

TRACTION MOTOR GEAR CASE INSPECTION AND REPAIR

INTRODUCTION

This Maintenance Instruction provides gear case inspection and dimensional checks and a recommended repair procedure. When a gear case is removed from a traction motor/wheel axle assembly, the case should be cleaned and qualified prior to reassembly to ensure that only those gear cases which are capable of satisfactory performance will be reused. The inspection procedure is not complicated and can prevent a defective gear case from

being reassembled. The following instructions apply to all models of gear cases.

DESCRIPTION

The gear case, Fig. 1, houses the traction motor pinion and mating axle gear, protecting them from dirt or damage and also carries the gear lubricant. The case is made of two close fitting halves with offset seals to provide complete contact and closure.

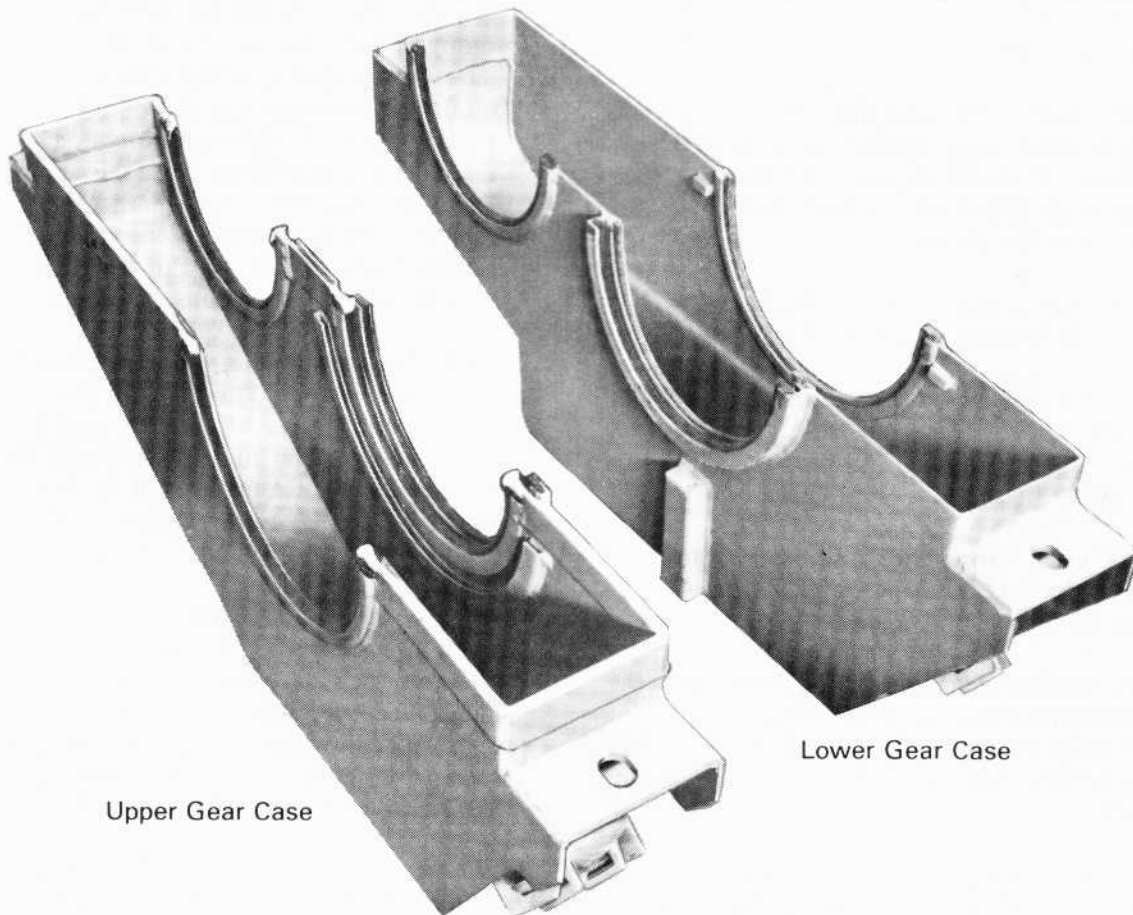


Fig.1 - Traction Motor Gear Case

Removable gutters over the upper cover axle bores divert the flow of grease away from seal surfaces.

