

GE
Transportation

5GEB30 Traction Motor Combo Inspection and Service

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imagination at work

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5GEB30 TRACTION MOTOR COMBO INSPECTION AND SERVICE

PH37ACMi PowerHaul® Series Locomotive

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1. GENERAL INFORMATION

1.1. INTRODUCTION

This publication provides inspection and service instructions for the model 5GEB30 Combo Assembly (Traction Motor, Gearcase and Motor Support Bearing U-tube) on the PH37ACMi PowerHaul® Series Locomotive (Figure 1).

Section 4.1., *VISUAL INSPECTION* and Section 4.2., *LUBRICATION*, apply to Combo Assemblies that are on the truck under the locomotive as well as Combo Assemblies removed from the truck.

NOTE: *The motor support bearing housing wraps around the support bearing, with the side toward the motor open in a U shape. From this shape, the term U-Tube is used to describe this assembly.*

1.2. RELATED PUBLICATIONS

5GEB30 Traction Motor Repair and Overhaul MI-31112, GEK-76777
Scheduled Maintenance, PH37ACMi PowerHaul® Series Locomotive GEK-114501
Truck/Bogie Maintenance, PH37ACMi PowerHaul® Series Locomotive GEK-114519

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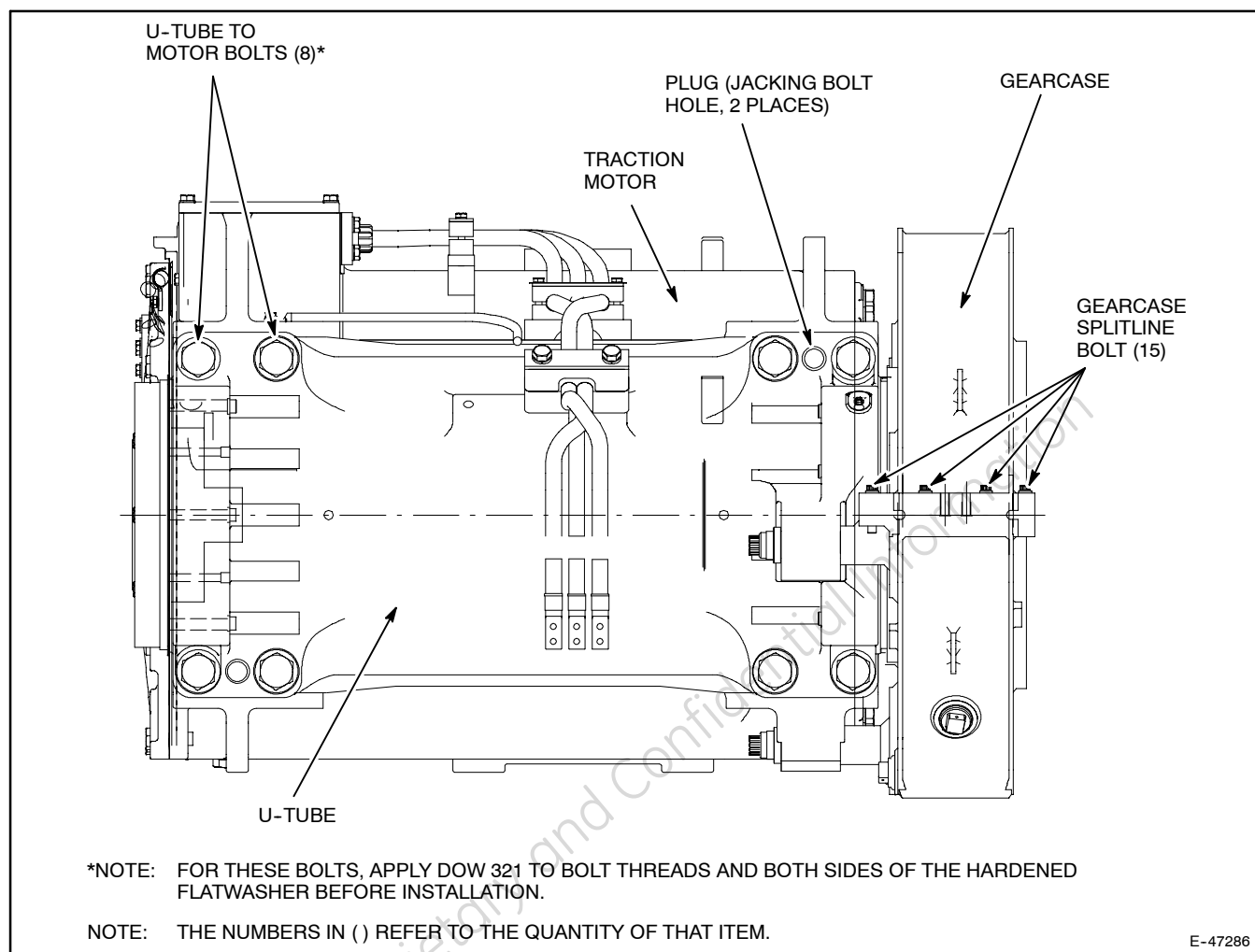


Figure 1. 5GEB30 Propulsion Combo Assembly.

