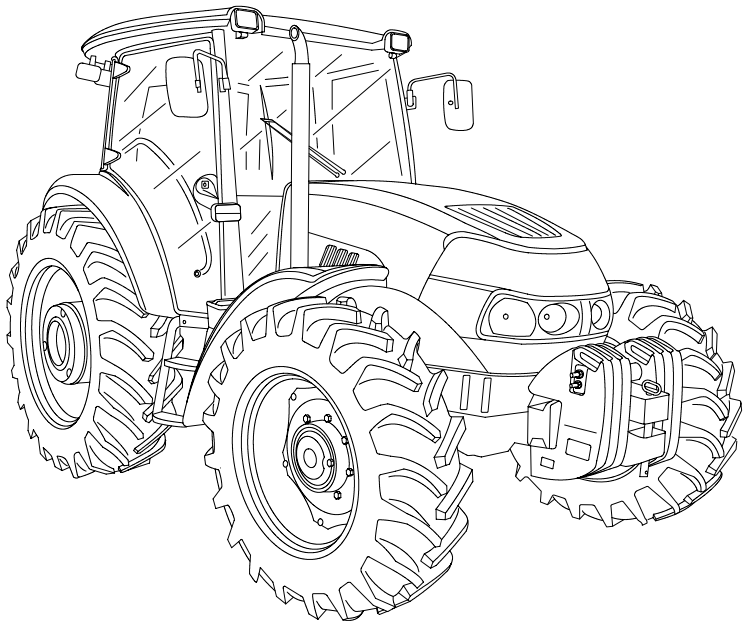


FARMALL 70JX – FARMALL 75JX – FARMALL 80JX – FARMALL 90JX – FARMALL100JX – FARMALL 110JX
MODEL TRACTORS
SERVICE MANUAL

SECTIONS

47454233 – 10-2012

SAFETY RULES

PAY ATTENTION TO THIS SYMBOL

This warning symbol points out important messages involving personal safety. Carefully read the safety rules contained herein and follow advised precautions to avoid potential hazards and safeguard your safety and personal integrity. In this manual you will find this symbol together with the following key-words:

***WARNING** - it gives warning about improper repair operations and deriving potential consequences affecting the service technician's personal safety.*

***DANGER** - it gives specific warning about potential dangers for personal safety of the operator or other persons directly or indirectly involved.*

TO PREVENT ACCIDENTS

Most accidents and personal injuries taking place in workshops are due from non-observance of some simple and essential prudential rule and safety precautions. For this reason, IN MOST CASES THEY CAN BE AVOIDED. It suffices to foresee possible causes and act consequently with necessary caution and care.

The possibility that an accident might occur with any type of machines should not be disregarded, no matter how well the machine in question was designed and built.

A wise and careful service technician is the best precautions against accidents.

Careful observance of this only basic precaution would be enough to avoid many severe accidents.

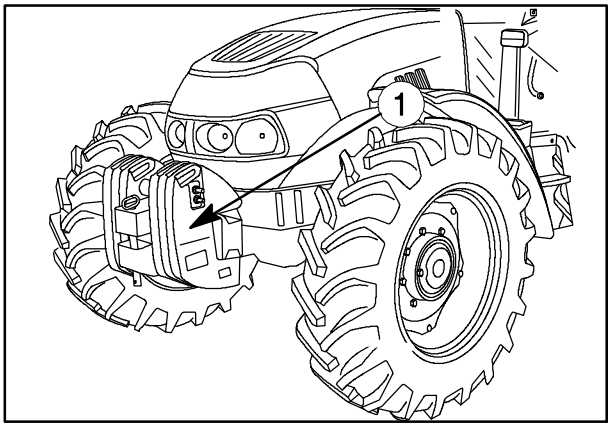
DANGER: Never carry out any cleaning, lubrication or maintenance operations when the engine is running.

SAFETY RULES

GENERALITIES

- Carefully follow specified repair and maintenance procedures.
- Do not wear rings, wristwatches, jewels, unbuttoned or flapping clothing such as ties, torn clothes, scarves, open jackets or shirts with open zips which could get hold into moving parts. We advise to use approved safety clothing such as anti-slipping footwear, gloves, safety goggles, helmets, etc.
- Never carry out any repair on the machine if someone is sitting on the operator's seat, except if they are certified operators to assist in the operation to be carried out.
- Never operate the machine or use attachments from a place other than sitting at the operator's seat.
- Never carry out any operation on the machine when the engine is running, except when specifically indicated.
- Stop the engine and ensure that all pressure is relieved from hydraulic circuits before removing caps, covers, valves, etc.
- All repair and maintenance operations should be carried out with the greatest care and attention.
- Service stairs and platforms used in a workshop or in the field should be built in compliance with the safety rules in force.
- Disconnect the batteries and label all controls to warn that the tractor is being serviced. Block the machine and all equipment which should be raised.
- Never check or fill fuel tanks and accumulator batteries, nor use starting liquid if you are smoking or near open flames as such fluids are flammable.
- Brakes are inoperative when they are manually released for maintenance purposes. In such cases, the machine should be kept constantly under control using blocks or similar devices.
- The fuel filling gun should remain always in contact with the filler neck. Maintain this contact until the fuel stops flowing into the tank to avoid possible sparks due to static electricity buildup.

