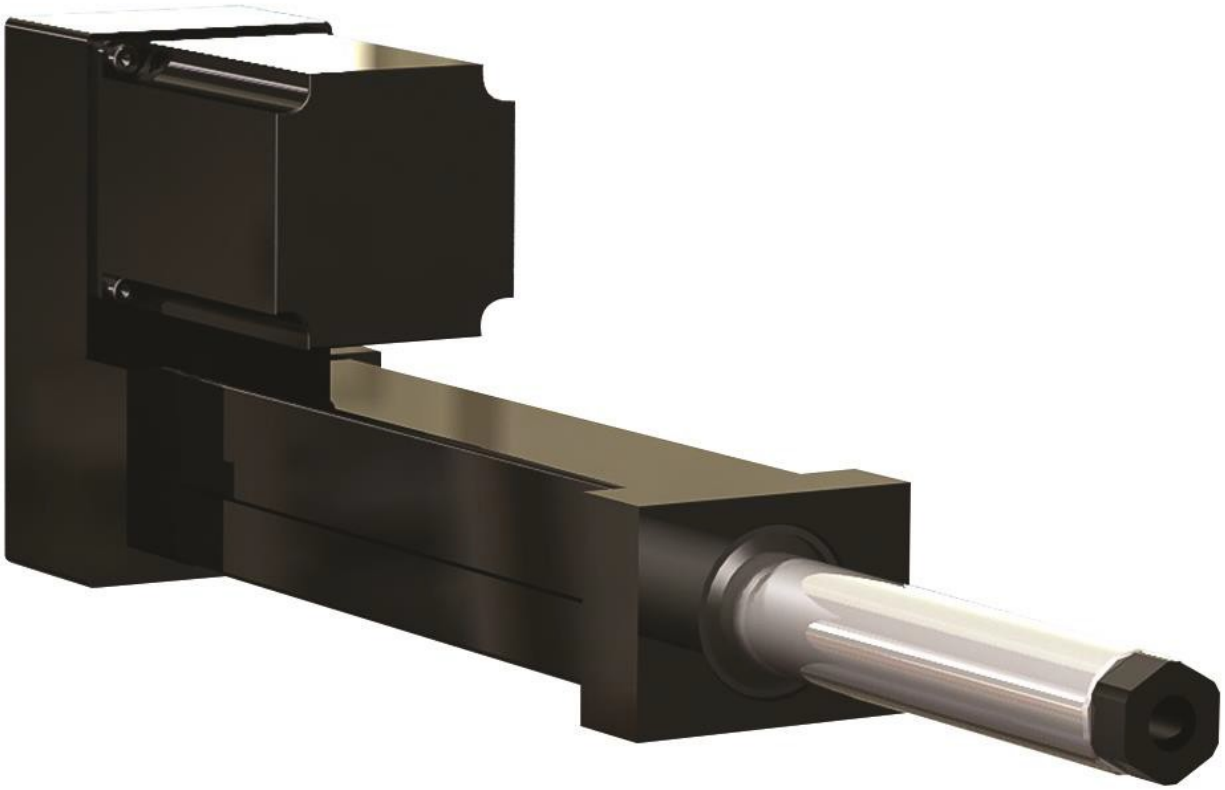
Quality Since 1980

SERVICE GUIDE

Tac Series LS™



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Engineering Assistance
EDrive Actuators, Inc.
385 Stamm Road
Newington, CT 06111
sales@edriveactuators.com

Repair Service
Request RMA from:
sales@edriveactuators.com
Please include serial number with request.

Phone: 860.953.0588
Fax: 860.953.0496
Website: www.edriveactuators.com

For warranty information please refer to www.edriveactuators.com.

Important Information for Users

Installation and Operation
EDrive Linear Actuators must be installed and operated in such a way that all applicable safety requirements are met. As an installer, it is your responsibility to identify and comply with all relevant safety standards. Severe personal injury as well as equipment damage may result from any failure to heed this warning. Read and understand this entire service guide before installation and operation of this equipment.

The installation and maintenance of this actuator should only be performed by personnel who have been appropriately trained. Such persons should be familiar with the potential hazards associated with electrical and mechanical equipment. The individual or group having overall responsibility for this equipment must ensure that operators are adequately trained.

