Allen-Bradley

TL-Series Electric Cylinders

Catalog Numbers TLAR-A1*xxx*B, TLAR-A1*xxx*E, TLAR-A2*xxx*C, TLAR-A2*xxx*F, TLAR-A3*xxx*E, TLAR-A3*xxx*H

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

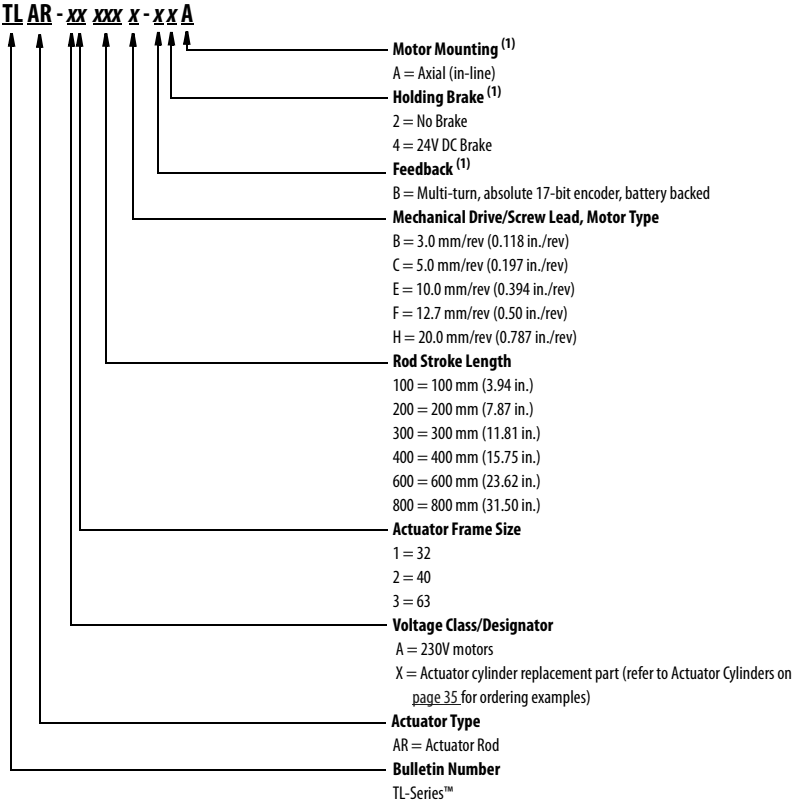
SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

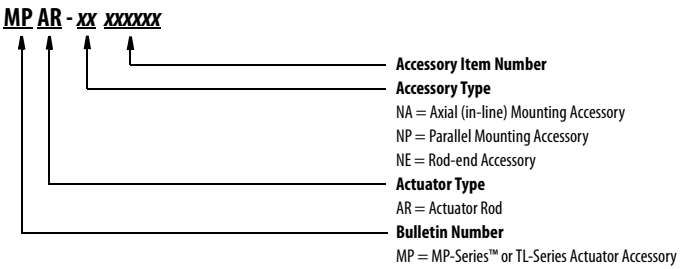
ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Catalog Number Explanation

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



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

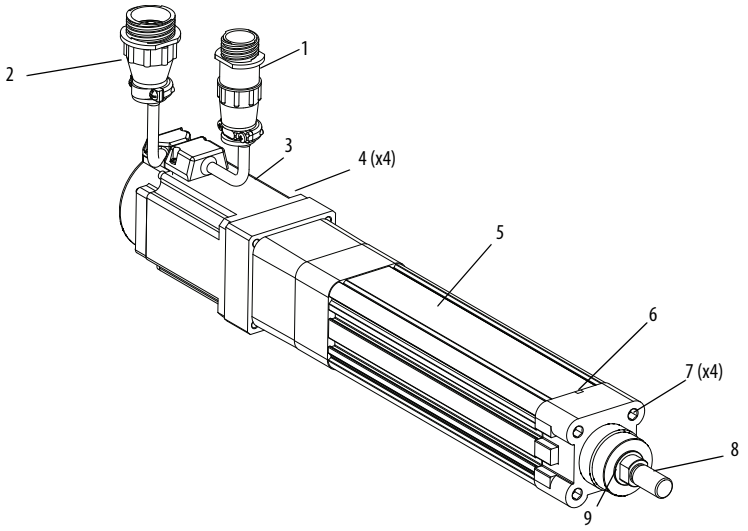


About the TL-Series Electric Cylinders

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

IMPORTANT The TLAR-A*xxxxx-x*2A 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 TL-Series electric cylinders have been designed for exact positioning at high speeds.



Item	Description
1	Power connector
2	Feedback connector
3	TL-Series motor
4	Motor mounting bolts
5	Actuator cylinder
6	Breather port (must not be sealed or covered)
7	Hollow bolts with internal treads for fastening
8	Piston rod
9	Wrench flats for counteracting torque on piston rod

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 that 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 15.0 kg (33.07 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.

ATTENTION: Do not attempt to open and modify the electric cylinder. 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 Kinetix Linear Motion Specifications, publication GMC-TD002, for the specifications and more products that are 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. Align the load with the line-of-motion of the piston rod. Side loading reduces the lifetime of the electric-cylinder.

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

ATTENTION: Uncontrolled moving masses can injure or damage to property.
If there is a spindle nut fracture inside the electric cylinder due to wear, the working mass drops down. Check whether more external safety measures are required to prevent damage in the event of a spindle nut fracture.

- Corrosive environments reduce the service life of electric cylinders.
- Depending on the work load, the piston rod can bend. See the piston-rod deflection specifications for limitations.
- 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 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. The servo motor controller can apply the power source or it can be done manual operator control.

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

An unpowered electric cylinder requires 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 GMC-TD002.

A brake can be use with the actuator to keep it from back driving, typically in vertical applications. A brake can be used for safety reasons or for energy savings, allowing the actuator to hold position when unpowered.

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 of preventing motor shaft rotation is a four-step process: first, command the servo drive to 0 rpm; second, verify that the motor is at 0 rpm; third, engage the brake; and fourth, disable the drive.

Disabling the drive removes the potential for brake wear that is caused by a badly tuned servo system oscillating the shaft.

Preventing Electrical Noise

Electromagnetic interference (EMI), commonly called electrical noise, can reduce motor performance. Effective techniques to counter EMI include filtering the AC power, using shielded cables, separating the signal cables from power wiring, and practicing 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 cables 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 more electrical noise reduction techniques to reduce EMI in noisy environments.

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

Build and Route Cables

Knowledgeable cable routing and careful cable construction improves 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: High voltage can be present on the shield of a power cable, if the shield is not grounded.
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 result in the connector environmental seal opening and closing 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. Rotating the piston rod breaks the mechanism that lets the electric cylinder extend and retract.
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 Kinetix Linear Motion Specifications Technical Data, publication GMC-TD002, for the operating temperature range. Do not enclose the electric cylinder unless forced air is blown across the electric cylinder for cooling. Keep other heat producing devices 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 32.

   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 specification has a ±20% tolerance.

4. Attach rod-end accessories and the work load.

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

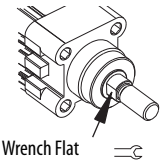
ATTENTION: Damage can occur to the electric cylinder bearings and the feedback device if sharp impact to the piston rod is applied during installation. Do not strike the piston rod with tools during installation or removal.

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

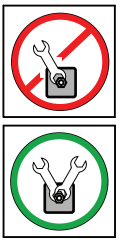
IMPORTANT Do not twist or rotate the piston rod. If the piston rod is rotated, the absolute position of the electric cylinder is lost and the absolute home position must be re-established.

When fastening a rod-end accessory or work load 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 counter act 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. Rotating the piston rod breaks the mechanism that lets the electric cylinder extend and retract. Use two wrenches to install the work load.
Failure to observe these safety precautions could result in damage to the electric cylinder and its components.