CLEANING

1. Remove and discard old seal insert assemblies. Remove cotton cording from parting line channels of upper gear case and discard.
2. Clean out seal retainers and parting line channels of all dirt, gasket compound, or any foreign material.
3. Thoroughly clean gear case of all dirt and grease by immersing in a hot water/caustic solution. Never remove grease by burning, as heat may distort the gear case to the extent that the gear case halves will not fit properly when installed, and leakage will occur.

INSPECTION AND DIMENSIONAL CHECKS

This procedure applies to both the upper and lower halves of the gear case unless specifically identified. Refer to Figs. 2 and 3 during procedure. If repair is required, refer to Repair Procedure of this Maintenance Instruction.

1. Visually inspect the case for damage such as, cracked welds and broken or damaged seal retainers. Visually inspect the parting line channels of upper case, gutter retainers, and gutter stops for damage.
2. Magnaflux all gear cases. Inspect for fatigue cracks which often originate near welds.
3. Check the distance between the two 27 mm (1-1/16") mounting pad hole centers. The distance should be 1089 mm \pm 0.25 mm (42-7/8" \pm .010).
4. Check each mounting pad hole center in relation to the side openings of the case as shown in Figs. 2 and 3.
5. Check the distance from the parting line to the mounting pad surface. The distance shall be not less than 49.00 mm (1.929") nor more than 50.42 mm (1.985"). Maximum pad wear is 0.4 mm (1/64").
6. Check the straightness of the parting line. Parting line shall not be bowed up or down more than 0.4 mm (1/64").

7. Check the side bowing at the parting line. The parting line width shall be +0.8 mm, -0 (+1/32", -0) for a distance of 152 mm (6") from both extreme ends. A bow out of 2.4 mm (3/32") is permissible per side between these points.
8. Check filler opening covers for damage and broken springs.

PAINTING

A clean qualified gear case should be repainted.

Ensure the inside of the gear case is free of scale, shot, slag, and all foreign the material except firmly fused weld spatter.

When gear is thoroughly clean and dry, repaint with buff primer. Do not paint the upper gear case gutters or the inside surface of the gutter retainers.

REPAIR PROCEDURE

This procedure applies to both the upper and lower halves of the gear case unless specifically identified. Refer to Figs. 2 and 3 during this procedure.

1. All gear cases should have the mounting holes elongated to facilitate the mounting of the gear case on the motor/wheel axle assembly. If the mounting holes are not elongated, elongate the two 27 mm (1-1/16") mounting holes to 35 mm (1-3/8"). Elongation to be on the centerline that joins the two holes and shall extend 17 mm (11/16") on each side of the hole center line. Ensure the center line dimensions adhere strictly to the dimensions of Figs. 2 and 3.
2. When mounting pads show excessive wear and the dimension to the parting line is beyond acceptable limits of Figs. 2 and 3, the pad surface should be built up with weld. Weld pad surface using electrode A.W.S. E-6012. Machine pad to the new dimensions of Figs. 2 and 3.

NOTE

When the gear case is badly damaged or distorted, the most economical means of repair should be considered. In some instances it may be more economical to cut out the damaged section and replace it with new material, rather than try to straighten the damaged area.

3. When the seal retainers and parting line seal channels are distorted or welds are broken, straighten or replace retainers or channels with

METRIC CONVERSION CHART			
(inch)	mm	(inch)	mm
0.015	0.38	1.985	50.42
1/64	0.4	2-15/16	74.6
1/32	0.8	5-9/16	141.3
0.040	1.02	5-7/8	149.2
3/64	1.2	6-3/16	157.2
1/16	1.6	6-11/16	169.9
1/8	3.2	17.111	434.62
3/16	4.8	23-15/16	608.0
1-3/16	30.2	25-27/32	656.4
1.929	49.00	39-1/16	992.2
1.969	50.01	42-7/8	1089.0

NOTE

1. Parting line shall not be bowed up or down more than 1/64".
 2. Maintain this width, +1/32", -0, for a distance of 6" from both extreme ends. A bow out of 3/32" is permissible per side between these points.
 3. Inside of parting line seals, gutter and seal retainers must be free of weld spatter.
- Inside of gear case must be free of scale, shot, slag, and all foreign material except firmly fused weld spatter.

