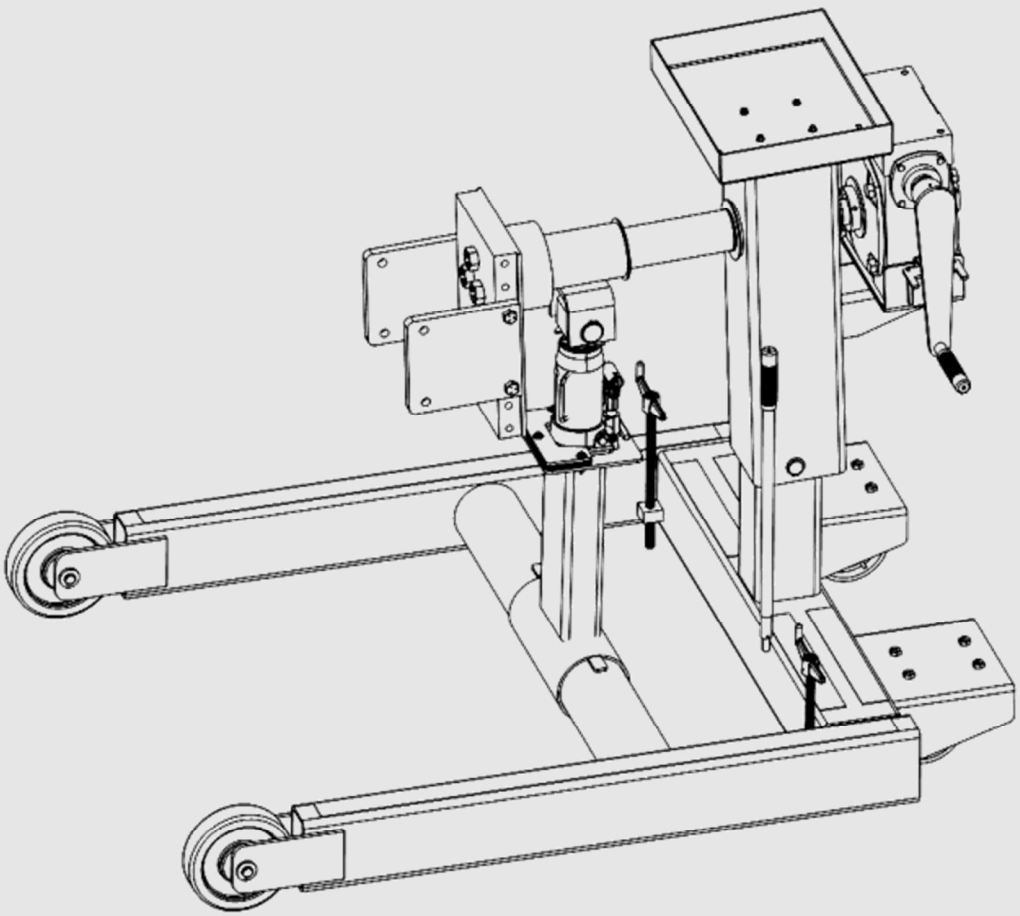
MAHLE

MAHLE CES-6000

EN Operation Manual
Engine Stand



EVERY PERSON WHO OPERATES THIS EQUIPMENT NEEDS TO KNOW AND UNDERSTAND ALL OF THE INFORMATION IN THIS MANUAL – FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY OR DEATH.

READ THIS MANUAL CAREFULLY AND RETAIN FOR YOUR RECORDS

Contents

1. Safety Regulations

1.1 Warnings

⚠ Failure to follow all of these safety instructions can lead to severe injury or death from a sudden loss of the load. Contact the manufacturer at the numbers or address printed on the back cover of this manual if you have any questions.

⚠ **Anyone who operates this product must read and understand all the instructions and warnings provided with this stand before being allowed to use it.** All operators must be careful, competent, trained, and qualified in the safe operation of the stand. The owner (or other responsible individual) must ensure that any operator observes the proper safety procedures for using this stand at all times. If the operator does not read well or is not fluent in English, the owner / manager must read and review the instructions and warnings in the manual with the operator in the operator's native language to be sure that the operator will use the stand properly.

