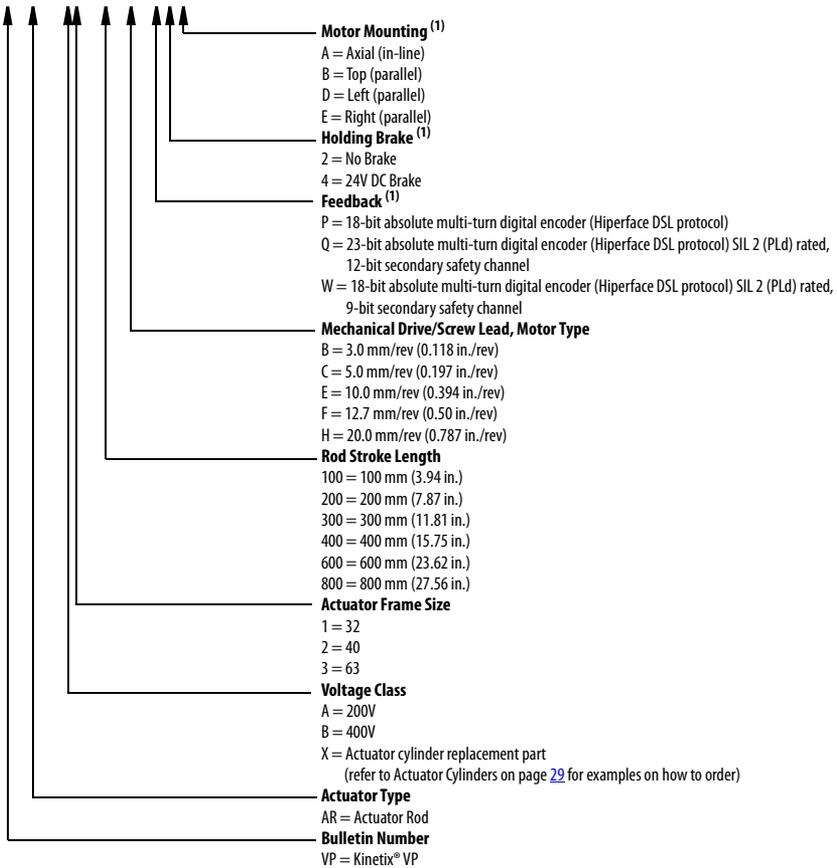
This manual contains new and updated information as indicated in the following table.

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Update frame 63 dimension drawing and table.	16...17

## Catalog Number Explanation

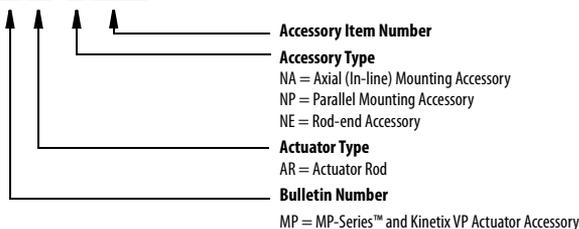
Catalog numbers consist of various characters, each of which identifies a specific version or option for that component. Use this catalog explanation to understand the configuration of your actuator.

### VP AR - xx xxx X - x x x



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

### MP AR - xx xxxxxx

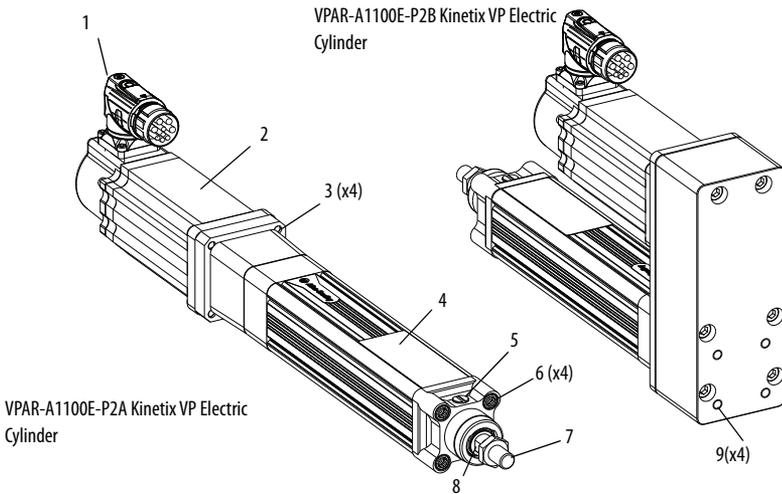


## About the Kinetix VP Electric Cylinders

Kinetix VP electric cylinders feature multi-turn high-resolution encoders and are available with 24V DC brakes. The Kinetix VP 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 VP-A/Bxxxx-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 Kinetix VP electric cylinders have been designed for exact positioning at high speeds.



Item	Description
1	Single motor connector
2	Kinetix VP motor
3	Motor mounting bolts
4	Actuator cylinder
5	Breather port
6	Hollow bolts with internal threads for fastening
7	Piston rod
8	Wrench flats to counteract torque on piston rod
9	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 kg (44.0 lb).
3. Visually inspect the electric cylinder for damage.
4. Examine the electric cylinder frame, piston shaft, and hollow bolts for anomalies.
5. Notify the carrier of shipping damage immediately



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**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.

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## Planning Your Installation

See the Kinetix Linear Motion Specifications Technical Data, publication [KNX-TD002](#), 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.



