

Maintenance Manual



UNI-LIFT Division of Templeton, Kenly & Co. Inc.
2525 Gardner Rd * Broadview, IL 60155
Phone: (708)865-1500 * Fax: (708)865-0894

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How to use Maintenance Manual and contact UNI-LIFT for customer support

Caution: Read this manual before installation or operation of UNI-LIFT equipment. Failure to understand this manual, install or operate **UNI-LIFT** equipment properly could result in damage to the equipment and or serious personal injury.

Do not exceed the UNI-LIFT ratings including design load, travel, and input speed. Install, align and shield all moving parts properly. Proper machinery installation practices should be followed. Safety codes for Mechanical Power Transmissions Apparatus are to be followed. Check for and adhere to all applicable safety codes. (Building and elevator codes, AISC Steel Construction specifications, and others including OSHA Title 29, Chapter 1910-219 and ANSI B15.1) Bolts should be sized to fit the UNI-LIFT mounting holes, at least grade 5 and tightened to the appropriate torque. Mounting bases should be flat and sufficiently strong to support the load. Properly lubricate and maintain the UNI-LIFT product. Use the UNI-LIFT only for the intended application. Failure to install, use, or maintain UNI-LIFT products could result in product failure and personal injury.

This service manual is applicable to all UNI-LIFT models(s). Note: Information represents typical configuration and may differ slightly from the actual equipment being installed or repaired. The maintenance manual provides recommendations of safe and efficient approach to installation or service repair problems. This maintenance manual is separated into 8 sections.

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When an operating situation occurs, refer to the troubleshooting guide to isolate cause. When applicable, guides are listed by symptom followed with suggestions of probable cause(s).

Once the source of the problem is identified, consult “Disassembly / Re-assembly Procedures...” guides for recommended repair procedures.

For your convenience, refer to our web-site to properly identify proper name and part number. To order, contact an authorized UNI-LIFT Service Center or Distributor to order replacement parts.

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GENERAL INSTRUCTION AND SPECIFICATIONS

Your machine screw jack was manufactured to high quality standards and is designed to provide many hours of service. Yet, certain safety measures and procedures must be followed in handling, installing and servicing the jack to insure long trouble free service.

- A. Any obvious or suspected damage to equipment during transport from the factory must be immediately reported to Templeton, Kenly & Co, Inc. and the carrier.
- B. Upon delivery all of the equipment should be inventoried to determine if shortages exist. All shortages must be immediately reported to Templeton, Kenly & Co, Inc. and the carrier.
- C. The installation of the actuators and complementing equipment supplied by Templeton, Kenly & Co., Inc. does not include the services of a field engineer. Telephone or e-mail support is readily available from the factory.
- D. The warranty applies only if the unit is operated within the rated capacity and conditions for which the unit was specifically designed. The application design engineer must prevent any destructive conditions for the actuators and complementing equipment. Conditions that may be considered destructive are: excessive input speeds, extreme shock loading, mechanical or thermal overloading, exceeding recommended duty cycles, and side loading of the load screw.
- E. Installation, maintenance and safety instructions must be given to personnel directly responsible for the installation, maintenance and operation of the equipment.
- F. In the event that a malfunction of the unit occurs within the warranty period Templeton, Kenly & Co., Inc. must be informed immediately and the unit must be immediately removed from service.

CAUTION!

MACHINE SCREW JACKS ARE NORMALLY SELF LOCKING. VIBRATION COULD CAUSE A MACHINE SCREW JACK TO SELF LOWER OR CREEP.

IN THE ABSENCE OF INTERNAL OR EXTERNAL STOPS THE LOAD SCREW CAN BE EJECTED OUT OF THE UNI-LIFT. YOUR UNI-LIFT IS NOT EQUIPPED WITH INTERNAL STOPS UNLESS SPECIFICALLY REQUESTED IN YOUR ORDER.

UNI-LIFTS ARE NOT MEANT FOR PERSONNEL SUPPORT. ALL APPLICATIONS DESIGNED FOR PERSONNEL SUPPORT MUST BE APPROVED BY TEMPLETON, KENLY & CO., INC. ENGINEERS.