⚠ **The owner / manager must keep this manual for future reference**, and make sure the warning labels on the product are legible and intact at all times. Replacement labels and manuals are available from the manufacturer. Call the manufacturer using the contact information on the back cover of this manual if you have any questions.

⚠ **Wear eye protection** that meets the requirements of ANSI Z87.1 and OSHA.

⚠ **Make sure the load does not exceed the maximum capacity of the stand.** Maximum capacity is 6000 lb. Do not exceed. Overloading can result in equipment failure.

⚠ **Never use parts, attachments, or accessories that have not been provided by the manufacturer.** Do not use hardware with a lower grade than what is provided by the manufacturer.

⚠ **Never modify the product in any way.** Modifications may cause the dolly to perform improperly, resulting in injury or death.

⚠ **Always use caution while operating this device** and remain mindful of how the device and load will react during operation of this device. Do not use anything other than the supplied handle to rotate the engine.

⚠ **Off-center loads may make the load and handle rotate** in either direction when the rotational locking device is released.

⚠ **Never load stand abruptly**. Load stand slowly and carefully. Never subject the stand to abnormal shocks or loads. Your safety and that of others depends on the proper operation of the stand.

⚠ **Always use Anti-Rotation lever while moving loaded engine stand.**

⚠ **Never allow the engine's center of gravity to be misaligned with the engine stand's axis of rotation.** Ensure engine is fully secured to Engine Adapter Plate before placing on stand.

⚠ **Always apply the locking screws when stand is being loaded and/or remaining stationary.**

⚠ **Always use engine stand on a hard level surface.** Be sure surface is clean and free of debris, cracks, and chips. Avoid any uneven or dirty surfaces when moving loaded engine stand.

⚠ **Never mount anything other than automotive engines** without accessories or attachments supplied by the manufacturer.

⚠ **Never abuse or cause damage to the stand.** NEVER subject the stand to abnormal shocks or loads. Your safety and that of others depends on the proper operation of the stand.

2. Foreword

2.1 From the manufacturer

Thank you for your purchase. To complement the offering of A/C, fluid and nitrogen service equipment, MAHLE Service Solutions has partnered with Gray Manufacturing to provide the highest quality hydraulic and pneumatic equipment available for the professional service technician. This equipment adheres to high standards promised in the MAHLE guarantee including the assurance of innovation and reliability that comes with the Gray Manufacturing name. Please contact MAHLE Service Solutions' customer service at (800) 468-2321 or tech.mss@us.mahle.com with any comments or questions.

3. Symbols Use

3.1 Signal words

Signal words call attention to a safety message or messages, or a property damage message or messages, and designate a degree or level of hazard seriousness. Signal words used in this manual include:

Keyword	Probability of occurrence	Severity of danger if instructions not observed
DANGER	**Immediate** impending **danger**	**Death** or **severe** injury.
WARNING	**Possible** impending **danger**	**Death** or **severe** injury
CAUTION	Possible **dangerous situation**	**Minor** injury
NOTICE	Possible **damage to property**	**Possible property damage**

4. Responsibilities

4.1 Receiving inspection

Before attempting to operate this equipment, thoroughly read and understand this manual. Completely remove all tape and packaging. Inspect the equipment immediately upon delivery. If shipping damage is evident, inform the delivering carrier immediately and contact the manufacturer using the contact information on the back cover of this manual.

4.2 Owner and/or operator responsibilities

The owner of this equipment must read these instructions and maintain them for future reference and for instructing any other users of the equipment. The owner is responsible for keeping all warning labels and instruction manuals legible and intact. Replacement labels and literature are available from the manufacturer. The owner must never authorize or allow anyone to use this equipment until the operator has read and understood the information in this manual and on the accompanying labeling on the equipment itself.

If this equipment is being used in an occupational setting (or workplace), the employer should ensure that all personnel working with and around the equipment know of the risks associated with its use. Personnel involved in the use and operation of this equipment shall be careful, competent, trained, and qualified in the safe operation of the equipment and its proper use when servicing motor vehicles and their components. Safety information provided with this equipment should be emphasized by the employer and understood by each employee. The employer must make this manual available to all personnel using this equipment and all personnel must read and understand the contents of this manual. If the operator is not fluent in English, the manufacturer's instructions and warnings shall be read to and discussed with the operator in the operator's native language by the employer, making sure that the operator comprehends its contents and observes the proper procedures for use of this equipment.

