Massey Ferguson®

2635
Tractor

SERVICE MANUAL
4283424M3

CONTENTS

SECTION 10

REAR AXLE AND OIL IMMERSED BRAKES

REAR AXLE AND BRAKES

SPECIFICATION:

Crown wheel pinion ratio	...	3.4545:1
Type	...	Direct drive with 11 X 38 crown wheel pinion
Pinion preload	...	18 - 22 lbs.inch
Brake operation	...	Rods and levers.
Parking brake	...	Cable operated on both brakes indepedent of foot brake.

Special Tools:

SER / 054	...	Tractor splitting stand.
SER / 164	...	Drift
SER / 029	...	Adaptor.
SER / 028	...	Universal puller.
SER / 163	...	Bearing drive.
SER / 023	...	Differential bearing preload gauge.
SER / 024	...	Straight edge in conjuction with SER / 023.
SER / 162	...	Bearing driver.
SER / 017	...	Holder.
SER / 018	...	Bench Adaptor.
SER / 038	...	Hand press.
SER / 059	...	Adaptor.
SER / 056	...	Adaptor.
SER / 061	...	Pre - Load gauge.
SER / 022	...	Needle roller bearing puller.
SER / 063	...	Needle roller bearing driver.
SER / 058	...	Universal Handle.
SER / 060	...	Pinion lock nut 'C' Spanner.
SER / 064	...	Preload checking gauge aid.
SER / 117	...	Extractor.
SER / 030	...	Bearing remover main tool.
SER / 225	...	Axle housing cup remover.
SER / 118	...	Preload checking tool.
SER / G / 204	...	To press cup on differential carrier left - hand.
SER / G / 207	...	To press cone on differential lock.
SER / G / 228	...	Plate differential carrier cone removal.
SER / G / 227	...	Differential case left - hand cup removal.
SER / G / 223	...	To press bush into the carrier

SER / G / 224	...	Carrier bush pusher
SER / G / 194	...	Adaptor.
SER / G / 195	...	Adaptor
SER / G / 196	...	Bearing cup and seal remover.
SER / G / 198	...	Bearing cup assembler.
SER / G / 197	...	Seal replacer.
SER / G / 199	...	Bearing cone remover.
SER / G / 200	...	Bearing cone remover.
SER / G / 201	...	Bearing replacer.

Bolt torques:

Rear Wheels nuts	...	200 lbf.ft (270 Nm)
Epicyclic unit housing bolts	...	55 lbf.ft (75 Nm)
Stabliser mounting bolts	...	170 lbf.ft (230 Nm).
Differential case mounting bolts	...	80 lbf.ft (108 Nm)
Centre mounting bolts	...	18 lbf.ft (25 Nm)
Sleeve mounting bolts	...	118 lbf.ft (160 Nm)

10.1 GENERAL

The drive from the Transmission mainshaft is transmitted through the rear drive shaft and shear tube to a spiral bevel driving pinion and crown wheel, then through the axle shafts to the rear wheel axles.

The driving pinion is supported in the centre housing by a straight roller pilot bearing and a pre-loaded housing assembly carrying two taper roller bearings.

The Crownwheel is attached to the split differential case, which is supported on each side by a tapper roller bearing. The differential pinions run on a cross joint and thrust is taken by thrust washers behind the pinions.

The axle shaft inner ends are splined into differential gears, and the outer ends are mounted in rear wheel disc.

This tractor is fitted with multi-disc oil cooled brakes between the axle housings and the differential carrier plates adjacent to the centre housing.

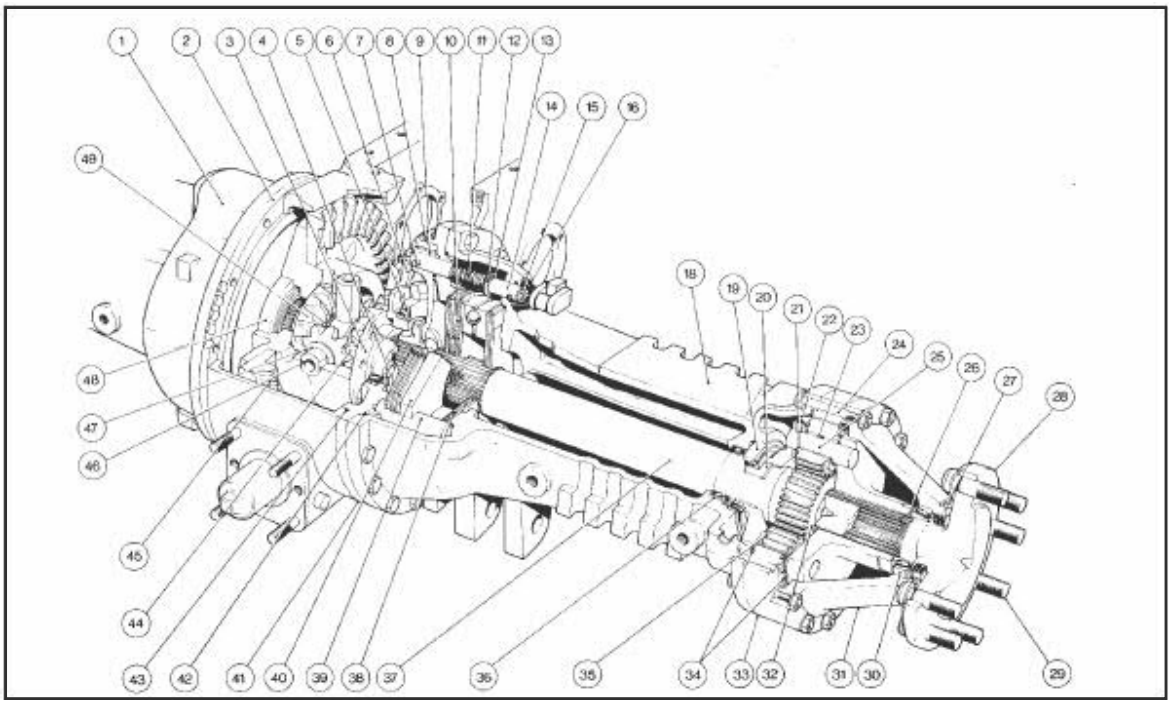
The brakes are operated by two independently operated pedals located on the right of the transmission housing.

