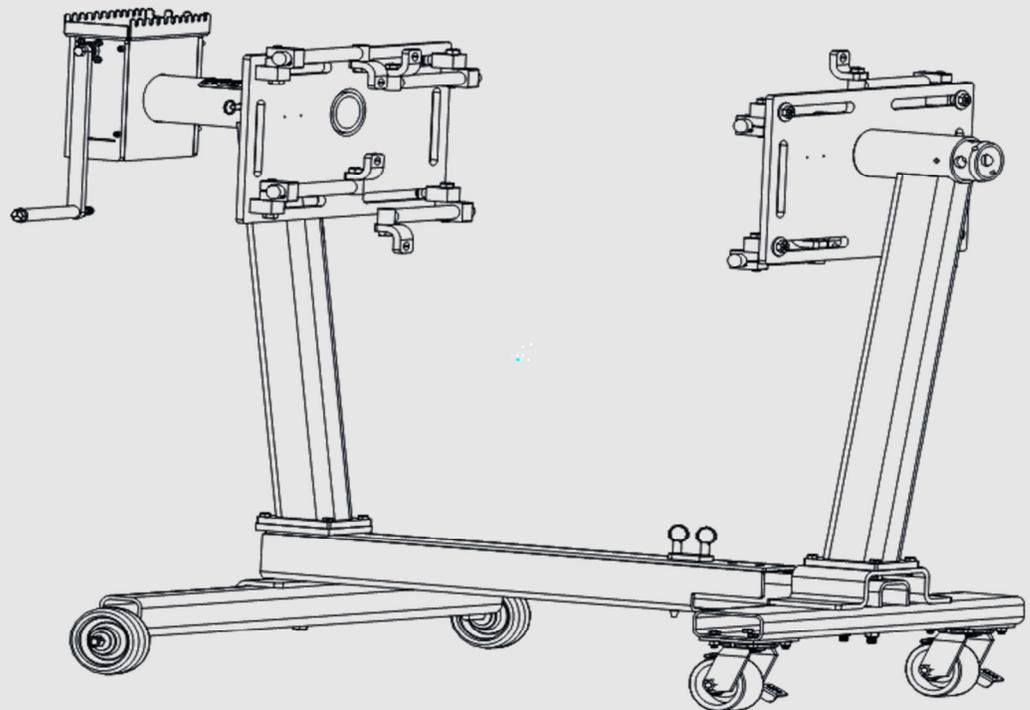


MAHLE CES-2000

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**

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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 2000 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 Rotation Locking Pins and Main Tube Locking Pin while moving loaded engine stand.**

⚠ **Always install Rotation Locking Pin and Main Tube Locking Pin before loading engine stand.**

⚠ **Always Release Rotation Locking Pins slowly and carefully.**

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

⚠ **Always maintain control of Rotation Handle** and use caster brakes while loading and operating engine stand.

⚠ **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-2000

Model CES-2000	US units	Metric units
Maximum capacity	2000 lbs	908 kg
Overall width	41 in	104.1 cm
Overall length	84 in	213.4 cm
Overall height	58.5 in	148.6 cm
Maximum swing radius	31 in	78.8 cm
Handle length	12 in	30.5 cm
Weight	337 lb	152.9 kg