1.3. SAFETY INFORMATION

Safety precautions must be observed when working on the 5GEB30 Combo Assembly. WARNINGS indicate the potential for personal injury and CAUTIONS indicate the potential for equipment damage.

2. CONTROL AND INDICATORS

Not Applicable.

3. FUNCTIONAL DESCRIPTION

The Model 5GEB30 traction motor (Figure 1) is a force-ventilated, three-phase AC induction motor designed for locomotive propulsion. Its normal function is to convert the electrical energy supplied by the traction alternator, through rectifiers and an inverter, into mechanical power for driving the locomotive wheels.

The traction motor is coupled to the locomotive axle through a single reduction gear set housed in a gearcase. The gearcase is attached to the traction motor and surrounds an integral pinion and gear to keep out dirt and moisture and to retain the necessary gear lubricant. An additional motor suspension assembly attaches the traction motor to the truck. Locomotives equipped with dynamic braking use the traction motors as generators to control the rate of travel when descending grades or slowing down the train.

4. SCHEDULED MAINTENANCE

4.1. VISUAL INSPECTION

4.1.1. Power Cables

Inspect the power cables for signs of excessive heating, poor insulation, chafing, or mechanical damage. Verify that cable connections are tight. Check for damaged cable bushings and loose or missing cable cleat hardware and replace as necessary.

4.1.2. Ground Cable

Ensure that the ground cable is bolted securely to the motor and to the truck frame.

4.1.3. Gearcase

WARNING: Before accessing a traction motor, be sure the locomotive engine is shut down and the locomotive is secured on the rail. Follow all Railroad Operating procedures.

NOTE: Before checking gearcase lubricant level, locomotive must have remained motionless for at least 30 minutes to get an accurate reading.

Inspect the gearcase for mechanical damage, loose split line bolts, loose mounting bolts, damaged or missing fill or drain plugs, and signs of oil leakage. Refer to Figures 1 through 7 for locations and parts. All loose bolts must be tightened to the specified torque values as listed in *Section 6.1., TORQUE VALUES*, of this publication.

4.1.3.1. Traction Motor Seals

Inspect the motor shaft/axle gearcase seal interface areas. Accumulation of oil – dirt mixture around these areas should not be considered unusual. If streaking or running patterns of oil are observed on the gearcase flanks, these may be an indication of excessive leakage due to defective seals that must be replaced. There should be no seepage or running leaks at the split line joint between the gearcase halves. Refer to Figures 8 through 13 for examples of leaking units.

4.1.3.2. Traction Motor Oil Level

Check the oil level in the gearcase with the dipstick. Refer to *Section 4.2., LUBRICATION*, of this publication for more information. If the oil level is not low, dipstick reading that it needs less than 5 quarts (4.7 liters) to fill (dipstick reads quarts needed to fill), the leakage is probably due to normal seepage. If the gearcase level is low or requires more than 5 quarts (4.7 liters) to fill it, the unit should be removed and serviced. Refer to **GEK-76777, 5GEB30 TRACTION MOTOR REPAIR AND OVERHAUL** for more information to change the seals.