The right pedal operates the right hand brake and the left pedal operates the left hand brake, to assist turning.

For off-field use, the brakes are used together by operating an interlocking latch which joins the two brake pedals.

When only single brakes are applied on the tractor the parking brake also actuates these disc brakes.

Pressure on the brake pedal brings an actuating assembly in contact with two rotating middle (friction) discs splined to each axle shaft, these in turn contact fixed friction faces provided in the axle housing and in the differential carrier plate fitted between the centre and axle housings. The mechanism of each brake consists of two cast iron actuating disc, held together by tension springs and separated by steel balls located in inclined seats. Pressure on the brake pedal, pulling on the operating rod, rotates one actuating disc relative to the other, and the steel balls ride up their inclined seats and so spread the actuating disc apart. These come into contact with the rotating (friction disc), which are splined to the shaft being braked. The actuating assembly will move slightly in the direction of rotation until the torque ear of the one actuating disc comes into contact with a shaft in the housing. The other actuating disc tends to rotate further, increasing the angular displacement between the discs, and assisting the braking action. When the operating pull is released, the tension springs cause the discs to return to their normal position.



Key to Figure – 1

1	Axle Housing- Left-hand	18	Axle Housing – Right-hand	34	Gasket
2	Carrier Plate - Left-hand	19	Epicyclic Hub-Inner bearing	35	Planet Gear
3	Differential lock Coupler cap	20	Epicyclic hub – bush	36	Inner Oil seal
4	Differential lock Coupler	21	Thrust Washer	37	Axle shaft
5	RH Differential bearing	22	Roll pin	38	Brake friction plate
6	Pinion Assembly	23	Needle rollers	39	Brake stop rod
7	Roll pin	24	Epicyclic unit securing bolts	40	Actuator unit
8	Ground Speed gear	25	Planet gear-shaft	41	Carrier plate-Right-hand
9	Differential lock coupler fork	26	Half ring	42	'O' ring- Outer
10	Brake interplate	27	Outer oil seal	43	'O' ring- Inner
11	Differential lock return spring	28	Stub axle	44	Differential gear-RH
12	Washer	29	Wheel stud	45	Crown wheel
13	Circlip	30	Outer Bearing	46	Cross shaft
14	Differential lock actuating shaft	31	Cover Rear Drive	47	Thrust washer
15	Differential lock adjusting nut	32	Sun gear	48	Differential Bearing
16	Dust cover	33	Ring Gear	49	Differential Gear-Left-hand

10. 2 REAR WHEEL STUD

Removal and Replacement

Removal

1. Jack up the tractor.
2. Remove the rear wheel
3. Drive out the damaged stud.

   Examine the stud hole, the other studs and the wheel disc for signs of fretting or damage.

Refitment:

4. Locate a new stud in the wheel axle.
5. Tap the stud gently to locate the splines.
6. Fit a new wheel nut, with the flat side against the axle to the stud and pull the stud through the axle to its correct position.
7. Remove the nut.
8. Refit the rear wheel and nuts and tighten the nuts progressively and evenly to a torque of 200 lbf.ft (270 Nm).

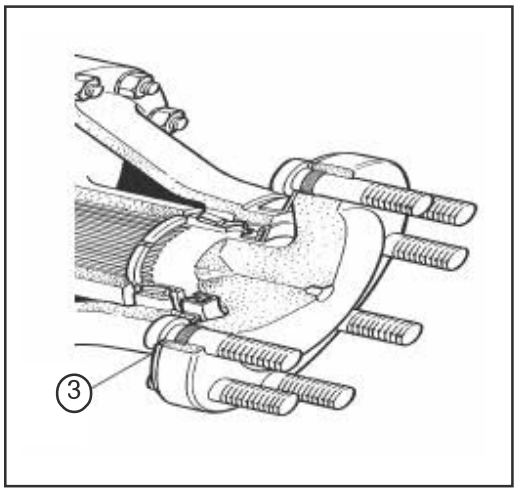


Fig 2

10. 3 EPICYCLIC UNIT OUTER HOUSING AND RING GEAR

Removal and Refitment

Removal

1. Apply the parking brake.
2. Jack up the tractor.
3. Remove the rear wheel.
4. Scribe a mark across the outer housing, ring gear, and axle housing to facilitate refitment. Also scribe a mark across the outer housing and ring gear only, this will ensure that the ring gear is replaced with the teeth in full engagement.
5. Remove the nuts and bolts.
6. Remove the outer housing and ring gear assembly.
7. Remove the ring gear.

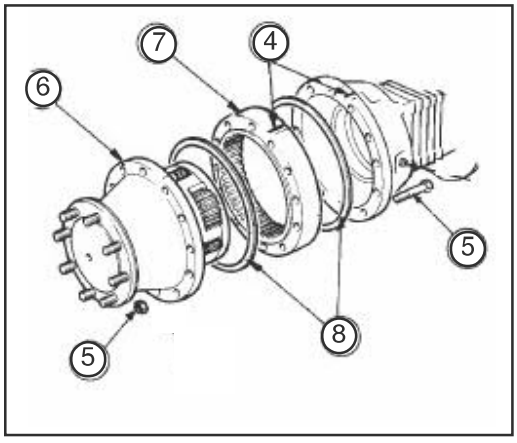


Fig 3

Note: *Do not withdraw the axle shaft.*

8. Remove and discard the two cork gaskets. Clean the recesses in which the ring gear spigots are located and check that there is no burr or deformity which could cause leakage.