5. Specifications

5.1 CES-6000

Model CES-6000	US units	Metric units
Maximum capacity	6000 lbs	2721.6 kg
Overall width	49 in	124.5 cm
Overall length	78 in	198.1 cm
Overall height	49 in	124.5 cm
Maximum swing radius	42 in	106.7 cm
Handle length	12 in	30.5 cm
Weight	835 lb	378.8 kg

6. Product Description

6.1 Component identification

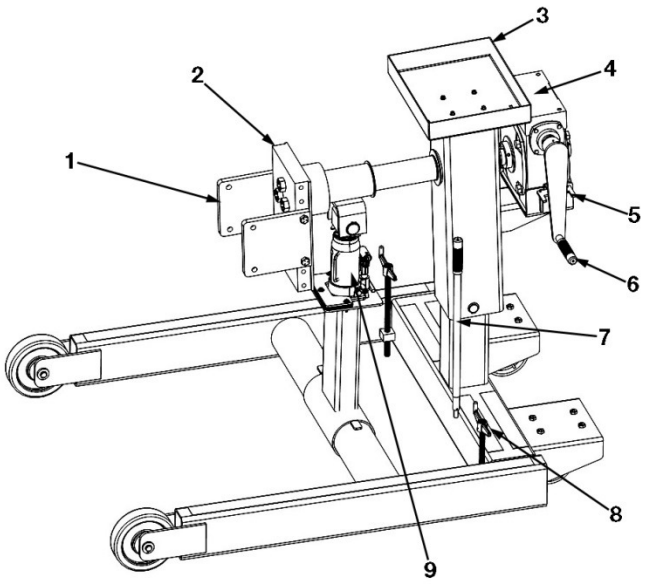


Fig. 1: CES-6000 Side view

1 Adapter extension plate
2 Adapter adjuster plate
3 Tool tray
4 Gear box
5 Anti-rotation lever
6 Gear box crank handle
7 Jack handle
8 Locking screw
9 Jack

7. Assembly

7.1 CES-6000 assembly

⚠ Use care while assembling engine stand. Parts are heavy and awkward to handle. Have another person assist with assembly where necessary.

ℹ Use figures to assist in assembly of engine stand. If assembly instructions are not understood, contact the manufacturer using the contact information printed on the back cover of this manual for assistance.

Tools Required
Small snap ring pliers
Large snap ring pliers
3/4” wrench
3/4” socket
7/16” wrench
7/16” socket
15/16” wrench
1-1/2” socket
Pliers
3/8” socket
1/8” Allen wrench