Under no circumstances will EDrive be liable for any incidental, consequential, or special damages resulting from use or misuse of this equipment or this service guide.

Safety Warning
Motion equipment is capable of rapid movement and very high forces. Unexpected motion may occur at any time. KEEP CLEAR of any machinery until the on-site supervisor has determined that all sources of electrical or mechanical potential energy have been disabled or otherwise “locked out”. Avoid contact or physical proximity to the actuator while it is in operation.

This product is sold, as a component, to be installed in a complete system using good engineering practices.

EDrive continually strives to improve its products, therefore we reserve the right to modify equipment and service guides without prior notice.

Product Description

EDrive Linear Actuators are based on a high efficiency anti-friction ball screw, supported in bearings, and rotated by a motor. The nut is attached to the piston rod. By constraining the piston from rotating, the rotary movement of the motor is converted into linear motion of the piston rod. The motor may be directly coupled or include a gear belt drive or a third-party gear reducer.

Mechanical and performance specifications can be found on our web site, or by contacting EDrive, sales@edriveactuators.com or 860.953.0588. All inquiries should include the actuator serial number, this is a number with a "P" prefix that is inscribed on the actuator.

Safety Considerations

In any situation where safeguards and control systems do not prevent accidental contact between personnel and the actuator, the machine builder/installer must provide suitable warnings.

Installation Considerations

In mounting any actuator, the following issues need to be considered:

- Avoid distortion of the actuator body.
- Proper alignment of the actuator must be relative to the load travel.
- Prevent side loading of the piston rod.
- Limit linear acceleration and deceleration, which should not exceed 386 in/sec².
- The load, velocity, and motor input torque should not exceed catalog specifications.

As with any ball bearing device, special care must be taken to avoid impact. Any impact will jeopardize actuator life. Before energizing the motor install over - travel limit switches and connect them to control circuitry. This is a necessary step to reduce the possibility of damage through accidental extension or retraction beyond the limits of the actuator.

Motor Pulley should be in line with the ball screw pulley within 1/32 inch. Fasten pulley to motor shaft with the supplied set screw or taper lock bushing.

Gear Belt should be properly tensioned. Gear belt drives should not be tightened to the same extent as other belt drives (i.e. V-belt, Poly-V, Flat belt, etc.). If the gear belt tension is too great, it imposes excessive and unnecessary

loading on the bearings. When the gear belt is too loose, the belt may jump teeth (particularly on high torque applications). Detailed information can be found in Appendix A.

Coupling (inline only) Determine the correct position to equally engage both the motor shaft and the ball screw into the coupling. Fasten the coupling to the motor shaft and install the motor into the coupling housing. Use the access hole in the housing to tighten the clamping bolt on the ball screw side of the coupling. Caution: Avoid excess axial loading on the all screw shaft.

End Effectors Caution should be exercised when attaching any device to the end of the piston rod. Use the wrench flats on the piston end to prevent rotation while attaching the end effector. Any substantial torque applied to the piston rod may damage the internal anti-rotation system.

Ball Screw Pulley In the event this pulley is removed or replaced – DO NOT use the fully retracted or fully extended rod position to counteract the applied wrench torque.

Air Purge and Vent

This actuator has a sealed chamber. As the piston is extended, the internal volume increases, creating a partial vacuum. Similarly, when the piston retracts, a positive pressure develops. When the linear motions are rapid, there may be a tendency during extension to draw airborne contaminants through the end seal; and similarly, during retraction, to expel air through the seal. These conditions may compromise the seal integrity and subsequently lead to contamination of the ball screw system. We encourage the application of 2-3 psi of clean air to the actuator chamber to compensate for these air flows. If this air purge is not used, we suggest use of a filtered vent or plumbing pipe/hose to a source of clean air.

Lubrication

The standard lubrication is Mobil SHC-32. As an option the actuator can be supplied with food grade grease, Mobil FM101.