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**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 reduces the lifetime of the electric-cylinder.

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



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**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 drops down.  
Check whether additional external safety measures are required to help prevent damage of the spindle nut fractures.

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

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- Motor feedback, auxiliary feedback, and I/O connector kits are not included, but can be purchased separately.
  - Factory manufactured single cables are available in standard cable lengths. They provide environmental sealing and shield termination. Contact your Rockwell Automation 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 help 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.

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**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 help 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.

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## Prevent 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, 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.
- Do not route cables over the vent openings of servo drives.
- Ground all equipment by using a single-point parallel ground system that employs ground busbars 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.

## Install Cables

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

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**ATTENTION:** The overall shield on the actuator power cables must be grounded to obtain an effective encoder signal. The encoder data signal is transmitted through an impedance-matched twisted-wire pair that requires effective shielding for optimum performance. Be sure that there is an effective connection between the cable shields and the drive system ground

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Kinetix 5500 and 5700 inverters and Kinetix VP electric cylinder combinations use single motor-cable technology with motor power, feedback, and brake wires (when specified) housed in one cable. Feedback wires are shielded separately and provide a shield braid for grounding in the connector kit.

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**IMPORTANT** Due to the unique characteristics of single cable technology, which is designed for and tested with Kinetix 5500 and 5700 inverters and Kinetix VP electric cylinders, you cannot build your own cables or use third-party cables.

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## 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 help 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 breaks.

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 29](#) 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.

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

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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  $\leq 0.2$  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 26](#).

Tighten the fastening screws evenly.

Attribute	Frame 32	Frame 40	Frame 63
Internal thread of cover screws	M6	M6	M8
Torque, max <sup>(1)</sup>	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  $\pm 20\%$  tolerance.

4. Attach rod-end accessories and the workload.

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



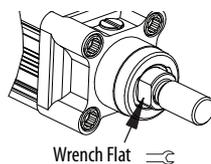
**ATTENTION:** Damage can occur to the electric cylinder bearings and the feedback device if sharp impact to the piston rod is applied during installation. Do not strike the piston rod with tools during installation or removal.

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-NA1635xx, see [page 28](#) for torque values.

If you are using a rod guide accessory, catalog number MPAR-NE34xxx or MPAR-NE150xxx, adjust the guides of the workload and the electric cylinder so that they are exactly parallel. This alignment avoids excessive wear on the guide.

## Change Connector Orientation

You can rotate the SpeedTec DIN-connector housings up to 325°.



**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.  
The connector provides a larger area to grasp and extends the leverage force.
2. Grasp the mated connector and cable plug with your hands and slowly rotate the motor connector into the new position.

3. Remove the cable plug after the connector is aligned.



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**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.

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## Mount the Electric Cylinder

Use stainless steel fasteners to mount your electric cylinder to your application.



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

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## Attach Single Motor Cable

Follow these steps to attach the single motor cable after the electric-cylinder is mounted.



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**ATTENTION:** Consider electric-cylinder surface temperature when making the motor-mating connection. Failure to observe these safety precautions can result in personal injury or damage to equipment.

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1. Carefully align the cable connector with motor connector.



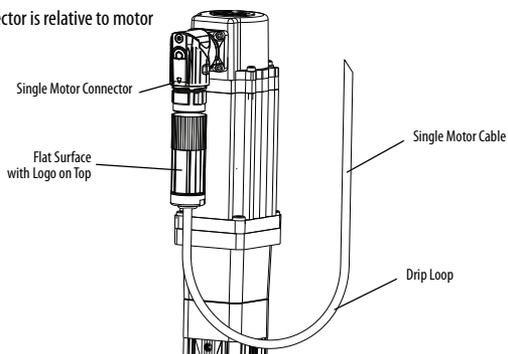
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**ATTENTION:** The keyed connector must be properly aligned and hand-tightened. Do not use tools, or apply excessive force, when mating the cable to the motor connector. If the connectors do not go together with light hand force, realign and try again.

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2. Hand-tighten the knurled collar one-quarter turn to seat the cable connector fully.

Top of connector is relative to motor orientation.



**ATTENTION:** Make sure that the cable is installed and restrained to prevent uneven tension or flexion at the cable connectors. Excessive and uneven lateral force at the cable connector 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.



**ATTENTION:** The overall shield on the single motor cable must be grounded to obtain an effective encoder signal. The encoder data signal is transmitted through an impedance-matched twisted-wire pair that requires effective shielding for optimum performance. Be sure that there is an effective connection between the single motor cable shield and the drive system ground.

3. If applicable, form a drip loop in the cables to carry liquids away from the connector.



**Kinetix VP Electric Cylinder Dimensions (In-line Configuration, Frame 32)**

Electric Cylinder Cat. No.	L7 <sup>(1)</sup> mm (in.)	LB <sup>(1)</sup> mm (in.)	LE <sup>(1)</sup> mm (in.)
VPAR-x1100B-P2A	467.3 (18.40)	148.1 (5.83)	85.3 (3.36)
VPAR-x1200B-P2A	567.3 (22.33)		
VPAR-x1300B-P2A	667.3 (26.27)		
VPAR-x1400B-P2A	767.3 (30.21)		
VPAR-x1100E-P2A	492.3 (19.38)	173.1 (6.81)	110.3 (4.34)
VPAR-x1200E-P2A	592.3 (23.32)		
VPAR-x1300E-P2A	692.3 (27.26)		
VPAR-x1400E-P2A	792.3 (31.19)		

(1) If you are ordering an VPAR-x1xxx-P4x actuator with brake, add 30.6 mm (1.20 in.) to dimensions L7, LB, and LE.

