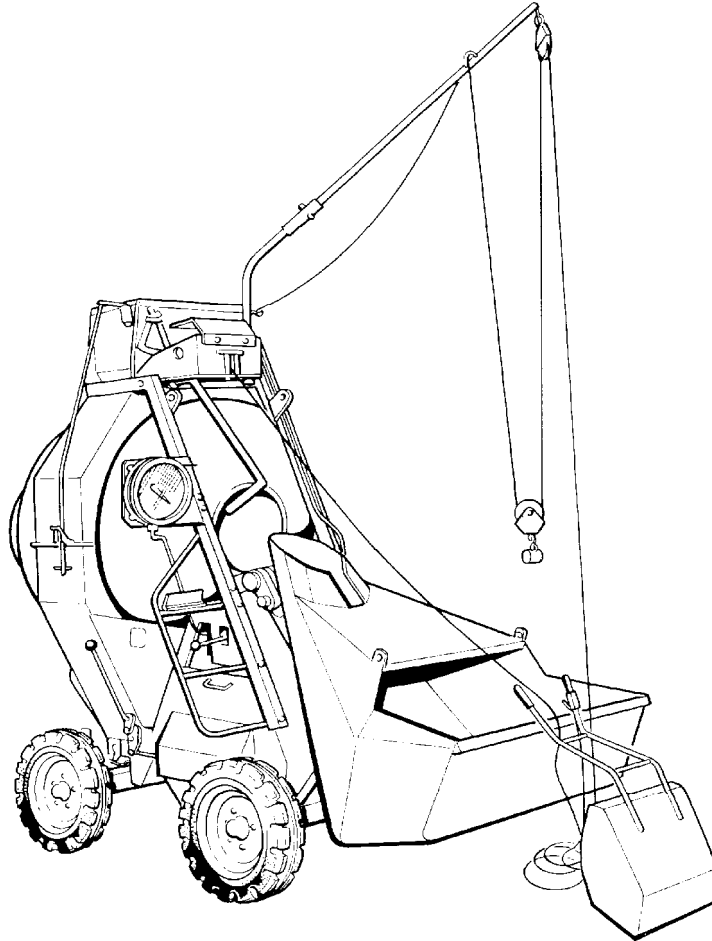


WINGET

SERVICE MANUAL



REVERSING GEARBOX

FROM 1990

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INTRODUCTION

This manual covers the Reversing Gearbox installed into 300R, 400R and 500R Reversing Drum Mixers.

The following pages should enable a competent fitter/mechanic to fault find, repair or overhaul Reversing Gearboxes.

The contents of this manual although correct at the time of publication, may be subject to alteration by the manufacturers without notice and Winget Limited can accept no responsibility for any errors or omissions contained within the following pages. Nor can we accept any liability whatsoever arising from the use of this manual howsoever caused.

Winget Limited operate a policy of continuous product development, therefore some illustrations or text within this publication may differ from your machine.

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Asbestos Warning

The clutch linings within the gearbox may contain asbestos and suitable precautions should be taken to avoid inhaling the dust which should not be blown out with an airline. Dispose of old linings, dust, wipers etc safely.

Removal of Gearbox

Place the gearbox into neutral and removing the circlip, drift out the pivot pin and pull the operating fork and linkage clear of the gearbox plunger guide.

Disconnect the hydraulic hoses to the pump, plug the ports and hoses unbolt and remove the hydraulic pump taking care not to lose the shim pack.

Remove the ring of setscrews securing the propshaft to the gearbox output flange and lower the propshaft clear of the gearbox.

Unbolt the gearbox mounting bolts, disconnect the drive coupling between the engine/electric motor and using suitable lifting equipment lift the gearbox clear of the mainframe and support on a suitable worksurface.

Clean down the outer casing and place a suitable container below the drain plug. Remove the drain plug and allow the oil to drain. Refit the drain plug. Dispose of the oil safely and in accordance with local regulations covering the disposal of waste oil.