The worm gear driven Machine Screw Jack incorporates a ground alloy steel worm which drives a high tensile bronze gear nut, accurately machined to the high standards of Templeton Kenly & Co. for maximum load carrying capacity and uniformity of motion transmission. All shafts are mounted on heavy duty tapered bearings to increase operating efficiency of the drive mechanism. Heavy bearings are provided to support the rated thrust load of each unit. Housings are made of Aluminum or Ductile Iron and are designed to handle the rated thrust load and torque loads of each unit size.

A protector pipe is furnished which is threaded into the unit in order to keep the threads free of foreign material and lubricated.

The load screw is made of high quality steel that is ground to size and precision rolled to form the threads. They are well proportioned to handle the maximum lifting load rating of the Jack

Stainless steel or special alloy load screws can be provided at an additional cost. The threads of the load screw should be well lubricated and kept free of grit and dirt. Protective bellows boots can be provided as an accessory to protect the exposed portion of the load screw. In the event of over travel the boots may be crushed.

Standard units may be operated at a wide range of input speeds. All units are recommended based on customer supplied duty cycle requirements.

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INSTALLATION INSTRUCTIONS

1. Be certain that the rating of the UNI-LIFT exceeds the maximum load that may be applied to it.
2. Check that rated input speeds of the UNI-LIFT will not be exceeded. Verify in the UNI-LIFT catalog.
3. The foundation for the UNI-LIFT should be rigid enough to maintain correct alignment with connected machinery and have sufficient strength to support the maximum load.
4. The foundation should have a flat mounting surface in order to assure uniform support for the UNI-LIFT. Be sure the opening in the foundation for the protector pipe or the load screw is as small as possible in order that the unit is supported over the greatest possible area.
5. Check that the method of stopping the screw rotation so translation will occur is sufficiently strong. See Key Torque Tables in the UNI-LIFT catalog.
6. It is extremely important that the UNI-LIFT be installed so that the load screw is perfectly plumb and that all connecting shafts are aligned with the worm shaft.
7. After precise alignment, each member must be securely bolted and if possible doweled in place. Doweling will assure exact repositioning if ever removed. It is essential that a gear unit be securely bolted down to the foundation using bolts of proper diameter to fit the mounting holes. Bolts should be S.A.E. Grade 5 or equivalent.

IMPORTANT – Take up evenly on mounting bolts to avoid damaging the housing.

Torque Values for bolting are as follows:

BOLT SIZE	APPROXIMATE TORQUE VALUE (INCH FOOT-POUNDS)
1/4	6
3/8	20
5/8	100
3/4	165
7/8	265
1	400
1 1/4	830
1 1/2	1350
1 3/4	2500
2	3650

8. After the jacks, Mitre Boxes, Couplings, etc. are installed and aligned; there should be no sign of binding or misalignment.
9. Shaft and coupling guards are the responsibility of the customer and are not provided by Templeton, Kenly & Co.

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INSTALLATION INSTRUCTIONS CONT'

10. Caution must be taken when operating your UNI-LIFT at either extreme travel limits. If possible external stops and travel limiters should be provided.
11. If operating at the upper limits of the UNI-LIFT rating, **DO NOT STOP** the load on the housing or the hard external or internal stops. Serious damage to the internal gearing may be the result.
12. The customer is responsible for providing all mechanical stops and switches for control of the prime mover. These items may be purchased from Templeton, Kenly & Co.

CAUTION!

If limit switches are furnished by Templeton, Kenly & Co. they are NOT factory set. Limit switches should be set by carefully moving the set position by hand or jogging the motor. Care should be exercised when operating the unit at the extreme limits of travel.

The foundation of the UNI-LIFT is critical to insure alignment. 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. Shim under the base to achieve this if needed. Both eccentric loading and/or side loading will cause premature wear and possible bending and failure of the UNI-LIFT. Once the alignment is correct hand tighten the mounting bolts.