**Kinetix VP Electric Cylinder Dimensions (Parallel Configuration, Frame 32)<sup>(1)</sup>**

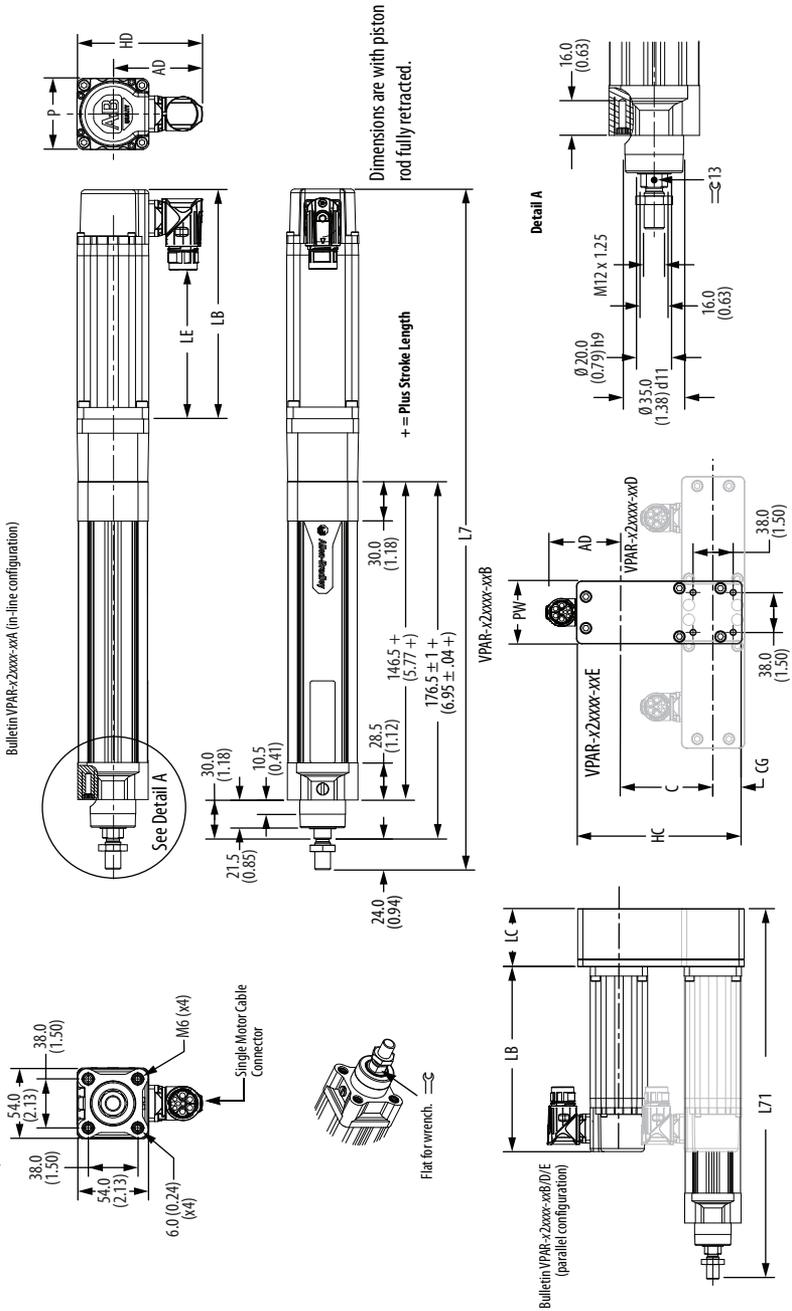
Electric Cylinder Cat. No.	L71 mm (in.)
VPAR-x1100B-P2B/D/E	326.3 (12.8)
VPAR-x1200B-P2B/D/E	426.3 (16.8)
VPAR-x1300B-P2B/D/E	526.3 (20.7)
VPAR-x1400B-P2B/D/E	626.3 (24.6)

(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.

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

Dimensions are in mm (in.).

**Kinetix VP Electric Cylinders (Frame 40)**



### Kinetix VP Electric Cylinder Dimensions (In-line, Frame 40)

Electric Cylinder Cat. No.	L7 <sup>(1)</sup> mm (in.)	LB <sup>(1)</sup> mm (in.)	LE <sup>(1)</sup> mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)
VPAR-x2100C-P2A	522.8 (20.58)	173.1 (6.81)	110.3 (4.34)	55.0 (2.17)	69.5 (2.74)	97.0 (3.82)
VPAR-x2200C-P2A	622.8 (24.52)					
VPAR-x2300C-P2A	722.8 (28.46)					
VPAR-x2400C-P2A	822.8 (32.39)					
VPAR-x2600C-P2A	1022.8(40.27)					
VPAR-x2100F-P2A	499.6 (19.67)	149.9 (5.90)	87.1 (3.43)	70.0 (2.76)	77.0 (3.03)	112.0 (4.41)
VPAR-x2200F-P2A	599.6 (23.61)					
VPAR-x2300F-P2A	699.6 (27.54)					
VPAR-x2400F-P2A	799.6 (31.48)					
VPAR-x2600F-P2A	999.6 (39.35)					

(1) If you are ordering an VPAR-x2xxx-P4x actuator with brake, add 30.6 mm (1.20 in.) to dimensions L7, LB, and LE.