5. Remove the weights (1) from the front support.



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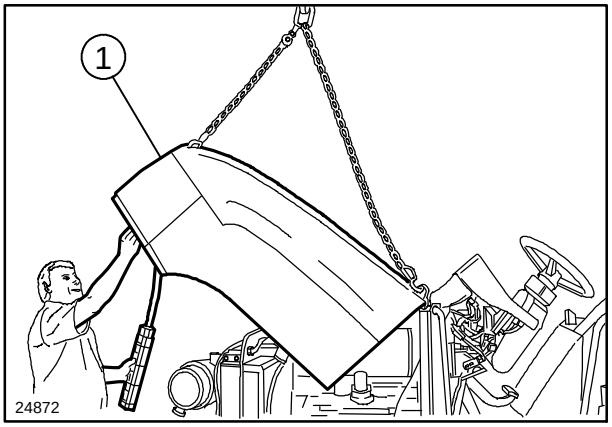
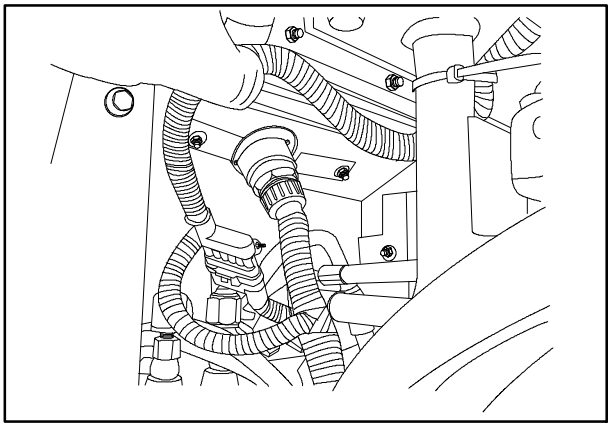
6. Remove the exhaust pipe, attach lifting chains to the bonnet (1) and attach the chain to the hoist.



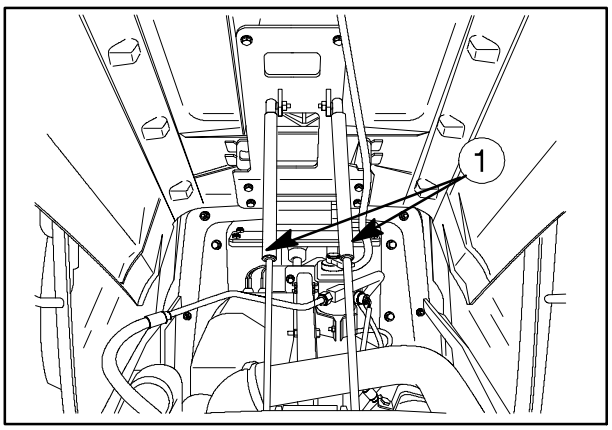
13

7. Disconnect the electrical connection (1) of bonnet.



14

8. Detach the gas struts (1) from the bonnet.



15

CHECKS, MEASUREMENTS AND REPAIRS – LUBRICATION SYSTEM

WARNING

Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing, safety goggles, gloves and footwear.

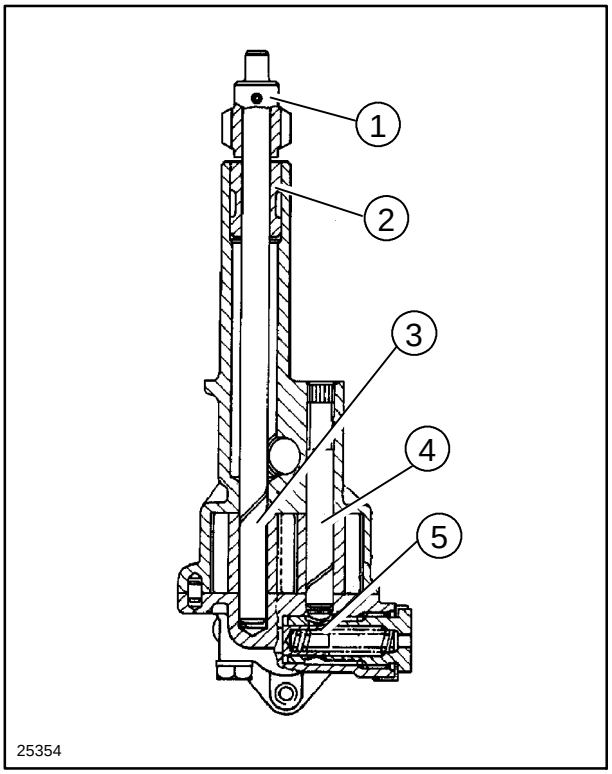
Clean all parts carefully before proceeding with the operations described below.

OIL PUMP – Overhaul

To access the oil pump, remove the sump pan.

When servicing the pump, check component wear against dimensions specified in the table.

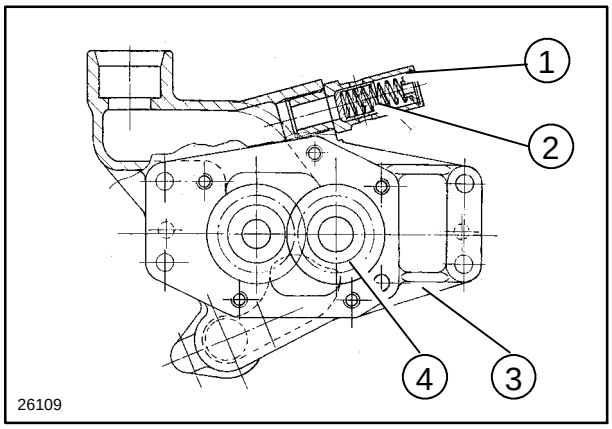
In case of replacement, note that the drive shaft (3) and drive gear are supplied ready assembled, with the gear hot shrink–fitted on the shaft.



179

Cross–sectional view of engine lubrication oil pump models Farmall 70JX and Farmall 80JX Models

1. External drive gear.
2. Bushing.
3. Drive shaft and gear.
4. Driven shaft and gear.
5. Pressure relief valve.



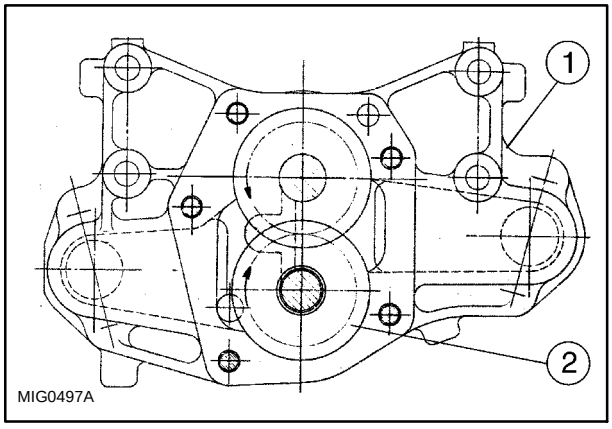
180

Cross–sectional view of engine lubrication oil pump models Farmall 90JX Farmall 100JX and Farmall 110JX Models