Disassembly of Gearbox

Remove the two 3/8 UNC self locking nuts and retaining washers, remove both the input and output flanges, it may be necessary to tap the flanges off the shafts using a soft faced mallet or suitable two or four leg puller taking care not to damage the flanges.

Remove the twelve 3/8 UNC headed screws securing the input pinion cartridge, output oil seal housing and plunger guide, note the four capscrews securing the pinion cartridge are shorter than those securing the oil seal housing and plunger guide.

Remove the cartridge, oil seal housing and plunger guide taking care not to lose or mix the shim packs. Remove both parallel keys from the pinion and output shaft and the loose pin located in the operating plunger.

Support the pinion cartridge in a soft faced vice and using a soft faced mallet tap the pinion out of the housing and remove the bearings, spacer and oil seal.

Remove the 3/8 UNC cap headed screws securing the two halves of the gearbox casing together and carefully prise the halves apart and lift the top half clear, note the two halves are dowelled together and care should be taken not to damage the mating surfaces when prising the casing apart.

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Locate the operating pin in the centre of the cone clutches, remove the split pins and carefully drift out the pin, pull the operating plunger and shaft assembly out of the main shaft.

Remove the rubber "O" ring off the operating plunger and remove the internal circlip securing the operating shaft and bearing into the plunger. Secure the end of the operating shaft into a soft jawed vice, using a soft faced mallet tap the operating plunger off the shaft and bearing.

The bearing is a loose fit on the operating shaft and is retained by a countersunk plate and countersunk capheaded screw. Remove the screw, plate and bearing.

Using suitable lifting equipment lift the mainshaft, bevel gears and cone clutches out of the case. Remove the bearings, shims, bevel gears and cone clutches off the shaft, layout, clean and inspect all components for wear or damage.

Inspect the friction linings for wear (4.8mm when new), note production linings are bonded to the clutch faces, replacements are either pre drilled for fixing by rivets, or plain, undrilled, requiring bonding using loctite 9497 or similar. Pre drilled linings can also be bonded as an alternative to rivetting. Do not attempt to drill plain linings.

Clutch Lining Replacement

Clean all traces of the old clutch linings off the clutch cones (taking suitable precautions to avoid breathing in the dust which may contain asbestos fibres).

Should the replacement linings be pre drilled use the following procedure if using rivets to secure and the clutch cones are not themselves pre-drilled:- Slip the new friction linings onto the cones gently tapping fully home. Using the linings as a template drill the cones and insert the rivets. Using a suitable drift support the head of each rivet in turn and using a small ball pein hammer gently peen over the shank of the rivet on the inner face of the cone assembly. Repeat the operation until all the rivets are secure. If using loctite follow the manufacturers instructions for correct application.

Re-assembly of Gearbox

Locate the bearing (3) onto the operating shaft (4) coat the threads of the countersunk screw (6) with loctite and retain the bearing using the screw and retaining plate (7). Note the bearing should be free to move on the shaft once the screw and plate are in place.

Using a soft faced mallet tap the shaft and bearing assembly into the plunger (8) and retain with the circlip (5). Fit the rubber "O" ring (9) onto the plunger.

Locate the four circlips (11) into the bevel gears (10, 20) and insert the four outer cones of the taper roller bearings (13, 14, 16, 17) into the bevel gears as illustrated.

Slip the 0.5mm thick shim (19) over the main shaft (2) followed by the inner race of the taper roller bearing (17). Insert the mainshaft (2) into the bevel gear (20) and tap home the inner race of the taper roller bearings (15, 16) as illustrated.

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Slide the cone clutch assembly (21) over the main shaft (2) aligning the drilled hole through the cone clutches with the slot machined in the mainshaft.

Loosely fit the outer cone of the bearing (15), lubricate the operating shaft (4) and insert into the centre of the mainshaft (2) align the hole in the operating shaft with the slot and holes in the mainshaft and cone clutch and fit the operating pin (22) retaining with the split pins (23).