Next align the input shafts with the worm shaft of the UNI-LIFT. This alignment can be just as critical to proper operation. Test the alignment by rotating the shafts by hand, and fully extend the load screws.

If the hand operation turns freely and the other components of the system are in alignment, tighten the mounting fasteners and attach the load to the UNI-LIFT. Start-up should be and break-in periods of several minutes with careful observation are required.

Any vibrations, binding or excessive amperage draw of motors is reason to shut down and repeat the entire alignment procedure.

Finally the load screw should be re-greased with a light film, and the UNI-LIFT housing be checked that it is full of grease.

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TROUBLESHOOTING

Your actuator will perform satisfactorily if the suggestions described in the booklet are carefully followed. It is estimated the approximately 98 percent of screw jack failures can be attributed to improper lubrication, misapplication, and misalignment.

Trouble	What to Inspect	Action
Housing Failure	1. Unit Overload	Reduce load or replace with Uni-Lift of sufficient capacity
	2. Improper Support	The Uni-Lift should be supported over entire base area not just the bolt hole location
	3. High Shock	Select larger Uni-Lift
	4. Uneven Bolting Torque	Torque all mounting bolts evenly
Worm Shaft Failure	1. Type of coupling	Rigid couplings can cause shaft failure. Replace with coupling which will provide adequate flexibility and lateral float
	2. Coupling Alignment	Re-Align as required
	3. Excessive Overhung load	Contact factory for allowable overhung loads.
	4. Unit Overload	See Housing failure #1
	5. Shock Loading	Install coupling capable of absorbing shock and if necessary replace with Uni-Lift of sufficient capacity. Shock loads can significantly increase apparent dead weight.
	6. Ganging Units	If several Uni-Lifts are in-line, the worm shaft of the first unit will be subjected to the combined torque of all the units. If this torque exceeded 300% of the rated input torque you must replace with a larger unit.
Bearing Failure	1. Unit Overload	See Housing failure #1
	2. Coupling Alignment	See Worm Shaft Failure #2
	3. Excessive Overhung Load	See Worm Shaft Failure #3
	4 Coupling Lateral Alignment	Adjust spacing between connecting shafts to relieve end pressure
	5. Bearing Adjustment	Bearings must be preloaded. See Assembly procedure for the proper preload on the bearings.
	6. Bearing Lubrication	Proper levels and grade must be maintained at all times. See Lubrication page.
	7. Shock Loading	See Worm Shaft Failure #5
Worm Gear Failure	1. Unit Overload	See Housing failure #1
	2. Load Screw Alignment	Load Screws must be perfectly plumb.
	3. Lubrication	See Bearing Failure #6
	4. Duty Cycle Limit Exceeded	Reduce the number of cycles per hour or reduce the load. Contact factory for the maximum allowable cycles per hour.
	5. Side load	Eliminate side load.
Load Screw Failure	1. Unit Overload	See Housing failure #1
	2. Load Screw Alignment	See Worm Gear Failure #2
	3. Side load	See Worm Gear Failure #4

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LUBRICATION

The lubricant should not be corrosive to gears, ball or roller bearings and must be neutral in reaction. The lubricant must not contain any contamination that may be detrimental to operation of the unit. The lubricant must have resistance to oxidation and must be non-channeling. Operating temperatures must be considered when selecting a lubricant for a jack. We recommended the following extreme pressure greases or their equivalents. For applications outside these limits contact the factory.

Up to 180 degrees F. Operation:

Shell Alvania EP2 Premium Lithium based grease. If another brand EP2 grease is used it should have oil viscosity of 840 to 890 SUS @ 100 degrees F, and 76 to 84 SUS @ 210 degrees F.

Up to 400 degrees F. Operation:

Du Boise MPG-2 Grease NLGI Grade 2, If another brand of Hi-Temp grease is used it should have a viscosity of 539 SUS @ 100 degrees F.