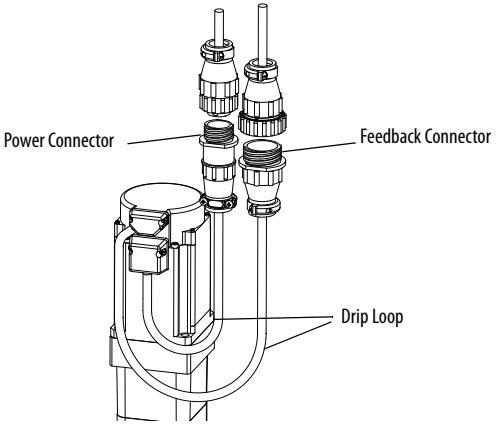


If you are using a coupling piece attachment, catalog number MPAR-NE3612*x*, or trunnion mounting kit, catalog number MPAR-NA1635*xx*, see Accessories on page 32 for torque values.

If you are using a rod guide accessory, catalog number MPAR-NE34*xxx* or MPAR-NE150*xxx*, adjust the guides of the work load and the electric cylinder so that they are exactly parallel. By making the components parallel, you avoid 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 and use a drip loop in the cable to keep liquids away from the motor.



BURN HAZARD: Outer surfaces of the motor can reach high temperatures, 65 °C (149 °F), during electric cylinder operation. Take precautions to prevent accidental contact with hot surfaces. 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.

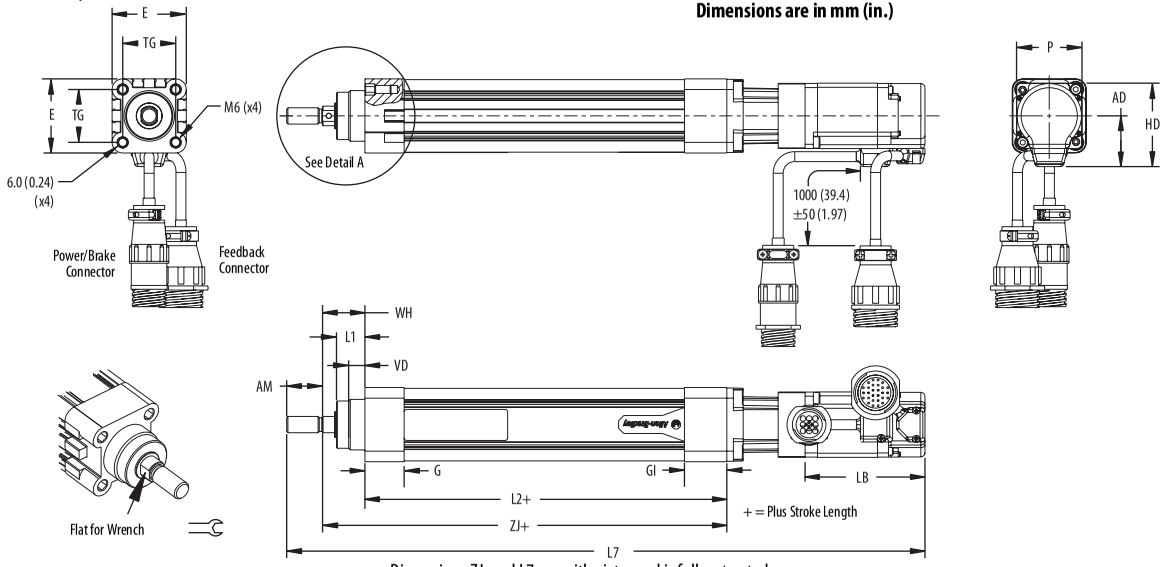
ATTENTION: Keyed connectors must be properly aligned and hand-tightened the recommended number of turns. Improper connector alignment requires excessive force, such as the need for t tools to fully seat connectors. Failure to observe these safety precautions could result in damage to the motor and cable,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

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.

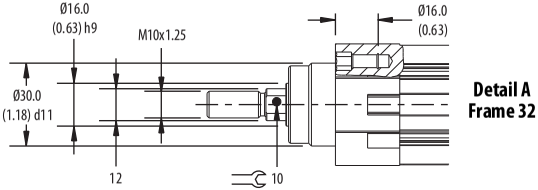
Dimensions

TL-Series Electric Cylinders (frame 32 and frame 40)

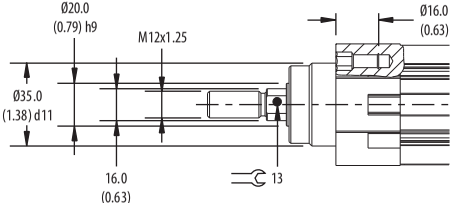
Dimensions are in mm (in.)



Dimensions ZJ, and L7 are with piston rod is fully retracted.



Detail A
Frame 32



Detail A
Frame 40

TL-Series Electric Cylinder Dimensions (frame 32)

Electric Cylinder Cat. No.	L7 (1) mm (in.)	LB (1) mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)	AM mm (in.)	G1 mm (in.)	L1 mm (in.)	ZJ (2) mm (in.)	WH mm (in.)
TLAR-A1100B-B2A	391.5 (15.41)	73.5 (2.89)	40.0 (1.57)	31.1 (1.22)	51.1 (2.01)	22.0 (0.87)	26.0 (1.02)	18.0 (0.71)	148.0 (5.83)	26.0 (1.02)
TLAR-A1200B-B2A	491.5 (19.35)									
TLAR-A1300B-B2A	591.5 (23.29)	76.1 (3.0)								
TLAR-A1400B-B2A	691.5 (27.22)									
TLAR-A1100E-B2A	405.5 (15.96)	109.1 (4.30)	60.0 (2.36)	43.0 (1.69)	73.0 (2.87)					
TLAR-A1200E-B2A	505.5 (19.90)									
TLAR-A1300E-B2A	605.5 (23.84)	110.7 (4.36)								
TLAR-A1400E-B2A	705.5 (27.78)									

(1) If ordering TLAR-A1*xxx*B-B4A actuator with brake, add 35.6 mm (1.40 in.) to dimensions L7 and LB.
If ordering TLAR-A2*xxx*E-B4A actuator with brake, add 34.6 mm (1.36 in.) to dimensions L7 and LB.

(2) The tolerance for this dimension is ±1.0 mm (0.039 in.).

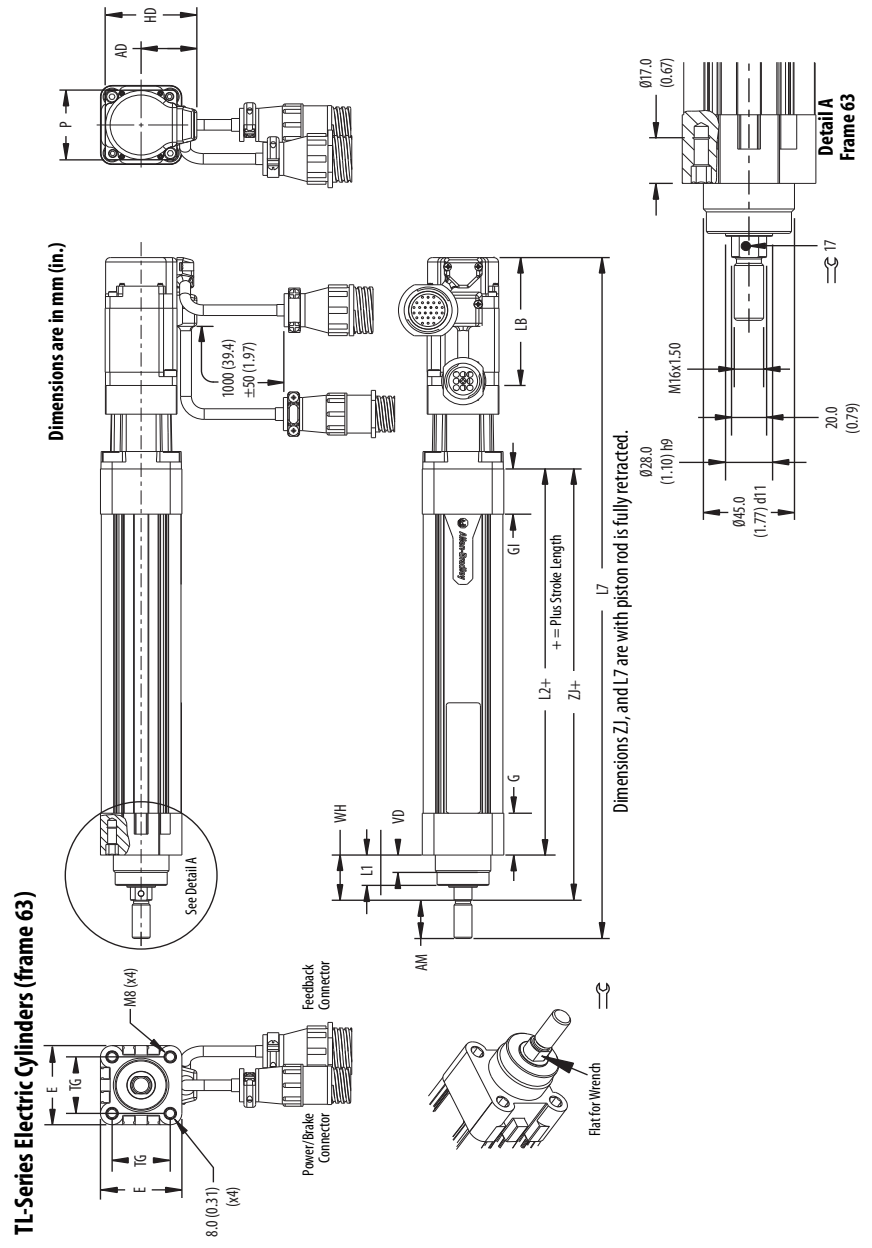
TL-Series Electric Cylinder Dimensions (frame 40)

