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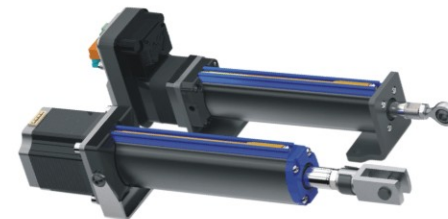
Lude Transmission

Installation and maintenance manual of servo electric cylinder



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1 Introduction

1.1 Warranty and Limitations of Liability

Lude Transmission warrants its product(s) to the original purchaser and in the case of original customer equipment manufacturers, to their original customer to be free from defects in material and workmanship and to be made in accordance with the Buyer's specifications which have been accepted in writing by Lude Transmission. In no event, however, shall Lude Transmission be liable or have any responsibility under such warranty if the product(s) has been improperly stored, installed, used or maintained, or if Buyer has permitted any unauthorized modifications, adjustments and/or repairs to such product(s).

Seller's obligation hereunder is limited solely to repairing or replacing (at its option), at the factory any product(s), or parts thereof, which prove to Seller's satisfaction to be defective as a result of defective materials or workmanship, and within the period of time, in accordance with the Seller's stated product warranty (see terms and conditions), provided, however, that written notice of claimed defects shall have been given to Lude Transmission within thirty (30) days from the date any such defect is first discovered. The product(s) or part(s) claimed to be defective must be returned to Lude Transmission, transportation prepaid by Buyer, with written specification of the claimed defect.

Components such as seals, wipers, bearings, bushings, splines, and ball screws are considered wear parts and must be inspected and serviced on a regular basis. Any damage caused by failure to properly lubricate Lude Transmission products and/or to replace wear parts at appropriate times, are not covered by this warranty.

1.2 Safety Considerations

As with any electro-mechanical device, safety should be considered during installation and operation of your DMB Series actuator. Throughout this manual you will see paragraphs marked with WARNING or CAUTION signs as shown below.



CAUTION



WARNING

Pay particular attention to these paragraphs. They are intended to provide you with helpful information to ensure a safe and trouble free installation and operation.



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Care should be taken not to exceed the physical travel limits of DMB Series actuators. Doing so will cause the actuator to impact its end of travel bumpers. Repeated end of travel crashes can physically damage the ball screw and the internal components of the actuator.

1.3 DMB Series Linear Actuators Overview

DMB Series actuators are offered in three standard nominal frame sizes

Continuous duty thrust load ratings for the DMB series product range from 50 kg to 5000kg. Intermittent load ratings for each actuator are twice the respective continuous duty load rating. DMB series actuators utilize a ball screw mechanism to converts rotary to linear motion. The ball screw offers superior travel life, rigidity, and resistance to shock load than the ball screws commonly found in electromechanical actuators. The ball screw is mounted within a sealed, extending tube package. The main rod extends or retracts as the input drive shaft is rotated. The general operating principle is illustrated below.

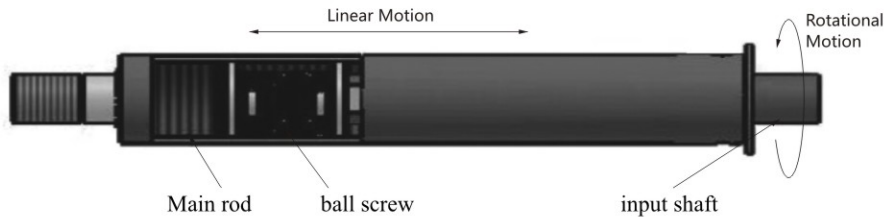


Figure 1: DMB Series Actuator Operation Principle

<p>CCW Shaft rotation looking at input shaft of base unit = Extending motion CW Shaft rotation looking at input shaft of base unit = Retracting motion</p>

The DMB series actuator designs offer contamination protection to IP54 or IP65 levels depending on the specific series or options selected. All rotary to linear conversion components are mounted within an IP65 or IP54 sealed housing. These levels of sealing protect the actuators internal components from particulate contamination or from corrosive agents.



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1.4 Basic Actuator Construction

The IP65 DMB series designs offer o-ring seals at each housing joint, and a rod wiper to seal out liquid and particulate contaminants. PNP please refer to page 24.

The IP54 DMB series designs offer protection from particulate contaminants, but are not sealed against liquid penetration.

The aluminum actuator case and housing parts are anodized. All steel mounting parts (flange mounts, side lug plates, trunnions, etc.) offer a black oxide finish. Corrosion resistant options offer these mounting parts in stainless steel or with QPQ corrosion resistance heat treatment. Electroless Nickel and hard coat anodizing are available corrosion resistant options for the actuator housing and case parts. These finishes are intended to retard corrosion. The specific environment of the customer's application should be discussed with Lude Transmission application engineers.



If the environment in which the IMB series actuator will be commissioned involves contact with corrosive substances, contact Lude Transmission for application assistance.

The standard DMB series output rod is manufactured from 4100 Series steel and is heat treated with a corrosion resistance QPQ process that provides corrosion resistance and wear resistance.



If the extending rod of the DMB series actuator is subject to abrasions, scratches and dents, this will allow contaminants to be carried past the actuators or wiper and will cause the wiper to wear prematurely allowing contamination to the internal components of the actuator.



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1.5 Actuator Configurations

The DMB series base unit actuator includes a high performance ball screw assembly, bearing support, anodized extruded aluminum housing, precision internal anti-rotate sliders, extending rod, and an input shaft for attachment to your drive system. An DMB series base unit is shown below.

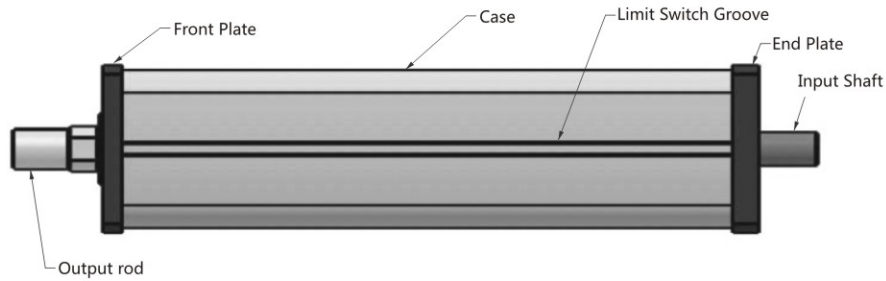


Figure 2: DMB series Base Model Actuator

The DMB series actuators are also available with provisions for mounting various motors. Standard motor mountings include parallel with belt drive, inline direct drive, and inline with planetary gearing.