Slip both the 1.00mm thick shim (18) and the 0.5mm thick shim (24) over the opposite end of the main shaft followed by the inner race of the taper roller bearing (14) locate the second bevel gear (10) over the mainshaft and fit the taper roller bearings (12, 13) as illustrated.

Carefully lift the assembly and locate into the lower half of the gearbox casing.

If removed refit the two dowel pins (27, 28) and coat the mating surfaces of the two halves of the gearbox case with a silicone sealer and secure the two halves together. Note do not tighten capscrews (25, 26, 29, 30, 31, 32) until assembly of the box is completed.

Lubricate and insert the pin (33) into the plunger (8). Select a 0.35mm thick shim pack (x) and fit over the plunger guide (34) coating the mating surfaces with a suitable silicone sealer. Install the plunger guide ensuring the machined slots in both the guide (34) and plunger (8) are aligned. Fit and tighten the four 3/8 x 1" UNC cap headed screws (35).

Select a 0.50mm thick shim pack (Y) and fit over the oil seal housing (36), install the housing and tighten two of the four 3/8 x 1" UNC capheaded screws (37).

Fit the feather key (39) and slide on the flange (41), rotate the shaft a few complete revolutions in either direction to seat the bearings then check the bearing pre-load.

The pre-load is best checked by winding a length of string tightly round the flange (41), attaching a spring balance and measuring the load required to turn the flange.

The preload is correct when a reading of around 1Kg is obtained.

If the preload is too low, remove the flange (41) and housing (36). Tap the shaft end with a soft faced mallet to release the loadings on the shaft and add additional 0.05, 0.125 or 0.25mm thick shims. Refit the housing and flange rotate the shaft then re-check the preload.

If the preload is too high, carry out the above procedure but reduce the shim pack thickness and re-check the preload.

If necessary repeat the operations above until the preload obtained is correct.

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When the preload reading is correct remove the flange (41) key (39) and housing (36). Using a suitable tool fit the oil seal (38) and lubricate the seal lips with a little grease. Coat the mating surfaces of the shim pack (Y) housing (36) and gearbox casing with a suitable silicone sealer and refit the housing securing with the four 3/8 x 1" UNC cap headed screws (37). Fit the feather key (39) and carefully refit the flange (41) taking care not to damage the oil seal. Secure the flange using the washer (40) and 5/8" UNC self locking nut (1).

Using a suitable bearing tube and soft faced hammer fit the bearing (43) onto the pinion (42). Slide on the spacer (44) and assemble the pinion, bearing and spacer into the cartridge (51). Stand the assembly on the head of the pinion and fit the bearing (45) and oil seal (46) lubricate the oil seal lips with a little grease. Insert the feather key (47).

Select a shim pack 0.50mm thick (52) and fit over the pinion cartridge (51) and insert the cartridge into the gearbox casing securing with the four 3/8" x 3/4" UNC cap headed screws (53). Fit the flange/pulley (50) onto the pinion and retain with the washer (49) and 5/8" UNC self locking nut (48). Turn the flange a few complete revolutions in each direction then check the pinion/bevel gear backlash.

To check the backlash reach through the hole in the gearbox casing and hold one of the two bevel gears (10, 20) preventing it from moving, with the other hand turn the flange (50) and check the backlash.

The backlash is best measured by placing a dial indicator against one of the holes in the flange/pulley (50).

The backlash is correct when the reading obtained on the dial indicator is 0.130/0.180mm.

If there is either no backlash or insufficient backlash, remove the pinion cartridge and increase the thickness of the shim pack then re-check the backlash with the dial indicator preventing the same bevel gear from moving.

If there is too much backlash, remove the pinion cartridge and decrease the thickness of the shim pack then recheck the backlash with the dial indicator preventing the same bevel gear from moving.

If necessary repeat the operations until the reading obtained by the dial indicator is correct. Note it is important that the backlash is checked on the same bevel gear each time the test is repeated.