Refitment

10. Reverse procedure 1 to 8 except:
    a. Fit new cork gaskets.
    b. Ensure that the scribe marks are correctly aligned ensuring that the teeth of the ring gear are in full engagement, otherwise severe damage can occur.
    c. Tighten the nuts and bolts to a torque of 55 lbf ft (75 Nm).
    d. Refill to the correct level with an approved oil.

10 .4 EPICYCLIC PLANET AND SUN GEAR

Servicing

Special Tools : 3/8 inch UNF bolt

Disassembly

1. Remove the outer housing assembly. (See operation 10 .3) To service the sun gear it is only necessary to remove one planet gear.

   Note : *The sun gear will come out through only one of the planet gear operation. It is wider than the other two.*

2. Drive out and discard the roll pin.
3. Fit the 3/8 inch bolt to the planet gear shaft.
4. Withdraw the shaft trying not to dislodge the needle rollers.
5. Remove the 3/8 inch bolt.
6. Remove the thrust washers and the planet gear. Repeat operations 2 to 6 only if the epicyclic hub is to be completely overhauled.
7. Withdraw the sun gear. Inspect all parts and replace any which show signs of undue wear or damage.

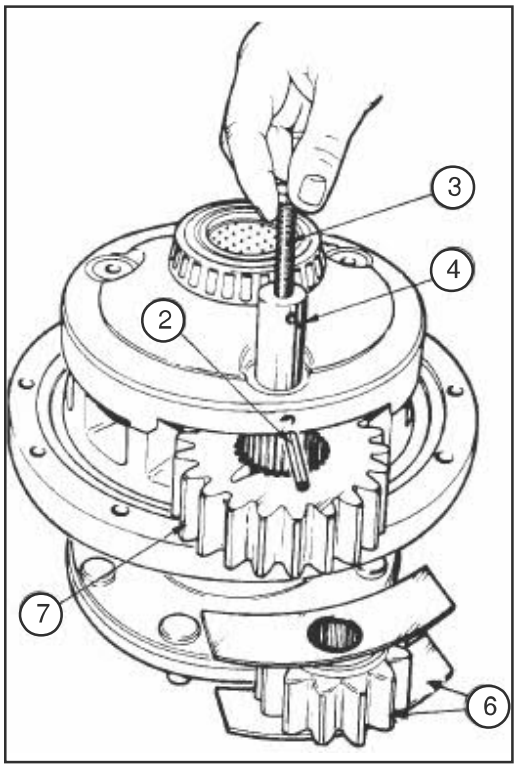


Fig 4

Reassembly

8. Reverse procedure 1 to 7 except:

   a) If the needle rollers are dislodged, refit them using petroleum jelly, not grease. There are 58 needle rollers per planetary gear (two rows of 29, plus a spacer washer).

b) Ensure that the holes in the casting and shaft are aligned.

c) Fit a new roll pin.

d) The wider opening for the removal of the sun gear has special wide thrust washer. Ensure that they are fitted to the correct planetary gear.

Note : *Planetary gears must be fitted with the larger shoulder facing the centre at the axle.*

10 .5 EPICYCLIC UNIT

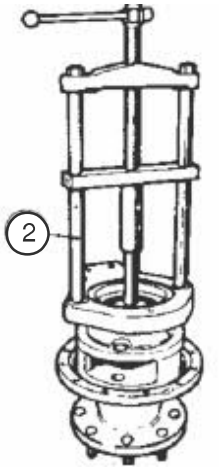
Servicing

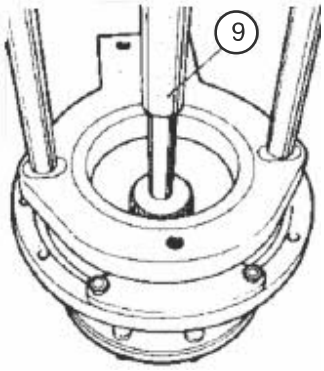
Special tools :

a. SER/028 - Differential bearing remover.
b. SER/029 - Base
c. SER/038 - Hand press
d. SER/G/223 - To press bush into carrier
e. SER/G/224 - Carrier bush pusher
f. SER/G/194 - Adaptor
g. SER/G/195 - Adaptor
h. SER/G/196 - Bearing cup and seal remover.
i. SER/117 - Extractor
j. SER/G/198 - Bearing cup assembler
k. SER/030 - Bearing remover (Main tool)
l. SER/225 - Axle Housing cup remover.
m. SER/058 - Drive Handle
n. SER/G/197 - Seal replacer
o. SER/G/199 - Bearing cone replacer
p. SER/G/200 - Bearing cone replacer
q. SER/G/201 - Bearing replacer

Disassembly

1. Remove the planetary gear and sun gear. (See operation 10 .4)
2. Remove the bearing cone using SER/029 and SER/G/194.
3. Normal Duty Axles: Tap the bearing bush into the hub using SER/G/223
4. Normal Duty Axles: Remove the bush and SER/G/224 from the hub.
5. Place the dismounted wheel on the workshop floor.
6. Fit the outer housing and hub assembly and secure with two wheel nuts.
7. Fit SER/117 and remove the hub from the housing.
8. Remove the two half rings.
9. Using SER/038 and SER/G/195 press out the wheel axle.
10. Lift out the bearing cone.