The parallel motor mounting configuration utilizes a high performance belt drive system, which while providing quiet operation, requires no re-tensioning for the life of the actuator as long as the motor is not removed or adjusted.

Drive speed reduction ratios between 1:1 and 2:1 are available, with 1:1 and 2:1 being standard. Speed increasing ratios are available also.



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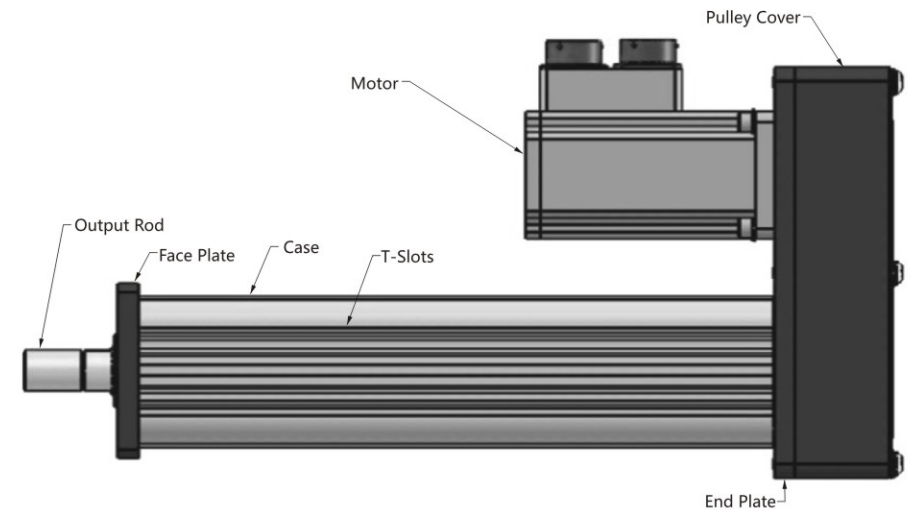


Figure 3: DMB series with Parallel Motor Mount

The inline motor mounting configuration uses a zero backlash coupling attaching the motors output shaft to the actuators drive shaft.

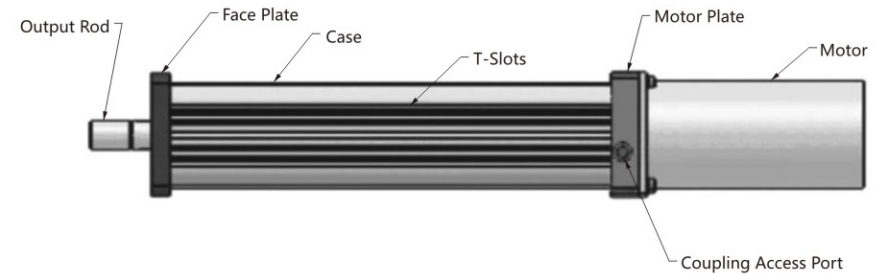


Figure 4: DMB series with Inline Motor Mount

The inline planetary gearing option offers 5:1 or 10:1 planetary gear reduction. The planetary gearing is integral to the input of the actuator and an inline coupling is included to attach the motor's output shaft to the input of the planetary gear stage.

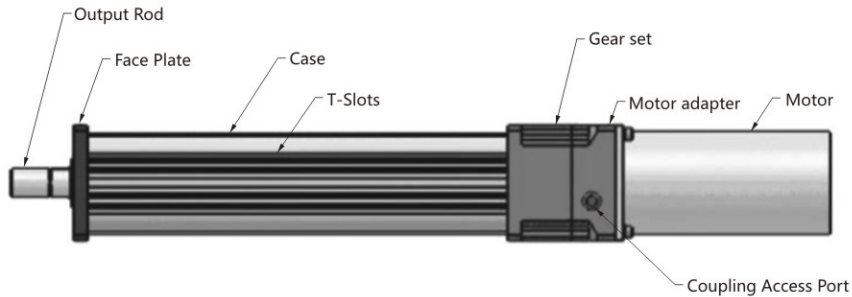


Figure 5: DMB series with Inline Gearset Motor Mount

2 Installation

2.1 Mounting Configurations

The DMB series actuators offer a wide variety of mounting accessories. The standard mounting accessories are; side lug or foot mounts, side mounted flange attachments and side mounted trunnions. Each of these mounting components utilize the T-Slot tracks on the sides of the case for attachment. Also available is a front flange mount that is integral to the actuator housing and does not attach via the T slots.

2.2 Mounting Considerations

Care should be taken to mount the DMB series actuator such that its linear travel is well aligned with the allowable travel of its load. Misalignment imparts direct side load on the actuator's extending rod. Side loading of the actuators extending rod leads to accelerated seal wear, bearing wear and ball screw wear, and should be avoided.



Excessive side load on the output rod of the actuator may reduce the travel and seal life of the actuator.



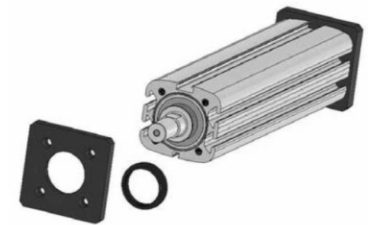
T Slot mounting hardware should be attached perpendicular to the axis of linear motion. All T-Nuts and associated flathead cap screws should be tightened to the appropriate torque level indicated in section 3.7 Fastener Torque Values.



