Workshop service manual N° 3378177 M1

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1 . INTRODUCTION

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A . Reading the manual

General

The aim of this manual is to assist Distributors and Dealer to put AGCO tractors into service and ensure their efficient maintenance and repair.
By following the methods outlined in the manual and where necessary by using the specialised service tools indicated, the necessary maintenance operations can be carried out within the times specified in the Repair Times Schedule.

Page numbering

Example: 7C01.3
This manual is divided into chapters and sections, with each page providing the following information:
7 = Chapter
C = Section
01 = Sequence number in the section
3 = Page number in the section.

At the bottom of the page is shown the issue number and date.

Using the manual

To facilitate searching, at the beginning of each chapter is an index showing the different sections contained in the chapter. Then, at the beginning of each section, is a list of contents.

Meaning of symbols

circle (..) : identifies the component part only

Amendments

Amended pages are issued using precisely the same numbering system as the previous pages: only the issue number and the date are changed.
The old pages should be removed from the manual and destroyed.

Service tools

During operations where a specific service tool needs to be used, the tool reference number is specified.

Repairs and replacement of parts

When replacing parts, it is essential that only AGCO original spare parts are used.
Special attention should be paid to the following facts concerning the carrying out of repairs and the fitting of spare parts and replacement accessories.
The fitting of spare parts, other than AGCO original spare parts can compromise the safety of the tractor.
In certain countries, the legislation actually forbids the fitting of parts that do not comply with the tractor manufacturer's specifications. All tightening torques indicated in the manual must be scrupulously complied with.
At specific locations, locking devices are fitted. If any locking device is damaged during disassembly, a new locking device must be fitted.
Fitting spare parts other than AGCO original spare parts voids the warranty of the tractor since all AGCO parts are guaranteed by the manufacturer. AGCO Distributors and Dealers are required to supply original spare parts only.

Repair Times Schedule

The chapters in the Repair Times Schedule are identical to those found in this Workshop Manual.

B . General specifications

Engine

Specifications	8210	8220 / 8220 Xtra	8240 / 8240 Xtra	8250 / 8250 Xtra
PERKINS ENGINE	1006	1006		
VALMET ENGINE			620	634
Number of cylinders	6	6	6	6
Turbocharger	Yes	Yes	Yes	Yes
Air / Air intercooler		Yes	Yes	Yes
Bore (mm)	100	100	108	108
Stroke (mm)	127	127	120	134
Capacity (l)	6	6	6.6	7.4
Rated power (ISO Kw)	113	119.5	125 / 142	136 / 159
At engine speed (rpm)	2200	2200	2200	2200
Maximum torque (ISO Nm)	620	663	727 / 855	797 / 920
Engine speed at maximum torque	1400	1400	1400	1400
Idle speed	950	950	950	950
Maximum power speed (rpm)	2200	2200	2200	2200
Maximum speed at no load (rpm)	2354	2354	2354	2354
Lubrication: By gear pump - suction strainer and interchangeable external cartridge filters				
Valves: Overhead valves operated by pushrods				
Rocker arm clearance (cold)				
- Inlet - mm (inches)	0.20	0.20	0.35	0.35
- Exhaust - mm (inches)	0.45	0.45	0.35	0.35
Engine oil cooler	Yes	Yes	Yes	Yes

Injection and air filter

	8210	8220 / 8220 Xtra	8240 / 8240 Xtra	8250 / 8250 Xtra
Fuel filter	Yes	Yes	Yes	Yes
No. of elements	2	2	2	2
Injection pump	Lucas	Lucas	Stanadyne/Bosch	Bosch
Injectors and nozzle holder	Lucas	Lucas	Stanadyne	Stanadyne
Two-stage air filter, a dry filter element with a filter-clogging indicator.				
Start up in cold weather			Thermostart	

Introduction

Specifications	8260 / 8260 Xtra	8270 / 8270 Xtra	8280 / 8280 Xtra
VALMET ENGINE	634	645	645
Number of cylinders	6	6	6
Turbocharger	Yes	Yes	Yes
Air / Water intercooler	Yes / No	Yes / No	Yes / No
Air / Air intercooler	No / Yes	No / Yes	No / Yes
Bore (mm)	108	111	111
Stroke (mm)	134	145	145
Capacity (l)	7.4	8.4	8.4
Rated power (ISO Kw)	162 / 172	181 / 192	200 / 212
At engine speed .	2200	2200	2200
Maximum torque (ISON Nm)	878 / 980	1002 / 1120	1150 / 1260
Engine speed at maximum torque	1400	1400	1400
Idle speed	950	950	950
Maximum power speed (rpm)	2200	2200	2200
Maximum speed at no load (rpm)	2354	2354	2354
Lubrication: By gear pump - suction strainer and interchangeable external cartridge filters			
Valves: Overhead valves operated by pushrods			
Rocker arm clearance (cold)			
- Inlet - mm (inches)	0.35	0.35	0.35
- Exhaust - mm (inches)	0.35	0.35	0.35
Engine oil cooler	Yes	Yes	Yes

Injection and air filter

	8260 / 8260 Xtra	8270 / 8270 Xtra	8280 / 8280 Xtra
Fuel filter	Yes	Yes	Yes
No. of elements	2	2	2
Injection pump	Bosch	Bosch	Bosch
Injectors and nozzle holder	Stanadyne	Stanadyne/Bosch	Stanadyne/Bosch
Two stage air filter, dry filter element with filter clogging indicator.			
Start up in cold weather		Thermostart	

Introduction

Road speeds at 2200 rpm - Dynashift transmission with creeper unit - Heavy Duty reduction drive units - 20.8R38 tyres.

RANGE			FORWARD		REVERSE	
			Heavy Duty reduction drive unit km/h	Heavy Duty reduction drive unit km/h	Heavy Duty reduction drive unit km/h	Heavy Duty reduction drive unit km/h
TORTOISE 	**1**	A	2.36	0.6	2.3	0.6
		B	2.76	0.7	2.7	0.7
		C	3.26	0.8	3.19	0.8
		D	3.81	0.9	3.74	0.9
	2	A	3.58	0.9	3.51	0.9
		B	4.19	1	4.1	1
		C	4.94	1.2	4.84	1.2
		D	5.79	1.4	5.67	1.4
	3	A	5.11	1.2	5.01	1.2
		B	5.98	1.5	5.86	1.4
		C	7.06	1.7	6.92	1.7
		D	8.27	2	8.1	2
	4	A	6.96	1.7	6.82	1.7
		B	8.14	2	7.98	1.9
		C	9.61	2.3	9.42	2.3
		D	11.25	2.7	11.02	2.7
HARE 	**1**	A	7.77	1.9	7.61	1.9
		B	9.09	2.2	8.91	2.2
		C	10.73	2.6	10.51	2.6
		D	12.56	3.1	12.3	3
	2	A	11.79	2.9	11.55	2.8
		B	13.8	3.4	11.55	2.8
		C	16.29	4	15.95	3.9
		D	19.06	4.7	18.67	4.6
	3	A	16.84	4.1	16.5	4
		B	19.71	4.8	19.31	4.7
		C	23.27	5.7	22.79	5.6
		D	27.23	6.6	26.68	6.5
	4	A	22.92	5.6	22.45	5.5
		B	26.83	6.5	26.28	6.4
		C	31.67	7.7	31.02	7.6
		D	37.06	9	36.31	8.9

Introduction

Road speeds at 2200 rpm - Full Powershift transmission AG150, sealed Heavy Duty reduction drive units - 20.8R38 tyres.

RANGE	FORWARD (km/h)	REVERSE (km/h)
1	2.28	2.28
2	2.94	3.8
3	3.8	4.32
4	4.32	6.33
5	4.91	7.21
6	5.59	10.54
7	6.33	12.01
8	7.21	17.57
9	8.18	
10	9.31	
11	10.54	
12	12.01	
13	13.62	
14	15.52	
15	17.57	
16	22.69	
17	29.28	
18	37.82	

Introduction

Road speeds at 2200 rpm - Full Powershift transmission AG150, sealed Heavy Duty reduction drive units with creeper unit - 20.8R38 tyres.

RANGE	FRONT (km/h)	REAR (km/h)
1	0,6	0,6
2	0,7	0,9
3	0,9	1,1
4	1,1	1,5
5	1,2	1,8
6	1,4	2,6
7	1,5	2,9
8	1,8	4,3
9	2,0	
10	2,3	
11	2,6	
12	2,9	
13	3,3	
14	3,8	
15	4,3	
16	5,5	
17	7,1	
18	9,2	

Introduction

Road speed at 2200 rpm - AG250 Full Powershift Transmission, double drive units - 650 / 85R38 tires

RANGE	FRONT (km/h)	REAR (km/h)
1	2.40	2.40
2	3.10	4.00
3	4.00	4.60
4	4.60	6.70
5	5.10	7.60
6	5.90	11.10
7	6.70	12.70
8	7.60	18.50
9	8.60	
10	9.80	
11	11.10	
12	12.70	
13	14.30	
14	16.30	
15	18.50	
16	23.90	
17	30.90	
18	39.80	

Introduction

Road speed at 2200 rpm AG250 Full Powershift Transmission, double drive units - 650 / 85R38 tires with gearbox

RANGE	FRONT (km/h)	REAR (km/h)
1	0.60	0.60
2	0.80	1.00
3	1.00	1.10
4	1.10	1.60
5	1.30	1.90
6	1.40	2.70
7	1.60	3.10
8	1.90	4.50
9	2.10	
10	2.40	
11	2.70	
12	3.10	
13	3.50	
14	4.00	
15	4.50	
16	5.80	
17	7.50	
18	9.70	

Introduction

Electrical circuit

Voltage :	12 volt, negative to ground
Batteries :	2 maintenance-free batteries
Alternator :	120 Amp.
Starter safety :	Controlled by clutch pedal
Headlights :	European dipped beam 40/45 W
Parking lights :	5 W
Direction indicators :	21 W
Number plate light :	10 W
Work lights :	55 W - H3
Dials and signal lamp lighting :	3 W - 2 W - 1,2 W
Roof light:	10 W

Cooling system

Mode :	Thermostat controlled, open temperature: 82° C.
Fan:	Viscostatic releasable type
Water pump :	- gear-driven in 8210 / 8220 / 8270 / 8280 tractors - belt-driven in 8240 / 8245 / 8250 / 8260 tractors
Fan belt tension :	15 mm (0.6") to 20 mm (0.8") on the longest run

Transmission

Dynashift gearbox with mechanical reverse shuttle	- 32 forward speeds - 32 reverse speeds - four ratios selectable without declutching - synchromesh reverse shuttle
• Clutch :	- wet clutch : 8210 / 8220 : 6 plates 8240 : 7 plates 8250 : 8 plates
• ¼ Creeper gearbox :	- 48 forward speeds - 48 reverse speeds
• Filtering	- 1 x 60 micron suction strainer
Dynashift gearbox with power shuttle	- 32 forward speeds - 32 reverse speeds - four ratios selectable without declutching - power shuttle
• 8210 - 8220 power shuttle	- clutch controlled - 6 forward speed discs - 5 reverse speed discs
• 8240 power shuttle	- clutch controlled - 7 forward speed discs - 6 reverse speed discs
• 8250 power shuttle	- clutch controlled - 8 forward speed discs - 6 reverse speed discs
• ¼ Creeper gearbox :	- 48 forward speeds - 48 reverse speeds
• Filtering	- 1 x 60 micron suction strainer

Introduction

Full Powershift gearbox :
- 17 or 18 forward speeds (depending on 30 km/h or 40 km/h version)
- 8 reverse speeds

• Clutches : 9 clutches controlled by solenoid valves

• ¼ ratio creeper gearbox :
- 34 or 36 forward speeds (depending on 30 km/h or 40 km/h version)
- 16 reverse speeds

• Hydraulics : 1 "Gerotor" pump - Capacity 110 l/min at 2200 rpm provides (for lubrication and supply of clutches, cooling system and boosting of) the master cylinders.

• Filtering : 1 x 150 micron suction strainer, located inside the housing. External 15-micron filter, 3-way filter protects solenoid valves from particles.

Final reduction drive units

Reduction drive units: Epicyclical, located in rear axle housings.

Reduction ratios:

8210/8220 Heavy duty	6.21:1
8220/8240/8245 Heavy duty sealed compartment	6.21:1
8240 / 8245 / 8250 / 8260 Composite	7.14:1
8260 / 8270 / 8280 Dual	9.47:1

Front axle with 2-wheel drive

• Optional in 8210 to 8260 tractors

Front axle with 4-wheel drive

Suspension : Option available on models Carraro 20.29 and 20.43 (8210 to 8250) only

Clutch mechanism: Electro-hydraulically controlled from a button on the armrest inside the cab.

Differential lock: Differential lock coupling is electro-hydraulically controlled.
Lock :
- oil-bath clutch on Carraro (20.29 and 20.43) and Dana AG280 front axles
- hydromechanical dog coupling on Dana AG155 and AG200 front axles.

Gear ratios:

8210 / 8220 / 8240	AG155	20,872/1	up to K137012
8210 / 8220 / 8240	20.29	20,769/1	from K137013
8240 /8245 /8250 /8260	AG200	20.475/1	
8250	20.43	20.769/1	From K116015
8250 Xtra	20.48	20.945/1	
8270 / 8280	APL5052	20.475/1	Up to L074008
8270 : 8280	AG280	20.363/1	From L074009

Power take-off

• interchangeable shaft : 540 (6 splines) or 1000 rpm (21 splines) at engine speed of 2000 rpm.

• Shiftable : with 540 rpm or 1000 rpm interchangeable end

• 750 rpm economy PTO : 750 rpm at engine speed of 2000 rpm
6 splines, shaft Ø 35 mm
20 splines shaft Ø 44.5 mm or
21 splines shaft Ø 35 mm

Introduction

Hydraulic circuit

Closed centre hydraulic circuit with flow and pressure regulation.
2 possible circuits :

- 110 l/min at 200 bar
- 150 l/min at 200 bar, optionally available on 8200 tractors only if they are equipped with a Full Powershift gearbox

Booster pump: maximum flow 150 l/min or 215 l/min (o 150 l/min hydraulic circuit) at 2200 rpm guaranteeing a constant 5 bar boost for the variable displacement pump, also provides lubrication for the rear axle.

Low-pressure circuit (17 bar) supplies the following functions :

- 4 WD clutch
- Differential lock
- Power take-off clutch
- Engine clutch (mechanical reverse shuttle)
- Power shuttle
- Hare / Tortoise range (Heavy Duty gearbox)

Low pressure circuit for Full Powershift gearbox
- the Full Powershift gearbox has its own low pressure pump that ensures lubrication of the transmission and operation of these clutches at a 17 bar pressure

High-pressure circuit: maximum pump flow 110 l/min or 150 l/min (optionally) at 2200 rpm, maximum pressure 200 bar that supplies:

- the steering
- the auxiliary spool valves
- the 17 bar valve
- the hydraulic lift system

Filtering : 1 x 150 micron suction strainer located on the left-hand side of the transmission housing.
Main external high-pressure 15-micron oil filter, located on the right-hand side of the transmission housing.

Hydraulic lift

Type: 3-point, category 3
Lift rams: dia. 95 (8210, 8220, 8240, 8250) quantity 2 - capacity (see table)

Position of lift rod on drawbar (mm)	Length of lift rod (mm)	Horizontal drawbar (Kg)	Drawbar in transport position (Kg)
547.5	824	7149	9365
	918	7373	8627
600	824	7769	9865
	918	7927	9109

Lift rams: dia. 105 (8260 to 8280) quantity 2 - capacity (see table)

Position of lift rod on drawbar (mm)	Length of lift rod (mm)	Horizontal drawbar (Kg)	Drawbar in transport position (Kg)
Mini 530.4	838	8741	11387
	915	8994	10656
Maxi 580.9	838	9475	12001
	915	9667	11252

Brakes

Type : disc brakes, two discs per wheel with double reduction unit constant flow lubrication, external dia. 313 mm.
Lining internal dia. : 239 mm.
Operation : Hydraulic, using two master cylinders.
Parking brake : operates on intermediate shaft of drive pinion.
Park lock : mechanically locks the intermediate shaft of the drive pinion.

Rear differential lock

Type :
- 8210 to 8250 : Hydro-mechanical , standard torque
- 8210 to 8250 : 5'' or 7'' multidisc (according to version) in oil bath, standard torque
- 8260 to 8280 : 7'' Multi-disc in oil bath, hypoid torque

Control: Electrically controlled hydraulics.

Introduction

Steering

Type: Hydrostatic, telescopic or fixed tilting steering column double action steering ram (8200 with Dana or Carraro front axle), two double action steering rams (8270 and 8280 with APL5052 front axle only).

Wheels

Front (4 wheel drive): adjustable steel rims
Rear: steel rims (fixed or adjustable), manually adjustable pressed steel rim with cast iron disc.

Capacities

Fuel tank with additional reserve :	8210/8220/8240/8250/8260 :	410 l
	8270/8280 :	456 l
Cooling system	8210/8220 :	28,5 l
	8240 to 8280 :	34 l
Engine sump	8210/8220 :	15,6 l
	8240 :	20 l
	8250/8260/8270/8280 :	19 l
Transmission / rear axle Dynashift gearbox (Heavy Duty)	8210/8220 :	123 l
Transmission / rear axle Full Powershift gearbox(Heavy Duty)	8210/8220 :	157 l
Transmission / rear axle Dynashift gearbox (Heavy Duty sealed)	8220/8240 :	120 l
Transmission / rear axle Full Powershift (Heavy Duty sealed)	8220/8240 :	150 l
Transmission / rear axle Dynashift gearbox (Composite)	8240/8250 :	114 l
Transmission / rear axle Full Powershift gearbox (Composite)	8240/8245/8250/8260 :	147 l
Transmission / rear axle Full Powershift gearbox (double drive unit)	8260/8270/8280 :	156 l

Note: Transmission/rear axle assembly filling tolerances ± 5 l.

Introduction

AG155 and AG200 front axle assembly	8210 to 8260	10.2 l
APL5052 front axle assembly	8270/8280	10 l
AG280 front axle assembly	8270/8280	16 l
20.29ACP and 20.43ACP fixed front axle assembly	8210 to 8250	6 l
20.29S and 20.43S suspension front axle assembly	8210 to 8250	8.6 l
20.48ACP fixed front axle assembly	8250 Xtra	10 l
20.48S suspension front axle assembly	8250 Xtra	10 l

AG 155H front final drive unit (each)	8210 to 8240	1.6 l
20.29 or 20.43 front final drive unit (each)	8210 to 8250	1.3 l
20.48 front final drive unit (each)	8250 Xtra	1.9 l
AG 200 front final drive unit (each)	8240/8245/8250/8260	1,8 l
APL 5052 front final drive unit (each)	8270/8280	4 l
AG280 front final drive unit (each)	8270/8280	2.7 l

Heavy Duty Sealed Rear final drive unit (each)	8220/8240	3,6 l
Composite rear final drive drive units (each)	8240/8245/8250/8360	4,5 l

Introduction

Tightening torque

Wheel to rear axle

- Standard final drive
  - rim to disc ..... 250 - 350 Nm
  - rim to axle hub: ..... 400 - 450 Nm
- Straight shaft
  - disc to single conical hub (shaft dia. 95) ..... 350 - 460 Nm
  - half conical hub to hub (shaft dia. 95) ..... 350 - 460 Nm
  - half conical hub to hub (shaft dia. 110) ..... 500 - 600 Nm
  - disc to half conical hub ..... 640 - 680 Nm
  - rim to disc ..... 250 - 350 Nm

Wheel to front axle

- 4 WD wheel to hub (dry M22 studs) ..... 640 - 680 Nm

Miscellaneous

- Extending arms ..... 400 - 600 Nm
- Power take-off shaft ..... 100 - 130 Nm
- Steering rams ..... 75 - 80 Nm
- Engine oil drain plug ..... 80 Nm
- Fuel tank drain plug ..... 15 - 18 Nm

Noise levels (Dba) reaching the driver's ears

- Measured according to EEC instruction 77/311 Appendix II

Type	CEE 77/311 Appendix II	
	Windows closed	Windows open
8210	78	80
8220 / 8220 Xtra	77	83
8240	74	80
8250	77	84
8270	76	81
8280	77	82

Type	CEE 77/311 Appendix II	
	Windows closed	Windows open
8240 Xtra	75	80
8250 Xtra	74	79
8260 Xtra	77	81
8270 Xtra	76	81
8280 Xtra	76	81

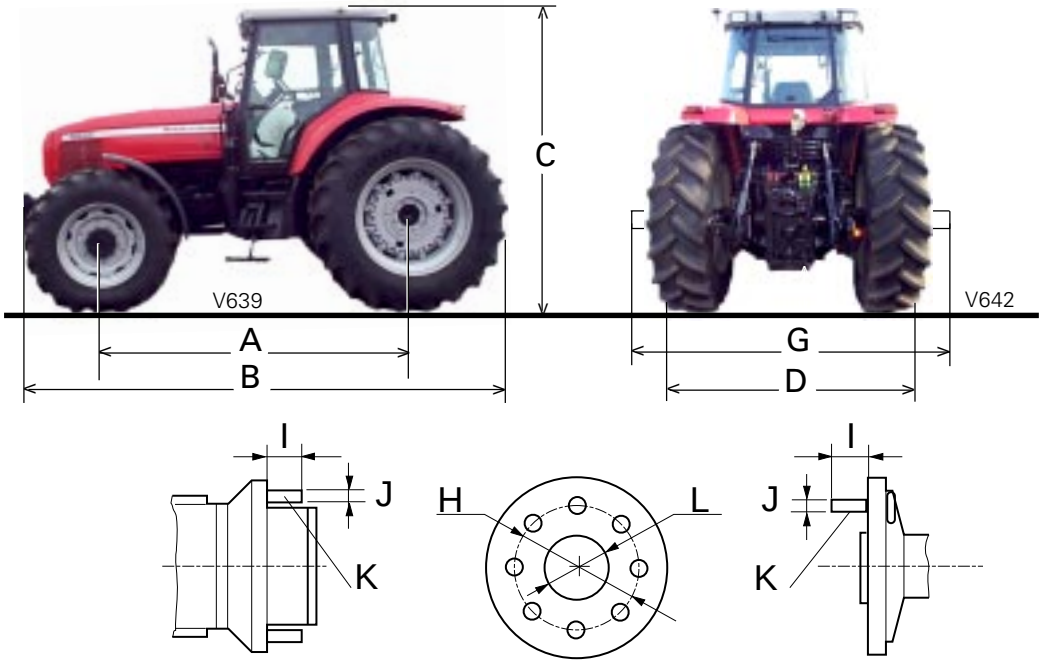
Introduction

Dimensions and weights

SPECIFICATIONS mm - kg	8210	8220	8240	8250	8260
	4RM. Dynashift/Powershift				
A Wheelbase	2825	2825	2985	3075	3075
B Overall length (with 3PT, without front weights)	4949/4951	4949/4951	5111/5109	5111/5201	5251
C Height to roof (cab tractor)	2980	2980	3042	3042	3038
D Overall width (1)	2854	2854	2880	2998	3007
E Ground clearance	453	453	453	453	453
Min. weight (with full tank, without extra weight steel wheels).	6750/6925	6885/7160	7580/7665	8295	8850
Front tyres	16.9R28	16.9R30		480/70	
Rear tyres	20.8 R38	20.8 R42		620/70 R42	

	Dynashift /Full Powershift rear front axle			Front axle			
	Flanged shaft	Straight shaft Ø95	Ø110	20.29 /20.43	20.48	AG155	AG200
G Distance between flanges	1940			1900	1890	1892	1892
Short straight shaft :		2334	2494				
Long straight shaft:		2990	2990				
H Stud distance	203,2	335	335	280	280	280,8	280,8
L Centring diameter	149,35	280,80	280,8	335	335	335	335
I Stud length (according to rim)	63	87 / 110		40	40	40	40
J Stud diameter	M18 x 1,5	M22 x 1,5		M22 x 1,5	M22 x 1,5	M22 x 1,5	M22 x 1,5
K Number of studs	8/10 x 2	10 x 2		10 x2	10 x2	10 x2	10 x2

(1) These dimensions are for max. track (without straight shaft).

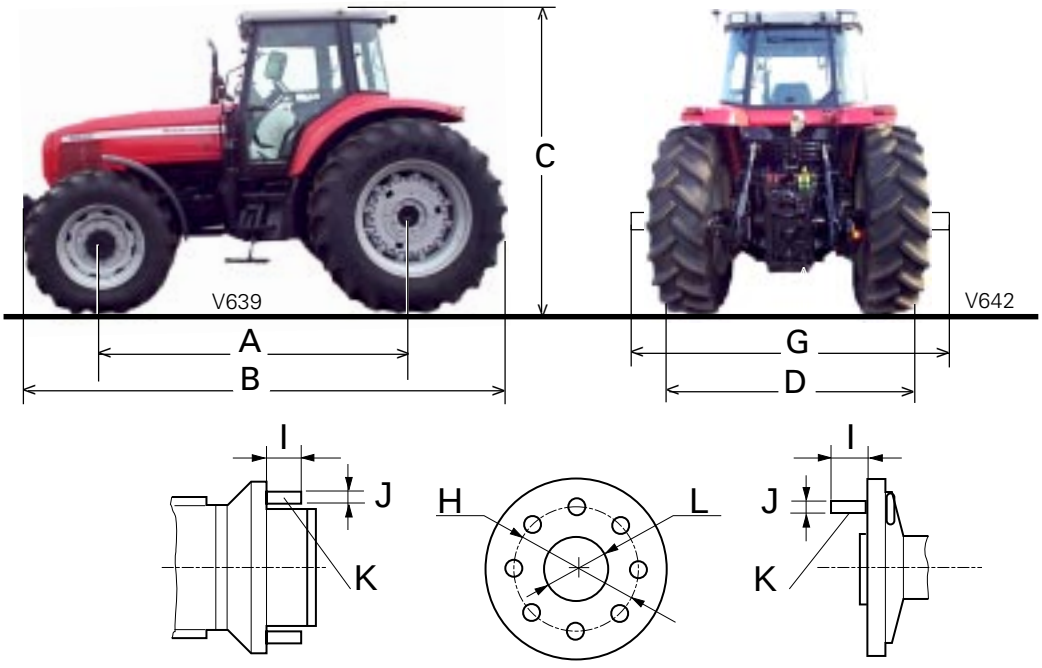


Introduction

SPECIFICATIONS mm - kg	8270 4RM. Powershift	8280 4RM. Powershift
A Wheelbase	3075	3075
B Overall length (with 3PT, without front weights)	5251	5251
C Height to roof (cab tractor)	3117	3117
D Overall width (1)	3032	3030
E Ground clearance	432	432
Min. weight (with full tank, without extra weight steel wheels).	9250	9250
Front tyres Rear tyres	600/70R28 650/85R38	600/70R28 650/85R38

	Front axle APL 5052	 AG 280
	1875	1892
G Distance between flanges	-	-
H Stud distance	425	425
L Centring diameter	370	370
I Stud length (according to rim)	40	47
J Stud diameter	M22 x 1.5	M22 x 1,5
K Number of studs	12	12

(1) These dimensions are for maxi track (without straight shaft).



C. Safety instructions

See Operator Instruction Book

D . Practical advice

Safety

When working on machinery, of whatever type, the first concern must always be the safety of oneself and others. To work in complete safety it is necessary to fully understand the nature of the work that has to be carried out, to use the appropriate tools and various equipment correctly and to employ common sense in all situations.