Once the correct backlash reading is obtained slacken and remove the 5/8" UNC nut (48) and washer (49) remove the flange/pulley and pinion cartridge from the gearbox and coat the mating surfaces of the shim pack, gearbox case and pinion cartridge with a suitable silicone sealer and reassemble into the gearbox.

Check the backlash between the pinion and the second bevel gear (10, 20) it should be the same as the backlash on the first bevel gear on which the readings were taken.

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If not the shimpack thickness at points "X" and "Y" should be adjusted by moving the excess shims from either "X" to "Y" or "Y" to "X".

EXAMPLE

Backlash measured on bevel gear "A" item 20 is:-

0.13mm

Backlash measured on bevel gear "B" item 10 is:-

0.18mm

Difference between the two = 0.05mm

Divide by two, 0.025mm, remove 0.025mm from shim pack "Y" and add to "X".

Backlash now equal at both "A" and "B" = 0.175mm.

Tighten the 3/8 UNC capscrews (25, 26, 29, 30, 31, 32) refit the oil drain plug and top up the gearbox oil using a good quality 20W/30 Engine Oil.

Note: Do not use Gear Oils, use of Gear Oils can prevent the cone clutches from operating correctly causing clutch slippage and premature failure of the linings.

Refit the level plug.

Refitting Gearbox

Using suitable lifting equipment sling the gearbox assembly and position within the mainframe.

If a dragline is fitted slip the dynamo drive belt over the gearbox drive pulley.

Shim up the gearbox ensuring the centre line of the engine and gearbox are aligned to avoid straining the drive couplings. Connect up the drive coupling between the engine and gearbox, tighten the gearbox down and refit the propshaft.

Reconnect the operating lever/fork fitting the pivot pin, retaining with the circlips.

Refit the hydraulic pump assembly, checking the backlash as described overleaf, reconnect the hoses etc.

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Checking Hydraulic Pump Gear Backlash

The pump should be shimmed to give 5-8 thou (0.02-0.20mm) gear backlash.

Place the hydraulic pump onto the gearbox without any shims and measure the gap between the pump body and gearbox casting. Add 5-8 thou (0.02-0.20mm) to the measurement obtained and select a shim pack of the correct thickness.