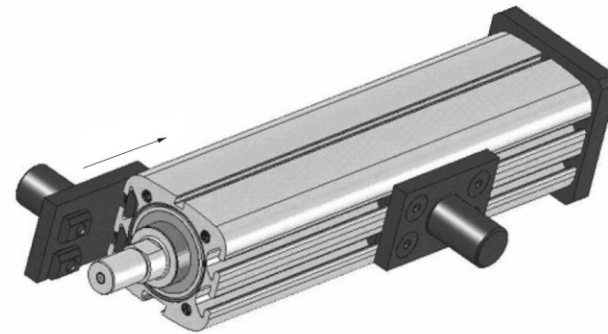
Mounting hardware installation:



Step 1: Remove faceplate screws



Step 2: Remove faceplate and rod wiper. If O-Ring does not stay in place, remove that as well (IP65 units only)



Step 3: You may preassemble the T-nuts, with mounting attachments and appropriate Flat Head Cap Screws to be held loosely together as you guide the T-nuts into the slots. Alternatively, you can slip the T-Nuts into the slots, then assemble the mounting components and screws to the captive T-Nuts. Once the components are fully engaged in the T-nuts, it is advised that you lightly tighten one screw on each mounting component to prevent it from sliding back and forth as you reassemble the actuator.

DMB series Mounting Hardware Torque Specifications

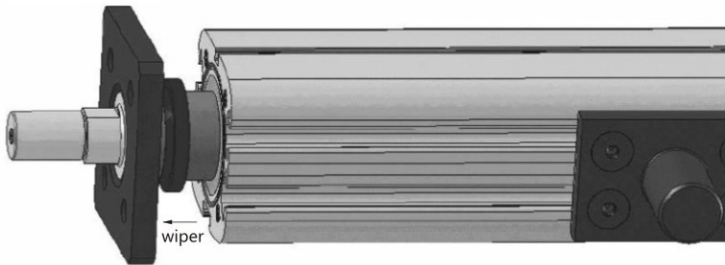
Actuator	Component	in-lbs	ft-lb	N-m
DMB10/20/30 /40/50/60	Mounting Component T Nut/bolt, Black Oxide	252	21	28.5
DMB10/20/30 /40/50/60	Mounting Component T Nut/bolt, Stainless Steel	169	14	19.1

All values are assuming dry (not oily or plated components)



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Faceplate/Wiper



Step 4: Rotate the drive shaft to extend the main rod about 50mm from the fully retracted position. If the O-Ring has been removed, place O-Ring grease in the groove and fit the O-Ring back into the groove. Slide the wiper onto the main rod, leaving enough space for your fingers between the wiper and the front of the case. The flange on the wiper points towards the rod end as shown. Put the face Plate over the rod (with the counter bore for the wiper facing the wiper) and with your fingers press the wiper into the faceplate counter bore, while keeping it on the main rod cylinder. Then press the faceplate down onto the O-Ring and rotate it so the holes line up.



Step 5: Torque faceplate screws to recommended value (see Section 3.4) Position mounting hardware to the same distance from the face plate and torque Flathead Cap Screws to their recommended value.



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2.3 Lubrication

DMB series actuators are shipped from the factory fully lubricated with a high temperature grease. Periodic inspection and renewal of the bearing and ball screw grease is recommended according to the periods shown in the table below. Follow the procedure in section 3.6 for renewing grease.

RMS Rotational Speed (rpm)	Recommended Grease Renewal Period (hours)
250	10000
500	10000
1000	8000
1500	7000
2000	5800
2500	5000
3000	4000

For duty cycles of varying speeds use RMS rotational speed to determine grease renewal period. To determine this value follow the equation below:

$$V_{rms} = [(V_1t_1 + V_2t_2 + V_3t_3 + \dots) / (t_1 + t_2 + t_3 + \dots)]^{1/2}$$

V_{rms} = RMS Rotational speed (rpm)

$V_{1,2,3...}$ = Rotational speed of ball screw shaft for corresponding $t_{1,2,3...}$ time (rpm)

$t_{1,2,3...}$ = Time at corresponding $V_{1,2,3...}$ rotational speed (minutes)



Over greasing or cold grease may cause elevated motor torque.

Lude Transmission recommends using Mobilith SHC 220, a high performance, extreme-pressure grease. The unique physical properties of the synthetic base oil provides outstanding protection against wear, rust, corrosion and high or low-temperature degradation. Mobilith SHC allows for very low starting and running torque values. Its operating range is -40 degrees C to 177 degrees C (-40 degrees F to 350 degrees F).

2.4 Anti-Rotate Mechanism

Lude Transmission's DMB series actuators have an internal anti-rotate mechanism. Internal anti-rotation sliders travel in channels integral to the actuator case. The anti-rotate mechanism limits angular motion to 0.35 degrees rotation and is designed to withstand the maximum rated input torque for each respective actuator size. Care should be taken when applying torque to the actuators main rod during rod end or load attachment to not damage the anti-rotate mechanism. The DMB series standard main rod designs offer wrench flats that should be used to resist the torque applied when attaching rod end accessories or load attachments. The anti-rotate mechanism should not be used to resist this assembly torque. The anti-rotate mechanism is also the housing for the magnet sensed by the optional limit switches.

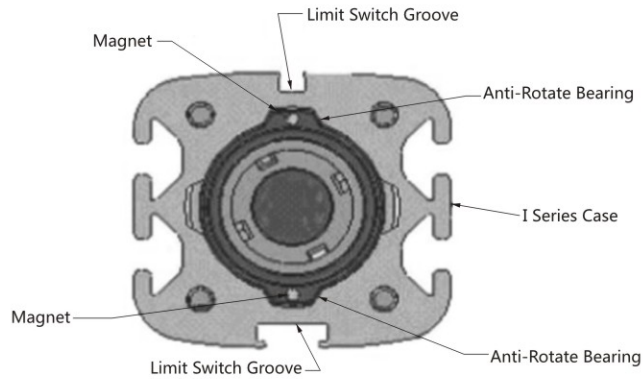


Figure 6: Anti-Rotate Mechanism



To avoid damage to the anti-rotate mechanism, care should be taken during assembly to avoid applying more torque to the main rod than shown below.

DMB10----4Nm	DMB20---- 6.8Nm
DMB30----13.6Nm	DMB40---- 34Nm
DMB50---- 47Nm	DMB60---- 81Nm

3 Maintenance & Service

3.1 Seals

DMB series actuators provided with IP65 sealing have Buna-n o-rings at the joints of the actuator housing components. The extending rod is sealed with a wiper seal. The input shaft of an IP65 unit is sealed using a spring loaded nitrile shaft seal that is contained within the back end plate of the actuator. These seals are lubricated on initial assembly with a teflon seal lubricant. The front wiper should have a small amount of mineral oil applied to it periodically depending on amount of actuator use or storage to keep the wiper operating smoothly and to prolong life. The o-rings are treated with a o-ring lubricant designed to slightly swell the o-ring to assure proper sealing.