Down to -100 degrees F. Operation:

AeroShell Grease 7 Low Temperature Aviation Synthetic Hydrocarbon Microgel grease

Special Requirements:

USDA approved grease for food industries, or any other special requirement are available upon request.

UNI-LIFT screw jacks are shipped with grease in the unit. Lubrication inspection is recommended at regular intervals. Intervals are determined by the duty cycles of the jacks but should be performed a minimum of once every two months.

Each unit is furnished with a grease fitting. The unit should be filled with grease until lubricant begins to seep from the load screw opening. For units with boots, remove the boot at the jack before you check for proper grease levels. Severe operating conditions may require more frequent lubrication.

Load screws must be checked regularly to insure that they are adequately lubricated. This is especially critical for the rotating design units where no lubrication is deposited because the load screw does not translate through the gear box into the protector pipe.

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INSPECTION AND REBUILDING

Caution: - Never perform any work on the UNI-LIFT or Associated Transmission Equipment until the prime mover cannot be remotely or automatically started. Make sure the load is properly supported before the UNI-LIFT, brake, or other holding devices are removed. Be sure the area around the UNI-LIFT is relatively clean to prevent the parts from becoming contaminated, and the machined parts are stored on wooden blocks to prevent damage to the machined surfaces.

Assembly Inspection:

1. If possible remove the UNI-LIFT from the structure and inspect the jack on a work bench. If not use cribbing to support the load.
2. Clean the UNI-LIFT of grease, dirt, and foreign material
3. Visually inspect the UNI-LIFT for damage such as cracked, broken or chipped parts, and marred surfaces.
4. Using a soft cloth or tape to protect the input shaft, with a pair of pliers or by hand, attempt to turn the input shaft. If it won't turn without extreme effort, total disassembly will be required. Go to the Disassembly procedure.
5. **Measure the Rotary Backlash:** Rig a positive stop and extend the load screw against the stop. Mark the position of the input shaft. Reverse the rotation of the input shaft until you feel the beginning of the load screw movement. Again mark the position of the input shaft. Measure the angle of this rotation. If the measurement exceeds the 60 degrees then the worm shaft and the gear nut must be replaced.
6. **Measure the Axial Backlash:** Extend the load screw against the positive stop. Mark and remove the positive stop. Protect the load screw with a soft cloth or tape, clamp a handle to the load screw and pull the load screw in the direction of the removed stop. Measure the movement to determine the axial movement. If the movement is greater than the allowable limits from the table below the gear nut and the load screw should be replaced.

TONNAGE	AXIAL MOVEMENT (INCHES)
¼ - 2	0.12
3 & 5	0.17
10	0.25
12.5	0.17
15 – 25	0.25
30 – 75	0.32
100	0.37

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DISASSEMBLY PROCEDURES

Translating Jack:

1. Unscrew the protector pipe #17
2. Unscrew load screw #16 from UNI-LIFT housing #1.
3. Remove the set screws # 11 from the side of the housing or load cap, and unthread the housing cover #2 using the spanner holes. The upper bearing #27 should come out with the cap.
4. Remove the end cap plates #5 by removing the hex head cap screws #7. Carefully slide the end plate over the input shaft #4 so no damage is done to the shaft seal #9. Note the number, the color and the location of the shims during this removal.
5. Gently tap one end of the worm shaft with a wooden/lead mallet until the bearing cup #14 is free. Do the same on the other side.
6. Lift the gear nut #3 and the Gear bearing cones #13 & 28 out of the housing
7. Remove the input shaft and its corresponding bearing.
8. All parts should be cleaned of grease, dirt, and contaminates. Visually inspect all parts for damage, any parts that appear to be damaged should be replaced. Particularly note the condition of the gear nut. Inspect the internal acme threads and the external worm teeth. Any wear approaching one half tooth thicknesses is cause for replacement.

Rotating Jacks

1. Unscrew housing plug #20 using the spanner holes.
2. Remove Hex Head Cap Screw #35, Plate Washer #41, and Torque Key #42. The Torque key has a small tapped hole in the end for ease of removal.
3. Proceed to step #2 of the Translating jack disassembly.