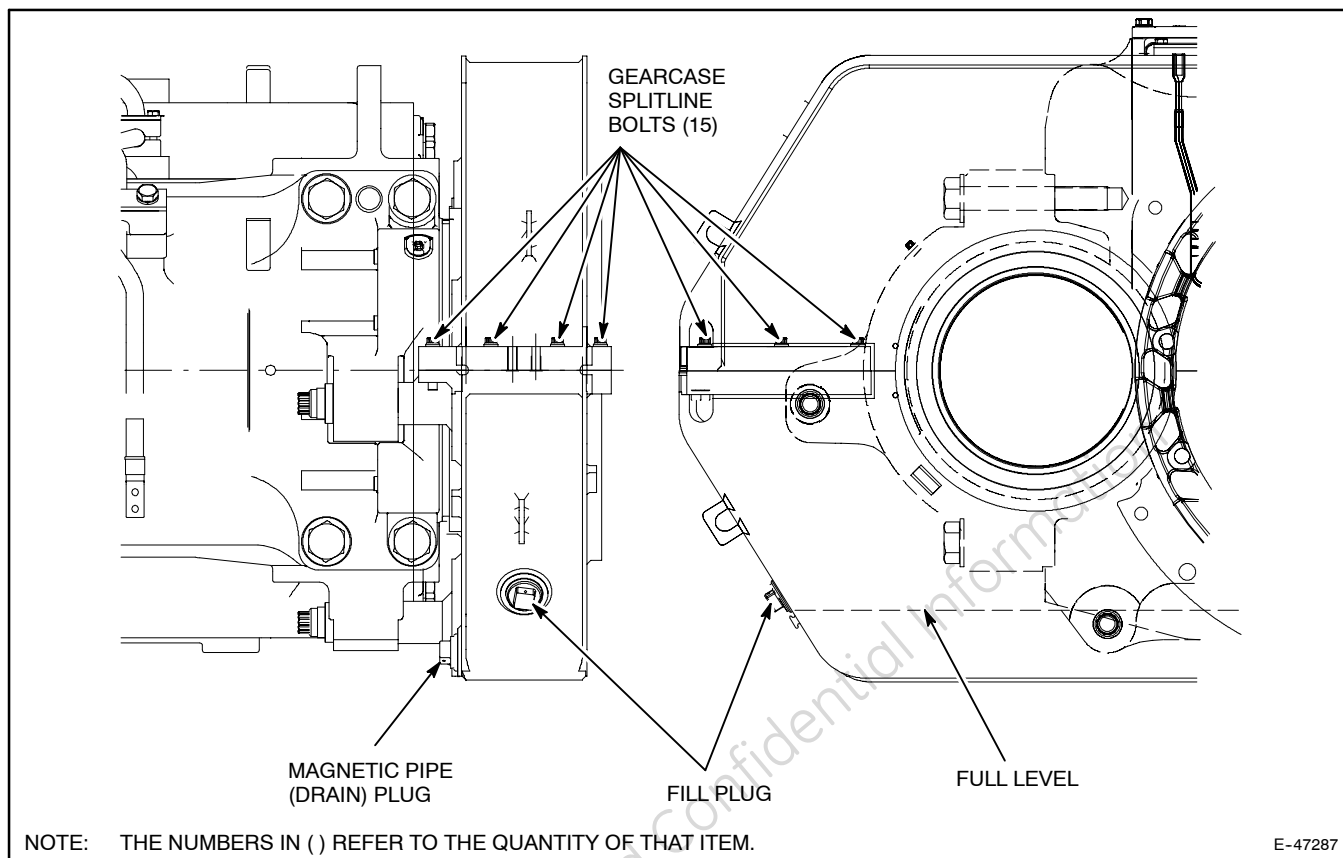


Figure 2. Typical Gearcase Lubricant Level.

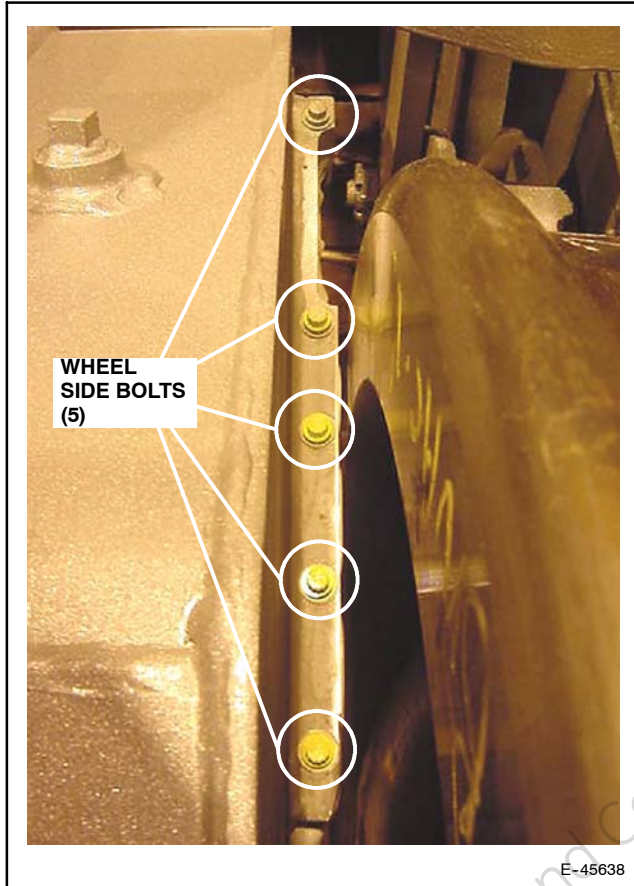


Figure 3. Typical Wheel Side Split Line Bolts.