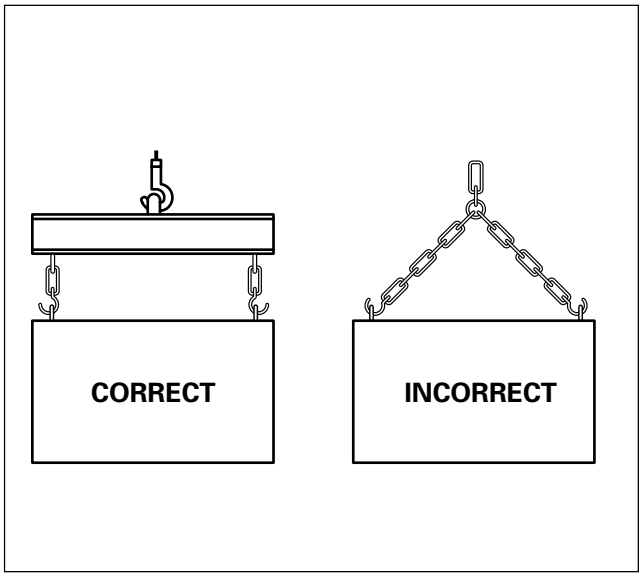
Troubleshooting

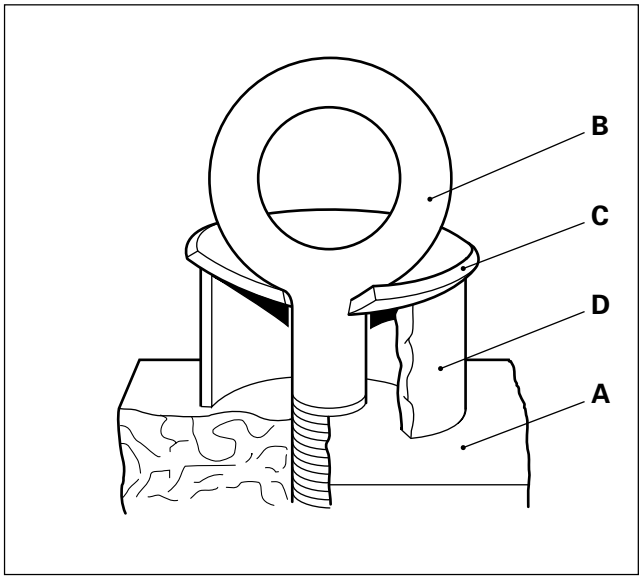
Using the information supplied in the workshop manual, the following method enables problems on the tractor to be pinpointed with accuracy.
The method consists of following a certain number of logical steps to identify the problem, to locate it and then to correct it:

1. Define the problem
2. List the possible causes for the problem
3. Discriminate between the causes
4. Carry out checks in logical order in order to discover the exact cause
5. Evaluate the remaining life of components, the price of the components and the cost of labour.
6. Carry out the repair thus judged necessary
7. Check for the correct operation of the system and functions that were affected.

Lifting heavy components and assemblies

Unless specified otherwise, all disassembly should be carried out using adjustable lifting tackle. The slings bearing the weight must all be parallel to each other and as near as possible vertical in relation to the object being lifted. However, it is permitted where the slings are of a much greater strength than the load being lifted that slings may be used in a triangle (2, 3 or 4 loops from a single ring beneath the pulley-block hook).
To remove a tilted component, it is necessary to bear in mind that the capacity of a lifting ring diminishes when the angle formed by the elements supporting the object is less than 90° (good and bad lifting methods).
Lifting rings and their supports must never be bent and they must only be used in tension. A short length of tubing and a washer can be used to reduce side forces on lifting rings.





Support for a forged lifting ring

A: Load – **B**: Lifting shackle – **C**: Shackle support plate (3 mm thick) – **D**: Sleeve (preferably welded to the plate).
In certain cases, lifting accessories can be obtained to provide the required equilibrium for lifting without danger. Consult the section concerned in the workshop manual.
Note: Where difficulties are encountered on removing a component, first check that all the retaining nuts and bolts have actually been removed and that neighbouring components are not hindering its removal.

Introduction

Cleanliness

To ensure a long life cycle to any machine, it is important that its moving parts are protected from dust and foreign bodies. Precautions must be taken against such danger. Sealed compartments, seals and filters ensure the cleanliness of air, fuel and lubricating oil. None of these protection systems should be removed.

When disconnecting piping, whether it be hydraulic, fuel, lubricating or air lines, clean both the connecting points and the surrounding area. As soon as the piping is disconnected insert a plug, a cover or fasten adhesive tape over the opening to prevent foreign bodies from entering.

In the same way, clean and cover all access covers and inspection plates when they are removed. Clean and check all components. Take care that all passageways and holes are unobstructed. Cover all components so that they remain clean. Ensure that all components are clean at the time of reassembly. Leave new parts in their packaging up until the time that they are actually used.

Assembly

To reassemble a piece of equipment, complete each step in turn. Never partially assemble one subassembly and then begin to assemble another. Carry out all the recommended adjustments. Always recheck the work that has been carried out to ensure that nothing has been forgotten.

Check the various adjustments again before putting the equipment back into service.

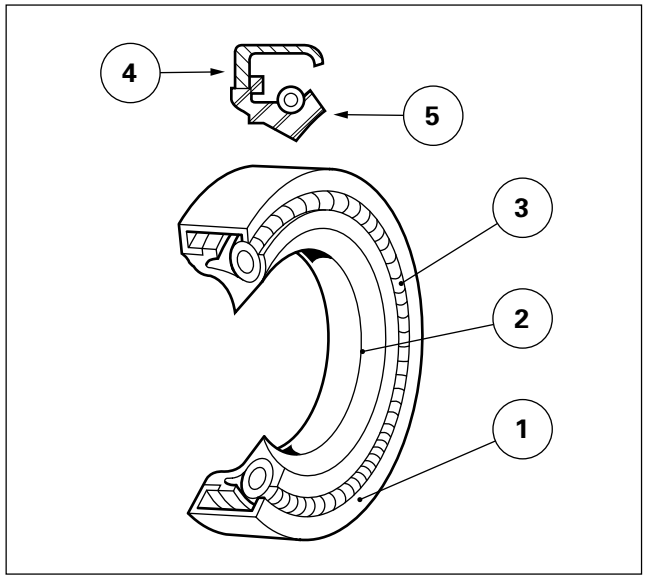
Note: Before fitting new parts, remove the anti-rust compound from all machined surfaces (usually a peel-off material).

Lubrication

According to recommendations, fill the compartments of the repaired or replaced elements with the correct quantity of clean oil of the type recommended in the maintenance section of the Operator Instruction Book.

Shims

Whenever shims are removed, they should be attached together and their location marked. Ensure that distance pieces are clean and take care that they are not bent in any way when refitting.



Seals

Take care that the holes in seals match exactly the lubricating channels in the corresponding components. If gaskets need to be made, select the thickness and type of material carefully. Take care that the seal is correctly shaped and cut. Badly cut and fitting seal can cause major breakdowns.

SPY type lip seals

Before fitting, lubricate the lips of SPY type seals with oil. Do not use grease on seals, unless they are grease seals.

The main components of SPY type seals are the envelope (**1**), oil tightness element (**2**) and annular spring (**3**). The cross section shows the heel (**4**) and the pivot (**5**), these impart the dimensions to a single element seal. With one or two exceptions, the pivot of a lip seal faces the lubricant side. Some seals also have an auxiliary lip without a spring.

Cables and wires

When removing or disconnecting a group of cables or wires, they must be identified and labelled in order to ensure that they are refitted correctly later.

Introduction

Locking devices on nuts and bolts

To avoid the accidental loosening of nuts and bolts, lock washers, tab washers and split pins are used. In addition to such mechanical means, compounds of the Loctite type are also used.

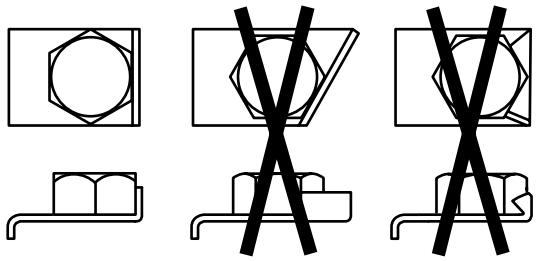
To be efficient, the flat locking tabs must be correctly fitted. Bend one end of the locking tab over the edge of the part. Bend the other end to fit flush against one of the flats on the head of the nut or bolt.

Always fit new locking tabs in compartments that house moving parts. When fitting a lock washer on aluminium housings, place a flat washer between the lock washer and the housing.

Note:

1) Never fit a lock washer (Grower washer, lock washer, spring washer, etc.) beneath a nut or the head of a bolt to which a recommended torque must be applied to (see section H).

2) When using locking compounds of the Loctite type, always degrease the components before application.



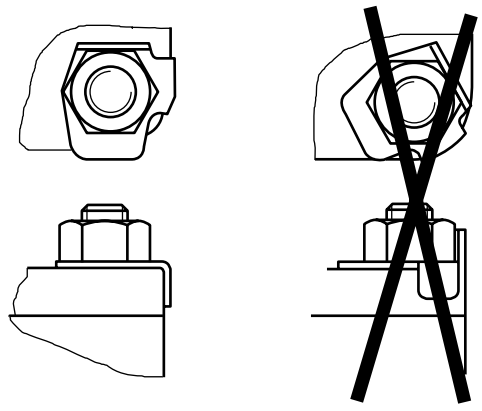
Correct and incorrect use of folded metal locking tabs

Lubricating bushes and force fitting

Do not fit bushes using a hammer only. Use an appropriate tool in addition to a hammer, and where possible use a press.

When using a press, take care that the pressure being exerted is in exactly the same direction as the bore. Where a lubricating bush has an oil hole, carefully align it with the hole on the matching part.

When force fitting one component within another, lubricate the corresponding surfaces. Adjust tapered parts without lubricating. Before fitting, ensure that the cones are clean, dry and have no burs.



Correct and incorrect methods of fitting and bending the flat locking tabs

Fitting bolts in blind holes

Select a bolt of the correct length. Too long a bolt may come to a halt before its head is in contact with the part that it is intended to hold; the threads may then be damaged when trying to tighten it further.

If the bolt is too short, there may not be sufficient thread engaged to efficiently hold the part.

E . Instructions for putting the tractor in service

General

To ensure the regular servicing of the tractor during the twelve-month warranty period, the AGCO supplying Distributor or Dealer must carry out the first 50-hour and 250-hour servicing operations.
These periods are calculated so as to provide maximum efficiency of the tractor throughout the warranty period, and thus ensure later reliability of the tractor.

Checks before delivery

The Distributor, before delivery to a Dealer; and the Dealer before delivery to a Customer or driver, must carry out the following operations:

1. General installation

- Clean the top of the battery and coat the battery terminals with Vaseline grease.
- Charge the battery if necessary.
- Check all electrical connections, cable attachments, piping and warning lights.
- Check and top-up the oil in the engine and transmission housings.
- Grease all grease points.
- Check and adjust where necessary the tension of belts (alternator, fan, auxiliary pump and air-conditioning compressor).
- Flush the cooling circuit and fill it with soft water, unless it contains anti-freeze.
- Ensure that the tank contains enough fuel of the correct type.
- Check the tightening of the cylinder head bolts and nuts to the correct torque. Check the tightness of the inlet pipe and the exhaust manifold.
- Check and adjust the rocker arm clearance and visually check the valve springs.
- Check the injectors, bleed the fuel circuit and tighten all fuel supply connections.
- Check the fitting of the engine air filter hoses.
- Check the adjustment of the engine control linkage and ensure that it is operating freely.
- Run the engine.
- Check the correct operation of all control instruments and signal and warning lights.
- Check the engine speed on the tachometer, using both foot and hand throttles.
- Hitch an implement and check the correct operation of the tractor's hydraulic accessories.
- Check and adjust tyre pressures (road or field work).
- Check the tightness of all nuts, bolts, studs, piping connections and attachment points.
- Check that there are no hose or piping leaks.
- Check that the headlights are correctly adjusted.
- Carry out a road test on the tractor and check the correct operation of the brakes, instruments and accessories.

2. Electronic systems

- Check the correct operation of the electronic linkage control. Carry out the quick check procedure detailed in Chapter 11C01.
- Check the various functions of the Autotronic, carry out test procedure 11A01 or 11B01 depending on the version.
- Check the installation of the onboard computer in accordance with procedure 11D01.

3. Tightening torques

- Check the tightening torques on all chassis attachment nuts and bolts:
  . Front axle / Engine
  . Engine / Gearbox
  . Gearbox / Rear axle
  . Trumpet housings / Rear axle.
- Check the tightening torque on nuts or studs fitted on wheels and wheel webs.

Instructions for the driver

The following instructions must be provided to the Customer or driver:

1. Safety precautions to be taken when starting the engine
2. Location and meaning of the tractor and engine serial numbers
3. Controls – control instruments
4. Running-in instructions
5. Starting and stopping the engine
6. Selection of gears, use of gear shift and reverse shuttle levers
7. Dangers of towing downhill without engine braking and correct use of the gearbox
8. Use and adjustment of the brakes and the coupling and locking of the pedals
9. Use of the tractor's clutch
10. Use of the hydraulic differential lock
11. Use of the hydraulic PTO - clutch and brake
12. Operation of the hydraulic lift control
13. Hitching and unhitching towed implements
14. Grease points
15. Changing of oil grades
16. Replacing the engine and transmission oil filters
17. Operation of the fuel supply circuit – bleeding of supply circuit and injectors – air filter – filter-clogging indicator
18. Cooling circuit. Anti-freeze precautions. Tension of the two fan belts
19. Maintenance of electrical equipment (batteries). Negative earthed circuit
20. Adjustment of front and rear track
21. Tyre pressures
22. Tightness of nuts, bolts and screws
23. Storing and handling fuel
24. Use of auxiliary hydraulic equipment
25. Marking of the tractor serial number and engine serial number in the Operator Instruction Book
26. Reading of the Operator Instruction Book.

F . Conversion tables

Units of Pressure
1 PSI = 1 lbf/in^2 = 0.0689 bar
1 bar = 14.512 lbf/in^2 = 14.512 PSI

Bar	lbf / in^2	Bar	lbf / in^2	Bar	lbf / in^2
0.5	7.256	9.5	137.9	35	508
1	14.51	10	145	40	588
1.5	21.77	11	159.6	45	653
2	29	12	174	50	726
2.5	36.28	13	189	60	871
3	43.54	14	203	70	1029
3.5	50.8	15	218	80	1161
4	58	16	232	90	1306
4.5	65.3	17	247	100	1451
5	72.6	18	261	200	2903
5.5	79.8	19	276	300	4354
6	87.1	20	290	400	5805
6.5	94.3	21	309	500	7257
7	101.6	22	319	600	8708
7.5	108.8	23	334	700	10160
8	116.1	24	348	800	11611
8.5	123.4	25	368	900	13235
9	130.6	30	435	1000	14514

Units of torque

1 Nm = 0.7376 lbf/ft
1 lbf/ft = 1.3558 Nm

Nm		lbf/ft	Nm		lbf/ft	Nm		lbf/ft
1.3558	1	0.7376	46.0972	34	25.0784	90.8396	67	49.4912
2.7116	2	1.4752	47.4530	35	25.8160	92.1944	68	50.1568
4.0674	3	2.2128	48.8088	36	26.5536	93.5502	69	50.8944
5.4232	4	2.9504	50.1646	37	27.2912	94.9060	70	51.6320
6.7790	5	3.6880	51.5204	38	28.0288	96.2618	71	52.3696
8.1348	6	4.4256	52.8762	39	28.7664	97.6176	72	53.1072
9.4906	7	5.1632	54.2320	40	29.5040	98.9734	73	53.8448
10.8464	8	5.9008	55.5878	41	30.2416	100.329	74	54.5824
12.2022	9	6.6384	56.9436	42	30.9792	101.685	75	55.3200
13.5580	10	7.3760	58.2994	43	31.7168	103.041	76	56.0576
14.9138	11	8.1136	59.6552	44	32.4544	104.397	77	56.7952
16.2696	12	8.8512	61.0110	45	33.1920	105.752	78	57.5328
17.6254	13	9.5888	62.3668	46	33.9296	107.108	79	58.2704
18.812	14	10.3264	63.7226	47	34.6672	108.464	80	59.0080
20.3370	15	11.0640	65.0784	48	35.4048	109.820	81	59.7456
21.6928	16	11.8016	66.4342	49	36.1424	111.176	82	60.4832
23.0486	17	12.5392	67.7900	50	36.8800	112.531	83	61.2208
24.4044	18	13.2768	69.1458	51	37.6176	113.887	84	61.9584
25.7602	19	14.0144	70.5016	52	38.3552	115.243	85	62.6960
27.1160	20	14.7520	71.8574	53	39.0928	116.600	86	63.4336
28.4718	21	15.4896	73.2132	54	39.8304	117.955	87	64.1712
29.8276	22	16.2272	74.5690	55	40.5680	119.310	88	64.9088
31.1834	23	16.9648	75.9248	56	41.3056	120.666	89	65.6464
32.5392	24	17.7024	77.2806	57	42.0432	122.022	90	66.3840
33.8950	25	18.4400	78.6364	58	42.7808	123.378	91	67.1216
35.2508	26	19.1776	79.9992	59	43.5184	124.734	92	67.8592
36.6066	27	19.9152	81.3480	60	44.2560	126.089	93	68.5968
37.9624	28	20.6528	82.7038	61	44.9936	127.445	94	69.3344
39.3182	29	21.3904	84.0596	62	45.7312	128.801	95	70.0720
40.6740	30	22.1280	85.4154	63	46.4688	130.157	96	70.8096
42.0298	31	22.8656	86.7712	64	47.2064	131.513	97	71.5472
43.3856	32	23.6032	88.1270	65	47.9440	132.868	98	72.2848
44.7414	33	24.3408	89.4828	66	48.6816	134.224	99	73.0224

Units of Capacity

1 litre = 0.2199 imperial gallon
1 imp. gallon = 4.5459 litres

Imp. gal.		Litres	Imp. gal.		Litres	Imp. gal.		Litres
0.2199	1	4.5459	7.4766	34	154.561	14.733	67	304.575
0.4398	2	9.0918	7.6965	35	159.107	14.9532	68	309.121
0.6597	3	13.6377	7.9164	36	163.652	15.1731	69	313.667
0.8796	4	18.1836	8.1363	37	168.198	15.3930	70	318.213
1.0995	5	22.7295	8.3562	38	172.744	15.6129	71	322.759
1.3194	6	27.2754	8.5761	39	177.290	15.8328	72	327.305
1.5393	7	31.8213	8.7960	40	181.836	16.0527	73	331.851
1.7592	8	36.3672	9.0159	41	186.382	16.2726	74	336.397
1.9791	9	40.9131	9.2358	42	190.929	16.4925	75	340.943
2.1990	10	45.4590	9.4557	43	195.474	16.7124	76	345.488
2.4189	11	50.0049	9.6756	44	200.019	16.9323	77	350.034
2.6388	12	54.5508	9.8955	45	204.566	17.1522	78	354.580
2.8587	13	59.0967	10.1154	46	209.111	17.3721	79	359.126
3.0786	14	63.6426	10.3353	47	213.657	17.5920	80	363.672
3.2985	15	68.1885	10.5552	48	218.203	17.8119	81	368.218
3.5184	16	72.7344	10.7751	49	222.749	18.0318	82	372.764
3.7383	17	77.2803	10.9950	50	227.295	18.2517	83	377.310
3.9582	18	81.8262	11.2149	51	231.841	18.4716	84	381.856
4.1781	19	86.3721	11.4348	52	236.387	18.6915	85	386.402
4.3980	20	90.9180	11.6547	53	240.933	18.9114	86	390.947
4.6179	21	95.4639	11.8746	54	245.479	19.1313	87	395.493
4.8378	22	100.009	12.0945	55	250.025	19.3512	88	400.039
5.0577	23	104.556	12.3144	56	254.570	19.5711	89	404.585
5.2776	24	109.102	12.5343	57	259.116	19.7910	90	409.131
5.4975	25	113.648	12.7542	58	263.662	20.0109	91	413.677
5.7174	26	118.193	12.9741	59	268.209	20.2308	92	418.223
5.9373	27	122.739	13.1940	60	272.754	20.4507	93	422.769
6.1572	28	127.285	13.4139	61	277.299	20.6706	94	427.315
6.3771	29	131.831	13.6338	62	281.846	20.8905	95	431.861
6.5970	30	136.377	13.8537	63	286.392	21.1104	96	436.406
6.8169	31	140.923	14.0736	64	290.938	21.3303	97	440.952
7.0368	32	145.469	14.2935	65	295.483	21.5502	98	445.498
7.2567	33	150.015	14.5134	66	300.029	21.7701	99	450.044

Units of Capacity

1 litre = 1.7599 imperial pints
1 imp. pint = 0.5682 litres

Imp. pt.		Litres	Imp. pt.		Litres	Imp. pt.		Litres
1.7599	1	0.5682	59.8366	34	19.3188	117.913	67	38.0694
3.5198	2	1.1364	61.5965	35	19.8870	119.673	68	38.6376
5.2797	3	1.7046	63.3564	36	20.4552	121.433	69	39.2058
7.0396	4	2.2728	65.1163	37	21.0234	123.193	70	39.7740
8.7995	5	2.8400	66.8762	38	21.5916	124.953	71	40.3422
10.5594	6	3.4902	68.6361	39	22.1598	126.713	72	40.9104
12.3193	7	3.9774	70.3960	40	22.7280	128.473	73	41.4786
14.0792	8	4.5456	72.1559	41	23.2962	130.233	74	42.0468
15.8391	9	5.1138	73.9158	42	23.8644	131.993	75	42.6150
17.5990	10	5.6820	75.6757	43	24.4326	133.752	76	43.1832
19.3589	11	6.2502	77.4356	44	25.0008	135.512	77	43.7514
21.1188	12	6.8184	79.1955	45	25.5690	137.272	78	44.3196
22.8787	13	7.3866	80.9554	46	26.1372	139.032	79	44.8878
24.6386	14	7.9548	82.7153	47	26.7054	140.792	80	45.4560
26.3985	15	8.5230	84.4752	48	27.2736	142.552	81	46.0242
28.1854	16	9.0912	86.2351	49	27.8418	144.312	82	46.5924
29.9183	17	9.6594	87.9950	50	28.4100	146.072	83	47.1606
31.6782	18	10.2276	89.7549	51	28.9782	147.832	84	47.7288
33.4381	19	10.7958	91.5148	52	29.5464	149.592	85	48.2970
35.1980	20	11.3640	93.2747	53	30.1146	151.351	86	48.8652
36.9579	21	11.9322	95.0346	54	30.6828	153.111	87	49.4334
38.7178	22	12.5004	96.7945	55	31.2510	154.871	88	50.0016
40.4770	23	13.0686	98.5544	56	31.8192	156.631	89	50.5698
42.2376	24	13.6368	100.314	57	32.3874	158.391	90	51.1380
43.9975	25	14.2050	102.074	58	32.9556	160.151	91	51.7062
45.7574	26	14.7732	103.834	59	33.5238	161.912	92	52.2744
57.5173	27	15.3414	105.594	60	34.0920	163.671	93	52.8426
49.2772	28	15.9096	107.354	61	34.6602	165.431	94	53.4108
51.0371	29	16.4778	109.114	62	35.2284	167.191	95	53.9790
52.7970	30	17.0460	110.874	63	35.7966	168.950	96	54.5472
54.5569	31	17.6142	112.634	64	36.3648	170.710	97	55.1154
56.3168	32	18.1824	114.394	65	36.9330	172.470	98	55.6836
58.0767	33	18.7506	116.153	66	37.5012	174.230	99	56.2518

Units of Length

1 m = 3.2808 feet
1 foot = 0.3048 metres

m		ft	m		ft	m		ft
0.3048	1	3.2808	10.3632	34	111.549	20.4216	67	219.816
0.6096	2	6.5617	10.6680	35	114.829	20.7264	68	223.097
0.9144	3	9.8425	10.9728	36	118.110	21.0312	69	226.378
1.2192	4	13.1234	11.2776	37	121.391	21.3360	70	229.659
1.5240	5	16.4042	11.5824	38	124.672	21.6408	71	232.940
1.8288	6	19.6850	11.8872	39	127.953	21.9456	72	236.220
2.1336	7	22.9659	12.1920	40	131.234	22.2504	73	239.501
2.4384	8	26.2467	12.4968	41	134.514	22.5552	74	242.782
2.7432	9	29.5276	12.8016	42	137.795	22.8600	75	246.063
3.0480	10	32.8084	13.1064	43	141.076	23.1648	76	249.344
3.3528	11	36.0892	13.4112	44	144.357	23.4696	77	252.625
3.6576	12	39.3701	13.7160	45	147.638	23.7744	78	255.906
3.9624	13	42.6509	14.0208	46	150.919	24.0792	79	259.186
4.2672	14	45.9318	14.3256	47	154.199	24.3840	80	262.467
4.5720	15	49.2126	14.6304	48	157.480	24.6888	81	265.748
4.8768	16	52.4934	14.9352	49	160.761	24.9936	82	269.029
5.1816	17	55.7743	15.2400	50	164.042	25.2984	83	272.310
5.4864	18	59.0551	15.5448	51	167.323	25.6032	84	275.591
5.7912	19	62.3360	15.8496	52	170.604	25.9080	85	278.871
6.0960	20	65.6168	16.1544	53	173.885	26.2128	86	282.152
6.4008	21	68.8976	16.4592	54	177.165	26.5176	87	285.433
6.7056	22	72.1785	16.7640	55	180.446	26.8224	88	288.714
7.0104	23	75.4593	17.0688	56	183.727	27.1272	89	291.995
7.3152	24	78.7402	17.3736	57	187.008	27.4320	90	295.276
7.6200	25	82.0210	17.6784	58	190.289	27.7368	91	298.556
7.9248	26	85.3018	17.9832	59	193.570	28.0416	92	301.837
8.2296	27	88.5827	18.2880	60	196.850	28.3464	93	305.118
8.5344	28	91.8635	18.5928	61	200.131	28.6512	94	308.399
8.8392	29	95.1444	18.8976	61	203.412	28.9560	95	311.680
9.1440	30	98.4252	19.2024	63	206.693	29.2608	96	314.961
9.4488	31	101.7060	19.5072	64	209.974	29.5656	97	318.241
9.7536	32	104.9870	19.8120	65	213.255	29.8704	98	321.522
10.0584	33	108.2680	20.1168	66	216.535	30.1752	99	324.803