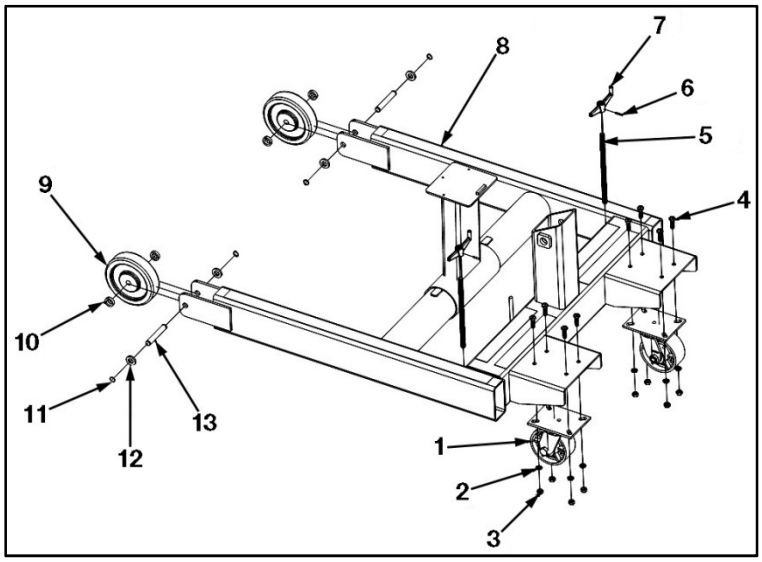


Fig. 2: Base assembly parts

1 Caster, swivel plate, 6” diameter (2)
2 Lock washer, 1/2” split type (8)
3 Nut, 1/2”-13UNC (8)
4 Cap screw, 1/2”-13UNC, 1-1/2” long (8)
5 Threaded rod, 5/8”-8 ACME (2)
6 Roll pin, 3/16” diameter, 1-1/8” long (2)
7 Crank handle (2)
8 Engine stand base (1)
9 Wheel, 8” diameter, 2-3/16” wide (2)
10 Engine stand, front wheel spacer, 3/8” wide (4)
11 Retaining ring, external, 3/4” diameter (4)
12 Engine stand, washer, 1/4” wide (4)
13 Engine stand, front wheel axle (2)

1. Use items 2, 3 and 4 to fasten item 1 to engine stand base (Item 8).
2. Assemble locking screws, putting items 5, 6, and 7 together.
3. Screw locking screws into the engine stand base to prevent movement while assembling engine stand. Reference Component Identification diagram if needed.
4. Use items 11, 12 and 13 and items 9 and 10 to assemble front wheels on engine stand. Be sure to put item 10 on either side of item 9 when assembling.

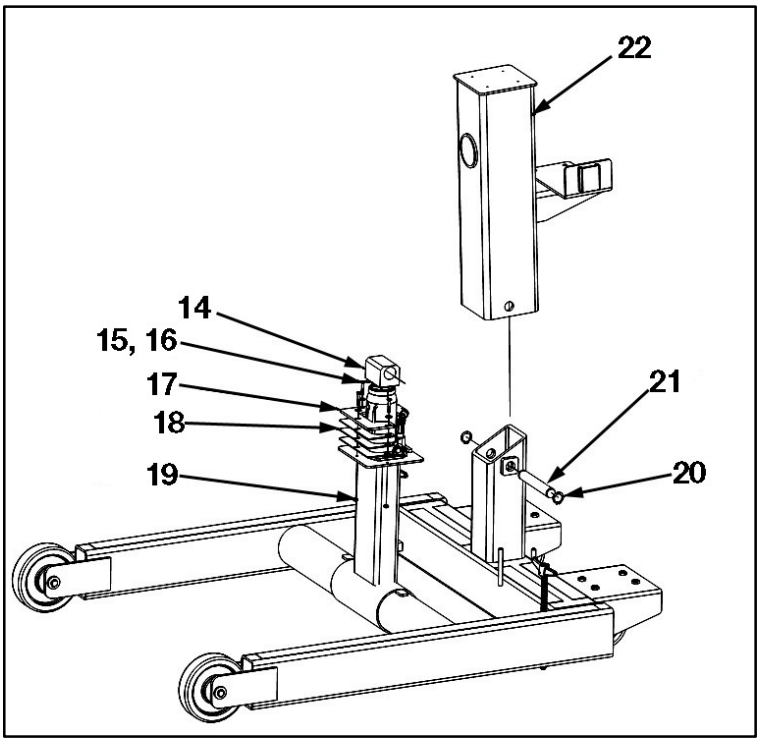


Fig. 3: Jack and main top assembly

14 Jack with pivot block (1)
15 Cap screw, 1/4”-20UNC, 1-1/2” long (3)
16 Flat washer, 1/4” (3)
17 Jack bracket, 1/4” thick (1)
18 Jack bracket spacer, 1/8” thick (4)
19 Nut, 1/4”-20UNC (3)
20 Retaining ring, 1-1/8” diameter (2)
21 Base pivot pin, 1-1/8” diameter (1)
22 Main top (1)

5. Place item 14 on the pivot tube of the engine stand base. Use items 17 and 18 to capture item 14. Item 17 will go over the top edges of item 14 to hold in place.

ℹ Item 18 is only used as a spacer; not all may be used.

6. Item 14 should be secured and oriented to pivot tube of engine stand as shown. Secure with items 15, 16, and 19. Lay pivot tube on floor.

