ENERPAC®
POWERFUL SOLUTIONS. GLOBAL FORCE.

Instruction Sheet

Uni-Lift® Mechanical Actuators M and B Series Models

L2943 Rev. A 11/09

1.0 GENERAL SAFETY INFORMATION

Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. Enerpac cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Enerpac when in doubt as to the safety precautions and operations.

Failure to comply with the following precautionary statements could cause equipment damage and personal injury.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.

WARNING: Read and understand the entire contents of this manual before beginning installation or operation of Uni-Lift® actuators and related equipment. Follow all instructions and observe all safety precautions. Failure to properly install or operate Uni-Lift® actuators could result in serious personal injury or damage to equipment and/or property.

2.0 ACTUATOR SAFETY PRECAUTIONS

• Install the actuator and all related equipment in accordance with the engineering guidelines and recommendations contained in the *Enerpac Uni-Lift® Catalog* #E500 (available from your Enerpac distributor).

• Do not exceed the actuator ratings, including design load, travel, and input speed.

• Comply with and adhere to all applicable safety codes for your area, such as: building codes, elevator codes, AISC Steel Construction specifications, and applicable regulations and standards (including OSHA Title 29, Chapter 1910-219 and ANSI B15.1). **Note:** applicable safety codes, regulations and standards will vary depending on country and local requirements.

• Follow standard machinery installation practices. Properly install, align and shield all moving parts.

• Inspect, lubricate and maintain the actuator as described in this instruction sheet. Use the actuator only for its intended purpose.

IMPORTANT: Use of Uni-Lift® products to support or move human cargo is not recommended. Contact Enerpac before attempting to design a Uni-Lift® system for this application.

WARNING: Always lockout power before performing any inspection, maintenance, lubrication, adjustment or repair procedures on the actuator or any associated power transmission equipment. Be absolutely certain that the electric motor (or other prime mover) cannot be remotely or automatically started. Make sure the load is properly supported before the actuator brake or other holding devices are removed.

3.0 ACTUATOR MODELS

Enerpac Uni-Lift® actuators are available in two versions, *machine screw* (M-Series) and *ball screw* (B-Series).

The M-Series actuator uses a precision rolled Acme threaded screw that is self locking. In most applications, it will hold its position without a brake. This type of actuator is best suited for high load at slower speeds, applications with less frequent cycling and if the load must be held in position when the system is at rest.

The B-Series actuator uses ball screws to convert rotary motion to linear movement. It requires about one-third the horsepower of a comparable machine screw actuator. This type of actuator is best suited when smooth, fast operation is required, and if high cycle operation is anticipated. However, due to the efficiency of the ball screw, a mechanical brake must be used to stop the load screw and to hold it in position.

IMPORTANT: Brakes are recommended for use on ANY Uni-Lift® actuator (including M-Series models) if vibration is present.

Note: The information contained in this manual is intended for general reference only. Appearance, features and specifications will vary due to design variables, custom engineering and optional equipment. Refer to the charts in sections 12.0 through 15.0 for an overview of available Uni-Lift® models, features and optional accessories.

