Massey Ferguson

268 (2WD/4WD)
Tractor

Workshop Service Manual

out service and repairs plug all hose ends and component connections to prevent dirt entry.

- Clean the exterior of all components before carrying out any form of repair. Dirt and abrasive dust can reduce the efficiency and working life of a component and lead to costly replacement. Use of high pressure water or steam cleaner is recommended.
- Before loosening any hoses or tubes connecting implements to remote control valves, etc., switch off the engine, remove all pressure in the lines by operating levers several times.
- Prior to pressure testing, make sure all hoses and connectors not only of the equipment, but also those of the test equipment, are in good condition and tightly sealed. Pressure readings must be taken with the gauges specified. The correct procedure should be rigidly observed to prevent damage to the system or equipment, and to eliminate the possibility to reduce the risk.
- Hydraulic fluid escaping under pressure can have enough force to penetrate the human skin. To locate a leak under pressure, use a small piece of cardboard, never use your hands. If you are injected with hydraulic fluid seek medical help immediately.
- When equipment or implements are required to be attached to the hydraulic linkage, either for testing purposes or for transportation, the 'Position Control' should be used.
- Always lower equipment to the ground when leaving the tractor.
- If high lift attachments are installed on a tractor beware of overhead power, electric or telephone cables when travelling. Drop the attachment near to ground level to increase stability and minimise risks.
- DO not park or attempt to service the equipment on an incline. If unavoidable, take extra care and chock all wheels.
- Prior to removing wheels and tires from a tractor, check to determine whether additional ballast (liquid or weights) has been added Seek assistance and use suitable equipment to support the weight of the wheel assembly. Store the wheel so that they cannot fall over and cause injury.
- When inflating tires beware of over inflation – constantly check the pressure. Over inflation can cause tires to burst and result in personal injury.

SERVICING TECHNIQUES

Service Safety

Appropriate service methods and proper repair procedures are essential for the safe, reliable operation of all farm machinery as well as the personal safety of the individual doing the work.

This Service Manual provides general directions for accomplishing service and repair work with tested, effective techniques. Following them will help assure that a thorough repair is successfully completed.

There are numerous variations in procedures, techniques, tools, and parts for servicing tractors, as well as in the skill of the individual doing the work. This Manual cannot possibly anticipate all such variations and provide advice or cautions as to each. Anyone who departs from the instructions provided in this Manual must realise that one compromises their personal safety and the tractor's integrity by the choice of repair methods, tools and / or parts.

Service Techniques

Clean the exterior of all components before carrying any form of repair. Dirt and abrasive dust can reduce the efficient working life of a component and lead to costly replacement.

Time spent on the preparation and cleanliness of working surfaces will pay dividends in making the job easier and safer and will result in overhauled components being more reliable and efficient in operation.

Use cleaning fluids which are known to be safe. Certain types of fluid can cause damage to 'O' rings and cause skin irritation. Check the label on solvents to ensure that they are suitable for the cleaning of components and also that they DO NOT risk the personal safety of the user.

Replace 'O' rings, seals or gaskets whenever they are disturbed. Never mix new and old seals or 'O' rings, regardless of condition. Always lubricate new seals and 'O' rings with hydraulic oil before installation.

When replacing component parts use the correct tool for the job.

TRACTOR IDENTIFICATION

Each tractor is identified by a tractor serial number and an engine serial number. To ensure prompt response to ordering of service parts or repair from your dealer, always quote the tractor model, tractor serial number and engine serial number.

The tractor model number,type & serial number (chassis serial number) is stamped on the number plate fixed at the right-hand side of the steering housing - Fig. 1

Record this number for future reference.

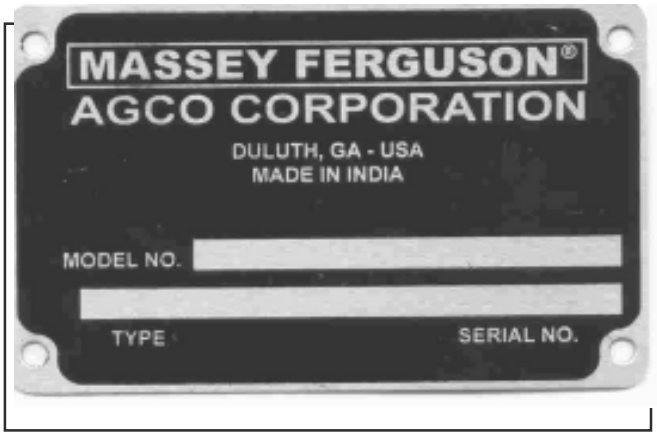


Fig. 1

The **engine serial number** is also stamped on the right-hand side of the engine block - Fig. 2

The engine serial number for MF 268 Xtra will be as follows :

MF 268Xtra 2WD / 4WD – SJ436 E XXXXX

Record the exact serial number of the engine fitted to your tractor for future reference.

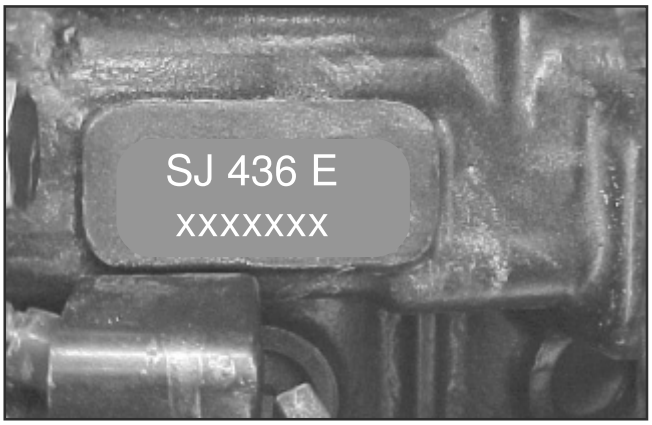


Fig. 2

SPLITTING THE TRACTOR

Table of Contents

5.4 AIR CLEANER

Removal and Refitment (Fig. 4- 5)

Removal

1. Remove the Hood refer operation 5.3.
2. Remove hose clamps and disconnect the hoses from air cleaner.
3. Remove the vaccum switch wiring connections.
4. Remove two bolts and spring washers securing the air cleaner and remove it.

Refitment

5. Reverse procedures 1 to 4.

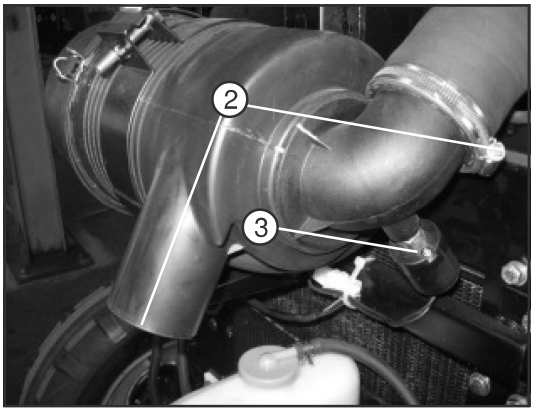


Fig 4

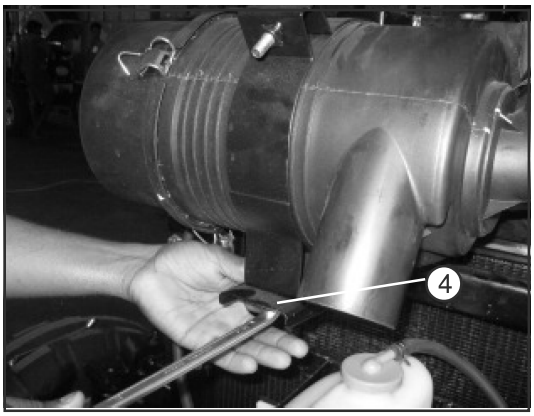


Fig 5

5.5 DRY TYPE AIR CLEANER OVER HAULING

Removal and Refitment (Fig 6- 13)

Removal of filter:

1. Unfasten or unlatch the service cover . Because of the filter fits tightly over the outlet tube to create the critical seal there will be some initial resistance similar to breaking the seal on a jar.
2. Gently move the end of the filter back and forth to break the seal. Avoid knocking the filter against the housing.
3. The inner secondary filter element must be replaced every third primary filter change. Remove the inner secondary filter as you would the primary filter.
4. Make sure you cover the air cleaner outlet tube to avoid any unfiltered contaminant dropping into the engine.

Fig 6

Fig 7

Section 6

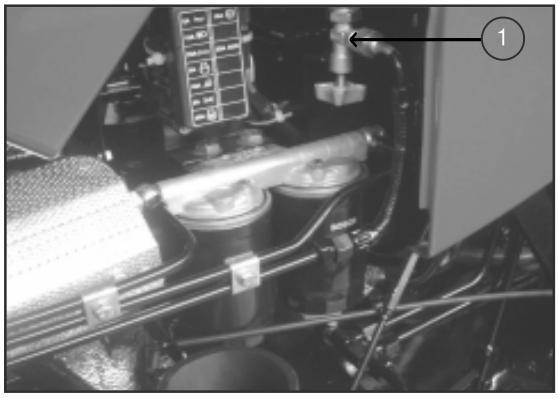
ENGINE

Running clearance	...	0.0027 / 0.0051 inch (0.07 / 0.13 mm)
Recommended size in service	...	0.010 inch (0.25 mm) ; 0.020 inch (0.51 mm) ; 0.030 inch (0.76 mm)
Camshaft		
Type	...	Polydine *(Hollow shaft located with thrust washer)* Journals are pressure feed lubrication.
No. 1 Journal Dia.	...	1.8700 / 1.8694 inch (47.50 / 47.48 mm)
No. 2 Journal Dia.	...	1.8602 / 1.8596 inch (47.25 / 47.23 mm)
No. 3 Journal Dia	...	1.8503 / 1.8497 inch (47.00 / 46.98 mm)
No. 4 Journal Dia	...	1.8401 / 1.8395 inch (46.74 / 46.72 mm)
No. 5 Journal Dia	...	1.8401 / 1.8395 inch (46.50 / 46.48 mm)
Running Clearance – All Camshaft Journals	...	0.0039 / 0.0055 inch (0.10 / 0.141 mm)
Oil way for rocker shaft lubrication	...	From head to 1st rocker bracket top face
Cam Lift - *Inlet*	...	0.2512 inch (6.3814 mm)
- *Exhaust*	...	0.292 inch (7.4169 mm)
Gear–Spigot dia	...	1.3779 / 1.3769 inch (35.000 / 34.975 mm)
Camshaft end float	...	0.0157 / 0.039 inch (0.40 / 0.10 mm)
Cylinder Head		
Cylinder head total height	...	4.645 inch (118 mm)
Skimming allowance on head face	...	A maximum of 0.0118 inch (0.30 mm) may be removed from the Head Face provided the atomiser nozzle protrusion does not exceed 0.147" (3.75 mm) after skimming
Leak Test	...	4 Bar for 1 minute
Valve seat angle	...	Inlet 30° / Exhaust 45°
Tappet bore in cylinder head	...	0.6306 / 0.6299 inch (16.018 / 16.000 mm)
Valve guide bore in cylinder head	...	0.5125 / 0.5118 inch (13.018 / 13.000 mm)
Permissible cylinder head bow		
Transverse and Longitudinal	...	0.00314 inch (0.080 mm)
Valve Guides (Sintered) – Inlet and Exhaust		
Inside Dia.	...	0.3110 / 0.3116 inch (7.900 / 7.915 mm)
Outside Dia	...	0.5127 / 0.5131 inch (13.023 / 13.034 mm)
Overall Length	...	2.3228 / 2.3149 inch (59.00 / 58.8 mm)

FUEL FILTER ELEMENT

To Renew

1. Close the fuel tank cock (1).
2. Clean the filter assembly externally
3. Drain the fuel from fuel filter by loosening the drain plug (3).
4. Remove and discard the filter/ filters.
5. Apply clean engine oil to the surface of the rubber gasket (oil seal) in the new oil filter.
6. Screw the filter to filter head.
7. Operate the priming pump and bleed the fuel system.
8. Start and run the engine. Check for any leakage.



Cautions:

a. It is important that only genuine fuel filter element is used

b. Do not allow dirt to enter into the fuel system.

c. Do not over tighten fuel line joints.

d. Use genuine washer/ seals to stop fuel leakage.

e Do not replace both primary and secondary fuel filters at the same time.

TO BLEED THE AIR FROM FUEL SYSTEM

1. Loosen the bleeding screw (2) on top of the twin element fuel filter by two or three turns.
2. Operate the priming device until fuel free of air comes from the filter vent point.
3. Tighten the bleeding screw.
4. Remove the bleed screw from FIP and prime the system till clean fule comes out.