IP65 versions of the inline motor mount and inline gear set actuators have additional o-rings (or gaskets on I 40) between the actuator base unit and the motor mounting plate or gear set housing section. In parallel mounted units the pulley housing is not sealed but may be equipped with drain holes. Contact Lude Transmission application engineers for details about custom sealing options.

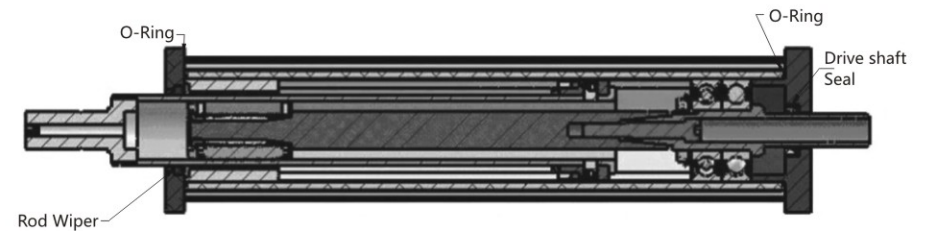


Figure 7-1 : IP65 Base Unit Sealing Details

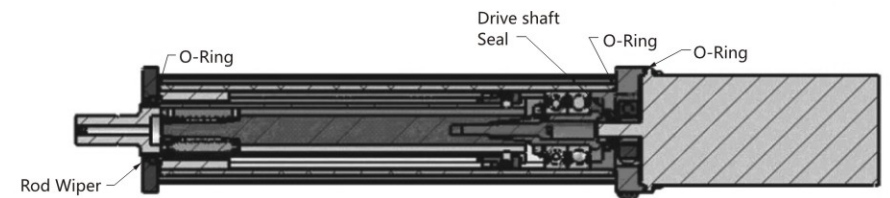


Figure 7-2 : IP65 Integrated Motor Mount Unit Sealing Details

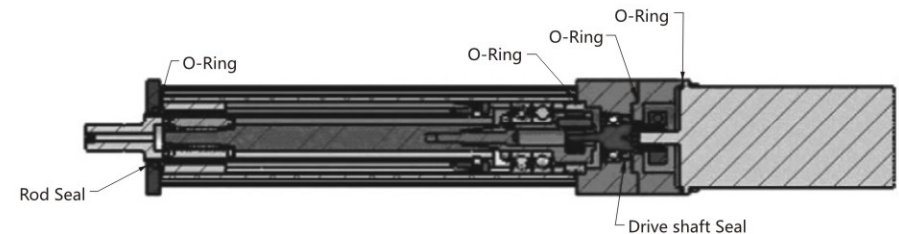


Figure 7-3 : IP65 Gear set/Integrated Motor Mount Unit Sealing Details

3.2 Thrust Bearings

DMB10/20/30 Series actuators offer two deep groove ball bearings. DMB40/50/60 series actuators provide two angular contact bearings mounted in duplex arrangement. These bearings support the drive shaft within the IMB series actuator. The inner races of the angular contact bearings are pre-loaded using a bearing jam nut and lock washer to ensure that the pre-loaded condition is not lost. The outer races are pre-loaded by the end plate screws as shown in figure 8.

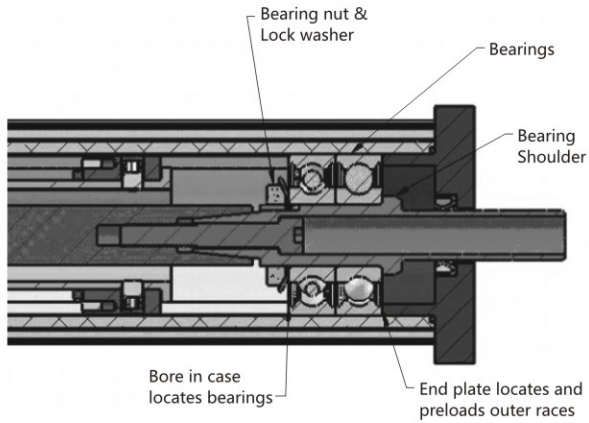


Figure 8: ball screw Support Bearing Detail

3.3 Drive Train

The parallel motor mount option for the IMB series actuators provides a fiberglass reinforced belt and pulley drive train to transmit the motors rotation and torque to the actuators ball screw mechanism. The drive train does not require lubrication. The belt and pulley transmission is housed in a protective housing to help prevent contamination by dirt and debris. The belt housing and cover should be kept in place at all times during operation and should only be removed for motor mounting and drive train inspection. The belt and pulley system should be inspected periodically for wear and proper tensioning.



Removing the protective housing from the belt and pulley drive train during operation of the actuator may cause damage to the actuator components or severe injury. Power should be removed and locked out from the actuators motor at any time the the protective drive train cover is removed. Failure to do so can result in damage to the actuator or cause serious injury.

Improper belt tension can cause premature belt wear and failure, belt noise and slippage. The following picture is an example of a typical belt and pulley drive train in an DMB series actuator. Actual drive trains will vary in configuration depending on exact actuator and motor configuration. Contact Lude Transmission application engineers with any questions regarding the installation or maintenance of the belt and pulley drive train on your DMB Series Actuator.