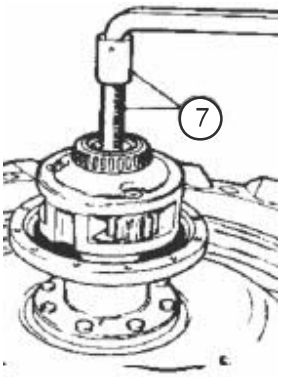


Fig 5

11. Tap out the outer seal. Using special tool SER/G/196.

Fig 6

12. Tap out the bearing cup. Using special tool SER/G/196.

Fig 7

13. Fully apply the parking brake and check that the transmission oil is no higher than the FULL mark on the dipstick. Remove the axle shaft.
14. Using SER/G/225, remove the inner bearing cup and shims.
15. Inspect all parts and replace any which show signs of undue wear or damage. Replace all seals and gaskets.

Reassembly

16. Using SER/G/198 Refit the bearing cup, making sure it is fully seated.

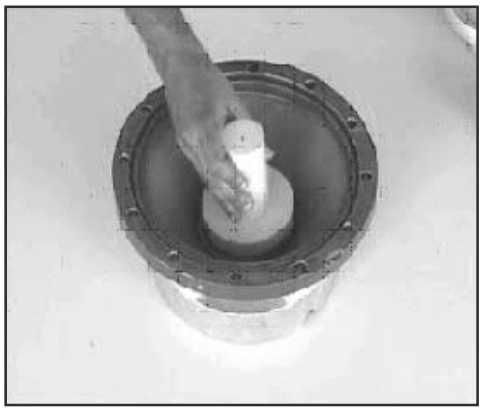


Fig 8

17. Smear a new outer seal lightly with recommended "Loctite 243", then drive it into the housing using SER/G/197 metal face outwards, and 0.080 inch (2 mm) above the housing (dimension A). Smear the lip, and fill the seal cavity with petroleum jelly.

Note :

Allow the Cone assembly undisturbed for 72 hours for the seal to get firmly located in its position.

18. Carefully, insert the wheel axle through the outer seal.

19. Using SER/G/199 drive the bearing cone fully onto the wheel axle, seating the rollers in the cup.

Fig 9

Fig 10

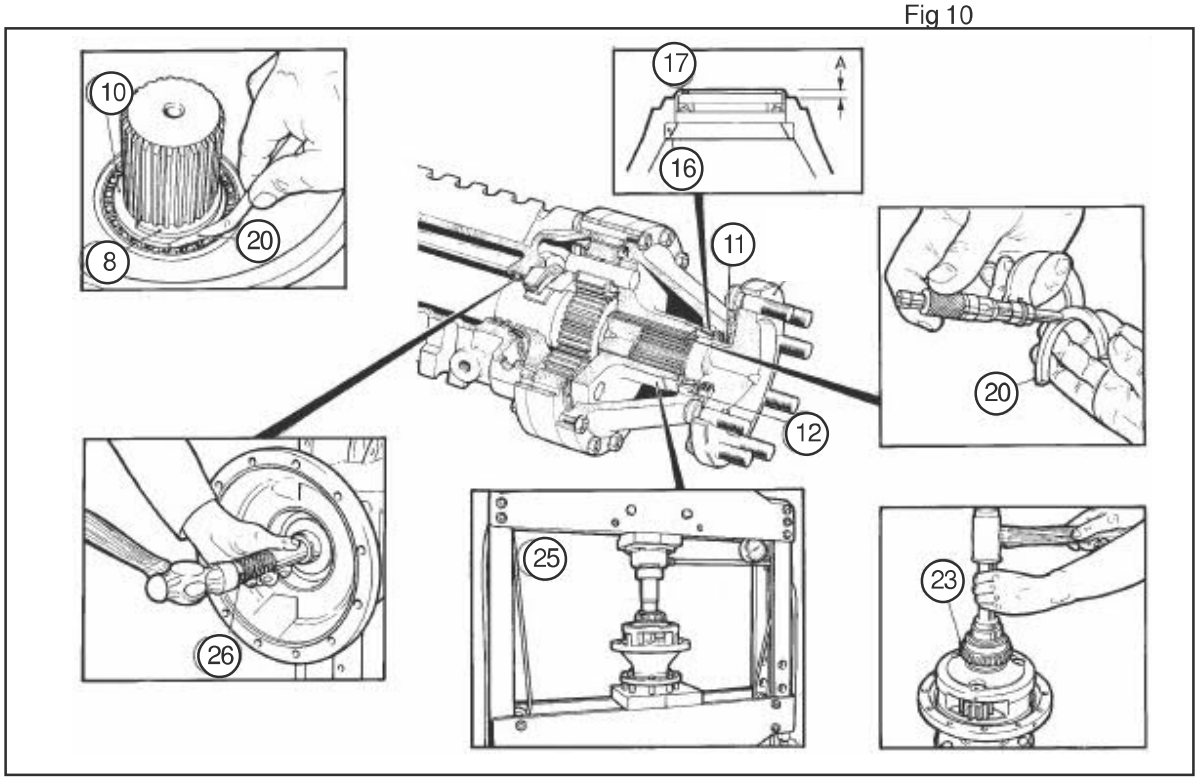


Fig 11

NORMAL AXLES

Using the number 0 half ring and feeler gauges measure the gap between the bearing cone and the half ring. If there is no clearance, the No. 0 half ring can be used. If the clearance is measurable, select a pair of half rings to give a clearance of 0.00 to 0.001 inch (0.00 to 0.025 mm) by using the following procedure and the table below.