Units of Weight

1 kg = 2.2046 lb
1 lb = 0.4536 kg

kg		lb	kg		lb	kg		lb
0.4536	1	2.2046	15.4224	34	74.9564	30.3912	67	147.708
0.9072	2	4.4092	15.8760	35	77.1610	30.8448	68	149.913
1.3608	3	6.6138	16.3296	36	79.3656	31.2984	69	152.117
1.8144	4	8.8184	16.7832	37	81.5702	31.7520	70	154.322
2.2680	5	11.0230	17.2368	38	83.7748	32.2056	71	156.527
2.7216	6	13.2276	17.6904	39	85.9794	32.6592	72	158.731
3.1752	7	15.4322	18.1440	40	88.1840	33.1128	73	160.936
3.6288	8	17.6368	18.5976	41	90.3886	33.5664	74	163.140
4.0824	9	19.8414	19.0512	42	92.5932	34.0200	75	165.345
4.5360	10	22.0460	19.5048	43	94.7978	34.4736	76	167.549
4.9896	11	24.2506	19.9584	44	97.0024	34.9272	77	169.754
5.4432	12	26.4552	20.4120	45	99.207	35.3808	78	171.958
5.8968	13	28.6598	20.8656	46	101.412	35.8344	79	174.163
6.3504	14	30.8644	21.3192	47	103.616	36.2880	80	176.368
6.8040	15	33.0690	21.7728	48	105.821	36.7416	81	178.573
7.2576	16	35.2736	22.2264	49	108.025	37.1952	82	180.777
7.7112	17	37.4782	22.6800	50	110.230	37.6488	83	182.982
8.1648	18	39.6828	23.1336	51	112.435	38.1024	84	185.186
8.6184	19	41.8874	23.5872	52	114.639	38.5560	85	187.391
9.0720	20	44.0920	24.0408	53	116.844	39.0096	86	189.596
9.5256	21	46.2966	24.4944	54	119.048	39.4632	87	191.800
9.9792	22	48.5012	24.9489	55	121.253	39.9168	88	194.005
10.4328	23	50.7058	25.4016	56	123.458	40.3704	89	196.209
10.8864	24	52.9104	25.8552	57	125.662	40.8240	90	198.414
11.3400	25	55.1150	26.3088	58	127.867	41.2776	91	200.619
11.7936	26	57.3196	26.7624	59	130.071	41.7312	92	202.823
12.2472	27	59.5242	27.2160	60	132.276	42.1848	93	205.028
12.7008	28	61.7288	27.6696	61	134.481	42.6384	94	207.232
13.1544	29	63.9334	28.1232	62	136.685	43.0920	95	209.437
13.6080	30	66.1380	28.5768	63	138.889	43.5456	96	211.642
14.0616	31	68.3426	29.0304	64	141.094	43.9992	97	213.846
14.5152	32	70.5472	29.4840	65	143.299	44.4528	98	216.051
16.9688	33	72.7518	29.9376	66	145.504	44.9064	99	218.255

Conversion table of English Measurements

	LENGTHS 1 inch = 25.4 mm						TEMPERATURES			
Fractions inches	Decimal	mm	Inches in mm		mm in inches		Fahrenheit to Celsius			
			Inches	mm	mm	Inches	° F	° C	° C	° F
1/64	.015625	0.3969					- 20	- 28.9	- 30	- 22
1/32	.031250	0.7937					- 15	- 26.1	- 28	- 18.4
3/64	.468750	1.1906					- 10	- 23.3	- 26	- 14.8
1/16	.062500	1.5875	0.0001	0.00254	0.004	0.00015	- 5	- 20.6	- 24	- 11.2
5/64	.078125	1.9844	.0002	.00508	0.005	.00019	0	- 17.8	- 22	- 7.6
3/32	.093750	2.3812	.0003	.00762	0.006	.00023	1	- 17.2	- 20	- 4
7/64	.109375	2.7781	.0004	.01016	0.007	.00027	2	- 16.7	- 18	- 0.4
1/8	.125000	3.1750	.0005	.01270	0.008	.00031	3	- 16.1	- 16	3.2
9/64	.140625	3.5719	.0006	.01524	0.009	.00035	4	- 15.6	- 14	6.8
5/32	.156250	3.9687	.0007	.01778	0.01	.00039	5	- 15.0	- 12	10.4
11/64	.171875	4.3656	.0008	.02032	0.02	.00079	10	- 12.2	- 10	14
3/16	.187500	4.7625	.0009	.02286	0.03	.00118	15	- 9.4	- 8	17.6
13/64	.203125	5.1594	.001	.0254	0.04	.00157	20	- 6.7	- 6	21.2
7/32	.218750	5.5562	.002	.0508	0.05	.00197	25	- 3.9	- 4	24.8
15/64	.234375	5.9531	.003	.0762	0.06	.00236	30	- 1.1	- 2	28.4
1/4	.250000	6.3500	.004	.1016	0.07	.00276	35	1.7	0	32
17/64	.265625	6.7469	.005	.1270	0.08	.00315	40	4.4	2	35.6
9/32	.281250	7.1437	.006	.1524	0.09	.00354	45	7.2	4	39.2
19/64	.296875	7.5406	.007	.1778	0.10	.00394	50	10.0	6	42.8
5/16	.312500	7.9375	.008	.2032	0.20	.0078	55	12.8	8	46.4
21/64	.328125	8.3344	.009	.2286	0.30	.01181	60	15.6	10	50
11/32	.343750	8.7312	.01	.254	0.40	.01575	65	18.3	12	53.6
23/64	.359375	9.1281	.02	.508	0.50	.01969	70	21.1	14	57.2
3/8	.375000	9.5250	.03	.762	0.60	.02362	75	23.9	16	60.8
25/64	.390625	9.9219	.04	1.016	0.70	.02756	80	26.7	18	64.4
13/32	.406250	10.3187	.05	1.270	0.80	.03149	85	29.4	20	68
27/64	.421875	10.7156	.06	1.524	0.90	.03543	90	32.2	22	71.6
7/16	.437500	11.1125	.07	1.778	1	.03937	95	35.0	24	75.2
29/64	.453125	11.5094	.08	2.032	2	.07874	100	37.8	26	78.8
15,32	.468750	11.9062	.09	2.286	3	.11811	105	40.6	28	82.4
31/64	.484375	12.3031	.10	2.540	4	.15748	110	43.3	30	86
1/2	.500000	12.7000	.20	5.080	5	.19685	115	46.1	32	89.6
33/64	.515625	13.0969	.30	7.620	6	.23622	120	48.9	34	93.2
17/32	.53125	13.4937	.40	10.160	7	.27559	125	51.7	36	96.8

LENGTHS 1 Pouce (inch) = 25.4 mm							TEMPERATURES			
Fractions of inches	Decimal	mm	Inches in mm		mm in inches		Fahrenheit to Celsius			
			Inches	mm	mm	Inches	° F	° C	° C	° F
35/64	.546875	13.8906	0.5	12.70	8	0.31496	130	54.4	38	100.4
9/16	.562500	14.2875	.6	15.24	9	.35433	135	57.2	40	104
37/64	.578125	14.6844	.7	17.78	10	.39370	140	60.0	42	107.6
19/32	.593750	15.0812	.8	20.32	11	.43307	145	62.8	44	112.2
39/64	.609375	15.4781	.9	22.86	12	.47244	150	65.6	46	114.8
5/8	.6250	15.8750	1	25.4	13	.51181	155	68.3	48	118.4
41/64	.640625	16.2719	2	50.8	14	.55118	160	71.1	50	122
21/32	.656250	16.6687	3	76.2	15	.59055	165	73.9	52	125.6
43/64	.671875	17.0656	4	101.6	16	.62992	170	76.7	54	129.2
11/16	.687500	17.4625	5	127	17	.66929	175	79.4	56	132.8
45/64	.703125	17.8594	6	152.4	18	.70866	180	82.2	58	136.4
23/32	.718750	18.2562	7	177.8	19	.74803	185	85.0	60	140
47/64	.734375	18.6531	8	203.2	20	.78740	190	87.8	62	143.6
3/4	.7500	19.05	9	228.6	21	.82677	195	90.6	64	147.2
49/64	.765625	19.4469	10	254	22	.86614	200	93.3	66	150.8
25/32	.781250	19.8437	11	279.4	23	.90551	205	96.1	68	154.4
51/64	.796875	20.2406	12	304.8	24	.94480	210	98.9	70	158
13/16	.812500	20.6375	13	330.2	25	.98425	212	100.0	75	167
53/64	.828125	21.0344	14	355.6	26	1.02362	215	101.7	80	176
27/32	.843750	21.4312	15	381	27	1.06299	220	104.4	85	185
55/64	.859375	21.8281	16	406.4	28	1.10236	225	107.2	90	194
7/8	.875000	22.2250	17	431.8	29	1.14173	230	110.0	95	203
57/64	.890625	22.6219	18	457.2	30	1.18110	235	112.8	100	212
29/32	.906250	23.0187	19	482.6	31	1.22047	240	115.6	105	221
59/64	.921875	23.4156	20	508	32	1.25984	245	118.3	110	230
15/16	.937500	23.8125	21	533.4	33	1.29921	250	121.1	115	239
61/64	.953125	24.2094	22	558.8	34	1.33858				
31/32	.968750	24.6062	23	584.2	34	1.37795				
63/64	.984375	25.0031	24	609.6	36	1.41732				
1	1.00	25.40	25	635	37	1.45669				
			26	660.4	38	1.49606				
					39	1.53543				
					40	1.57480				

G . Locking compounds and sealants

The Loctite compounds mentioned in this manual are referred to by their industrial names.
For repairs, use the brands or AGCO references shown in the following table:

Loctite industrial name	Brand	AGCO reference
242 - 241 - 542	Frenetanche	3 930 904 M1
270	Frenbloc	3 405 352 M5
510 - 221	Formajoint	3 900 613 M2
638 - 648	Scelbloc	1 633 268 M2
Silicomet	Auto-joint clair	3 405 423 M2

Note: Use the product "Form A Gasket 2" in cases where sealing is required between plastic and steel or cast-iron. For example: PTO sensor, forward speed sensor…

These products can be ordered from the following address:
LOCTITE
10 Avenue Eugène Gazeau
Zone Industrielle
6034 – SENLIS
France

Application method for Loctite products

1. Remove all traces of the old sealing product and corrosion
   - by rubbing with a cloth or brushing
   - by chemical action: "DECAPLOC 88". Leave to act, then scrape off and dry.
2. Degrease the parts in solvent
   - preferably, use "Super Solvent Sec LOCTITE 706"
3. Evaporate off the solvent
4. Smear the parts with the recommended grade of LOCTITE:
   - for blind tapped holes, place a small quantity of the product on the last of the tapped threads.
   - for cylindrical fitting components, place the product on both areas using a clean brush.
   - for mating faces, apply a bead of product on one of the two faces, forming rings around any communicating holes and tighten the parts together as quickly as possible.

Note:
a) Apply the minimum quantity of product required in order to avoid sticking adjacent parts.
b) Do not further tighten or loosen bolts after 5 minutes of polymerisation in order not to break the film.
c) If the ambient temperature is less than +10° C and in order to speed up the process (except with SILICOMET), after operation 2 use LOCTITE T 747 quick setting on at least one of the parts. Any excess of product outside the sealed area will not harden (anaerobic product – polymerises only in the absence of oxygen).

Grease

When grease is used in components that are in contact with transmission oil, employ a miscible grease to avoid clogging the hydraulic filters.
Use "Amber Technical" grease, supplied by WITCO 76320 Saint-Pierre les Elbeuf.

H . Tightening torques

Use the recommended tightening torques for nuts and bolts in accordance with tables:
- **1** and **2**: for metric threads
- **3** and **4**: for non-metric threads

Where a particular torque is required, it is mentioned in the text.
Tables 1 and 3 indicate the normal values of the tightening torques applicable with zinc-plated threaded elements with normal nuts, coarse or fine threads, with or without flat or lock washers, and weld nuts having a height greater than 0.8 d.

Tables 2 and 4 indicate the lower torque values applicable to threaded elements in assemblies using self-locking safety nuts, zinc-plated, phosphate coated nuts and bolts, flat nuts, and weld nuts having a height less than 0.8 d.
These values apply to all dry assemblies. If the threads are lubricated, reduce the tightening torques in consequence.

Note: Read the strength classification on the head of the bolt and determine the corresponding torque to be applied.

Example:

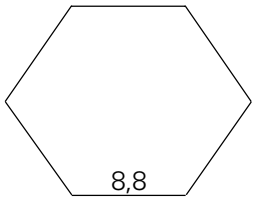


Table 1
Tightening torque values: zinc-plated metric threads

Nominal dimension d.	Strength classification ISO 8,8 (SAE 5, BS S) Torque Nm		Strength classification ISO 10,9 (SAE 8, BS V) Torque Nm	
	Max	Min	Max	Min
M3	1.7	1.3	2.4	1
M4	4.1	3.1	5.7	4
M5	8	6	11.5	8
M6	14	10	20	14
M8	35	25	46	36
M10	70	50	96	72
M12	120	90	160	120
M16	260	200	400	300
M20	560	420	800	600
M24	960	720	1300	1000
M30	1800	1400	2800	2100
M36	3300	2500	4800	3600

Table 2
Reduced tightening torque values: metric threads

Nominal dimension d.	Strength classification ISO 8,8 (SAE 5, BS S) Torque Nm		Strength classification ISO 10,9 (SAE 8, BS V) Torque Nm	
	Max	Min	Max	Min
M3	1.4	1	1.9	1
M4	3.3	2.5	4.6	3
M5	6.4	4.8	9.2	6
M6	11	8	16	12
M8	28	20	37	29
M10	56	40	77	57
M12	96	72	130	100
M16	210	160	320	240
M20	450	340	640	480
M24	770	570	1040	800
M30	1400	1100	2200	1700
M36	2600	2000	3800	2900

Table 3
Tightening torque values: zinc-plated non-metric threads

Nominal dimension d.	Strength classification SAE 5 (ISO 8,8 BS S) Torque Nm		Strength classification SAE 8 (ISO 10,9 BS V) Torque Nm	
	Max	Min	Max	Min
#6	2.4	1.8	3.3	2
#8	4.4	3.4	6.3	4
#10	6.3	4.7	8.9	6
1/4	15	11	22	16
5/16	30	22	43	31
3/8	53	39	75	55
7/16	86	64	120	90
1/2	130	100	180	140
5/8	260	200	370	280
3/4	460	350	660	490
7/8	760	560	1060	800
1	1120	840	1600	1200
1 1/8	1390	1050	2200	1700
1 1/4	2000	1500	3200	2400
1 1/2	3400	2600	5400	4100

Table 4
Tightening torque values: zinc-plated non-metric threads

Nominale dimension d.	Strength classification SAE 5 (ISO 8,8 BS S) Torque Nm		Strength classification SAE 8 (ISO 10,9 BS V) Torque Nm	
	Max	Min	Max	Min
#6	1.9	1.5	2.6	2
#8	3.5	2.7	5	3
#10	5	3.8	7.1	5
1/4	12	8.8	18	13
5/16	24	18	34	25
3/8	42	31	60	44
7/16	69	51	96	72
1/2	104	80	140	110
5/8	210	160	300	220
3/4	370	280	530	390
7/8	610	450	850	640
1	900	670	1280	960
1 1/8	1100	840	1760	1360
1 1/4	1600	1200	2560	1920
1 1/2	2700	2100	4320	3280

2 . SPLITTING THE TRACTOR

Contents

2 A01 Splitting the tractor between front frame / Engine

CONTENTS

General

This section presents a general disassembly procedure. Due to the diversity of the hydraulic or mechanical options available on the 8200 series tractors, mention will only be made of those pipes or main connections to be disconnected.
For this reason, before and when disassembling the tractor, ensure no connections remain between the fixed assembly and the moving assembly.
Disassembling the front frame and the engine allows working on the mechanical parts located at the front of the engine.

A . Preliminary operations

1. Remove the side panels. Unlock and hinge open the bonnet, or remove (if necessary).
Position of locks:
- *tractors 8210 8220 and 8240 to 8260:* below the front nose assembly;
- *tractors 8270 and 8280:* below the front nose assembly, on the rear left-hand side of the bonnet.

Disconnect the battery terminals.

2. Disconnect the front differential-locking control pipe at both ends (front axles AG155H and AG200) (blank the pipe).
Remove the transmission guard and shaft (4 WD) (all tractor types).

3. Remove the guards located either side of the radiator.

4. Disconnect the horn wiring harness located inside the nose assembly.

5. Mark then disconnect the steering hoses from the side pipes fitted on the engine mount. Blank the pipes.

6. Disconnect the vacuum-gauge harness. Remove the suction pipe from the air cleaner above the radiator.

7. Drain the cooling system.

8. On the radiator, disconnect:
- the hoses (lower and upper),
- the hose connecting the radiator and the expansion tank.

9. Remove the cleat above the radiator.

10. Mark the position then disconnect the following hoses:
Full Powershift gearbox
- the hoses from the cooler to the thermostatic valve.

Heavy Duty gearbox
- the cooler hoses routed to the right-hand hydraulic cover.

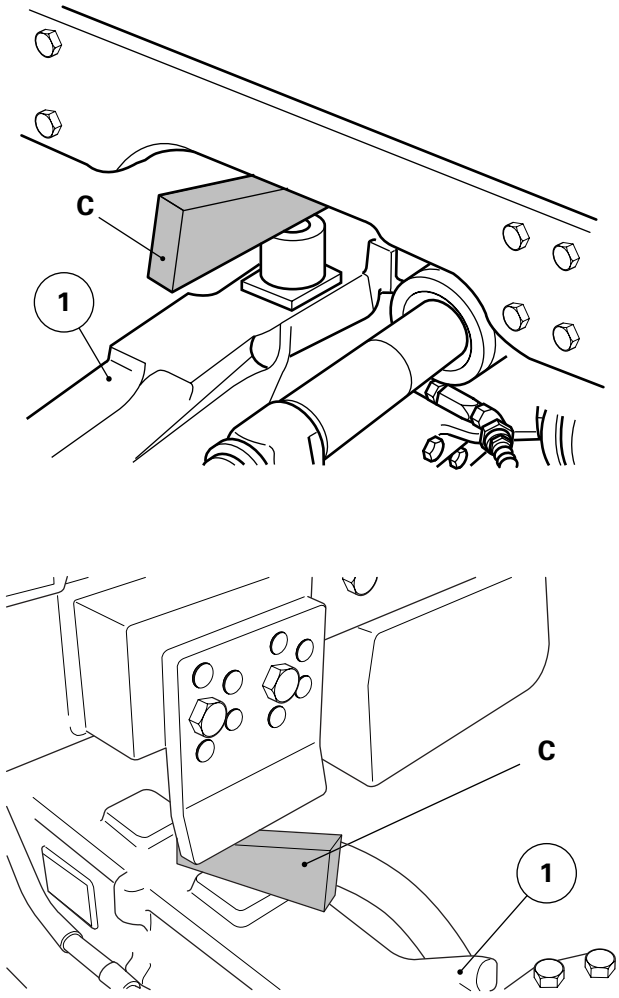


Fig. 1

11. Disconnect the air conditioning intakes at the front left of the cab. Fit blanking plugs.

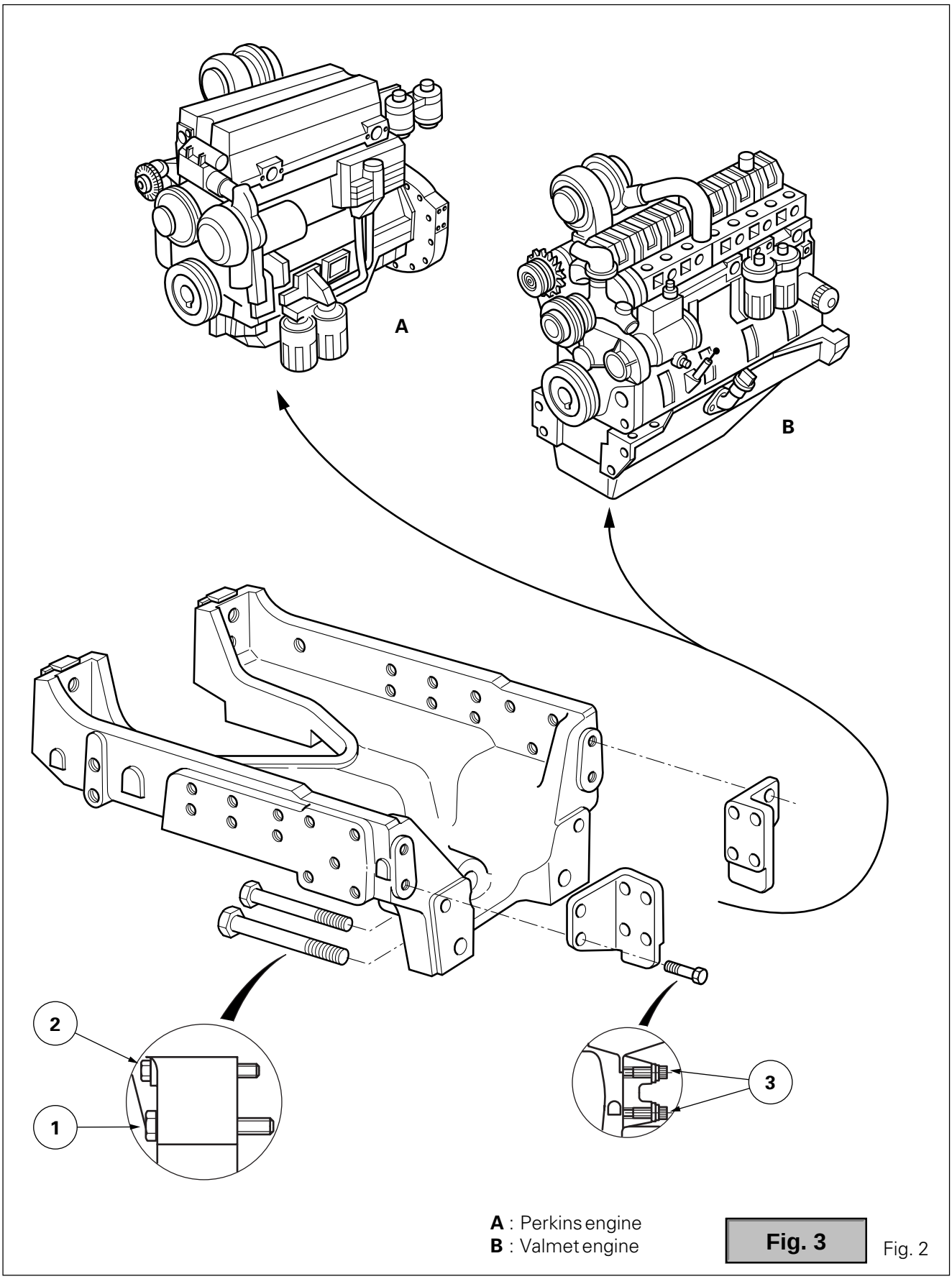
12. Remove the compressor from its mounting and tilt forward without disconnecting the hoses.

13. If necessary, remove the steering cylinder (front axles AG155H and AG200H) to gain access to the screws securing the frame to the engine.

14. Remove the chassis reinforcements located either side of the engine (if installed) (see section 2F01). Set the handbrake and block front axle (**1**), using suitable chocks "**C**" (Fig. 1). Chock the rear wheels.

15. Remove one screw (**3**) (Fig. 2 - 3) on each front engine mount, replacing by two guide studs of sufficient length.

Splitting *- Front Frame / Engine*



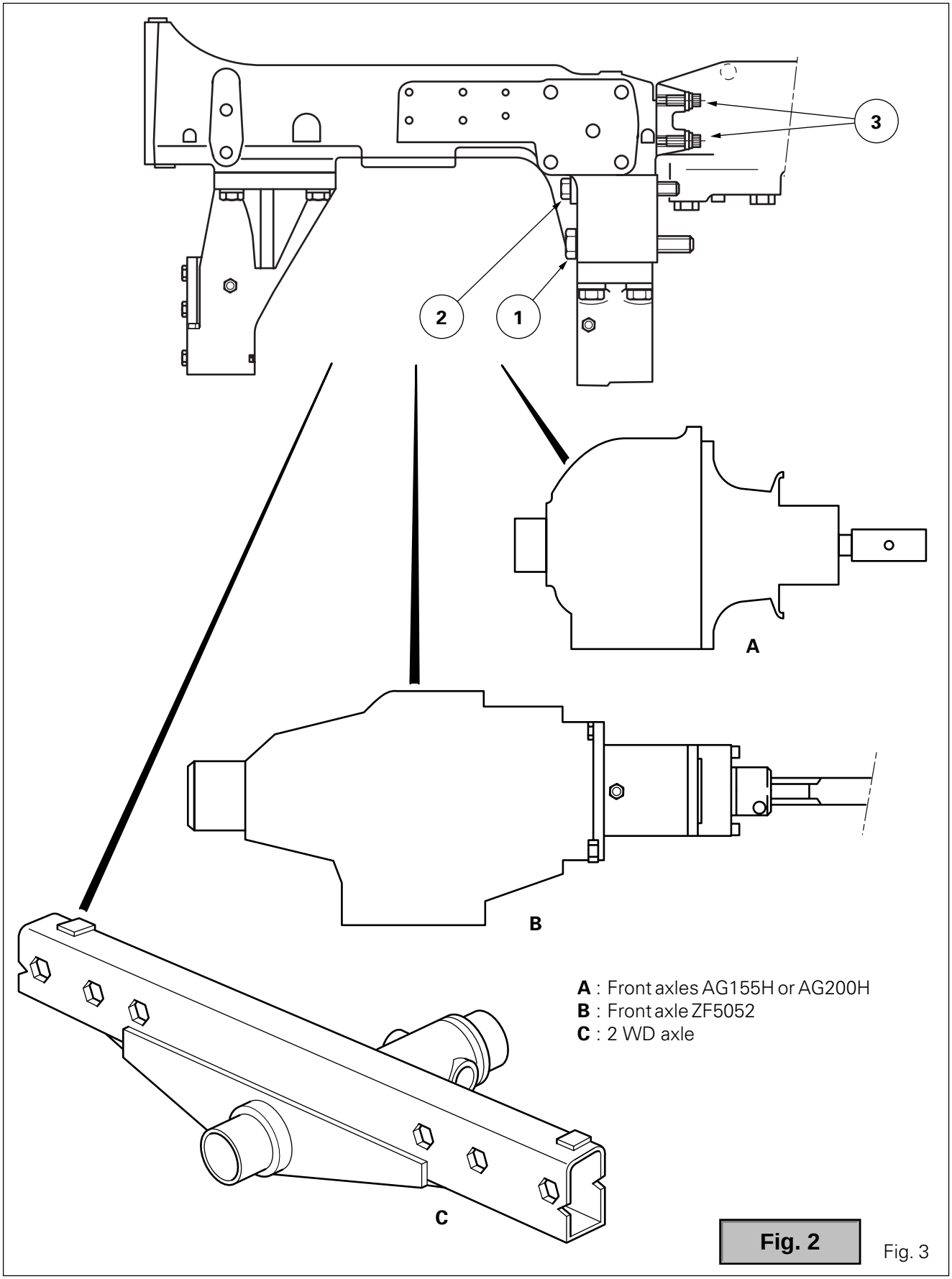
A : Perkins engine
B : Valmet engine

Fig. 3

Fig. 2

2A01.4

Splitting - *Front frame / Engine*



A : Front axles AG155H or AG200H
B : Front axle ZF5052
C : 2 WD axle

Fig. 2

Fig. 3

B . Disassembling (Fig. 4)

Note: Remove the front weights and belly weights (if installed).

16. Position a fixed axle stand under the engine sump.
17. Position a movable axle stand under the front axle (2 or 4 WD), in the longitudinal axis of the tractor, or use suitable lifting equipment.
18. Finish removing the other attachment screws (**1**) (**2**) (**3**) (Fig. 2 - 3) from the front engine frame.
19. Assisted by an operator, separate the assemblies.

Danger

- Ensure there is no risk of accidental tipping of the front frame assembly during the disassembly operation.