Electric Cylinder Cat. No.	L7 (1) mm (in.)	LB (1) mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)	AM mm (in.)	G1 mm (in.)	L1 mm (in.)	ZJ (2) mm (in.)	WH mm (in.)
TLAR-A2100C-B2A	436.0 (17.17)	76.1 (3.0)	60.0 (2.36)	43.0 (1.69)	73.0 (2.87)	24.0 (0.94)	30.0 (1.18)	21.5 (0.85)	176.5 (6.95)	30.0 (1.18)
TLAR-A2200C-B2A	536.0 (21.10)									
TLAR-A2300C-B2A	636.0 (25.04)									
TLAR-A2400C-B2A	736.0 (28.98)									
TLAR-A2600C-B2A	936.0 (36.85)									
TLAR-A2100F-B2A	457.9 (18.03)	98.1 (3.86)								
TLAR-A2200F-B2A	557.9 (21.96)									
TLAR-A2300F-B2A	657.9 (25.90)									
TLAR-A2400F-B2A	757.9 (29.84)									
TLAR-A2600F-B2A	957.9 (37.71)									

(1) If ordering TLAR-A2*xxxx*-B4A actuator with brake, add 36.1 mm (1.42 in.) to dimensions L7 and LB.

(2) The tolerance for this dimension is ±1.0 mm (0.039 in.).

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


TL-Series Electric Cylinders (frame 63)
Dimensions are in mm (in.)
P
AD
HD
1000 (39.4)
±50 (1.97)
See Detail A
LB
GI
L2+
+ = Plus Stroke Length
ZJ+
L7
G
WH
VD
L1
AM
Dimensions ZJ, and L7 are with piston rod is fully retracted.
Ø17.0
(0.67)
Detail A
Frame 63
M16x1.50
17
20.0
(0.79)
Ø28.0
(1.10) h9
Ø45.0
(1.77) d11
E
TG
M8 (x4)
Feedback
Connector
Power/Brake
Connector
8.0 (0.31)
(x4)
Flat for Wrench

TL-Series Electric Cylinder Dimensions (frame 63)

Electric Cylinder Cat. No.	L7 [1] mm (in.)	LB [1] mm (in.)	P mm (in.)	AD mm (in.)	HD mm (in.)	AM mm (in.)	G1 mm (in.)	L1 mm (in.)	ZJ [2] mm (in.)	WH mm (in.)
TLAR-A3100E-B2A	564.6 (22.23)	144.2 (5.68)	86.0 (3.39)	56.0 (2.20)	99.0 (3.90)	32.0 (1.26)	36.0 (1.42)	28.5 (1.12)	214.0 (8.43)	37.0 (1.46)
TLAR-A3200E-B2A	664.6 (26.17)									
TLAR-A3300E-B2A	764.6 (30.10)									
TLAR-A3400E-B2A	864.6 (34.04)									
TLAR-A3600E-B2A	1064.6 (41.91)									
TLAR-A3800E-B2A	1264.6 (49.79)									
TLAR-A3100H-B2A	564.6 (22.23)									
TLAR-A3200H-B2A	664.6 (26.17)									
TLAR-A3300H-B2A	764.6 (30.10)									
TLAR-A3400H-B2A	864.6 (34.04)									
TLAR-A3600H-B2A	1064.6 (41.91)									
TLAR-A3800H-B2A	1264.6 (49.79)									

(1) If ordering TLAR-A3*xxxx*-B4A actuator with brake, add 23.0 mm (0.91 in.) to dimensions L7 and LB.

(2) The tolerance for this dimension is ±1.0 mm (0.039 in.).

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

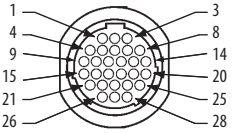
Connector Data

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

Feedback

Pin	Signal	
1…5	Reserved	—
6	BAT+	Brown
7…12	Reserved	—
13	Data+	Blue
14	Data-	Blue/black
15…21	Reserved	—
22	EPWR 5V	Red
23	ECOM & BAT-	Black
24	Shield	Drain wire
25…28	Reserved	—

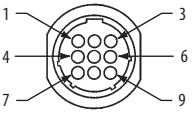
Tyco AMP 206152-1



Power and Brake

Pin	Signal	
1	U phase	Red
2	V phase	White
3	W phase	Black
4	Reserved	—
5	Ground	Yellow/green and drain wires
6	Reserved	—
7	MBRK+	Yellow
8	Reserved	—
9	MBRK-	Blue

Tyco AMP 206705-2



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 could result in damage to the motor and its components.

Commissioning

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

Required Files

Firmware revisions and software versions that are required to support the electric cylinders include the following:

- Kinetix 2000 multi-axis drives
  - Firmware revision 1.096 or later
  - Studio 5000 Logix Designer application
  - For RSLogix 5000® software, version 16.*xx*,
    Use Motion Database file, version 4_18_0 or later
  - For RSLogix 5000 software, version 17.*xx* or later,
    Use Motion Database file, version 5_9_0 or later
- Kinetix 3 component servo drive
  - Connected Components Workbench™ software
- Kinetix 350 single-axis EtherNet/IP servo drive
  - Logix Designer application
- Kinetix 300 EtherNet/IP Indexing Servo Drive
  - Logix Designer application
- Motion Analyzer software, version 4.70 or later

Download these files from http://www.rockwellautomation.com/support.

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 drive.

ATTENTION: Moving parts can cause injuries. Before running the electric cylinder, make sure that all components are secure and safe guards are in place to prevent access to the path of moving machinery.

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 cause personnel injury or damage to the equipment.

IMPORTANT You are responsible to verify that the servo control system safely controls the electric cylinder regarding maximum force, acceleration, and speed.

Configure the Logix Designer Application for Electric Cylinder with Kinetix Drives

Use the following procedure to configure the drive for your electric cylinder. It is assumed that the electric cylinder and a Kinetix 2000 or Kinetix 350 drive are installed and wired.

ATTENTION: Incorrect parameter settings can result in uncontrolled motion, with the potential for damage to the electric cylinder.

Initiating a motion command on an electric cylinder with an incorrect Position mode setting can result in damage to the electric cylinder, and the machine in which it is installed.

1. Open the Logix Designer application.
2. On the Axis Properties tabs, enter these parameters for your electric cylinder.