Half ring	Feeler gap	Half ring thickness		Part No.	Identification No.
mm	inch	mm	inch		
5.92	0.233	5.84	0.230	882601M1	0
5.94	0.234	5.89	0.232		
5.95	0.2341	5.90	0.2321	882602M1	1
5.99	0.236	5.94	0.234		
6.00	0.2361	5.95	0.2341	882603M1	2
6.04	0.238	5.99	0.236		
6.05	0.2381	6.00	0.2361	882604M1	3
6.09	0.240	6.04	0.238		

a. Using a micrometer, measure the thickness of the No. 0 half ring.

b. Add the No. 0 half ring thickness to the feeler gauge measurement to give the thickness of the half rings required.

21. Fit the two half rings, ensuring that they seat fully in the groove.

Fig 12

22. Using the SER/058 Drive handle, SER/G/200, drive the bearing cone onto the spigot on the epicylic hub.
23. Reassemble the planetary gears and the sun gear in the epicyclic hub.
24. Using the handle, SER/G/200 and a hydraulic press, drive the epicylic hub onto the wheel axle.
25. Check the epicyclic preload.
26. Refit the inner bearing cup and shim in the axle housing, using special tool SER/G/201.
28. Refit the ring gear and outer housing assembly. (operation 10 .3)

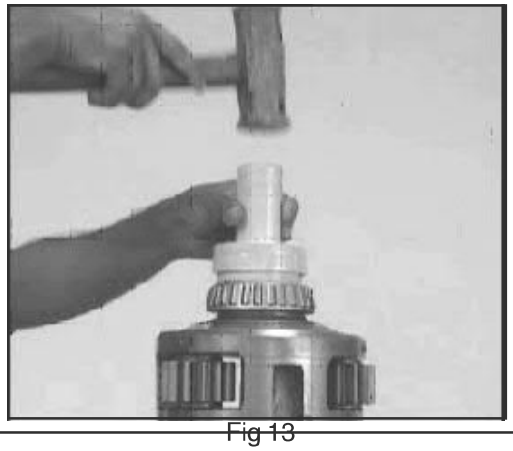


Fig 13

10 .6 EPICYCLIC PRE-LOAD

Special Tools :

SER/118	– Preload Checking tool
SER/028	– Puller
SER/029	– Base
SER/G/194	– Adapter

Procedure

1. Remove the outer housing and ring gear.
2. Remove the two cork gaskets and thoroughly clean the mating faces of the ring gear and outer housing.
3. Bolt the ring gear to the outer housing using four bolts from the epicyclic unit with four wheel nuts as spacers. These bolts should be equally spaced around the ring gear.

   Note: *Ensure that the ring gear is correctly fitted i.e., with the teeth in full engagement.*
4. Ensure that the oil level is not higher than the FULL mark on the dipstick, fully apply the handbrake and remove the half-shaft.
5. **Normal / Axle**
   Using SER/028, SER/029 & SER/G/194 remove the inner bearing cup from the trumpet housing.
6. Remove the old shims.
7. Place the bearing cup on the spigot in the centre of SER/118. Do not fit the shims.
8. Place the epicyclic unit on SER/118 and measure the gap at points 'A' using two feeler gauges.
9. Note the clearance, which must be equal at both sides, then select shim or shims as per sizes from the table provided.

11.7 REAR AXLE EPICYCLIC PRE-LOAD TABLE

Gap Measured by Feeler Gauges (Both Sides)				Shim thickness required	
mm		inches		mm	inches
0.02	0.11	0.001	0.004	1.14	0.045
0.12	0.24	0.005	0.009	1.02	0.040
0.25	0.36	0.010	0.014	0.89	0.035
0.37	0.49	0.015	0.019	0.76	0.030
0.50	0.62	0.020	0.024	0.64	0.025
0.63	0.74	0.025	0.029	0.51	0.020
0.75	0.87	0.030	0.034	0.38	0.015
0.88	1.00	0.035	0.039	0.25	0.010
1.01	1.13	0.040	0.044	0.13	0.005
1.14	1.25	0.045	0.049	0.000	0.000

The shims are available as follows :

Shim Thickness		Part No.
mm	inches	
0.13	0.005	894757M1
0.25	0.010	894758M1
0.38	0.015	894759M1

10. Fit the shims to the axle housing.
11. Refit the inner bearing cup, ensuring that it is fully seated.
12. Refit the axle shaft.
13. Remove the four bolts and spacers securing the ring gear to the outer housing.
14. Using new cork gasket, refit the ring gear and outer housing. (operation 10 .3)

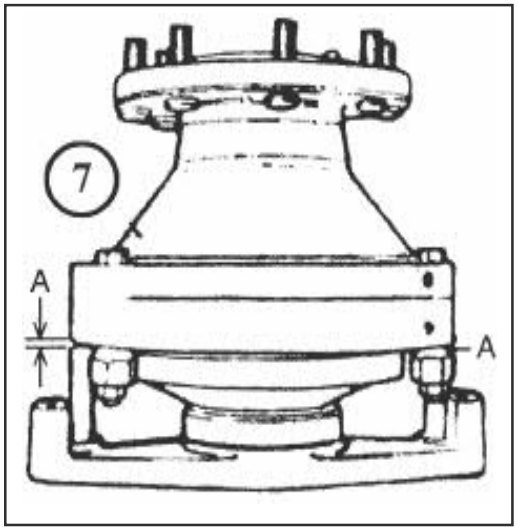


Fig 14

10 .7 AXLE HOUSING LEFT HAND

Removal and Refitment

Special tools : SER / 054 Tractor splitting stand.

Removal

1. Drain the transmission oil.
2. Release the lift rod at the knuckle.
3. Release the check chain at the check chain anchor bracket.
4. Release the stabilizer bracket underneath the axle housing.
5. Release the forward end of the lower link from the axle housing bracket.
6. Remove the lift arm and lower link assembly complete.
7. Release the brake pull rods and the return spring.
8. Jack up the tractor under the axle housing being serviced.
9. Remove the left hand rear wheel.
10. Place the SER / 054 tractor splitting stand under the centre housing and lower the tractor until the jack is just taking the axle housing weight.
11. Remove all the nuts and bolts securing the axle housing to the centre housing.
12. Lower the axle housing slightly and withdraw it far enough to clear the half shaft from the differential splines.
13. Withdraw the axle housing completely.
14. Remove the 'O' ring from the flange on the carrier plate.

