

**Montgomery Industries International, Inc
P.O. Box 3687 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401**

**OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY
INSTRUCTIONS**

for

**HH36
Spiral Design Hammer Hog**

Bulletin 23-45-04

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

TABLE OF CONTENTS

SAFETY PRECAUTIONS	4
INSTALLATION	6
• FOUNDATION PREPARATION	6
• SHIM & GROUT BASE PLATE	6
• START-UP PROCEDURES	7
HYDRAULIC DOOR OPENER (OPTIONAL)	10
• SAFETY PRECAUTIONS	10
• START-UP CHECKLIST	11
• PRINCIPLES OF OPERATION	12
MAINTENANCE PROCEDURES	16
• ROUTINE MAINTENANCE	16
• BEARING LUBRICATION - GREASE	16
• BEARING LUBRICATION - OIL	18
• BEARING REPLACEMENT - REMOVING AN OLD BEARING	19
• BEARING REPLACEMENT - INSTALLING A NEW BEARING	19
• BEARING TEMPERATURE	24
• HAMMERS & PIVOT PINS	25
• SCREEN	27
• TRAMP METAL PROTECTION	27
• V-BELT DRIVE	28
TROUBLESHOOTING	29
• BEARINGS ARE OVERHEATING	29
• EXCESSIVE VIBRATION	30
ORDERING PARTS FOR THE HH36	32
• MATERIAL LIST	32
• RECOMMENDED SPARE PARTS	32

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

TABLE OF CONTENTS

WARRANTY INFORMATION	34
APPENDIX	35
• BEARINGS	35
• MATERIAL LIST & DRAWINGS	35

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

SAFETY PRECAUTIONS



ANY MALFUNCTION OR OPERATION PROBLEM NOT COVERED IN THIS MANUAL SHOULD BE REPORTED TO THE FACTORY. OUR TRAINED ENGINEERS ARE AVAILABLE TO ASSIST YOU.



READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE USING THIS EQUIPMENT.

IT IS THE RESPONSIBILITY OF THE USER TO KEEP THE HAMMER PINS PROPERLY TORQUED AT ALL TIMES.

- √ Due to the high inertia load of the HOG rotor, multiple start-ups can cause excessive internal heat build-up in the motor, causing motor failure.
- √ HOG should not be started more often than once in a two hour period.
- √ Do **not** perform any maintenance work or any other operations on this equipment unless it is completely stopped and all electrical circuits are deactivated and locked out. We recommend that the person performing the maintenance work keep the lockout key on his person to ensure that no one else engages power without knowledge of maintenance work being performed.
- √ Do **not** operate this or other machinery without all guards being installed.
- √ Do **not** remove inspection door while HOG shaft is turning over.
- √ Do **not** turn rotor over by hand or power with any part of the body between the hammers and anvil bar. This is a **high inertia** rotor and cannot be stopped easily, once in motion. **Even when barely moving, it has enough momentum to cut off a finger.**
- √ Do **not** look into the machine when rotor is turning. Wear safety glasses any time you are working on or in near proximity to operating equipment.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

- √ The noise level of this equipment when operating is in excess of safe levels for unprotected ears. Wear hearing protection any time you are near this or other loud machinery.
- √ Wear gloves any time you are working on this equipment.
- √ Under no circumstances should fingers be inserted in the holes of the HOG screen to facilitate removing. A slip of the screen could easily remove a finger.
- √ Do **not** clear obstructions from screen holes with hands while screen is in the machine.
- √ Use caution and proper lifting equipment to open the front door of the HOG. The rear door is too heavy for one man to support. If a hydraulic rear door opener was provided with the HOG, **always use the Safety Bar** as instructed in this manual.
- √ Be careful when installing new rings on a shaft as fingers are easily smashed.
- √ Never wear loose clothing, especially a necktie, which could get entangled in any moving machinery.
- √ Do **not** hand feed material directly into the HOG. If hand feeding is required, it should be onto a conveyor feeding into the HOG.
- √ Do **not** poke sticks, poles, etc. into any access opening on HOG while it is operating. HOG should be completely stopped before attempting to clear any blockages.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

INSTALLATION

- **FOUNDATION PREPARATION**

1. Unit must be mounted on a reinforced concrete foundation which should extend at least 6" beyond the base plate of the unit on all sides.

The unit must be bolted down tightly. The foundation must be smooth, clean, and level. Unit must be shimmed and grouted. Base plate can bow causing excessive stress when anchor bolts are pulled down on an uneven foundation.

When foundation is smooth, clean, and level, and base plate is shimmed and grouted, tighten all anchor bolts holding down unit.

2. The minimum recommended thickness of concrete is 12" but local codes and frost line will determine the actual thickness required.
3. Anchor bolts should be 1" NC extending 3" above the top of the concrete.
4. The unit must be mounted with the base plate horizontal. Mounting on an angle may cause the bearings to fail.
5. If the unit is mounted on steel columns, the supporting structural steel sub-base and the column legs should be designed for a minimum capacity of 2.5 times the total static weight of all equipment supported, with beams under and parallel to the motor and under and parallel to the rotor.
6. **Provide at least 36" of clearance on all sides of the unit for maintenance.**

- **SHIM & GROUT BASE PLATE**

1. With the HOG sitting flat on the floor (do not bolt down), place shims under any corner which is not already flat.
2. After shimming corners where needed, insert shims 12" - 16" apart down all four sides as needed. Each shim should be of a size to fill the gap between the floor and the bottom of the HOG base plate.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

3. Pack grout as far back under the base plate as possible, usually 2" to 3".
4. After the grout is dry, tighten all mounting bolts.

• START-UP PROCEDURES

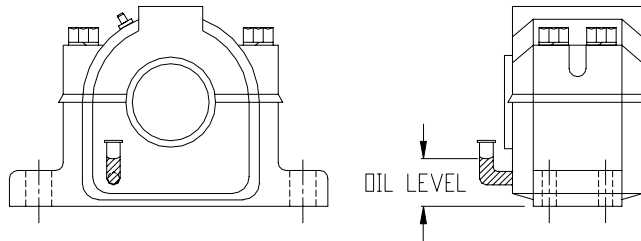
1. Check bearings for proper lubrication.