1. Pressure relief valve.
2. Spring.
3. Pump housing.
4. Internal gears.

Cross–sectional view of engine lubrication oil pump models Farmall 75JX Model

1. Pump housing.
2. Internal gears.



181

SECTION 18 – CLUTCH

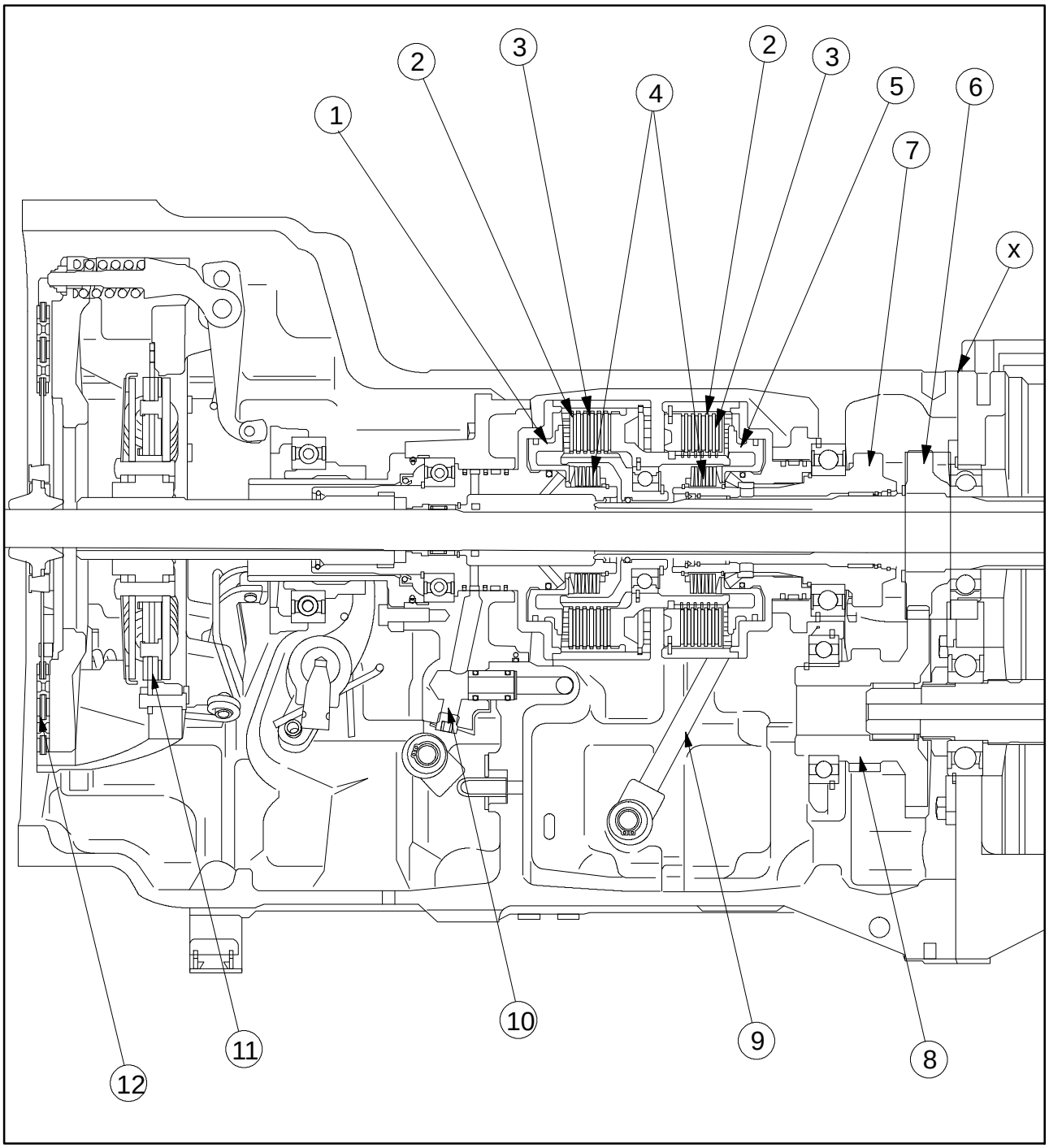
Chapter 1 – Clutch

CONTENTS

GENERAL SPECIFICATIONS, CLUTCH 11”/11”

(Models Farmall 70JX, Farmall 80JX, Farmall 75JX)

Type		Dual clutch consisting of two single dry plate clutches
Mechanical		control: pedal operation for main clutch and hand lever for power take–off clutch
Engagement and release mechanism		single Belleville spring
Driven plate lining material for main transmission clutch (11”)		
Models Farmall 70JX and Farmall 80JX		Organic agglomerate
Models Farmall 75JX		cerametallic
Driven plate lining material for PTO clutch (11”)		
Models Farmall 70JX, Farmall 80JX, Farmall 75JX		Organic agglomerate
Driven plate thickness:		
. main clutch (9, fig. 1)		
. VALEO		
. Organic agglomerate and cerametallic	mm (in.)	10.2 to 10.8 (0.4016 to 0.4252)
. PTO clutch (11, fig. 1)		
. VALEO	mm (in.)	7.3 to 7.9 (0.2874 – 0.3110)
. wear limit	”	See pages 25
Clearance between main clutch release sleeve and related seat	mm (in.)	0.050 to 0.151 (0.0020 to 0.0059)
Clearance between PTO clutch release sleeve and related seat	mm (in.)	0.050 to 0.151 (0.0020 to 0.0059)
Release lever coplanarity adjustment		See page 26
Clutch control adjustment		See page 28



1

Longitudinal cross–sectional view of Power Shuttle gearbox

1. Forward clutch control piston.
2. Steel disks.
3. Friction disks.
4. Piston return Belleville washer.
5. Reverse clutch control piston.
6. Forward Speed Driving gear.
7. Reverse Speed Driving gear.
8. Driven gear
9. Reverse speed clutch control pipes.
10. Forward speed clutch control pipes.
11. Main clutch
12. PTO clutch

Note – On assembly apply a bead of sealing compound to the surfaces **X** as indicated on page 6, chap. 1.