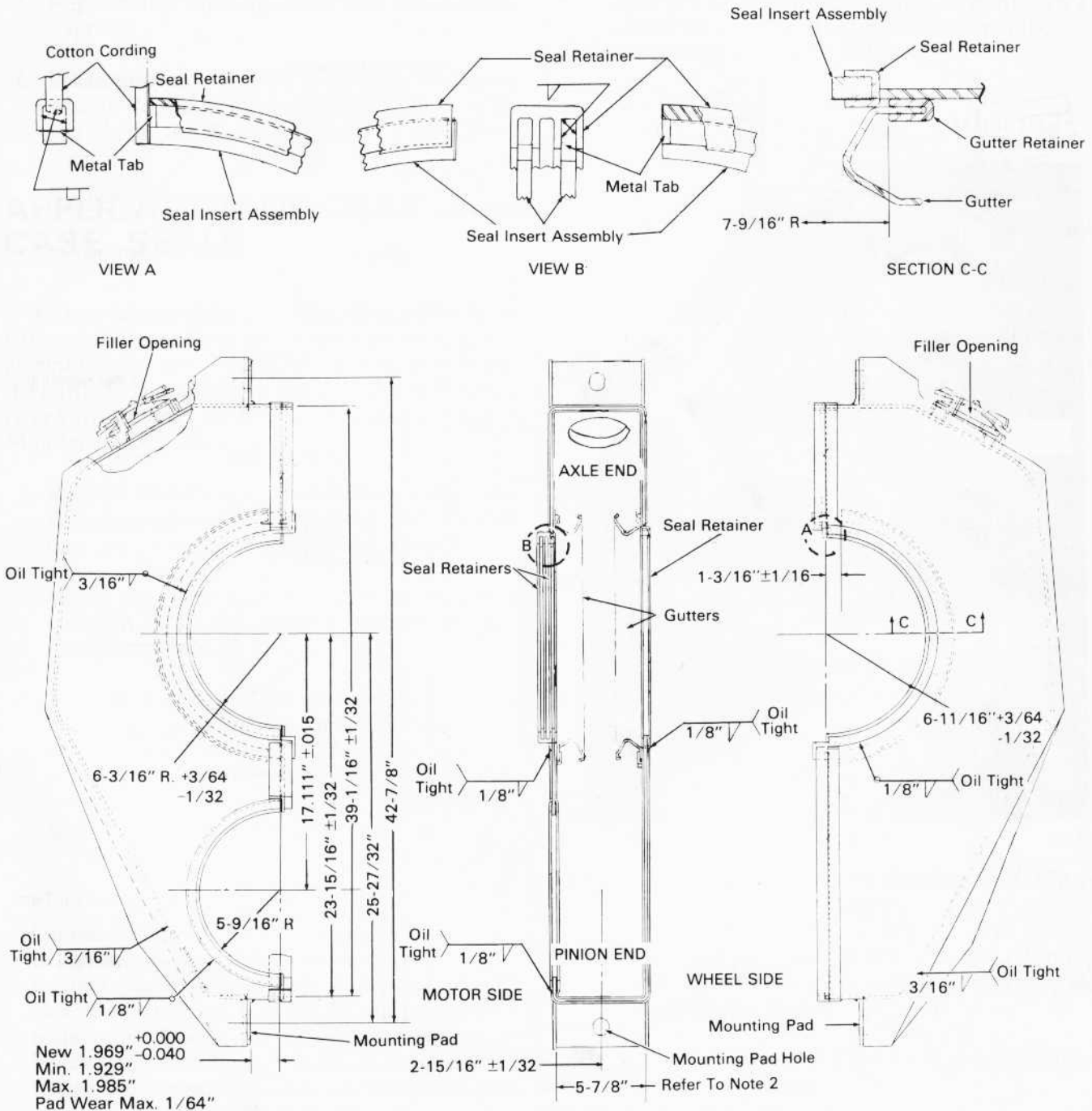


Fig.2 - Upper Gear Case

new retainers or channels and reweld as required. Ensure new and welded retainers or channels adhere strictly to the dimensions of Figs. 2 and 3. The seal retainers and parting line channels must be straightened so that they can accept the seal insert assemblies and cotton cording without binding.

4. Check welding of entire gear case. Reweld any cracked welds. Most welds must be oil tight. Refer to Figs. 2 and 3.
5. Replace filler opening covers with new covers if required.
6. When gear case is in an acceptable condition, refer to Painting and Application Of Gear Seals sections of this Maintenance Instruction.

APPLICATION OF GEAR CASE SEALS

If the gear is in an acceptable condition, perform the following procedure to install new seal insert assemblies and new string covered cotton cording in the parting line channels of the upper cover. If repair is required, refer to Repair Procedure of this Maintenance Instruction.

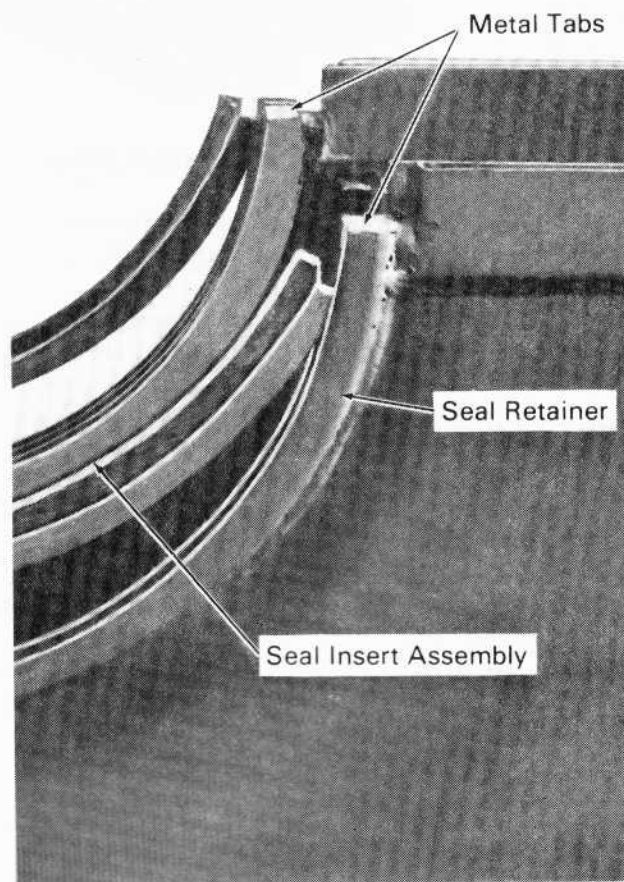
1. Remove and discard old seal insert assemblies. Remove cotton cording from parting line channels of upper gear case and discard.
2. Clean out seal retainers and parting line channels of all dirt, gasket compound, or any foreign material.
3. Straighten and size the seal retainers so that retainers can accept the seal insert assemblies without the seal inserts binding. Ensure the width of the seal retainer groove is maintained at the section mating with the inner parting line seals.

NOTE

On older model gear cases, metal tabs should be welded to one end of the axle bore seal retainers on both sides of the upper and lower case. Refer to Figs. 2 and 3 for placement of metal tabs. The metal tabs prevent the seal insert assemblies from turning. This will tend to prevent the excessive loss of lubricant that occurred when the older model seals would move in the channels due to the turning forces imposed.

Ensure there is no weld metal protruding above the end of the channel and no weld spatter in the seal retainers.