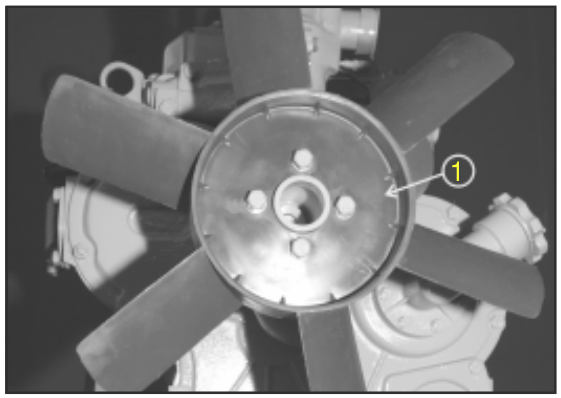
Section G

COOLING SYSTEM – WATER PUMP

TO REMOVE AND REFIT FAN

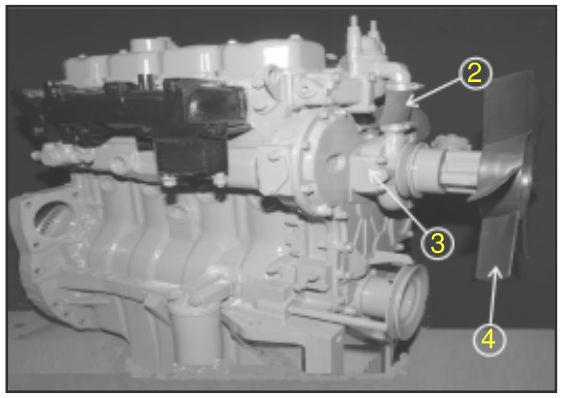
1. Loosen and remove the set screws (1) securing the fan and remove the fan and fan extension. If necessary, fit the set screws to retain the fan extension to the pulley hub.
2. Clean the fan extension and fan thoroughly. Renew the defective parts.
3. Fit the fan extension and fan. Tighten the set screws to 16 lbf.ft (22 Nm).

Note: *While fitting the fan ensure the fan direction is correct. If wrongly fitted engine will get overheated.*



TO REMOVE WATER PUMP

1. Drain the coolant so its level is below water pump.
2. Remove Fan (4).
3. Slacken alternator securing setscrews and remove fan belt.
4. Loosen the water pump inlet and outlet hose clips and remove the hose connections (2).
5. Unscrew setscrews (3) securing the water pump and remove the water pump.



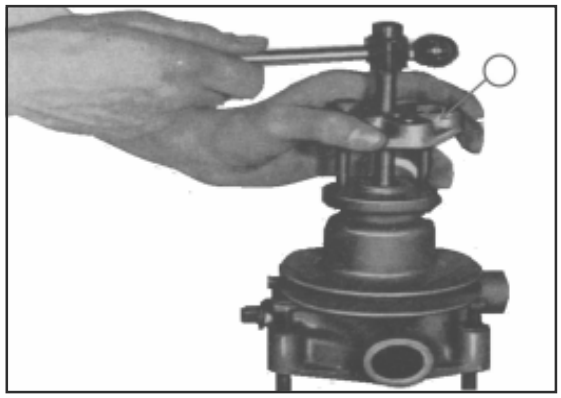
Inspection

Check the water pump for any damage or wear.

Check the bearing for damage, abnormal noise and sluggish movement.

Check the seal for leaks.

Replace the water pump kit or water pump assembly as necessary.



To Dismantle Water Pump

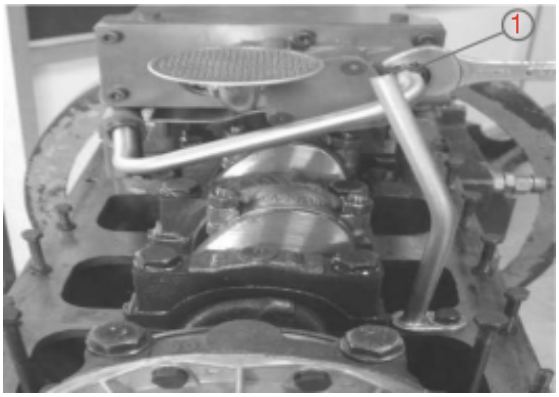
1. Remove the water pump pulley using a suitable puller (5).
2. Press the water pump shaft complete with bearings and impeller from the rear of the pump body. Press the shaft and bearing assembly out of the impeller.
3. Remove the unitised seal from the shaft.

OIL STRAINER AND SUCTION PIPE

The oil strainer is an integral part of the suction pipe. No regular services are necessary but wash the strainer when it is removed.
The suction pipe is normally a short pipe which is fastened to the balancer frame.

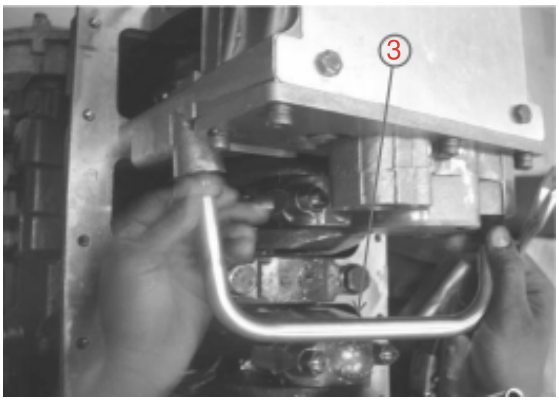
OIL PUMP

Note: *The oil pump is an integral part of the balancer assembly, it should not be repaired. How ever the pump rotors can be checked for its serviceability.*

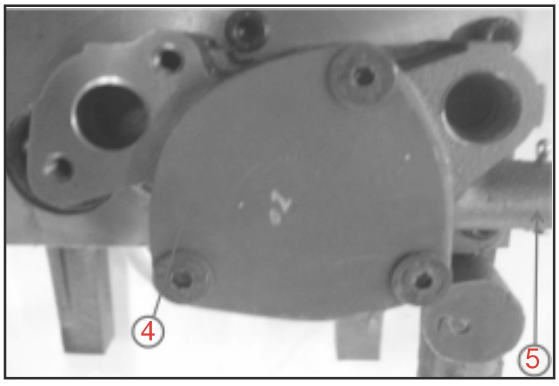


To Inspect

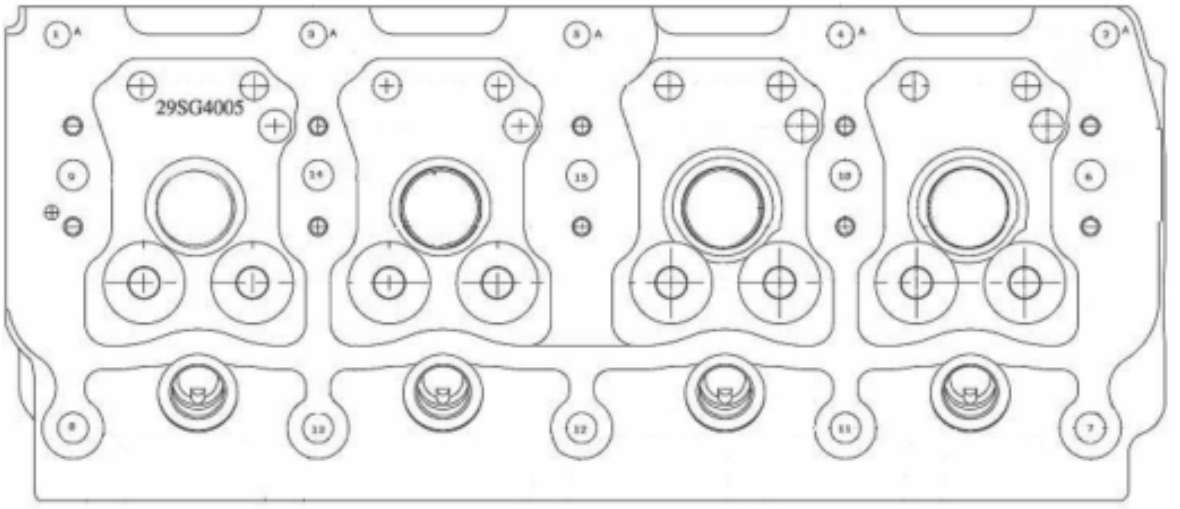
1. Remove sump.
2. Loosen and remove strainer pipe securing screws. Remove the strainer pipe (1).
3. Loosen and disconnect the delivery pipe fixing screws (2) from the oil pump to balancer body.
4. Remove the delivery pipe (3).
5. Using a suitable wrench, unscrew the three screws from oil pump end plate (4).
6. Remove the end plate.



Note: *The oil relief valve (5) is located in the body of the lubricating oil pump. It is an adjustable plunger type valve but unless special test equipment is available, no attempt should be made to dismantle it.*



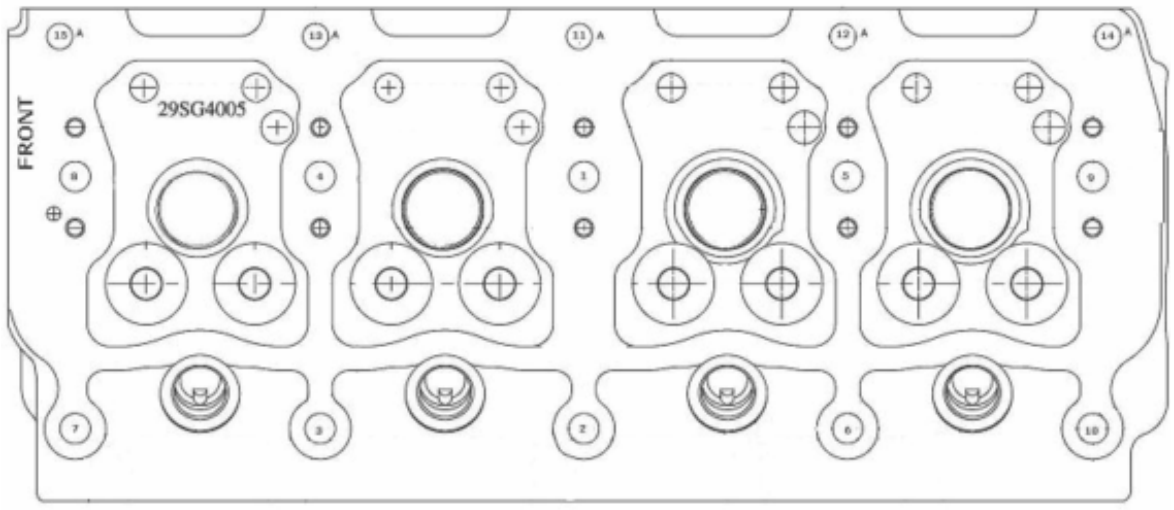
CYLINDER HEAD SETSCRW RELEASING SEQUANCE



TORQUE TO BE APPLIED

A – M10x1 – TORQUE 65 Nm (6,3 Kgm)
SLNO HOLES – M12x1,5 – IN THE FIRST TURN TORQUE to 45 Nm
IN THE SECOND TURN–180°
IN THE THIRD TURN–180°

CYLINDER HEAD SETSCREW TIGHTENING SEQUENCE



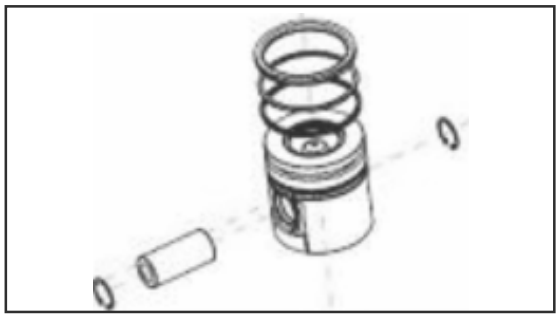
TORQUE TO BE APPLIED

A – M10x1 – TORQUE 65 Nm (6,3 Kgm)
SLNO HOLES – M12x1,5 – IN THE FIRST TURN TORQUE to 45 Nm
IN THE SECOND TURN–180°
IN THE THIRD TURN–180°

Remove Gudgeon Pins

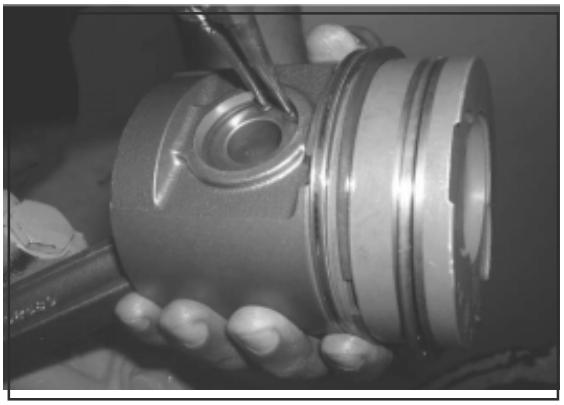
Remove the circlips from the pistons, using a pair of long nosed plier and push the pin from one end.