Axis Properties Tab	Parameter	Entry/Selection
Drive/Motor	Motor Catalog Number	Select one from this list TLAR-A1*xxx*B-B2A TLAR-A1*xxx*B-B4A TLAR-A1*xxx*E-B2A TLAR-A1*xxx*E-B4A TLAR-A2*xxx*C-B2A TLAR-A2*xxx*C-B4A TLAR-A2*xxx*F-B2A TLAR-A2*xxx*F-B4A TLAR-A3*xxx*E-B2A TLAR-A3*xxx*E-B4A TLAR-A3*xxx*H-B2A TLAR-A3*xxx*H-B4A
	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	
		Setting the Positioning Mode to Rotary can damage to the electric cylinder or the machine due to incorrect positioning.	
	Conversion Constant	66666.667 drive cnts/1.0 mm for	1693333.3 drive cnts/1.0 in. for
		TLAR-*x*1*xxx*B-B2A TLAR-*x*1*xxx*B-B4A	
	Conversion Constant	20000 drive cnts/1.0 mm for	508000 drive cnts/1.0 in. for
		TLAR-*x*1*xxx*E-B2A TLAR-*x*1*xxx*E-B4A TLAR-*x*3*xxx*E-B2A TLAR-*x*3*xxx*E-B4A	
	Conversion Constant	40000 drive cnts/1.0 mm for	1016000 drive cnts/1.0 in. for
		TLAR-*x*2*xxx*C-B2A TLAR-*x*2*xxx*C-B4A	
	Conversion Constant	15748.0315 drive cnts/1.0 mm for	400000 drive cnts/1.0 in. for
		TLAR-*x*2*xxx*F-B2A TLAR-*x*2*xxx*F-B4A	
	Conversion Constant	10000 drive cnts/1.0 mm for	254000 drive cnts/1.0 in. for
		TLAR-*x*3*xxx*H-B2A TLAR-*x*3*xxx*H-B4A	
Dynamics	Maximum Speed(1)	150 mm/s (default 157.5 mm/s)	5.91 in/s (default 6.20 in/s)
		TLAR-*x*1*xxx*B-*xx*A	
		500 mm/s (default 525 mm/s)	19.68 in/s (default 20.67 in/s)
		TLAR-*x*1*xxx*E-*xx*A TLAR-*x*3*xxx*E-*xx*A	
		250 mm/s (default 262.5 mm/s)	9.82 in/s (default 10.33 in/s)
		TLAR-*x*2*xxx*C-*xx*A	
		640 mm/s (default 672 mm/s)	24.61 in/s (default 25.84 in/s)
		TLAR-*x*2*xxx*F-*xx*A	
		1000 mm/s (default 1050 mm/s)	41.34 in/s (default 43.41 in/s)
		TLAR*x*3*xxx*H-*xx*A	
	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 adjust for your application.	
	Maximum Deceleration Jerk	Use default values, or adjust 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 the following can lead to reduction of life of your actuator.

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

Parameter	Absolute Homing	Torque Level-to-Marker Homing
	Value	Value
Mode	Absolute	Active
Position	0, typical	0, typical
Offset	N/A	0 mm
Sequence	Immediate	Torque Level-to-Marker
Direction	N/A	Reverse Bi-directional
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.

5. Do the following for absolute homing.
   a. Use motion direct commands to jog your axis slowly to the home location; do not exceed 10 mm/s (0.4 in/s).
   a. Issue the Motion Direct Command (MAH) to set the home position on your axis.
6. Click the Limits tab.
7. 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 a value that is within the piston-rod mechanical travel.
Maximum Negative	Enter a value that is within the piston-rod mechanical travel.

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

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 causes the software overtravel to trigger or an end-stop impact.

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

You can determine the deceleration distance before the piston rod contacts the end of travel that 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.

Impact Energy

Cat. No.	Impact Energy, max
TLAR-*x*1*xxxx*-*xx*A	0.0001 J
TLAR-*x*2*xxxx*-*xx*A	0.0002 J
TLAR-*x*3*xxxx*-*xx*A	0.0004 J

This table lists maximum velocity for end-stop impact with no load.

End-stop Impact

Cat. No.	Extracted Mass g (oz)	Impact Velocity, max mm/s (in/s)
TLAR-*x*1100B-*xxx*	239 (8.4)	28.9 (1.14)
TLAR-*x*1200B-*xxx*	308 (10.8)	25.5 (1.00)
TLAR-*x*1300B-*xxx*	377 (13.9)	23.0 (0.91)
TLAR-*x*1400B-*xxx*	446 (15.7)	21.2 (0.83)
TLAR-*x*1100E-*xxx*	269 (9.5)	27.3 (1.07)
TLAR-*x*1200E-*xxx*	338 (11.9)	24.3 (0.96)
TLAR-*x*1300E-*xxx*	407 (14.36)	22.2 (0.87)
TLAR-*x*1400E-*xxx*	476 (16.8)	20.5 (0.81)
TLAR-*x*2100C-*xxx*	399 (14.1)	31.7 (1.25)
TLAR-*x*2200C-*xxx*	488 (17.2)	28.6 (1.12)
TLAR-*x*2300C-*xxx*	577 (20.4)	26.3 (1.03)
TLAR-*x*2400C-*xxx*	666 (23.5)	24.5 (0.96)

End-stop Impact (continued)

Cat. No.	Extracted Mass g (oz)	Impact Velocity, max mm/s (in/s)
TLAR-*x*2600C-*xxx*	844 (29.8)	21.8 (0.86)
TLAR-*x*2100F-*xxx*	469 (16.5)	29.2 (1.15)
TLAR-*x*2200F-*xxx*	558 (19.7)	26.8 (1.05)
TLAR-*x*2300F-*xxx*	647 (22.82)	24.9 (0.98)
TLAR-*x*2400F-*xxx*	736 (26.0).	23.3 (0.92)
TLAR-*x*2600F-*xxx*	914 (32.2)	20.9 (0.82)
TLAR-*x*3100E-*xxx*	938 (33.1)	29.2 (1.15
TLAR-*x*3200E-*xxx*	1066 (37.6)	27.4 (1.08)
TLAR-*x*3300E-*xxx*	1194 (42.1)	25.9 (1.02)
TLAR-*x*3400E-*xxx*	1322 (46.6)	24.6 (0.97)
TLAR-*x*3600E-*xxx*	1578 (55.7)	22.5 (0.86)
TLAR-*x*3800E-*xxx*	1834 (64.7)	20.9 (0.82)
TLAR-*x*3100H-*xxx*	938 (33.1)	29.2 (1.149)
TLAR-*x*3200H-*xxx*	1066 (37.6)	27.4 (1.08)
TLAR-*x*3300H-*xxx*	1194 (42.1)	25.9 (1.02)
TLAR-*x*3400H-*xxx*	1322 (46.6)	24.6 (0.97)
TLAR-*x*3600H-*xxx*	1578 (55.7)	22.5 (0.88)
TLAR-*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 reestablished.

Tune Your Electric Cylinder with the Logix Designer Application

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

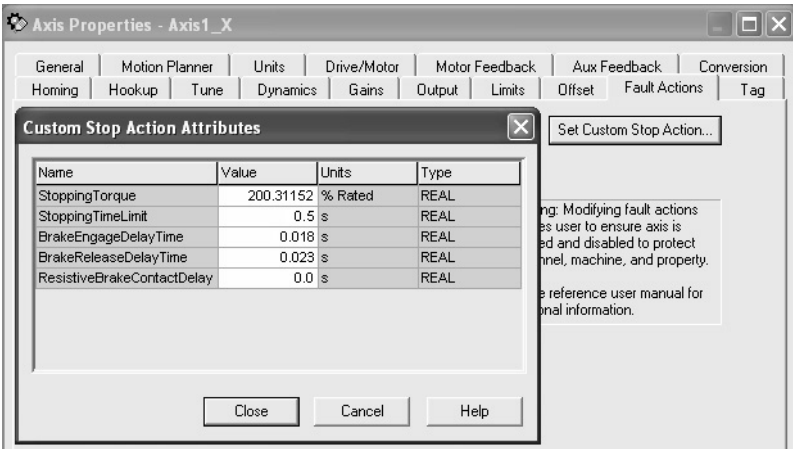
- Tuning your electric cylinder requires you to calculate and configure the loop gain based on the actual measured inertia.
- By setting travel limits, your application minimum deceleration is defined.

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 These parameter settings work best if the electric cylinder is installed in a horizontal (table top) or a wall mount (vertical) orientation.

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 GMC-TD002.
4. Reduce the default Stopping Time Limit 10...0.5 seconds.