Grease Bearings The bottom half of the housing, with the bearing sitting in the housing, should be filled 1/3 to 1/2 full of grease. (see *Bearing Lubrication* Section).



GREASE IS FLAMMABLE AND EXPLOSIVE IN CONTACT WITH PURE OXYGEN!

Static Oil Bearings Check sight gauge for proper oil level. Fill to oil levels based on bearing size. Oil level is measured from the bottom of the block base to the meniscus on oil sight gauge. Oil should be at level shown while HOG is shut down. When HOG is running, level of oil may rise or drop from shut down level.



USE ONLY OIL WITH SPECIFICATIONS AS LISTED IN *ROUTINE MAINTENANCE: Bearing Lubrication - Oil.*

USAF 600 The Static Oil Level should be 2-9/16" for 4-15/16" Bearings

Circulating Oil System

Bearings using a Circulating Oil Lubrication System cannot also have a static oil level maintained inside the bearing. If static oil is present and more oil is introduced into the bearing, oil will flow out of the shaft seal.



USE ONLY OIL WITH SPECIFICATIONS AS LISTED IN *ROUTINE MAINTENANCE: Bearing Lubrication - Oil.*

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

- A. Wire the 115 VAC power wiring for the Oil System from the starter for the machine so that the machine cannot be started until the oil pump starts and begins to pump oil to the bearings. If the main motor starter is wired for 230 VAC or 460 VAC, a step-down transformer will be required.
- B. The Oil Pump Unit should be mounted so that the distance to each bearing from the pump is approximately the same.
- C. The flow rate through each bearing for circulating oil is based on a HOG speed of 1200 RPM.

USAF 600 4-15/16" Bearings: The flow rate should be approximately 2-3 pints/min.
(0.25-0.375 GPM)

- D. To measure the above flow rate, connect a line from the Oil Circulating Unit to one bearing only. Leave the other line free to check flow.

Obtain a clear container of at least one gallon capacity. Pour in a measured amount of liquid equal to the recommended flow rate per minute and mark that level on the container.

Empty the container and be sure to dry the container completely if the measured liquid is not the oil being used for the bearings.

Start the Oil Circulating pump and pump oil from the open line to the bearing into the container. Adjust the needle valve as required to fill to the mark in one minute. Turn the needle valve clockwise to get less flow, counter-clockwise to get more flow.

After getting the desired flow rate, check the flow to the other bearing in the same manner.

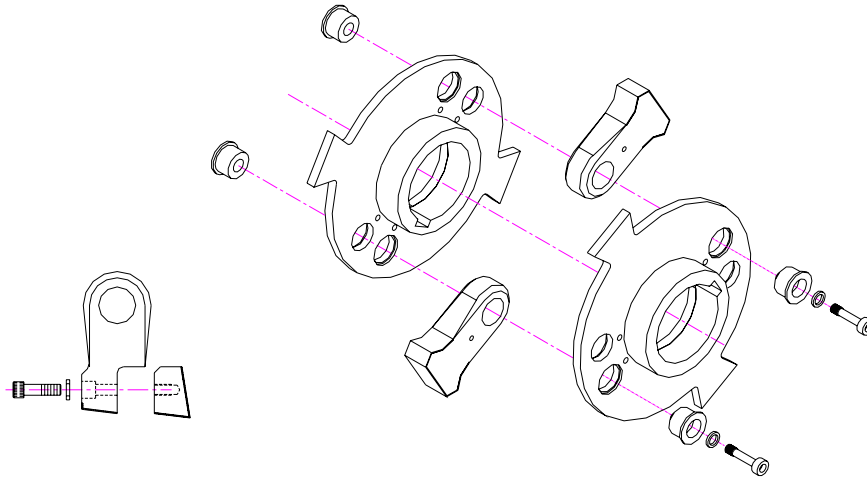
- E. Refill the oil reservoir to the proper level shown on the sight gauge.
- 2. Check alignment of flexible coupling or V-belt drive.
 - 3. Make certain all hammers are tight. Access the hammers and inserts by opening the hinged rear door.



**A LOOSE HAMMER AND/OR INSERT CAN CAUSE
DAMAGE TO THE UNIT AND POSSIBLY CAUSE SEVERE
INJURY TO PERSONNEL IN THE AREA.**

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG



The hammers are attached to the ring with a pivot pin combination that is held together with a 3/4" X 3" Socket Head Capscrew. The recommended torque for the HH pivot pin is 350 ft-lbs.

If the insert style hammer is used, the Insert Block is attached to the Hammer Holder for Insert with a 1" X 3" Socket Head Capscrew. The recommended torque for the HH36 Insert Block is 500 ft-lbs.

4. Turn rotor by hand (or by pulling on drive belt) for a few rotations to check for binding.
5. Jog motor to verify correct shaft rotation under power.
6. Make certain that all guards are in place and secure.
7. If a blowpipe connection is used to collect the shredded material, make certain there are no objects obstructing the air flow that could cause the pipe to plug.
8. If a mechanical conveyor is used to collect the shredded material, make certain that it is properly installed.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