The gudgeon pins can now be removed and the connecting rods separated from the pistons.



INSPECTION

1. Check each piston for scuffing, scoring, wear and other defects. Replace any piston that is defective.
2. Check each piston rings for breakage, damage and abnormal wear. Replace the defective rings. When piston requires replacement, its rings should also be replaced.
3. Check that the piston pin fits in the piston pin hole. Replace any piston and pin assembly that is defective. The piston pin must be smoothly pushed easily into the piston hole.

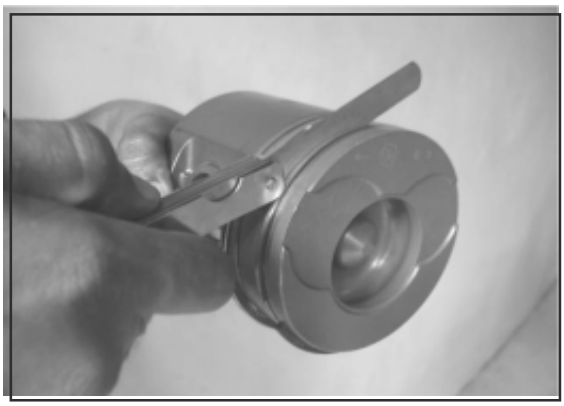


4. Measure the piston ring side clearance.

Piston ring side clearance: Standard Value

Top ring : Nil (Since Keystone)

No.2 & 3 ring: 0.0015/ 0.003 inch (0.040/ 0.080 mm)



5. Measure the piston ring end clearance

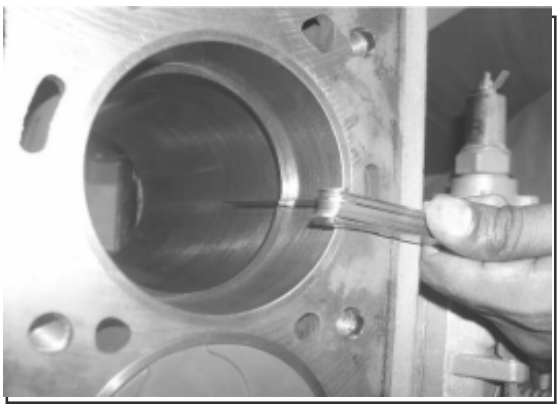
Piston ring end clearance: Standard Value

Top ring: 0.0015/ 0.0216 inch (0.30/ 0.55 mm)

2nd ring: 0.0314/ 0.0393 inch (0.80/ 1.00 mm)

3rd ring: 0.0015/ 0.003 inch (0.30/ 0.55 mm)

6. Measure the piston ring width.



Piston ring Width : Standard Value

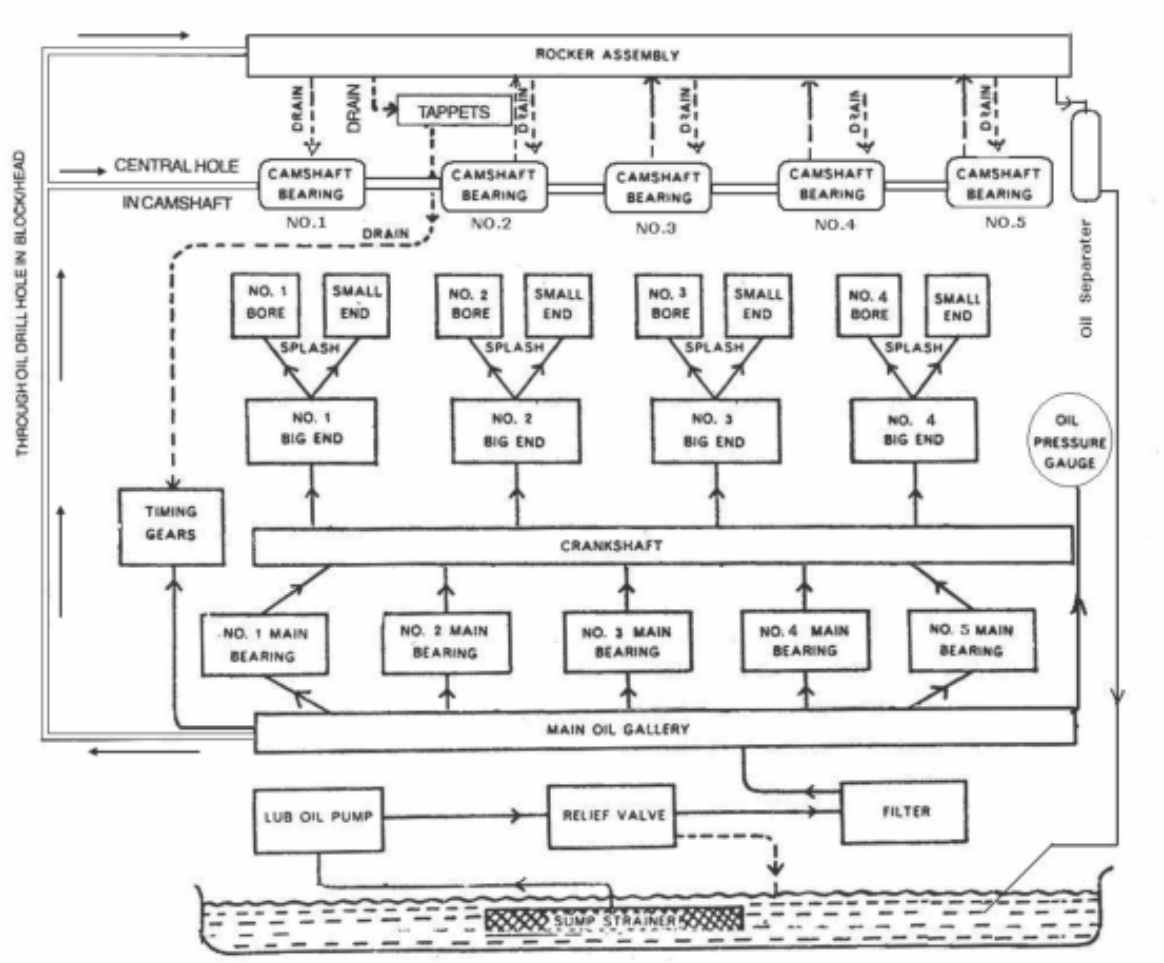
Top ring: 3.0 mm (0.118 inch)

2nd ring: 0.077/ 0.079 inch (1.97/1.99 mm)

3rd ring: 0.156/ 0.157 inch (3.970/ 3.990 mm)

Section P

LUBRICATION SYSTEM



PROBLEM	POSSIBLE CAUSES	REMEDY
ERRATIC RUNNING	Sticking throttle or restricted movement	Check, clean, lubricate and adjust settings
	Overheating	See Problem – Overheating
	Incorrect tappet adjustment	Check and reset the adjustment
	Sticking valves	Replace valve with new standard or oversize, and/or machine the valve guide bores
	Incorrect high pressure pipes	Renew the pipes of correct specifications
	Broken, worn-out or sticking piston ring/s	Fit new rings, check bore and pistons for damage
	Piston seized	Replace piston assembly and check the bore for damage
	Broken valve spring	Replace with new springs
VIBRATION	Faulty fuel injection pump	Overhaul injection pump
	Faulty injectors	Overhaul injectors
	Poor compression	See Problem – Poor Compression
	Sticking throttle or restricted movement	Check, clean, lubricate and adjust settings.
	Cylinder head gasket leaking	Check the cylinder head bolts torque or renew the gasket
	Overheating	See Problem – Overheating
	Sticking valves	Replace valve with new standard or oversize, and/or machine the valve guide bores
	Incorrect high pressure pipes	Renew with pipes of correct specifications
	Broken worn or sticking piston ring/s	Fit new rings, check bore and pistons for damage
	Piston seized	Replace piston assembly and check the bore for damage
	Faulty engine mounting	Check and redo the installation of engine
	Incorrectly aligned flywheel housing or flywheel	Check and align flywheel housing and flywheel
HIGH OIL PRESSURE	Incorrect grade of lubricating oil	Drain and refill with specified grade of oil
	Inaccurate relief gauge	Check and renew gauge
	Pressure relief valve faulty	Fit new relief valve

7A.2 FRONT WHEEL TOE - IN HYDROSTATIC STEERING

Adjustment

Procedure

1. The tractor must be on firm , level ground with the wheels facing straight ahead.
2. To check the toe –in, see fig. Distance B must be 0.059 - 0.177 inch (1.5 to 4.5 mm) less than distance A, measured on the center line of the axle, at the wheel rim.

If adjustment is required:

3. Loosen the clamp bolt and nut.
4. Slacken the track adjusting setscrew and nut.
5. Screw out the track rod tube to increase toe-in. Screw in the track rod tube to decrease toe-in.
6. Locate the track adjusting setscrew in its hole and tighten to a torque of 37 lbf ft (50 Nm). Tighten the locknut.
7. Retighten the clamp nut and bolt to a torque of 37 lbf ft (50 Nm).

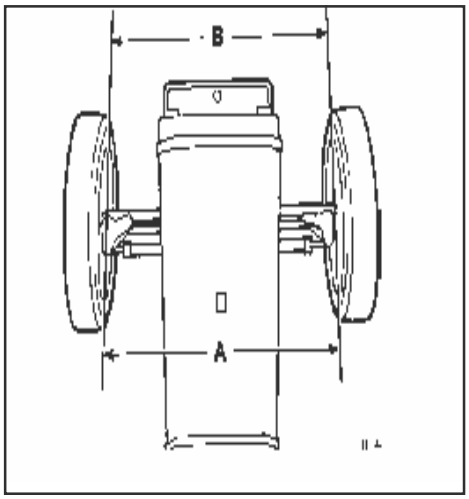


Fig 2

7A.3 FRONT HUB

Adjustment Procedure

1. Raise the front wheel off the ground and check the wheel bearings for excessive free play. If movement is found, adjust the bearing pre-load as follows:
2. Remove the hub cap.
3. Remove and discard the split pin.
4. Tighten the slotted nut to 60 lbf ft (80 Nm) then slacken off the nut to the nearest split pin hole to give the correct end float.
5. Fit a new split pin.
6. Refit the hub cap.

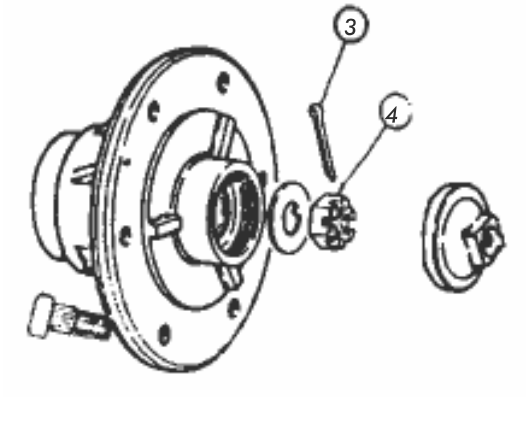


Fig 3

Section 7

Part B

Front Axle - 4 Wheel Drive

19. Replace the planetary ring gear carrier using special tool MF.495 Planetary Ring Gear Replacer.
20. To special tool MF.488 add the two extensions (part of MF.495) ensuring that the bolts are tight as shown in the illustration. It is important that they are fitted with the overlapping part to the outside.
21. Remove the top and bottom swivel pin caps and fit the two blocks complete with the threaded studs.
22. Suspend MF.488 on the studs and fit the nuts and washers.
23. Position the ring gear carrier so that the splines are in alignment. Place the cap over the end of the shaft and locate the forcing screw in the end of the cap.