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RE-ASSEMBLY PROCEDURE

Assembly Procedure:

1. Press bearing cones (#13, 15, & 28) onto worm shaft and gear. Inspect the bearings to make sure they are fully seated with the shoulders of the worm gear and worm shaft.
2. Press top bearing cup #27 into housing cover and the lower bearing #12 into the housing. Inspect the bearing cups to make sure they are fully seated with the bearing seat.
3. Press shaft seals into end plates. Gartner spring must be visible from the stepped (inward) side of the end plate.
4. Install worm shaft assembly, then the bearing cups #14 into the housing.
5. From the disassembly procedure step #4, place the shims back in the same order as noted. Carefully slide the end cap assemblies over the input shaft so not to cut the seal. Install the Hex Head Cap Screws on both sides.
6. Measure the axial movement of the worm shaft under a reversing force. If the movement is in excess of 0.005 inches adjustments will need to be made. If the assembly has steel shims that are located by the cup you must add shims. If they are the plastic shims located by the screws you must remove shims. If the worm shaft won't rotate reverse the shim assembly as stated above.
7. Install Gear assembly into housing.
8. Using a spanner wrench thread cover into housing until it is snug against the bearing.
9. Set the pre-load on the bearings by loosening the cover and re-tighten by hand only with no more than a light snuggling force.
10. Rotate to tighten the cover by the degrees or the inches of rotation shown in the table below.
11. Tighten the set screws to lock the cap.

TONNAGE	DEGREE OF CAP ROTATION	INCH OF CAP ROTATION
¼ - ¾	30	0.8
1 – 1.5	30	0.9
2	45	1.4
3 – 5	40	1.5
10 – 12.5	100	4.75
15	75	4.0
20	60	3.5
25 – 30	45	2.75
40 – 50	45	3.75
75 – 100	20	2.0

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RE-ASSEMBLY PROCEDURE CONT'

12. Rotate Input Shaft in both directions to cause a full rotation of the Gear Nut without binding. Torque should not exceed the tabled values listed below. Check that the rotational back-lash of the Input Shaft and the Gear Nut does not exceed four degrees.