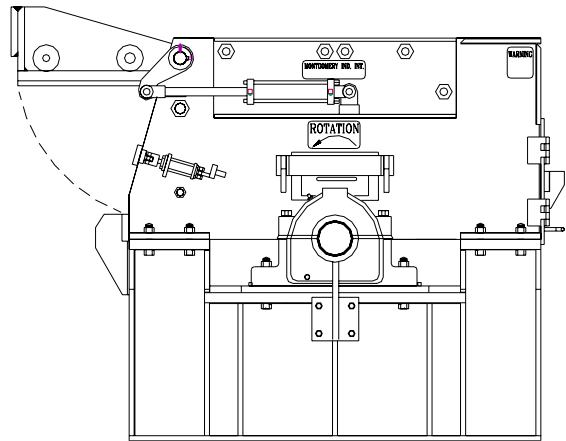
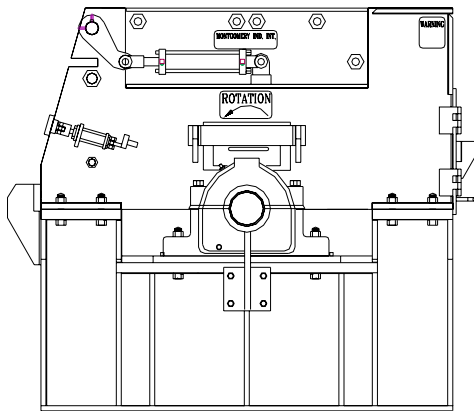
HYDRAULIC DOOR OPENER (Optional)



ANY MALFUNCTION OR OPERATION PROBLEM NOT COVERED IN THIS MANUAL SHOULD BE REPORTED TO THE FACTORY. OUR TRAINED ENGINEERS ARE AVAILABLE TO ASSIST YOU.



READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL BEFORE USING THIS EQUIPMENT.



• **SAFETY PRECAUTIONS**

- √ Do not operate this or other machinery without proper training and complete understanding of all instructions contained in this manual.
- √ Do **not** attempt to open the front or rear door unless the hog is completely stopped and the hog motor is deactivated and locked out. We recommend that the person performing the maintenance work keep the lockout key on his person to ensure that no one else engages power without knowledge of maintenance work being performed.



DO NOT STAND BENEATH THE FRONT DOOR WHEN IT IS OPEN UNLESS THE 1" X 4" STEEL **SAFETY BAR** IS PROPERLY SEATED BETWEEN THE SIDE HOUSINGS TO PREVENT THE FRONT DOOR FROM CLOSING UNEXPECTEDLY.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

- √ Do not remove the inspection door while the hog shaft is turning.
- √ Do **not** turn rotor over by hand or power with any part of the body between the hammers and anvil bar. This is a **high inertia** rotor and cannot be stopped easily, once in motion. **Even when barely moving, it has enough momentum to cut off a finger.**
- √ Do not look into the machine when the rotor is turning.
- √ Wear safety glasses whenever you are working on or near the hog.
- √ Wear gloves any time you are working on this equipment.
- √ Do not poke sticks, poles, or any other objects into any access opening on this hog while the rotor is turning.
- √ The hog should be completely stopped and the motor locked out before attempting to clear any blockages.



KEEP AWAY FROM THE CYLINDERS AND THE FRONT DOOR
AREA WHEN ACTIVATING THE HYDRAULIC DOOR OPENER.

- **START-UP CHECKLIST**

1. Make certain that the pump motor is wired properly. Refer to the installation information on the pump motor.
2. Make certain that the pump motor shaft is rotating in the proper direction.
3. Before starting the hog, operate each hydraulic cylinder and valve to make certain that no components are binding.
4. While checking the hydraulic components, check all hoses and hose connections to make certain that there are no hydraulic leaks.
5. Since the hydraulic valves are manually operated, shut off the pump motor during normal operation of the hog.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

• PRINCIPLES OF OPERATION

1. It is necessary to open the front door of the hog to provide access to the rotor area for routine maintenance of the anvil bar.
2. It can be helpful to open the front door to properly seat the section of the screen directly underneath the anvil bar.
3. Some users prefer to change the hammers from the front door side of the rotor.
4. The weight of the front door, even on the smallest model hog, is too heavy for one person to safely handle. Therefore, it is necessary to either use lifting equipment to safely remove the door or to use hydraulics to raise and lower the front door.
5. Two cylinders are used to open the front door, one on each side of the door.
6. Two cylinders are used “to break the seal” if material has become packed between the ends of the door and sides of the housing.

Opening the Door



KEEP AWAY FROM THE CYLINDERS AND THE FRONT DOOR AREA WHEN ACTIVATING THE HYDRAULIC DOOR OPENER.

1. Remove the 1” x 4” front door **Safety Bar** holder and place it to one side of the hog.
2. Remove the two bolts on each side of the door.
3. Turn on the hydraulic power unit and leave it on.
4. The hydraulic valve assembly has a manual handle which has three (3) positions. The handle is spring-loaded to return to its “neutral position” unless it is held in either its “extend position” or its “retract position”.

The hydraulic valve assembly has check valves to maintain pressure in the cylinders when the handle is released and automatically returns to its “neutral position”.

5. Hold the manual valve handle in its “extend position” until the cylinders raise the door to its horizontal position from its normal vertical position.

It may be necessary to “bump” the front door “to break the seal” if material has become packed

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

between the ends of the door and sides of the housing. There is a separate valve handle that operates the two cylinders at the lower portion of the door.

6. When the door is fully raised and the handle is released, wait for 30 seconds to verify that the door remains in its horizontal position.

Once it is verified that the hydraulics are fully supporting the weight of the door, two men (one on each side of the hog beyond the width of the front door for safety) need to slide the 1" x 4" front door **Safety Bar** into the slot in the side housings of the hog.

The **Safety Bar** provides a mechanical lock so that the door cannot unexpectedly close if a failure in the hydraulic system allows the door to start falling by gravity.

7. Once the front door is fully raised and the mechanical lock **Safety Bar** is securely in place, personnel can work on the hog through the front door.

Closing the Door



KEEP AWAY FROM THE CYLINDERS AND THE FRONT DOOR AREA WHEN ACTIVATING THE HYDRAULIC DOOR OPENER.

1. Make certain that the front door has remained above the mechanical lock **Safety Bar** which indicates that the check valves are maintaining pressure in the cylinders.
2. If the front door is not touching the mechanical lock **Safety Bar**, position two men (one on each side of the hog beyond the width of the front door for safety) and slide the 1" x 4" front door **Safety Bar** out of the slot in the side housings of the hog and place the **Safety Bar** to one side of the hog.
3. If the front door *is* touching the mechanical lock **Safety Bar**, hold the manual valve handle in its "extend position" until the cylinders raise the door to its horizontal position and the front door is no longer touching the mechanical lock **Safety Bar**.