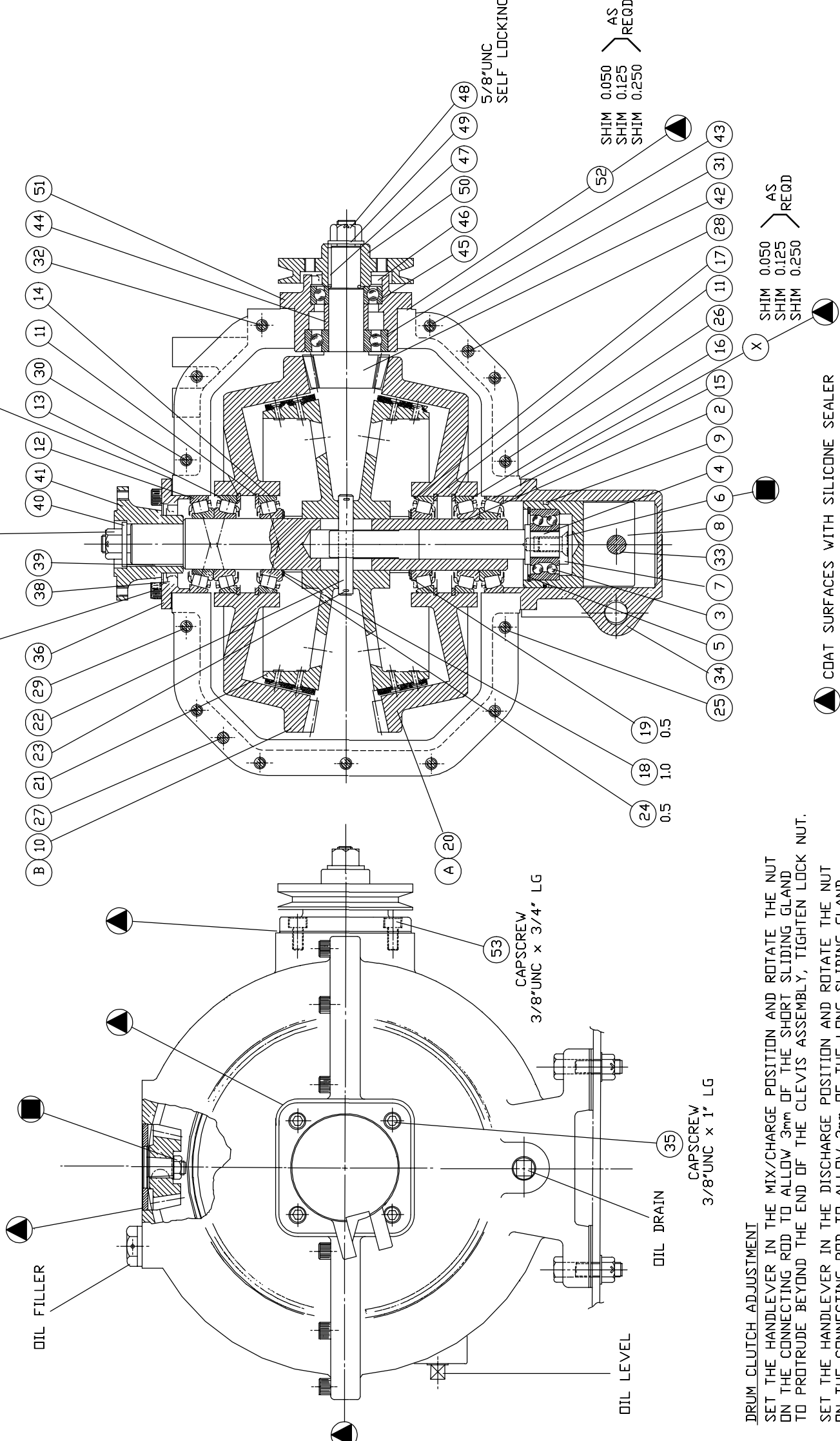
Drum Clutch Adjustment

Set the handlever in the Mix/Charge position and rotate the nut on the connecting rod to allow 3mm of the short sliding gland to protrude beyond the end of the clevis assembly, tighten up the locking nut.

Set the handlever in the Discharge position and rotate the nut on the connecting rod to allow 3mm of the long sliding gland to protrude beyond the end of the clevis assembly, tighten up the locking nut.

Reversing Gearbox.dwg 04/03/02 15:42:10 Scaled to fit
CHECKING HYDRAULIC PUMP GEAR BACKLASH

THE PUMP SHOULD BE SHIMMED TO GIVE 5-8 THOU(0.02-0.20mm) GEAR BACKLASH. PLACE THE HYDRAULIC PUMP INTO THE GEARBOX WITHOUT ANY SHIMS AND MEASURE THE GAP BETWEEN THE PUMP BODY AND GEARBOX CASTING. ADD 5-8 THOU TO THE MEASUREMENT OBTAINED AND SELECT A SHIM PACK OF THE CORRECT THICKNESS.



DRUM CLUTCH ADJUSTMENT
 SET THE HANDLEVER IN THE MIX/CHARGE POSITION AND ROTATE THE NUT ON THE CONNECTING ROD TO ALLOW 3mm OF THE SHORT SLIDING GLAND TO PROTRUDE BEYOND THE END OF THE CLEVIS ASSEMBLY, TIGHTEN LOCK NUT.
 SET THE HANDLEVER IN THE DISCHARGE POSITION AND ROTATE THE NUT ON THE CONNECTING ROD TO ALLOW 3mm OF THE LONG SLIDING GLAND TO PROTRUDE BEYOND THE END OF THE CLEVIS ASSEMBLY, TIGHTEN LOCK NUT.