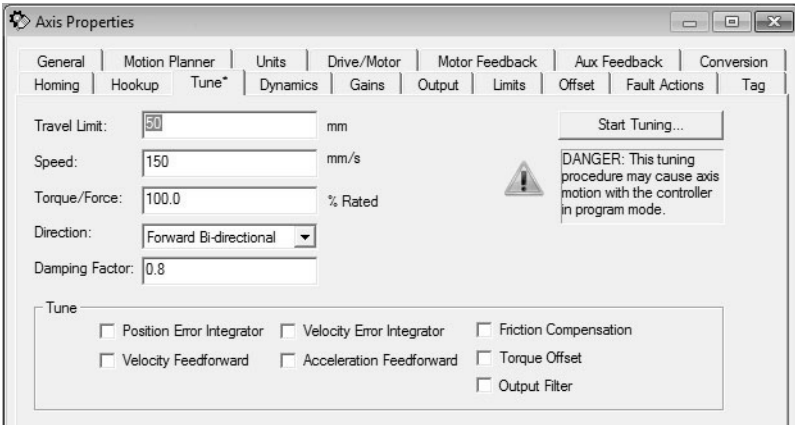
IMPORTANT To prevent the rod from moving or falling when installed in a vertical orientation, the Stopping Time Limit must be set to 0.99 seconds or less.

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

IMPORTANT Set travel limits and direction of tuning moves in reference to the 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 piston-rod starting position and allow for adequate travel.

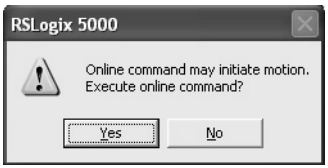
Insufficient travel while auto tuning causes the software overtravel to trigger or an end stop impact.



7. Click Start Tuning.

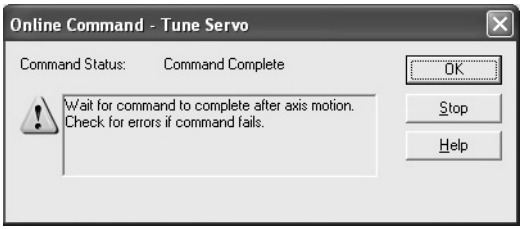
   The Motion Initiation dialog box is displayed.

8. Click Yes.



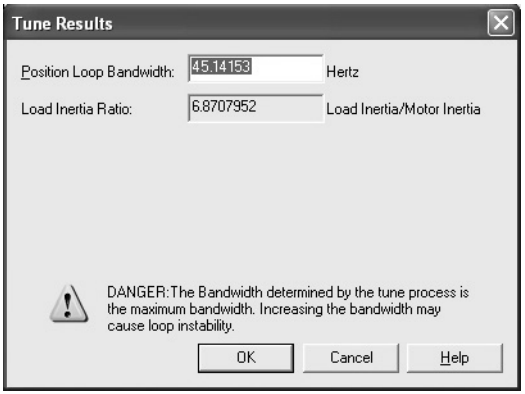
ATTENTION: Motion occurs immediately after clicking Yes.

Tuning is complete when the Tune Servo dialog box appears.



9. Click OK.

The Tune Results dialog box appears.



10. If you are satisfied with the tuning results, click OK; otherwise, continue with Calculate and Configure the Loop Gain.

Calculate and Configure the Loop Gain

Calculate a position loop bandwidth that is based on the actual measured inertia values from the Tune Results dialog box.

In this example, the Tune Results dialog box shows a default Position Loop Bandwidth of 45.14153 Hz, and a Load Inertia Ratio of 6.8707952.

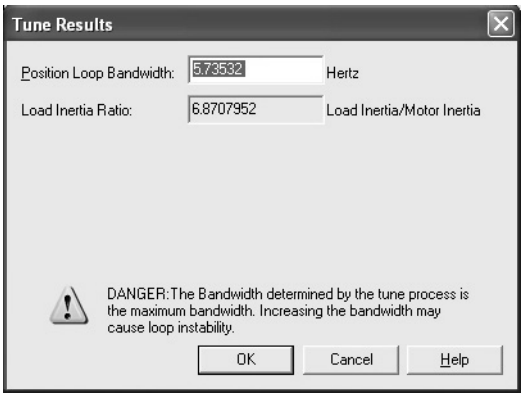
1. Calculate the Corrected Position Bandwidth.

   Corrected Position Loop Bandwidth = (Initial Position Loop Bandwidth Result/(Initial Load Inertia Ratio Result +1)

   For example, 5.73532 = 45.14153/7.8707952

2. In the Position Loop Bandwidth box, type 5.73532.

3. Click OK.



4. Click OK on the remaining dialog boxes to apply the values.

The proper Position Bandwidth results in a stable starting point; from that point, you can adjust the gains to fit your application requirements.

Configure and Tune Your Kinetix 300 Drive for an Electric Cylinder with MotionView On Board Software

In this section, you use the MotionView OnBoard software to configure and tune your electric cylinder.

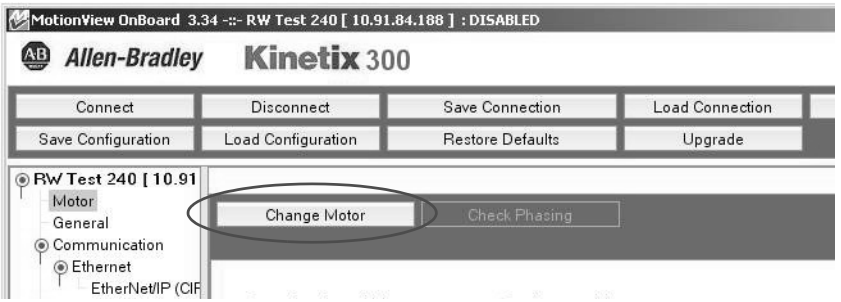
Configure Your Kinetix 300 Drive

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 configuring your electric cylinder, refer to Additional Resources on page 40. This procedure assumes that you are familiar with the Kinetix 300 drive.

1. Open the 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 automatically updates to the correct model number.



5. Click OK, then Click Yes.
6. Verify that the motor model matches the electric cylinder model that is connected to the drive.
7. From the Drive Organizer, choose General.
8. From the Drive Mode pull-down menu, choose Indexing.

9. Enter the Accel Limit, Decel Limit, and the 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.

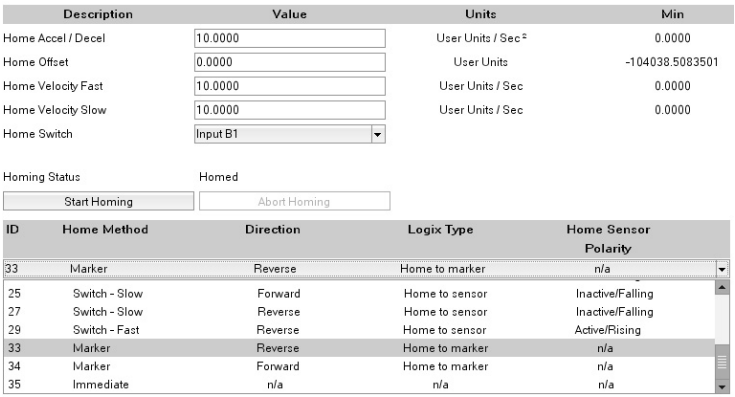
Cat. No.	Accel/Decel Limits rpm/s	User Units rev/mm (rev/in.)
TLAR-*x*1*xxx*B-B*xx*	120000	0.33333 (8.46667)
TLAR-*x*1*xxx*E-B*xx*	36000	0.10000 (2.54000)
TLAR-*x*2*xxx*C-Bxx	72000	0.20000 (5.08000)
TLAR-*x*2*xxx*F-Bxx	28346	0.07874 (2.00000)
TLAR-*x*3*xxx*E-Bxx	36000	0.10000 (2.54000)
TLAR-*x*3*xxx*H-Bxx	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 the recommend homing method, ID = 33, Home to marker, Reverse.



13. Click Start Homing.

14. 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 in reference to the 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 causes the software overtravel to trigger an end-stop impact.

ATTENTION: Care must be taken not to exceed the physical travel limits of the electric cylinder. If you exceed the physical travel limits the electric cylinder and impact the mechanical end-of-stroke you can physically damage the screw and internal components of the electric cylinder.