6. Product Description

6.1 Component identification

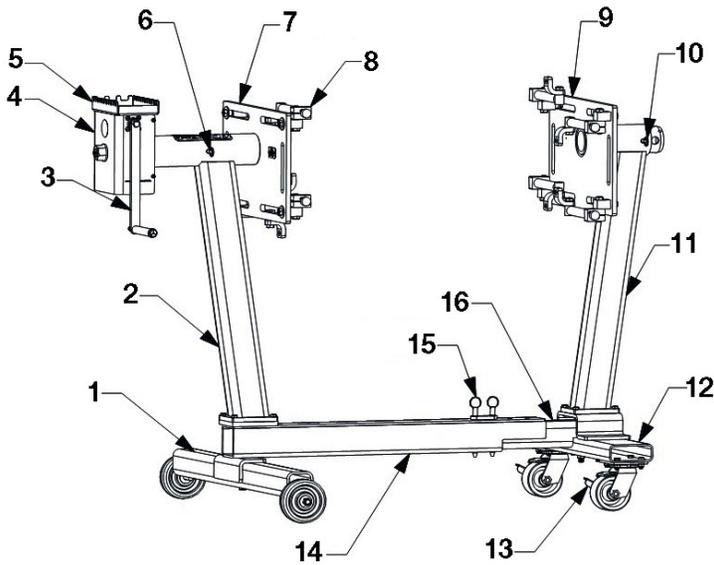


Fig. 1: CES-2000 Side view

- 1 Rear caster tube
- 2 Rear post
- 3 Rotation handle
- 4 Gear box
- 5 Tool tray
- 6 Rotation locking pin
- 7 Mounting plate
- 8 Mounting arm
- 9 Detachable mounting plate
- 10 Rotation locking pin
- 11 Front post
- 12 Front caster tube
- 13 Caster brake
- 14 Outer main tube
- 15 Main tube locking pin
- 16 Inner main tube

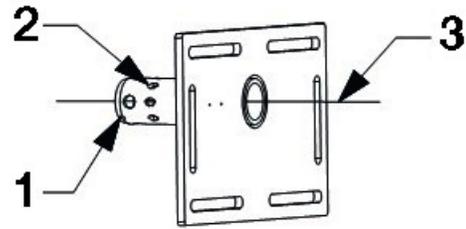


Fig. 2: Mounting plate

- 1 Mounting plate retention hole
- 2 Rotation locking holes
- 3 Axis of rotation

7. Assembly

7.1 CES-2000 assembly

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

🔧 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.

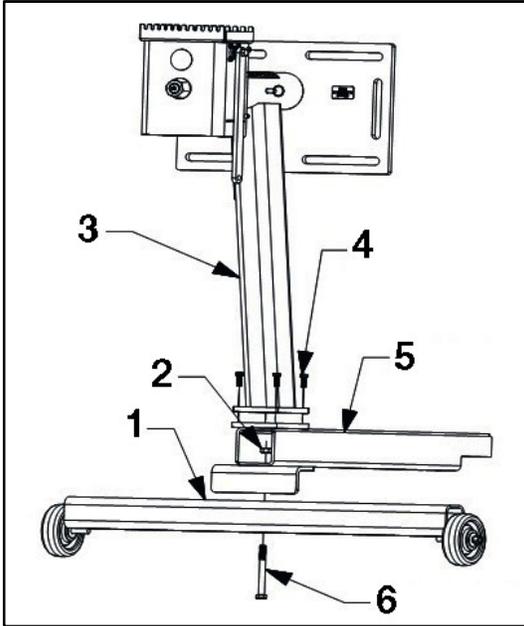


Fig. 3: Rear subassembly

- 1 Rear caster tube
- 2 1/2-13UNC nut
- 3 Rear post
- 4 1" L, 3/8-24UNF Grade 5 cap screw (4)
- 5 Outer main tube
- 6 4-1/2" L, 1/2-13UNC Grade 5 cap screw

1. Use (1) 1/2-13UNC grade 5 cap screw 4-1/2" long to fasten the Rear Caster Tube to the Outer Main Tube. Torque hardware to 70 ft-lbs minimum (Fig. 3).

2. Use (4) 3/8-24UNF grade 5 cap screws 1" long to fasten Rear Post to Outer Main Tube. Torque to 30-35 ft-lbs (Fig. 3).

⚠ **CAUTION** - Be careful not to let this subassembly tip over backward. If it will not stay leaning forward, use an appropriate means to hold it from tipping backward.