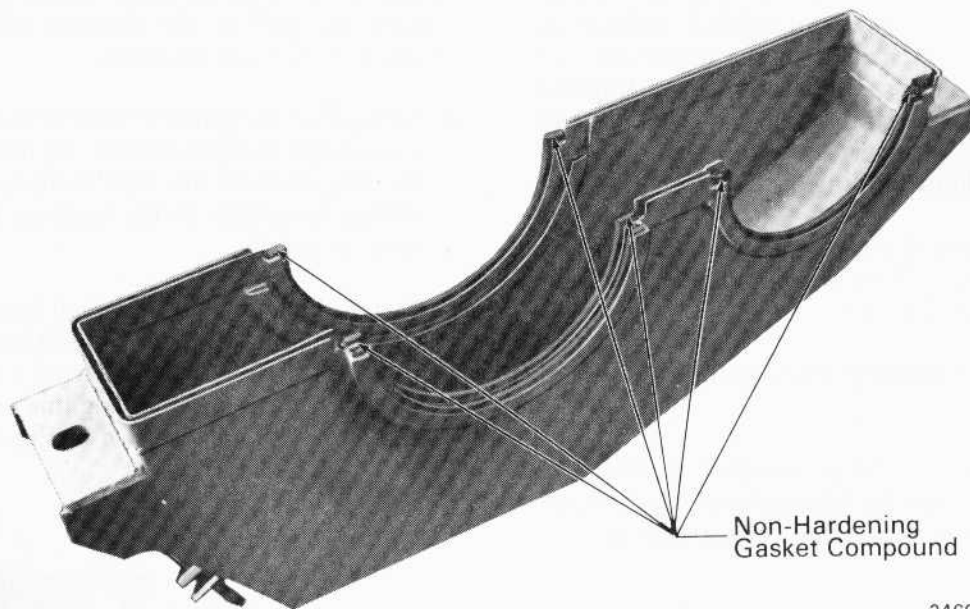
4. Straighten the gutter retainers so that retainers can accept the gutters without binding. Do not install gutters at this time. Gutters are installed during assembly to the traction motor/wheel axle assembly.
5. Notch the felt of the four seal insert assemblies that butt into the metal tabs of the axle bore seal retainers, so that the felt extends 1.6 mm (1/16") above the gear case parting line and parallel to the parting line as shown in Fig. 4.



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Fig.4 – Felt Notched For Seal Retainer Metal Tab

6. Cut the felt of the remaining seal insert assemblies so that the felt extends 1.6 mm (1/16") above the gear case parting line and parallel to the parting line.
7. Soak the seal insert assemblies in lubricating oil.
8. Install the seal insert assemblies in their respective seal retainers as shown in Fig. 5. Use



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Fig.5 – Gasket Compound Application To Upper Cover

a hammer to tap seal insert assemblies into seal retainers and also to flatten out felt at parting.

9. Apply non-hardening gasket compound to the corners of all the bore openings of the upper cover as shown in Fig. 5.
10. Insert string covered cotton cording into the parting line channels of the upper cover as shown in Fig. 6. Trim cotton cording flush with the felt of the seal insert assemblies. Ensure all the ends of the cotton cording are cemented to the gear case by the non-hardening gasket compound applied in Step 9.

TRACTION MOTOR AXLE CAP SUPPORT ARM AND BEARING HOUSING SUPPORT ARM POSITION

Prior to reassembly of the gear case to the traction motor/wheel axle assembly, the location of the 27 mm (1-1/16") gear case mounting hole should be checked on the traction motor axle cap support arm and the pinion end bearing housing support arm.