1. Units have been pre-lubricated at assembly. Re-greasing is recommended every 500-1000 hours of actuator movement under load.
2. Caution – DO NOT mix different types of lubricant.
3. To re-grease, move the piston to its re-grease position (ref. 1/2 to 3/4 inch from its fully retracted position). Clean, then remove the pipe plug. Using a grease gun, apply grease sparingly. Be careful not to allow any debris into the cylinder chamber. Replace the pipe plug.

NOTE: Tac Series LS Actuators use Flush type grease fittings.

Maintenance

1. Ball bearings are greased for life and require no maintenance.
2. Piston seals require periodic (6 months approx.) inspection.
3. Gear belts require periodic (6 months approx.) inspection for possible wear and for proper tension settings.

The successful operation and longevity of this actuator is based on superior components, precise manufacturing, and extreme cleanliness. Unless your maintenance personnel are thoroughly familiar with this type of construction, any attempt to perform “field” repairs may aggravate rather than resolve your problem. Emergency repairs and rebuilds are always given the highest priority by EDrive.

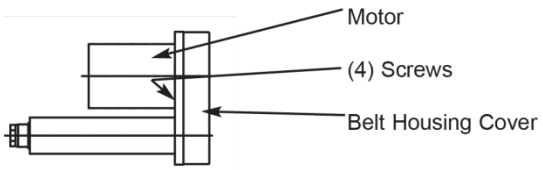
If you have any questions regarding performance or possible explanations for symptoms – we encourage early contact with EDrive (sales@edriveactuators.com) to help define the problem and determine the most appropriate resolution. For answers to common questions, you can check the FAQ page of our website, www.edriveactuators.com.

When contacting EDrive for service or support, it is most helpful if you have the actuator serial number available. This is the number with a "P" prefix that is inscribed directly on the actuator.

Gear Belt Installation/Tensioning *(see diagram)*

Remove the belt housing cover. Loosen the (4) screws in the motor but DO NOT remove them. This will allow you to slide the motor toward the actuator body. If both pulleys have flanges, it may be necessary to unbolt the motor to remove or install the gear belt. Install the gear belt. Then re-assemble with the correct tension and alignment.

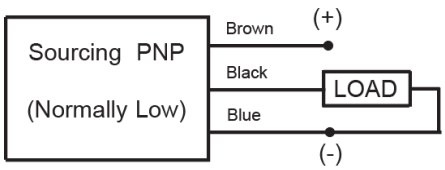
Gear belt drives do not need to be tightened to the same extent as other belt drives (i.e. V-belt, Poly-V, Flat belt, etc.). If the gear belt tension is too great, it imposes excessive and unnecessary loading on the bearings. For standard models, the chart below shows the correct deflection and force values for proper belt tensioning, For Non-standard models please refer to Appendix A.

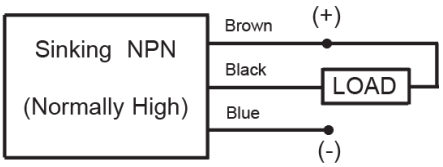


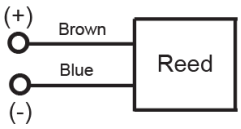
Tac Series LS	LS 2		LS 3	
Reduction Ratio	1:1	2:1	1:1	2:1
Belt Deflection	0.06 inch	0.06 inch	0.08 inch	0.07 inch
Deflection Force	2 lbs.	1-2 lbs.	3 lbs.	2 lbs.
Gearbelt Number	5MR-375-15	140XL075	187L100	187L100
Number of teeth (driver)	38	22	24	16
Number of teeth (driven)	38	44	24	32

Switch Wiring

Supplied Hall Effect or Reed type switches are for “home” sensing and over travel protection only. They should not be used as position switches.