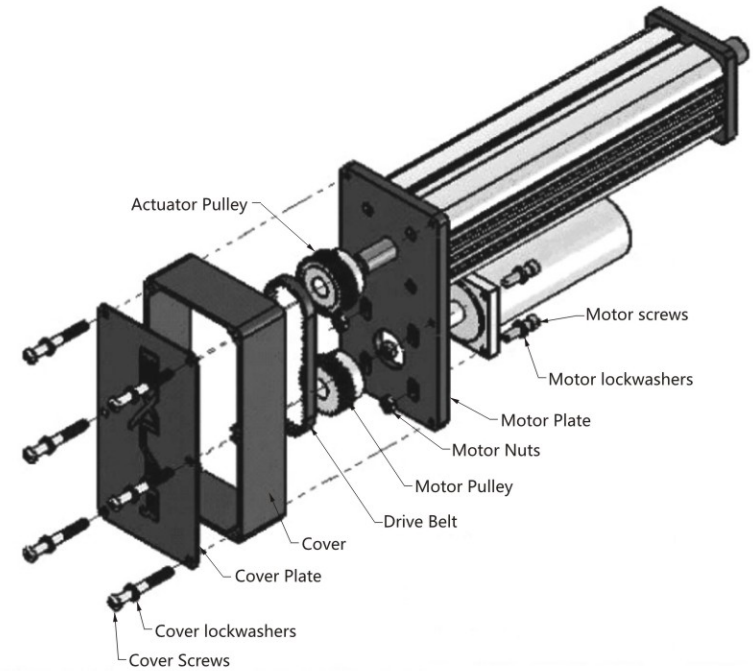
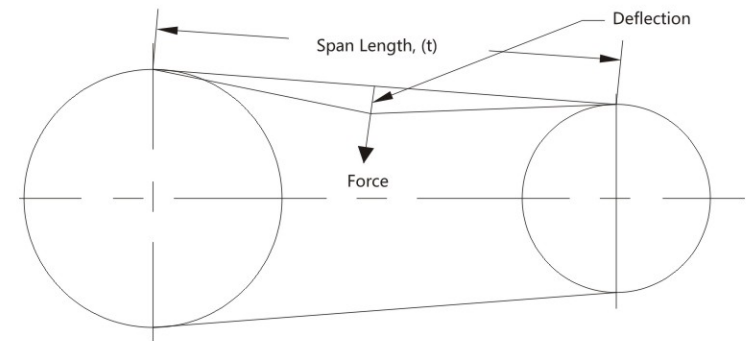


Figure 9: Parallel Motor Mount Drive Train Assembly

Proper Belt Tension





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Parallel Motor Mounting

The motor plate slots allow dropping of the motor so the belt can be placed, followed by raising the motor to tighten the belt.

DMB10 and DMB20 and DMB30 Belt Tensioning

The standard Size 10 and 20 and 30 DMB series belts are GT2 belts, 5mm pitch, 9mm width.

The proper tension for these belts is 1.5 lbs deflection tension for 1/64" deflection per inch of span.

The standard center to center distances of the pulleys are:

1:1 Ratio: $t = 92.5\text{mm}$

1:2 or 2:1 Ratio: $t = 89.38\text{mm}$

Non-standard configurations may have varying center to center distances.

For standard units, the deflection should be:

1:1 Ratio: 0.68kg @1.45mm deflection

1:2 or 2:1 ratio: 0.68kg @ 1.4mm deflection

DMB40/50/60 Belt Tensioning

The DMB40/50/60 uses a 5mm pitch by 9mm wide belt for lower torque applications and an 8 mm pitch by 22 mm wide belt for higher torque applications.

For the 9 mm wide belt, the proper tension is 1.5 pounds force to obtain 1/8 inches of deflection at the center of the belt between the two pulleys.

For the 22 mm wide belt, the proper tension is at 4.5 pounds force to get 1/8 inch of deflection at the center of the belt between the two pulleys.

These tensioning values apply to all pulley ratios used DMB40/50/60.

To identify which belt is used, a 9 mm wide belt = .35 inches wide, or approximately 3/8 of an inch, and a 22 mm wide belt = .866 inches or approximately 7/8 of an inch wide.

Inline Motor Mounting (motor adapter or gear set motor adapter)

- 1) Remove the clamp access plug by levering under the cap with a flat bladed screwdriver.
- 2) Loosen the collar clamp screw so the motor shaft can slide into the shaft adapter/coupler shaft, but maintain enough pressure so the clamp screw stays aligned with the access hole.
- 3) Position the splits in the clamp collar, motor coupler, and shaft adapter so they are not lined up with each other.
- 4) Place the actuator vertically with the motor mount facing up. Assembling in a vertical orientation will prevent unwanted side load being applied by the motor's weight.
- 5) IP65 UNITS: Place appropriate o-ring around the motor pilot.
- 6) Insert the shaft of the motor into the shaft adapter/ motor coupler. Slide the motor down so the motor flange is flush with the motor adapter plate.



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7) Rotate the motor so the mounting holes line up with the holes in the actuator's motor adapter plate.

8) Lightly tighten the motor mounting bolts, taking care to maintain alignment without imparting any side loading on the motor shaft.

9) Tighten motor bolts to the designated torque value. (See table in Section 3.7)

10) Tighten the collar clamp screw to 100 in-lbs using a hex key wrench. I 20 : Depending on size of clamp, either 1/8" or " hex key wrench I 30: " hex key wrench I 40: 3/16 inch hex key wrench

11) Replace the clamp access plug.



Do not tighten the collar clamp before tightening the motor mounting bolts. This will introduce compression loads into the motor and actuator bearings that may reduce the life of each.

3.4 Ball Screw

The ball screw used within the DMB series actuators is a precision mechanism. The standard actuator will be supplied lubricated and sealed from the factory. Lubrication of the ball screw should be maintained in accordance with section 2.3. Shock load and radial load should be avoided to provide maximum life from the actuator.



Extending or retracting the ball screw into the ends of travel may cause damage to the actuator or the other components of the application.

3.5 End of Stroke Cushions

Every standard DMB series actuator is equipped with nitrile rubber impact bumpers, which are designed to protect the actuator from accidental over extension or retraction.