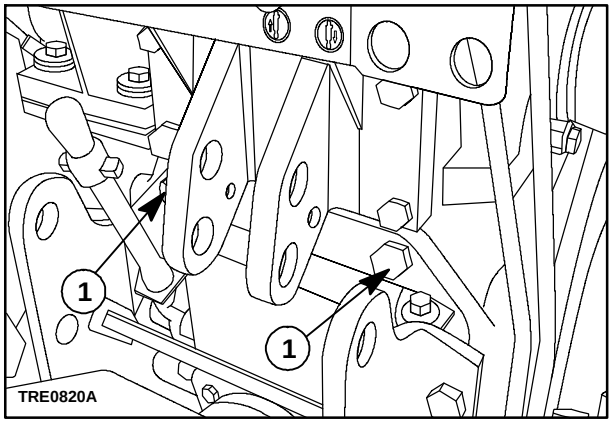
MAIN DATA

Bevel Drive and Differential		
- Thickness of pinion bearing adjustment spacer		
Farmall 70JX and Farmall 80JX Models	mm	2.5-2.55-2.6-2.65-2.7-2.75-2.8-2.85-2.9-2.95-3.00-3.05-3.10-3.15-3.2-3.25-3.3-3.35-3.4-3.45-3.5-3.55-3.6-3.65- 3.7
	(in.)	(0.0984-0.1004-0.1024-0.1043-0.1063-0.1083-0.1102-0.1122-0.1142-0.1161-0.1181-0.1201-0.1220-0.1240-0.1260-0.1280-0.1299-0.1319-0.1339-0.1358-0.1378-0.1398-0.1417-0.1437-0.1457)
Farmall 75JX, Farmall 90JX Farmall 100JX and Farmall 110JX Models	mm	2.2-2.25-2.30-2.35-2.40-2.45-2.5-2.55-2.6-2.65-2.7-2.75-2.8-2.85-2.9-2.95-3.00-3.05-3.1-3.15-3.2-3.25-3.3-3.35-3.4
	(in.)	(0.0866-0.0886-0.0906-0.0925-0.0945-0.0965-0.0984-0.1004-0.1024-0.1043-0.1063-0.1083-0.1102-0.1122-0.1142-0.1161-0.1181-0.1201-0.1220-0.1240-0.1260-0.1280-0.1299-0.1319-0.1339)
- Thickness of crown wheel position adjustment spacer		
Farmall 70JX and Farmall 80JX Models	mm	2.5-2.6-2.7-2.8-2.9-3.00-3.1-3.2-3.3-3.4-3.5-3.6-3.7
	(in.)	(0.0984-0.1024-0.1063-0.1102-0.1142-0.11811-0.1220-0.1260-0.1299-0.1339-0.1378-0.1417-0.1457)
Farmall 75JX, Farmall 90JX and Farmall 100JX and Farmall 110JX Models	mm	2.2-2.3-2.4-2.5-2.6-2.7-2.8-2.9-3.0-3.1-3.2-3.3-3.4-3.5
	(in.)	(0.0984-0.1024-0.1063-0.1102-0.1142-0.11811-0.1220-0.1260-0.1299-0.1339-0.1378-0.1417-0.1457)
- Clearance between sides of planet and side pinion teeth .	mm (in.)	0.15 (0.0059)
- Thickness of planet pinion thrust washers	mm (in.)	1.470 - 1.530 (0.0579 - 0.0602
- Thickness of side gear thrust washers	mm (in.)	1.50 to 1.60 (0.0591 to 0.0630)
- Diameter of cross pin for planet pinions		
Farmall 70JX and Farmall 80JX Models	mm (in.)	21.939 - 21.960 (0.8637 - 0.8646)
Farmall 75JX, Farmall 90JX Farmall 100JX and Farmall 110JX Models	mm (in.)	23.939 - 23.960 (0.9425 - 0.9433)
- Side diameter cross pin bore diameter		
Farmall 70JX and Farmall 80JX Models	mm (in.)	22.040 - 22.961 (0.8677 - 0.9040)
Farmall 75JX, Farmall 90JX Farmall 100JX and Farmall 110JX Models	mm (in.)	23.940 - 23.961 (0.9425 - 0.9433)
- Clearance between cross pin and bores		0.080 - 0.122 (0.0031 - 0.0048)
- Diameter of outer axle shafts and corresponding bushes		
Farmall 70JX and Farmall 80JX Models	mm (in.)	37.961 - 38.000 (1.4945 - 1.4961)
Farmall 75JX, Farmall 90JX Farmall 100JX and Farmall 110JX Models	mm (in.)	43.961 - 44.000 (1.7307 - 1.7323)
- Inside diameter of installed bushes		0.77 - 0.83 (0.0303 - 0.0327)
Farmall 70JX and Farmall 80JX Models	mm (in.)	38.080 - 38.199 (1.4992 - 1.5039)

TORQUE SETTINGS - Refer to fig. 1 on page 6

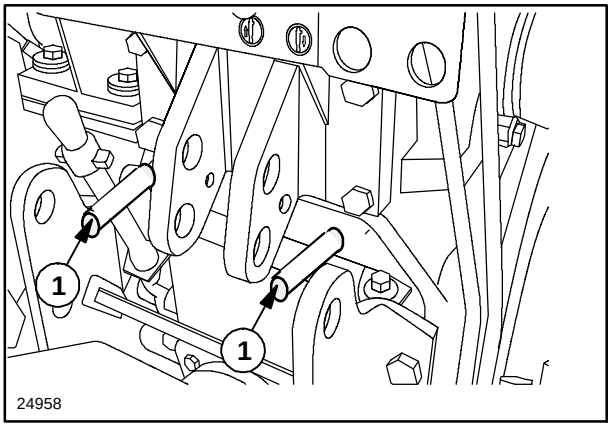
PART TO BE TIGHTENED	Thread	Torque settings	
		Nm	ft lb
Retaining bolts for rear transmission/gearbox upper cover (C_1) ...	M 10 x 1.25	59	43.5161
Bolts for securing lift to rear transmission box (C_2)	M 12 x 1.25	98	72.2811
Bolts for securing PTO box to transmission / gearbox case (C_3)	M 16 x 1.5	221	163.0012
Bolts for securing torsion bar to transmission / gearbox case (C_4)	M 16 x 1.5	221	163.0012
Nuts for stud bolt securing final drive box to transmission / gearbox case (C_5)	M 12 x 1.25	98	72.2811
Drive wheel hub to disc retaining nuts (C_6)	M 18 x 1.5	255	188.0783
Drive wheel rim to disc retaining nuts (C_7)	M 16 x 1.5	245	188.7027
Ring bevel gear retaining bolts (C_8)	M 12 x 1.25	123	90.7201
Bevel drive - differential support retaining self-locking bolts (C_9)	M 10 x 1.25	59	43.5161
Final drive casing cover retaining bolts (C_{10})	M 10 x 1.25	59	43.5161
Drive wheel axle retaining nut (C11)	M 55 x 1.5 M 60 x 2	882 882	650.5297 650.5297
Differential lock pedal support retaining bolts	M 10 x 1.25	49	36.1405
Nuts for drive wheel ballast ring retaining bolts	M 14 x 1.5	98	72.2811