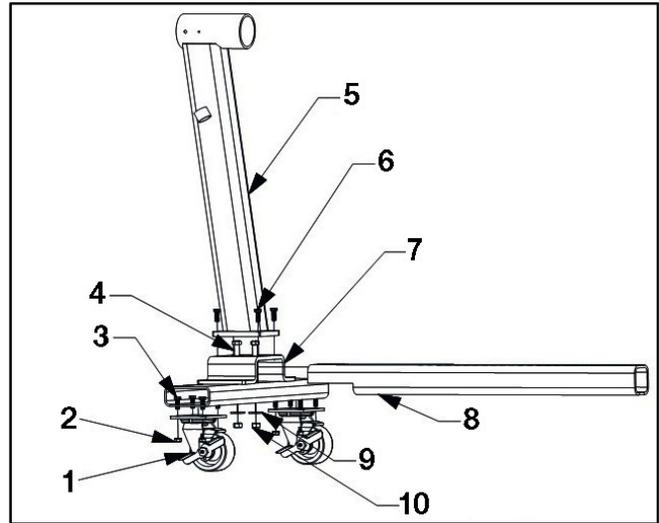


Fig. 4: Front subassembly

- 1 Caster
- 2 3/8-16UNC Flanged lock nut (8)
- 3 1" L, 3/8-16UNC Grade 5 cap screw (8)
- 4 5" L, 1/2-13UNC Grade 5 cap screw (2)
- 5 Front post
- 6 1" L, 3/8-24UNF Grade 5 cap screw (4)
- 7 Front caster tube
- 8 Inner main tube
- 9 1/2" Type A flat washer (2)
- 10 1/2-13UNC nut

3. Use (4) 3/8-16UNC grade 5 cap screws 1" long and (4) 3/8-16 UNC flanged lock nuts to fasten each of (2) casters to Front Caster Tube (Fig. 4).

4. Use (2) 1/2-13UNC grade 5 cap screws 5" long with (2) 1/2" Type A flat washers and (2) 1/2-13 UNC nuts to fasten the Front Caster Tube to the Inner Main Tube. Torque to 70 ft-lbs minimum ensuring the Inner Main Tube is perpendicular to the Front Caster Tube (Fig. 4).

5. Use (4) 3/8-24UNF grade 5 cap screws 1" long to fasten Front Post to Front Caster Tube. Torque to 30-35 ft-lbs (Fig. 4).

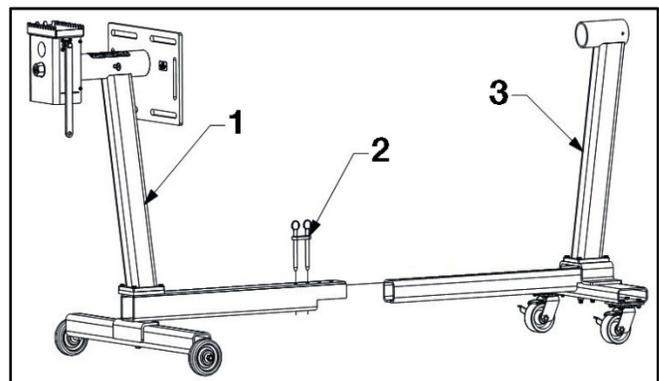


Fig. 5: Assemble front and rear subassemblies

- 1 Rear subassembly
- 2 Main tube locking pin
- 3 Front subassembly

6. Slide the Rear and Front Subassemblies together by inserting the Inner Main Tube into the Outer Main Tube (Fig. 5).
7. Secure them by aligning the holes in the Outer and Inner Main Tubes and fully inserting the Main Tube Locking Pin into the rearmost pair of holes in the Outer Main Tube that is aligned with holes in the Inner Main Tube.