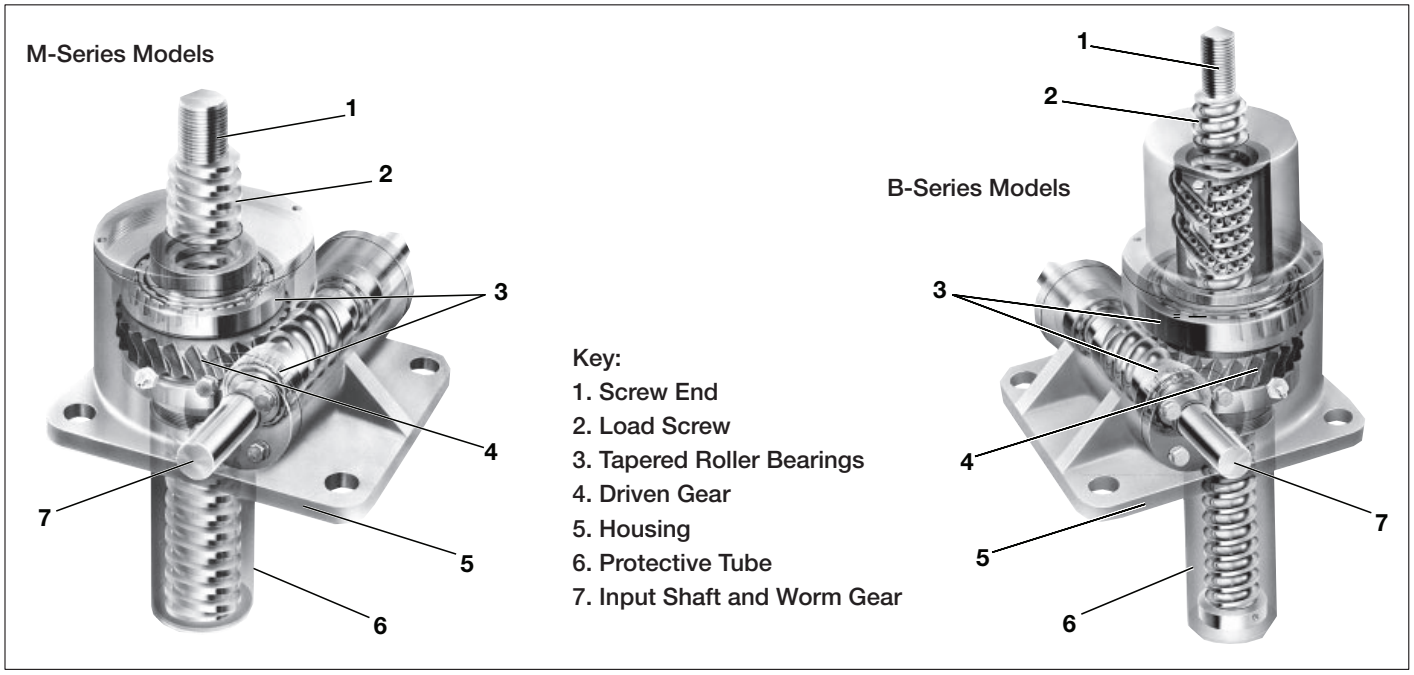


Figure 1, Major Features and Components

4.0 ACTUATOR FEATURES

Both M and B Series Uni-Lift® models incorporate a ground alloy steel worm gear which drives a high tensile bronze gear nut, accurately machined to high standards for maximum load carrying capacity and uniformity of motion transmission. See figure 1.

All shafts are mounted on heavy duty tapered roller bearings to support the rated thrust load of the actuator while maintaining correct gear alignment. The actuator housing is made of aluminum or ductile iron, depending on model specified.

The load screw is made of high quality steel that is ground to size and precision rolled to form the threads. It is well proportioned to handle the maximum load rating of the actuator. The load screw upper end can be provided in threaded, plain, clevis or "top plate" style, depending on model selected. Load screws with double-clevis ends are also available as an option on some models.

If needed, stainless steel or special alloy load screws can be provided at additional cost. Protective bellows boots are available as an accessory to protect the exposed portion of the load screw, and to help keep the threads lubricated and free of dirt.

On upright and double clevis models only, a protector tube is furnished in order to keep the load screw threads lubricated and free of foreign material.

Standard M and B Series actuators may be operated at a wide range of input speeds. Units are recommended based on duty cycle requirements and other customer supplied information.

5.0 LOAD SCREW CONFIGURATIONS

Uni-Lift® actuators are available in a choice of three different load screw configurations:

1) *Translating* (refer to section 5.1)

2) *Rotating* (refer to section 5.2)

3) *Keyed Translating* (refer to section 5.3)

5.1 Translating Configuration

On these actuators, the load screw "translates" through the unit to push or pull the load. The load must be fixed to the screw and restricted from rotation in order to produce linear motion. See figure 2.

An optional *Anti-Backlash* feature is available on selected M-Series Translating models. This feature automatically compensates for normal thread wear to reduce load screw endplay.

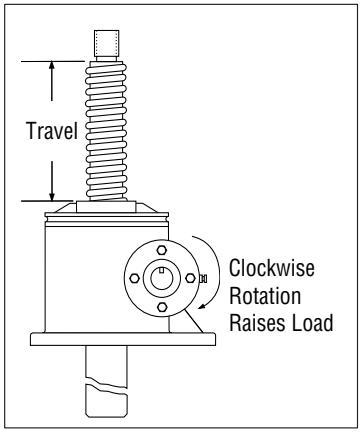


Figure 2

5.2 Rotating Configuration

On these actuators, the load screw is fixed to the driven gear, causing the screw to rotate. A flange nut travels along the exposed length of the load screw to push or pull the load. The load must be fixed to the flange nut and restricted from rotation in order to produce linear motion. See figure 3.

The plain end of the load screw and the flange nut are pre-assembled on these units. The plain end is designed to fit a standard pillow block bearing, to provide support and alignment for the rotating load screw.

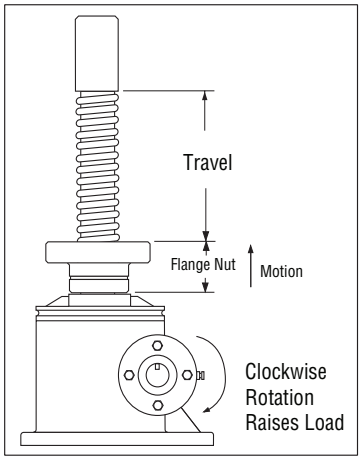


Figure 3

5.3 Keyed Translating Configuration

In applications where rotation cannot be prevented externally, a keyed design actuator is required. These models are keyed internally to prevent rotation of the screw, so that linear motion is produced. See figure 4.

Note: For keyed applications where operating loads are expected to exceed 25 percent of rated capacity, contact Enerpac for technical assistance. Also contact Enerpac for recommendations if unusually long travels or high screw velocities are required.

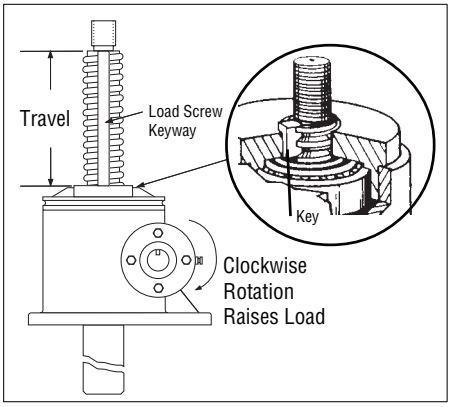


Figure 4

6.0 UNPACKING AND RECEIVING THE SHIPMENT

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

Upon delivery, take an inventory of the entire shipment to determine if shortages exist. All shortages must be immediately reported to Enerpac and also to the carrier.