9. Remove the two upper screws (1) which fasten the PTO unit to the transmission.



23

10. Insert the two guide pins **380001597** (1) and remove the two lower screws (2) (Fig. 3 Page.6) which fasten the PTO unit to the transmission.

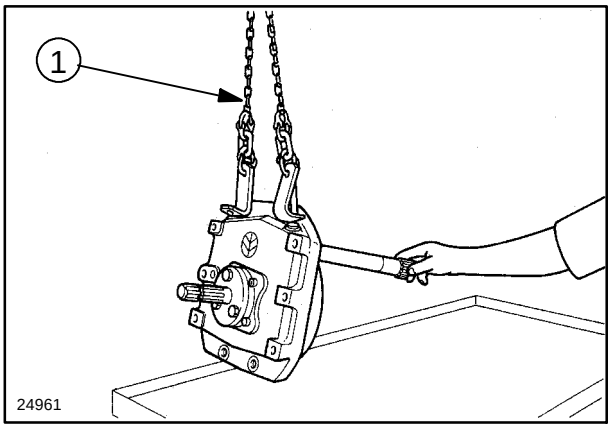


24

11. Engage the lever (1) fig. 9, in position (C), ground speed PTO, so that the sleeve (3) fig. 12, rests on the shaft (2) during the removal operation.
Withdraw the PTO unit by a few centimetres and detach using the hook with lifting chain **380000227** (1).

To reinstall proceed as follows:

— Clean the mating surfaces between the transmission and PTO cover and apply sealing compound as shown in figure 26.
— Raise the PTO unit and position it directly behind the transmission casing. Slide the PTO cover onto the guide pins **380001597**, for ease of assembly.
— Remove the hook with chain (1) fig. 25, and fasten the PTO unit using the two lower screws.
— Remove the two guide pins **380001597** and install the two upper screws.
— Reinstall the bracket (1) fig. 22, that retains the PTO speed selector control lever.
— Refit the tow bar support.
— Refit the tow bar, the tow hook and the three-point linkage top link.
— Screw in and tighten the oil drain plug and fill the transmission/gearbox with oil.
— Reconnect the negative battery cable.



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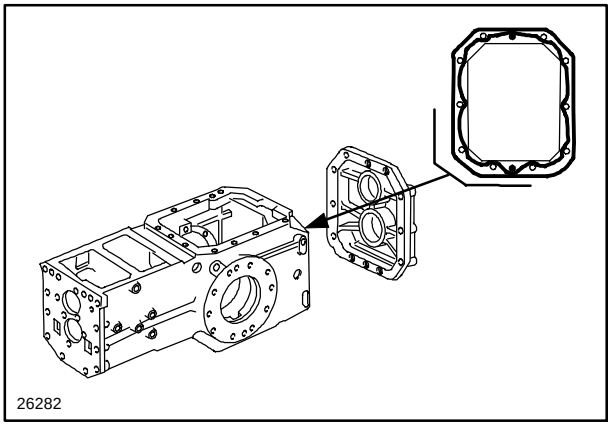

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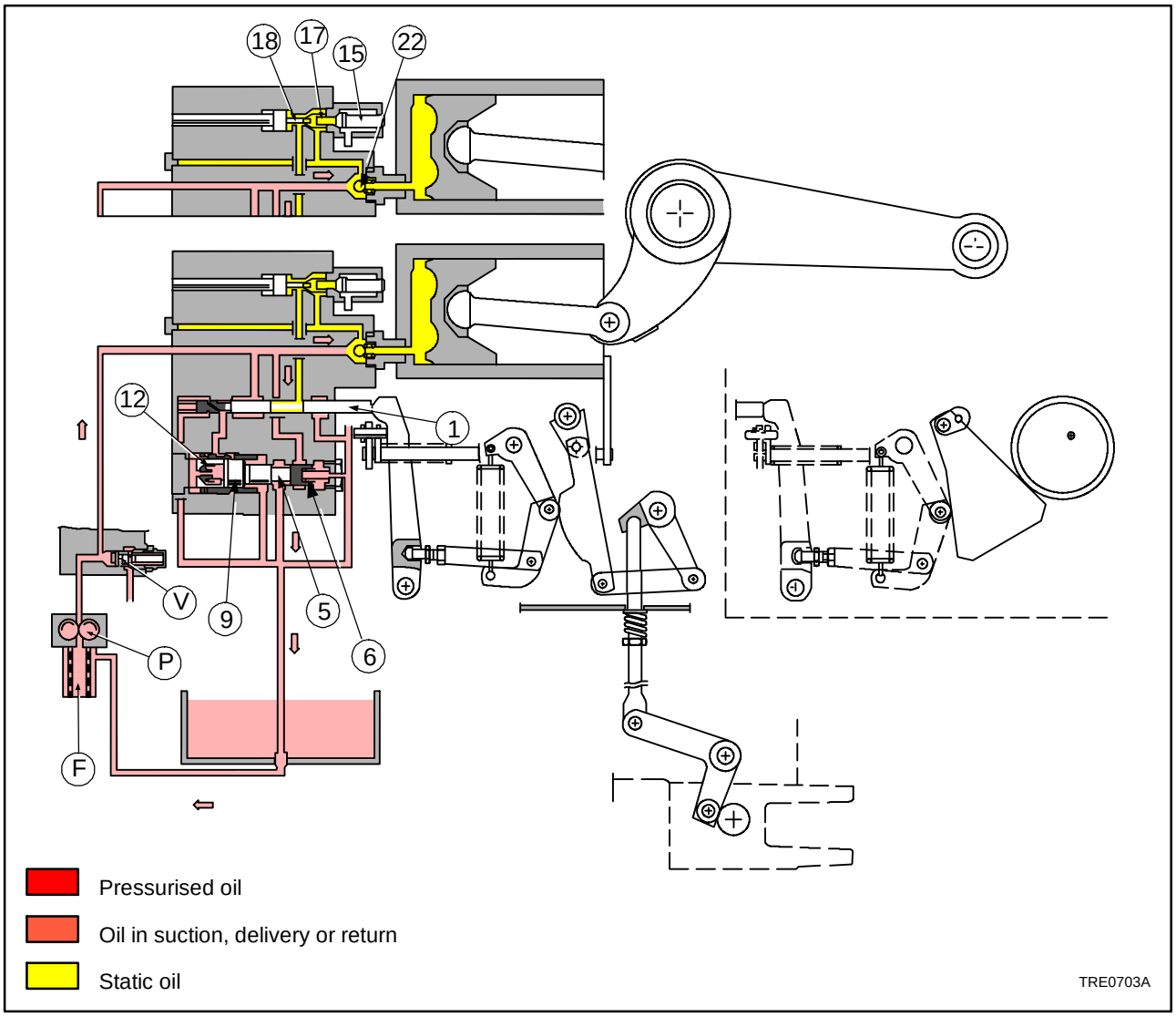