Refitment

15. Reverse procedures 1 to 14 except:
    a. Fit a new 'O' ring, using petroleum jelly.
    b. When manoeuvering the axle housing assembly back into position, take care to align the axle shaft splines in the differential unit and the studs through their holes in the centre housing.

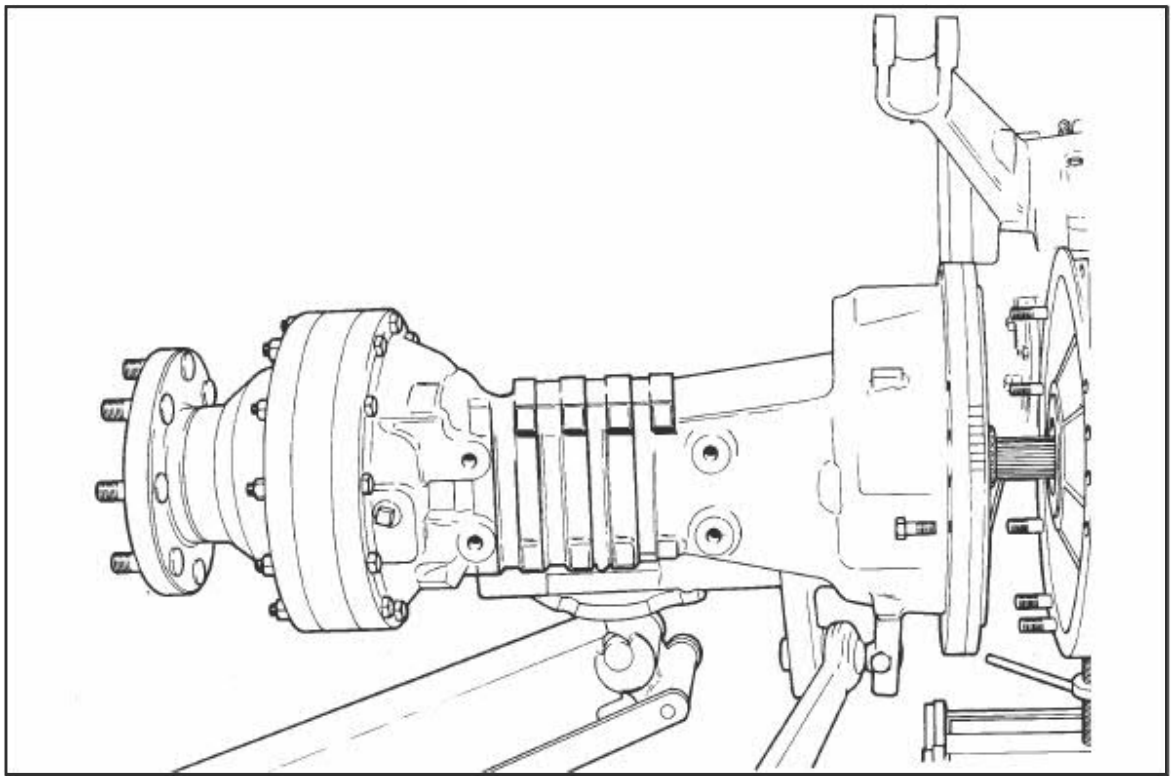


Fig 15

c. Apply a few drops of stud lock, then fit and tighten the stabilizer mounting bolts to a torque of 170 lbf ft (230 Nm).

d. Brush the wheel stud threads clean.

e. Refit the rear wheel and lightly oil the stud threads before fitting the wheel nuts.

Tractors fitted with 11/16 inch (17.5 mm) diameter studs.

Tighten the nuts progressively and evenly to a torque of 240 lbf ft (325 Nm).

Note : *The full quantity of oil, as stated in the specification will not be required as approximately 0.66 gal (2.5 liter) will be trapped by the carrier plates in the axle housing.*

16. Adjust and balance the brakes.

10 .8 AXLE HOUSING RIGHT HAND

Removal and Refitment

Special tools : SER / 054 Tractor splitting stand

1. Drain the transmission oil.
2. Release the leveling box at the knuckle.
3. Release the check chain at the check chain anchor bracket.
4. Release the stabilizer bracket underneath the axle housing.
5. Release the forward end of the lower link from the axle housing bracket.
6. Remove the lift arm and lower link assembly complete.
7. Release the brake pull rods and the return spring.
8. Jack up the tractor under the axle housing being serviced.
9. Remove the right hand rear wheel.
10. Place the SER / 054 Tractor splitting stand kit under the centre housing and lower the tractor until the jack is just taking the axle housing weight.
11. Remove all the nuts and bolts securing the axle housing to the centre housing.
12. Lower the trumpet housing slightly and withdraw it far enough to clear the half shaft from the differential splines.
13. Withdraw the axle housing completely.
14. Remove the 'O' ring from the flange on the carrier plate.

Refitment

15. Reverse procedures 1 to 14 except:
    a. Fit a new 'O' ring using petroleum jelly.
    b. Carefully manoeuvre the axle housing into position, taking care to align the axle shaft splines in the differential unit and the studs through their holes in the centre housing.
    c. Apply a few drops of Loctite stud lock, then fit and tighten the cab stabilizer mounting bolts to a torque of 170 lbf ft (230 Nm).
    d. Brush the wheel stud threads clean.
    e. Refit the rear wheel and lightly oil the stud threads before fitting the wheel nuts.