C . Reassembling

20. Assemble the frame with the engine.
21. Remove the guide studs. Install and torque the screws as follows (Fig. 2 - 3) :
- (**1**) : 670 - 900 Nm
- (**2**) : 520 - 640 Nm
- (**3**) : 300 - 400 Nm

D . Final operations

22. Remove the shims between the frame and the front axle.
If necessary, reinstall the chassis reinforcements (s 2F01) and the front weights.
23. If disassembled, reinstall the steering cylinder. Apply a light coating of Loctite 270 then torque the screws to 180 - 200 Nm and torque ball nuts to 140 - 155 Nm. Lock the nuts using new pins.
24. Tilt the compressor towards the rear and rest it on the support.
25. Remove the blanking plugs. Reconnect the air conditioning intakes.
26. Reconnect the hoses, reverse operation 10.
27. Reinstall the cleat above the radiator.
28. On the radiator, reconnect:
- the hoses (lower and upper),
- the hoses connected to the radiator seat and the expansion tank.

29. Service the cooling system and the expansion tank.
30. Reinstall the suction pipe on the air cleaner above the radiator.

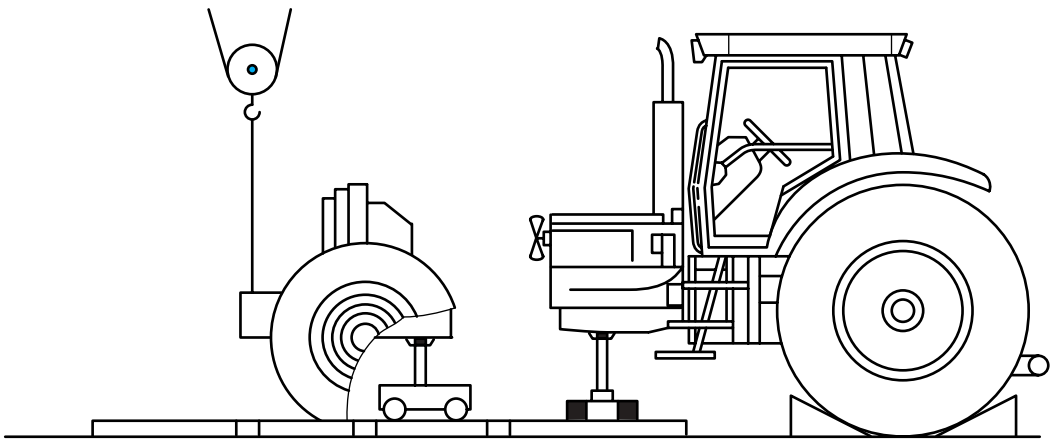


Fig. 4

31. Reconnect the steering hoses on the side pipes fitted on the engine mount.
32. Reconnect the horn wiring harness.
33. Reinstall the guards located either side of the radiator.
34. Reassemble the transmission shaft and guard. Reconnect the front differential-locking control pipe (4 WD) (Front axles AG155H and AG200H).
35. Reconnecting the battery terminals. Close the bonnet.
36. Start the engine.
37. Perform a road test.
38. Check the following points:
- leaktightness of hydraulic circuits,
- operation of electrical circuits,
- coolant level.

If required, complete servicing of the circuit in question.

Tightening torques (if required)

- Front wheel nuts : 640 - 680 Nm
- Belly weight screws (if fitted) 300 - 350 Nm, Loctite 270.

E. Version with Carraro front axle

Note

- 8210–8220-8240 and 8250 tractors are now equipped with Carraro front axle.
- The front frame (axle support) has a different shape to that with a Dana front axle. However, it can be fitted with a Dana front axle (optional).
- The procedure applied to split the front frame with Carraro front axle is practically identical to that used for Dana front axles. However, a few differences in layout and number of parts to be removed should be noted.

Preliminary operations

39. Set the handbrake and immobilize the front axle (**5**) using triangular chocks "**C**" (Fig. 5). Chock the rear wheels.

40. Remove the front weights (if fitted).

41. Remove the side panels. Unlock the bonnet and hinge it open. Use a rope to hold the bonnet open and disconnect the lower clamps on the holding cylinders.

42. Disconnect the negative terminals on the batteries on the right-hand side of the tractor.

43. Remove the guards (**2**) (**2A**) and the universal drive shaft (see section 8F03).

44. Remove the guards located either side of the radiator.

45. Remove the clamp that holds the tubes, hoses and harnesses above the radiator.

46. Remove the chassis reinforcements on either side of the engine (if fitted).

47. Mark and disconnect all the hydraulic or electric unions connected to the frame / front axle and steering cylinder unit, but leave the air conditioning hoses in place.

Note

- These links are located above the radiator and on the right- and left-hand sides of the tractor.

48. Remove the air filter intake pipe above the radiator.

49. Drain the cooling system.

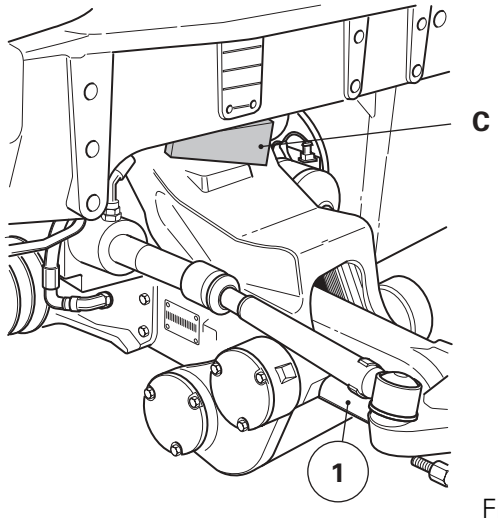


Fig. 5

50. On the radiator, partially disconnect:
- hoses (upper and lower)
- the linking hoses between the radiator and the expansion tank.

51. Tilt the air conditioning condenser housed in the front nose assembly to the front and rear of the engine without disconnecting the hose involved.

52. Remove the steering cylinder to access the adjusting screw that attaches the frame on the engine.

53. Remove a screw (**3**) (Fig. 6 - 8) from each square at the front of the engine, replacing it by a long guide stud of sufficient length.

Disassembling

Danger

- Remove the belly weight (if fitted).

54. Position a fixed axle stand under the engine sump.

55. Position a movable axle stand under the front axle in the longitudinal axis of the tractor, or use a suitable lifting fixture.

56. Finish removing the other attachment screws (**1**) (**2**) (**3**) (Fig. 6 - 8) from the engine frame.

57. Assisted by an operator, separate the assemblies (Fig. 7).

Danger

- Ensure there is no risk of accidental tipping of the front frame assembly during the disassembly operation.

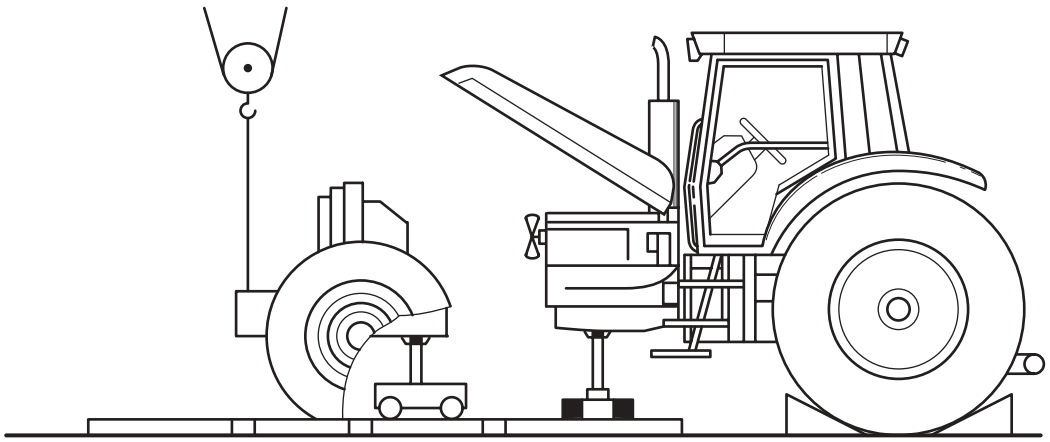
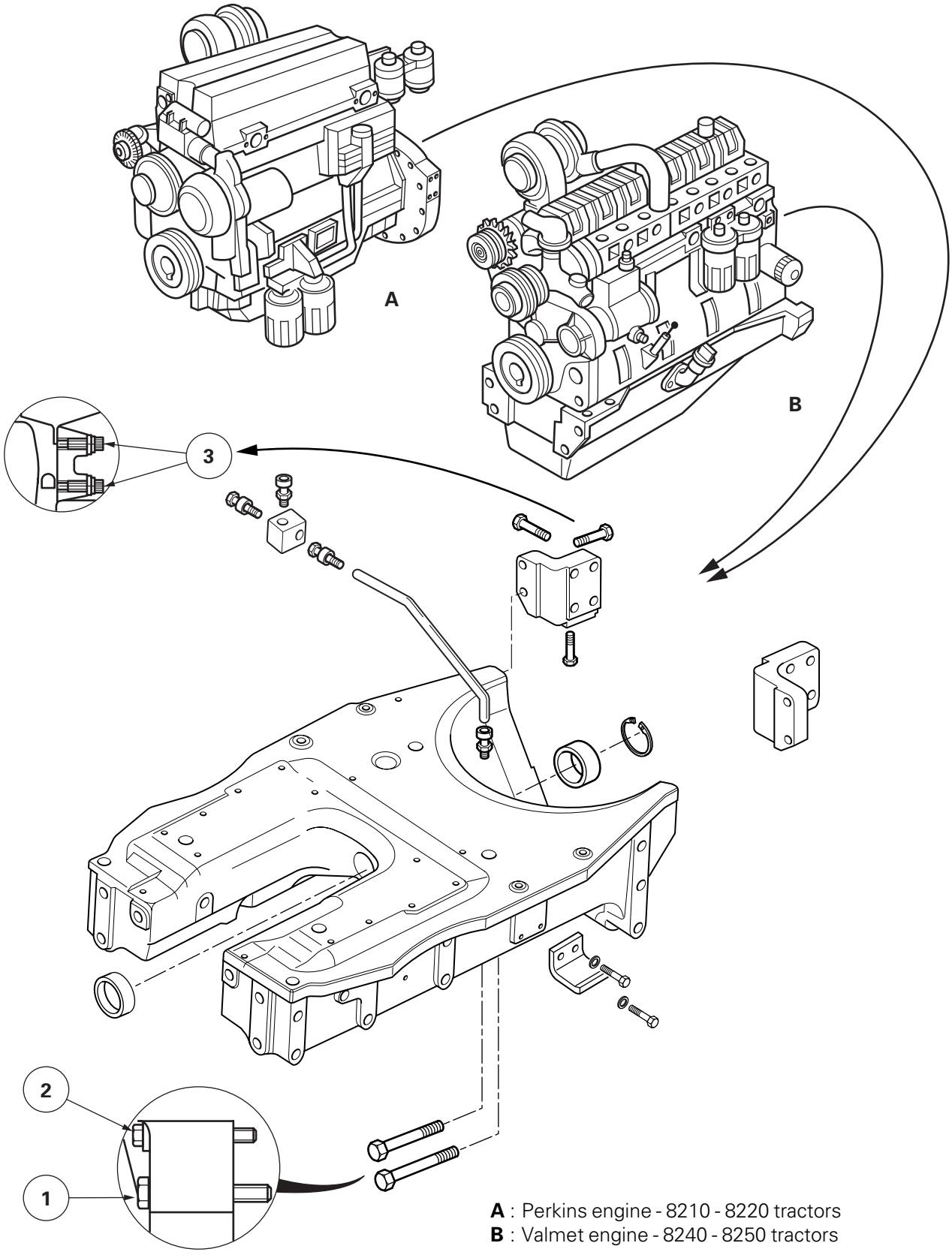


Fig. 7

Splitting *- Front Frame / Engine*



A : Perkins engine - 8210 - 8220 tractors
B : Valmet engine - 8240 - 8250 tractors

Fig. 6

Reassembling

58. Assemble the frame with the engine.

59. Remove the guide studs. Fit screws and torque to (Fig. 8):

- (**1**) : 670 – 900 Nm
- (**2**) : 520 – 640 Nm
- (**3**) : 300 – 400 Nm

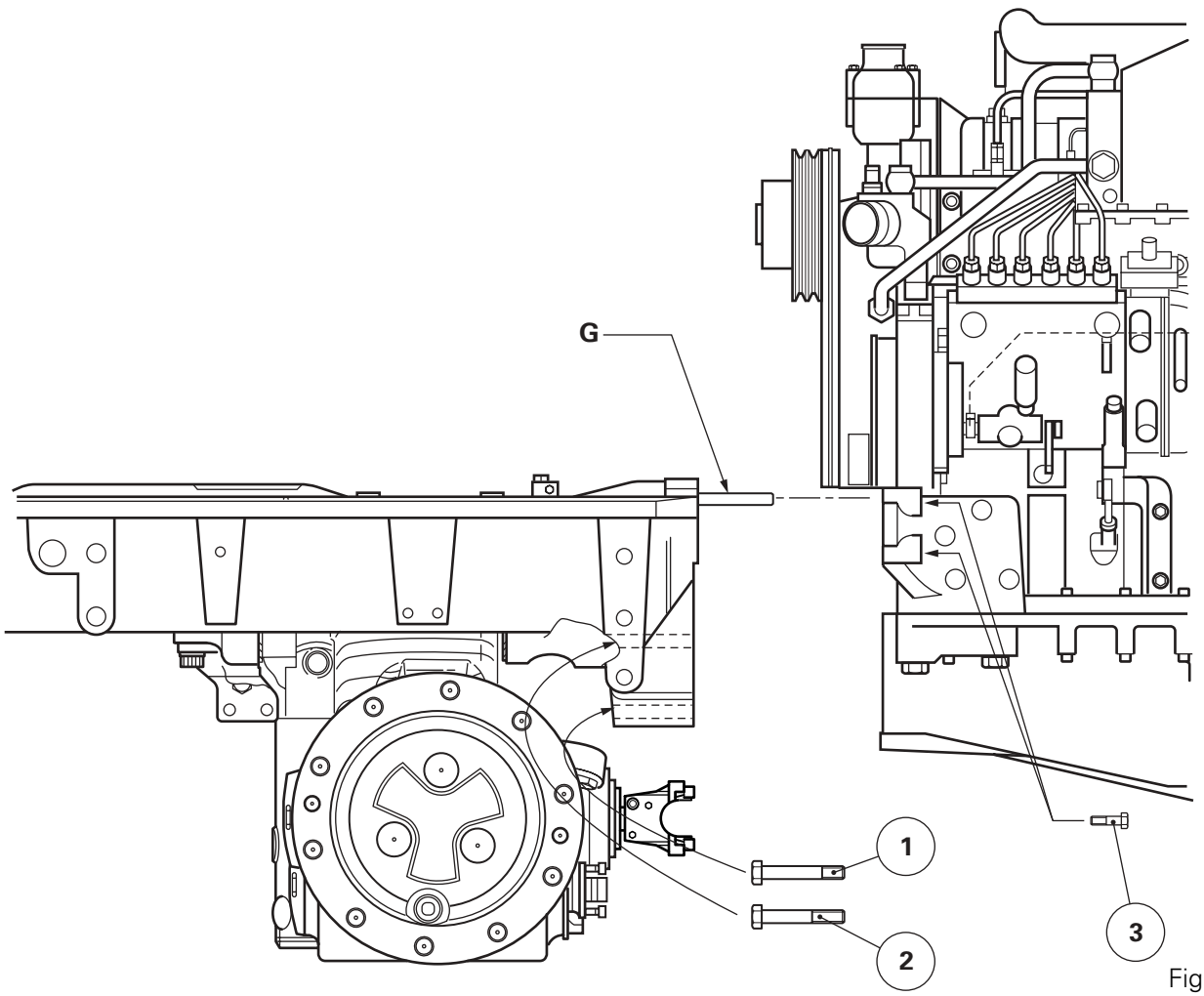


Fig. 8

Final operations
60. Refit the steering cylinder.
61. Refit the condenser.
62. Reconnect all the cooling hoses.
63. Refit the air filter intake pipe.
64. Reconnect the hydraulic and electric unions.
65. Refit the clamp above the radiator.
66. Reinstall the radiator side guards.
67. Refit the universal drive shaft and the guards (**2**) (**2A**).
68. Reconnect the negative terminals to the batteries.
69. Top up the fluid level in the cooling system and the expansion tank.
70. Start the engine. Check the electrical equipment for proper operation and check for hydraulic tightness:
- of hydraulic hoses and unions
- of hoses.

Front axles with a suspension system
- Activate front axle suspension system several times making it move from low position to high position and vice versa in order to check it and detect leaks, if any.
- In case of dysfunction, use the calibration procedure (see section 11 – Electronics).

Front axles –fixed or with a suspension system
71. Close the bonnet and reinstall the side panels.
72. Carry out a road test.

Tightening torques (if necessary)
- Front wheel nuts: 640 – 680 Nm.
- Belly weight screw: 420 – 560 Nm, Loctite 270.

F. Service tools

Tools available in the AGCO network
- 3376935M91 – Set of plugs for air conditioning unions (Fig. 9).

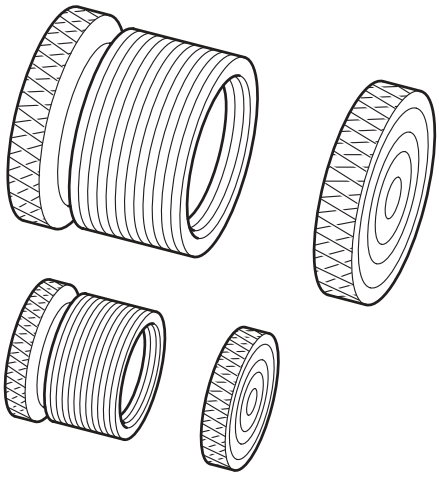


Fig. 9

2 B01 Splitting the tractor betwwen Engine / Gearbox

CONTENTS

Splitting - *Engine / Gearbox*

Splitting - Engine / Gearbox

General

This section presents a general disassembly procedure. Due to the diversity of the hydraulic and mechanical the options available on the 8200 series tractors, mention will only be made of those the pipes or main connections to be disconnected.
For this reason, before and when disassembling the tractor, ensure no connections remain between the fixed assembly and the moving assembly.
The 8200-Series tractors may be equipped either with a Full Powershift gearbox or a Heavy Duty gearbox. Disassembly remains basically identical for both versions.

Available equipment fits

- **Tractors 8210-8220 and 8240**: Full Powershift gearbox AG150
- **Tractors 8250 to 8280**: Full Powershift gearbox AG250,
- **Tractors 8210-8220 and 8240-8250**: Heavy Duty gearbox.

The cab remains attached to the rear axle.
Disassembling the engine and gearbox allows working on the mechanical parts located to the rear of the engine and principally in front of the Heavy Duty gearbox.

A . Preliminary operations

1. Remove the side panels. Unlock and hinge open the bonnet, or remove (if necessary).
Position of locks:
- *tractors 8210-8220 and 8240 to 8260:* below the front nose assembly,
- *tractors 8270 and 8280:* below the front nose assembly, on the rear left-hand side of the bonnet.

2. Remove the front weights. Disconnect the battery terminals.
3. Remove the turbocharger guard.
4. Remove the vertical exhaust assembly, the pipe sleeve-fitted on the turbo, and the flexible sleeve connected to the air cleaner.
5. Disconnect the front differential lock control pipe at both ends (if fitted). Blank the pipe. Remove the transmission guard and shaft (4 WD) (all tractor types).
6. Mark the position then disconnect the following hoses:
Full Powershift gearbox
- the charge and return hoses to/from the brake master-cylinders,
- the hoses to the thermostatic valve.

Heavy Duty gearbox
- Mark and disconnect the hoses coming from the right-hand hydraulic cover towards the cooler. Blank the hoses and ports,
- the charge and return hoses to/from the brake-master-cylinder tank.

7. Disconnect the harness and remove the starter.
8. Disconnect the gas-oil supply and return hoses. If necessary, drain the fuel tanks, disconnect the gauge harness and remove the side tank.
9. If required, remove the guards located either side of the radiator.
10. Disconnect the throttle control at the fuel injection pump.
11. Disconnect:
- the heating hoses under the right-hand floor of the cab, or on the engine, ensuring their positions are identified. Blank the hoses and ports in order to prevent complete drainage of the cooling system,
- the air conditioning intakes at the front left of the cab. Fit blanking plugs (see § E),
- the main harness connections above and to the left of the engine.

12. Mark then disconnect the steering hoses on the Orbitrol steering unit.
13. Remove the engine oil filter (Valmet only), to gain access to the hidden screw securing the gearbox.

14. Set the handbrake and block front axle (**1**) using appropriate chocks "**C**" (Fig. 1). If necessary, remove the chassis reinforcements (see section 2F01).

15. If required, raise the cab slightly and wedge in place.
Note: If the side tank was not removed, check the condition of the flexible unions between the tanks and the filler pipe hose connection.
On Heavy Duty gearboxes, check the condition of the gear control and reverser lifting arm and the selector cover. If the gear lifting arm interferes with raising of the cab, disconnect it (see sections 5C01 - 5C02 and 5C03 depending on option).

16. Remove screws (**3**) placed either side of the engine (**1**) and gearbox (**2**) (Fig. 2 or 3 depending on version). Replace with two guide studs of suitable length.
Note: If necessary, remove the access door set in the inner floor of the cab, to gain easier access to the upper screws fixing the engine to the gearbox.

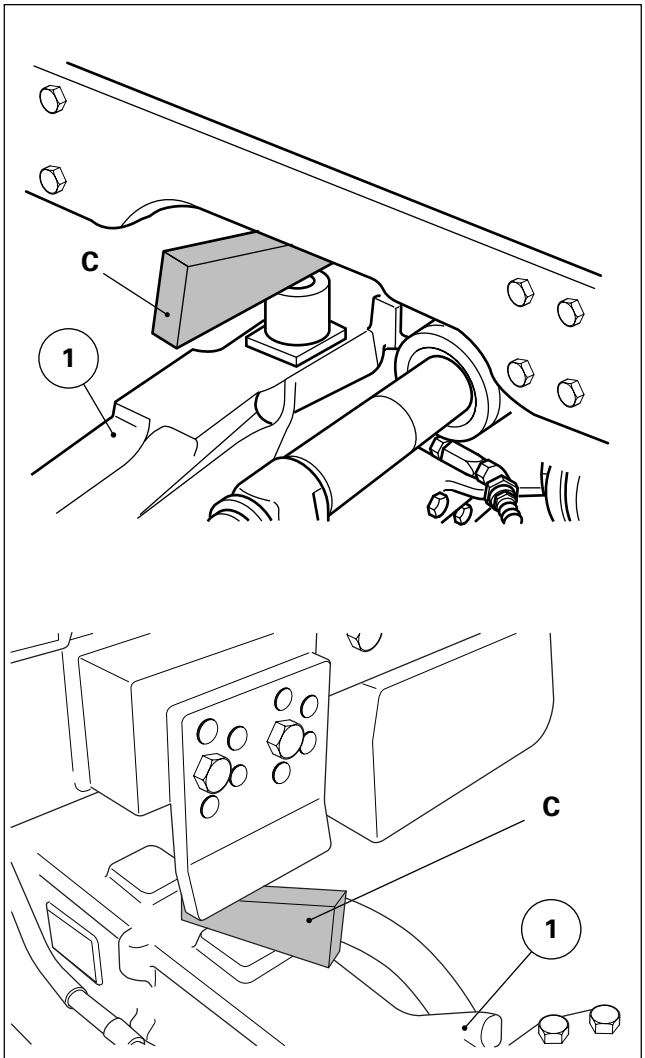


Fig. 1

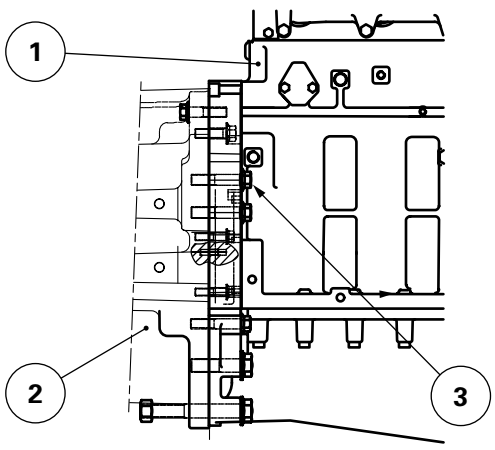


Fig. 2

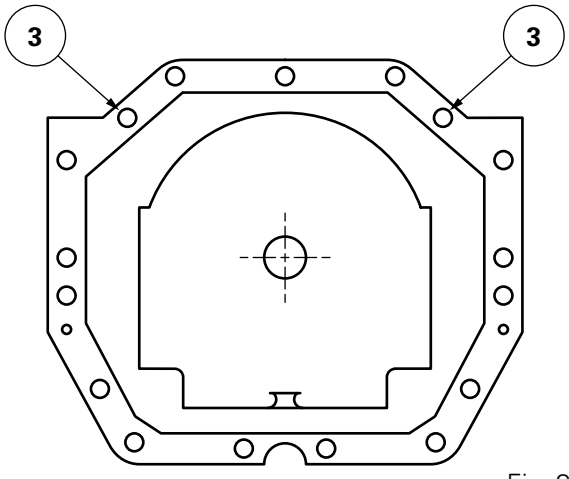


Fig. 3

B . Disassembling (Fig. 4)

17. Position the disassembly tooling.
18. Finish removing the other attachment screws securing the engine on the gearbox.
19. Assisted by an operator, separate the assemblies.