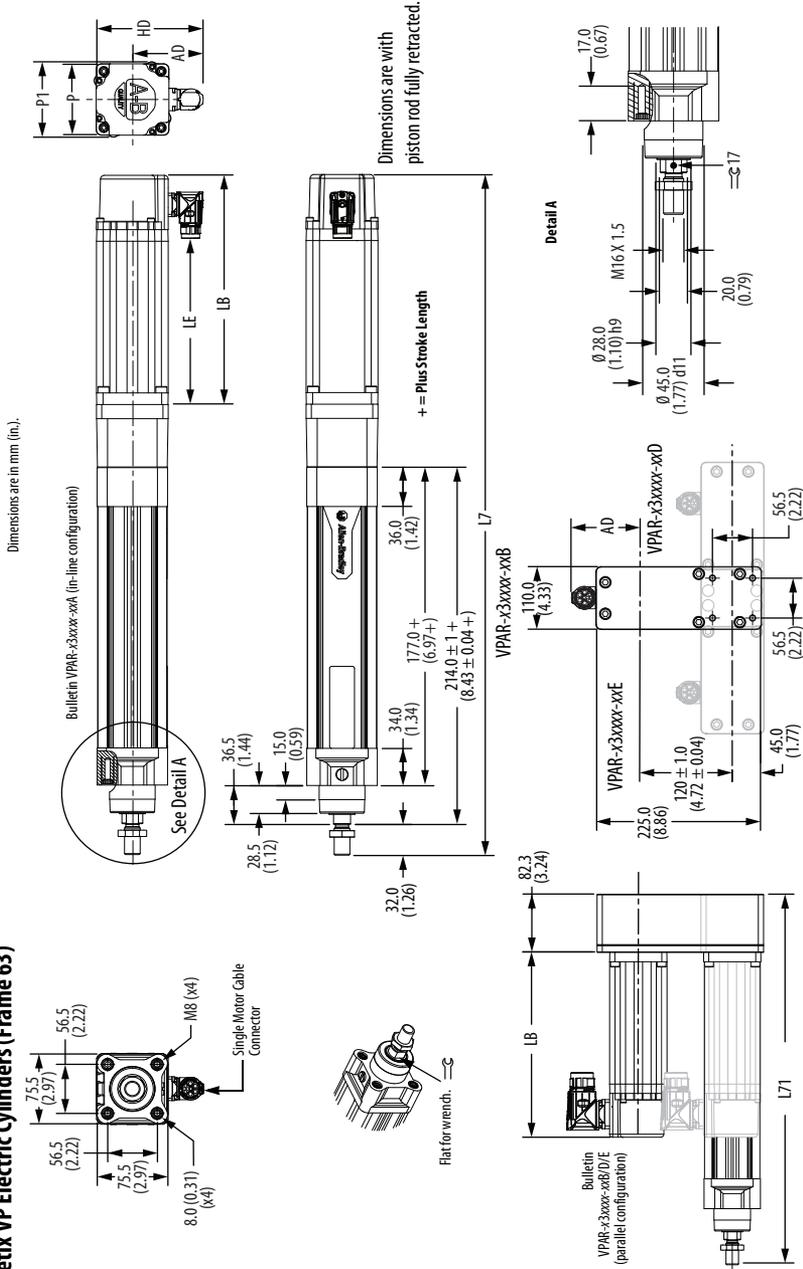
### Kinetix VP Electric Cylinder Dimensions (Parallel, Frame 40) <sup>(1)</sup>

Electric Cylinder Cat. No.	L71 mm (in.)	LC mm (in.)	HC mm (in.)	C <sup>(2)</sup> mm (in.)	CG mm (in.)	PW mm (in.)
VPAR-x2100C-P2B/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)
VPAR-x2200C-P2B/D/E	456.8 (17.98)					
VPAR-x2300C-P2B/D/E	556.8 (21.92)					
VPAR-x2400C-P2B/D/E	656.8 (25.86)					
VPAR-x2600C-P2B/D/E	856.8 (33.73)					
VPAR-x2100F-P2B/D/E	369.8 (14.56)	69.3 (2.73)	189.0 (7.44)	100.0 (3.94)	38.0 (1.50)	86.0 (3.39)
VPAR-x2200F-P2B/D/E	469.8 (18.50)					
VPAR-x2300F-P2B/D/E	569.8 (22.43)					
VPAR-x2400F-P2B/D/E	669.8 (26.37)					
VPAR-x2600F-P2B/D/E	869.8 (34.24)					

(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  $\pm 1.0$  mm (0.04 in.).