Tractors fitted with 11/16 inches (17.5 mm) diameter studs. Tighten the nuts progressively and evenly to a torque of 325 Nm (240 lbf ft).

> ***Note:*** *The full quantity of oil, as stated in the specification will not be required as approximately 0.66 gal (2.5 liter) will be trapped by carrier plate in the axle housing.*

16. Adjust and balance the brakes.

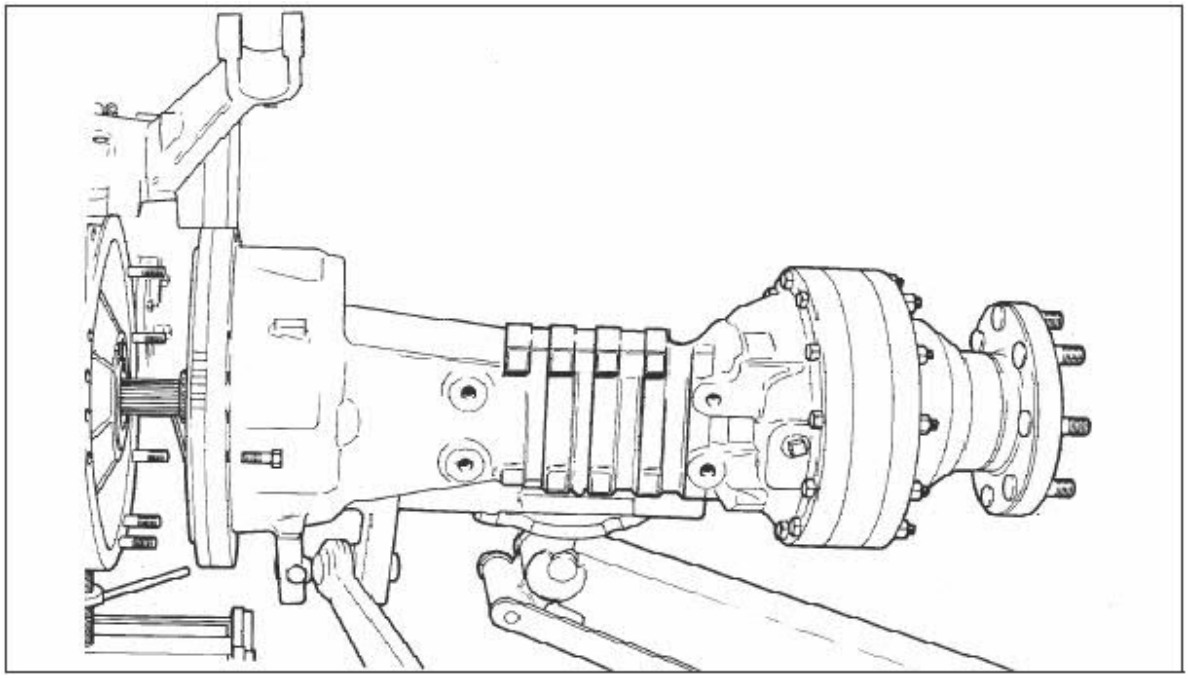


Fig 16

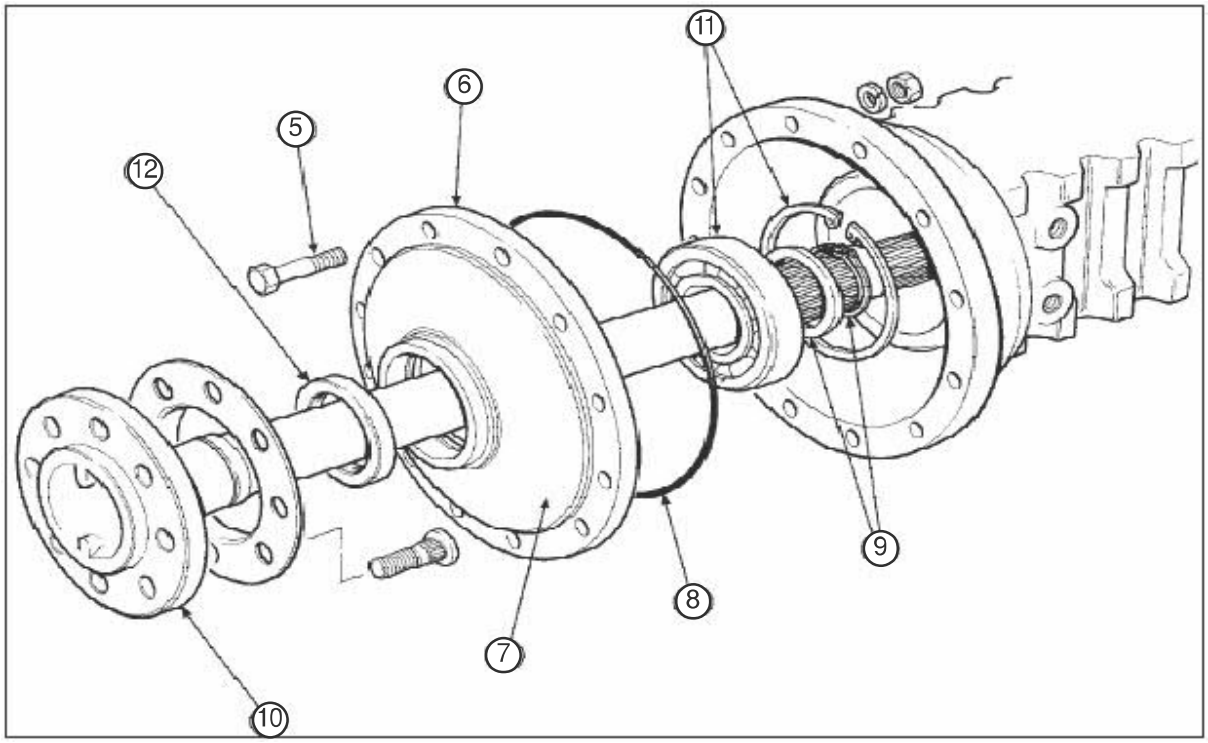


Fig 17

10 . 9 AXLE SHAFT – DIRECT DRIVE - WET BRAKES

Removal and refitment

Note: *This Axle shaft which has a taper roller bearing retained by a shrink fit collar. It can be identified by the large ball bearing retained by a spacer and circlips.*