If the door cannot remain in position, there may be a hydraulic leak or a problem with the hydraulic check valve.

Step away from the door if you cannot verify that the hydraulics are fully supporting the weight of the door!

If the hydraulics are not supporting the door, support the weight of the door with a chain hoist or similar lifting device. The weight of the door will vary with the size of the hog but may

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

weigh as much as 2,100 pounds. Verify that the weight of the door is supported before attempting to remove the **Safety Bar**.

If the hydraulics are supporting the door but the check valve is not holding it in position, have one man hold the hydraulic valve handle in its “extend position.” Hold this position for 30 seconds and **verify that the door remains supported and there are no hydraulic leaks** in the system.

If the door remains supported and there are no hydraulic leaks, position two men (one on each side of the hog beyond the width of the front door for safety) and slide the 1” x 4” front door **Safety Bar** out of slots in the end housings of the hog and place the **Safety Bar** to one side of the hog.

4. Once the mechanical lock has been removed and all personnel are clear of the front door and the hydraulic mechanism, hold the manual valve in its “retract position” to lower the front door down into its normal operating position.
5. Once the front door has returned to its normal operating position, install and properly tighten the two bolts on each side of the door, which secure it to the side housings.
6. Once the front door has been properly secured, turn off the hydraulic power unit.
7. Return front door **Safety Bar** to its original location in the lower HOG housing support brackets.

Removing the Front Door Completely

1. Make certain the hydraulic power unit is off.
2. Remove the clevis pins that connect the rod ends of the cylinders to the brackets on the front door pivot shaft.
3. Slide the brackets off of the front door pivot shaft and remove the bracket keys from the shaft.
4. Remove the two (2) cotter pins from the front door pivot shaft.
5. Using two (2) men (due to the length and weight of the front door pivot shaft), carefully slide the front door pivot shaft through the side housing until the shaft is completely clear of the housing.
6. Support the weight of the door with a chain hoist or similar lifting device. The weight of the

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

door will vary with the size of the hog but may weigh as much as 2,100 pounds.

7. Remove the 1" x 4" front door bar holder and place it to one side of the hog.
8. Remove the two bolts on each side of the door.
9. Carefully remove the door using the lifting device.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

MAINTENANCE PROCEDURES

**It is the responsibility of the user to keep all bolts properly torqued at all times.
Always use Vibra-Tite (or equivalent) when installing bolts.**

• **ROUTINE MAINTENANCE**

Anvil Bar	Tightness of bolts.
Bearings	Check temperature. Check lubrication.
Direct Coupling	Check for alignment.
Hammers	Tightness of bolts (Insert Type- 500 ft-lbs). Check for wear.
Pivot Pins	Tightness of bolts (350 ft-lbs). Check for wear.
Screen	Check for wear.
Tramp Metal	Check metal trap.
V-Belt Drive	Proper belt tension. Check for wear on belt.
Wear Liners	Tightness of bolts.

• **BEARING LUBRICATION - GREASE**



GREASE IS FLAMMABLE AND EXPLOSIVE IN
CONTACT WITH PURE OXYGEN!

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

Hogs using grease lubricated bearings should be greased in accordance with the following specifications:

1. All model HOGS use a Class-3 fit.
2. The following types of grease may be used:

√ Chevron Duralith EP #2 is preferred. Viscosity at 210° F: 80 SUS Drop point: 370° F	Shell Alvania EP #2 is acceptable. Viscosity at 210° F: 80 SUS Drop point: 365° F
	Gulf Crown EP #2 is acceptable. Viscosity at 210° F: 82.5 SUS Drop point: 348° F
3. Any equivalent grease should have the following characteristics:
 - Usable temperature range up to 200° F operating temperature.
 - Viscosity of the oil in the grease should not be less than 100 SUS at the operating temperature.
 - The drop point of the grease must be in excess of 300° F.
 - Grease compounds with Lithium or non-soap bases are preferred. The No. 2 consistency grades have been found to be the most satisfactory for normal operating speeds.
4. The re-lubrication cycle must be determined from experience. It is important that fresh grease reaches internal surfaces of the bearing. Refer to the re-lubrication guide which has been provided in the appendix.

When adding grease, a small amount at frequent intervals (approximately every 5 weeks) is preferable to a large amount at long intervals. A practical guide is V (ounces) = $0.25 \times d \times b$, where d is the depth of the bearing (in inches) and b is the bore of the shaft (in inches).
5. When replacing old grease with new, the grease should be worked into the available spacing in the bearing by hand, forcing grease in between the rollers and under the edge. The bottom half of the housing should be 1/3 to 1/2 full of grease, depending on the operating conditions.

An over supply of grease in the bearing will result in churning and break-down of the grease and overheating of the bearing.
6. The bearing housing must be cleaned, flushed with mineral spirits, and repacked with appropriate grease at least once per year.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

• **BEARING LUBRICATION - OIL**



**USE EXTREME CAUTION - GREASE AND OIL ARE FLAMMABLE
AND EXPLOSIVE IN CONTACT WITH PURE OXYGEN!**

1. If for any reason the bearings are switched from grease to oil lubrication, the bearing should be washed clean of all grease.

In the bottom half of the bearing housing below the shaft seal (slinger ring) there is a vertical hole drilled in each side of the housing. These holes are used to return oil back to the oil chambers. They should be cleaned thoroughly because if they are plugged, the oil will not return and may soon empty the bearing.