End of stroke cushions are provided for fail safe only and should not be used as an application limit of stroke. DMB Series Actuators are designed with an additional 10mm of length over nominal stroke. This is to allow users to utilize the full nominal stroke without causing damage by end crashing. See figures 10-1 to 10-3

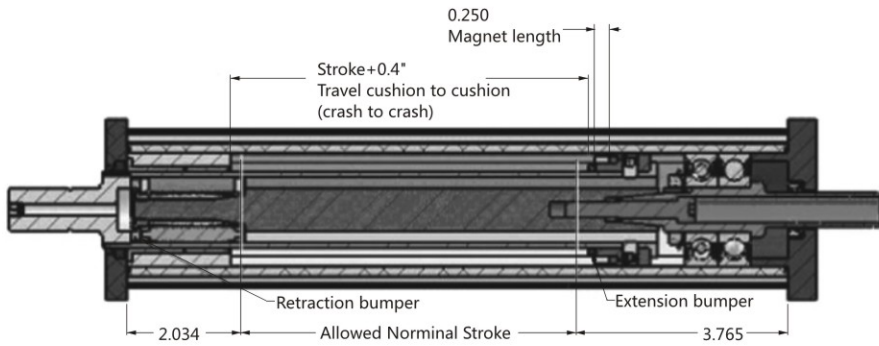


Figure10-1 : Actuator Shown in fully retracted "crash" position, with contact on forward impact bumper

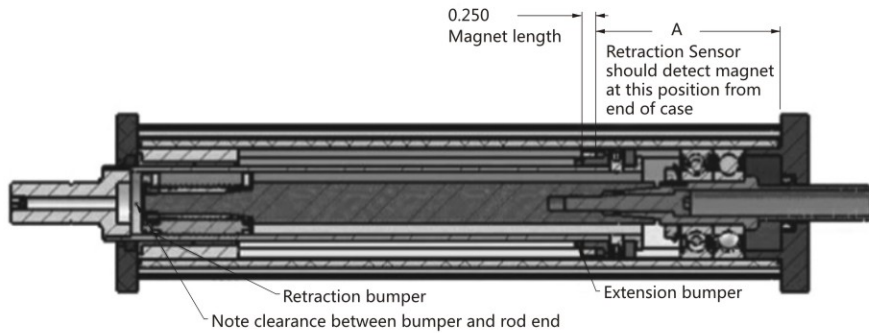


Figure10-2 : Actuator Shown in maximum recommended retracted position, with 10mm of 19 clearance on forward impact bumper

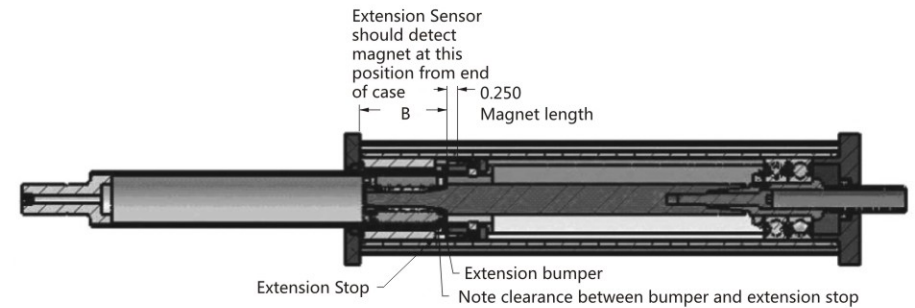


Figure10-3 : Actuator Shown in maximum recommended extension position, with 10mm of clearance on forward impact bumper

Recommended Limit Switch Positions for Magnet Sensing in DMB series

	Dim A	Dim B
DMB10	48mm	25mm
DMB20	62mm	33mm
DMB30	86mm	55mm
DMB40	132mm	65mm
DMB50	156mm	77mm
DMB60	182mm	93mm



Care should be taken not to exceed the physical travel limits of DMB series actuators. Doing so will cause the actuator to end-crash internally. End crashes can physically damage the ball screw and the internal components of the actuator.

3.6 Inspection and Lubrication Procedure

The following disassembly and reassembly procedures are general guidelines. Individual designs may differ from these procedures and any questions should be verified with Lude Transmission before reassembling and reinstalling the actuator into your machine or application. For both procedures refer to the drawings included in the disassembly procedure for reference only. For torque values see chart in Section 3.7.



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Parallel Mount Disassembly:

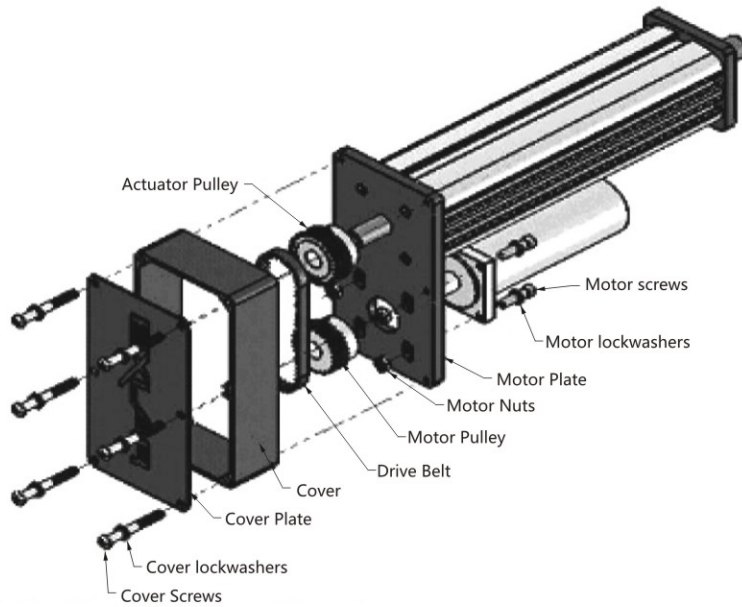


Figure 11: Parallel Motor Mount Drive Train Assembly

1. Remove power and dismount the actuator from the application.
2. Remove pulley cover and cover plate by removing cover screws and pulling cover and plate away from the motor plate.
3. Loosen motor mounting screws and slide motor down to relieve tension on belt. Once the belt can clear the pulley flange, remove the belt. Mark the position of the pulleys on the shafts—this will aid positioning in reassembly and ensure that the pulleys are parallel when reassembled.
- 4a. Loosen the set screws on motor and actuator shaft pulleys and slide the pulleys off the shafts. Take care not to damage the flanges on the flanged pulley, as these are made of aluminum and can be bent if subjected to prying forces.
- 4b. Loosen the bolts on the pulley taper couplings and slide pulleys off the shafts.
5. Support the motor, and remove the motor screws, washers, and nuts from the motor plate. Remove the motor.
6. Loosen and remove the four motor mounting screws. Remove the motor plate. If the unit is IP65 sealed, there will be O rings and shaft seals to be removed also. Remove the aluminum bearing spacer ring if possible, but if this is difficult it can be popped out when the actuator is pressed out of the case.
7. Proceed to the section on Actuator Disassembly.