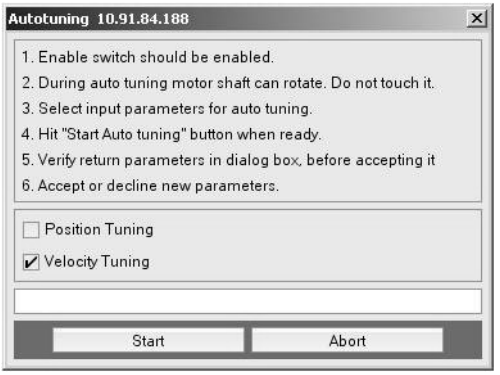
You can determine the deceleration distance before the piston rod contacts the end of travel based on the deceleration rate of the load, and the peak force available from the motor/screw combination. Use Motion Analyzer software to calculate the minimum deceleration distance at the maximum speed of your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

1. Open the MotionView OnBoard software.
2. Disable the motor.
3. From the Drive Organizer, choose General.
4. From the Drive Mode pull-down menu, choose Autotune.
5. Enable the motor.
6. From the Drive Organizer, choose Dynamics.
7. Click Autotune.

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



8. Check Velocity Tuning or Position Tuning or both.
9. Click Start.
10. To accept the new tuning value, click Yes.

Configure and Tune Your Kinetix 3 Drive for an Electric Cylinder with Connected Components Workbench or Ultraware Software

To configure and tune your Kinetix 3 drive by using Connected Components Workbench software or Ultraware software, refer to the Kinetix 3 Component Servo Drives User Manual, publication 2071-UM001.

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 a vertically or diagonally mounted electric cylinder, the work load falls. Uncontrolled moving mass 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 LUB-KC1 grease from Klueber, http://www.klueber.com.

Storage

Store your electric cylinder for a minimal amount of time in a clean and dry location within specifications found in the Kinetix Linear Motion Specifications Technical Data, publication GMC-TD002.

Troubleshooting

Use the Troubleshooting table to troubleshoot your linear actuator.

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 the electric cylinder is free of stress and evenly supported ≤ 0.2 mm (0.008 in.). Lubricate piston rod. See Maintenance on page 29. 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.

Troubleshooting (continued)

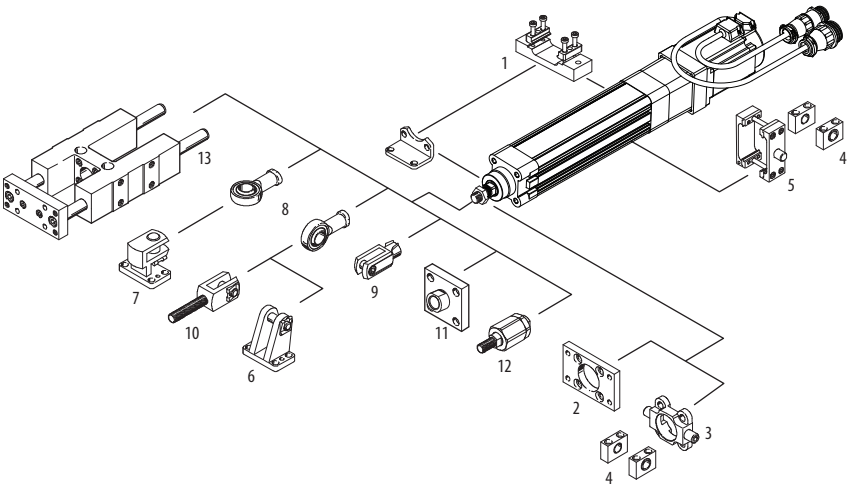
Description	Possible cause	Corrective action
Piston rod does not move.	Jamming in mechanical end position, after traveling at excessive speed or into end position.	Loosen jamming manually. 1. Switch off power supply. 2. Remove motor and coupling housing. 3. Turn drive shaft. Reduce speed for reference 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 increasing 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 cable is damaged.	Test the feedback cable.
	Feedback wiring is incorrect.	Verify correct feedback wiring.
Electric cylinder is operating but is not up to rated speeds/forces.	Motor phase are wired incorrectly or in incorrect order.	Verify correct motor power wiring.
	Amplifier is improperly tuned.	Check gain settings.
	Amplifier is set up 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.
	Amplifier has too low current capacity or is limited to too low of current capacity.	Verify correct amplifier and settings.
Electric cylinder moves or vibrates when piston rod is in motion.	Loose mounting.	Check electric cylinder mounting.
	Amplifier is improperly tuned- wrong gain setting.	Tune amplifier.

Troubleshooting (continued)

Description	Possible cause	Corrective action
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.
	Amplifier is poorly tuned, causing excessive current to be applied to motor.	Check gain settings.

Accessories

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



Mounting Accessories

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
1	Foot Mounting Kit	32	MPAR-NA174991	240 (8.46)
		40	MPAR-NA174992	310 (10.93)
		63	MPAR-NA174993	510 (17.99)
2	Flange Mounting	32	MPAR-NA174376	240 (8.46)
		40	MPAR-NA174377	280 (9.88)
		63	MPAR-NA174379	690 (24.34)

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
5	Trunnion Mounting Kit	32	MPAR-NA163525	210 (7.41)
		40	MPAR-NA163526	390 (13.76)
		63	MPAR-NA163528	890 (31.39)
2	Flange Mounting (corrosion resistant)	32	MPAR-NA161846	240 (8.46)
		40	MPAR-NA161847	300 (10.58)
		63	MPAR-NA161849	710 (25.04)

Mounting Accessories (continued)

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
3	Trunnion Flange	32	MPAR-NA174411	130 (4.58)
		40	MPAR-NA174412	240 (8.46)
		63	MPAR-NA174414	600 (21.16)
4	Trunnion Support	32	MPAR-NA32959	130 (4.58)
		40	MPAR-NA32960	400 (14.11)
		63	MPAR-NA32961	480 (16.93)
6	Clevis Foot	32	MPAR-NA31761	220 (7.76)
		40	MPAR-NA31762	300 (10.58)
		63	MPAR-NA31764	580 (20.46)

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
3	Trunnion Flange (corrosion resistant)	32	MPAR-NA161852	150 (5.29)
		40	MPAR-NA161853	260 (9.17)
		63	MPAR-NA161855	640 (22.57)
4	Trunnion Support (corrosion resistant)	32	MPAR-NA161874	200 (7.05)
		40	MPAR-NA161875	330 (11.64)
		63	MPAR-NA161876	440 (11.64)
7	Clevis Foot (right angle)	32	MPAR-NA31768	290 (10.23)
		40	MPAR-NA31769	360 (12.70)
		63	MPAR-NA31771	880 (31.0)

TL-Series Electric Cylinders Rod-end Accessories

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
8	Rod Eye	32	MPAR-NE9261	70 (2.47)
		40	MPAR-NE9262	110 (3.53)
		63	MPAR-NE9263	210 (7.41)
10	Rod Clevis	32	MPAR-NE32954	140 (4.94)
		40	MPAR-NE10767	210 (7.41)
		63	MPAR-NE10768	500 (17.64)
9	Rod Clevis (corrosion resistant)	32	MPAR-NE13569	110 (3.88)
		40	MPAR-NE13570	180 (6.35)
		63	MPAR-NE13571	400 (14.11)
11	Coupling Piece	32	MPAR-NE36125	110 (3.88)
		40	MPAR-NE36126	180 (6.35)
		63	MPAR-NE36127	250 (8.82)

Accessory Item		Frame	Cat. No.	Weight, Approx g (oz)
8	Rod Eye (corrosion resistant)	32	MPAR-NE195582	70 (2.47)
		40	MPAR-NE195583	110 (3.53)
		63	MPAR-NE195584	210 (7.41)
9	Rod Clevis	32	MPAR-NE6144	110 (3.88)
		40	MPAR-NE6145	170 (6.00)
		63	MPAR-NE6146	390 (13.76)
12	Self-aligning Rod Coupler	32	MPAR-NE6140	210 (7.41)
		40	MPAR-NE6141	220 (7.76)
		63	MPAR-NE6142	650 (22.93)