	Configuration	State	Voltage (VDC Typ.)	Current (mA Max.)	Type	Part Number	H					
							1	2	3	4	5	6
A	Hall Effect, Sourcing	N.O.	5-24	500	PNP	MLE-K06			1	2	2	1
A	Hall Effect, Sourcing	N.C.	5-24	500	PNP	MLE-Q06						
B	Hall Effect, Sinking	N.O.	5-24	500	NPN	MLE-G06						
B	Hall Effect, Sinking	N.C.	5-24	500	NPN	MLE-J06	1	2			1	2

	Configuration	State	Contact Rating (VA)	Switching Voltage (Max.) V(AC/DC)	Switching Current (Max.) (mA)	Carry Current (Max)	Part Number
C	Reed	N.O.	10	100	500	1 A	MLE-D06
C	Reed	N.C.	3	30	200	500 mA	MLE-T06

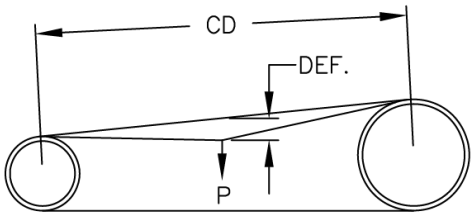
- Cable - PVC Jacket; 24 AWG 105 strand
- Brown (+), Blue (-), Black (load)
- Switch response: 0.01 mS
- Operating temperature: -10 to 60° C
- Shock resistance: 50 g Hall; 30 g Reed
- Vibration resistance: 30 g
- Magnetic field required: 40 gauss minimum, no upper limit

Appendix A – Tensioning Trapezoidal Drives

Method of Tensioning Trapezoidal Gearbelt Drives

Gearbelt drives do not need to be extremely tight such as other belt drives. (V–Belt, Poly–V, Flat Belt, etc.) If belt tension is too great, it imposes excessive, and unnecessary loading on bearings. When belt is too loose (particularly on High Torque Applications), belts may "jump" teeth. In order to tension a drive properly, the following may be followed:

FORMULA:



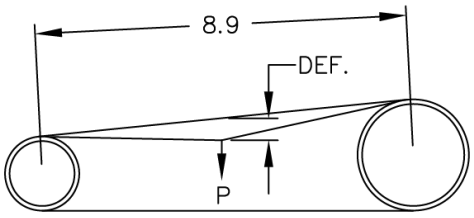
$$Ts = T + \frac{CD \times K}{L_B}$$

$$P = \frac{Ts}{16}$$

$$DEF. = \frac{CD}{64}$$

CD = Center Distance
L_B = Belt Length
Ts = Static Tension
P = Deflecting Force
DEF. = Amount of Deflection in inches
T = Tension in lbs. (from table below)
K = Constant (from table below)

EXAMPLE:



$$Ts = 70 + \left(\frac{8.9 \times 46}{24}\right)$$

$$P = \frac{87.058}{16}$$

$$DEF. = \frac{8.9}{64}$$

(i.e., belt #240H100 is 24" long, 1" wide, "H" belt.)

Ts = 87.058
P = 5.4 lbs.
DEF. = 0.140

CD = Center Distance
L_B = Belt Length
Ts = Static Tension
P = Deflecting Force
DEF. = Amount of Deflection in inches
T = Tension in lbs. (from table below)
K = Constant (from table below)

BELT SECT.	FACTORS	BELT WIDTH				
		1/2	3/4	1	1–1/2	2
3/8"P. (L)	T	11.5	19.5	27.5		
	K	9.9	17.0	24.0		
1/2"P. (H)	T		49.5	70	109	150
	K		32	46	71	95
7/8"P. (XH)	T					204
	K					190

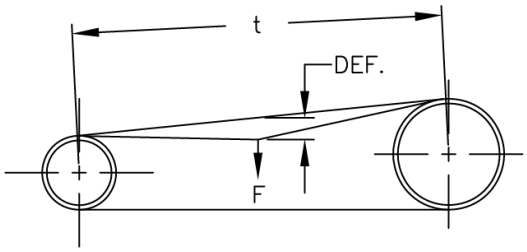
A Belt Tension checker can be used to check both, "P" and "DEF." as obtained above.

Appendix A – Tensioning HPT Drives

Method of Tensioning HPT Gearbelt Drives

Place belt on sprockets and adjust takeup so that belt teeth mesh securely with sprocket grooves. Measure belt span "t". Then tighten belt so that it deflects 1/64" for each inch of belt span when a force is applied as specified in the table below. Deflection 1/64" per inch of span. (Measure or calculate the span length "t" as shown in sketch below.)