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Inline Motor Mount Disassembly:

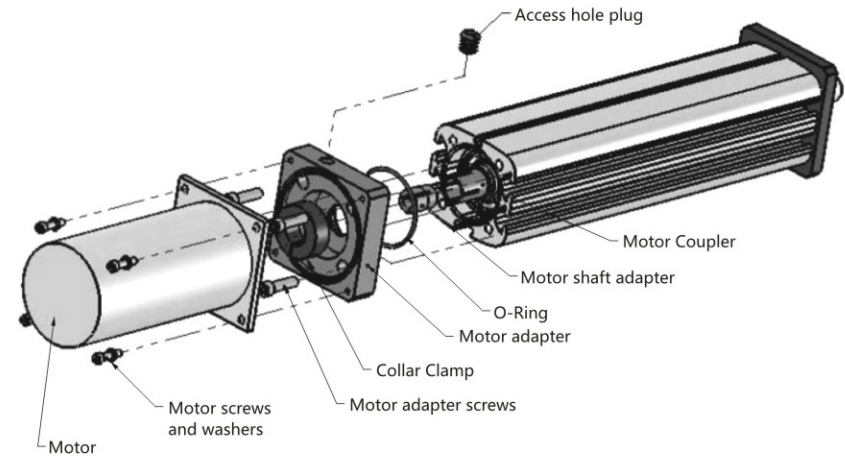


Figure 12: Inline Motor Mount Disassembly

1. Remove the actuator assembly from the application or machine by removing power from the motor, disconnecting main rod coupling and actuator mounting bolts or fasteners.
2. Pry access cap from access hole on motor plate.
3. Using a hex key wrench, reach into the access hole and turn the collar clamp until the cap screw socket is accessible. Then loosen the collar clamp. (Note: if the motor is equipped with an electronic brake, you may have to disable the brake to turn the motor shaft.)
4. Support the motor so it will not fall, and remove the motor screws, washers, and nuts from the motor plate. Remove the motor. If the unit is IP65 sealed, remove the motor pilot O-Ring.
5. Remove the motor adapter mounting screws. Remove the inline motor adapter. Some models will have a two-part motor adapter/end plate, which will require removal of two components and associated screws sequentially. The collar clamp can be slipped off as the motor adapter is removed, by pulling on the adapter as you twist it back and forth. If the unit is IP65 sealed, the shaft seal and ORings will need to be removed.



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Inline gear set/motor mount disassembly:

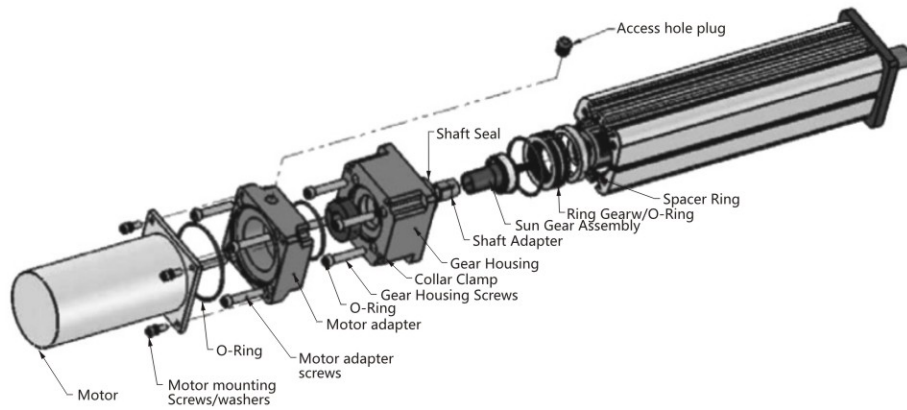


Figure 13: Inline Gear set/Motor Mount Disassembly

1. Remove the actuator assembly from the application or machine by removing power from the motor, disconnecting main rod coupling and actuator mounting bolts or fasteners.
2. Pry access cap from access hole on motor plate.
3. Using a hex key wrench, reach into the access hole and turn the collar clamp until the cap screw socket is accessible. Then loosen the collar clamp. (Note: if the motor is equipped with an electronic brake, you may have to disable the brake to turn the motor shaft.)
4. Support the motor so it will not fall, and remove the motor screws, washers, and nuts from the motor plate. Remove the motor. If the unit is IP65 sealed, remove the motor pilot O-Ring.
5. Remove the motor adapter mounting screws. Remove the inline motor adapter. If the unit is IP65 sealed, remove the o-ring.
6. Remove the gear housing and collar clamp. The collar clamp can be slipped off as the gear housing is removed, by pulling on the housing as you twist it back and forth. If the unit is IP65 sealed, the shaft seal and o-ring will need to be removed.
7. Remove the planetary gear set's sun gear assembly by pulling it away from the actuator. A slight side to side motion may assist in removing it. If the unit is IP65 sealed, remove the case o-ring.
8. The ring gear with its centering o-rings and the Spacer ring may have to be pushed out of the case with the main actuator mechanism. Take care to retain these components during disassembly.