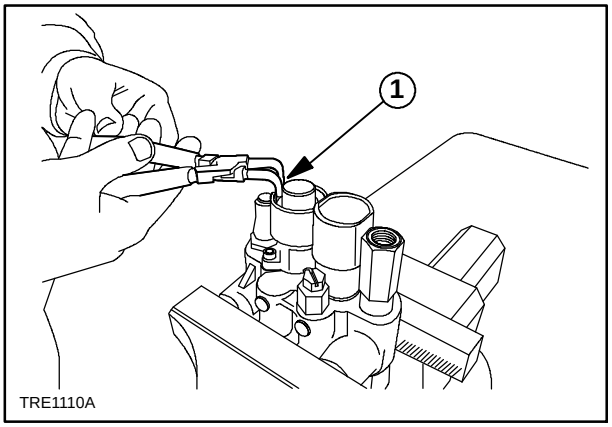
5

NEUTRAL PHASE

F. Filter.
P. Hydraulic pump.
V. Relief valve.
1. Valve spool.
5. Plunger.
6. Plunger spring.
9. Piston.
12. Draft sensitivity valve.
15. Cylinder safety valve.
17. Arm lowering speed control valve.
18. Ball.
22. Check valve.

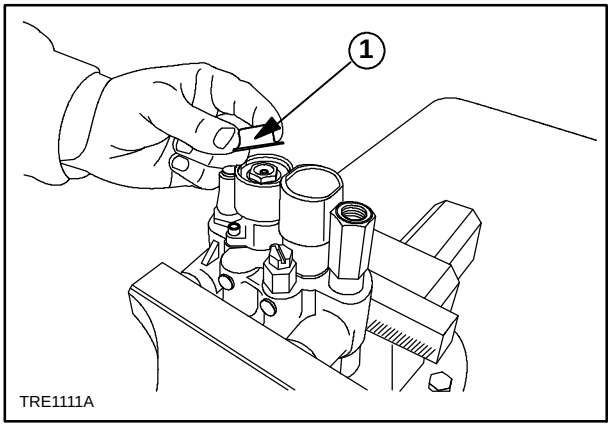
With spool (1) in the neutral position, oil is delivered through the response adjusting valve (12) to piston (9), which overcomes spring reaction (6) and moves plunger (5) to the right. This opens the exhaust port and directs oil flow to the tank in the rear transmission housing rather than to the cylinder.

9. Remove circlip (1) Fig.22.



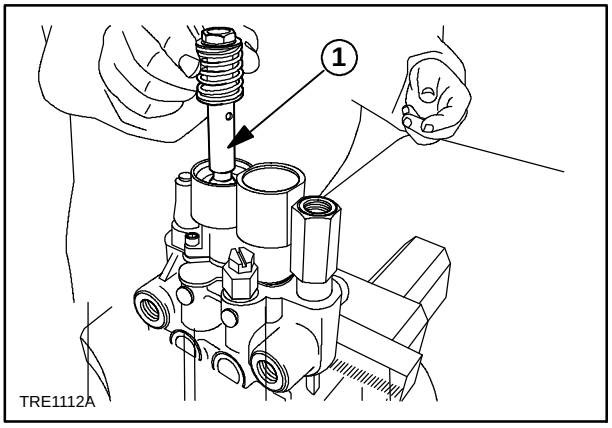
22

10. Take off the cover (1) Fig. 23.



23

11. Remove the spool assembly (Detent release) (1) Fig.24.



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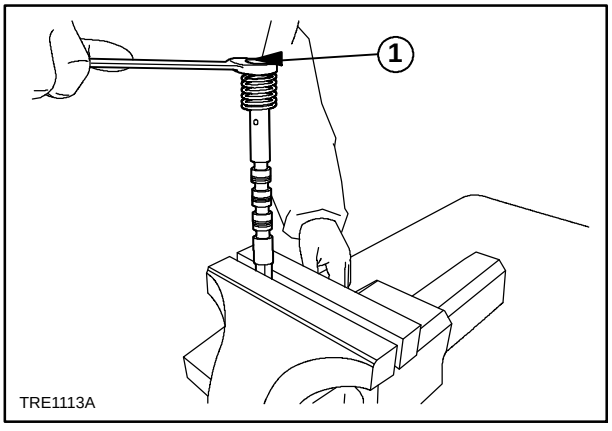
12. Remove the nut (1) Fig.25 fixing the assembly.