    IMPORTANT: *Lubricate all the threads of the forcing screw.*
24. Tighten the screw until the carrier is pressed full home. DO NOT put excessive loads on the tool. Check by turning the hub to determine when the fitting has been completed.
25. Remove the special tool and replace the caps ensuring that the one with the shims is fitted on the top.
26. Renew the ring gear retaining nut and tighten to a torque of 313 lbf.ft (425 Nm) using special tool MF.481.
27. Hammer the lip of the nut down into the slot.
28. Replace the sun gear and circlip.
29. Replace the planetary carrier

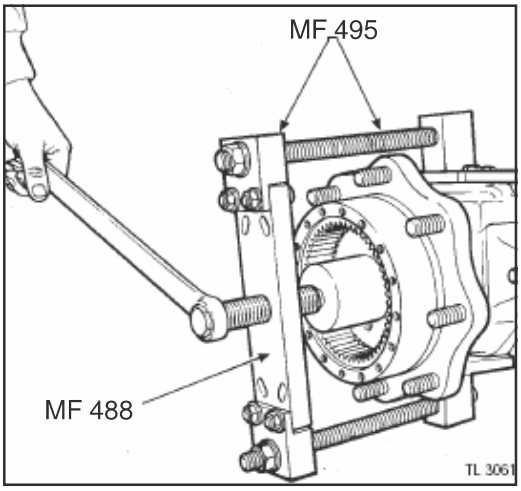


Fig 16

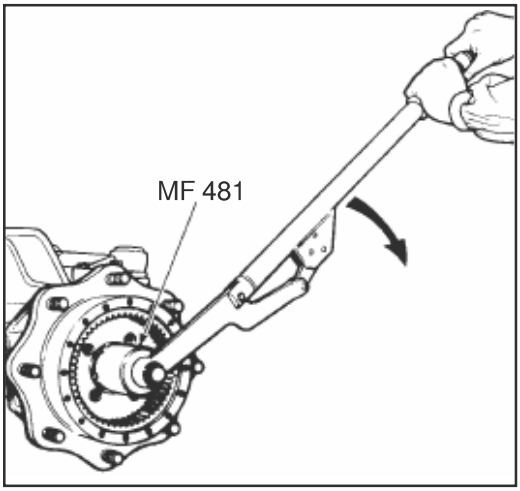


Fig 17

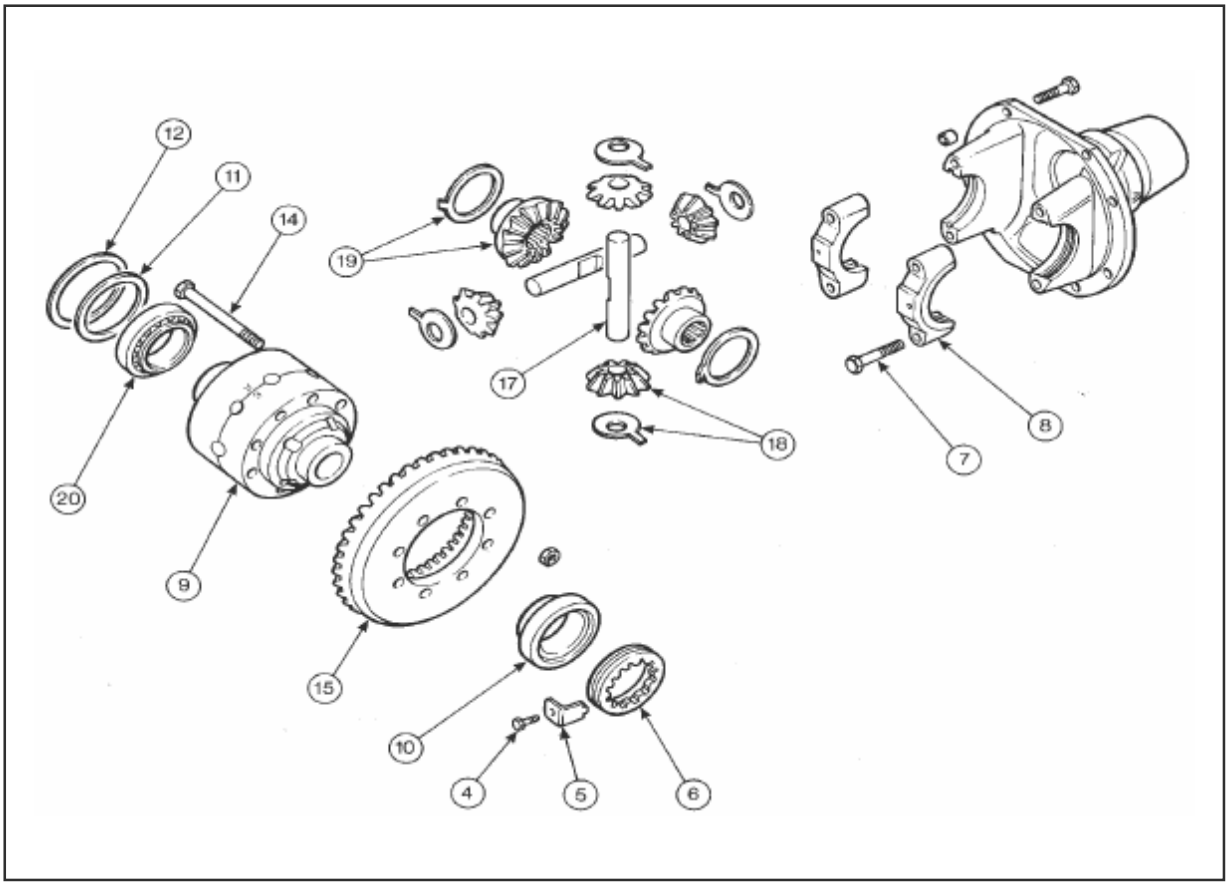


Fig 35

13. Mark the two halves of the differential case and the crown wheel to aid re-assembly.
14. Place the crownwheel and differential unit in the vice and remove the eight nuts and bolts.
15. Remove the crownwheel.
16. Split the differential case.
17. Remove the differential cross.
18. Remove the differential gears and side washers.
19. Remove the differential side gears and thrust washers.
20. Remove the taper roller bearing cones from the differential housing.

    Examination : Thoroughly clean and inspect all components. Any parts showing signs of wear or damage must be renewed. Renew all 'O' rings, seals and circlips.

Re-assembly

21. Refit the retaining ring.
22. Refit the removed shims.

Crownwheel and differential

23. Refit or renew the taper roller bearing cones if they have been removed.
24. Refit the differential gears, cross and thrust washers to the case.
25. Align the previously made marks on the case and the crown wheel if the original wheel is being re-used. Refit the eight bolts, apply Massey Ferguson Stud Lock (Loctite 270) to the threads and tighten to a torque of 112 lbf.ft (83 Nm).
26. Refit the bearing cups and refit the crownwheel and differential assembly. The crownwheel is mounted on the left side of the differential.
27. Refit the bearing caps and lightly tighten the bolts.

Part A

Dual Clutch

Table of Contents

SECTION 9

Transmission

INDEX

Part A

8 SPEED TRANSMISSION – DUAL CLUTCH

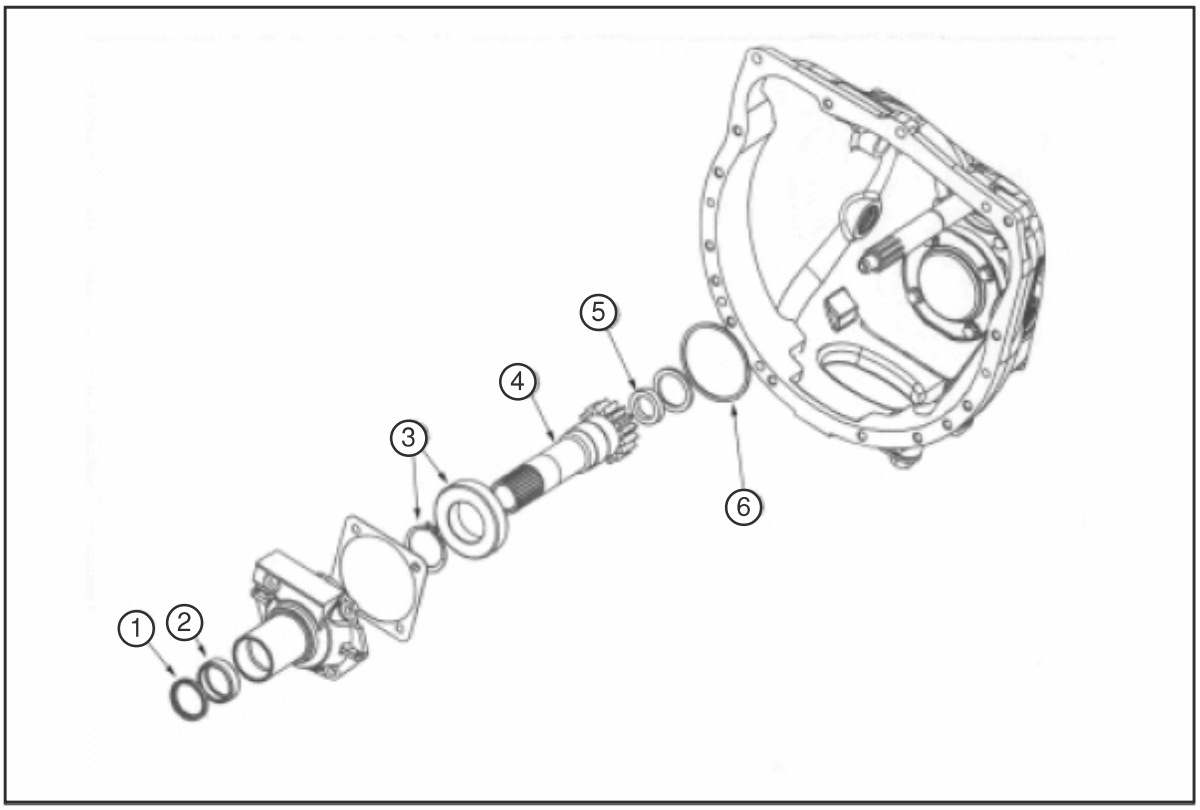


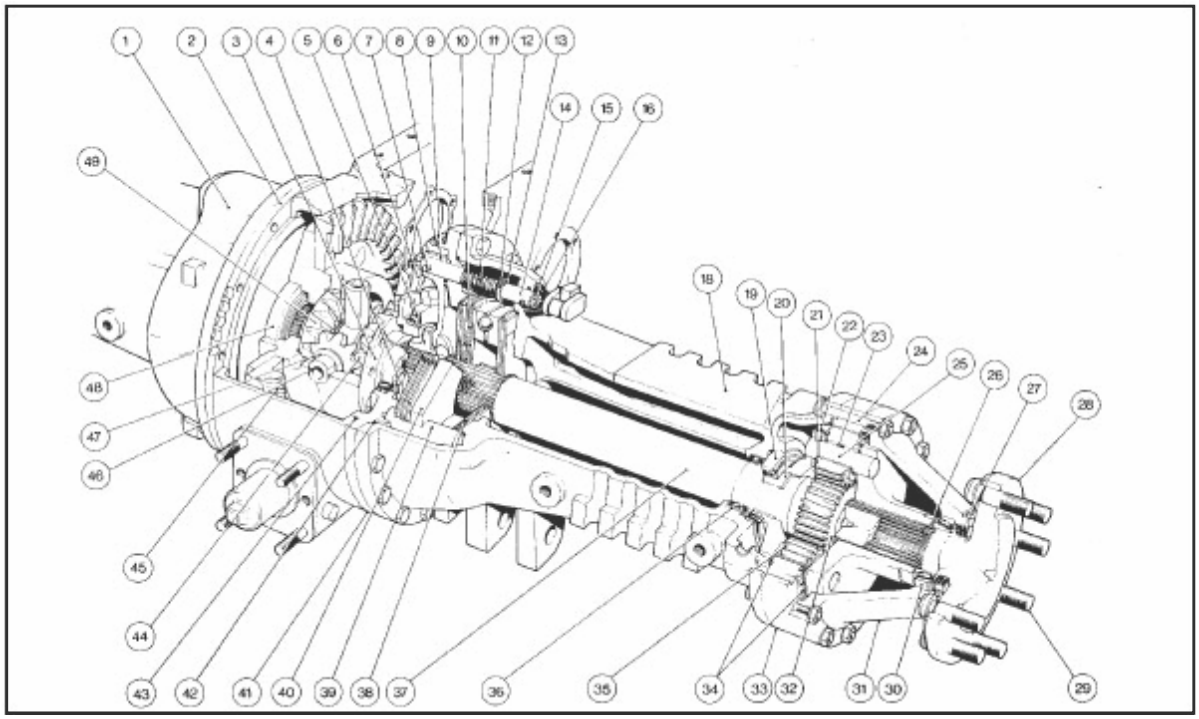
Fig. 9

Removal and Disassembly

1. Remove the clutch release mechanism.
2. Loosen and remove the main drive retainer bolts
3. Remove the main drive retainer housing with PTO pinion shaft and gasket.
4. Remove the PTO pinion shaft retaining ring. (Item 6 in Fig. 9).
5. Push the PTO pinion shaft complete with bearing out of the housing.
6. If necessary remove the circlip and press the bearing off the Shaft. (Item 3 in Fig. 9) by using SER / 038 hand press tool.
7. Remove the PTO pinion shaft oil seal. (Item 5 in Fig. 9).
8. Remove the oil seal from main drive housing (Item 1 in Fig. 9).
9. Remove the needle roller bearing by using SER / 075 (Item 2 in Fig. 9).