2. For HOGS using oil lubricated bearings, either static lubrication or circulating oil systems, the following oil types may be used:

√ **Mobile DTE Oil AA is preferred.**
API Gravity: 0.897
Minimum Flash Temperature: 460° F
Viscosity: 120-130 SUS at 210° F
Viscosity Index: 95

Mobile DTE Oil HH is acceptable.
API Gravity: 0.9
Minimum Flash Temperature: 520° F
Viscosity: 140-155 SUS at 210° F
Viscosity Index: 95

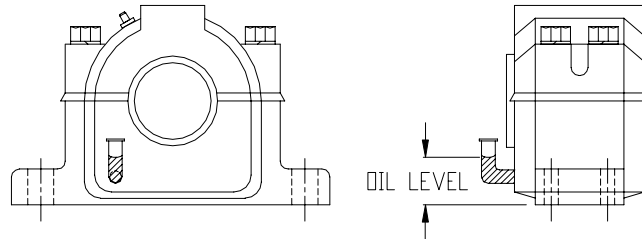
Shell Tellus Oil 976 is acceptable.
API Gravity: 27.6
Minimum Flash Temperature: 495° F
Viscosity: 126 SUS at 210° F
Viscosity Index: 97

3. Any equivalent oil should have the following characteristics:
 - Usable temperature range up to 200° F operating temperature.
 - Minimum Flash Temperature of 460°F
 - Viscosity at 210° F must be a minimum of 100 SUS.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

4. Check sight gauge for proper oil level. Fill to oil levels based on bearing size. Oil level is measured from the bottom of the block base to the meniscus on oil sight gauge. Oil should be at level shown while HOG is shut down. When HOG is running, level of oil may rise or drop from shut down level.



USAF 600 The Static Oil Level should be 2-9/16" for 4-15/16" Bearings

- **BEARING REPLACEMENT - REMOVING AN OLD BEARING**

- ✓ **STOP THE HOG**

1. Bend out the locking device on the lock ring to release the nut.
2. Loosen the nut about two or three turns.

To loosen the nut, place a spanner wrench or heavy bar of brass or bronze against the nut. Use a heavy sledge to hit the wrench or bar and keep moving around the nut with the wrench or bar. Do **not** keep pounding in one place as this will ruin the threads on the sleeve and nut.

3. Place a cylinder slightly larger than the bearing journal of the HOG shaft and long enough to clear the end of the shaft against the bearing unit locking nut (part of the adapter assembly).
4. Using a sledge hammer, strike the end of the cylinder with a level swing to jar the bearing loose from the tapered sleeve. If the bearing unit resists separating from the tapered sleeve, use wood blocks as a wedge behind the bearing unit so that it cannot move.
5. Once the bearing unit is loose, all the bearing component will easily slide off of the shaft.

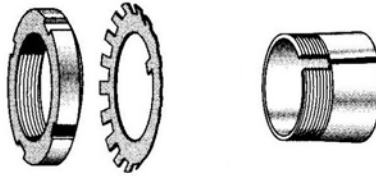
- **BEARING REPLACEMENT - INSTALLING A NEW BEARING**

1. Clean the shaft thoroughly and remove any rough spots with either a file or an emery cloth.

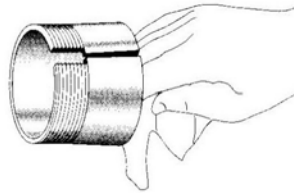
Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

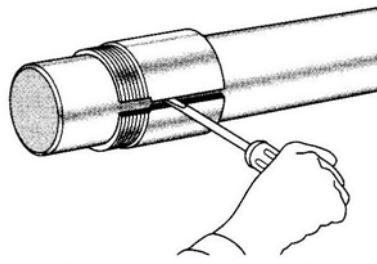
2. Screw off the nut and remove the locking washer.



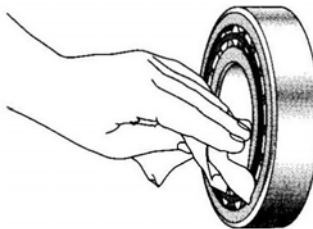
3. Wipe the preservative from the surface of the sleeve and then oil the bore surface lightly. Use a thin mineral oil.



4. Slide the inner bearing housing seal onto the shaft prior to sliding on the adapter.
5. Open up the sleeve by inserting a screwdriver in the slit; then slide the sleeve along the shaft to the correct position.



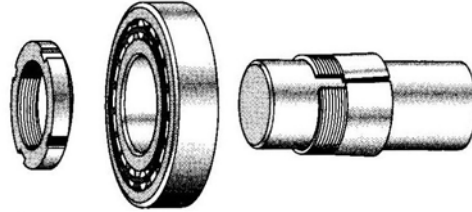
6. Wipe the preservative from the bore of the bearing and then oil the surface lightly. Use a thin mineral oil.



Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

7. Place the bearing on the sleeve. Screw on the nut with its chamfer facing the bearing, but do not mount the locking washer. Do not push the inner ring up on the taper.



8. The bearing unit is secured on the shaft by tightening the lock nut with a spanner wrench or with a blunt chisel and hammer. Turn the nut sufficiently to ensure that the shaft makes proper contact (self-locking) with the sleeve, but do not drive the bearing any further up the sleeve until you begin checking the mounted clearance.

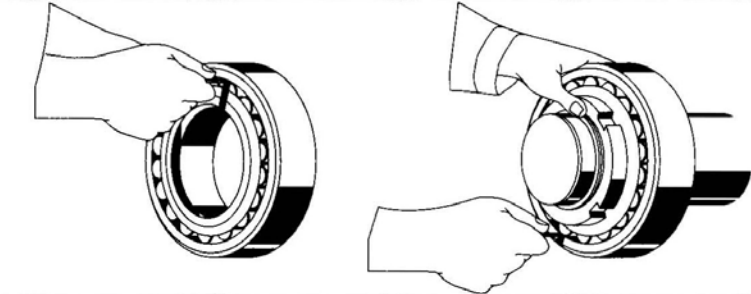


9. Allow shaft and bearing unit to rest in the bottom half of the housing for final tightening.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

10. While continuing to tighten the nut, keep checking the clearance between the top roller and outer race with a feeler gauge until the proper clearance is reached. Refer to Schedule "A" below for clearance requirements, based on the bearing manufacturer's recommendations.