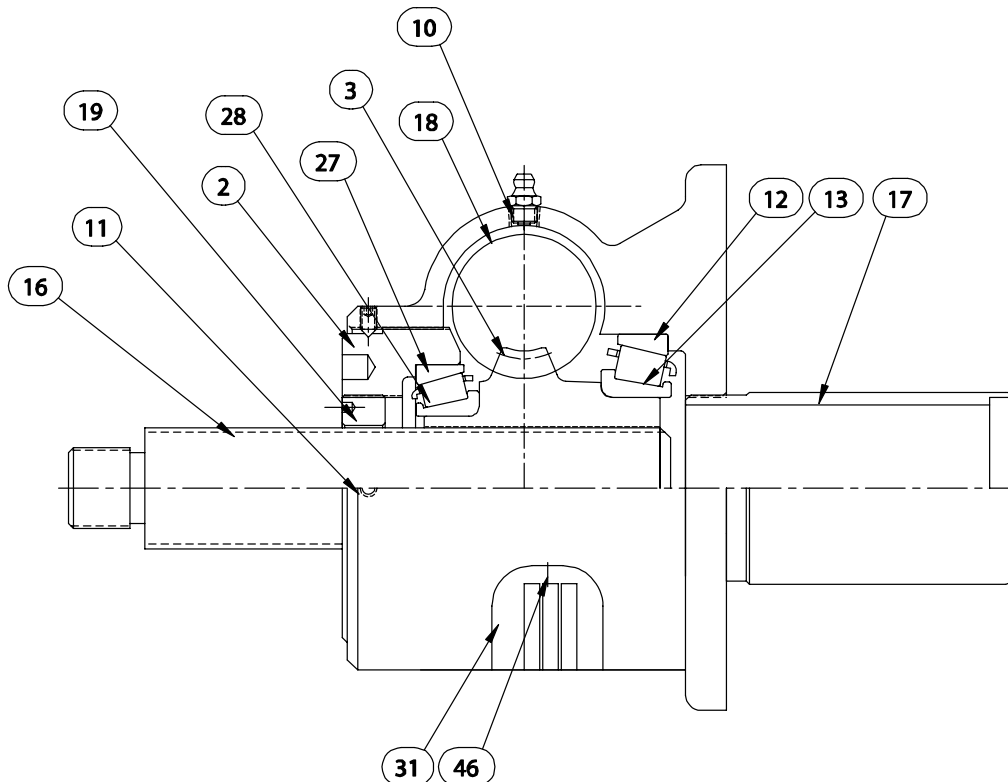
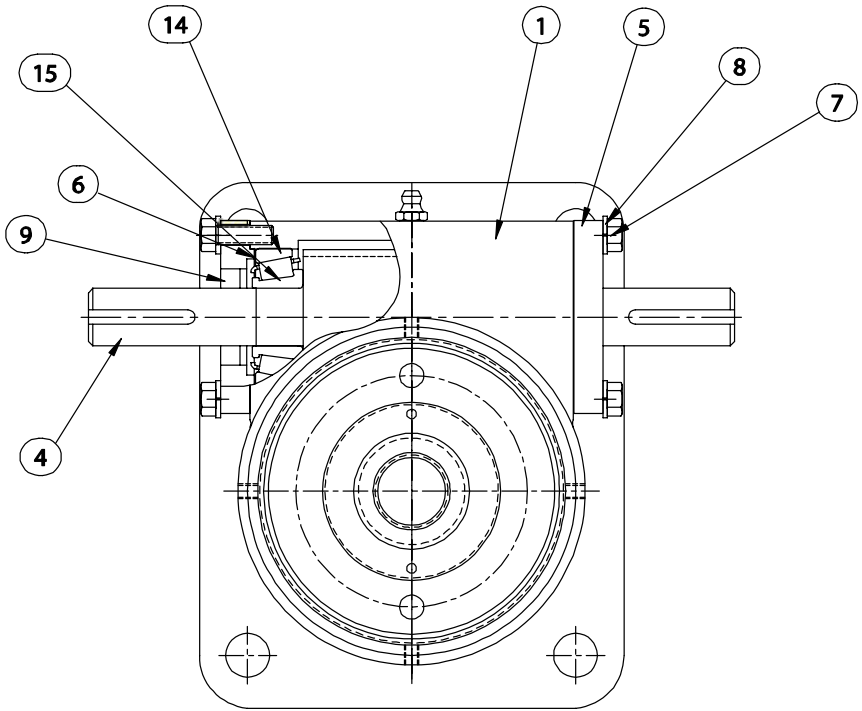
TONNAGE	NO LOAD TORQUE (LB-INCHES)
¼ - ¾	1.5
1 – 1.5	3.0
2	4.0
3 – 5	5.0
10 – 12.5	7.0
15	8.0
20	9.0
25 – 30	10.0
40 – 50	12.0
75 – 100	20.0

13. Install Grease fitting #10 into the housing.
14. Thread the Load screw into the housing assembly until it reaches the appropriate ESL.
15. Inject grease into the housing assembly, through the grease fitting, until the grease comes out of the housing around the load screw.