Reassembly and Refitment

1. Install the needle roller bearing into the housing by using SER / 075 (Item 2 in Fig. 9).
2. Fit a new oil seal into the housing by using SER / 036 and seal lip facing away from the tool. (Item 1 in Fig. 9).
3. Fit a new oil seal in the PTO pinion shaft with lip of the seal facing the tool by using SER / 076 (Item 5 in Fig. 9).
4. Refit the PTO pinion shaft bearing onto the PTO pinion shaft and refit the circlip, and check that it is properly seated. (Item 3 in Fig. 9).
5. Refit the PTO pinion shaft into the main drive housing.
6. Refit the circlip (Item 6 in Fig. 9) and check that it is properly seated.
7. Smear petroleum jelly to lubricate oil seals lips.
8. Insert the main drive retainer housing with new gasket and PTO pinion shaft into the Input shaft.
9. Replace the housing bolts (pre coated) and tighten the bolts to a torque of 45 lbf. ft. (61 Nm).



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

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 .17 DIFFERENTIAL LOCK ACTUATOR MECHANISM

Removal and Refitment

Removal

1. Remove the right-hand axle housing. (see operation 10 .8)
2. Manoeuvre the axle housing assembly off the jack and stand it on end.
3. Lift up the rubber seal
4. Release the locknut.
5. Rotate the differential lock operating lever out of engagement with the actuator fork.
6. Unscrew the fork from the shaft complete with its locknut and rubber seal.
7. Remove the carrier plate. (see operation 10 .11)
8. Remove the shaft, complete with the spring, washer, circlip and 'O' ring.

Examination

Examine the shaft for signs of wear or scoring. Clean and degrease the threads in the end of the shaft, and on the actuator fork.

Refitment

9. Fit a new 'O' ring to the shaft. If renewing the shaft, a new washer and circlip should be fitted.
10. Refit the shaft taking care not to damage the 'O' ring.
11. Refit the spring.
12. Refit the carrier plate. (see operation 10 .11)
13. Smear the threads of the actuator fork with loctite 241, then screw the fork fully into the shaft.
14. Unscrew the actuator fork until it will engage the differential lock operating lever in the horizontal position.
15. Tighten the locknut.
16. Push the rubber seal into position.

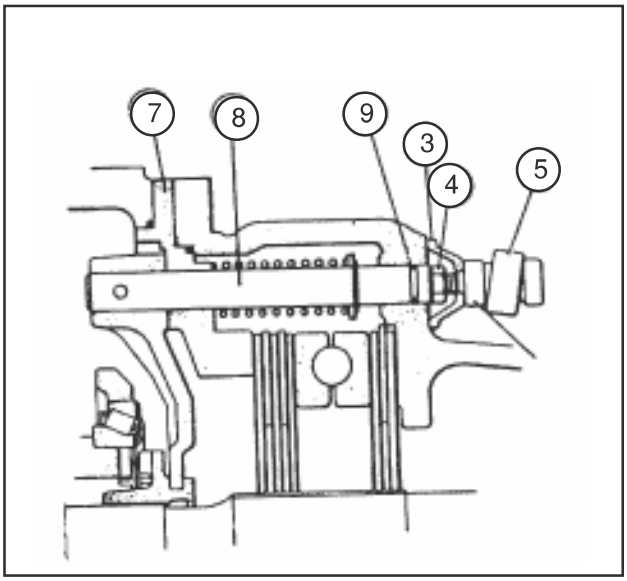


Fig 26

16. Secure the locking ring by tapping a locking roller down either side of one of the pinion splines.

Note: The needle rollers must be driven flush with the locking collar.

Before refitment, the pinion assembly should be freely lubricated with clean transmission oil.

17. Refit the pinion assembly.

Fig 47

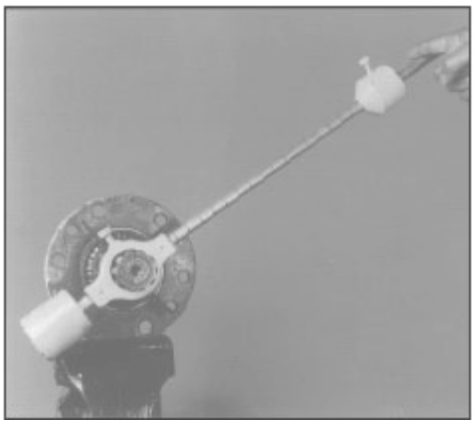


Fig 48

10 .26 REAR DRIVE SHAFT

Servicing

Special tools: SER/022 Needle Roller Bearing Puller
SER/063 Needle Roller Bearing Driver
SER/058 Universal Handle

Disassembly

1. Remove the lift cover.
2. Remove the split pin from the shear tube.
3. Remove the shear tube.
4. Remove the rear drive shaft.
5. Locate the end of SER/022 underneath the bearing cage.
6. Extract the bearing.
7. Remove the plunger and spring.

Examine the drive shaft for signs of wear and fit a new needle roller bearing.

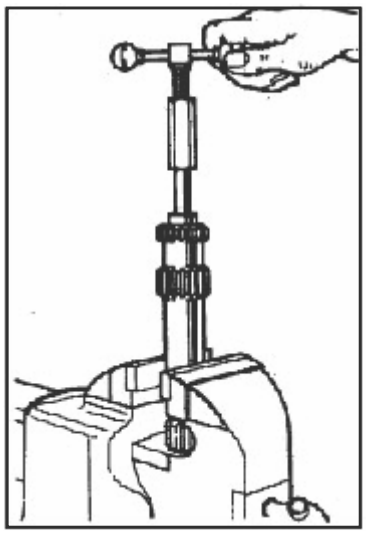


Fig 49

Draft Control - tension force in the top link (Fig. 9).

Variations in ground conditions will cause fluctuations in the draft force in the top link. If the draft force decreases, the compression force in the control spring decreases. The Draft Control linkage follows the control spring plunger (1) under the influence of the breakout spring in the guide rod (7), and moves the Draft Control link rearwards. The vertical lever (4) pivots and moves the pump control valve, via the lever (5), towards discharge. When the correct depth is obtained, the valve is restored to neutral. An increase of draft force in the top link will have an opposite effect.

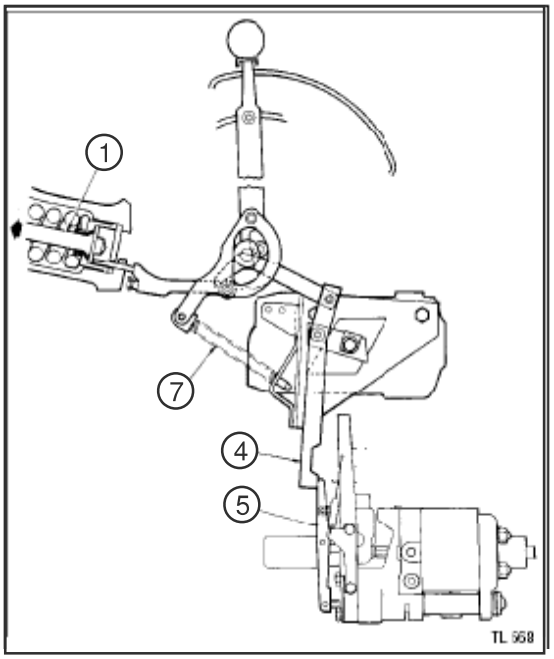


Fig.9

Position Control - implement lowering (Fig. 10).

With the Draft Control in the fully UP position downward movement of the Position Control Lever causes the eccentric roller (2) to force the cam (3) downwards. The breakout spring pushes the Position Control link (1) to maintain contact between the roller (8) and the eccentric cam on the cross shaft (9), and the front roller (6) moves the cam (3) rearwards, causing the vertical lever (4) to pivot and move the pump control valve, via the lever (5) into the discharge position.

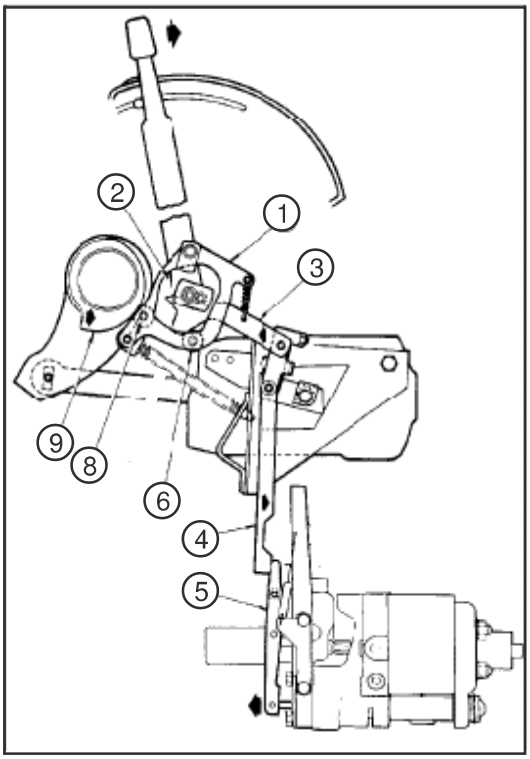


Fig.10

Quadrant location:

1. Slacken the two bolts.
2. Slacken the two barrel nuts.
3. Locate the inner quadrant in the centre of the elongated hole.
4. Tighten the two barrel nuts.
5. Locate the outer quadrant in the centre of the elongated hole.
6. Tighten the two bolts.

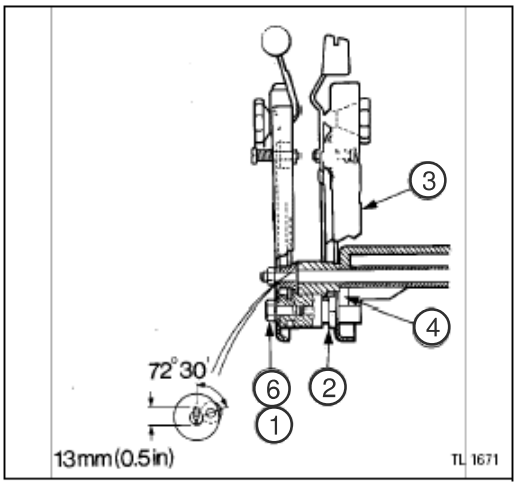


Fig 29

Draft Control rod adjustment

1. Place the Draft Control lever in the UP position.
2. Place the Position Control lever in the Transport position.
3. Using MF.333, adjust the set screw to give a clearance of 0.228 inch (5.8 mm) between the set screw and the lift cover casting.

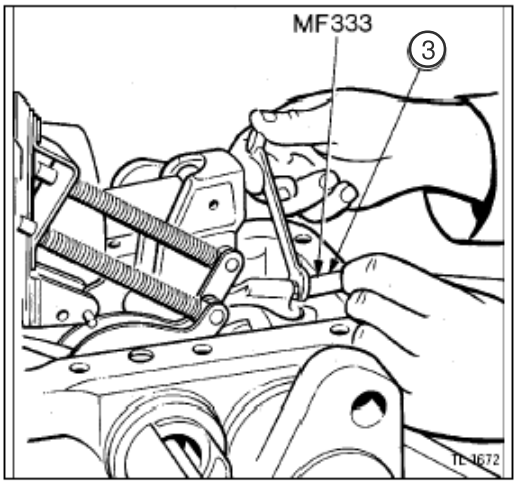


Fig 30

Draft Control neutral setting

1. Slacken the locknut.
2. Slacken the hexagon socket grub-screw and locknut on the vertical lever to the end of its thread. This will ensure that no interference from the Position Control linkage takes place.
3. Release the tabwasher.
4. Slacken the nut.
5. Position MF.273 A on the lift cover.
6. Apply a load of 1.3 kg (2.86 lbs) to the end of the vertical lever. This simulates the force of the linkage pump control spring (a spring balance can be used if no tool is available).
7. Locate MF.356C on the lift cover
8. Place the Draft Control lever in the Sector position.
9. Place the Position Control lever in the Transport position.
10. Adjust the slide pivot, until the vertical lever just touches the pin on MF.356C.
11. Tighten the nut.
12. Re-check the setting.
13. Secure the nut with the tabwasher.