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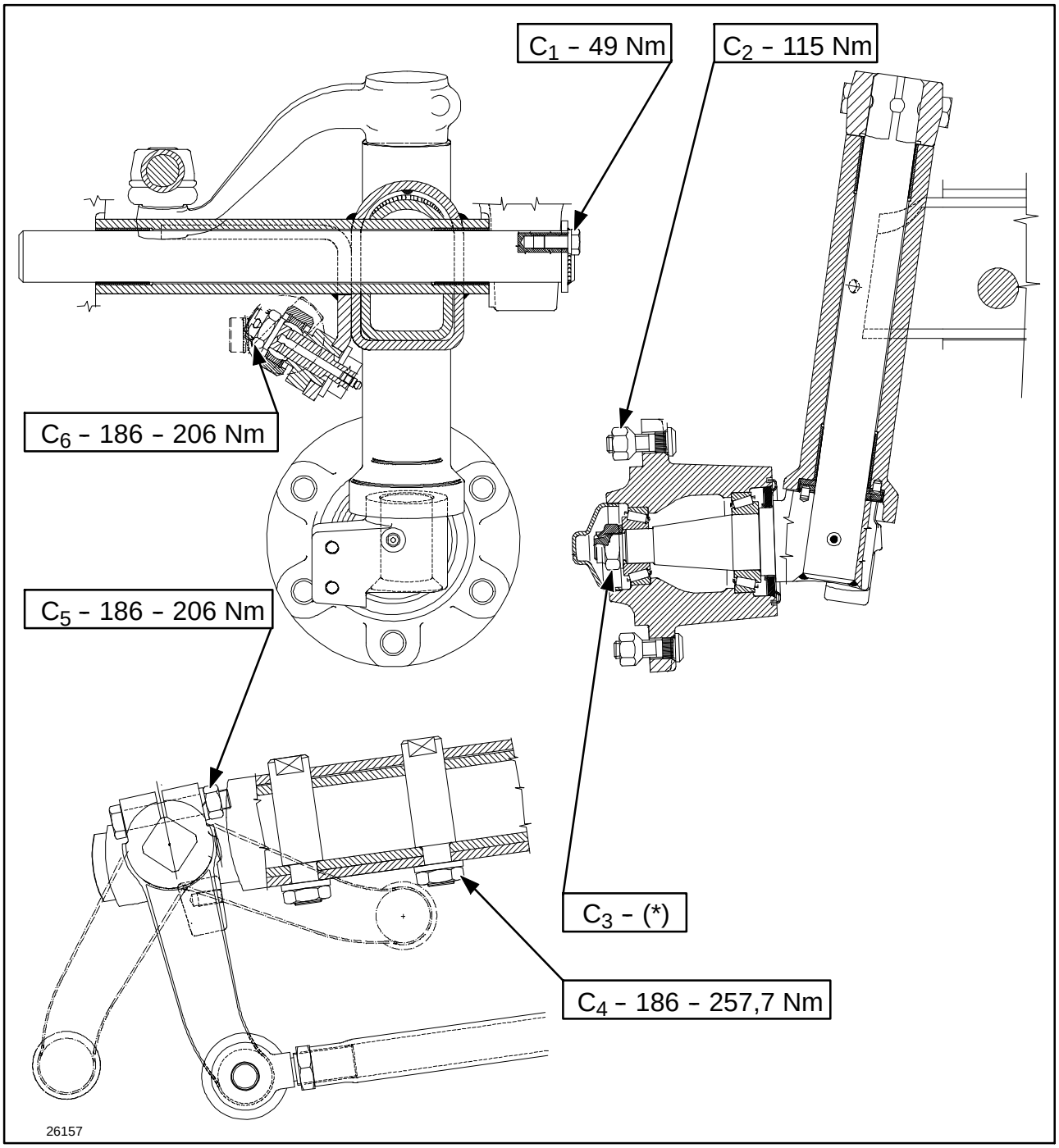


3

Front axle torque settings

C1 Axle articulation pin fixing screw
C2 Retaining bolt holding the disc to the wheel hub
C3 Bearing adjuster nut
C4 Axle end fixing nut
C5 Nut for stub axle pin control lever fixing screw
C6 Nut securing cylinder to fulcrum pin
* See operations 11. and 12. page 15.

47. Rotate the outer casing (30) so that pressure value indicated on the graduated scale corresponds with the value shown on pressure gauge (2).

48. When the refrigerant in the cylinder has reached the required level, as indicated on the glass rod (29), close the cock of the external cylinder, the cock on the charging pipe (24) and cock (27).

Note – If excessive time is required to transfer refrigerant from the external cylinder to cylinder (31), slightly open valve (1) and discharge air from the cylinder (31); the pressure reading on gauge (2) should not exceed 5 bar.

Evacuation of the cab air conditioning system (previously discharged using the recovery/recycling station)

49. Remove the caps from the service valves on the suction and discharge lines of the compressor.

Refer to figure 17 and proceed as follows:

50. Connect the blue service pipe (17) to the valve on the low pressure side of the compressor marked " S ".

51. Connect the red service pipe (15) to the valve on the high pressure side of the compressor marked " D ".

52. Open the quick–fit cocks (16).

53. Open cocks (4 – 9 – 10 – 22).

54. Start the pump by turning switch (19) to position "I" and evacuate the system for at least thirty minutes; pressure gauges (5 – 6 – 8) should show a negative reading. If the evacuation procedure dose not function correctly, check all connections.

55. Close cock (9), switch off the pump by turning switch (19) to position "0" and check the vacuum seal for at least five minutes using vacuum meter (8). This done, close all cocks.

Charging the cab air conditioning system (after evacuation) with new oil

If no refrigerant leaks, whether major or minor, have ever been found in the system, on recharging, replace the contaminated oil previously recovered in operations (25 and 26, page 24) with the same quantity of new oil. If, on the contrary, significant leaks have occurred in the past, proceed with the compressor oil level check procedure.

Refer to figure 16 and proceed as follows:

56. Pour the oil into the graduated oil meter of kit **294043**.

57. Connect the oil meter to the oil meter (20).

58. Close cocks (4 and 10).

59. Set switch (19) to position "2" to switch on the refrigerant heater on cylinder (31).

60. Open cock (12) and the cock on the graduated oil meter.

61. Check the quantity of oil flowing from the oil meter, and once the required quantity has been reached, close cocks (12) and the cock on the oil meter, and remove the graduated meter.