(**1**) Full Powershift gearbox
(**2**) Heavy Duty gearbox
(**3**) 8210 - 8220 and 8240 to 8260 bonnet
(**4**) 8270 and 8280 bonnet

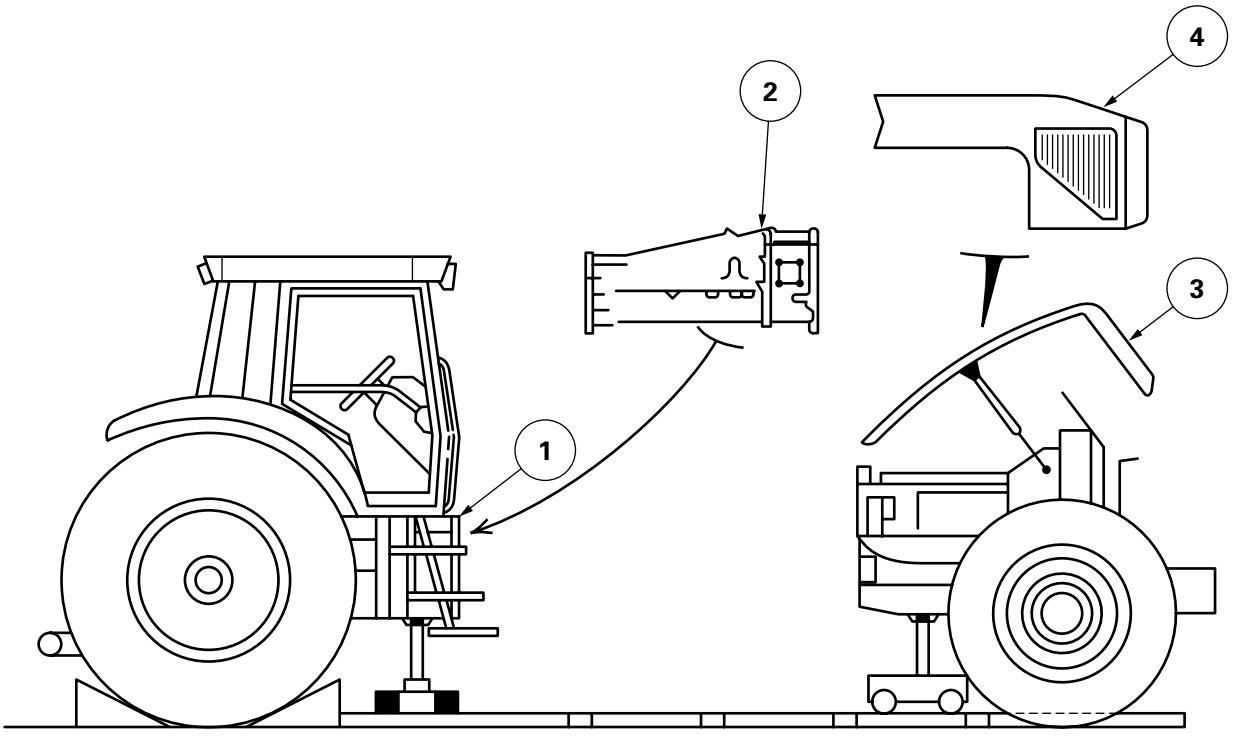


Fig. 4

C . Reassembling

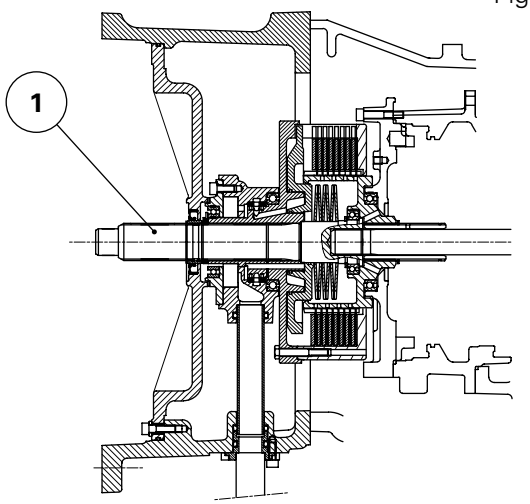
On the Full Powershift gearbox

20. Coat one seat of spring (**2**) with adhesive (Loctite 401 or equivalent). Slide the spring on shaft (**1**) (Fig. 6), the Loctited seat pointed towards the shoulder of the shaft. Allow the Loctite to dry a few seconds. Lightly lubricate the splines of main shaft (**1**) (Fig. 6) with grease (type GN + Molycote) or equivalent.

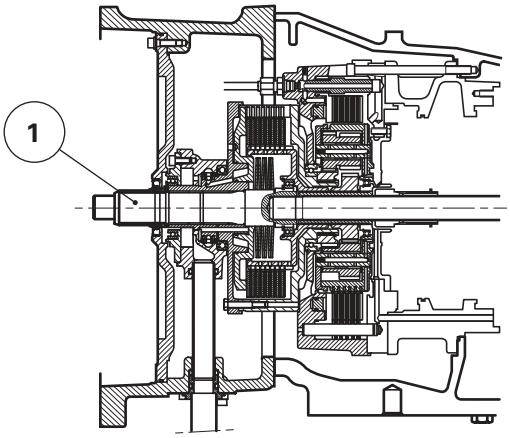
On the Heavy Duty gearbox

- Lightly lubricate the splines of main shaft (**1**) (Fig. 5) using the type of grease mentioned previously.

Fig. 5



Version with mechanical shuttle



Version with Power shuttle

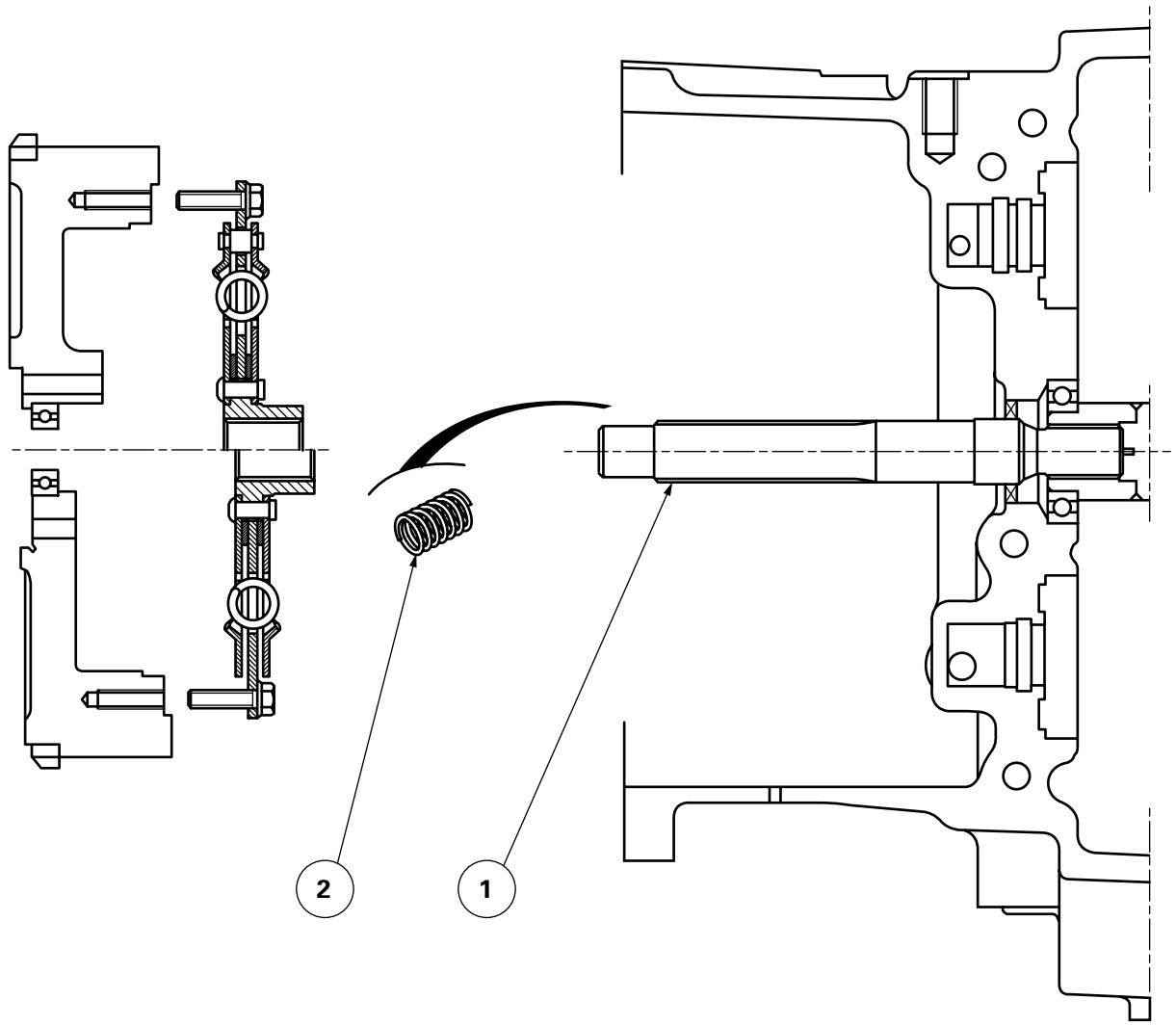


Fig. 6

21. Clean the mating surfaces:
Full Powershift gearbox
- of the engine and gearbox.
Heavy Duty gearbox
- of the engine and spacer.

22. Coat the mating face of the gearbox or the spacer with a sealing product (Loctite 510 or equivalent).

23. Screw two guide studs of suitable length onto the gearbox or spacer (depending on option).

24. Check the presence of the two locating pins (**10**) on the engine (Fig. 8).

25. Assemble the engine to the gearbox or the spacer. In order to facilitate engagement of the main-shaft splines with those in the hub of the damper, manually rotate the crown wheel on the engine flywheel, inserting a suitable tool in the hole provided for fixing the starter.

Full Powershift gearbox AG250 (Fig. 7)

26. Remove the two guide studs. Install screw (**1**), washers (**2**), spacers (**4**) and nuts (**3**).
Apply a light coating of Loctite 270 then torque the screws to 480-640 Nm.

Full Powershift (AG150) and Heavy Duty gearboxes (Fig. 8)

- Remove the two guide studs. Fit washers (**8**). Apply a light coating of Loctite 270, then torque the screws as follows:
  . (**1**) : 240 - 320 Nm
  . (**2**) : 300 - 400 Nm
  . (**3**) : 400 - 540 Nm
  . (**4**) : 100 - 130 Nm
  . (**5**) : 300 - 400 Nm
  . (**6**) : 790 - 1050 Nm
  . (**7**) (**9**) : 630 - 840 Nm

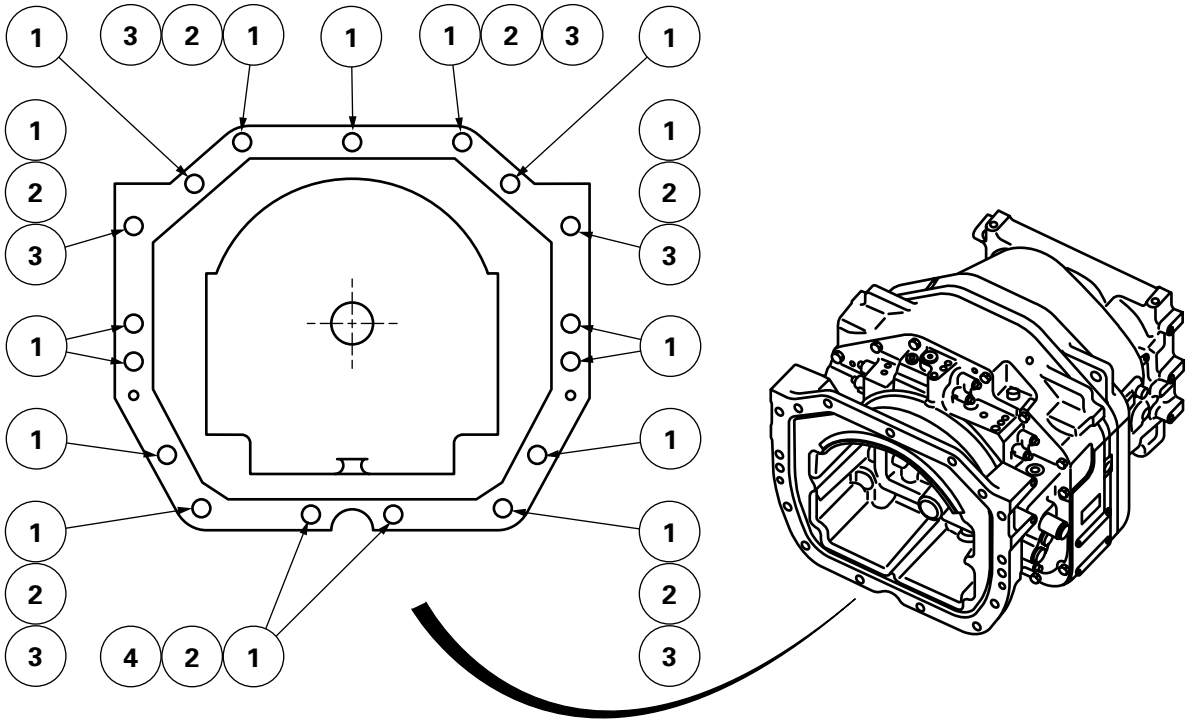

1
3
2
1
1
1
2
3
1
1
2
3
1
1
1
1
1
2
3
4
2
1

Fig. 7

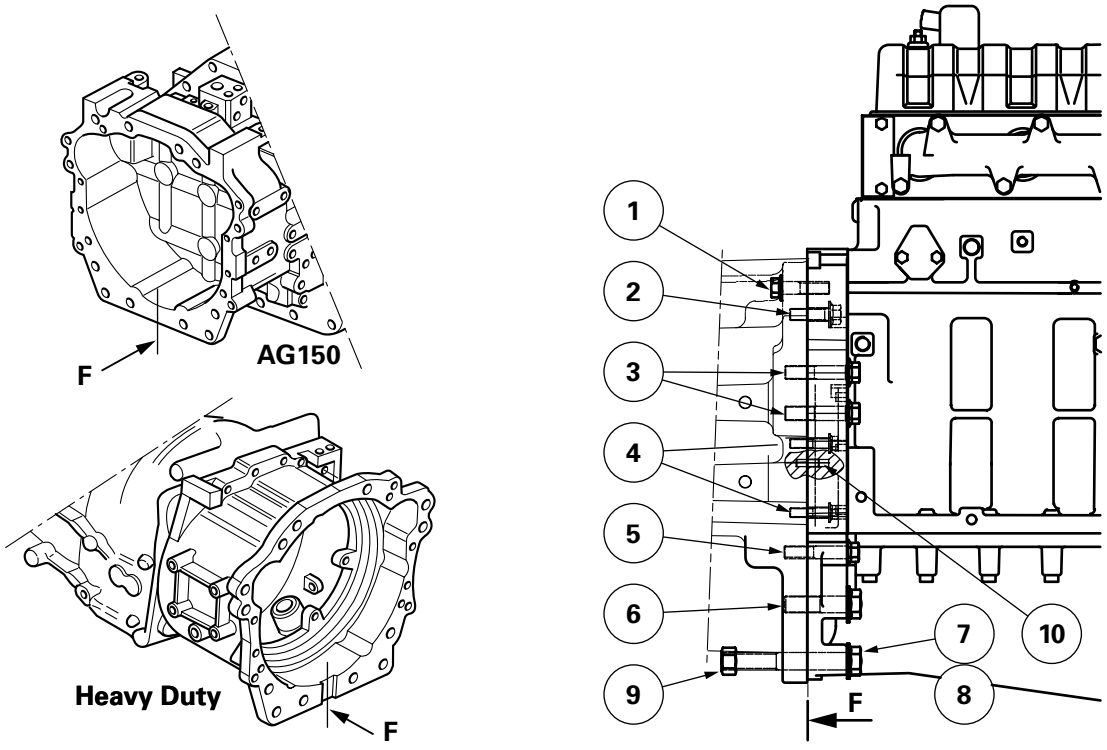

F
AG150
Heavy Duty
F
1
2
3
4
5
6
7
8
9
10
F

Fig. 8

D . Final operations

27. If the cab was raised, reposition it on its front supports. On tractors fitted with the Heavy Duty gearbox, monitor the behaviour of the gear control lifting arm during refitting of the cab. If necessary, reinstall and adjust the gear lifting arm (see section 5C01 - 5C02 or 5C03 depending on option). Install and screws in silent blocks and torque to 200 - 270 Nm.
28. Remove the disassembly tooling.
29. Remove the chocks from the front axle. Reinstall and if necessary adjust the chassis reinforcements (see section 2F01).
30. Reinstall the engine oil filter (Valmet only).
Special point:
- The filter must be in contact with its support; tighten it through an extra quarter-turn approximately.

31. Reconnect the steering-cylinder hoses.
32. Reconnect the main harness connections.
33. Assemble the air conditioning intakes.
34. Reconnect the heating hoses under the cab or on the engine (depending on option).
35. Reconnect the throttle control at the fuel injection pump.
If necessary, reinstall the guards located either side of the radiator.
36. If disassembled, reinstall the side tank and reconnect the gauge harness, the gas-oil supply and the return hoses.
37. Reinstall the starter. Tighten the screws. Reconnect the harness.
38. Reconnect the hoses, reversing operation 6.
39. Reinstall the transmission shaft and guard. Reconnect the differential lock control pipe (4 WD)(if fitted).
40. Reinstall the flexible pipe connection, the tube on the turbocharger and the vertical exhaust assembly. Install the Guard.
41. Reconnecting the battery terminals.
42. Check the setting of the throttle control.
43. If the side tank was removed, pour fuel into the tanks. Service the cooling system and the expansion tank.
44. Start the engine.
45. Close the bonnet.
46. Perform a road test.
47. Check the following points:
- leaktightness of hydraulic circuits,
- operation of electrical circuits,
- coolant level. If required, complete servicing of the circuit in question.

E . Service tools

Tools available in the AGCO network

- **3376935M91 - Set of plugs for air conditioning couplings (Fig. 9).**

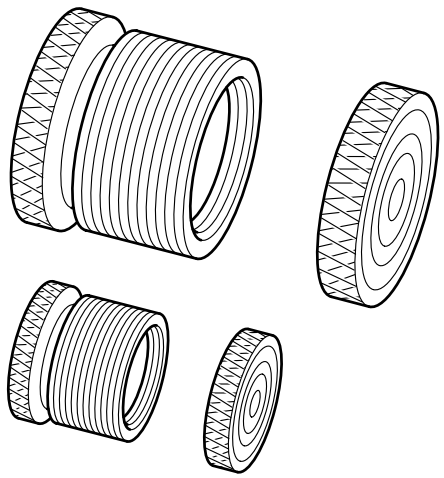


Fig. 9

2 C01 Splitting the tractor between Gearbox / Intermediate housing

CONTENTS

2C01.2 **Splitting -** Gearbox / Intermediate Housing

General

This section presents a general disassembly procedure. Due to the diversity of the hydraulic and mechanical the options available on the 8200-Series tractors, mention will only be made of those the pipes or main connections to be disconnected.
For this reason, before and when disassembling the tractor, ensure no connections remain between the fixed assembly and the moving assembly.
The 8200-Series tractors may be equipped with either a Full Powershift gearbox, or a Heavy Duty gearbox. Disassembly remains basically identical for both versions.

Available equipment fits

- **Tractors 8210-8220 and 8240-8250**: Full Powershift gearbox AG150
- **Tractors 8250 to 8280**: Full Powershift gearbox AG250
- **Tractors 8210-8220 and 8240-8250**: Heavy Duty gearbox.

The cab remains attached to the rear axle.
Disassembling the gearbox and the intermediate housing allows working on the Gerotor hydraulic pump (Full Powershift gearbox) or on the output shaft (Heavy Duty gearbox), located respectively on the rear of the stated gearboxes.

A . Preliminary operations

1. Position the rear wheels in wide tread.
2. Remove the side panels. Unlock and hinge open the bonnet and remove (if necessary).
   Position of locks:
   - *tractors 8210-8220 and 8240 to 8260:* below the front nose assembly,
   - *tractors 8270 and 8280:* below the front nose assembly, on the rear left-hand side of the bonnet.
3. Disconnect the battery terminals.
4. Remove the battery compartment and the right footstep.
5. Remove the turbocharger guard.
6. Disconnect the front differential-locking control pipe at both ends ((if fitted). Blank the pipe.
7. Remove the guard and the 4 WD transmission shaft (all tractor types).
8. Disconnect the charge hose from the brake-master-cylinder tank.
9. Mark then disconnect the steering hoses from the Orbitrol steering unit.
10. Remove the radiator guards (depending on option).
11. Disconnect the heating hoses under the right floor of the cab or on the engine (depending on option); identify their positions. Blank the hoses and ports to prevent complete drainage the cooling system.
12. Remove the left footstep.
13. Drain the fuel tanks.
14. **Mark then disconnect:**
    - the harness to the side-tank gauge,
    - the gas-oil supply and return hoses.
15. Remove the side tank.
16. Slightly raise the front of the cab and wedge in place per Fig. 2, using suitable axle stands.
17. **Mark positions of following parts then disassemble from the gearbox:**
    - solenoid valves (if necessary, remove the access door in cab floor to access the upper solenoid valves),
    - sensors (intermediate speeds, engine speeds, road speed, gearbox temperature and pressure),
    - connectors to receptacles A, B, C, D, E, F of the TC unit installed on the right-hand side of the gearbox.
18. Drain the intermediate housing.
19. Disconnect the gearbox return hoses (Orbitrol steering unit, power-assisted braking).

20. Disconnect the return hose from the brake-master-cylinder tank on the intermediate housing.
21. Disconnect hose (17 bar) towards the power-assisted braking on the right-hand hydraulic cover.
22. Remove suction pipe (**1**) (Fig. 1) at the Gerotor pump, and the elbow unions fitted on the intermediate housing and the Full Powershift gearbox.
23. Disconnect:
- the creeper-speed control on the right-hand side of the intermediate housing (depending on option, all tractor types)
- the air conditioning intakes at the front left of the cab. Fit blanking plugs (see § E)
- the main harness connections above and to the left of the engine.

24. Disconnect the throttle control on the injection pump.
25. Block front axle (**1**), using suitable chocks - "**C**" (Fig. 1A).
26. Chock the rear wheels.

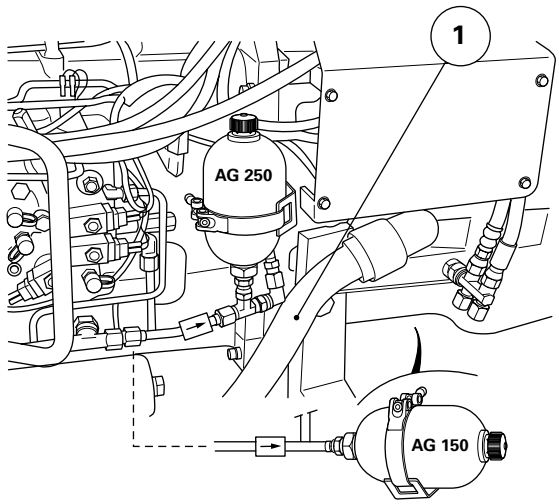


Fig. 1

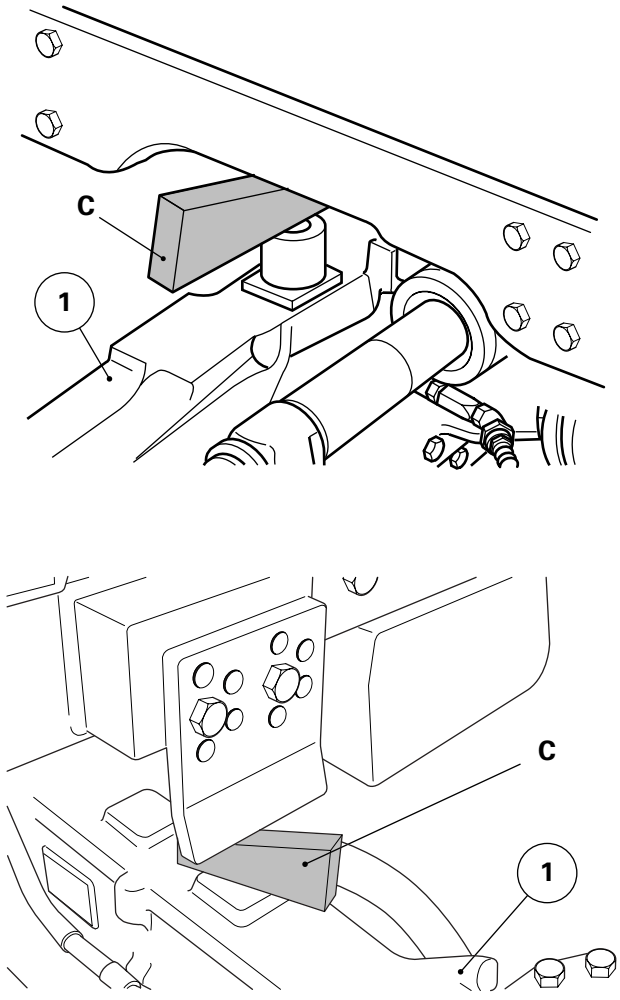


Fig. 1A

B . Disassembling (Fig. 2)

Separating the gearbox from the intermediate housing (Fig. 2)

27. In order to free lower shaft (**2**) (Fig. 3 - 3A), turn the special screw on the Park lock control unit clockwise until a hard point is felt (see section 6F01, Full Powershift gearbox only).

28. Install the disassembly tooling (see § E).

29. Remove the screw attaching the gearbox to the housing.

30. Assisted by an operator, separate the assemblies, taking care to identify the position of the coupling sleeves on connection shafts (**1**) and (**2**) (Fig. 3).

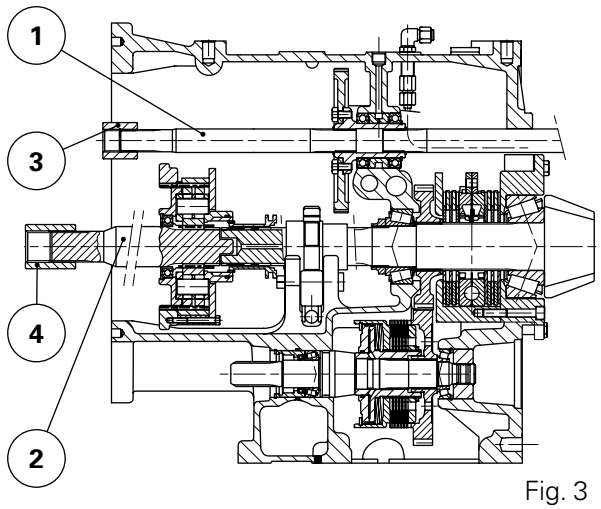


Fig. 3

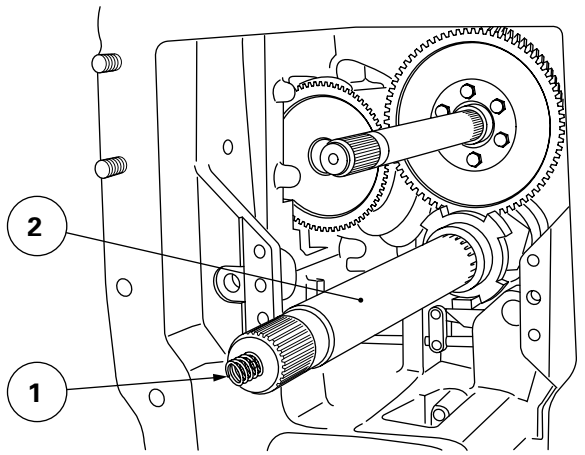


Fig. 3A

(1) Full Powershift gearbox

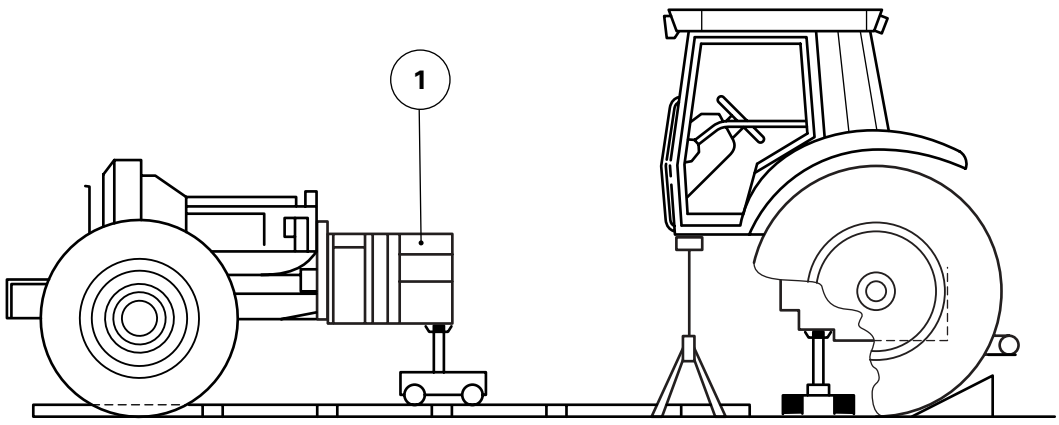


Fig. 2

C . Reassembling

Assembling the gearbox and the intermediate housing

31. Clean the mating surfaces of the gearbox and the housing.

32. Coat the mating face of the housing with sealing product Loctite 510 or equivalent.

33. Check the presence of the locating pins on the housing.

34. Check the presence of connection shafts (**1**) and (**2**) and sleeves (**3**) (**4**) (Fig. 3).

Note: Position the machined groove on the outside diameter of each sleeve towards the gearbox (optional).