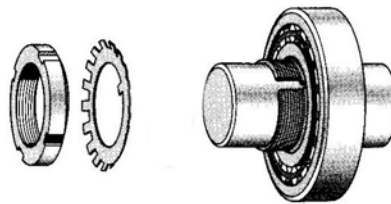


SCHEDULE "A" (SKF Bearings)

Shaft Journal	Bearing	Bore (mm)	Unmounted Clearance	Reduction In Internal Clearance	Mounted Clearance
4.9375	22328CCK/C3W33	140	0.0063 - 0.0079	0.0025 - 0.0035	0.0038 - 0.0044

NOTE: Values are in inches unless noted. The above clearances are based on a Class-3 fit.

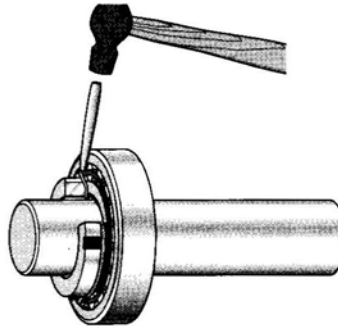
11. Once the proper mounted clearance is achieved, unscrew the nut, place the locking washer in position, and tighten the nut firmly again. Make sure that the bearing is not driven any further up the sleeve.



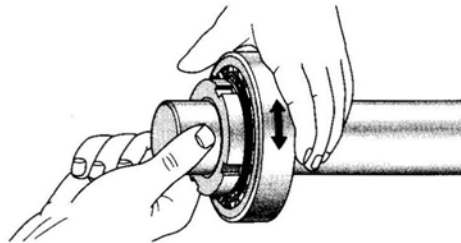
Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFTEY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

12. Lock the lock nut in place by bending one of the locking washer tabs down into one of the slots in the nut. Do not bend it to the bottom of the slot.



13. Check that the shaft or outer ring can be rotated easily by hand.



CAUTION: A loose adapter sleeve can lead to the inner ring turning on the adapter sleeve and/or the adapter sleeve turning on the shaft. To insure that the nut is not excessively tight, make certain the outer ring of the bearing rotates freely. For a C3 fit bearing, the outer ring will swivel freely.

14. Apply lubrication.
15. Slide the outer bearing housing seal onto the shaft and insert the stabilizing ring, if applicable.

The HOG uses only one stabilizing ring per set of bearings, customarily installed opposite the drive end. The stabilizing ring is a partial ring that can be installed around the shaft and located inside the bearing housing after the bearing has been attached.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

- **BEARING TEMPERATURE**

1. Check temperature of bearings.

Temperature monitor decals are attached to the top of the bearing to aid in determining the operating temperature of the bearing.

The normal operating temperatures are between 140° Fahrenheit and 160° Fahrenheit. Operating temperatures are allowable up to 200° Fahrenheit.

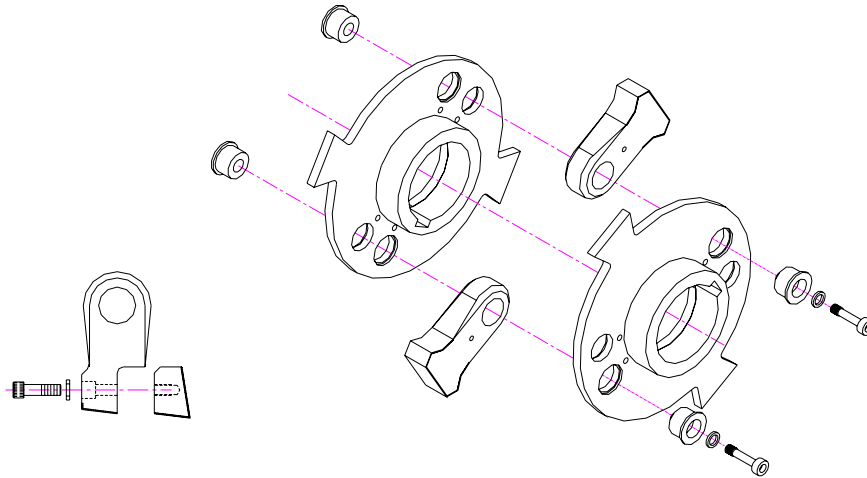
During the first day or two of operation, new bearings may heat up to temperatures exceeding the normal range. Although this occurrence is expected, bearings should be checked daily for one week to ensure that the temperature has decreased to a normal operating range after the bearing has seated and adjusted to the housing.

Operating temperatures above 200° Fahrenheit will cause most lubricants to break down, which can result in damage to the bearings and HOG. We recommend a MONTGOMERY BEARING ALERT as an optional piece of equipment. When used, the BEARING ALERT constantly monitors the temperature of the bearing without having to rely on an operator being present when a critical temperature is reached or exceeded. If the bearing becomes too hot, the BEARING ALERT will activate audible and visible warning signals and, when properly wired, shut down the equipment involved.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

- **HAMMERS & PIVOT PINS**

Since all bolted connections will work loose over a period of time, it is essential that the hammer pins be periodically checked and if necessary re-tightened. Make certain all hammers are tight. Access the hammers by opening the hinged rear door.



The hammers are attached to the ring with a pivot pin combination that is held together with a 3/4" X 3" Socket Head Capscrew. The recommended torque for the HH pivot pin is 350 ft-lbs.

If the insert style hammer is used, the Insert Block is attached to the Hammer Holder for Insert with a 1" X 3" Socket Head Capscrew. The recommended torque for the HH36 Insert Block is 500 ft-lbs.

Due to the wide variation in applications and the types of materials processed, it is not possible to provide any specific time between re-tightening of the hammer pins. Actual operating experience for each customer is required to determine the maximum time interval before the hammer pins and insert blocks are checked and re-tightened.

**It is the responsibility of the user to keep all bolts properly torqued at all times.
Always use Vibra-Tite (or equivalent) when installing bolts.**

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

1. Hammers are made from several types of alloy steel and may also be hardfaced with impact and abrasion resistant over-lays.

If hammers are rebuilt, a high compression type welding rod should be used to bring the worn surface to within 1/8" of the finished surface.