FORMULA:

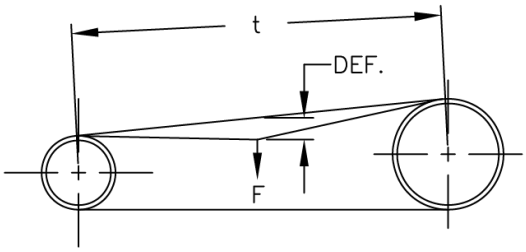


$$t = \sqrt{C^2 - \left(\frac{D-d}{2}\right)^2}$$

$$DEF. = \frac{1}{64}(t)$$

t = Span Length
C = Center Distance
D = Pitch Dia. (Large Pulley)
d = Pitch Dia. (Small Pulley)
F = Deflecting Force (see Table)
DEF. = Amount of Deflection in inches

EXAMPLE:



i.e.
D = B568M30SDS (5.61)
d = B288M30H (2.81)
C = B7208M30 (7.43)

$$t = \sqrt{7.43^2 - \left(\frac{5.61-2.81}{2}\right)^2}$$

$$t = 7.30$$

$$DEF. = \frac{1}{64}(7.30)$$

$$DEF. = .114$$

Belt Pitch	Belt Width	Force
8 mm	20 mm 30 mm 50 mm 85 mm	4 lbs. 6 lbs. 11 lbs. 19 lbs.
14 mm	40 mm 55 mm 85 mm 115 mm 170 mm	11 lbs. 16 lbs. 26 lbs. 37 lbs. 58 lbs.

Note:

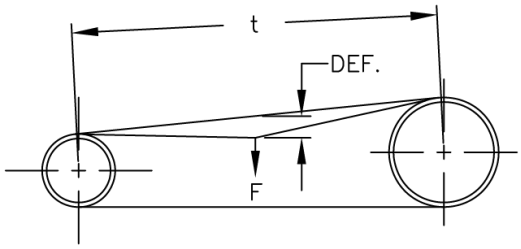
For belts wider than two inches, it is suggested that a strip of keystock or something similiar, be placed across the belt between the tension tester and the belt to prevent belt distortion.

Appendix A – Tensioning HTD Drives

Method of Tensioning HTD Gearbelt Drives

Place belt on sprockets and adjust takeup so that belt teeth mesh securely with sprocket grooves. Measure belt span "t". Then tighten belt so that it deflects 1/64" for each inch of belt span when a force is applied as specified in the table below.
Deflection 1/64" per inch of span. (Measure or calculate the span length "t" as shown in sketch below.)

FORMULA:

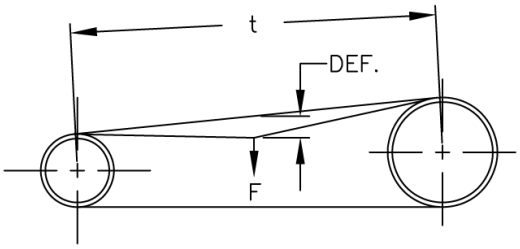


$$t = \sqrt{C^2 - \left(\frac{D-d}{2}\right)^2}$$

$$DEF. = \frac{1}{64}(t)$$

t = Span Length
C = Center Distance
D = Pitch Dia. (Large Pulley)
d = Pitch Dia. (Small Pulley)
F = Deflecting Force (see Table)
DEF. = Amount of Deflection in inches

EXAMPLE:



i.e.
D = P80–8M–85 (8.02)
d = P40–8M–85 (4.02)
C = 880–8M–85 (7.61)

$$t = \sqrt{7.61^2 - \left(\frac{8.02-4.02}{2}\right)^2}$$

$$t = 7.34$$

$$DEF. = \frac{1}{64}(7.34)$$

$$DEF. = .115$$

Belt Pitch	Belt Width	Force
5 mm	9 mm 15 mm 25 mm	9 to 18 oz. 1 to 2 lbs. 1–1/2 to 3 lbs.
8 mm	20 mm 30 mm 50 mm 85 mm	3 to 4 lbs. 5 to 6–1/2 lbs. 9 to 12 lbs. 16 to 20 lbs.

Note:

For belts wider than two inches, it is suggested that a 3/4 or 1 inch strip of metal be placed across the belt between the tension tester and the belt to prevent belt distortion.