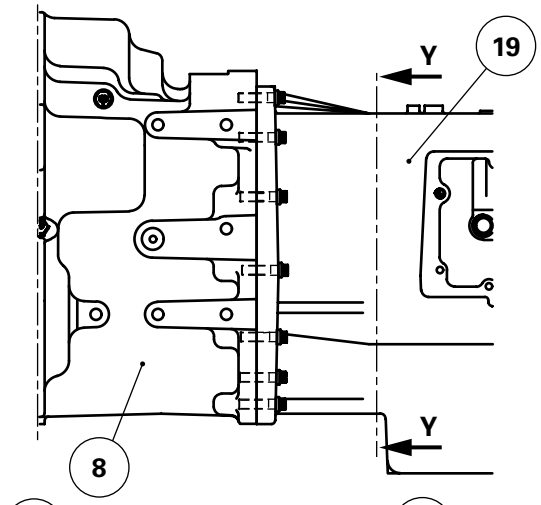
Special point:

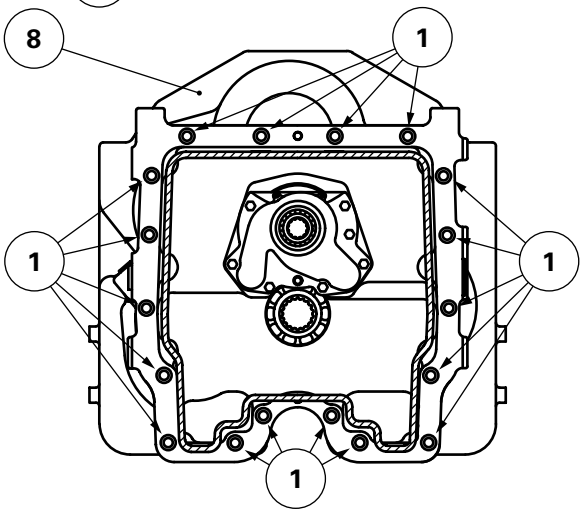
- On 8200 series tractors without creeper speeds, fitted with the Full Powershift transmission, spring (**1**) located at the front of shaft (**2**) maintains the latter in position (Fig. 3A).

35. Screw two diametrically opposed guide studs into the gearbox.

36. Assemble gearbox (**8**) onto housing (**19**).

37. Remove the guide studs. Install screw (**1**) (Fig. 4) and torque to 240 - 320 Nm.





Section Y Y

Fig. 4

D . Final operations

38. Remove the chocks from the front axle.
39. Reconnect the throttle control on the injection pump.
40. Reinstall the left-hand radiator guard (if fitted).
41. **Reconnect**:
- the main harness connections above and to the left of the engine,
- the air conditioning intakes at the front left of the cab.

42. Reinstall:
- the creeper control (if fitted). For setting instructions, see section 6H01
- the Gerotorpump sleeves and suction pipe.

43. Reconnect the power-assisted braking hose (17 bar) on the right-hand hydraulic cover.
44. Reconnect the return hose from the brake master-cylinder tank.
45. Reconnect the return hoses for the Orbitrol steering unit and power-assisted braking on the gearbox.
46. Reconnect following items to gearbox:
- connectors for receptacles A, B, C, D, E, F of the TC unit,
- sensors,
- solenoid valves.

47. Position the cab on its front supports (Fig. 5). Install screws (**1**) in silent blocks and torque to 200 - 270 Nm.
48. Reinstall the side tank.
49. Reconnect the following items:
- the gas-oil supply and return hoses,
- the tank-gauge harness.

50. Reinstall the left footstep.
51. Reconnect the heating hoses.
52. Reinstall the right-hand radiator guard (if fitted).
53. Reconnect the steering hoses on the Orbitrol steering unit.

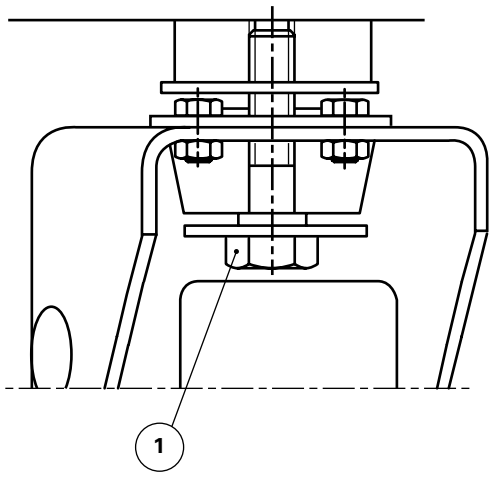


Fig. 5

54. Reconnect the charge hose to the brake-master-cylinder tank.
55. Reinstall the transmission shaft and guard. Reconnect the differential-locking control pipe (4 WD) (front axles AG155H and AG200).
56. Reinstall the battery compartment and right foot-step.
57. Reconnect the battery terminals.
58. Reinstall the turbocharger guard.
59. Check the setting of the throttle control.
60. Service the oil system and check the level in the transparent tube on the left of the centre housing.
Note: The drain plug in the intermediate housing is special. It has a cylindrical part which the other plugs do not. It is therefore essential to check its position during reassembly.
61. Pour fuel into the tanks.
62. Service the cooling system and the expansion tank.
63. Reset the special screw on the Park lock control unit to its initial position (see section 6F01) (Full Powershift gearbox only).
64. Close the bonnet.
65. Align the wheels to their initial position. Torque screws or nuts to values shown (see section 2G01).
66. Road test all the controls.
67. Check the following points:
- leaktightness of hydraulic circuits,
- sealing of mating face between gearbox and intermediate housing,
- operation of electronic and electrical circuits,
- coolant level. If required, complete servicing of the circuit in question.

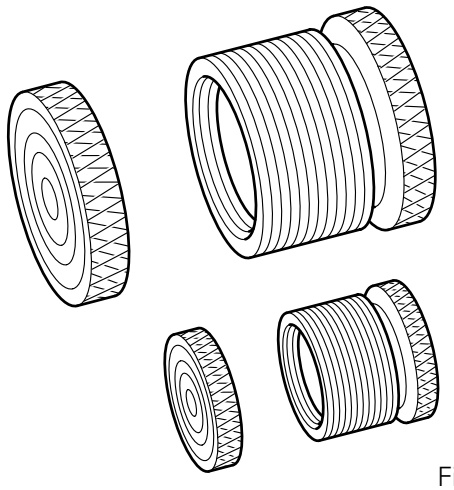


Fig. 6

E . Service tools

Tools available in the AGCO network:

- 3376935M91 - Set of plugs for air-conditioning couplings (Fig. 9)

F . Heavy Duty Version

On tractors fitted with the Heavy Duty gearbox, the disassembly method remains basically identical to that used on the version employing the Full Powershift gearbox. Only special points concerning the Heavy Duty gearbox will be covered in this chapter.

Note: The contour of the intermediate housing is different. The drain plugs have the same special feature as mentioned for the one on the intermediate housing, Full Powershift gearbox) (see operation 60).

Preliminary operations

Special point

68. Mark then disconnect the hoses coming from the right-hand hydraulic cover to the cooler. Blank the hoses and ports.

69. On the gearbox, mark then demate the connectors on the solenoid valves at the Dynashift valve (version with mechanical reverse shuttle) or at the clutch control unit (version with power shuttle).

70. Remove the chassis reinforcements located either side of the gearbox (if installed, see section 2F01). Remove:
- the pipes near the clutch control valve and remove latter, without disconnecting the hose coming from the master-cylinder (version with mechanical reverse shuttle).
- the pipes near the clutch control unit (version with power shuttle).

71. Remove clutch lube pipe (**17**) located between intermediate housing (**19**) and spacer (**16**) (Fig. 7 - 7B).

72. Remove the 17-bar pipe coming from the right-hand hydraulic cover to the selector cover and the 17-bar hose feeding to the power-assisted braking.

73. Disconnect the end of the gearbox lube pipe fitted on the outlet of the right-hand hydraulic cover.

74. Remove or disconnect the following items on the selector cover:
- harness of temperature sensor and Hare/Tortoise electro-valve,
- return hose from brake-master-cylinder tank,
- return hoses from Orbitrol steering unit and power-assisted braking,
- gear control lifting arm (see section 5C01 - 5C02 or 5C03 depending on version)
- control cables of the mechanical reverse shuttle (see section 5C01)
- creeper unit control (depending on option).

75. Drain the fuel tanks. Remove the side tank.

Version with mechanical reverse shuttle

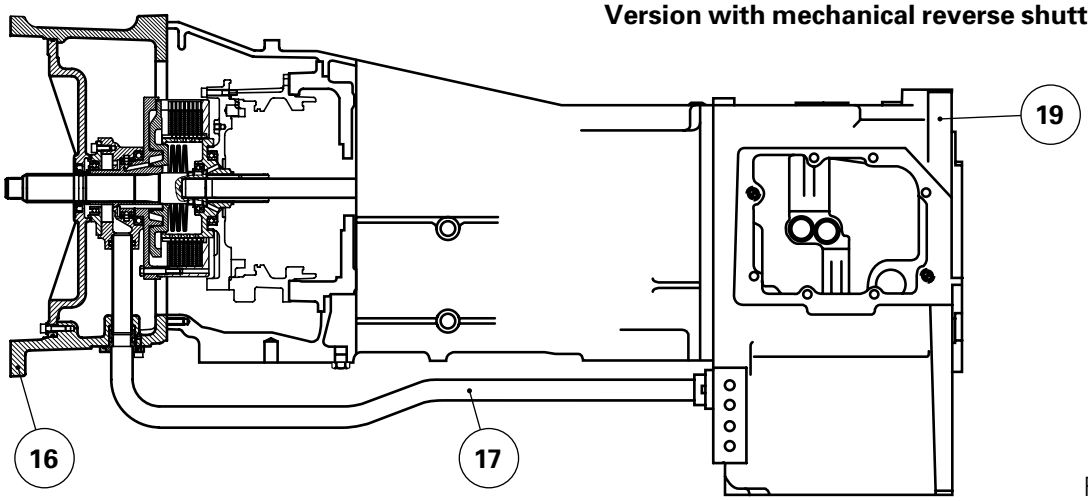


Fig. 7

(**2**) Heavy Duty gearbox

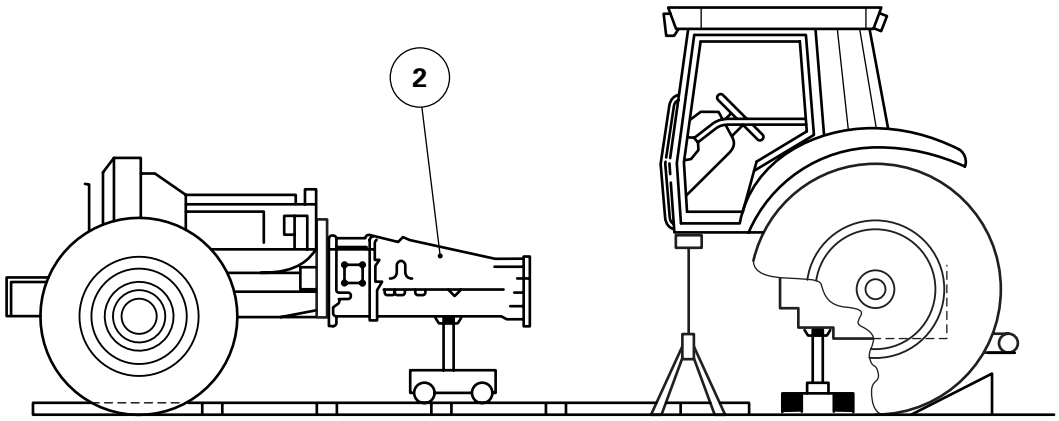


Fig. 7A

Version with power shuttle

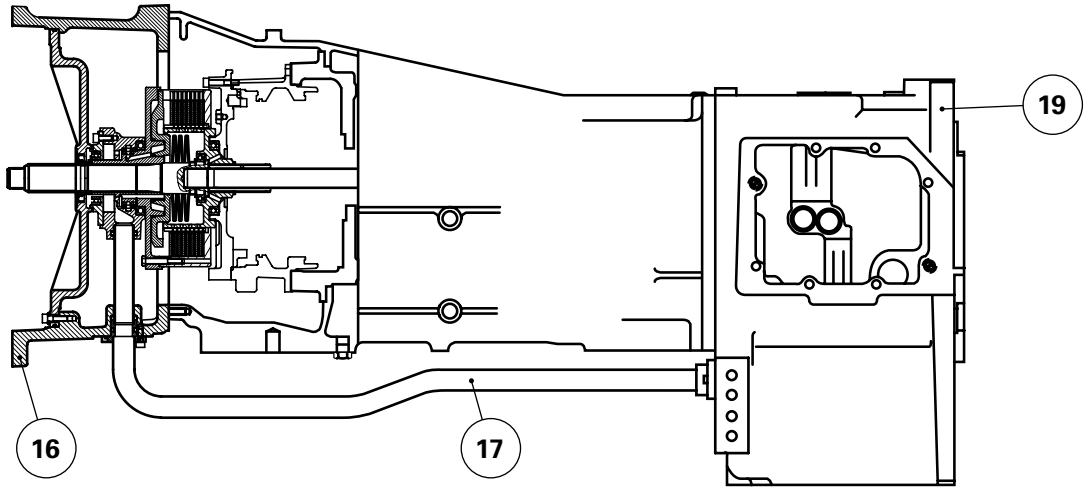


Fig. 7B

Separating the gearbox from the intermediate housing (Fig. 7A)

Special point

76. To access screws (**7**) (Fig. 9), remove the closing plate under the gearbox. During separation, mark the direction of assembly of sleeve (**1**) on output shaft (**47**) on gearbox housing "**C**" (Fig. 8).

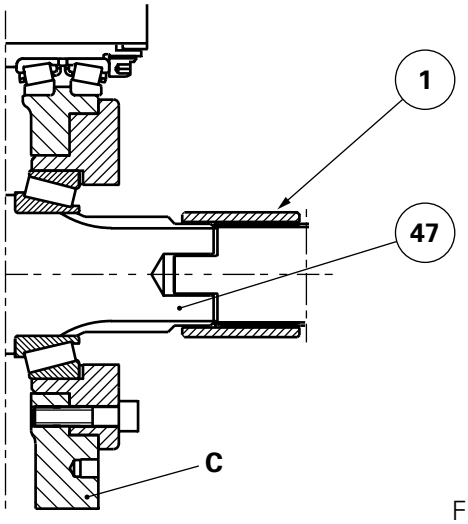
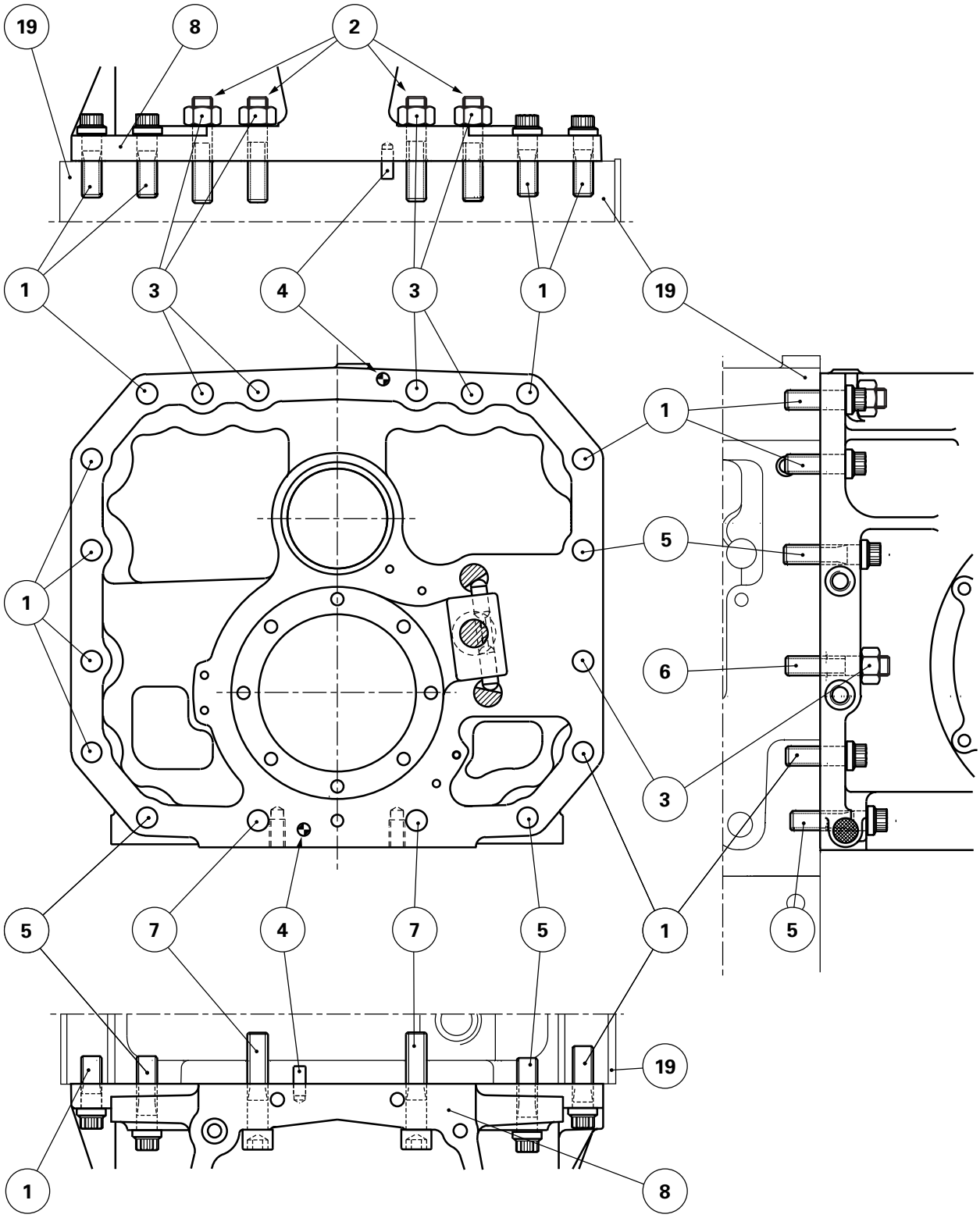


Fig. 8



(**8**) Gearbox
(**19**) Intermediate housing

Fig. 9

Assembling the gearbox and the intermediate housing

Special point

77. Check the presence of locating pins (**4**) (Fig. 9) on the gearbox.

78. Check that the undercut part of the PTO shaft (**2**) is pointing towards hydraulic-pump drive gear (**1**) (Fig. 10).

Note: Before assembling, coat one seat of spring (3) with Loctite 401 adhesive. Slide the spring on shaft (2), the Loctited seat pointed towards the shouldered part of the shaft.

79. Clean the mating surfaces of the gearbox and the intermediate housing.

80. Coat the jointing surface of the housing with a sealing product Loctite 510 or equivalent.

81. Screw two studs diametrically opposite into the intermediate housing.

82. Check the presence of sleeve (**1**) on output shaft (**47**) (Fig. 8).

Note: The internal unsplined part of sleeve (1) must be pointed towards the rear axle.

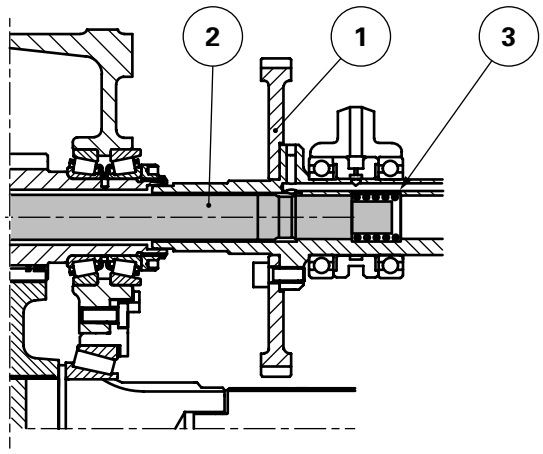


Fig. 10

Special point

- In order to facilitate assembly of the gearbox with the intermediate housing on 8200 tractors fitted with creeper speeds, point the reducer link located on the right of the intermediate housing upwards. If resistance is noted during assembly of the various parts (gearbox - intermediate housing), avoid forcing, and find the reason.

83. Assemble the gearbox to the housing.

84. Remove the guide studs. Install the following screws and nuts and torque as shown (Fig. 9) :

- (**1**) : 240 - 320 Nm
- (**3**) : 300 - 400 Nm
- (**5**) : 240 - 320 Nm
- (**7**) : 300 - 400 Nm

Notes:

- Studs (**2**) and (**6**) (Fig. 9) are lightly coated with Loctite 270 and locked into the intermediate housing,
- Locating pins (**4**) (Fig. 9) are hard-sleeved into the gearbox housing.

Final operations

Special point

85. During positioning of the cab, check the behaviour of the gear control lifting arm. Reinstall and adjust the gear lifting arm (see section 5C01 - 5C02 or 5C03 depending on version).

86. Reconnect and adjust the control cables of the mechanical reverse shuttle (see section 5C01).

87. Reinstall or reconnect the following items on the selector cover:
- creeper control, if fitted (see section 5K01),
- return hose from power-assisted braking and return hose from Orbitrol steering unit,
- return hose from brake master-cylinder tank,
- harness of temperature sensor and Hare/Tortoise solenoid valve.

88. Perform the following operations:
- reconnect the transmission lube pipe,
- reinstall the 17-bar pipe on the selector cover, and the 17-bar hose feeding to the power-assisted braking,
- reinstall lube pipe (**17**) (Fig. 8),
- clean the mating surfaces of the clutch valve or of the clutch control unit (depending on version) and of the housing.
- coat the mating face of the housing with sealing product Loctite 510 or equivalent,
- reinstall the clutch control valve (version with mechanical reverse shuttle) or the clutch control unit (version with power shuttle).
  Torque the screws to 25 - 35 Nm. Reconnect the pipes and the solenoid valve connectors on the Dynashift valve or on the clutch control unit (depending on version).
- Fit the solenoid-valve connectors onto the of Dynashift valve.
- Reconnect the cooler hoses, observing the markings made during disassembly.

89. Reinstall the side tank. Reinstall and adjust the chassis reinforcements (see section 2F01).

2 D01 Splitting the tractor between Intermediate housing / Centre housing

CONTENTS

2D01.2 **Splitting -** *Intermediate housing /Centre housing*

General

This Section presents a general disassembly procedure. Due to the diversity of the hydraulic or mechanical options available on the 8200-Series tractors, mention will only be made of those pipes or main connections requiring to be disconnected.
For this reason, before and when disassembling the tractor, ensure no connections remain between the fixed assembly and the moving assembly.
The 8200-Series tractors may be equipped with either a Full Powershift gearbox, or a Heavy Duty gearbox. Disassembly remains basically identical for both versions.

Available equipment fits:

- **Tractors 8210-8220 and 8240**: Full Powershift gearbox AG150
- **Tractors 8250 to 8280**: Full Power-shift gearbox AG250
- **Tractors 8210-8220 and 8240-8250**: Heavy Duty gearbox

The cab will remain integral with the gearbox.
Disassembling the intermediate housing from the centre housing allows working on the following items: drive pinion, ring gear, differential and housings.

A . Preliminary operations

1. Set the lifting arm to the fully DOWN position.
2. Position the rear wheels in wide tread.
3. Remove the side panels. Unlock and hinge open the bonnet.
Position of locks:
- *Tractors 8210-8220 and 8240 to 8260:* below the front nose assembly;
- *Tractors 8270 and 8280:* below the front nose assembly, on the rear left-hand side of the bonnet.

4. Disconnect the battery terminals;
5. Disconnect the front differential-locking control pipe at both ends (if fitted). Blank the pipe. Remove the guard and (4 WD) transmission shaft (all tractor types).
6. Remove the left footstep and if necessary, the right footstep and battery compartment.
7. Drain the fuel tanks.
8. Mark then disconnect:
- the harness on the side-tank gauge,
- the gas-oil supply and return hoses.

9. Remove the side tank.
10. Mark then disconnect the control cables and hoses of the compensating spool valves on the auxiliary spool valves.
Important: During the Removal of the cables, it is essential to avoid turning the main spool of the valves through a half-turn , to avoid accidental connecting of the service and pilot-pressure pipes.
11. Remove the rear cab attachments and slightly raise the cab, ensuring there is no interference with the vertical exhaust assembly or windshield. During the operation, also check the behaviour of the speed control and of the mechanical reverse shuttle (if fitted), on the selector cover (Heavy Duty gearbox). If the gear lifting arm interferes with lifting of the cab, disconnect it (see section 5C01 - 5C02 or 5C03 depending on option).
Chock the cab using suitable axle stands (Fig. 4).
12. Mark then disconnect:
- the return hose from the brake tank on the intermediate housing (Full Powershift gearbox),
- the hoses of the left and right brake pipes located above the intermediate housing (blank hoses and tubes),
- the hose (17 bar) towards the power-assisted braking on the right-hand hydraulic cover,
- the cooler hoses routed to the right-hand hydraulic cover (Heavy Duty gearbox),
- the pipe (17 bar) on the right-hand hydraulic cover (Heavy Duty gearbox),
- the supply and pilot-flow hoses on the Orbitrol steering unit on the priority block(s).

13. Drain the intermediate housing and Centre housing. Note the contour of the plugs.

14. Remove suction pipe (**1**) (Fig. 1) from the Gerotor pump, and the elbow unions fitted in the intermediate housing and Full Powershift gearbox.

15. Remove the chassis reinforcements located either side of the Heavy Duty gearbox (if installed, see section 2F01). Remove clutch lube pipe (**17**) located between the intermediate housing (**19**) and spacer (**16**) (Fig. 2 - 2A) (Heavy Duty gearbox).

16. Disconnect the handbrake control cable above the intermediate housing and creeper-speed control on the right-hand side of the intermediate housing (depending on option, all tractor types).

17. Mark then disconnect:
- the harness to the solenoid valves on the right-hand hydraulic cover, and the harness to the Park lock transmission lock located on the right-hand side of the intermediate housing (if the tractor is fitted with this device),
- the harness to the low-pressure switch and the one to the clogging switch on the main filter (15 microns),
- the harnesses to the load sensors,
- the connectors to the (MoveUp-MoveDown) solenoid valves of the lift control valve,
- the harnesses to the position sensors on the right-hand lift bearing and the drive sensor on the centre housing,
- the PTO sensors (dual driving pinion and output shaft) on the rear housing.

18. Block the front axle (**1**), using suitable chocks - "**C**" (depending on the type of front axle Dana - ZF 5052 or Carraro) (Fig. 3).