A wear resistant coating – able to withstand some impact – may be applied to bring the surface to finished dimensions. It is recommended to keep this layer approximately 1/8" thick.

2. Because of the different coefficients of expansion between mild steel and hardfacing alloys, hairline cracks usually appear upon cooling. Minor hairline cracks do not affect the life of these parts. These parts should not be considered defective when minor hairline cracks are present.
3. Single piece Hammers may be reversed to wear both sides. Insert Hammers have a removable block that contains a hardsurfaced cutting edge ground to finished dimensions. The Insert is not reversible but may be removed without removing the Hammer.
4. If hammers are severely worn, they should be replaced rather than rebuilt.



Block or tie the rotor before removing a hammer so that the rotor will not turn suddenly when the weight of the hammer is removed.



Insert pin or short steel safety bar through hole in hammer to keep it from swinging while working on it. Scissors action is dangerous – do not let hammer pivot while working on it.

5. Each hammer is held in place with two pivot pins.
6. Remove the capscrew holding the two pivot pins together. The pivot pins are now free to slide out to release the hammer.



Use care when sliding out the pivot pins. Do not let hammer drop. Never stick a finger in the hole through the ring to push the pins out. This could cause injury or loss of a finger. Use a short steel bar, if needed.

7. Replace hammers using a similar procedure. Push the pivot pins through the ring into the hammer and secure with a capscrew, which should be tightened to *350 ft-pounds*.



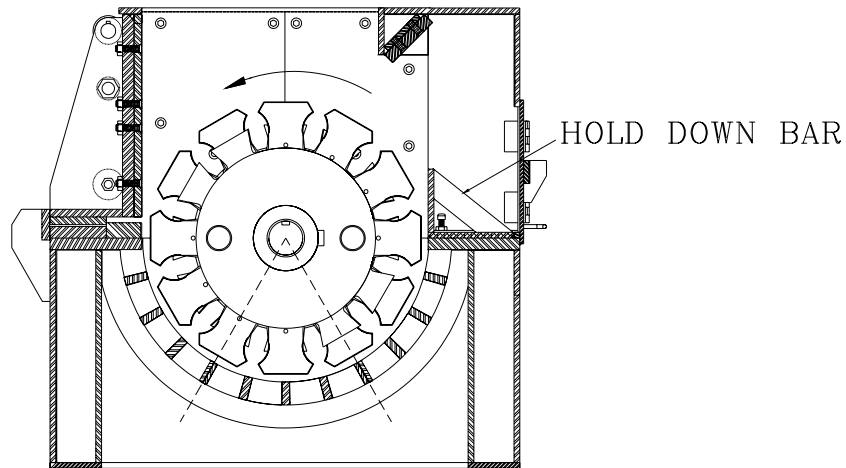
Remove pin or short steel safety bar through the hole in the hammer after changing the hammer.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

- **SCREEN**

Periodic inspection of the screen is recommended. The screen is in three sections. A worn front section may sometimes be removed and rotated to the back, extending the life of the screen. Screens may be replaced in sections.



To remove a screen section, open the rear door and remove the screen hold-down bar. The screen section may now be rolled upward and removed. Use chainfall or come-along if necessary to handle the weight.

Replace screen sections in a similar manner. After replacing the screen hold-down bar, adjust the socket head capscrews to apply pressure on the screen sections and force them firmly around their rotary seat against the anvil bar.

- **TRAMP METAL PROTECTION**

Avoid tramp metal being introduced into the HOG as much as possible. Wear to internal parts will be increased due to tramp metal. The use of magnetic or detection devices is recommended.

A metal trap is provided which will catch and retain most pieces of tramp metal. Metal particles striking a hammer will hit the upper impact plate and be deflected into the trap. This material should be removed through the rear doors. A good practice is to open the doors and clean out the trap *before* the HOG is started.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com



NEVER OPEN REAR DOORS TO REMOVE OBJECTS WITHOUT FIRST FULLY STOPPING THE HOG.

Each hammer can also swing back when striking metal objects to provide clearance and allow the object to be moved around the screen to the trap area.

- **V-BELT DRIVE**

If HOG is V-Belt driven, V-Belts should be rechecked and re-tightened, if required, after one or two weeks of operation.

TROUBLESHOOTING

- **BEARINGS ARE OVERHEATING**

Temperature monitor decals are attached to the top of the bearing to aid in determining the operating temperature of the bearing.

The normal operating temperatures are between 140° Fahrenheit and 160° Fahrenheit. Operating temperatures are allowable up to 200° Fahrenheit.



DO NOT RUN HOG WITH BEARING CAP BOLTS OR ANCHOR BOLTS LOOSE.

During the first day or two of operation, new bearings may heat up to temperatures exceeding the normal range. Although this occurrence is expected, bearings should be checked daily for one week to ensure that the temperature has decreased to a normal operating range after the bearing has seated and adjusted to the housing.

Operating temperatures above 200° Fahrenheit will cause most lubricants to break down, which can result in damage to the bearings and HOG. We recommend a MONTGOMERY BEARING ALERT as an optional piece of equipment. When used, the BEARING ALERT constantly monitors the temperature of the bearing without having to rely on an operator being present when a critical temperature is reached or exceeded. If the bearing becomes too hot, the BEARING ALERT will activate audible and visible warning signals and, when properly wired, shut down the equipment involved.

1. Too much grease or oil will cause overheating. Make sure that the bearing is well lubricated but not over lubricated.

When a bearing is overheating, it is common to assume that it needs lubrication. However, if a bearing is hot from too much lubrication, adding lubrication only worsens the problem.

Oil Bearings To check for an excess amount of oil, simply inspect the oil sight gauge.

Grease Bearings **SHUT DOWN HOG.** To check for an excess amount of grease, remove the bearing cap and inspect.

If there is too much grease, it will be necessary to remove one (and only one) drain plug while the HOG is running to permit excess grease to escape. Be

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

sure to replace the drain plug.