PARTS LIST

TRANSLATING JACK

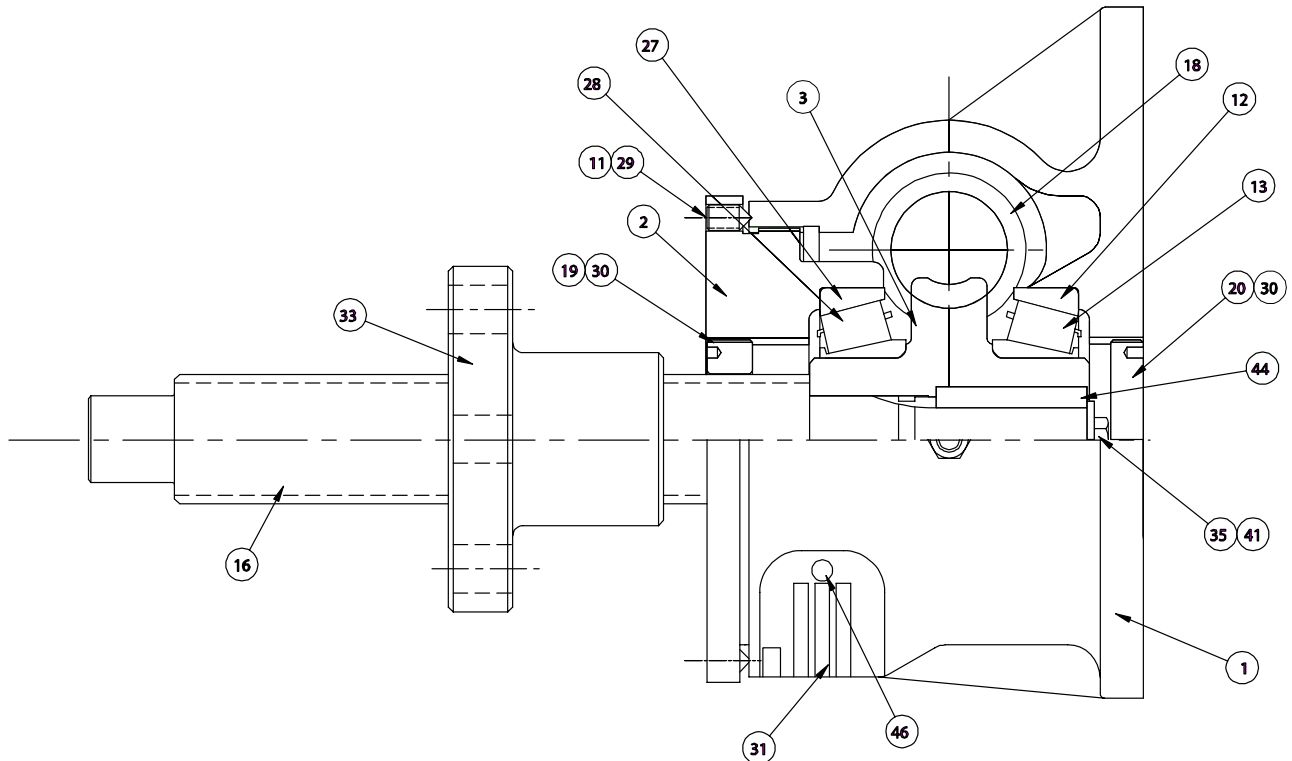
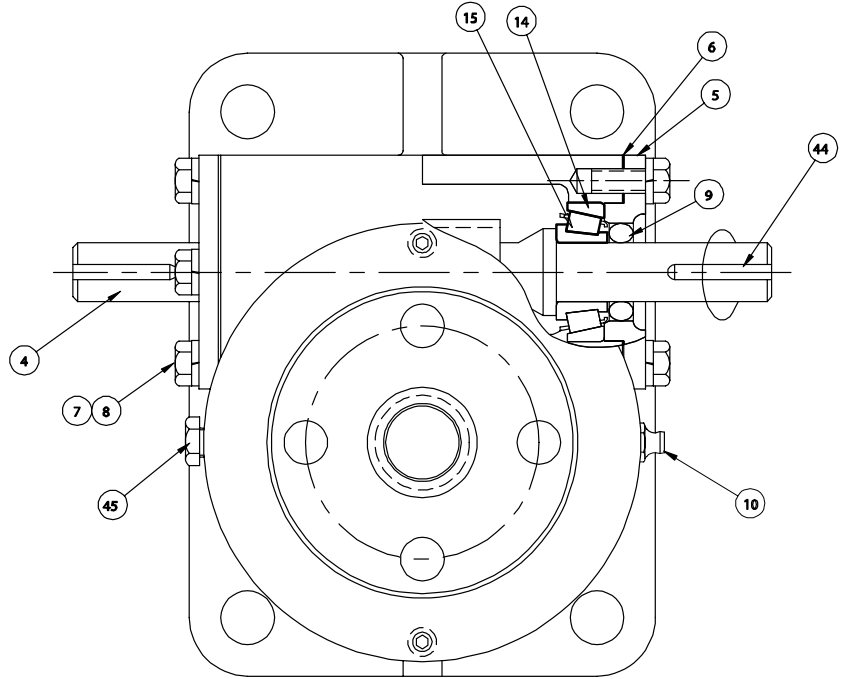
ITEM	DESCRIPTION	QTY
01	HOUSING	1.00
02	HOUSING COVER KEYED	1.00
03	GEAR NUT	1.00
04	WORM SHAFT	1.00
05	END-CAP	2.00
06	GASKET	2.00
07	HEX HD CAP SCR	8.00
08	LOCK WASHER	8.00
09	OIL SEAL (BUNA)	2.00
10	GREASE FITTING	1.00
11	SOC HD SET SCREW	2.00
11	SOC HD SET SCREW	2.00
14	SHAFT CUP	2.00
15	SHAFT CONE	2.00
18	LUBRICANT GREASE	0.40
19	HOUSING INSERT	1.00
27	WORM CUP UPPER	2.00
28	WORM CONE UPPER	2.00
29	THREADLOCK 222/LM113	0.01
30	THREADLOCK 277/HH120	0.01
31	UNI LIFT NAME PLATE	1.00
34	HOUSING COVER	1.00
45	PLUG PIPE 1/8 HEX HD	1.00
46	TACK.METAL	2.00
53	SHCS	1.00
54	LOCKWASHER	1.00