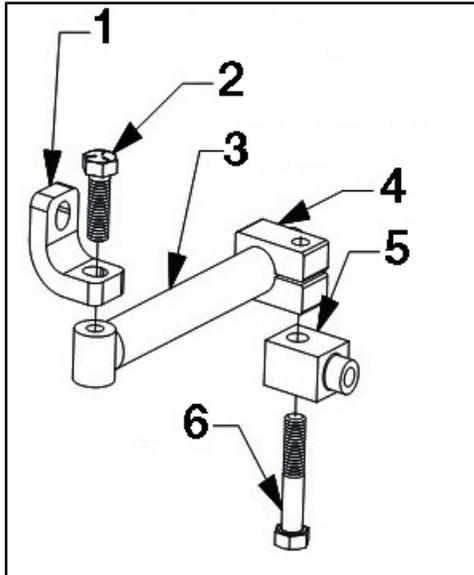


Fig. 6: Mounting arm subassembly

- 1 Mounting arm bracket
- 2 1-1/2"L, 1/2-13UNC Grade 5 cap screw
- 3 Mounting arm weldment
- 4 Mounting arm capturing block
- 5 Mounting arm retention block
- 6 2-1/2"L, 1/2-13UNC Grade 5 cap screw

8. Use (1) 1/2-13UNC grade 5 cap screw 1-1/2" long to fasten the Mounting Arm Bracket to the Mounting Arm Weldment. Use (1) 1/2-13UNC grade 5 cap screw 2-1/2" long to fasten the Mounting Arm Retention Block to the Mounting Arm Capturing Block. Ensure the unthreaded hole in the Mounting Arm Capturing Block is against the Mounting Arm Retention Block. This hardware can be left loose when not in use. Repeat this step for all (8) Mounting Arms (Fig. 6).

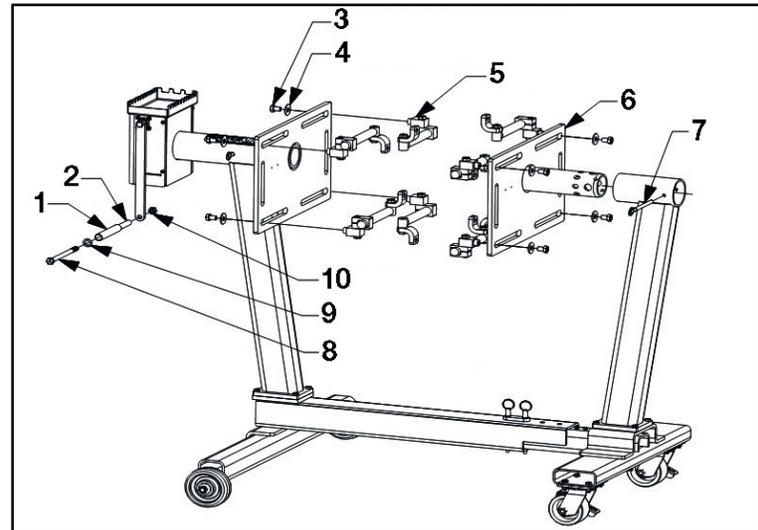


Fig. 7: Installing rotation handle and mounting plates

- 1 Outer handle tube
- 2 Inner handle tube
- 3 3/4"L, 1/2-13UNC Grade 8 cap screw (8)
- 4 1/2" Grade 9 USS flat washer (8)
- 5 Mounting arm (8)
- 6 Detachable mounting plate
- 7 Rotation locking pin
- 8 7"L, 1/2-13UNC Grade 5 cap screw
- 9 5/8" 18GA Flat washer
- 10 1/2-13UNC nut

9. Use (1) 1/2-13UNC grade 5 cap screw 7" long cap screw with (1) 5/8" 18GA flat washer and (1) 1/2-13UNC nut to fasten the Inner and Outer Handle Tubes to the Rotation Handle (Fig. 7).
10. Insert Detachable Mounting Plate into Front Post and insert Rotation Locking Pin through Post and Mounting Plate Rotation Locking Holes to hold Detachable Mounting Plate in place (Fig. 7).
11. Insert the Mounting Bracket Retention Blocks into the slots in the Mounting Plates and use (8) 1/2-13UNC grade 8 cap screws 3/4" long and (8) 1/2" grade 9 USS flat washers to fasten them to the Mounting Plate (Fig. 7).