**Kinetix VP Electric Cylinders (Frame 63)**



### Kinetix VP Electric Cylinder Dimensions (In-line, Frame 63)

Electric Cylinder Cat. No.	L7 <sup>(1)</sup> mm (in.)	LB <sup>(1)</sup> mm (in.)	LE <sup>(1)</sup> mm (in.)	P mm (in.)	P1 mm (in.)	AD mm (in.)	HD mm (in.)
VPAR-x3100E-x2A	598.5 (23.56)	181.4 (7.14)	119.7 (4.71)	89.4 (3.52)	94.4 (3.72)	86.5 (3.41)	131.2 (5.17)
VPAR-x3200E-x2A	698.5 (27.50)						
VPAR-x3300E-x2A	798.5 (31.44)						
VPAR-x3400E-x2A	898.5 (35.37)						
VPAR-x3600E-x2A	1098.5 (43.25)						
VPAR-x3800E-x2A	1298.5 (51.12)						
VPAR-x3100H-x2A	577.9 (22.75)	152.4 (6.00)	90.7 (3.57)	98.3 (3.87)	101.5 (4.00)	90.8 (3.57)	140.0 (5.51)
VPAR-x3200H-x2A	677.9 (26.69)						
VPAR-x3300H-x2A	777.9 (30.63)						
VPAR-x3400H-x2A	877.9 (34.56)						
VPAR-x3600H-x2A	1077.9 (42.44)						
VPAR-x3800H-x2A	1277.9 (50.31)						

- (1) If you are ordering an VPAR-x3xxxE-x4x actuator with brake, add 34.5 mm (1.36 in.) to dimensions L7, LB, and LE.  
If you are ordering an VPAR-x3xxxH-x4x actuator with brake, add 48.5 mm (1.91 in.) to dimensions L7, LB, and LE.

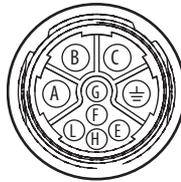
### Kinetix VP Electric Cylinder Dimensions (Parallel, Frame 63)

Electric Cylinder Cat. No.	L71 mm (in.)
VPAR-x3100x-x2B/D/E	428.3 (16.86)
VPAR-x3200x-x2B/D/E	528.3 (20.80)
VPAR-x3300x-x2B/D/E	628.3 (24.74)
VPAR-x3400x-x2B/D/E	728.3 (28.67)
VPAR-x3600x-x2B/D/E	928.3 (36.55)
VPAR-x3800x-x2B/D/E	1128.3 (44.42)

## Connector Data

This table lists the signal descriptions for power, feedback, and brake pin in the single-motor connector on the electric cylinder.

Pin	High-resolution Encoder
A	Phase U
B	Phase V
C	Phase W
⊕	Ground
E	DATA+
F	MBRK+
G	MBRK-
H	DATA-
L	Reserved



## Single Cable Types

Cable Type	Cable Cat. No.
With brake wires	2090-CSBM1Dx-xxAAxx (standard, non-flex) or 2090-CSBM1Dx-xxAFxx (continuous-flex)
Without brake wires	2090-CSWM1Dx-xxAAxx (standard, non-flex)

## Commission

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

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

Configure the electric-cylinder by using the basic parameter settings that are described in this section.



**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.

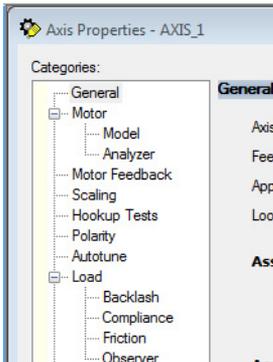
Safeguards must prevent access to the electric cylinder until all motion has stopped. Check that the electric cylinder is clear of foreign matter and tools. Objects hit by the moving piston rod can become projectiles that can cause personal injury or damage equipment.

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

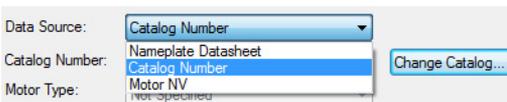
The procedure assumes the electric-cylinder and the Kinetix 5500 or Kinetix 5700 servo drive are installed and wired as one axis of the motion system.

To configure your drive, do the following.

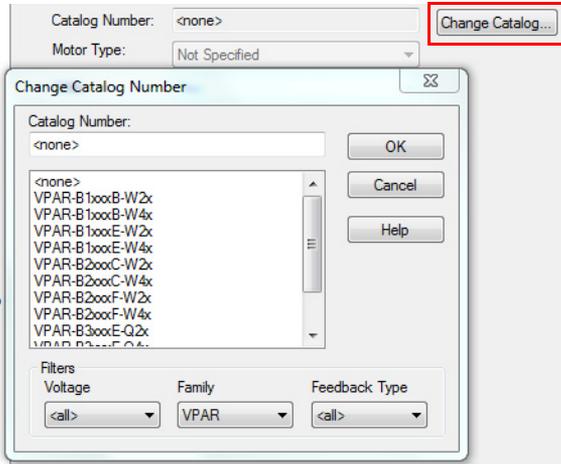
1. From Axis Properties select, Motor category.



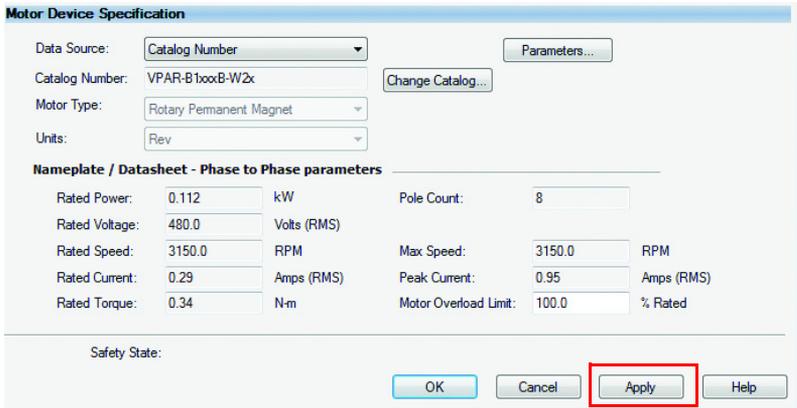
2. From the Data Source pull-down menu, choose Catalog Number.