7.0 GENERAL INFORMATION

• The customer's application design engineer is responsible for ensuring that there are no destructive conditions which could affect the actuator(s) and/or complementing equipment. Conditions that may be considered destructive include, but are not limited to: 1) excessive input speeds, 2) extreme shock loading, 3) mechanical or thermal overloading, 4) exceeding recommended duty cycles and 5) side loading of the load screw.

• Each actuator in the system must be specified in accordance with the stated requirements and precautions contained in the *Enerpac Uni-Lift® Catalog* #E500. All calculations and specifications must be reviewed and approved by the customer's application design engineer in advance of installation.

Note: Unless specified in the sales order, the services of a field engineer are not included with the purchase of Enerpac Uni-Lift® actuators and related equipment.

• Installation, maintenance and safety instructions must be given to all personnel directly responsible for the installation, maintenance and operation of the Uni-Lift® equipment.

7.1 Warranty Guidelines

• The Enerpac warranty is valid only if the actuator is operated within the rated capacity and conditions for which the unit was specifically designed.

• In the event that a malfunction of the actuator occurs within the warranty period, the unit must be immediately removed from service and Enerpac must be promptly informed of the problem.

8.0 INSTALLATION REQUIREMENTS

1. Be certain that the rated capacity of the actuator exceeds the maximum load that may be applied to it during use.
2. Check that the maximum allowable input speed (RPM) of the actuator will not be exceeded.

Note: For maximum input speeds and other Uni-Lift® specifications, refer to the charts in sections 12.0 through 15.0 of this document.

3. Select a motor (if used) of appropriate size for your application. For motor sizing information, refer to the *Enerpac Uni-Lift® Catalog* #E500.
4. Ensure that the actuator foundation is sufficiently rigid to maintain correct alignment with connected machinery and that it has sufficient strength to support the maximum load.
5. Check that the foundation has a flat mounting surface to assure uniform support for the actuator. Mounting bases should be flat and sufficiently strong to support the load.
6. Be sure the opening in the foundation for the protective tube or the load screw is as small as possible, so that the unit is supported over the greatest possible area.
7. Ensure that the method of preventing load screw or flange nut (as applicable) rotation is sufficiently strong, so that translation will occur. Refer to the *Load Screw Torque* section of the *Enerpac Uni-Lift® Catalog* #E500.

9.0 INSTALLATION AND ALIGNMENT PROCEDURES

1. Mount the actuator and check that the axis of the load screw is parallel to the movement of the load and centered with respect to the load. If required, shim under the actuator base so that this condition is achieved. After re-checking that alignment is correct, hand tighten the mounting bolts. Repeat this step for each actuator to be installed in the system.

CAUTION: Eccentric loading and/or side loading will result in premature wear and/or damage the actuator and possibly other components in the system. Such damage is not covered under the Enerpac warranty.

IMPORTANT: To help ensure proper alignment, use of laser transits during alignment procedures is strongly recommended.

2. Install and align all power transmission equipment, including speed reducers, mitre gearboxes, shafts and couplings. Hand tighten mounting bolts.
3 Re-check alignment of input shaft(s) with the worm shaft(s) of the actuator(s). This alignment is critical for proper operation.
4. Check the entire system for any obvious indications of binding or misalignment. Test the system alignment by rotating the shafts by hand. Fully extend the load screw(s).

Note: When the actuator(s), shafting and gearboxes are properly coupled together and aligned in a system, it should be possible to rotate the shafts by hand and to fully extend the load screw(s) when the load is not applied.

5. After checking for proper alignment, tighten all mounting bolts and other fasteners to the proper torques. Be sure to torque all mounting bolts evenly to avoid damaging the actuator housing. Refer to table 1 (see next page) for torque values.

IMPORTANT: It is essential that all gearboxes and actuators be securely bolted down to the foundation, using bolts of proper diameter to fit the actuator mounting holes. Bolts must be at least S.A.E. Grade 5 or equivalent. If possible, it is recommended that each actuator be doweled in place. Doweling will assure exact repositioning if the component is ever removed.

Table 1 - Threaded Fastener Torque Values			
BOLT SIZE		APPROXIMATE TORQUE VALUE	
inch	metric	pound force (inches)	kilogram force (centimeters)
1/4	M6x1	6	6.9
3/8	M10x1.5	20	23
5/8	M18x2	100	115
3/4	M20x2.5	165	190
7/8	---	265	305
1	M24x3	400	460
1 ¼	M30x3.5	830	8956
1 ½	M36x4	1350	1555
1 ¾	M45x6	2500	2880
2	M52x6.5	3650	4205

7. After the actuator(s) and all components are securely bolted in place, attach the load to the actuator(s).
8. Install external stops and travel limiters as required. Installation of these items is the customer's responsibility.

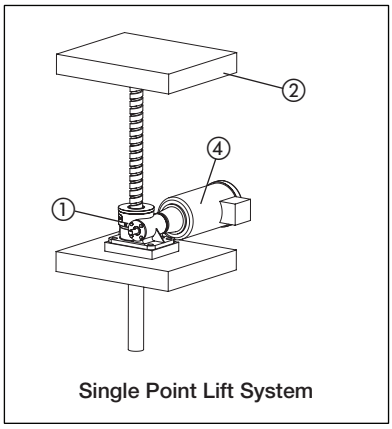
CAUTION: If limit switches are furnished by Enerpac, they are NOT factory set. Limit switches should be set by carefully moving the set position by hand or jogging the motor. Exercise care when operating the unit at the extreme limits of travel.

CAUTION: Emergency stop nuts are intended for use only as secondary stops, in the event of overtravel emergencies. Gear damage may result when emergency stop nuts are used as the primary travel limit and other means of overload protection are not incorporated into the system.