TRACTION MOTOR AXLE CAP SUPPORT ARM

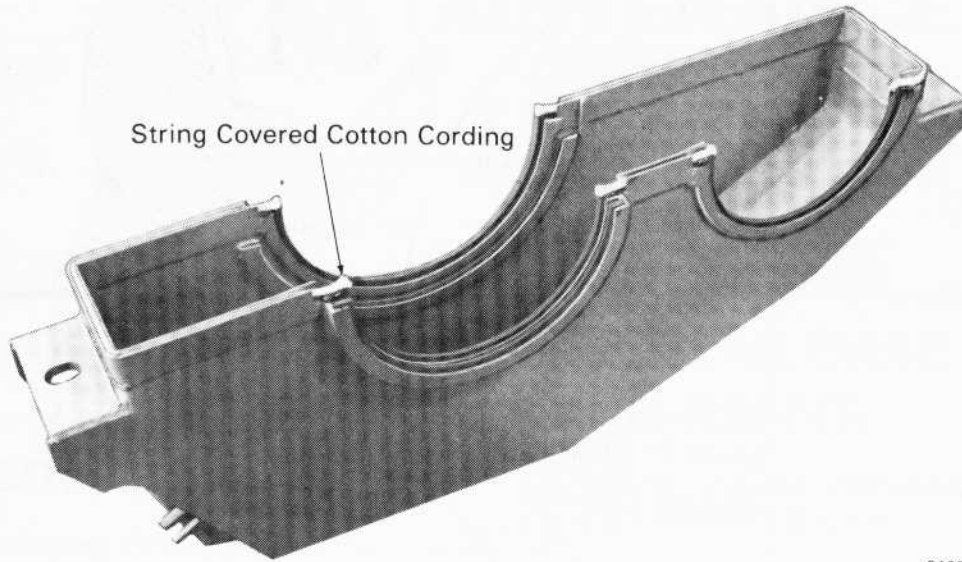
The horizontal centerline of the axle cap support arm is determined by a line from the centerpoint of the armature bore through the centerpoint of the axle bore. Refer to Fig. 7.

The vertical centerline of the support pad should be $434.98 \text{ mm} \pm 0.25$ ($17.125" \pm .010$) from the axle bore centerline. This line is used to check the position of the 27 mm (1-1/16") gear case mounting hole, Figs. 2 and 3.

The dimension $114.30 \text{ mm} \pm 0.05$ ($4.500" \pm .002$) from the pinion end armature bore face and parallel to the bore face will provide the second intersecting line necessary to check the position of the 27 mm (1-1/16") mounting hole in the axle cap support arm. Refer to Fig. 7.