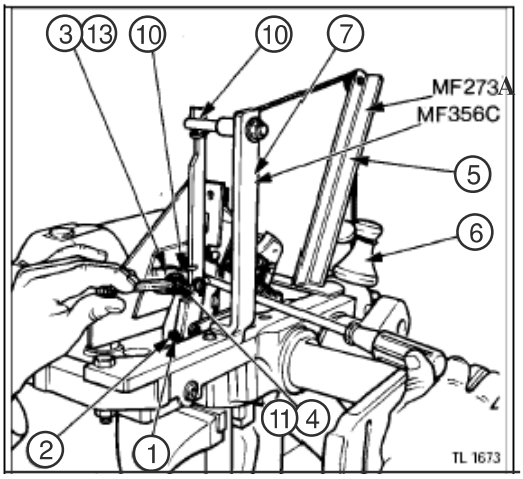
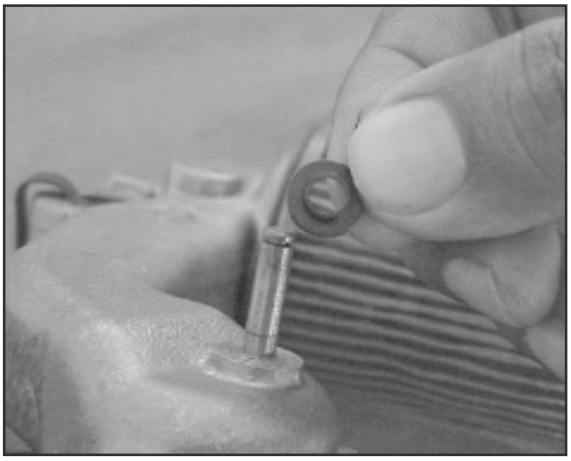
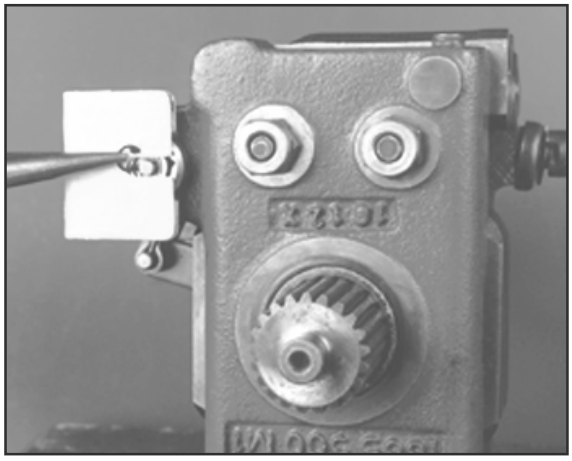


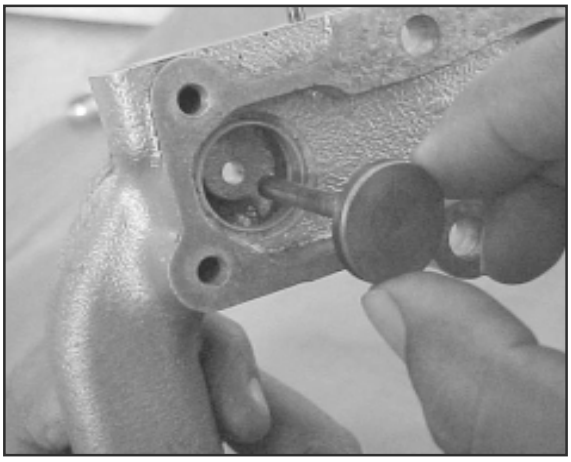
Fig 31



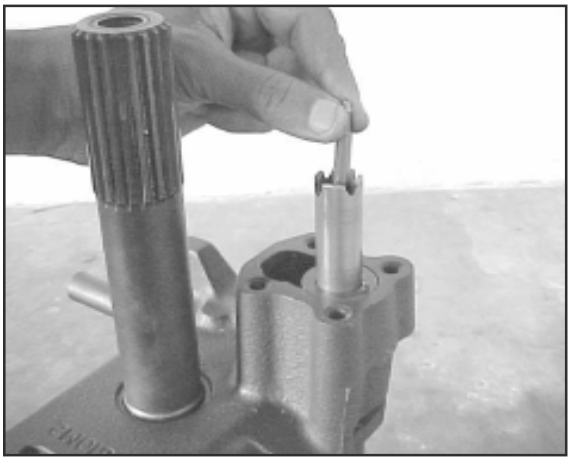
33. Remove the seal and discard it.



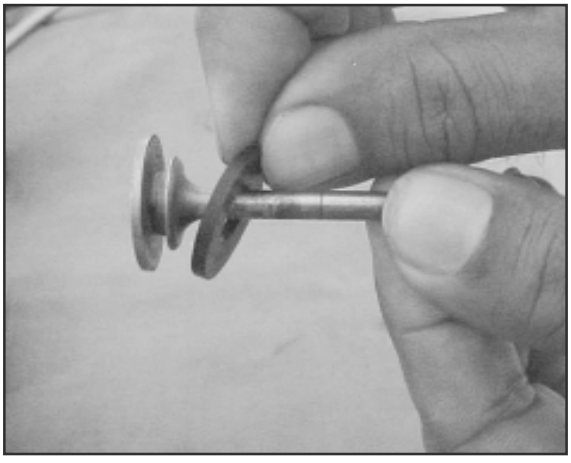
36. Remove valve spring retainer clip, slide it into position to hold back the spring tension. Remove and discard the retaining ring.



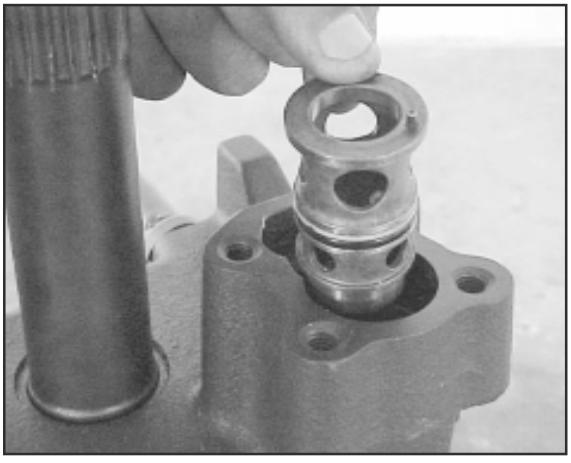
34. Remove the valve.



37. Withdraw the control valve.



35. Remove the seal and discard it.



38. Withdraw the sleeve.

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13A - 1 - Specification:

Oribitrol steering unit:

Make	...	Danfoss.
Type code	...	OSPJ 100 ON.
Nominal displacement	...	100 cubic centimeter per rev.
Relief valve presuure setting at 1200 engine RPM	...	140 bar (2030 psi).
Shock valve pressure setting	...	200 bar (2900 psi).
Reservior capacity	...	0.65 to 0.75 lts. (1.3 to 1.5 pts).

Special tools:

SER / 278	...	Holding tool.
SER / 279	...	Guide ring.
SER / 280	...	Assembly tool for 'O' ring and king ring.
SER / 281	...	Assembly tool for roto glyd.
SER / 282	...	Assembly tool for lip seal.
SER / 283	...	Assembly tool for cardan shaft.
SER / 284	...	Assembly tool for dust seal.
SER / 298	...	Hydraulic cylinder ball joint end cover tool.

Bolt torques:

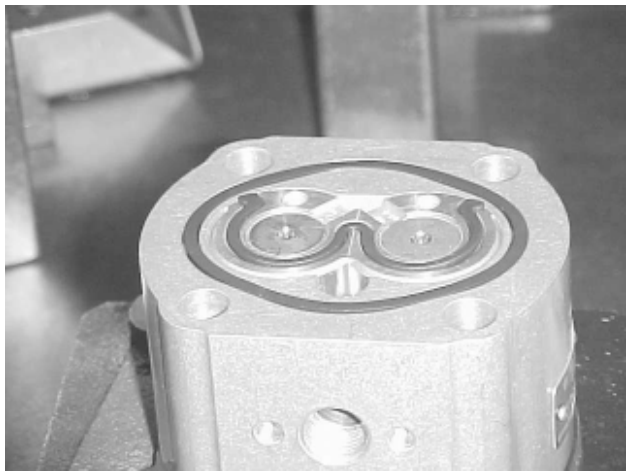
Steering uint mounting plate bolts	...	27 lbf.ft.(36 Nm).
Oribitrol mounting bolts	...	22 lbf.ft.(30 Nm).
Oribitrol relief valve plug	...	37 lbf.ft.(50 Nm).
Ball joints	...	90 lbf.ft.(122 Nm).
Clamp bolt	...	35 lbf.ft.(47 Nm).
Track adjustment bolt	...	35 lbf.ft. (47 Nm).
Ball joint nuts	...	70 lbf.ft (95 Nm).
Reservior oil fill plug	...	106 lbf.inch (12 Nm).
Mounting flange mounting bolts	...	37 + 7 lbf.ft (50 + 10 Nm).

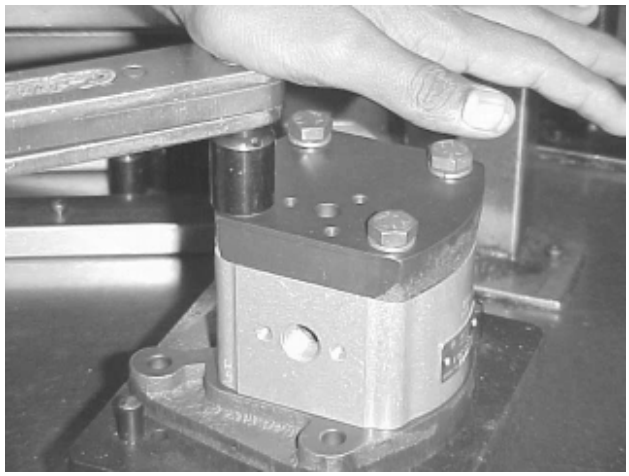
5. Remove housing along with bearing bushes & gears from mounting flange. Mark C & D on drive & driven side bush respectively
6. Remove all seals. Dis assemble bearing bushes and gears from the housing. Do not use hammer or force to separate the components.
7. Remove the mounting flange from the fixture plate. Mount it upside down. Remove circlip.
8. Remove the shaft seal
9. Clean all the components with a suitable cleaning media. Remove burrs from housing.

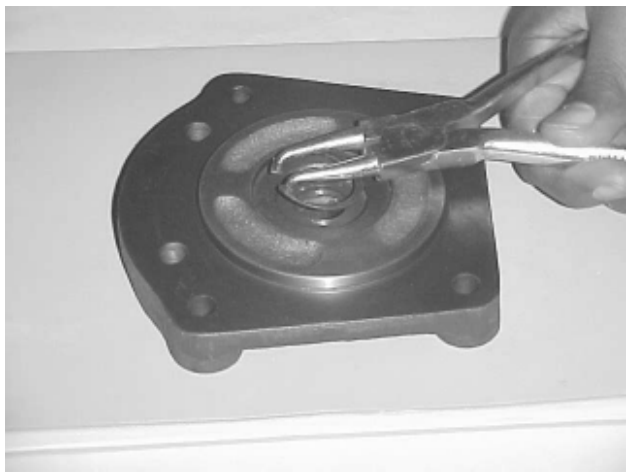
   Do not use file to deburr, use a sharp tool to scrape, such as a triangular scraper.

   Do not use cotton waste or cloth for cleaning/ wiping.
10. Examine the housing, bearing bush surfaces and the bearing sleeves for wear due to contamination etc.
11. If no severe wear is seen in the housing and bearing bushes, re-assemble the pump with new seals as per re-assembly procedure and use the pump.

    If the wear is severe, the pump can not be repaired.



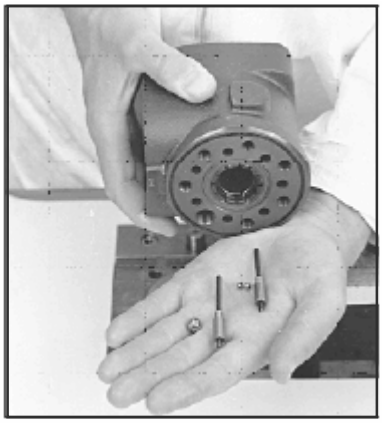




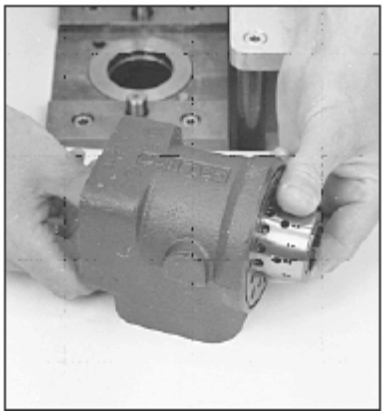
OSPJ 100 ON:

8. Shake out the check valve ball and suction valve pins and balls.

   Note:*On some pins in the OSPJ 100 ON there are two springs.Replace these pins prior to the reassembly.*



9. Take care to keep the cross pin in the sleeve and spool horizontal.The pin can be seen through the open end of the spool.Press the spool inwards and the sleeve,ring,bearing races and needle bearing will be pushed out of the housing together.