Figure 4. Motor Side (Center) Gearcase Split Line Bolt.

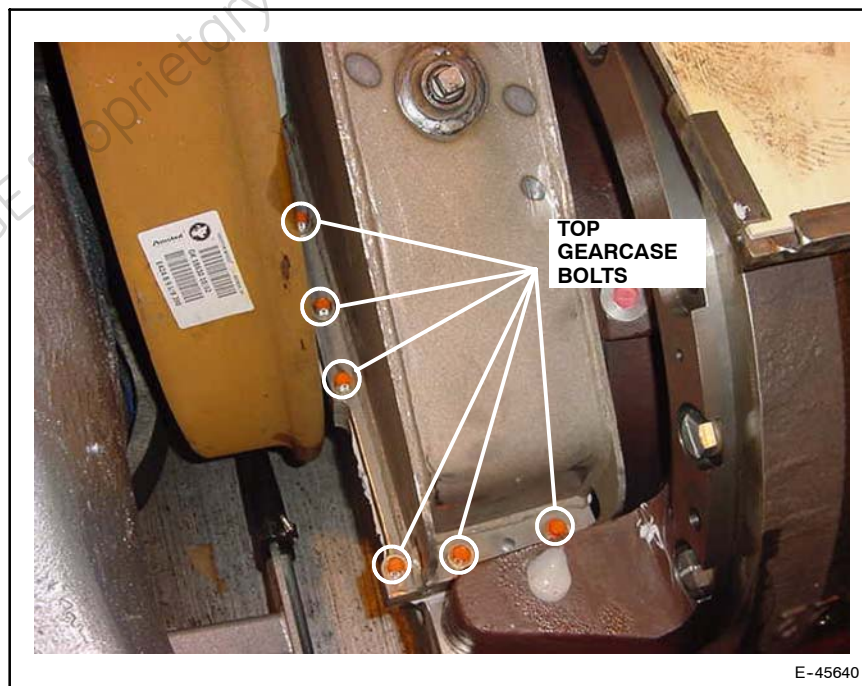


Figure 5. Typical Other Motor Side Split Line Bolts (5GEB30 only has 4).