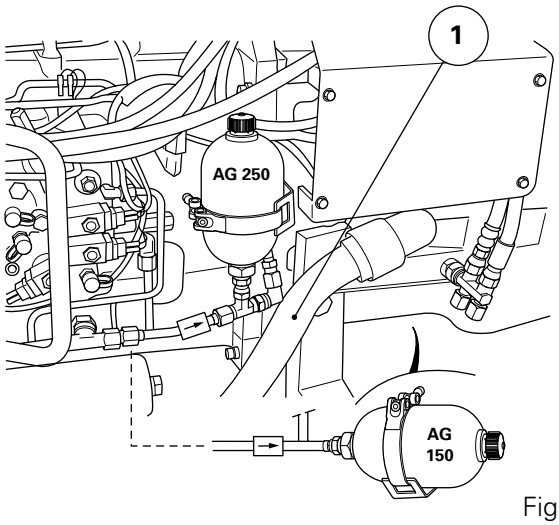


Fig. 1

Version with mechanical reverse shuttle

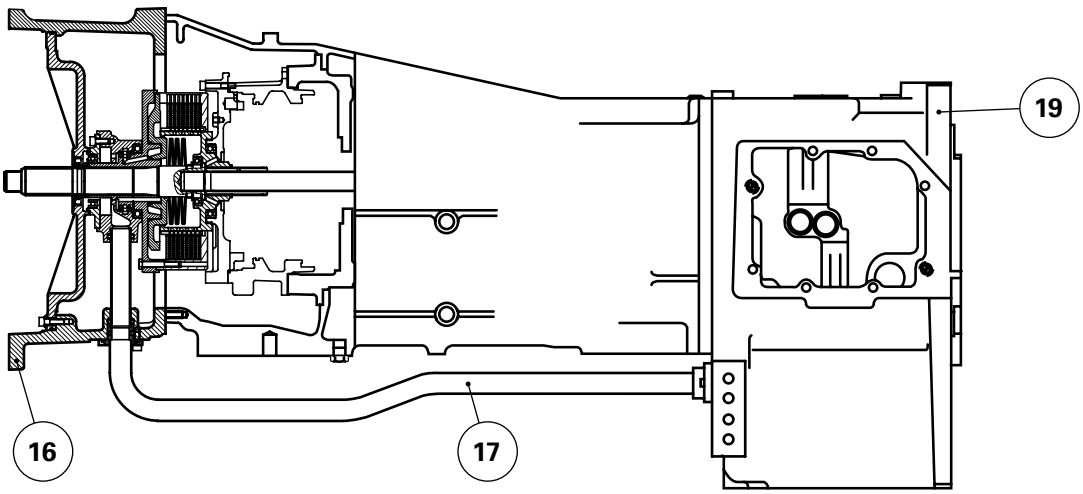


Fig. 2

Version with power shuttle

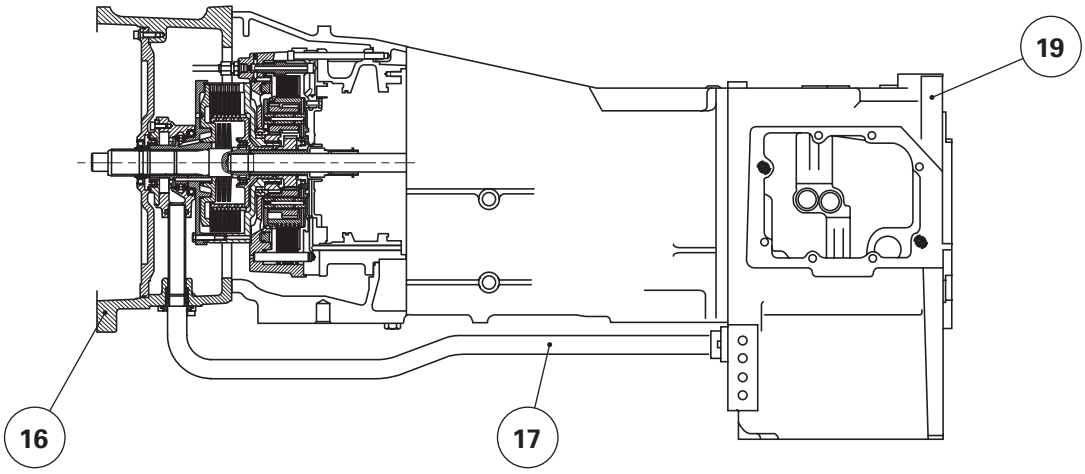


Fig. 2A

B . Disassembling

Separating the gearbox from the intermediate housing

19. For tractors fitted with Park lock transmission locking, free lower shaft (**2**) (see section 2C01, Fig. 3) by turning the special screw on the unit located on the right-hand side of the intermediate housing clockwise until a hard point is felt (see section 6F01).

20. Install the disassembly tooling.

21. Remove the screws securing the gearbox to the intermediate housing.

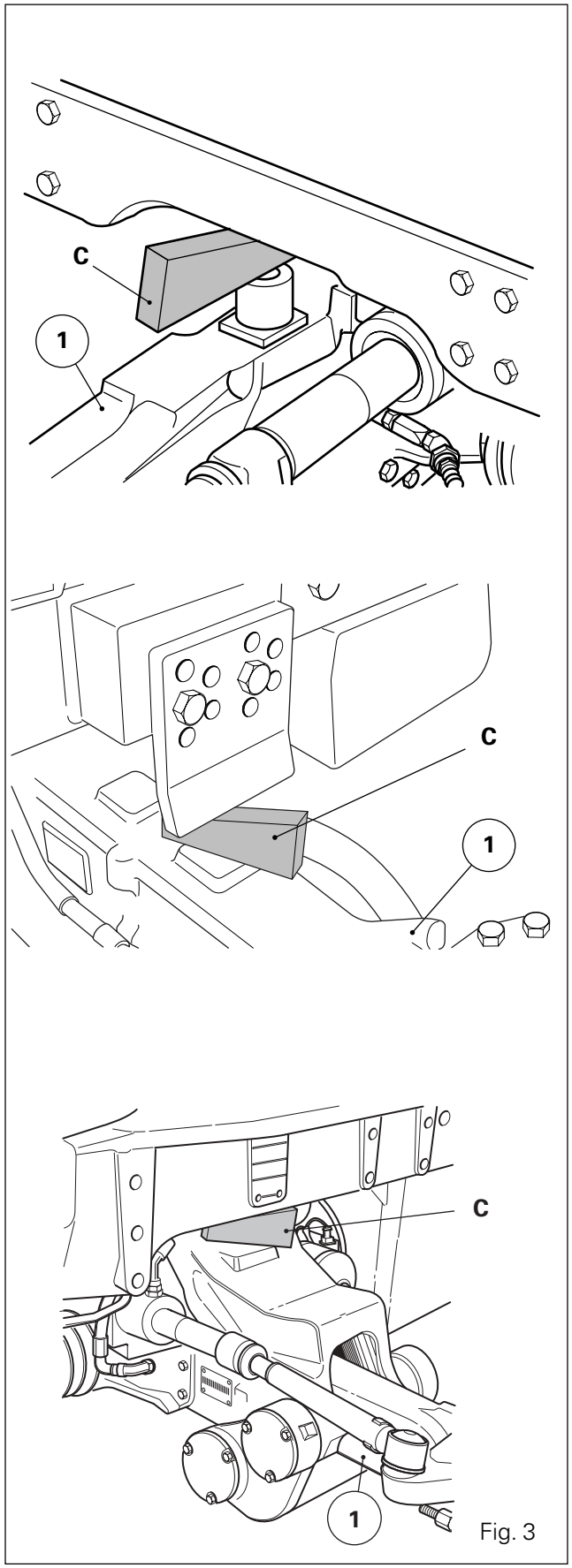


Fig. 3

22. Assisted by an operator, separate the assemblies (Fig. 4).
Note: On the tractors fitted with a Heavy Duty transmission with creeper unit, monitor the separation at the gearbox output shaft and drive pinion.

Separating the intermediate housing and the centre housing

23. Remove the right- and left-hand covers in order to access hidden screws (**2**) (Fig. 5) (see respective sections 9G01, 9G02 or 9H01).
24. Remove and unstick cover (**3**) from 4 WD unit (if installed (Fig. 7). Identify positions of screws (**2**) securing intermediate housing (**19**) to centre housing.
25. Disconnect any hoses or pipes that may have remained connected to the various assemblies.
26. Chock the rear wheels. Place a fixed axle stand under the centre housing.
27. Sling the intermediate housing using suitable lifting equipment.

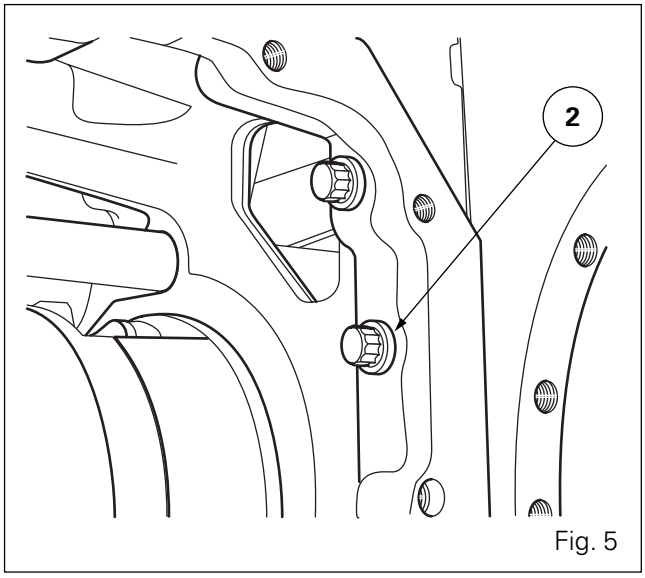


Fig. 5

(**1**) Full Powershift gearbox
(**2**) Heavy Duty gearbox
(**3**) Bonnet 8210-8220-8240 to 8260
(**4**) Bonnet 8270 and 8280

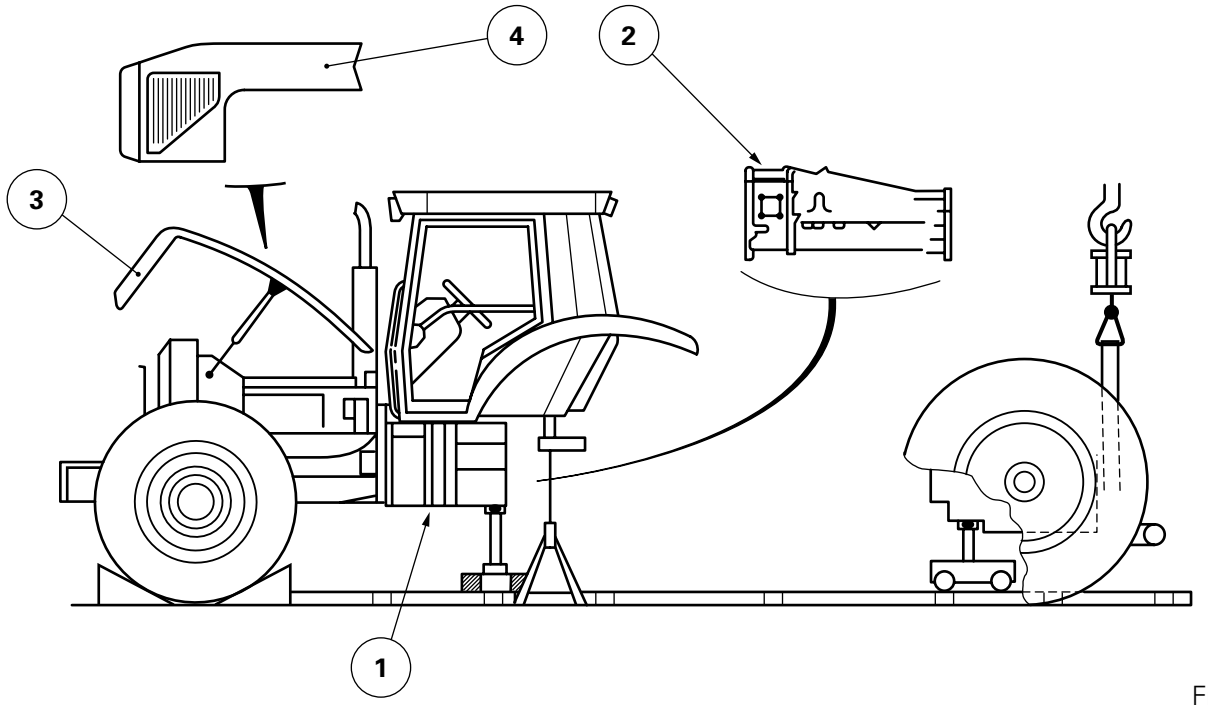


Fig. 4

28. Remove housing attachment screws (**2**). Install guide studs of sufficient length then start the separation (Fig. 7).
Note: In the event of resistance being felt during separation, screw two screws of suitable length into tapped holes "T" located on the right and left attachment flanges of intermediate housing (Fig. 6). Continue the extraction until the sumps are completely apart.
Shaft (28) (Fig. 7) located between the drive bearing of the pumps and the PTO clutch comes out with the intermediate housing.
efore setting down the shaft, if required visually mark land "D" to allow passage of the crown wheel (Fig. 7).

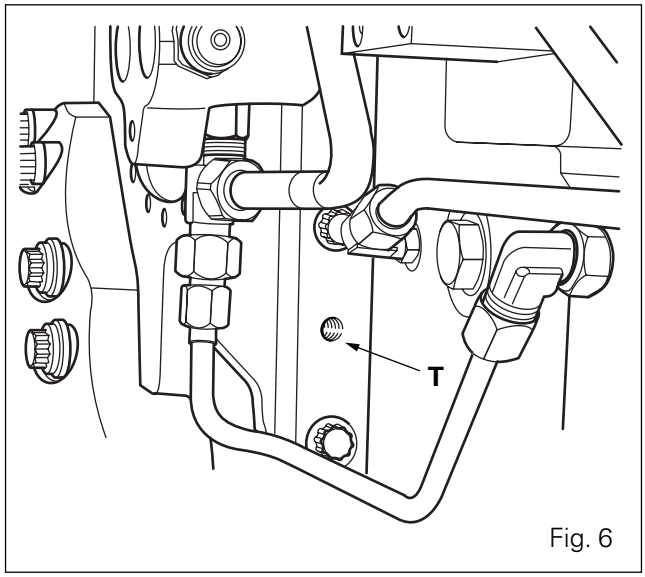


Fig. 6

C . Reassembling

Assembling the intermediate housing and the centre housing

29. Clean the mating surfaces of the housings.
30. Coat the mating face of the centre housing with sealing product - Loctite 510 or equivalent.
31. Check for presence and position of locating pin (**1**) sleeve- itted into the centre housing (Fig. 7).
Note: The stud has two flats positioned parallel with the centre line of the housing (Fig. 7).
32. If removed, reposition PTO shaft (**28**), checking the position of land "**D**" (Fig. 7).
33. Screw two guide studs at diametrically opposite positions on the centre housing.
34. Assemble the intermediate housing to the centre housing. Turn the pump driving pinion in order to mate the splines of shaft (**28**) with the splines on the PTO clutch.
35. Remove the guide studs. Install screws (**2**) and torque to 300 - 400 Nm.
36. Clean the mating surfaces of intermediate housing (**19**) and cover (**3**) (Fig. 7).

37. Coat the mating face of the housing Loctite 510. Reinstall the cover. Torque screws (**4**) to 50 - 70 Nm (Fig. 7).

38. Reinstall the right- and left-hand covers (see respective sections 9G01 - 9G02 or 9H01, depending on hydraulic equipment fit).

Assembling the gearbox and the intermediate housing

With the Full Powershift gearbox:

39. Assemble the gearbox and intermediate housing (see section 2C01, § C).

With the Heavy Duty gearbox:

40. Assemble the gearbox and intermediate housing (see section 2C01, § F).

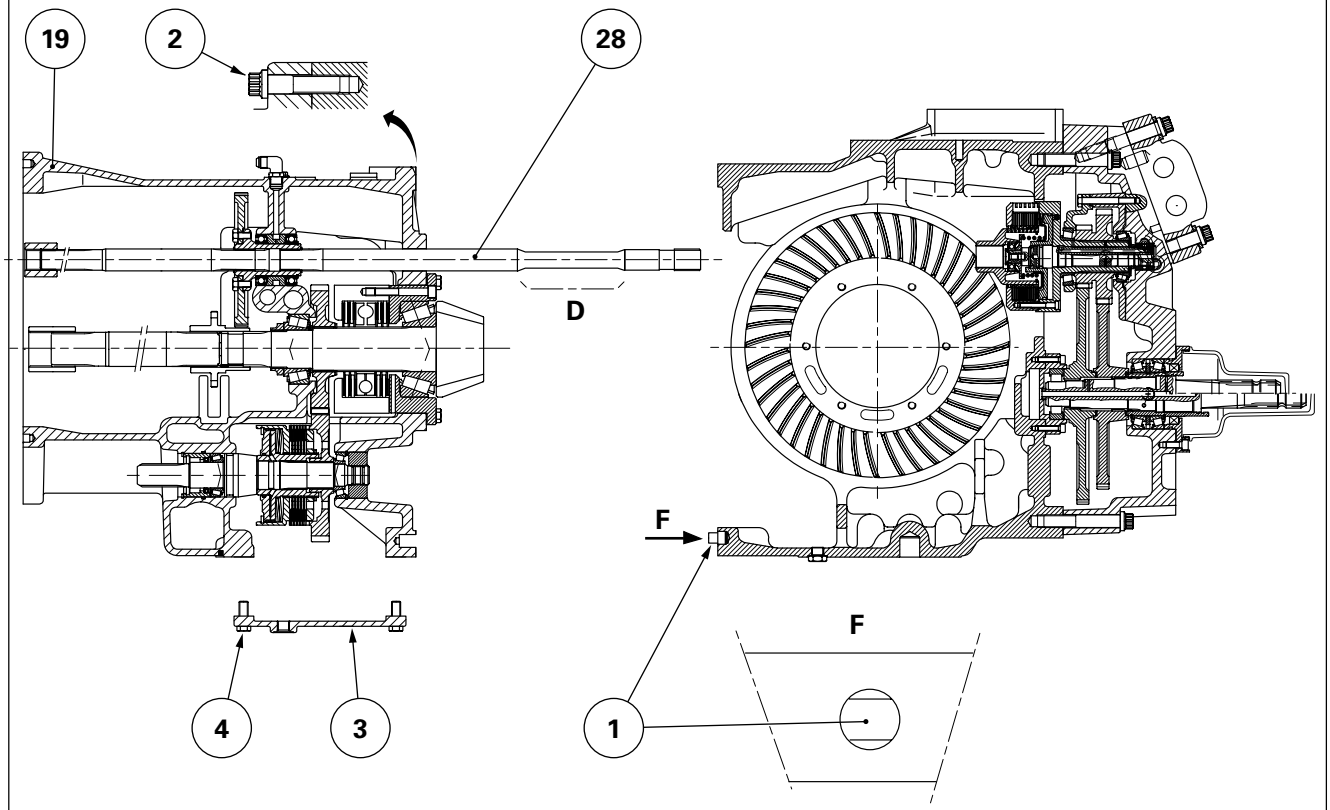


Fig. 7

D . Final operations

41. Reconnect the following items:
- PTO sensors
- position and status sensors
- solenoid valves (MoveUp - MoveDown) on lift control valve
- load sensors
- switch harnesses (low pressure and clogging)
- solenoid-valve harness on the right-hand hydraulic cover and Park lock transmission locking on intermediate housing (if installed)
- clutch lube pipe (**17**) (Fig. 2 - 2A) on Heavy Duty gearbox
- suction pipe (**1**) at Gerotor pump and sleeves (Full Powershift gearbox) (Fig. 1)
- creeper-speed control (if fitted) - for adjustment instructions, see section 5K01 or 6H01, depending on version)
- the supply and pilot-flow hoses to the Orbitrol steering unit on the priority block(s)
- the 17 bar pipe on the right-hand hydraulic cover (Heavy Duty gearbox),
- the cooler hoses routed to the right-hand hydraulic cover (Heavy Duty gearbox)
- the 17-bar hose to the power-assisted braking on the right-hand hydraulic cover
- the hoses on the brake pipes
- the return hose from the brake tank on the intermediate housing (Full Powershift gearbox)

42. Rest the cab on its rear supports (Fig. 8). Install the screws in the silent blocks. Torque nuts (**1**) to 27 - 35 Nm and locknuts (**2**) to 13 - 20 Nm (installed with Loctite 270). Reinstall and if necessary adjust the chassis reinforcements (see section 2F01).

43. Reconnect the hoses of the compensating spool valves and the control cables of the auxiliary spool valve units (see section 9D01 § B).

44. Reinstall the side tank.

45. Reconnect:
- the gas-oil supply and return hoses,
- the tank-gauge harness.

46. Reinstall the transmission shaft and guard.

47. Reconnect the front differential-locking control pipe (if fitted).

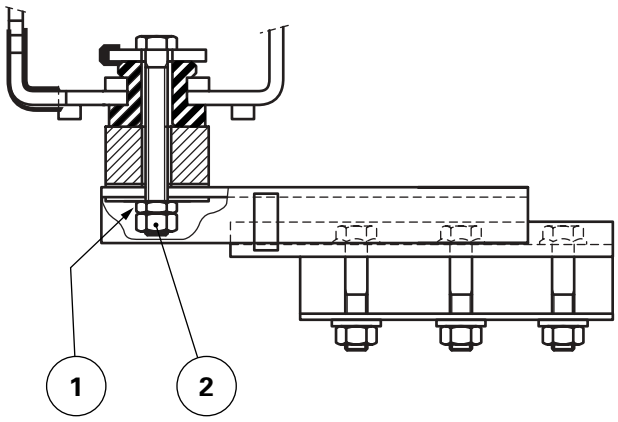


Fig. 8

48. Reinstall the left footstep. If disassembled, reinstall the battery compartment and the right footstep. Reconnect the battery terminals.

49. Align the wheels to their initial position. Torque screws or nuts to values shown (see section 2G01). Service the oil system and check the level in the transparent tube located on the left of the centre housing.

Note: The drain plug in the intermediate housing is special. It has a cylindrical part which the other plugs do not. It is therefore essential to check its position during reassembly.

50. Pour fuel into the tanks.

51. If the tractor is equipped with "Park lock" transmission locking, return the special screw on the control panel to its initial position (see section 6F01).

52. Start the engine.

53. Bleed the main brake system (see section 9I01).

54. Close the bonnet.

55. Road test all of the controls.

56. Check the following points:
- leaktightness of hydraulic circuits
- leaktightness of the mating surfaces between gearbox / intermediate housing, intermediate hou sing / centre housing, and cover (**3**) of the 4 WD system (if installed) (Fig. 7)
- presence of electronic and electrical functions
- hydraulic functions (low and high pressure)

2 E01 Separating PTO housing / Centre housing

CONTENTS

2E01.2

Splitting - PTO housing / Centre housing

A . Preliminary operations

1. Drain the centre housing.
2. Mark the position of the hoses (**1**) and disconnect hydraulic couplers (**2**) (Fig. 1).
3. Disconnect the clutch pipes (low pressure and lubrication) located on the right-hand side of the PTO housing.
4. Disconnect PTO sensors (**1**) and (**3**) (Fig. 2) on the driving gear and the output shaft.
5. Remove the right- and left-hand guards over the harnesses connected to the load sensors.
6. On housing (**4**), remove two diametrically opposite screws (**2**) (Fig. 2), and replace with two guide studs of sufficient length (230 mm approximately) (local manufacture).
7. Assisted by an operator, or using a suitable sling, remove support hook (**1**) (Fig. 3).

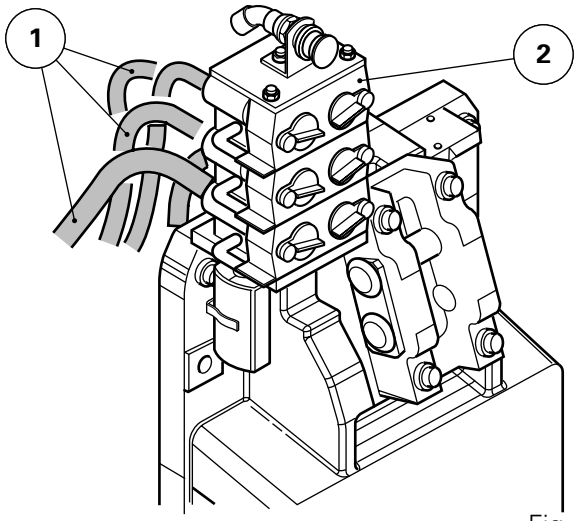


Fig. 1

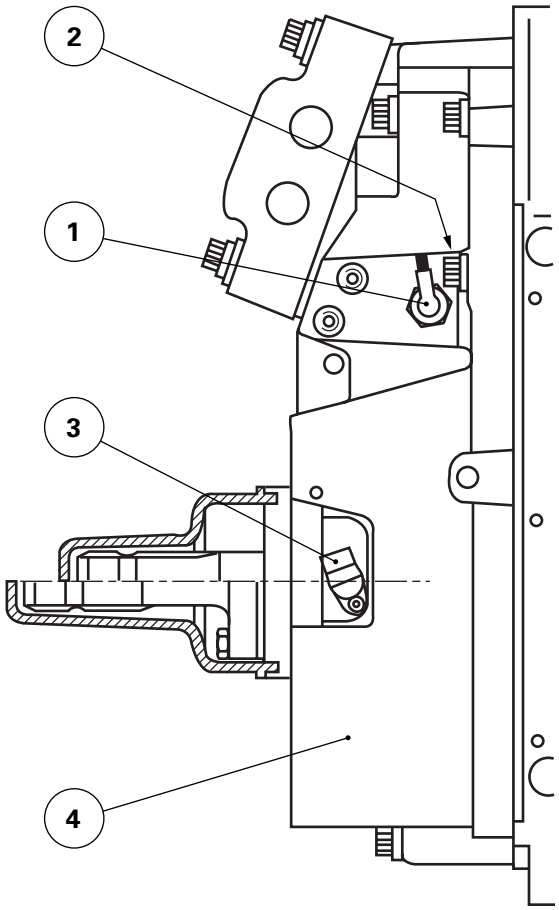


Fig. 2

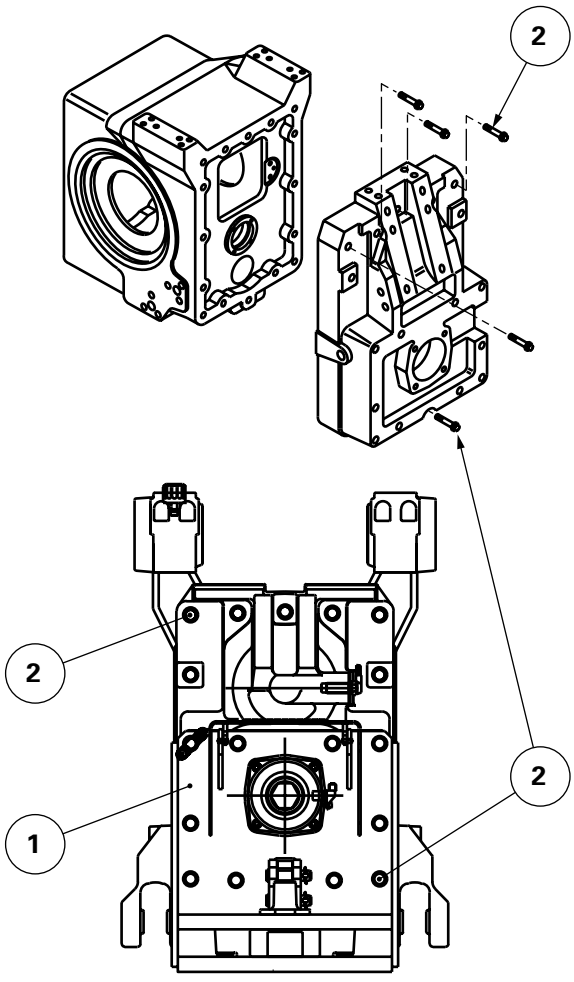


Fig. 3

B . Disassembling (Fig. 4)

8. Remove the remaining screws. Unstick and disengage the PTO housing from the centre housing by levering, then remove using suitable lifting equipment.