BEARING HOUSING GEAR CASE SUPPORT ARM

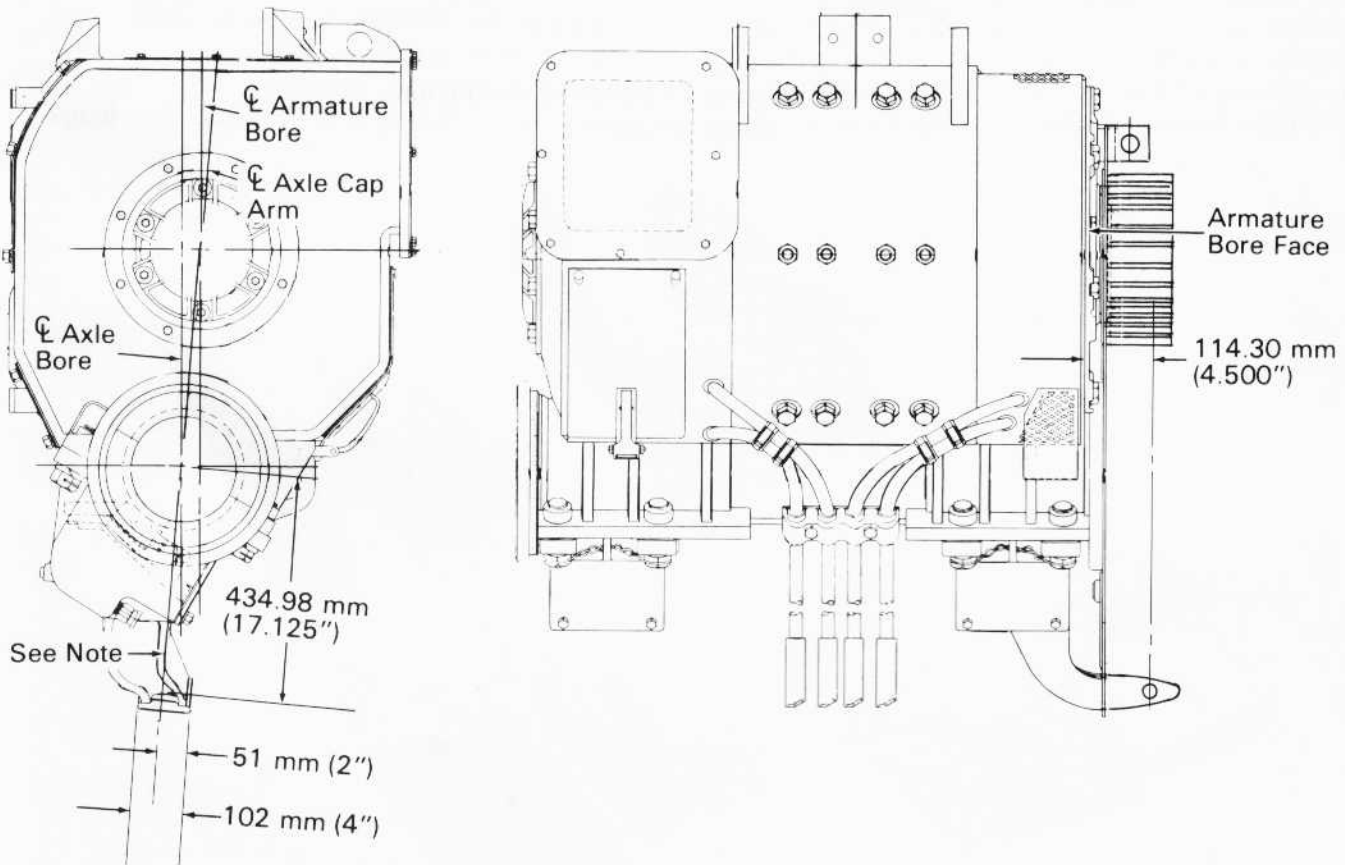
Check the location of the 27 mm (1-1/16") gear mounting hole in the gear case support arm on the pinion end bearing housing as shown in Fig. 8.



String Covered Cotton Cording

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Fig.6 - Cotton Cording Application To Upper Cover



NOTE

The centerline of axle cap arm is determined by a line from the centerpoint of the armature bore through the centerpoint of the axle bore.

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Fig.7 - Axle Support Arm Gear Case Mounting

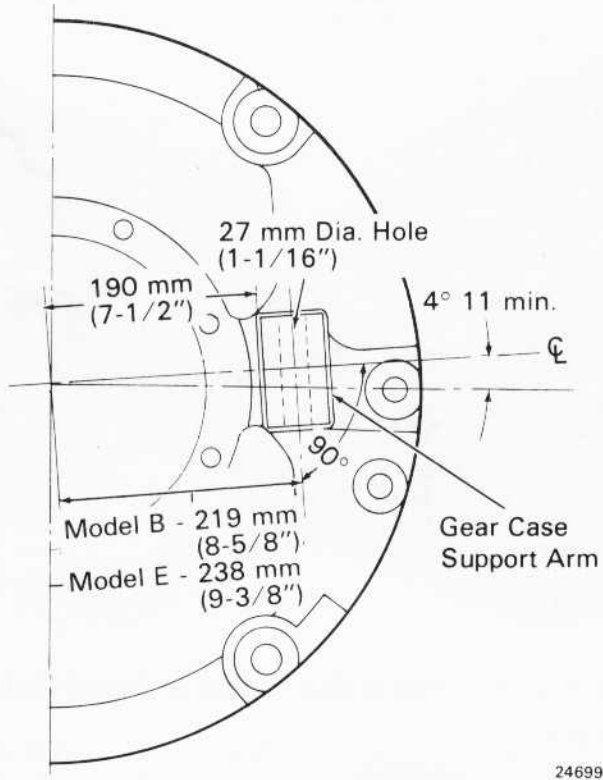


Fig.8 - Pinion End Bearing Housing Gear Case Support