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3.7 Fastener Torque Values

Fastener Torque Values	Torque (Nm)
DMB10 Torque Values	
1/4-20 SHCS (end fasteners), standard grade 8	16.3
1/4-20 SHCS (end fasteners), stainless steel	10.8
Screw, 1/4-28 x 2 SHCS Grade 8 (Shaft screw)	18.9
15 mm Bearing Locknut	20.3
Clamp, Split Collar	5.6
T Slot Mounting Component FHSCS, Black Oxide	28.4
T Slot Mounting Component FHSCS, Stainless Steel	23.1
Pulley Cover Mounting Screws, Screw, 1/4-20 x 2-1/4 BHCS	10.8
DMB20 Torque Values	
1/4-20 SHCS (end fasteners), standard grade 8	16.3
1/4-20 SHCS (end fasteners), stainless steel	10.8
Screw, 1/4-28 x 2 SHCS Grade 8 (Shaft screw)	18.9
15 mm Bearing Locknut	20.3
Clamp, Split Collar	5.6
T Slot Mounting Component FHSCS, Black Oxide	28.4
T Slot Mounting Component FHSCS, Stainless Steel	23.1
Pulley Cover Mounting Screws, Screw, 1/4-20 x 2-1/4 BHCS	10.8
DMB30 Torque Values	
1/4-20 SHCS (end fasteners), standard grade 8	16.3
1/4-20 SHCS (end fasteners), stainless steel	10.8
Screw, 5/16-24x 2 SHCS Grade 8	33.9
20 mm Bearing Locknut	40.7
Clamp, Split Collar	11.3
T Slot Mounting Component FHSCS, Black Oxide	28.4
T Slot Mounting Component FHSCS, Stainless Steel	23.1
Pulley Cover Mounting Screws, Screw, 1/4-20 x 2-1/4 BHCS	10.8
DMB40 Torque Values	
5/16-18 End Cap Fasteners	20.3
7/16-20 Tapered Shaft Screw	75.7
30 mm Bearing Locknut	81.3
1/4-20 Split Shaft Collar	10.8
10-28 NEMA 34, 42 Mounting Screws	5.1
T Slot Mounting Component FHSCS, Stainless Steel or Black Oxide	22.6
Pulley Cover Mounting Screws, -20 x 2-1/4 BHCS	10.8

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DMB50 Torque Values		
5/16-18 End Cap Fasteners		20.3
7/16-20 Tapered Shaft Screw		75.7
30 mm Bearing Locknut		81.3
1/4-20 Split Shaft Collar		10.8
10-28 NEMA 34, 42 Mounting Screws		5.1
T Slot Mounting Component FHSCS, Stainless Steel or Black Oxide		22.6
Pulley Cover Mounting Screws -20 x 2-1/4 BHCS		10.8
DMB60 Torque Values		
5/16-18 End Cap Fasteners		20.3
7/16-20 Tapered Shaft Screw		75.7
30 mm Bearing Locknut		81.3
1/4-20 Split Shaft Collar		10.8
10-28 NEMA 34, 42 Mounting Screws		5.1
T Slot Mounting Component FHSCS, Stainless Steel or Black Oxide		22.6
Pulley Cover Mounting Screws -20 x 2-1/4 BHCS		10.8
Motor Mounting Torques	Imperial Screw Size	Torque (Nm)
10-23		6.2
1/4-20		12.4
5/16-18		26.6
3/8-16		3.9
7/16-14		6.2
1/2-13		9.6
9/16-12		14.1
5/8-11		16.9
11/16-12		16.9
3/4-10		16.9
Motor Mounting Torques (cont'd)	Metric Screw Size	
M5x0.8		6
M6x1		10
M8x1.25		24
M10x1.5		46
M12x1.75		85
M16x2.0		199
M20x2.5		396

**LINEAR MOTION****4 Optional Equipment****4.1 Mounting Options**

As mentioned in section 2.1, standard mounting configurations on most models are Adjustable side lugs, adjustable side trunnions, and adjustable side flange mount. These options utilize the T-Slot grooves integrated into the case, offering a high degree of flexibility and adjustability. A fixed front flange mount is also available.

4.2 Standard Motor Mounting Configurations

The DMB series actuators are offered in two standard motor mounting configurations, parallel and inline. Each standard motor mounting is designed to accommodate any standard servo, DC or AC motor or planetary. Lude Transmission recommends that the motor be sent to our facility for mounting on the actuator to insure successful mounting of the belt drive or inline coupling system. See section 1.5 for more details.

4.3 Limit Switches

The DMB series actuator is equipped for adjustable externally mounted limit switches. Lude Transmission offers magnetic inductive proximity switches that are triggered by a target magnet that is located in the anti-rotate mechanisms inside of the actuator housing. The switches are available with normally open or normally closed PNP output. The logic configuration of the 3 standard options are indicated below:

L1 option: 1 N.O. switch

L2 option: 2 N.C. switches

L3 options: 1 N.O. and 2 N.C. switches.

For custom logic combinations, contact Lude Transmission applications engineering.

The magnetic inductive switch power is 10-30 VDC with a no-load operating current of <10 mA and a load current of less than or equal to 200 ma.

4.4 Rod Ends

DMB series actuators are available with standard male or female threaded rod ends with either Imperial or Metric threads. Each standard rod end is also equipped with wrench flats to aid in fastening rod end attachments or to the application load.

4.5 Motors

DMB series actuators are designed to accept any type of standard electric servo, AC or DC motor or planetary gear reducer. Due to motor size, torque or speed, not all motors or reducers can be mounted to each standard actuator. Custom motor mounting may be required. See section 5.0 for torque specifications required to drive application load levels.

4.6 Electronics

Electronics and drive amplifiers to match the appropriate motors are available from Lude Transmission or from the same manufactures of the motors. All maintenance and service guidelines



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contained within the amplifier and motor manufacturer’s installation and maintenance manuals should be followed.

5 Troubleshooting

5.1 Mechanical Problems

The following table offers suggestions to answer questions and offer solutions to issues that may arise during the installation or operation of your DMB series actuator.

Symptom/ Problem	Possible Cause	Problem Solution
Seemingly excessive audible noise	Misalignment or Side Load	Check alignment with application, remount actuator if necessary. Remove side load.
Seemingly excessive audible noise	Improper servo tuning	Consult tuning guidelines for servo motor and drive.
Actuator motor rotates but output rod does not extend or retract.	Belt or inline coupling failure	Disconnect power to motor, remove belt cover and inspect belt or inline coupling. Replace if necessary.
Motor does not operate.	Motor electrical problem	Consult motor manufacturer.
Output rod has excessive rotation, or rotates but does not extend	Anti-rotate failure	Replace anti-rotate mechanism
Excessive motor current to operate actuator.	An internal mechanism binding, application binding, ball screw failure. Operation over peak load rating.	Consult Lude Transmission

5.2 Electrical Problems

All electrical problems associated with the motor used to drive the ball screw in an DMB series actuator should be taken up with that motor manufacturer. Contact Lude Transmission application engineers or the motor and amplifier manufacturer for assistance with electrical problems.

If an externally mounted limit switch is not operating properly, check all power connections to the switch and make sure that the switch is wired properly. If the actuator has been disassembled, check to make sure that the switch groove in the case was lined up with the target.