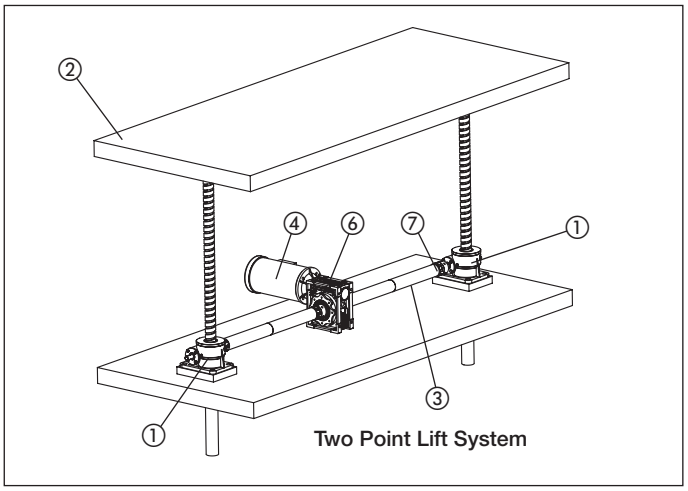
CAUTION: If operating at the upper limits of the actuator rating, do not stop the load on the housing or the hard external or internal stops. Failure to observe this precaution may result in damage to the actuator's internal gearing.

IMPORTANT: Positive stops or emergency stop nuts must be positioned so that the stop contact for all units will occur simultaneously to equally distribute the system stall load if overtravel occurs.

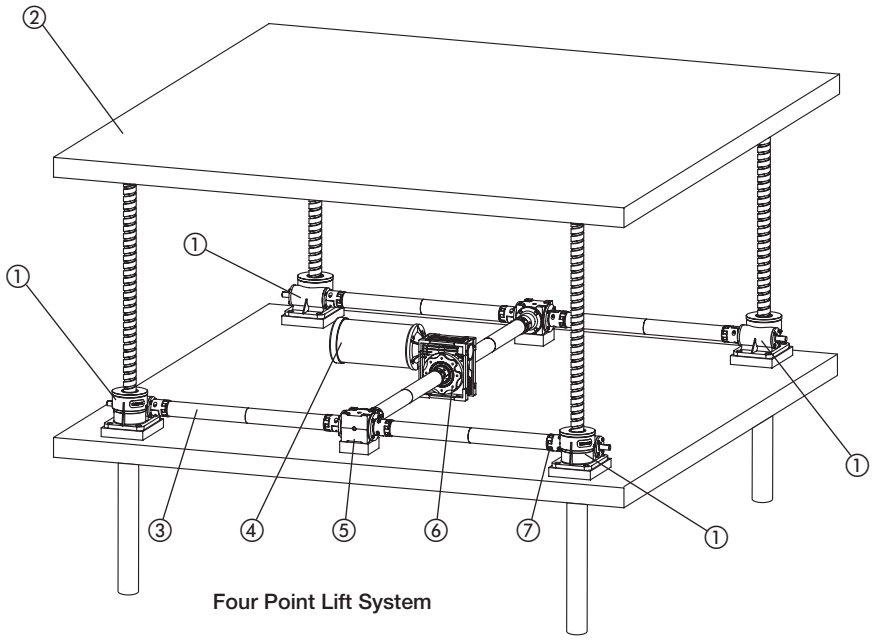
9. Install shaft guards, coupling guards and other protective devices as required, in accordance with all applicable safety codes and regulations.



Single Point Lift System



Two Point Lift System



Four Point Lift System

Key:
① Uni-Lift® Actuator
② Top Plate
③ Shafting
④ Electric Motor
⑤ Mitre Gearbox
⑥ Gear Reducer
⑦ Coupler

Figure 5, System Arrangements (typical)

WARNING: Fabrication and installation of shaft and coupling guards is the customer's responsibility. Guards and other protective devices are NOT provided by Enerpac.

10. Before startup, apply a light film of grease to the load screw threads. Check that the actuator housing is filled with grease. Refer to sections 10.0, 10.1 and 10.2 for additional instructions.
11. Test the operation of the actuator(s). Start-up should be closely monitored and break-in periods of several minutes with careful observation are required.

IMPORTANT: If vibration, binding or excessive motor amperage draw occurs, immediately shut down the system, lockout power and repeat the entire alignment procedure.

10.0 LUBRICATION AND MAINTENANCE

WARNING: Always lockout power before performing any inspection, maintenance, lubrication, adjustment or repair procedures on the actuator or any associated power transmission equipment. Be absolutely certain that the prime mover cannot be remotely or automatically started. Make sure the load is properly supported before the actuator brake or other holding devices are removed.

10.1 Lubrication Procedure

New Uni-Lift® actuators are shipped with grease in the housing. Lubrication is recommended at regular intervals. Such intervals are determined by the duty cycles of the actuator, but should be performed a minimum of once every 60 days.

Internal lubrication is performed by applying grease through one or more fittings located on the outside of the actuator housing. The number and locations of fittings will vary, depending on actuator size. See figure 6.

Perform lubrication as described in the following steps:

1. Use the proper grease as described in section 10.2.
2. Fill the gearbox by pumping grease into each grease fitting on the actuator housing. Continue filling the unit with grease until lubricant begins to seep from the load screw opening.

   Note: For units equipped with load screw boots, remove the boot at the actuator before adding grease.
3. Using a clean rag or paintbrush, apply a light film of grease directly to the load screw threads. See figure 7.