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

ⓘ The engine stand is designed to hold and rotate automotive engines weighing no more than 2000 pounds.

1. Prepare the engine to be mounted to the stand. Remove all components that will be in the way of attaching the Mounting Plates to the engine.
2. Adjust the length of the engine stand so that the Mounting Plates are as close as possible while still accommodating the engine to be worked on and lock the Main Tubes by fully inserting the Main Tube Locking Pin into the rearmost pair of holes in the Outer Main Tube that are aligned with holes in the Inner Main Tube.
3. Ensure Rotational Locking Pin is fully inserted into Rotation Locking Hole of Mounting Plate.
4. Using a shop crane or other suitable means, move the engine into position for attaching to the stand. Follow instructions provided with equipment used to move engine. Have the stand located so that the need to move the stand after the engine has been mounted is minimized.
5. Align the engine's center of gravity with the Mounting Plates' axis of rotation and loosely attach, at minimum, 3 Mounting Arms per Mounting Plate to adequate mounting holes on the engine using appropriately sized, grade 8 cap screws and washers. Cap screws should have, at minimum, 1 inch of thread engagement with the engine and the Mounting Arm Brackets should fully contact the engine. The locations at which the Mounting Arms will be attached to the engine should be as far apart as possible.
6. Insert the Rotation Locking Pin into the Mounting Plate Retention Hole on the Detachable Mounting Plate. If the Mounting Plate Retention Hole is not protruding from the rear of the tube on the Front Post, shorten the stand according to step 2.

⚠ **WARNING** - If the equipment being used to hold the engine is not rated for overhead use, the engine must be moved while adjusting the length of the stand so that no body parts are allowed under the engine while the stand is being adjusted.

7. Tighten all cap screws in the Mounting Arms to at least 75 ft-lbs of torque while maintaining alignment of Mounting Plates' axis of rotation and engine's center of gravity.
8. Slowly transfer engine's weight to engine stand.

⚠ **CAUTION** - If the engine or stand shifts, moves, or rotates check that the engine's center of gravity is in line with the Mounting Plates' axis of rotation 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.

9. Rotate engine by holding engine in place, slowly removing Rotation Locking Pin from Mounting Plate, and carefully rotating engine to locking position closest to desired position.
10. Insert Rotation Locking Pin into Rotation Locking Hole of Mounting Plate before releasing handle.
11. Slowly and cautiously move the stand to the desired work location. Once the stand is in location, use the brakes on the Casters to prevent movement.

8.2 Dismounting an engine

1. Prepare engine for moving and engine's destination for accepting engine.
2. Check that both Rotation Locking Pins are inserted in the stand.
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 from Mounting Arms.

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.
- Either Post or either Caster Tube is loose on the Main Tube.
- 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.
- 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 Periodic inspection

The engine stand owner (or a knowledgeable person appointed by the owner) must give the engine stand a more thorough inspection weekly (if it is used on a daily basis) or monthly (if used less frequently). In addition to a visual inspection (as described in the previous section) the inspector should also operate the engine stand to assist in identifying any problems that might exist. The engine stand must be removed from service and repaired if the engine stand appears damaged, if it is badly worn, or if it operates abnormally.

- Check that all hardware is properly tightened and in good condition.
- Ensure that the axis of rotation of each of the Posts is level.
- Check that the Mounting Plates, Mounting Brackets, and mounting hardware are not bent or stretched.
- Check that the Gear teeth and Worm are in good condition and are not cracked, bent, excessively worn, or otherwise damaged.
- Check that the Rotation Locking Pins are not damaged in any way and can be easily installed and removed.

9.3 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 the Gear regularly during use. The gear teeth can be greased from the bottom of the gear box and the inside of the Gear can be greased using the grease zerk on the back of the gear box.
- Grease wheel axles.
- Periodically grease the Worm, Gear Pin, Worm Sleeve and any other unpainted parts inside the gear box. This can be done during periodic inspection.

11. Notes

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