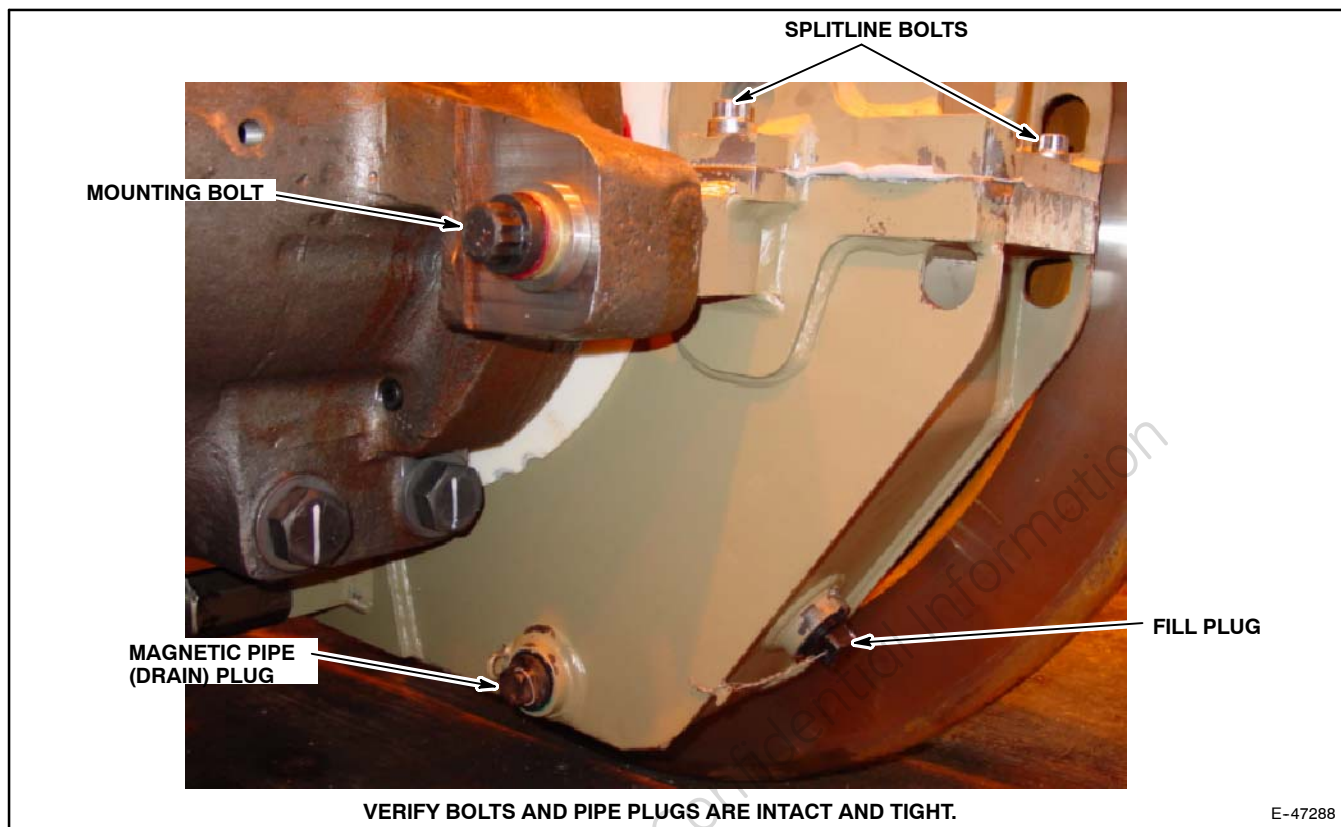


Figure 6. Typical Checking For Leaks, Side View.

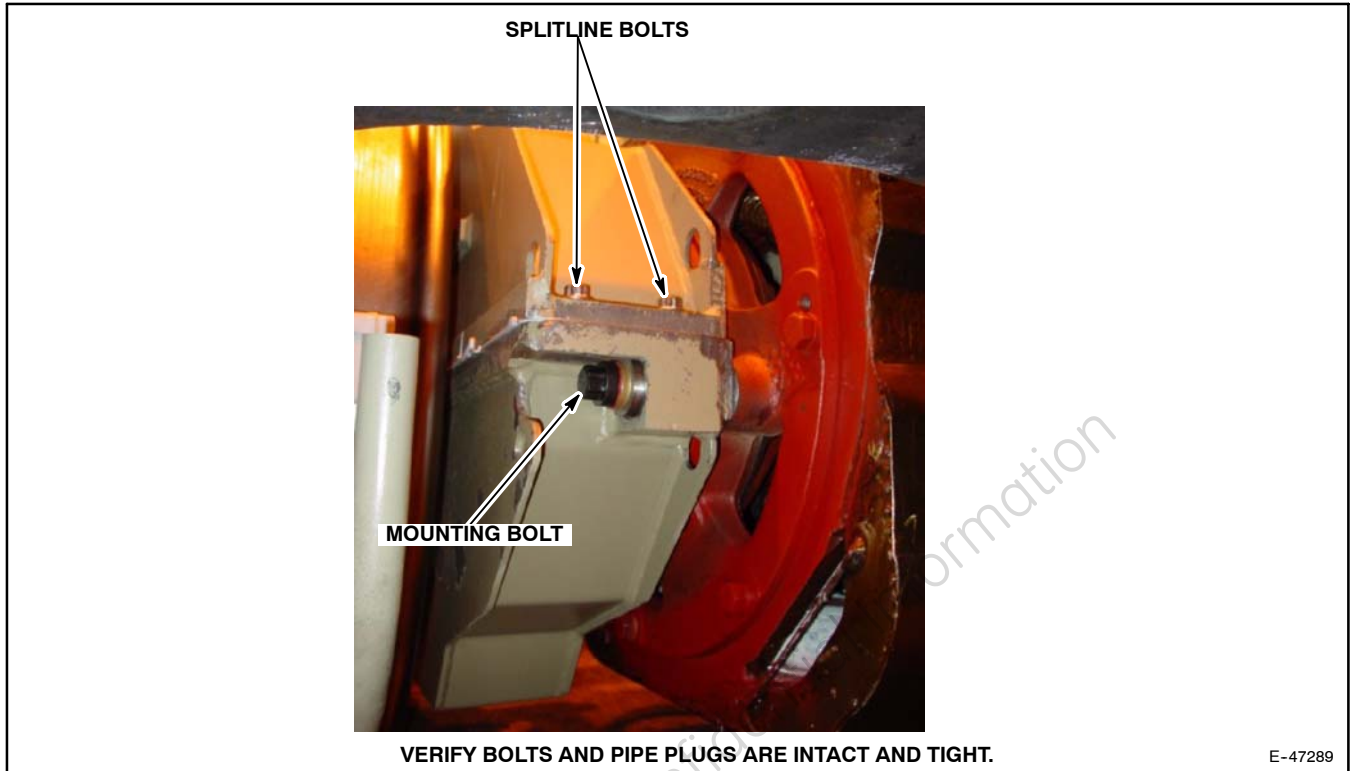


Figure 7. Typical Checking For Leaks, Front View.