Removal:

1. Jack up the tractor under the axle housing to be serviced.
2. Drain the oil from the transmission.
3. Remove the rear wheel.
4. Ensure that the parking brake is hard on.
5. Remove the 12 nuts, bolts and spring washer.
6. Pry apart the axle housing between the end cover and axle housing.
7. Remove the axle and end cover assembly.
8. Remove the 'O' ring and discard.
9. Remove the external circlip and spacer.
10. Drive the axle shaft out of the bearing and cover assembly.
11. Remove the internal circlip and ball bearing if necessary.
12. Remove and discard the oil seal.

Refitment:

13. Coat the oil seal with MF lock and seal (Loctite 542) and press into the cover up to the shoulder.
14. Replace the ball bearing if necessary.
15. Refit the axle shaft, spacer and circlip.
16. Replace the 'O' ring.
17. Place the axle shaft into the axle housing. Carefully passing the shaft through the brake plates.
18. Refit the nuts and bolts tightening to a torque of 54 lbf.ft (74 Nm).
19. Refit the rear wheel and nuts, and then tighten the nuts progressively and evenly to a torque of 199 lbf.ft (270 Nm).
20. Refill the transmission with approved oil to the correct level.
21. Adjust the brakes.

10 .10 LEFT HAND. CARRIER PLATE

Removal and Refitment

Special tools : SER / 054 Tractor splitting stand.

Removal

1. Remove the axle housing(see operation 10 .7)
2. Manoeuvre the axle housing, off the jack and stand it on end.
3. Remove the two countersunk screws.
4. Withdraw the carrier plate from the axle housing.
5. Remove and discard the inner 'O' ring.

Refitment

6. Reverse procedures 1 to 5 except:

   a. Place a new 'O' ring in the recess in the axle housing using a smear of petroleum jelly for location. Do not attempt to fit the 'O' ring to the carrier plate.

   b. Secure each countersunk screw with a centre punch mark.

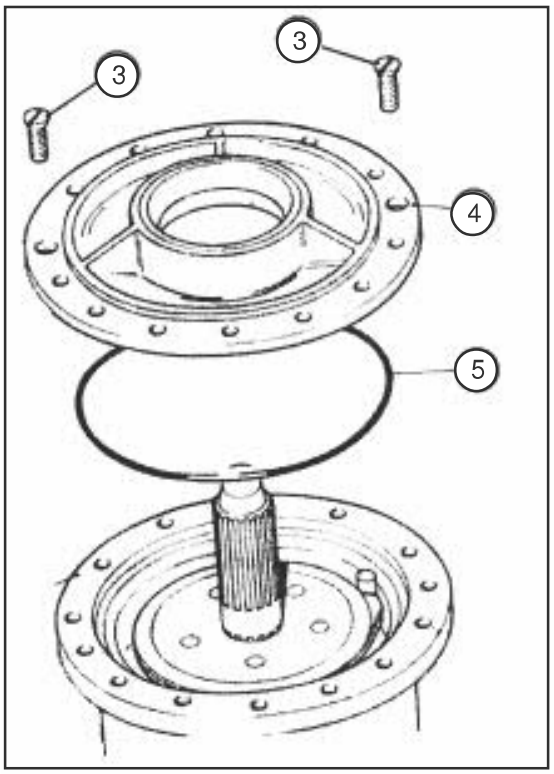


Fig 18

10 .11 RIGHT HAND CARRIER PLATE

Removal and Refitment

Special Tools: SER / 054 Tractor splitting stand.

Removal

1. Remove the axle housing(see operation 10 .8)
2. Manoeuvre the axle housing, off the jack and stand it on end.
3. Remove, and discard the roll pin.
4. Remove the two countersunk screws.
5. Remove the carrier plate complete with the differential lock coupler fork and coupler.
6. Remove and discard the inner 'O' ring.
7. Remove the differential lock coupler fork and coupler.

Refitment

8. Reverse procedures 1 to 7 except:

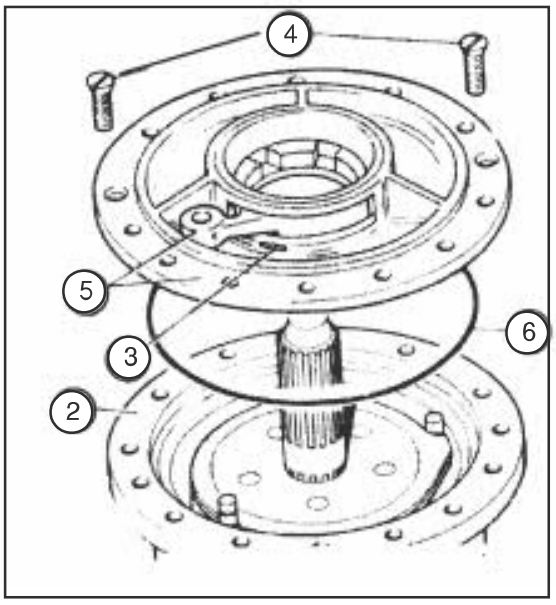


Fig 19

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