7. Using a shop crane, lift item 22 and put onto engine stand base (item 8), securing with items 20 and 21.

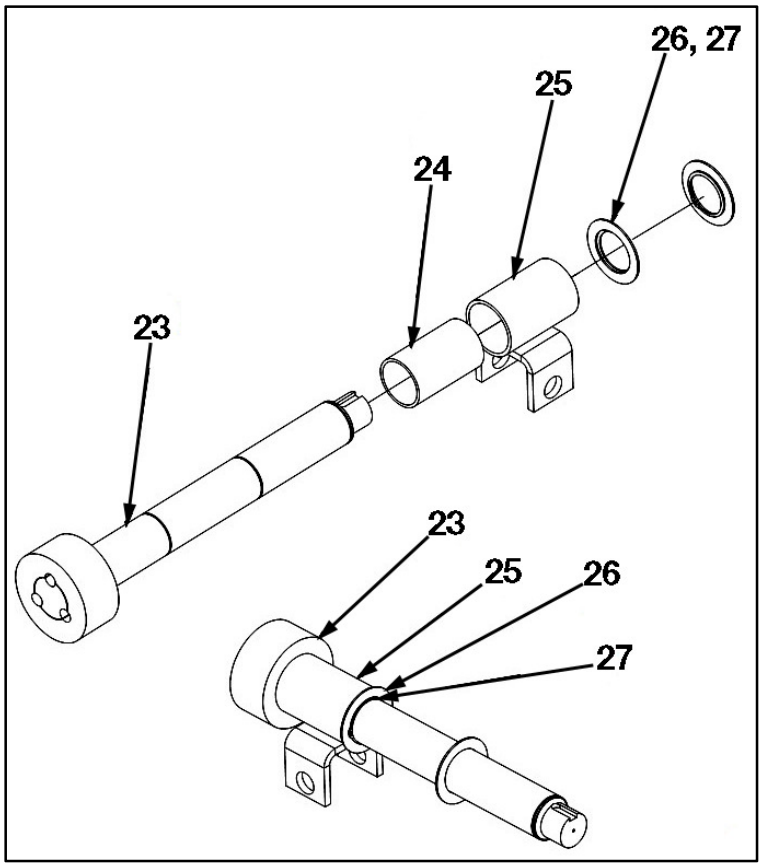


Fig. 4: Shaft assembly

23 Rotating shaft assembly (1)
24 Gardur bearing, 5-3/4” long (1)
25 Jack pivot mount (1)
26 Washer, 3” diameter (2)
27 Retaining ring, 3” diameter (2)

8. Slide items 24 and 25 over the end of item 23.

9. Slide items 26 and 27 to the end of item 25. Be sure to secure item 27 in groove on item 23.

10. Slide remaining item 27 over to the end of item 23, securing it in the 2nd groove.

11. Slide remaining item 26 to item 27 to complete shaft subassembly.

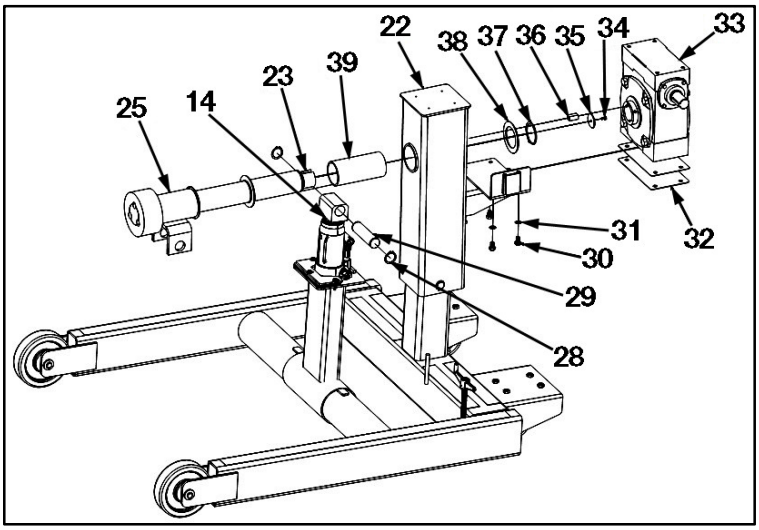


Fig. 5: Gear box installation

28 Retaining ring, 1-1/2" diameter (2)
29 Jack pivot pin (1)
30 Cap screw, 1/2"-13UNC, 3/4" long (4)
31 Flat washer, 1/2" (4)
32 Gear box spacer (2)
33 Gear box (1)
34 Cap screw, 1/4"-20UNC, 1/2" long (1)
35 Flat washer, 1/4" (1)
36 Square key, 5/8", 1-3/8" long (1)
37 Retaining ring, 3" diameter (1)
38 Flat washer, 3" diameter (1)
39 Gardur bearing, 7-3/8" long (1)