38. Fit bearing races and needle bearing as shown in drawing.

Assembly pattern for standard bearing

1 Outer bearing race

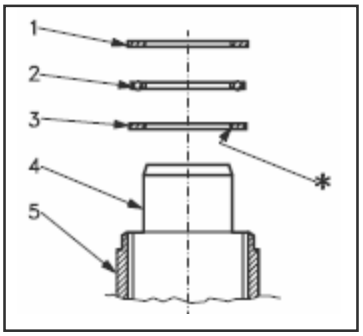
2 Needle bearing

3 Inner bearing race

4 Spool

5 Sleeve

* ***The inside chamfer on the inner bearing race must face the inner spool.***

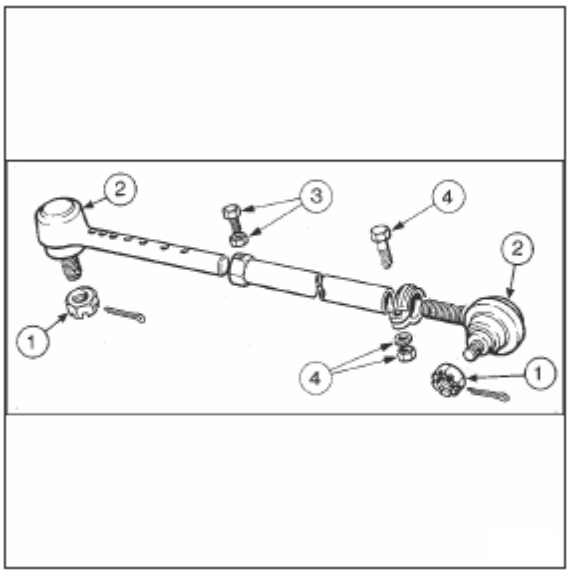


13 A - 9 - DRAG LINKS AND TIE RODS

Overhaul

Dis-assembly

1. Remove the nuts securing the ball joints to the drop arm or spindle arm.
2. Release the ball end by hitting the side of the arm while supporting the opposite side with a block of metal or heavy hammer.
3. Loosen the bolt and locknut and withdraw the ball end.
4. Loosen the clamp bolt and unscrew the ball end.



Examination

Check the ball ends for wear, replacing any defective components. These are safety critical components.

Re-assembly

5. Reverse procedures 1 to 4 except:

   a. Tighten the nuts and bolts to the following torque:

   i. Ball joint nuts 90 lbf.ft (122 Nm).

   ii. Clamp bolt 35 lbf.ft. (47 Nm).

   iii. Track adjustment bolt 35 lbf.ft.(47 Nm).

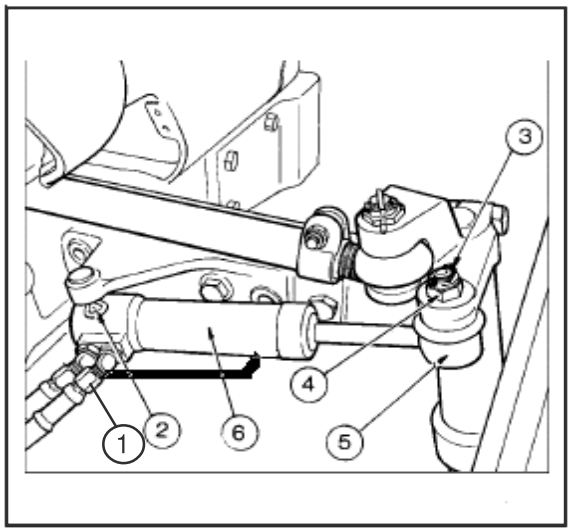
   b. Reset the front wheel toe in, see operation 7A . 2 .

13A - 10 - STEERING RAMS

Removal and refitment

Removal

1. Disconnect both hydraulic pipes to the steering ram.
2. Remove the 'R' clip from the inner pivot pin.
3. Remove the split pin.
4. Remove the slotted nut.
5. Drive the ball joint taper out of the steering arm.
6. Remove the steering ram assembly.



Refitment.

7. Reverse procedure 1 to 6 except:

   a. Tighten the ball joint nuts to a torque of 70 lbf.ft (95 Nm) for M16 UNF ball end nuts.

   b. Refill the reservoir.

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14 A . 14 WORK LIGHT BULB

Removal and refitment (Fig. 10 - 13)

Removal

1. Remove the retaining screws.

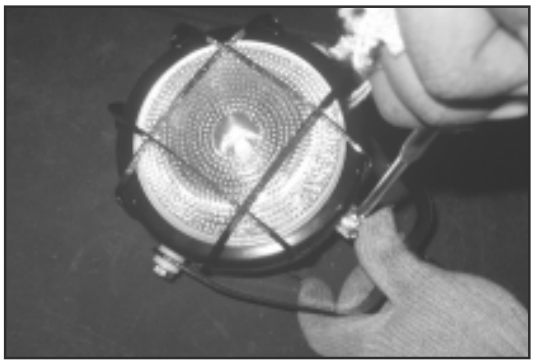


Fig 10

2. Ease the light unit out of the body.

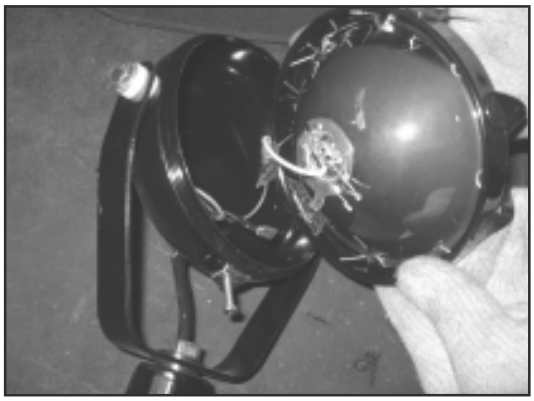


Fig 11

3. Disconnect the wiring connections.

Fig 12

4. Remove the spring clip and take out the bulb.

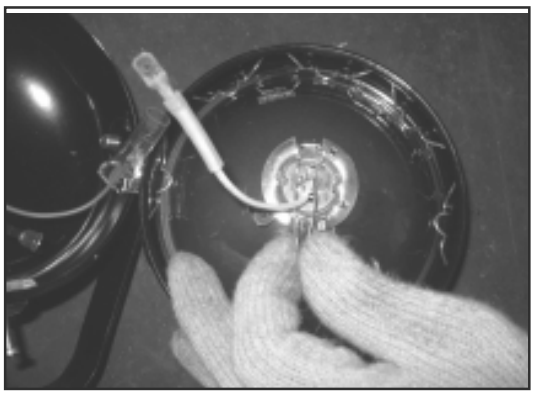


Fig 13

Refitment

5. Reverse the procedure 1 to 4 except .
   a. Replace the failed bulb with a new one.

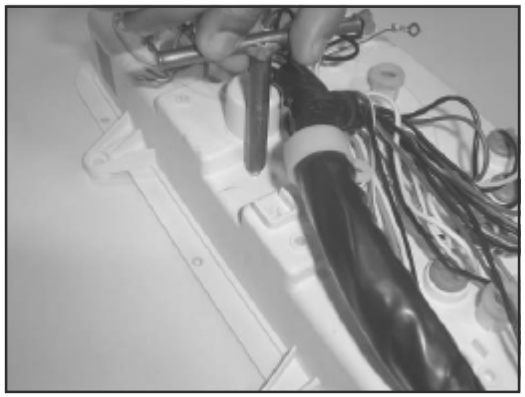
Electronic hour counter RPM meter

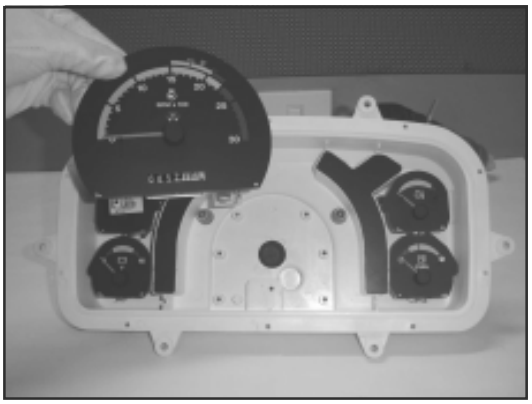
Removal of Assy RPM with hour meter:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the six screws,spring washer and plain washer.
3. Remove the slot nut and washer.
4. Remove the rpm meter from the cluster.

Refitment :

5. Reverse the procedure 1 to 3 except
   a. Tighten the all screws at the torque of 1.5 kgf - cm (1.2 lbf.inch) minimum can be applied.
   b. Ensure proper seating of screws.





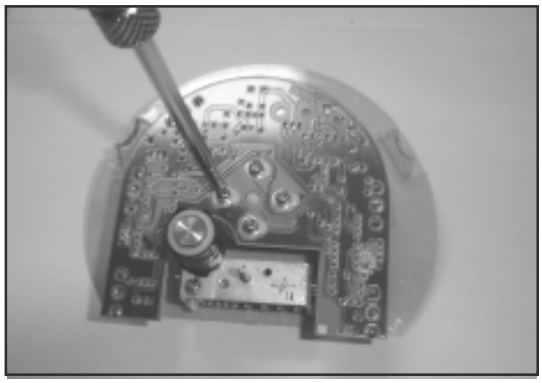
Assy PCB rigid:

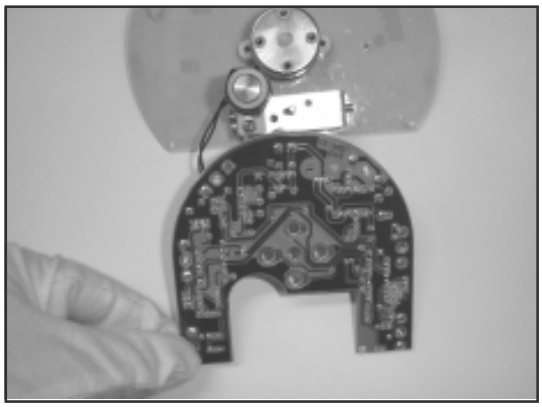
Removal:

1. Remove the cluster from tractor and keep the cluster facing down on scartch free surface.
2. Remove the four screws ,from the RPM meter.
3. Remove the assy PCB rigid from the assy RPM meter.

Refitment :

4. Reverse the procedure 1 to 3 except
   a. Tighten the four screws at the torque of 3.5 kgf - cm - 7 kgf/cm (3 - 6 lbf.inch) minimum can be applied.
   b. Ensure proper seating of screws and gauges.





TEST 3 -

Checking battery voltage on load (Fig.3)Connect a voltmeter across the terminals, as shown in Fig. 3, stop control out: operate the starter switch

Diagnosis:

S.NO	RESULT	ACTION
1	Reading below 9 volts	Remove battery for recharging
2	Reading above 9 volts	Proceed to test 4

TEST 4:-

Checking the voltage to the solenoid (Fig. 4)

If the solenoid operates intermittently during the test or the engine is cranked at low or irregular speed, there may be insufficient voltage at the solenoid operating winding terminal or the solenoid is faulty.

To check the circuit for high resistance (poor connections) connect the voltmeter between the solenoid operating terminal and ground (commutator end bracket) as shown in Fig. 4. When the switch contacts are closed, the reading on the voltmeter should be slightly less than the reading in the first part of test 1. A satisfactory reading indicates a negligible voltage drop in the circuit and consequently the fault may be in the solenoid.

TEST 5 (Fig. 5) :-

Checking the starter terminal voltage under load conditions (Fig. 5) Connect a voltmeter between the starter input terminal and ground (commutator end bracket) as shown in Fig. 5, stop control out, operate the starter switch.