Figure 8. Gearcase, Seal and Motor (Typical).



E-45644

Figure 9. Typical Leaking Unit in Need of Service.



E-45645

Figure 10. Typical Leaking Unit in Need of Service.



E-45678

Figure 11. Typical Split Line Leak Due To Broken Bolt Or Missing Sealant.



E-45769

Figure 12. Typical Leaking Axle Bore Seals Or Split Line Leak.



Figure 13. Typical Leaking Axle Bore Seal.

4.2. LUBRICATION

4.2.1. Rotor Connection-End Bearing

The traction motor rotor anti-friction connection-end ball bearing is packed with grease at motor assembly. Re-grease the ball bearing at each wheel change. Clean out the old grease in the cap, cleaning and drying the cap. Press 3 oz. (85 grams) of clean new grease into the ball/cage cavities, and put 7 oz. (200 grams) of clean new grease in the cap cavity.

4.2.2. Rotor Pinion-End Bearing and Gears

NOTE: Before checking the gearcase lubricant level, the locomotive must have remained motionless for at least 30 minutes to get an accurate reading.

The traction motor rotor pinion end roller bearing is lubricated by the gearcase lubricant. The pinion and axle gears are lubricated with special gear oil that is contained in the gearcase. Refer to *Section 4.2., LUBRICATION*, of this publication for lubricant specifications. Check the oil level in the gearcase to ensure the correct oil level.

CAUTION: Never permit the gearcase lubrication to run low, as this will result in the pinion-end bearing, gear and pinion failure. Do not use anything other than the recommended gearcase lubricant, as this will cause the pinion-end bearing to fail.

4.2.2.1. Checking Gearcase Lubricant

The gearcase has a fill opening located in the lower half of the gearcase (Figures 2 and 14). Check the lubricant level by looking in the fill opening and following these steps:

NOTE: The dipstick is marked with the number of quarts needed to fill.

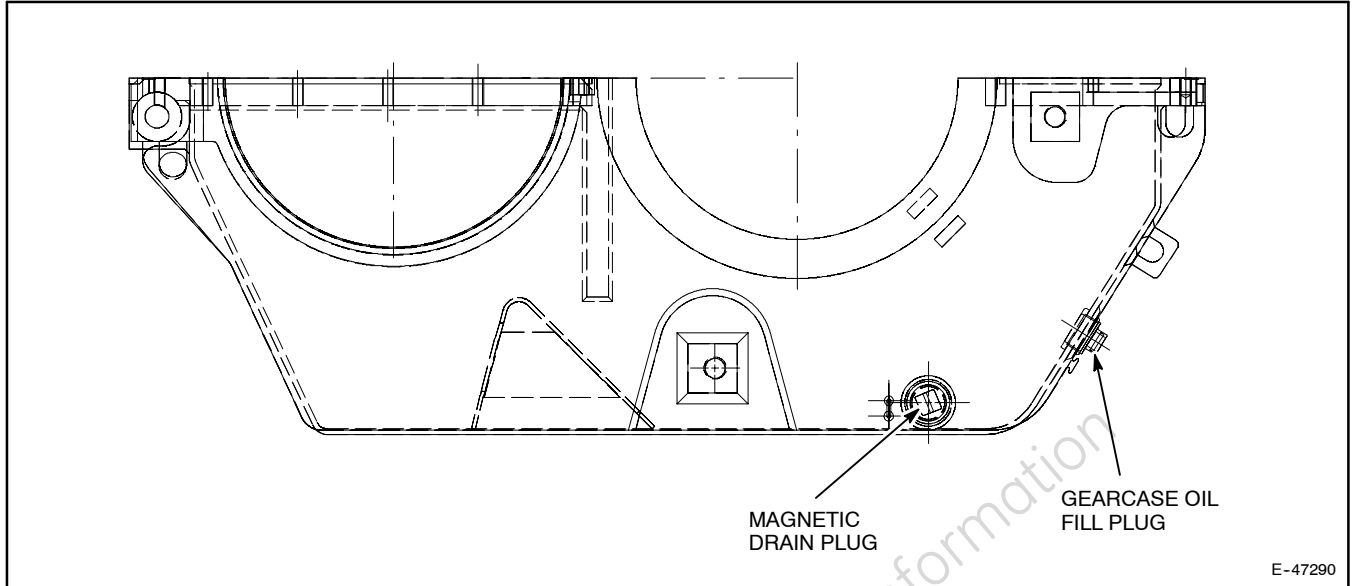


Figure 14. Gearcase With Oil Fill Plug.