10.2 Lubricant Requirements

The lubricant should not be corrosive to gears or to ball or roller bearings and must be neutral in reaction. In addition, the lubricant must be oxidation resistant and must be non-channeling.

Operating temperatures must be considered when selecting lubricants. Enerpac recommends the following extreme pressure greases or their equivalents:

1. **For operation up to 180°F [82°C] -** Use Shell Alvania EP2 premium lithium based grease. If another brand of EP2 grease is used, it should have a viscosity of 840 to 890 SUS at 100°F, and 76 to 84 SUS at 210°F.

2. **For operation up to 400°F [204°C] -** Use Shell Albida EP2 high temperature grease. If another brand of high temperature grease is used, it should have a viscosity of 539 SUS @100°F.

3. **For operation down to -100°F [-73°C] -** Use Shell AeroShell Grease 7 (Low temperature aviation synthetic hydrocarbon microgel grease).

Note: Standard Uni-Lift® models are designed to operate at 80°F [27°C] with a 100°F temperature rise. For higher temperatures, special seals are required. Contact Enerpac for additional information.

4. **Special Requirements -** Special greases approved for food industry applications and greases for extremely low temperature applications below -100°F [-73°F] are available. Contact Enerpac for additional information.

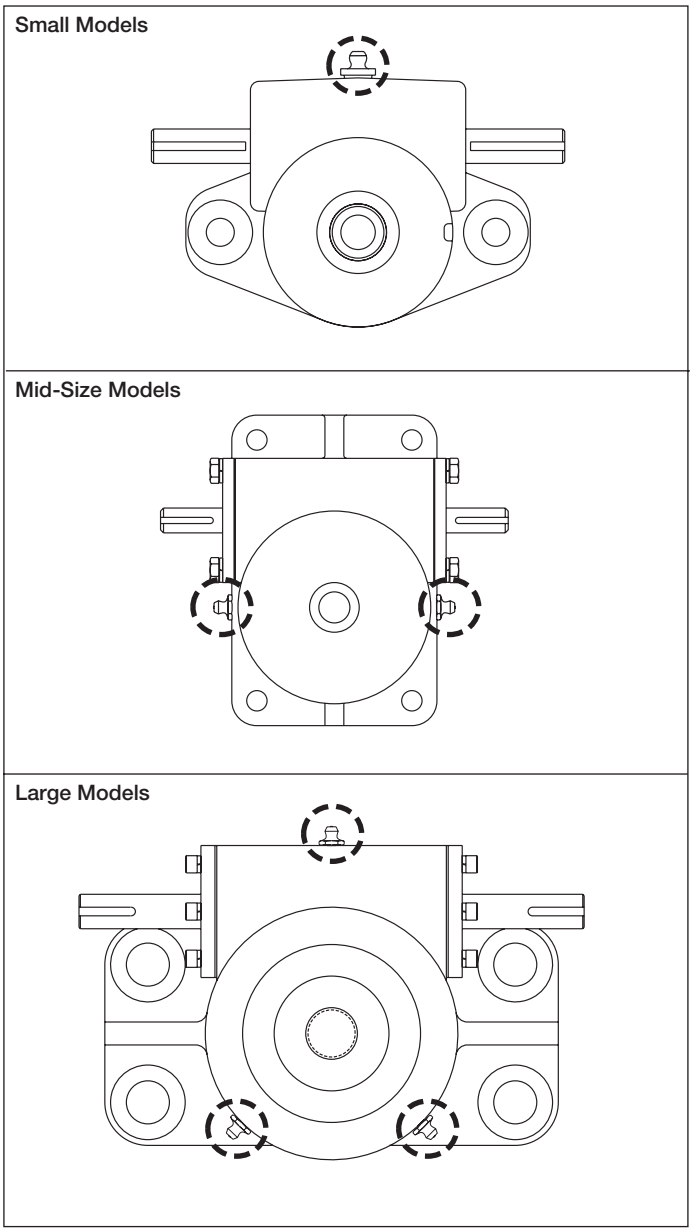


Figure 6, Grease Fitting Locations (typical - top view)

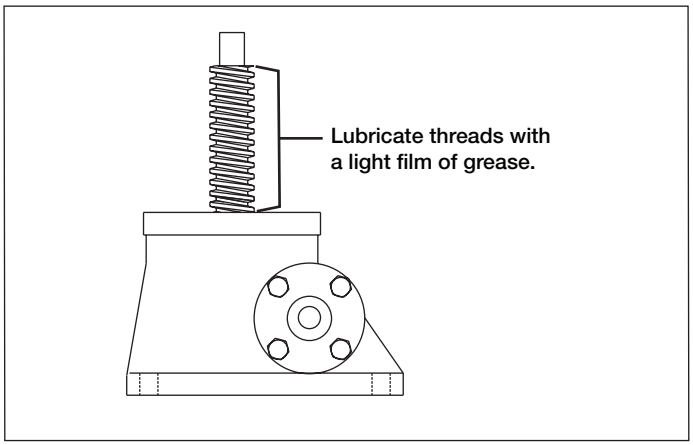


Figure 7, Load Screw Thread Lubrication (Typical - Side View)

10.3 Periodic Inspection and Maintenance

Perform the following inspection and maintenance procedures every 30 days or more often if needed:

• Wipe down and visually inspect the actuator. Check for damage, such as cracked, broken or chipped parts.

• If not done recently, top off the grease in the actuator housing. Use the grease fitting(s) provided on the side of the actuator. Refer to sections 10.0, 10.1 and 10.2 for additional information.