TL-Series Electric Cylinders Rod-end Accessories (continued)

Accessory Item		Cat. No.	Frame	Stroke Length mm (in)	Weight, Approx kg (lb)
13	Rod Guide	MPAR-NE34494	32	100 (3.94)	1.7 (3.747)
		MPAR-NE34496		200 (7.87)	1.9 (4.19)
		MPAR-NE34497		320 (12.60)	2.1 (4.63)
		MPAR-NE150290		400 (15.75)	2.3 (5.07)
		MPAR-NE34500	40	100 (3.94)	2.7 (5.95)
		MPAR-NE34502		200 (7.87)	3.0 (6.61)
		MPAR-NE34504		320 (12.60)	3.4 (7.49)
		MPAR-NE150291		400 (15.75)	3.7 (8.16)
		MPAR-NE34505		500 (19.68)	4.0 (8.82)
		MPAR-NE34514	63	100 (3.94)	5.9 (13.01)
		MPAR-NE34516		200 (7.87)	6.4 (14.11)
		MPAR-NE34518		320 (12.60)	7.0 (15.43)
		MPAR-NE34519		400 (15.75)	7.4 (16.31)
		MPAR-NE34520		500 (19.68)	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)

Coupling Piece Attachment

Cat. No.	Frame Size	Max Torque (1) N•m (lb•ft)	Max Torque (2) N•m (lb•ft)	Max Torque (3) N•m (lb•ft)
MPAR-NE36125	32	5.9 (4.35)	34 (25.1)	12 (8.8)
MPAR-NE36126	40	5.9 (4.35)	61 (45.0)	22 (16.2)
MPAR-NE36127	63	9.9 (7.3)	148 (109.2)	57 (42.0)

(1) Torque applies to mounting screws with standard threads and strength class 8.8. Apply torque to mounting screws evenly.

(2) Torque applies to lock nut on piston rod.

(3) Torque that coupling can transmit with coefficient of friction $\mu = 0.1$ and 10 x safety margin at maximally permissible tightening torque.

Weight Specifications

Electric Cylinders (weight of cylinder with non-brake motor)

Electric Cylinder Cat. No.	Weight, Approx kg (lb)
TLAR-A1100B-B2A	1.7 (3.75) (1)
TLAR-A1200B-B2A	2.0 (4.41) (1)
TLAR-A1300B-B2A	2.4 (5.29) (1)
TLAR-A1400B-B2A	2.7 (5.95) (1)
TLAR-A1100E-B2A	2.4 (5.29) (2)
TLAR-A1200E-B2A	2.8 (6.17) (2)
TLAR-A1300E-B2A	3.1 (6.83) (2)
TLAR-A1400E-B2A	3.4 (7.49) (2)

Electric Cylinder Cat. No.	Weight, Approx (3) kg (lb)
TLAR-A2100C-B2A	3.1 (6.83)
TLAR-A2200C-B2A	3.6 (7.94)
TLAR-A2300C-B2A	4.0 (8.82)
TLAR-A2400C-B2A	4.5 (9.92)
TLAR-A2600C-B2A	5.4 (11.90)
TLAR-A2100F-B2A	3.7 (8.16)
TLAR-A2200F-B2A	4.1 (9.04)
TLAR-A2300F-B2A	4.6 (10.14)
TLAR-A2400F-B2A	5.1 (11.24)
TLAR-A2600F-B2A	6.0 (13.23)

Electric Cylinder Cat. No.	Weight, Approx (4) kg (lb)
TLAR-A3100E-B2A	9.5 (20.94)
TLAR-A3200E-B2A	10.3 (22.71)
TLAR-A3300E-B2A	11.1 (24.47)
TLAR-A3400E-B2A	11.9 (26.23)
TLAR-A3600E-B2A	13.5 (29.76)
TLAR-A3800E-B2A	15.2 (33.51)
TLAR-A3100H-B2A	9.3 (20.50)
TLAR-A3200H-B2A	10.1 (22.27)
TLAR-A3300H-B2A	10.9 (24.03)
TLAR-A3400H-B2A	11.7 (25.79)
TLAR-A3600H-B2A	13.4 (29.54)
TLAR-A3800H-B2A	15.0 (33.07)

(1) If ordering an TLAR-A*xxxxx*-B4A electric cylinder with brake, add 0.2 kg (0.4 lb).

(2) If ordering an TLAR-A*xxxxx*-B4A electric cylinder with brake, add 0.5 kg (1.1 lb).

(3) If ordering an TLAR-A*xxxxx*-B4A electric cylinder with brake, add 0.4 kg (0.9 lb).

(4) If ordering an TLAR-A*xxxxx*-B4A electric cylinder with brake, add 0.6 kg (1.3 lb).

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)

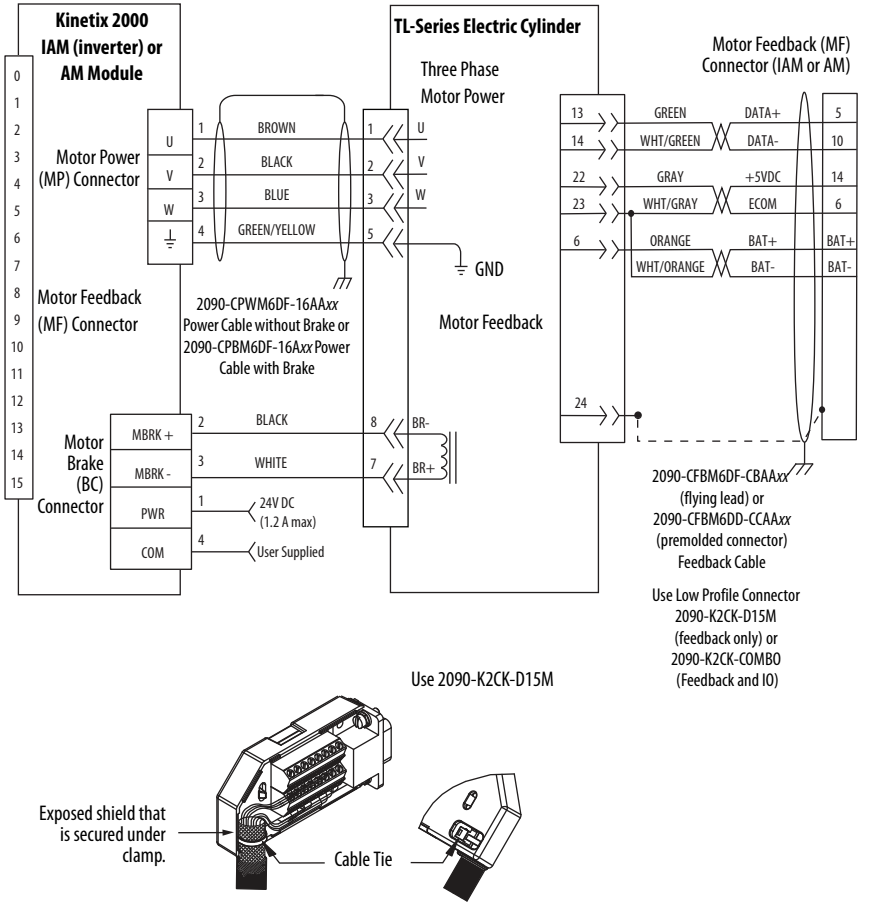
Actuator Cylinder Cat. No.	Weight, Approx kg (lb)
MPAR-X3100E	3.8 (8.38)
MPAR-X3200E	4.6 (10.14)
MPAR-X3300E	5.4 (11.90)
MPAR-X3400E	6.3 (13.89)
MPAR-X3600E	7.9 (17.46)
MPAR-X3800E	9.5 (20.94)
MPAR-X3100H	3.8 (8.38)
MPAR-X3200H	4.6 (10.14)
MPAR-X3300H	5.4 (11.90)
MPAR-X3400H	6.3 (13.89)
MPAR-X3600H	7.9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

(1) Replacement actuator cylinder example, if ordering a replacement cylinder for electric cylinder catalog number TLAR-A2100C-B2A, the replacement actuator cylinder is catalog number MPAR-X2100C.