1. If the lubricant is below the fill opening, use the dipstick to determine how much lubricant is needed.
2. Ensure that the dipstick is wiped with a clean cloth to remove oil, dirt, and sand before inserting into the gearcase.
3. Top off the required quantity of lubricant. Allow some time for the lubricant to redistribute and level out before re-inspecting the oil level in the gearcase.
4. Clean the plug to remove dirt and particles before fitting it onto the gearcase.
5. Use the torque value specified in *Section 6.1., TORQUE VALUES*, of this publication to tighten the plug.
6. Apply lockwire to the plug.

4.2.2.2. Changing Gearcase Lubricant

Refer to *Section 4.2., LUBRICATION*, of this publication for quantity and lubricant specification. To drain the gearcase lubricant and replace it, follow these steps:

1. Remove the drain plug located at the side of the bottom gearcase (Figure 14).
2. Allow the lubricant to drain into a suitable container.
3. After draining the lubricant, apply Hylomar Thread Sealant to the pipe plug(s).
4. Clean the drain plug. Be sure to remove all magnetic particles attached to it. Tighten the plug to the torque value indicated in *Section 6.1., TORQUE VALUES*, of this publication.
5. Apply lockwire to the plug.

4.2.3. U-Tube Bearings

The traction motor U-Tube taper roller bearings are packed with grease at axle assembly. The bearings should be re-greased per **GEK-76780, SCHEDULED MAINTENANCE**.

5. REMOVAL AND REPLACEMENT PROCEDURES

5.1. COMBO ASSEMBLY

5.1.1. Removal of Combo Assembly

Refer to **GEK-114519, TRUCK/BOGIE MAINTENANCE, PH37ACMi SERIES LOCOMOTIVE** for instructions to remove the Combo Assembly (traction motor, U-Tube, axle, wheels and gearcase) from the locomotive truck/bogie.

5.1.2. Installation of Combo Assembly

Refer to **GEK-114519, TRUCK/BOGIE MAINTENANCE, PH37ACMi SERIES LOCOMOTIVE** for instructions to install the Combo Assembly (traction motor, U-Tube, axle, wheels and gearcase) to the locomotive truck/bogie.

5.2. AC ROTOR LOCKING

CAUTION: If the gearcase is still filled with oil, the gearcase should not be tilted more than 4 in. (102 mm) end to end from the horizontal or the oil will run around the seals and drain into the Traction Motor itself.

CAUTION: Anytime that the traction motor is not on a locomotive and is moved more than half a kilometer, it must have the rotor locked to keep the bearings from being damaged by non-rotating impacts from shipping movements.

After the combo is removed from the truck, if it is not broken down immediately, the rotor on the AC motor should be locked to prevent possible shipping damage to the motor bearings. Use of a wood beam across the Pinion End of the motor will work, but the following procedure is good for either the motor alone or an entire combo assembly. It can also be used with the entire combo assembly mounted in a truck under a locomotive. Follow these steps and refer to Figure 15 to lock the rotor:

5.2.1. Installation of AC Rotor Lock

1. Remove, clean and bag the two bolts in the bottom of the frame, approximately 90° apart, near the OPE, for reuse in the motor.
2. Turn one nut, 3/4-10, onto each locking bolt, 3/4-10 x 9 in. long fully threaded, and turn it almost all the way up to the bolt head.
3. Carefully install the clean locking bolts, with nuts, into the tapped holes in the motor frame and against the speed sensor gear. Torque to 136 Nm (100 lb.-ft.).
4. Turn the nuts down against the frame and tighten. Torque the nuts to 136 Nm (100 lb.-ft.) Re-torque the bolts (do not loosen first) to 136 Nm (100 lb.-ft.).
5. Paint the locking bolt heads yellow (if not already done). Clearly tag them for removal before use.
6. Place the short bolts that were put in a bag with an instruction tag to remove before use, and attach to one of the locking bolt heads.