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PARTS LIST

ROTATING JACK

ITEM	DESCRIPTION	QTY
01	5 TON HOUSING UP.	1.00
02	5 TON HSG. CAP INV.	1.00
03	5 GN ACME TRNS 5.3:1	1.00
04	J5 WRM SHFT 5-1/3:1	1.00
05	END PLATE J5	2.00
06	J5 SHIM	10.00
07	HHCS 1/4-20X 3/4 LG.	8.00
08	LOCK WASHER 1/4	8.00
09	OIL SEAL WRM SHFT J5	2.00
10	GREASE FITTING	1.00
11	#10-32 HX SOC SETSCR	2.00
12	382A CUP	1.00
13	387A CONE	1.00
14	LM11910Q	2.00
15	LM11949Q	2.00
18	LUBRICANT GREASE	0.50
19	5 TON HOUSING INSERT	1.00
27	LM603011	1.00
28	LM603049Q	1.00
29	THREADLOCK 222/LM113	0.01
30	THREADLOCK 277/HH120	0.01
31	UNI LIFT NAME PLATE	1.00
46	TACK,METAL	2.00



KEYED JACK

ITEM	DESCRIPTION	QTY
01	HOUSING	1.00
02	HOUSING COVER KEYED	1.00
03	GEAR NUT	1.00
04	WORM SHAFT	1.00
05	END-CAP	2.00
06	GASKET	2.00
07	HEX HD CAP SCR	8.00
08	LOCK WASHER	8.00
09	OIL SEAL (BUNA)	2.00
10	GREASE FITTING	1.00
11	SOC HD SET SCREW	2.00
11	SOC HD SET SCREW	2.00
14	SHAFT CUP	2.00
15	SHAFT CONE	2.00
18	LUBRICANT GREASE	0.40
19	HOUSING INSERT	1.00
27	WORM CUP UPPER	2.00
28	WORM CONE UPPER	2.00
29	THREADLOCK 222/LM113	0.01
30	THREADLOCK 277/HH120	0.01
31	UNI LIFT NAME PLATE	1.00
34	HOUSING COVER	1.00
45	PLUG PIPE 1/8 HEX HD	1.00
46	TACK,METAL	2.00
53	SHCS	1.00
54	LOCKWASHER	1.00