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



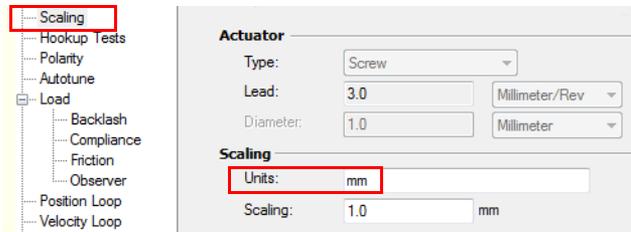
5. Click Apply.



**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.

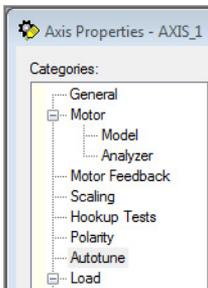
6. From Axis Properties, select Scaling category.

- Under Scaling, enter mm (millimeters) for Units.

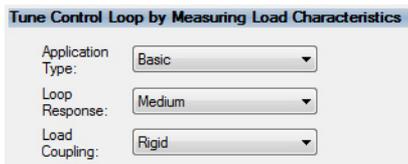


## Tune Your Electric Cylinder with a Kinetix 5500 or Kinetix 5700 Servo Drive

- From Axis Properties, select Autotune.



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



- Check Measure Inertia by using Tune Profile.
- Click Motor with Load or Uncouple Motor, which ever applies.

- 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.

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

Measure Inertia using Tune Profile

Motor with Load     Uncoupled Motor

Travel Limit: 50.0    Position Units

Speed: 100.0    Position Units/s

Torque: 100.0    % Rated

Direction: Forward Bi-directional

- To Perform Tune, click Start.  
Wait for autotune to complete.
- To apply values, click Accept Tune Values.

**Perform Tune**       DANGER: Starting tuning procedure with controller in Program or Run Mode causes axis motion.

Start    Stop

Tune Status: Ready

Loop Parameters Tuned

Name	Current	Tuned	Units
PositionLoopBandwidth	18.52124		Hz
PositionIntegratorBand...	0.0		Hz
VelocityLoopBandwidth	74.08496		Hz

Advanced Compensation

Load Parameters Tuned

Name	Current	Tuned	Units
MaximumAcceleration	54188.105		Po...
MaximumDeceleration	54188.105		Po...
Systeminertia	0.02029966		% ...

Accept Tuned Values

---

## Maintenance

Follow these steps to maintain your electric cylinder.

1. Remove power to the electric cylinder and lockout 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.

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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 Klüber 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 29](#).

## Troubleshooting

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

### Troubleshooting

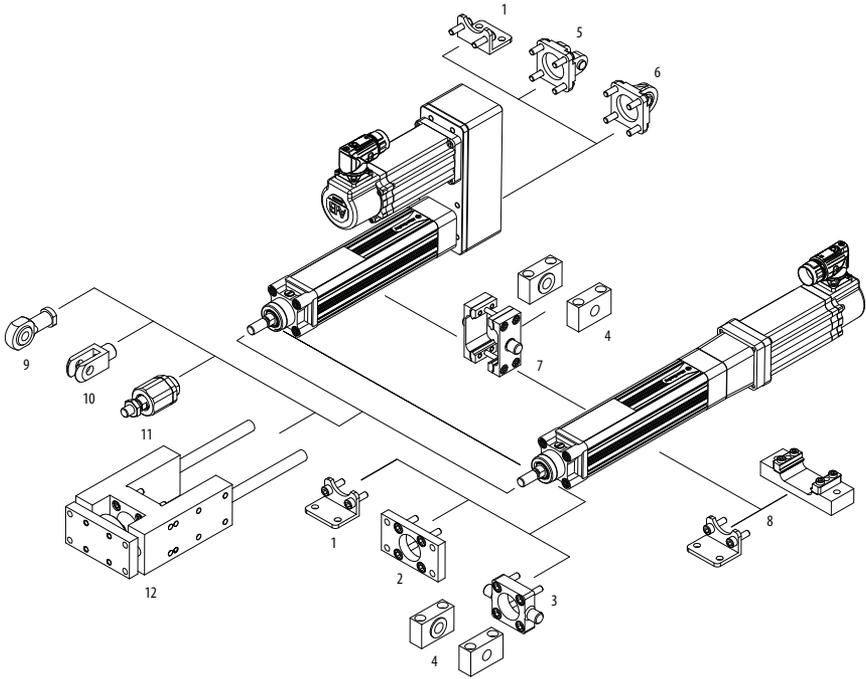
Description	Possible Cause	Corrective Action
Axial play too large.	Wear.	Replace actuator cylinder. Send to Rockwell Automation for repair.
Squeaking or vibrations.	Distortions.	Check that the electric cylinder is free of stress and evenly supported $\leq 0.2$ mm (0.008 in.). Lubricate piston rod. See Maintenance on <a href="#">page 23</a> . Modify positioning speed.
	Needs tuning.	Modify control parameters.
	Noises from the spindle support (with strokes 300 mm (11.81 in.) and high positioning speeds).	Normal, no impairment of function.
Piston rod does not move.	Jam in mechanical end position, after traveling at excessive speed or into end position.	Loosen jam 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.
Electric cylinder is enabled but not operating or is operating erratically.	Feedback signal interference.	Test the feedback signal.
	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 drive setting for number of poles, voltage, current, resistance, inductance, inertia, and other motor settings.