• Inspect the load screw threads and lubricate them if needed. Refer to sections 10.0, 10.1 and 10.2 for additional information.

Note: More frequent load screw lubrication may be required for the *rotating* style actuators. Since the load screw on these actuators does not translate through the gearbox as it turns, the load screw threads are not lubricated by grease from the gearbox during normal operation.

• Check the input shaft end plate screws, the housing cap screws and all mounting bolts for correct tightness. Retighten as required.

• Check the alignment of the load screw to the load. The load should be centered on the axis of the load screw and motion should be parallel to the load screw. Misalignment will cause premature wear and possible failure.

• Check that the power output shafting is aligned with respect to the input shaft of the actuator. Binding during rotation will cause premature wear.

Note: When the actuator(s), shafting, and gearboxes are properly coupled together in a system, it should be possible to rotate the shafts by hand and fully extend the unloaded actuator(s).

11.0 TROUBLESHOOTING

The Troubleshooting Guide (Refer to table 2 on next page) is intended to help you diagnose and correct various possible problems. Only qualified technicians should troubleshoot and repair the Uni-Lift® actuator. For repair service, contact the Authorized Enerpac Service Center in your area.

WARNING: Use extreme caution during troubleshooting procedures. Always lockout power before performing any inspection, maintenance, lubrication, adjustment or repair procedures on the actuator or any associated power transmission equipment. Be absolutely certain that the prime mover cannot be remotely or automatically started. Make sure the load is properly supported before the actuator brake or other holding devices are removed.

Table 2 - Troubleshooting Guide - Enerpac Uni-Lift® Mechanical Actuators		
Problem	**Possible Cause**	**Action**
Housing failure.	1. Actuator overloaded.	Reduce load or replace actuator with a larger actuator of sufficient capacity.
	2. Improper support.	Check that the actuator is supported under the entire base area (not just at the bolt holes).
	3. High shock.	Replace existing actuator with a larger actuator of sufficient capacity.
	4. Uneven bolting torque.	Torque all mounting bolts evenly.
Worm shaft failure.	1. Improper coupling.	Replace coupling. The coupling used must provide adequate flexibility and lateral float.
	2. Coupling misalignment.	Re-align coupling as required.
	3. Excessive overhung load.	Contact Enerpac for allowable overhung loads.
	4. Actuator overloaded.	Reduce load or replace existing actuator with a larger actuator of sufficient capacity.
	5. Shock loading.	Install coupling capable of absorbing shock. If necessary, replace existing actuator with a larger actuator of sufficient capacity. **Note:** Shock loads can significantly increase the apparent dead weight.
	6. Excessive torque due to ganged actuators.	If several actuators are connected in-line, the worm shaft of the first unit will be subjected to the combined torque of all the units. If this torque exceeds 300 percent of the rated input torque, the first unit must be replaced with a larger actuator of sufficient capacity.
Bearing failure.	1. Actuator overloaded.	Reduce load or replace existing actuator with a larger actuator of sufficient capacity.
	2. Coupling misalignment.	Re-align coupling as required.
	3. Load screw misalignment.	Check that load screw is perfectly plumb.
	4. Coupling lateral misalignment.	Adjust spacing between connecting shafts to reduce end pressure.
	5. Bearing adjustment.	Bearings must be preloaded. Contact Enerpac for additional information.
	6. Bearing lubrication.	Proper grease level must be maintained and proper grease type must be used.
	7. Shock loading.	Install coupling capable of absorbing shock. If necessary, replace existing actuator with a larger actuator of sufficient capacity. **Note:** Shock loads can significantly increase the apparent dead weight.
Worm gear failure.	1. Actuator overloaded.	Reduce load or replace existing actuator with a larger actuator of sufficient capacity.
	2. Load screw misalignment.	Check that load screws are perfectly plumb.
	3. Insufficient lubrication.	Proper grease level must be maintained and proper grease type must be used.
	4. Duty cycle limit exceeded.	Reduce the number of cycles per hour or reduce the load. Contact Enerpac for the maximum allowable duty cycle.
	5. Side loading.	Eliminate side load.
Load screw failure.	1. Actuator overloaded.	Reduce load or replace existing actuator with a larger actuator of sufficient capacity.
	2. Load screw misalignment.	Check that load screw is perfectly plumb.
	3. Side loading.	Eliminate side load.

12.0 CONFIGURATION CHART, M-SERIES ACTUATORS

M	1	U	T	0240	L	T	-	A11	B1	L62	M5	N	S2
1	2	3	4	5	6	7		8	9	10	11	12	13

1 Model Type

M = Machine Screw Actuator

2 Ton Rating

A5 = .25 Ton
A15 = .75 Ton
A20 = 1 Ton
1 = 1 Ton
2 = 2 Ton
3 = 3 Ton
4 = 4 Ton
5 = 5 Ton
8 = 8 Ton
10 = 10 Ton
15 = 15 Ton
20 = 20 Ton
25 = 25 Ton
30 = 30 Ton
40 = 40 Ton
50 = 50 Ton
75 = 75 Ton
100 = 100 Ton
150 = 150 Ton
250 = 250 Ton

3 Mounting Style

U = Upright
I = Inverted
D = Double Clevis *

4 Screw Configuration

T = Translating
R = Rotating
A = Translating (Anti-Backlash**)
K = Keyed Translating

5 Extended Screw Length (ESL)

xxx.x = Input Valve (in.)
(Do not include decimal in part No. - all data will be based on 1 decimal place.
Example: 12.0" = 0120")