Diagnosis:

S.NO	RESULT	ACTION
1	Difference in reading taken in test 3 - 0.5 volts	Check all connection
2	Same as in test 3	Proceed to test 5

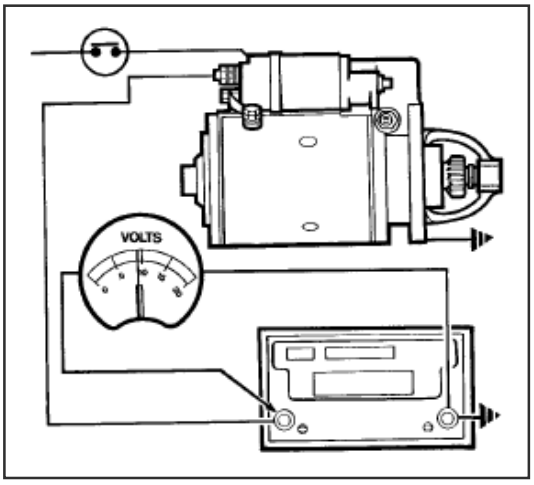


Fig. 3

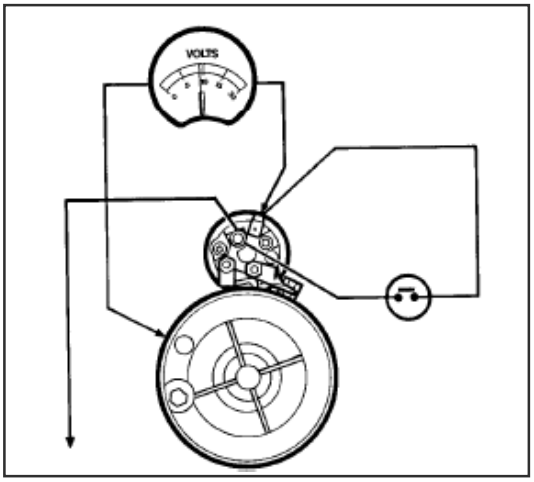


Fig. 4

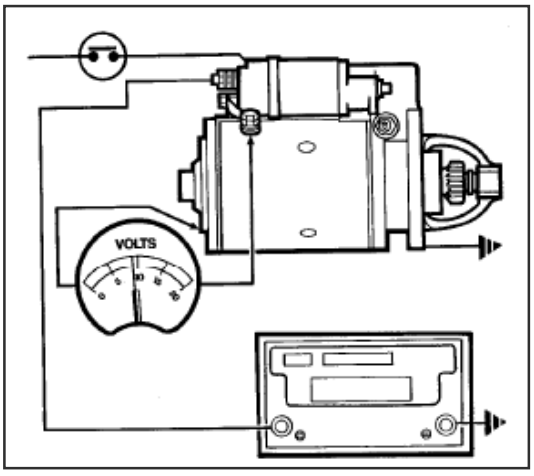


Fig. 5

TEST 4 - Checking alternator maximum output (Fig. 6)

The alternator should run for a few minutes to ensure that the tests are carried out at the normal operating temperature. Then stop the engine.

1. Switch on all lights to create a load, and discharge the battery for 1 minute.
2. Disconnect the battery ground cable.
3. Disconnect the wires on the back of the alternator.
4. Connect a test link (jump lead) between the small terminal (IND) on the alternator and the IND connection wire on the harness
5. Connect the ammeter between B positive terminal on alternator and the mating wire on harness

NOTE: *The clips or test probes on the ammeter MUST NOT touch the alternator casing before or during the test. A short circuit will result which will damage the alternator.*

6. Re-connect the battery ground cable.
7. Switch on, check that the warning light comes on.
8. Start the engine and slowly increase to maximum rated speed, the ammeter reading should equal the maximum rated output of the alternator of 30 to 35 Amps.

NOTE: *As the state of charge of the battery increases so the output of the alternator will decrease. The rated output of the alternator should be checked quickly.*

Diagnosis:

Result	Action
Ammeter reading low	Replace or repair alternator
Ammeter reading 40 - 45 Volts	Proceed to test 5

TEST 5 - Checking voltage drop in charging circuit (Fig. 7)

Use a voltmeter to check for high resistance (poor connections) in the charging circuit, see Fig. 7.

1. Connect a voltmeter between the battery insulated (+) terminal and the alternator main output terminal.
2. Switch on all lights to create a load. Start the engine and increase to maximum rated speed. The voltmeter reading should not exceed 0.5 volts.

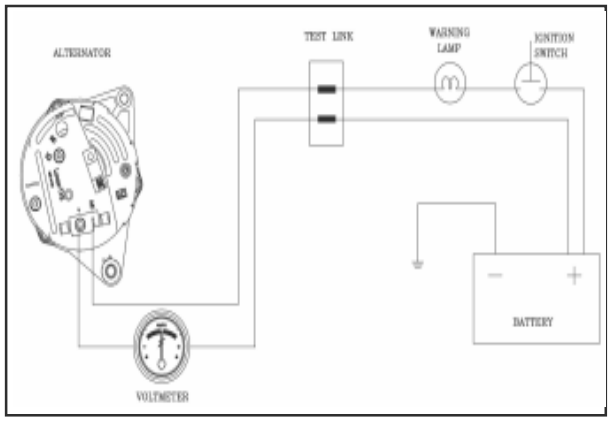


Fig 6

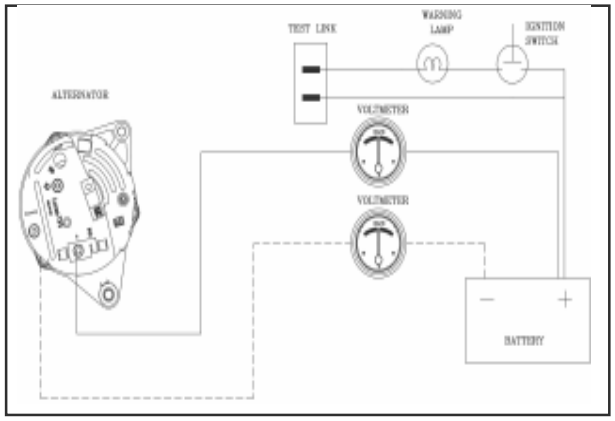


Fig 7

3. Transfer the voltmeter connections to the battery ground (-) terminal and the alternator body.
4. Start and run the engine as in (2).The voltmeter reading should not exceed 0.25 volts.

S.NO	RESULT	ACTION
1	2.Reading above 0.5 volts	Check all wirings for loose connections
2	4.Reading above 0.35 volts	
3	Reading below 0.5 volts	Proceed to test 6

15.A.4 FRONT WHEELS AND TIRES

The Tractor fitted with pressed steel rims and discs.

Tire Pressures

Front tire pressures are very critical, as they can affect the steering characteristics of the tractor considerably.

Refer specifications section for recommended tire pressure.

Front Wheels and Tires

For removal and refitment of front tube and tire, follow the procedure given for rear tire and ensure the front wheel pressure is maintained as per recommendation.

Note : *Always use a safety cage (Fig. 2.)*

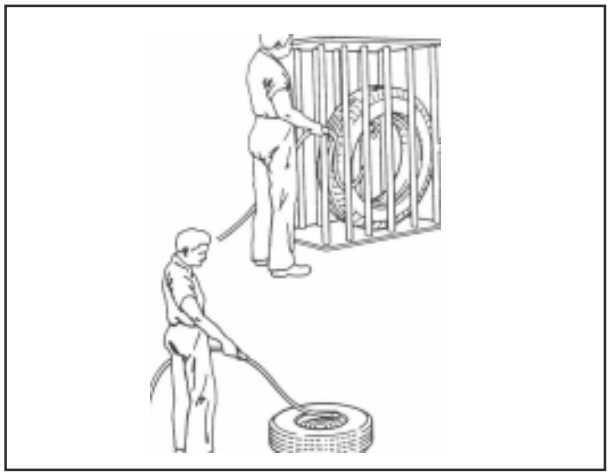


Fig. 2

15.A.5 REAR INNER TUBE

Removal and Refitment

Special Tools

"Bead-breaking" tool

3 lb Hammer

Tire Levers

Removal

1. Lay the wheel on the ground with the valve stem up.
2. Deflate the tire by removing the valve core and the valve retaining nut.
3. Drive the "Bead-breaking" tool between the tire and rim, taking care not to damage the rim or the tire. (Fig. 3).
4. After the bead has been released from the rim, invert the wheel and repeat above procedure 3.
5. Lubricate the rim, tire and base of the tube with a solution of soap and water or similar rubber lubricant. (Fig. 4).

   Note : *Never use petroleum or silicone base greases.*

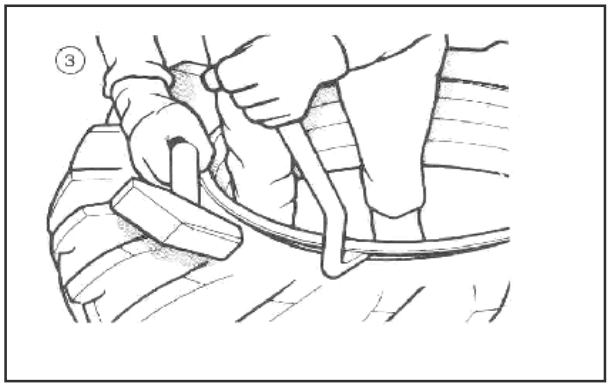


Fig. 3

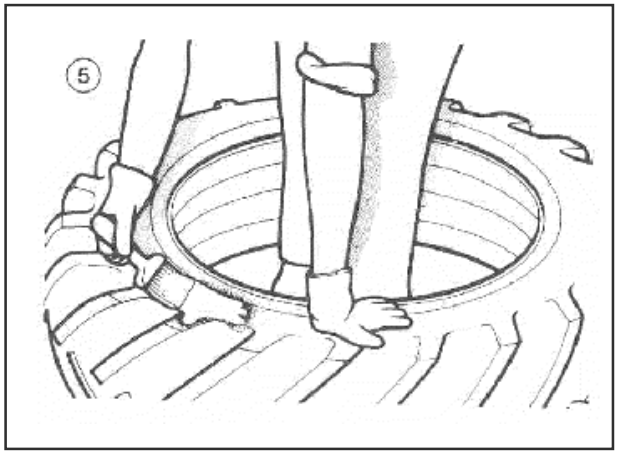


Fig .4

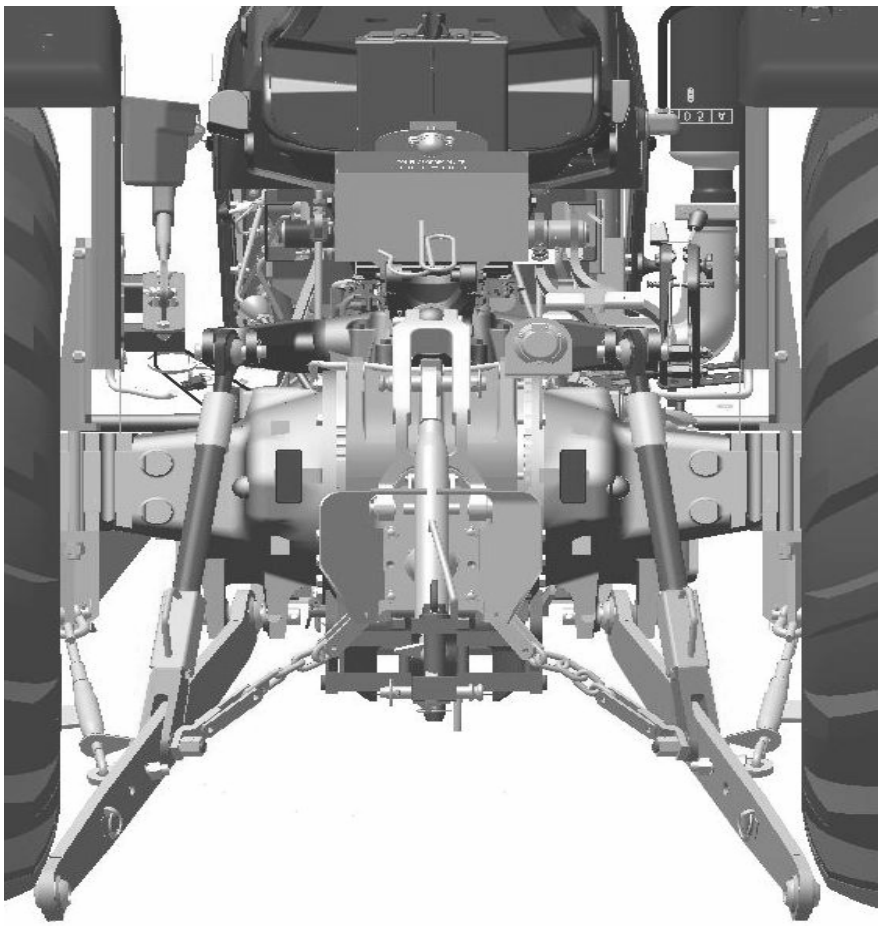


Fig 1