**Troubleshooting (Continued)**

Description	Possible Cause	Corrective Action
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 drive 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 drive.
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 Linear Motion Specifications, publication [KNX-TD002](#), 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)

**Kinetix VP 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)

**Kinetix VP 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 <sup>(1)</sup> Cat. No.	Weight, Approx kg (lb)	Actuator Cylinder <sup>(1)</sup> Cat. No.	Weight, Approx kg (lb)	Actuator Cylinder <sup>(1)</sup> Cat. No.	Weight, Approx kg (lb)
MPAR-X1100B	1.1 (2.43)	MPAR-X2100C	1.7 (3.75)	MPAR-X3100E	3.8 (8.38)
MPAR-X1200B	1.4 (3.09)	MPAR-X2200C	2.2 (4.85)	MPAR-X3200E	4.6 (10.14)
MPAR-X1300B	1.7 (3.75)	MPAR-X2300C	2.6 (5.73)	MPAR-X3300E	5.4 (11.90)
MPAR-X1400B	2.1 (4.63)	MPAR-X2400C	3.1 (6.83)	MPAR-X3400E	6.3 (13.89)
MPAR-X1100E	1.1 (4.63)	MPAR-X2600C	4.0 (8.82)	MPAR-X3600E	7.9 (17.46)
MPAR-X1200E	1.4 (3.09)	MPAR-X2100F	1.8 (3.97)	MPAR-X3800E	9.5 (20.94)
MPAR-X1300E	1.8 (3.97)	MPAR-X2200F	2.3 (5.07)	MPAR-X3100H	3.8 (8.38)
MPAR-X1400E	2.1 (4.63)	MPAR-X2300F	2.8 (6.17)	MPAR-X3200H	4.6 (10.14)
		MPAR-X2400F	3.2 (7.05)	MPAR-X3300H	5.4 (11.90)
		MPAR-X2600F	4.2 (9.26)	MPAR-X3400H	6.3 (13.89)
				MPAR-X3600H	7.9 (17.42)
				MPAR-X3800H	9.5 (20.94)