6 Gear Ratio

L = Low
M = Medium
H = High

7 End Configuration

V = Threaded End
C = Clevis End
P = Plain End
T = Top Plate

8 Motor Adaptor

First Digit
A = Motor Adaptor

Second Digit
1 = Right-Hand Mount
2 = Left-Hand Mount

Third Digit
1 = 56C
2 = 143/145TC
3 = 182/184C
4 = 182/184TC
5 = 213/215C
6 = 213/215TC

9 Booth Specifications

First Digit
B = Boot

Second Digit
1 = 1 Boot, No Guides
2 = 2 Boots, No Guides
3 = 1 Boot, With Guides
4 = 2 Boots, With Guides

10 Limit Switch Configuration

First Digit
L = Limit Switch

Second Digit
1 = Right Hand Position, 1
2 = Right Hand Position, 2
3 = Right Hand Position, 3
4 = Right Hand Position, 4
5 = Left Hand Position, 1
6 = Left Hand Position, 2
7 = Left Hand Position, 3
8 = Left Hand Position, 4

Third Digit
1 = 2 Circuit Series 360
2 = 2 Circuit Series 1440
3 = 2 Circuit Series 4320

11 Motor Specifications

First Digit
M = Motor

Second & Third Digits
1 = 1/4 hp, 1750 RPM
2 = 1/4 hp, 1140 RPM
3 = 1/3 hp, 1750 RPM
4 = 1/3 hp, 1140 RPM
5 = 1/2 hp, 1750 RPM
6 = 1/2 hp, 1140 RPM
7 = 3/4 hp, 1750 RPM
8 = 3/4 hp, 1140 RPM
9 = 1 hp, 1750 RPM
10 = 1 hp, 1140 RPM
11 = 1.5 hp, 1750 RPM
12 = 1 hp, 1140 RPM
13 = 2 hp, 1750 RPM
14 = 2 hp, 1140 RPM
15 = 3 hp, 1750 RPM

12 Stop Nut

First Digit
N = Stop Nut

13 Single Shaft

First Digit
S = Shaft

Second Digit
1 = Right Hand
2 = Left Hand

*Double Clevis option is available only on models: M2, M3, M4, M5, M10, M15 & M20.
**Anti-Backlash option is available only on models: M2, M5, M10, M20, M30 & M50.

13.0 SPECIFICATIONS CHART, M-SERIES ACTUATORS

Capacity	Model Number	Load Screw Diameter	Lead of Screw	Gear Center	Gear Ratio (in)			Turns of input shaft for 1 inch of rise			Torque Required to Lift 1 lbs. (in-lbs)			No Load Torque	Maximum Input RPM	Estimated Weight (lbs)		Radius of Gyration
(ton)		(in)	(in)	(in)	Low	Med.	High	Low	Med.	High	Low	Med.	High	(in-lbs)		0" Travel	Per Inch	(in)
.25	**MA5**	0.500	0.250	.0938	5:1	–	–	20	–	–	0.022	–	–	1.5	2587	2	0.1	0.094
.75	**MA15**	0.625	.25/.125	.0938	5:1	–	5:1	20	–	40	0.020	–	0.015	1.5/2.0	2587	2	0.1	0.125
1	**MA20**	0.75	0.20	1.250	5:1	–	20:1	25	–	100	0.020	–	0.010	4.0	2587	5	0.5	0.154
1	**M1**	0.75	0.25	1.500	5:1	–	10:1	20	–	40	0.021	–	0.013	3.0	2587	9	0.2	0.156
2	**M2**	1.00	0.25	1.750	6:1	–	24:1	24	–	96	0.020	–	0.009	5.0	1800	17	0.6	0.218
3	**M3**	1.00	0.25	1.831	6:1	8:1	12:1	24	8:1	48	0.021	0.017	0.013	4.0	1800	13	0.4	0.218
4	**M4**	1.50	0.33	2.256	5⅓:1	12:1	24:1	16	12:1	72	0.030	0.018	0.012	5.0	1800	23	0.7	0.334
5	**M5**	1.50	0.38	2.188	6:1	–	24:1	16	–	64	0.028	–	0.011	12.0	1800	30	0.7	0.316
8	**M8**	1.75	0.33	3.010	6:1	–	12:1	18	–	36	0.030	–	0.019	7.0	1800	47	0.9	0.396
10	**M10**	2.00	0.50	2.598	8:1	–	24:1	16	–	48	0.029	–	0.015	18.0	1800	45	1.1	0.423
15	**M15**	2.25	0.50	2.598	8:1	–	24:1	16	–	48	0.031	–	0.015	18.0	1800	55	1.2	0.486
20	**M20**	2.50	0.50	2.875	8:1	–	24:1	16	–	48	0.033	–	0.021	36.0	1800	80	1.7	0.566
25	**M25**	2.75	0.50	4.005	9:1	–	18:1	18	–	36	0.031	–	0.019	10.0	1450	103	2.1	0.628
30	**M30**	3.38	0.67	3.750	10⅔:1	–	32:1	16	–	48	0.034	–	0.017	48.0	1200	145	2.9	0.743
40	**M40**	4.25	0.67	5.162	–	–	20:1	–	–	30	–	–	0.024	12.0	1200	230	5.0	0.985
50	**M50**	4.25	0.67	5.313	10⅔:1	–	32:1	16	–	48	0.040	–	0.021	96.0	1200	280	5.0	1.074
75	**M75**	5.00	0.67	6.003	10⅔:1	–	32:1	16	–	48	0.042	–	0.021	156.0	900	495	6.3	1.149
100	**M100**	6.00	0.75	7.500	12:1	–	36:1	16	–	48	0.045	–	0.024	204.0	900	845	7.4	1.387
150	**M150**	Contact Enerpac																
250	**M250**																	