A good procedure to follow when lubricating a bearing is to remove one drain plug after lubricating. If a bearing has been over lubricated, the excess will escape. This procedure should be followed each time the bearing is lubricated to avoid overheating due to over lubrication.

2. A bearing tightened on an uneven surface will cause overheating.

SHUT DOWN HOG. Loosen the bearing bolts and check between the bottom of the bearing and pedestal with a feeler gauge. If the bearing is bolted down on an uneven surface or there is material under the bearing, the bearing housing can warp – causing excessive heat under operation.

3. An uneven surface between the upper and lower bearing housing can result in overheating.

SHUT DOWN HOG. The following procedure should be done with the cap bolts just snug but not tight.

Check the bearing cap where the cap rests on the bottom housing. There should be zero gap between the upper and lower bearing housing. If a feeler gauge will go between the upper and lower housing, check the gauge thickness and add shim stock to fill in.

4. Excessive vibration will cause overheating.

- **EXCESSIVE VIBRATION**

1. Rings, hammers, inserts, and/or pivot pins are worn.

New HOG rotors are dynamically balanced before leaving the factory. However, due to abrasion over the normal course of operation, the rings may eventually wear to a point where the original balance weights no longer serve to balance the hog.

2. Bearings are worn.

As bearings wear over time, the original tolerances between the bearing unit and the bearing housing can loosen, resulting in increased vibration of the HOG.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFTEY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

3. Shaft is bent.

If a significant amount of tramp metal gets into the HOG, the shaft may bend. How much a shaft can bend before it is no longer usable depends upon the drive configuration and where along the shaft it is bent. It is important to recognize that operating a HOG with a bent shaft will significantly decrease the expected life of the bearings.

4. HOG is not bolted securely to its foundation.

5. HOG foundation is inadequate.

It is important that the installation instructions be followed when preparing the foundation. It is especially important that elevated platforms be properly engineered to support the dynamic loading of the HOG.

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

ORDERING PARTS FOR THE HH36

- **MATERIAL LIST**

The material list and drawing (see *Appendix*) identify those components of the HH36 that are routinely replaced due to normal wear and tear.

Whenever ordering replacement parts, always provide the serial number of the unit, the model number of the unit, and the MII part numbers listed on the material list to ensure receiving the desired replacement parts.

- **RECOMMENDED SPARE PARTS**

Based upon the hammer configuration being used, some portion of the following spare parts should be kept in inventory to minimize any downtime when routine replacement parts are needed.

HH36 Models - Mild Steel Hammers		Model Size					
PART NUMBER	PART DESCRIPTION	27	36	44	53	61	70
151-07534	3/4" Dia X 3" Socket Head Capscrew	12	16	20	24	28	32
153-07502	3/4" Lock Washer	12	16	20	24	28	32
301-14033-MS	Hammer (Mild Steel) For HH36 Hogs	12	16	20	24	28	32
314-14335	Pivot Pin For Hammer Hog w/o Threads	12	16	20	24	28	32
314-14584	Pivot Pin For Hammer Hog w/ Threads	12	16	20	24	28	32

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

OPERATING, MAINTENANCE, LUBRICATION, AND SAFETY INSTRUCTIONS FOR
THE MONTGOMERY SPIRAL DESIGN HH36 HAMMER HOG

HH36 Models - T-1 Steel Hammers

Model Size

PART NUMBER	PART DESCRIPTION	27	36	44	53	61	70
151-07534	3/4" Dia X 3" Socket Head Capscrew	12	16	20	24	28	32
153-07502	3/4" Lock Washer	12	16	20	24	28	32
301-14033	Hammer (T-1) For HH36 Hogs	12	16	20	24	28	32
314-14335	Pivot Pin For Hammer Hog w/o Threads	12	16	20	24	28	32
314-14584	Pivot Pin For Hammer Hog w/ Threads	12	16	20	24	28	32

HH36 Models - Insert Hammers

Model Size

PART NUMBER	PART DESCRIPTION	27	36	44	53	61	70
151-07534	3/4" Dia X 3" Socket Head Capscrew	12	16	20	24	28	32
151-10033	1" Dia X 3" Socket Head Capscrew	12	16	20	24	28	32
153-07502	3/4" Lock Washer	12	16	20	24	28	32
153-10002	1" Lock Washer	12	16	20	24	28	32
301-17092	HH36 Hammer Holder for Insert	12	16	20	24	28	32
314-14335	Pivot Pin For Hammer Hog w/o Threads	12	16	20	24	28	32
314-14584	Pivot Pin For Hammer Hog w/ Threads	12	16	20	24	28	32
320-17092	Insert Block for HH36 Hammer Holder	12	16	20	24	28	32

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

WARRANTY INFORMATION

The Warranty on parts manufactured by Montgomery Industries is for one year from date of shipment, excluding normal wear and tear and excluding abuse of the equipment.

The Warranty on parts manufactured by Montgomery Industries covers replacement cost of the parts only. No labor expense incurred in replacing the parts under Warranty is covered.

The Warranty on parts not manufactured by Montgomery Industries is the standard Warranty offered by the actual manufacturer of the parts. These parts include all electrical components, all hydraulic system components, and all mechanical drive components.

Do not attempt to alter the equipment in any way or do anything you are not specifically qualified to do. If there is any question whatsoever concerning the safety or advisability of your intended action, do not proceed without written permission from Montgomery Industries.

Any malfunction or operation problems not covered in this manual should be reported to the factory -- a quick and simple answer may save many hours of unsatisfactory operation.

A factory engineer is available for discussion of any problems which may arise.

**USING PARTS NOT MANUFACTURED BY MONTGOMERY INDUSTRIES OR ITS
LICENSEES ENDANGERS THE SAFETY OF PERSONNEL AND VOIDS ALL
WARRANTIES.**

Montgomery Industries International, Inc.
P.O. Box 3687 • 2017 Thelma Street
Jacksonville, Florida 32206 U.S.A.
(904) 355-5671 FAX (904) 355-0401
www.montgomeryindustries.com

APPENDIX

- **BEARINGS**
- **MATERIAL LIST & DRAWINGS**