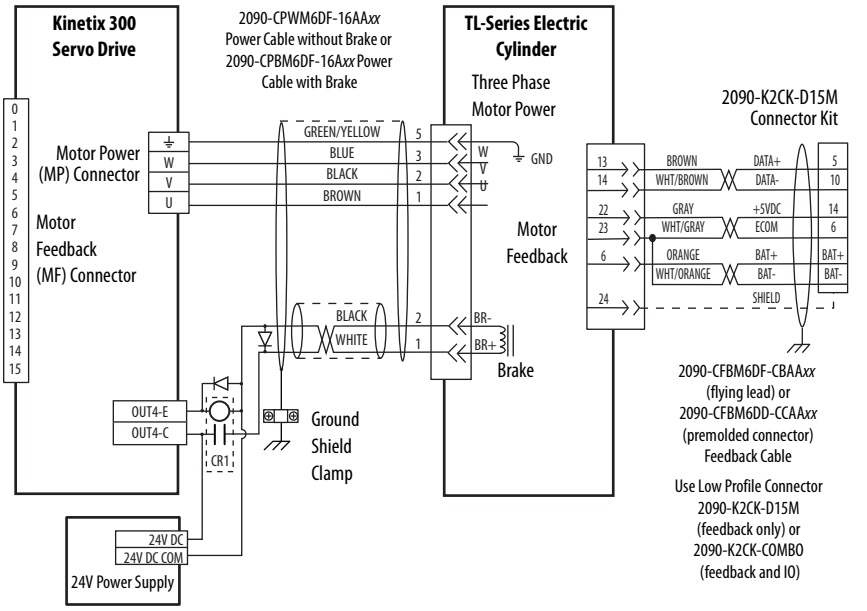
Interconnect Diagrams

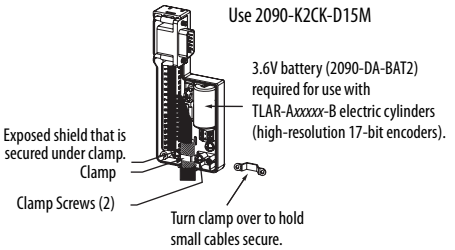
This is an example diagram for wiring your TL-Series electric cylinder and Allen-Bradley servo drives.

Wiring Example of TL-Series Electric Cylinder to Kinetix 2000 Drive

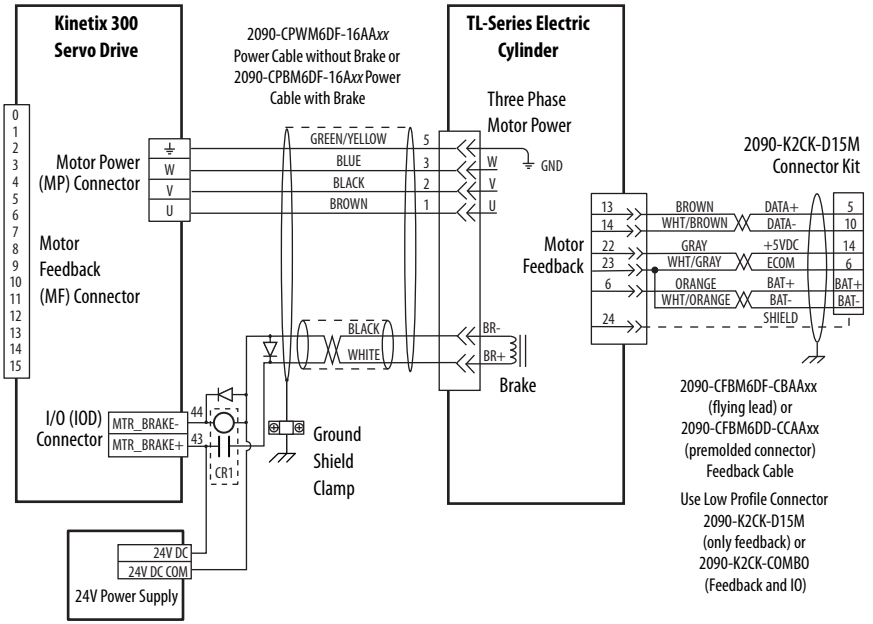


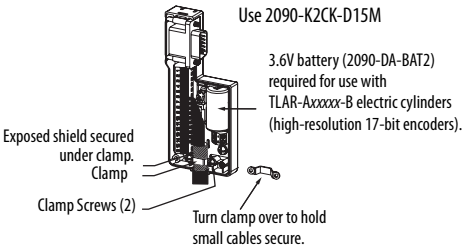
Wiring Example of TL-Series Electric Cylinder to Kinetix 300 Drive



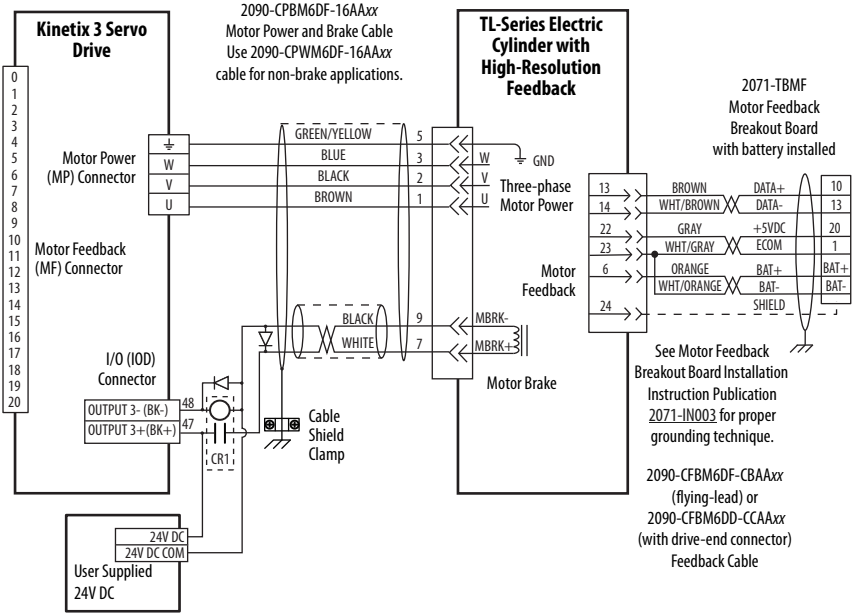


Wiring Example of TL-Series Electric Cylinder to Kinetix 350 Drive





Wiring Example of TL-Series Electric Cylinder to Kinetix 3 Drive



Additional Resources

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

Resource	Description
TL-Series Servo Motors Installation Instructions, publication TL-IN003	Information on installing TL-Series motors.
Kinetix 2000 Multi-axis Servo Drive User Manual, publication 2093-UM001	Information on installing, configuring, starting up and troubleshooting a Kinetix 2000 servo drive system with a TL-Series electric cylinder and Kinetix 2000 servo drive.
Kinetix 3 Component Servo Drives User Manual, publication 2071-UM001	Information on installing, configuring, starting up, and troubleshooting a Kinetix 3 servo drive system with a TL-Series electric cylinder and Kinetix 3 servo drive.
Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001	Information on installing, configuring, starting up, and troubleshooting a Kinetix 300 servo drive system with a TL-Series electric cylinder and Kinetix 300 servo drive.
Kinetix 350 Single-axis EtherNet/IP Servo Drives User Manual, publication 2097-UM002	Information on installing, configuring, startup, and troubleshooting a Kinetix 350 servo drive system with a TL-Series electric cylinder and Kinetix 350 servo drive.
Motion Analyzer, download at http://ab.rockwellautomation.com/Motion-Control/Motion-Analyzer-Software#/tab2	Drive and motor sizing with application analysis software.
Motion Modules in Logix5000™ Control Systems User Manual, publication LOGIX-UM002	Information on configuring and troubleshooting your ControlLogix® and CompactLogix™ sercos interface modules.
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.
Kinetix Motion Control Selection Guide, publication GMC-SG001	Specifications, motor/servo-drive system combinations, and accessories for Kinetix motion control products.
Product Certifications website, http://www.rockwellautomation.com/rockwellautomation/certification/overview.page	For declarations of conformity (DOC) currently available from Rockwell Automation.

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

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Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.
At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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