(1) Replacement actuator cylinder example, if you order a replacement cylinder for electric cylinder catalog number VPAR-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 kg (lb)	Electric Cylinder Cat. No.	Weight, Approx kg (lb)	Electric Cylinder Cat. No.	Weight, Approx kg (lb)
VPAR-x1100B-P2A	2.8 (6.07) <sup>(1)</sup>	VPAR-x2100C-P2A	3.8 (8.32) <sup>(1)</sup>	VPAR-x3100E-x2A	9.4 (20.57) <sup>(3)</sup>
VPAR-x1100B-P2B/D/E	3.7 (8.05) <sup>(1)</sup>	VPAR-x2100C-P2B/D/E	4.5 (9.86) <sup>(1)</sup>	VPAR-x3100E-x2B/D/E	13.5 (29.59) <sup>(3)</sup>
VPAR-x1200B-P2A	3.1 (6.73) <sup>(1)</sup>	VPAR-x2200C-P2A	4.2 (9.20) <sup>(1)</sup>	VPAR-x3200E-x2A	10.2 (22.33) <sup>(3)</sup>
VPAR-x1200B-P2B/D/E	4.0 (8.71) <sup>(1)</sup>	VPAR-x2200C-P2B/D/E	5.0 (10.96) <sup>(1)</sup>	VPAR-x3200E-x2B/D/E	14.3 (31.35) <sup>(3)</sup>
VPAR-x1300B-P2A	3.4 (7.39) <sup>(1)</sup>	VPAR-x2300C-P2A	4.7 (10.30) <sup>(1)</sup>	VPAR-x3300E-x2A	11.0 (24.09) <sup>(3)</sup>
VPAR-x1300B-P2B/D/E	4.3 (9.37) <sup>(1)</sup>	VPAR-x2300C-P2B/D/E	5.4 (11.84) <sup>(1)</sup>	VPAR-x3300E-x2B/D/E	15.1 (33.11) <sup>(3)</sup>
VPAR-x1400B-P2A	3.7 (8.05) <sup>(1)</sup>	VPAR-x2400C-P2A	5.1 (11.18) <sup>(1)</sup>	VPAR-x3400E-x2A	11.8 (25.85) <sup>(3)</sup>
VPAR-x1400B-P2B/D/E	4.7 (10.25) <sup>(1)</sup>	VPAR-x2400C-P2B/D/E	5.9 (12.94) <sup>(1)</sup>	VPAR-x3400E-x2B/D/E	16.0 (35.09) <sup>(3)</sup>
VPAR-x1100E-P2A	3.1 (6.78) <sup>(1)</sup>	VPAR-x2600C-P2A	6.1 (13.38) <sup>(1)</sup>	VPAR-x3600E-x2A	13.4 (29.37) <sup>(3)</sup>
VPAR-x1100E-P2B/D/E	3.9 (8.54) <sup>(1)</sup>	VPAR-x2600C-P2B/D/E	6.8 (14.92) <sup>(1)</sup>	VPAR-x3600E-x2B/D/E	17.6 (38.61) <sup>(3)</sup>
VPAR-x1200E-P2A	3.4 (7.44) <sup>(1)</sup>	VPAR-x2100F-P2A	4.2 (9.24) <sup>(2)</sup>	VPAR-x3800E-x2A	15.1 (33.11) <sup>(3)</sup>
VPAR-x1200E-P2B/D/E	4.2 (9.20) <sup>(1)</sup>	VPAR-x2100F-P2B/D/E	6.5 (14.30) <sup>(2)</sup>	VPAR-x3800E-x2B/D/E	19.4 (42.77) <sup>(3)</sup>
VPAR-x1300E-P2A	3.7 (8.10) <sup>(1)</sup>	VPAR-x2200F-P2A	4.7 (10.34) <sup>(2)</sup>	VPAR-x3100H-x2A	9.2 (20.28) <sup>(4)</sup>
VPAR-x1300E-P2B/D/E	4.6 (10.08) <sup>(1)</sup>	VPAR-x2200F-P2B/D/E	7.0 (15.40) <sup>(2)</sup>	VPAR-x3100H-x2B/D/E	13.3 (29.32) <sup>(4)</sup>
VPAR-x1400E-P2A	4.1 (8.98) <sup>(1)</sup>	VPAR-x2300F-P2A	5.2 (11.44) <sup>(2)</sup>	VPAR-x3200H-x2A	10.2 (22.48) <sup>(4)</sup>
VPAR-x1400E-P2B/D/E	4.9 (10.74) <sup>(1)</sup>	VPAR-x2300F-P2B/D/E	7.5 (16.50) <sup>(2)</sup>	VPAR-x3200H-x2B/D/E	14.1(32.85) <sup>(4)</sup>
		VPAR-x2400F-P2A	5.6 (12.32) <sup>(2)</sup>	VPAR-x3300H-x2A	11.0 (24.25) <sup>(4)</sup>
		VPAR-x2400F-P2B/D/E	7.9 (17.38) <sup>(2)</sup>	VPAR-x3300H-x2B/D/E	14.9 (32.85) <sup>(4)</sup>
		VPAR-x2600F-P2A	6.6 (14.52) <sup>(2)</sup>	VPAR-x3400H-x2A	11.8 (26.01) <sup>(4)</sup>
		VPAR-x2600F-P2B/D/E	8.9 (19.58) <sup>(2)</sup>	VPAR-x3400H-x2B/D/E	15.8 (34.83) <sup>(4)</sup>
				VPAR-x3600H-x2A	13.5 (29.76) <sup>(4)</sup>
				VPAR-x3600H-x2B/D/E	17.4 (38.36) <sup>(4)</sup>
				VPAR-x3800H-x2A	15.1 (33.29) <sup>(4)</sup>
				VPAR-x3800H-x2B/D/E	19.0 (41.89) <sup>(4)</sup>

- (1) If you are ordering a VPAR-x1xxxB-P4x or VPAR-x2xxxC-P4x electric cylinder with brake, add 0.34 kg (0.75 lb).
- (2) If you are ordering a VPAR-x2xxxF-P4x electric cylinder with brake, add 0.59 kg (1.30 lb).
- (3) If you are ordering a VPAR-x3xxxE-P4x electric cylinder with brake, add 0.63 kg (1.39 lb).
- (4) If you are ordering a VPAR-x3xxxH-P4x electric cylinder with brake, add 0.87 kg (1.92 lb).

## Additional Resources

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

Resource	Description
Kinetix Linear Motion Specifications Technical Data, publication <a href="#">KNX-TD002</a>	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 <a href="#">KNX-TD003</a>	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 <a href="#">MPAR-IN002</a>	Information on replacing actuator cylinders, motors, couplings, and belts for MP-Series and Kinetix VP electric cylinders.
Kinetix VP Low Inertia Servo Motors with 063...165 mm Frame Size, publication <a href="#">VPL-IN001</a>	Information for the installation of 063...165 mm frame size Kinetix VP low-inertia motors.
Kinetix 5500 Servo Drives User Manual, publication <a href="#">2198-UM001</a>	Information on how to install, configure, start up, and troubleshoot a servo drive system with an electric cylinder and a Kinetix 5500 drive.
Kinetix 5700 Servo Drives User Manual, publication <a href="#">2198-UM002</a>	Information on how to install, configure, start up, and troubleshoot a servo drive system with an electric cylinder and a Kinetix 5700 drive.
Motion Analyzer, download at <a href="https://motionanalyzer.rockwellautomation.com/">https://motionanalyzer.rockwellautomation.com/</a>	Drive and motor sizing with application analysis software.
SERCOS and Analog Motion Configuration and Startup User Manual, publication <a href="#">MOTION-UM001</a>	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 <a href="#">GMC-RM001</a>	Information, examples, and techniques that are designed to minimize system failures 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.

# Rockwell Automation Support

Use the following resources to access support information.

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

## 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](http://literature.rockwellautomation.com/idc/groups/literature/documents/du/ra-du002_-en-e.pdf).

Rockwell Automation maintains current product environmental information on its website at <http://www.rockwellautomation.com/rockwellautomation/about-us/sustainability-ethics/product-environmental-compliance.page>.

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