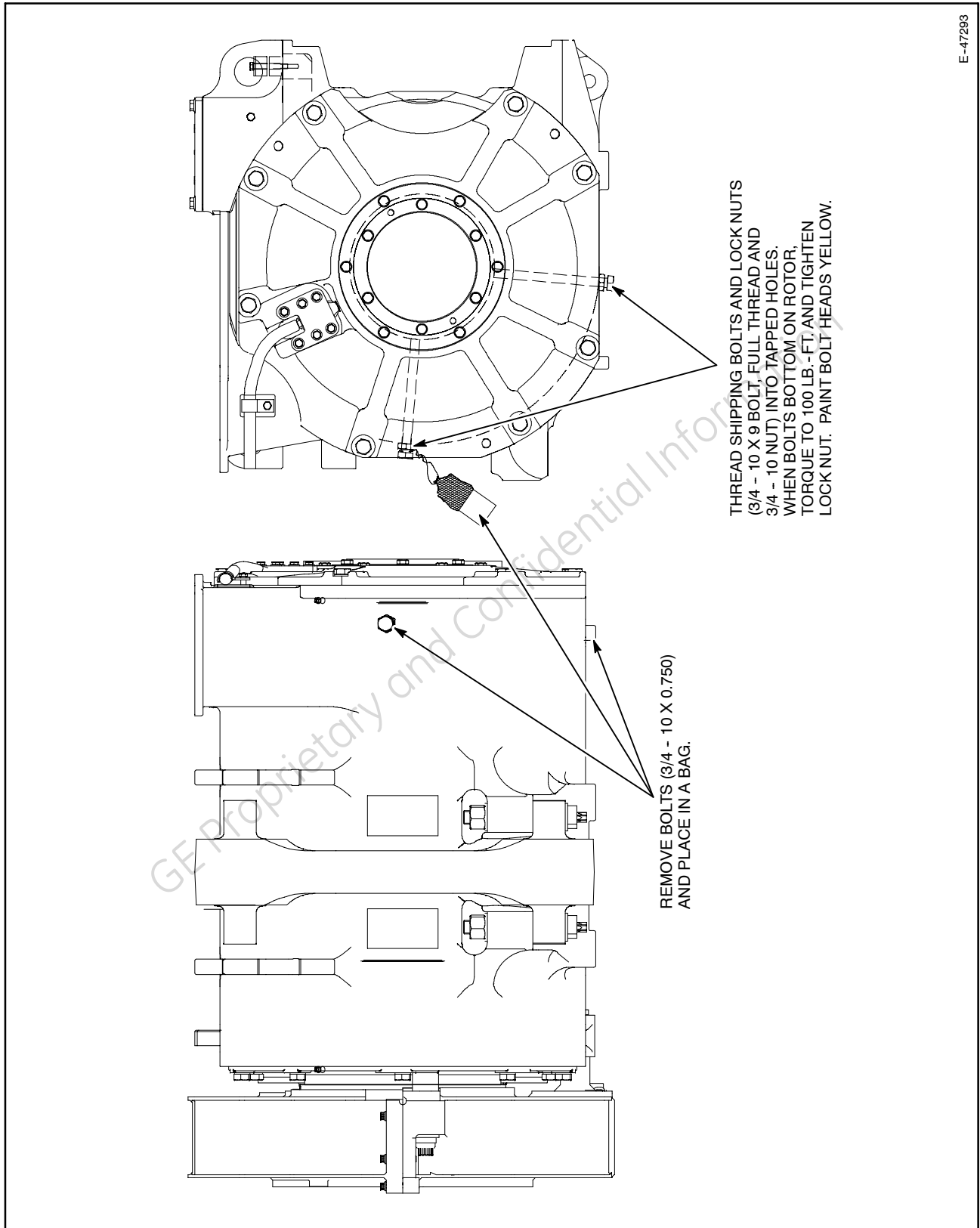


Figure 15. Rotor Locking for Shipment.

5.2.2. Removal of AC Rotor Lock

1. Carefully loosen the two nuts that are against the motor frame.
2. Loosen the two locking bolts and remove them from the motor frame.
3. Clean and save the bolts, nuts, bag and instruction tag.
4. From the bag that was attached, remove the two short bolts. Clean and insert them into the motor frame where the locking bolts had been. Torque to 271 Nm (200 lb.-ft.)
5. Place the clean locking bolts and nuts and any instructions into the bag. Save package for next shipment of the motor.

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6. SUMMARY DATA

6.1. TORQUE VALUES

Bolt/Component	Lb.-ft.	Nm
AC Rotor Locking Bolt (Long Bolt) and Lock Nuts	100	136
AC Rotor Locking Bolt (Short Bolts, No Nuts)	200	271
Gearcase Split Line Bolts	100	136
Gearcase Fill Plug	105	142
Gearcase Drain Plug	105	142

6.2. WEIGHT SUMMARY

	kg	Lb.
Propulsion Combo Assembly (with axle and without wheels)	3,697	8150
Traction Motor Only	2,268	5000

6.2.1. Lubricants

Gearcase:

Lubricant GE Spec. D50E32
Capacity 11.2 quarts (10.6 liters)

U-tube Bearings:

Lubricant (Synthetic) GE Spec. D50E28
Pinion End 43 oz. (1200 g)
Opposite Pinion End 26 oz. (740 g)
Opposite Drive End Ball Bearing Grease D6A2C17, 21.25 oz (600 g)

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