Charging the cab air conditioning system with refrigerant (after evacuation)

Note – The quantity of refrigerant to be put into the system is 1600 grams (3.5274 lb) (refrigerant R134a).

Refer to figure 17 and proceed as follows:

62. Keep switch (19) in position 2, with the refrigerant heater in cylinder (31) on, and heat the refrigerant for approx. 10 ‰ 15 minutes to facilitate transfer from the cylinder to the air conditioning system on the tractor.

63. According to the refrigerant type, rotate the outer casing (30) so that the graduated scale and the pressure values correspond with the pressure reading on gauge (2).

64. Move the external ring (26) along the cylinder glass to mark the quantity of refrigerant to be charged.

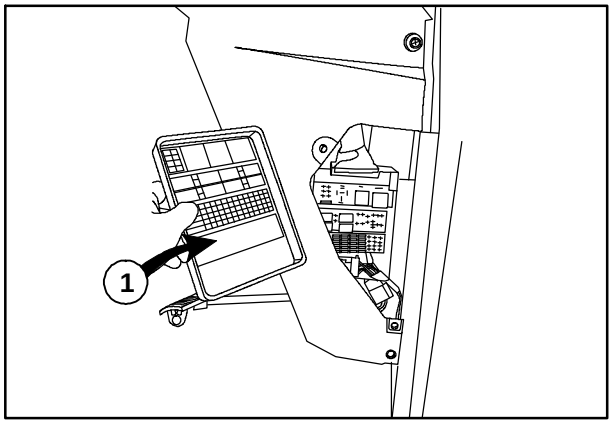
65. Open cock (22) and charge from the high pressure side.

66. Open cock (3), charge approx. 300 grams (0.6617 lb) of refrigerant, close cock (3) and check for leaks.

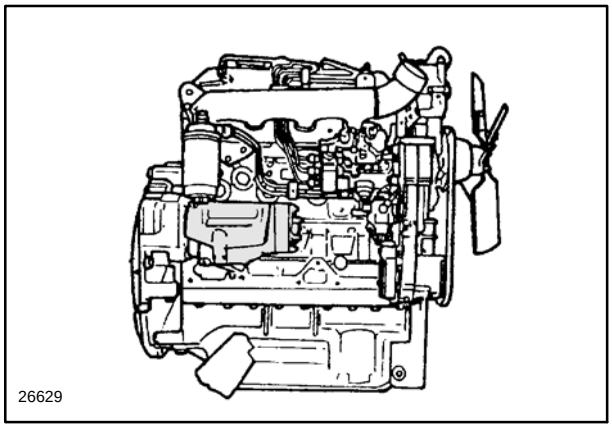
67. If there are no leaks, continue charging up to the prescribed quantity.

68. On completion of charging, turn switch (19) back to position "0", close cocks (3 and 22), disconnect pipes (17 and 15), and replace the caps on the service valves.

Carry out functional tests with the system set to maximum performance levels, as described below.



Fuse panel 28



Starter motor 29

SYSTEM TESTS

STARTING SYSTEM ON TRACTOR TEST

To easily and quickly trouble-shoot the starting system problems and reach conclusive results, it is recommended that you use a battery/starting tester (high discharge multimeter) with incorporated 0-20V voltmeter and 0-500 A ammeter.

When using testing devices, follow test procedures recommended by the manufacturer. If you do not have access to testing devices, carry out the following test using a normal 0-20V voltmeter and a 0-500 Amp ammeter in order to check correct starter motor functioning without removing it from the engine.

Before carrying out the test:

- check the battery is fully charged;
- check that no wires in the starting system are broken or frayed and that there are no loose connections;
- check the engine is not seized.

is hot (50 ·C (122 ·F) or higher), temporarily reduce or stop battery charging to avoid damaging the battery.

Table 2

	Type of battery	
	105Ah (760 cca)	120Ah (800 cca)
Slow charging programmes	25 hrs at 5A 12,5 hrs at 10A	30 hrs at 5A 15 hrs at 10A
Fast charging programmes (emergency use only)	7 hrs at 10A	10 hrs at 18A

TESTS

Before carrying out battery tests, check the breathers are not blocked, there is no rust, the breather caps are not open and the casing is not cracked.

Required testing equipment:

- Densimeter
- Battery starter tester (high amperage tester)
- Thermometer
- Battery charger

Relative density: This test shows the charge level of a battery.

1. With the float in a vertical position, note the reading.

2. Regulate the densimeter reading for battery electrolyte temperature variations subtracting 4 points (relative density 0.004) for every 5.5 ·C (41.9 ·F) below the temperature the densimeter is calibrated at and adding 4 points (relative density 0.004) for every 5.5 ·C (41.9 ·F) above this temperature.

The following examples have been calculated with a densimeter calibrated at 30 ·C (86 ·F).

Example 1:

Temperature below	30 ·C (86 ·F)
Battery electrolyte temperature	19 ·C (66.2 ·F)
Densimeter reading	1.270
Subtract $\frac{11.0}{5.5} \times 0.004$	
Correct relative density =	1.262

Example 2:

Temperature above	30 ·C (86 ·F)
Battery electrolyte temperature	40 ·C (104 ·F)
Densimeter reading	1.220
Add $\frac{10.0}{5.5} \times 0.004$	0.007
Correct relative density =	1.227

2. Use the following table to determine the charge level.

Charge condition	Correct relative density at 15 ·C (86 ·F)	Correct relative density at 25 ·C (86 ·F)	Average battery voltage
100%	1.295	1.287	12.66
75%	1.253	1.246	12.45
50%	1.217	1.210	12.30
25%	1.177	1.170	12.00
Flat	1.137	1.130	11.84

NOTE: *Relative density should not vary more than 0.025 points between cells.*

4. If relative density is 1.280 or higher, the battery is fully charged and in good working condition.

5. If the correct relative density is less than 1.280, charge the battery and check the charging system, to find the cause of low battery load.

NOTE: *If distilled water has recently been added, the battery must be charged for a short period of time to obtain precise densimeter readings.*

If the battery has been loaded and kept still, the battery electrolyte will be thicker at the base of the elements. The battery must be shaken periodically to mix the electrolyte. This will improve charging amperage and allow more precise densimeter readings during tests.