12. Using a shop crane, slide the shaft subassembly and item 39 into the rotation hole of item 22.
13. Once in place, slide item 37 and 38 on the end of the shaft subassembly.

⚠ Make sure item 37 is secured in the groove of item 23.

14. Lower the shaft subassembly so item 25 lines up with item 14.
15. Insert item 29 through items 14 and 25.
16. Secure item 29 with item 28.
17. Put item 36 in keyway of shaft subassembly. Secure items 34 and 35 to end of shaft subassembly.
18. Slide item 33 over the end of the shaft subassembly.

⚠ Be sure to align the keyway on item 33 to keyway of the shaft subassembly and item 36. Rotate input shaft of item 33 to align keyways if needed.

19. Insert item(s) 32 under item 33 to ensure proper alignment of items 25 and 33. All of items 32 may not be used.
20. Use items 30 and 31 to secure item 33 to bracket of item 22.

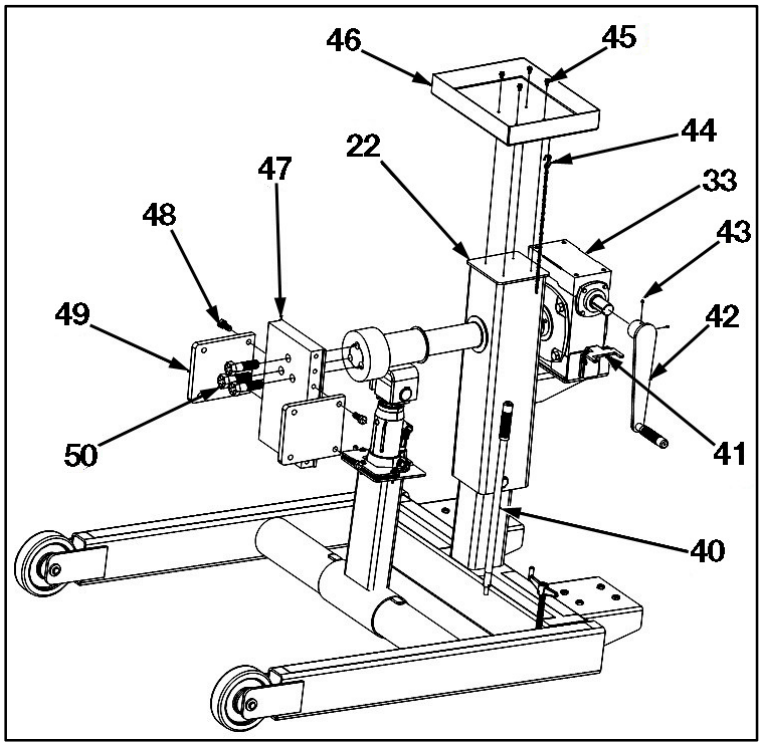


Fig. 6: Installing engine plates and handle

40 Jack handle (1)
41 Anti-rotation lever (1)
42 Gear box crank handle (1)
43 Set screw, 1/4"-28UNF, 1/4" long (2)
44 17" long chain subassembly (1)
45 Cap screw, flange lock, 1/4"-20UNC, 1/2" long (4)
46 Tool tray (1)
47 Adapter adjuster plate (1)
48 Cap screw, 5/8"-11UNC, 1-1/2" long (4)
49 Adapter extension plate (2)
50 Cap screw, 1"-8UNC, 3-1/2" long (3)

21. Attach item 47 to front of shaft subassembly using items 50. Torque to 150 ft-lbs.
22. Attach items 49 to item 47 using items 48. Torque to 120 ft-lbs.
23. Place item 46 on top of item 22, being sure to align holes of item 46 to threaded hole on item 22.
24. Use items 35 to secure item 46. Be sure item 46 is offset away from item 42.
25. Slide item 42 over the input shaft of item 33. Use items 43 to secure item 42 to item 33.
26. Attach item 44 to bottom of item 46 and item 41. Close s-hook with pliers.
27. Place item 41 in pocket of item 22 as shown.
28. Put item 40 in place as shown above.