14.0 CONFIGURATION CHART, B-SERIES ACTUATORS

B	1	U	R	0240	L	P	-	A11	B1	L63	M3	N	S2
1	2	3	4	5	6	7		8	9	10	11	12	13

1 Model Type
B = Ball Screw Actuator

2 Ton Rating
1 = 1 Ton
2 = 2 Ton
5 = 5 Ton
10 = 10 Ton
20 = 20 Ton
30 = 30 Ton
50 = 50 Ton
75 = 75 Ton
100 = 100 Ton

3 Mounting Style
U = Upright
I = Inverted
D = Double Clevis *

4 Screw Configuration
T = Translating
R = Rotating
K = Keyed Translating

5 Extended Screw Length (ESL)
xxx.x = Input Valve (in.)
(Do not include decimal in part No. - all data will be based on 1 decimal place.)
Example: 12.0" = 0120"

6 Gear Ratio
L = Low
H = High

7 End Configuration
V = Threaded End
C = Clevis End
P = Plain End
T = Top Plate

8 Motor Adaptor
First Digit
A = Motor Adaptor
Second Digit
1 = Right-Hand Mount
2 = Left-Hand Mount
Third Digit
1 = 56C
2 = 143/145TC
3 = 182/184C
4 = 182/184TC
5 = 213/215C
6 = 213/215TC

9 Boot Specifications
First Digit
B = Boot
Second Digit
1 = 1 Boot, No Guides
2 = 2 Boots, No Guides
3 = 1 Boot, With Guides
4 = 2 Boots, With Guides

10 Limit Switch Configuration
First Digit
L = Limit Switch
Second Digit
1 = Right-Hand Position, 1
2 = Right-Hand Position, 2
3 = Right-Hand Position, 3
4 = Right-Hand Position, 4
5 = Left-Hand Position, 1
6 = Left-Hand Position, 2
7 = Left-Hand Position, 3
8 = Left-Hand Position, 4
Third Digit
1 = 2 Circuit Series 360
2 = 2 Circuit Series 1440
3 = 2 Circuit Series 4320

*Double Clevis option is available only on models: **B2, B5 and B10.**

11 Motor Specifications
First Digit
M = Motor
Second & Third Digits
1 = 1/4 hp, 1750 RPM
2 = 1/4 hp, 1140 RPM
3 = 1/3 hp, 1750 RPM
4 = 1/3 hp, 1140 RPM
5 = 1/2 hp, 1750 RPM
6 = 1/2 hp, 1140 RPM
7 = 3/4 hp, 1750 RPM
8 = 3/4 hp, 1140 RPM
9 = 1 hp, 1750 RPM
10 = 1 hp, 1140 RPM
11 = 1.5 hp, 1750 RPM
12 = 1 hp, 1140 RPM
13 = 2 hp, 1750 RPM
14 = 2 hp, 1140 RPM
15 = 3 hp, 1750 RPM

12 Stop Nut
First Digit
N = Stop Nut

13 Single Shaft
First Digit
S = Shaft
Second Digit
1 = Right Hand
2 = Left Hand

15.0 SPECIFICATIONS CHART, B-SERIES ACTUATORS

Capacity	Model Number	Load Screw Diameter	Lead of Screw	Gear Center	Gear Ratio (in)		Turns of input shaft for 1 inch of rise		Torque Required to Lift 1 lbs. (in-lbs)		Holding Torque. (ft-lbs)		No Load Torque	Maximum Input RPM	Estimated Weight (lbs)		Radius of Gyration
(ton)		(in)	(in)	(in)	Low	High	Low	High	Low	High	Low	High	(in-lbs)		0" Travel	Per Inch	(in)
1	**B1**	.75	0.50	1.500	5:1	10:1	10	20	0.024	20	1.4	2	4	1800	2.3	0.7	0.154
2	**B2**	1.00	0.25	1.750	6:1	24:1	24	96	0.011	96	4	1.5	5	1800	17	0.6	0.205
5	**B5**	1.50	0.474	2.188	6:1	24:1	12.66	50.66	0.018	50.66	14	5	12	1800	35	0.6	0.285
10	**B10**	1.50	0.474	2.598	8:1	24:1	16.88	50.66	0.014	50.66	13	4	18	1800	50	0.8	0.285
20	**B20**	2.25	0.50	2.875	8:1	24:1	16	48	0.015	48	27	7	36	1800	85	1.5	0.463
30	**B30**	3.00	0.666	3.750	10⅔:1	32:1	16	48	0.015	48	21	5	48	1200	220	2.4	0.620
50	**B50**	4.00	1.00	5.313	10⅔:1	32:1	10.66	32	0.022	32	40	10	96	1200	340	2.8	0.835
75	**B75**	4.00	1.00	6.000	10⅔:1	32:1	10.66	32	0.022	32	107	24	156	900	590	4.6	0.835
100	**B100**	4.00	1.00	7.500	12:1	36:1	12	36	0.020	36	128	50	204	900	960	4.6	0.835

IMPORTANT:
- Product data, specifications and features are subject to change without notice.
- For system design guidelines and additional specifications, refer to the *Enerpac Uni-Lift® Catalog #E500.*

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09/30/09

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