8. Operation

⚠ **WARNING** - This section discusses the appropriate and safe methods for using the stand. Failure to follow all of the steps outlined in this section could result in serious injury or death.

8.1 Mounting an engine

ℹ The engine stand is designed to hold and rotate engines weighing no more than 6000 pounds.

1. Prepare the engine to be mounted to the stand. Remove all components that will be in the way of attaching the engine adapter plate to the engine.
2. Attach engine adapter plate to the side of the engine. Make sure the bolts are securely fastened.
3. Using a shop crane or other suitable means, move the engine into position for attaching to the adapter extension plates.
4. Align the engine's center of gravity within 2" of the engine stand's axis of rotation by raising or lowering the engine.
5. Align the adapter extension plates with the closest 5/8"-11UNC holes of the adapter adjuster plate.
6. Secure the adapter extension plates to the adapter adjuster plate on the engine stand. Torque bolts to 120 ft-lbs.
7. Slowly transfer the engine's weight to the engine stand.

⚠ If the engine or stand shifts, moves, or rotates, check that the engine's center of gravity is in line with the engine stand's axis of revolution and that all hardware is properly tightened. If something seems wrong, remove the engine stand from service and inspect it according to the Inspection Instructions in this manual.

8. Rotate gear box crank handle to rotate engine. Use jack and handle to raise and lower the engine as necessary. When engine stand is stationary, use locking screws to prevent the engine stand from moving.

8.2 Dismounting an engine

1. Prepare engine for moving and engine's destination for accepting engine.
2. Make sure the Anti-rotation lever is inserted, capturing the crank handle. Be sure the locking screws are lowered, and the engine stand does not move.
3. Using a shop crane or other suitable means, capture engine and transfer engine's weight to equipment being used to move engine. Follow instructions provided with equipment being used to move engine.
4. Carefully detach engine adapter plate from the adapter extension plates.

9. Maintenance and Inspection

⚠ **WARNING** - The engine stand must be inspected according to the requirements of this section. Failure to properly inspect the engine stand could lead to severe injury or death. The engine stand must be removed from service and inspected immediately if it is subjected to an abnormal load or a shock load. If any irregularities or problems are detected during an inspection, the engine stand must be removed from service immediately and repaired. Contact the manufacturer using the contact information printed on the back cover of this manual.

9.1 Inspection – before each use

Visual inspection of the engine stand must be made before each use. The engine stand should be immediately removed from service if any of the following conditions are detected or observed:

- Any part is cracked, chipped, bent, or shows signs of excessive wear or any other type of damage.
- The wheels and/or casters do not roll freely or the axles appear bent or otherwise damaged.
- Any abnormal condition or sign of damage that suggests the engine stand will not work properly.
- Check that all hardware is properly tightened and in good condition.
- Check that the engine mounting plates and mounting hardware are not bent or stretched.
- Verify that all warning and instructions decals are in place and legible before the lift is put back in service. If any decals are missing or illegible, contact the manufacturer for replacements.

⚠ If any irregularities or problems are detected during an inspection, the stand must be removed from service immediately and repaired. Contact the manufacturer using the contact information on the back cover of this manual.

9.2 Maintenance instructions

⚠ **WARNING** - All inspection and maintenance procedures must be performed after the jack has been removed from service. Failure to do this may result in personal injury and/or property damage.

- All warning and capacity labels should be readable and complete. Wash external surfaces of stand, labels, and decals with a mild soap solution.
- Lightly oil or grease any places where the paint has worn off to prevent corrosion and lubricate movement.
- Grease front wheel axles.

10. Maintenance Chart

Action	Date	Details	Person responsible
Receiving inspection			
Assembly			

Action	Date	Details	Person responsible

11. Notes

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