Note:

- The PTO housing comes out complete with the clutch and driving/driven pinions. Shaft (**28**) remains in the intermediate housing and centre housing.

C . Reassembling (Fig. 4)

9. Clean the mating surfaces of the housings.

10. Coat the mating face of the centre housing with sealing product - Loctite 510 or equivalent.

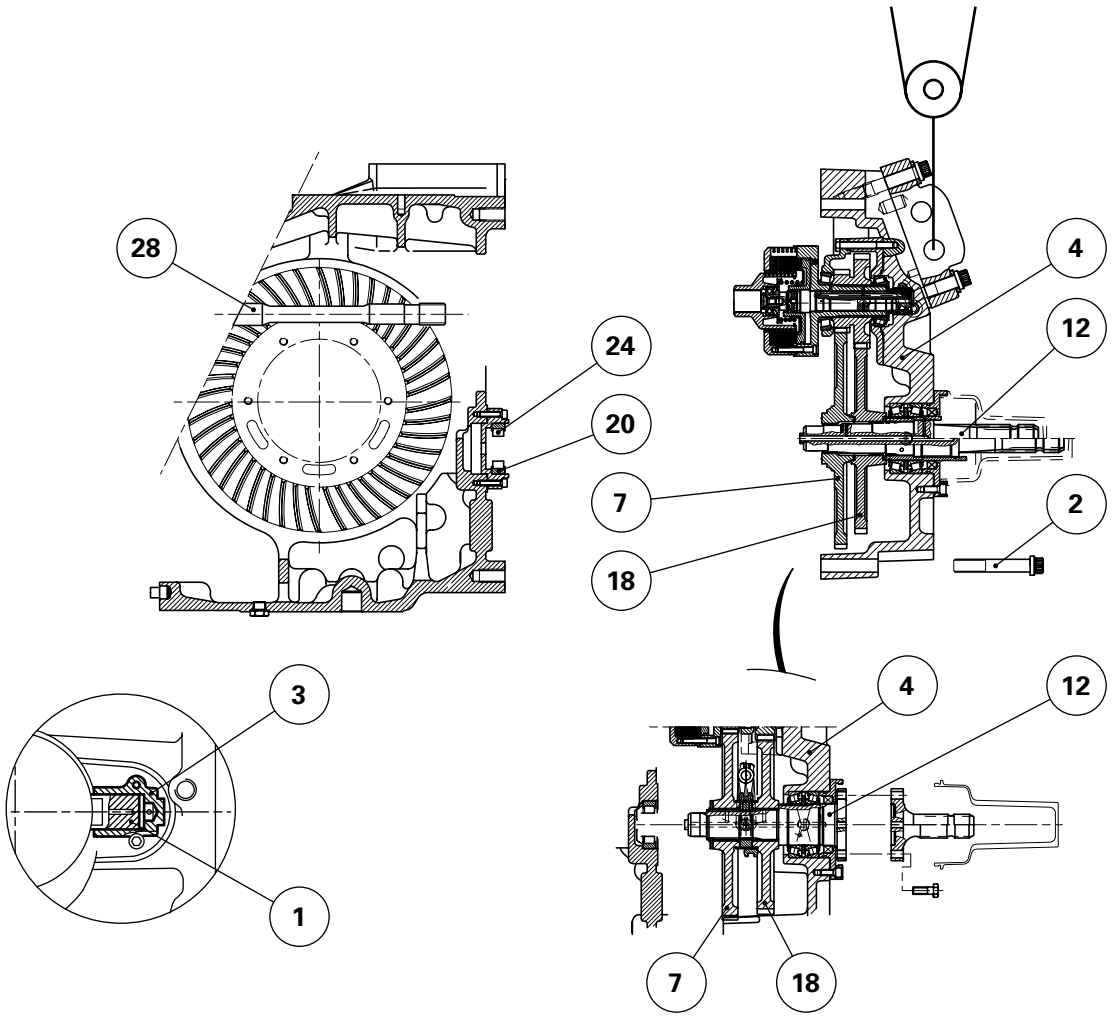


Fig. 4

11. Check the presence of the locating pins on the centre housing.
Note: The insertion dimension for the studs is 11.40 mm in relation to the surface of the centre housing. The studs are coated with Loctite 638 or equivalent before fitting.

12. Check that piston (**1**) in the PTO brake slides freely. Place the piston in abutment on cylinder (**3**) (Fig. 4) to allow passing the PTO clutch during reassembly of the housing.

13. Coat friction washer (**20**) with miscible grease and apply against bearing (**24**) (removable-shaft PTO only).

14. Ensure that driven pinions (**7**) and (**18**) are correctly positioned on shaft (**12**) and that they rotate normally (PTO all types).

15. Position complete housing (**4**) (Fig. 4) on the guide studs installed previously.

16. Progressively slide the housing onto the studs in order to engage the splines of shaft (**28**) in the clutch splines, and those on end of shaft (**12**) inside bearing (**24**).

17. Offer up the PTO housing to the centre housing. Install the support hook (**1**) (Fig. 3). Remove the guide studs. Install screws (**2**) (Fig. 3 and 4) and torque to 480-640 Nm (apply Loctite 542).

D . Final operations

18. Reinstall the side guards.

19. Connect pipes and sensors (**1**) and (**3**) (Fig. 2).

20. Fix the hoses to the hydraulic couplers.

21. Service the oil system and check the level on the transparent tube located on the left of the centre housing.

22. Check the following points:
- leaktightness of mating face of PTO housing: leaktightness of hydraulic unions,
- operation of PTO clutch, including PTO brake (all types).

2 F01 Chassis reinforcements

CONTENTS

2F01.2

Splitting *- Chassis reinforcements*

Splitting - Chassis reinforcements

A . General

The side-rails placed either side of the engine reinforce the tractor chassis.

Different sections of side-rails are used (see Fig. 1)

a : Type 8210-8220 tractors
- Perkins engine
- Full Powershift AG150 or Heavy Duty gearbox

Note: The side-rails are installed only on tractors having the "Front lifting arm" option.

b : Type 8240 tractors
- Valmet engine
- Full Powershift AG150 or Heavy Duty gearbox

Tractors 8250
- Valmet engine
- Heavy Duty gearbox

c : Tractors 8250-8260
- Valmet engine
- Full Powershift AG250 gearbox

d : Tractors 8270-8280
- Valmet engine
- Full Powershift AG250 gearbox

Danger

- The chassis reinforcements are heavy items. They must be handled with care, with presence of an operator and possibly suitable lifting equipment.

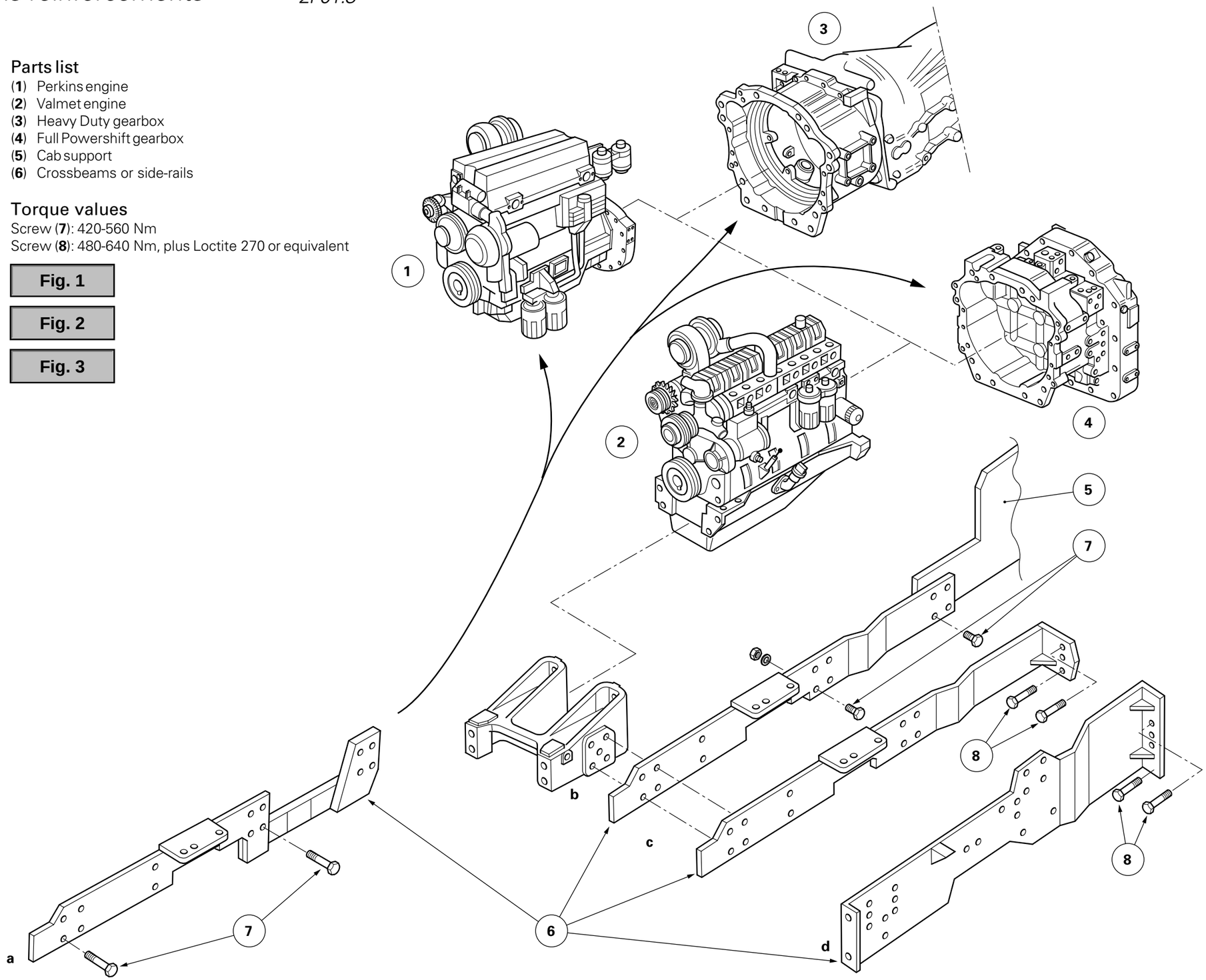
Parts list

(**1**) Perkins engine
(**2**) Valmet engine
(**3**) Heavy Duty gearbox
(**4**) Full Powershift gearbox
(**5**) Cab support
(**6**) Crossbeams or side-rails

Torque values

Screw (**7**): 420-560 Nm
Screw (**8**): 480-640 Nm, plus Loctite 270 or equivalent

Fig. 1
Fig. 2
Fig. 3



Parts list
Fig. 2
Fig. 3

Fig. 1

Notes:

Tractors 8240-8250 (Valmet engine) fitted with a Heavy Duty transmission have additional reinforcements located of each side of the gearbox (Fig. 2).
These comprise two crossbeams maintained as follows:
- at the front, on the gearbox spacer,
- at the rear, on the intermediate housing of the rear axle.

Tractors 8210-8220 (Perkins engine) may be fitted with the type of reinforcements described previously, provided that the "Front lifting arm" option is envisaged.

Tractors 8270 and 8280 are fitted with side-rails whose cross-section allows the fitting of adjustable thrust bearings used during oscillating of the ZF 5052 front axle. If access to screw (**8**) (Fig. 1) proves difficult, remove the left footstep and support, and the side fuel tank.

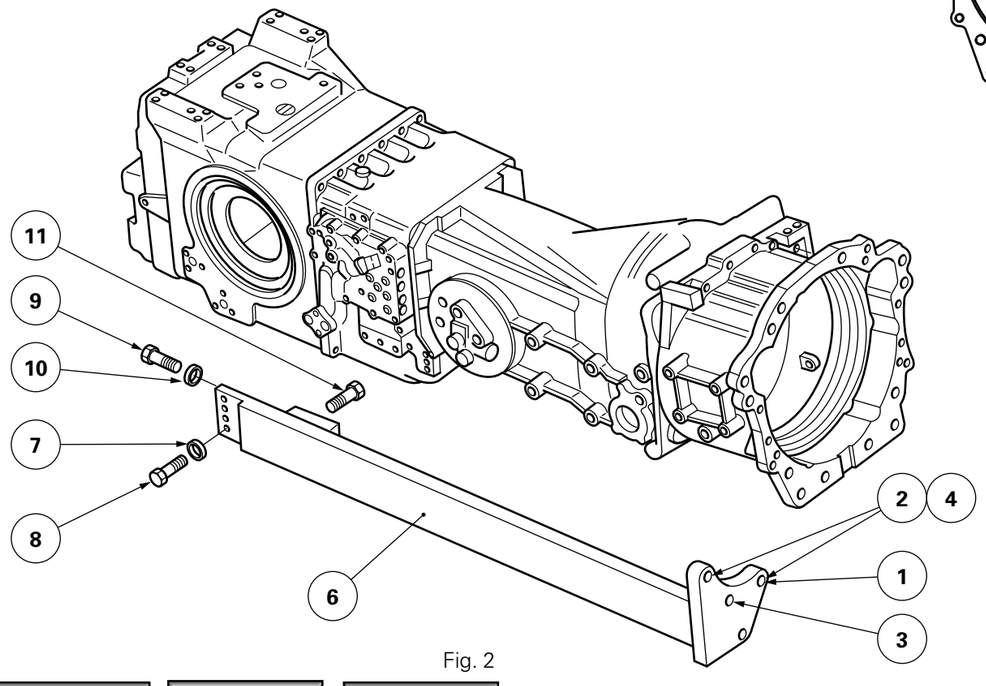


Fig. 2

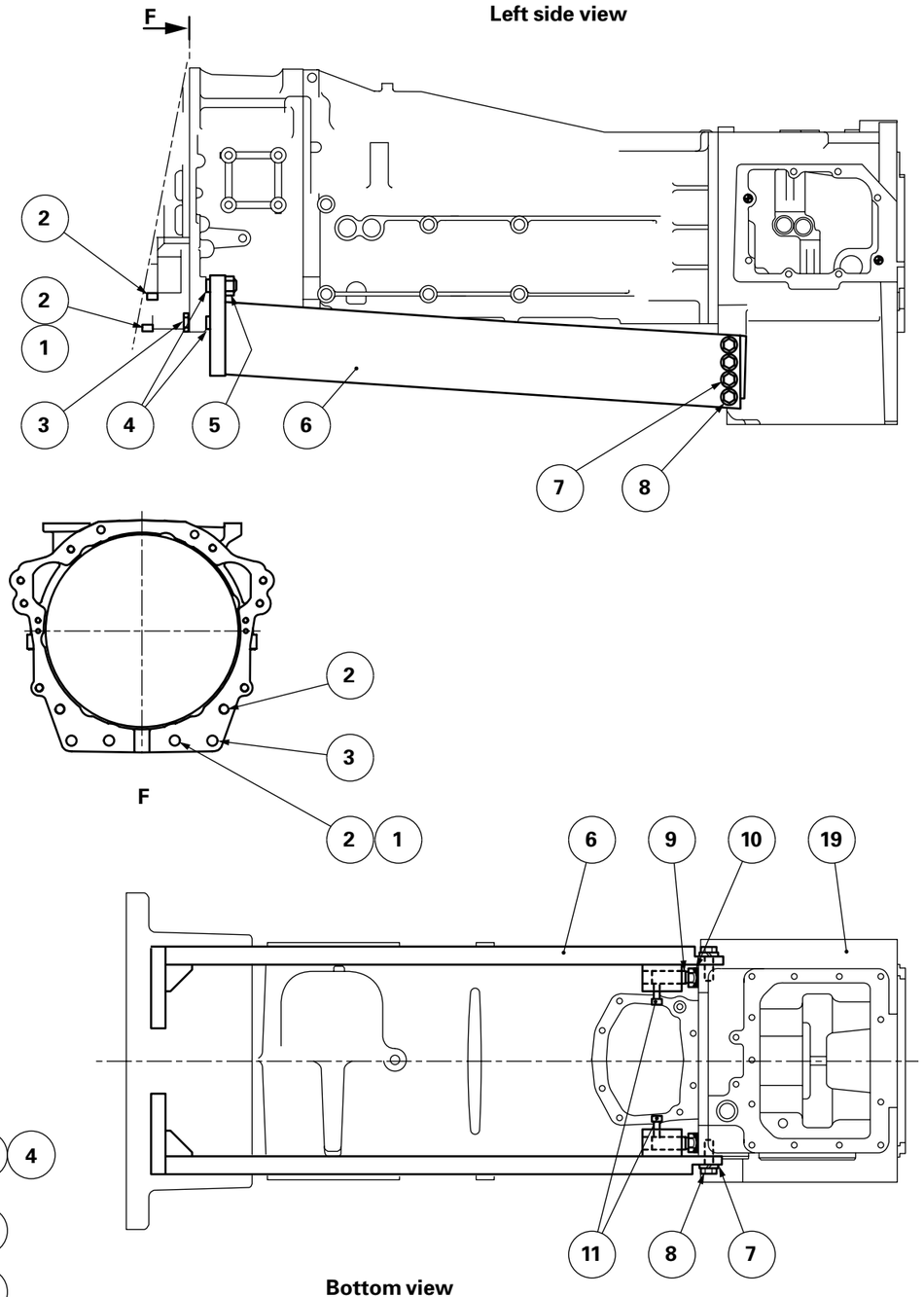


Fig. 3

Parts list | Fig. 1 | Fig. 3

Parts list | Fig. 1 | Fig. 2

B . Installing and adjusting the reinforcements (Heavy Duty gearbox) (Fig. 2 - 3)

Note:
See "Danger" at § A.

- Pre-assemble crossbeams (**6**) with screws and washers (**1**) and (**7**), spacers (**4**) and the nut,
- Coat the threads of screws (**2**) and (**3**) and nut (**5**) with Loctite 270. Torque the screws as follows:
  . Screw (**2**): 630 - 840 Nm
  . Screw (**3**): 790 - 1050 Nm
  - Pre-tighten screw (**8**) to 20 Nm
- Position the tensioner screws (**9**) in contact with curved washers (**10**) and loosen so as to obtain a pressure equivalent to a torque of 100 Nm on housing (**19**),
- Torque blocking screw (**11**) to 36 - 46 Nm
- Final torque screw (**8**) to 240 - 320 Nm.

2 G01 Rear wheels / Hubs

CONTENTS

2G01.2

Splitting - *Rear wheels / Hubs*

General

The 8200 tractors are fitted with quite different stub axles whose specifications vary depending on the type of trumpet (Figs. 1 to 8) and the transmissible torque:
- Flange shaft (**3**): Ø 82 mm (Fig. 1),
- Long straight shaft (**3**) (smooth), short or long: Ø 95 or 110 mm (Fig. 2 to 8).

Allocations

Tractors 8210 and 8220:
- Flange shafts: Ø 82 mm or
- Long straight shafts: Ø 95 mm

Tractors 8240 and 8250:
- Long straight shafts: Ø 95 mm or 110 mm

Tractors 8260 to 8280:
- Long straight shafts: Ø 110 mm

Changing tread is obtained:
- either by driving then locking the taper-fitting (long straight shaft),
- or by turning over the rim and/or the disk (flange shaft).

The material used for making the rim disk may be steel or cast iron.
The contour of the disk is also different depending on the buyer's option.

Parts list (Figs 2 to 5)

(**3**) Stubshaft
(**6**) Circlip
(**7**) Plastic plug
(**8**) Single cone
(**9**) Washer
(**10**) Spline
(**11**) Spline
(**12**) Adaptor
(**13**) Washer

Splitting - *Rear wheels / Hubs*

A . Presentation of the main assemblies and torque values

- Trumpet: Heavy Duty,
- Flange shaft: Ø 82 mm,
- "Steel" disc.

Tightening torque

- Nuts (**1**): 400 - 450 Nm

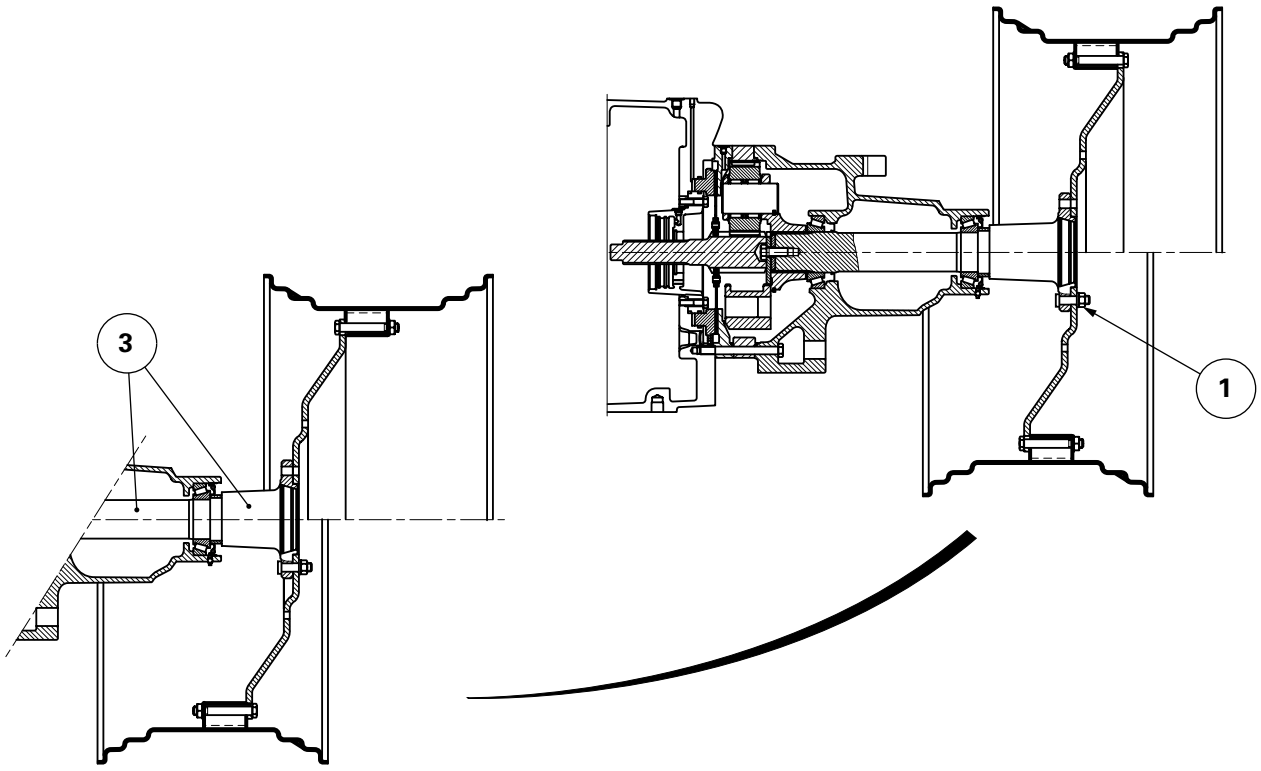


Fig. 1

2G01.4

Splitting - *Rear wheels / Hubs*

Type of trumpets used

- Heavy Duty
- Heavy Duty sealed
- with composite reducer
- Long straight shaft (smooth): Ø 95 mm with single cone and adaptor
- "Steel" disc

Tightening torque

- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 350 - 460 Nm

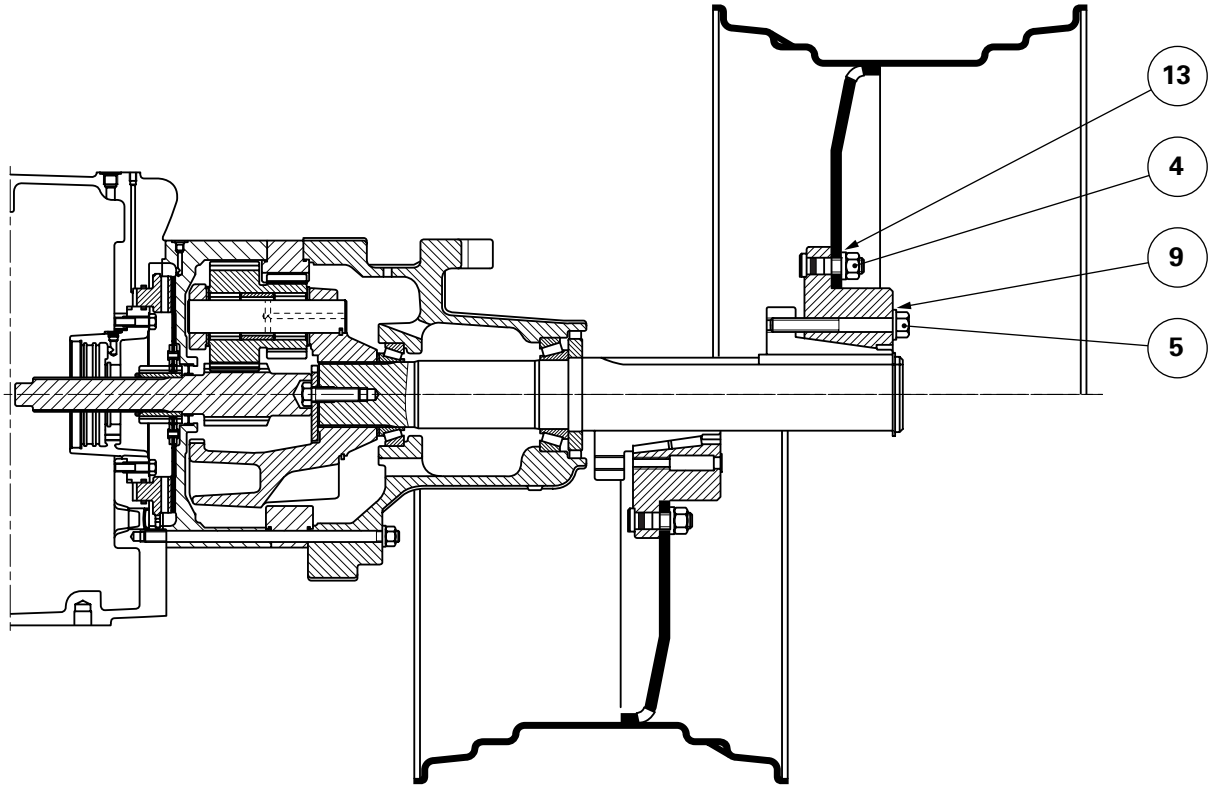


Fig. 2

Splitting - *Rear wheels / Hubs*

Type of trumpets used

- Heavy Duty
- Heavy Duty sealed
- with composite reducer
- Long straight shaft (smooth): Ø 95 mm with single cone and adaptor
- "Steel" disc.

Tightening torque

- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 350 - 460 Nm

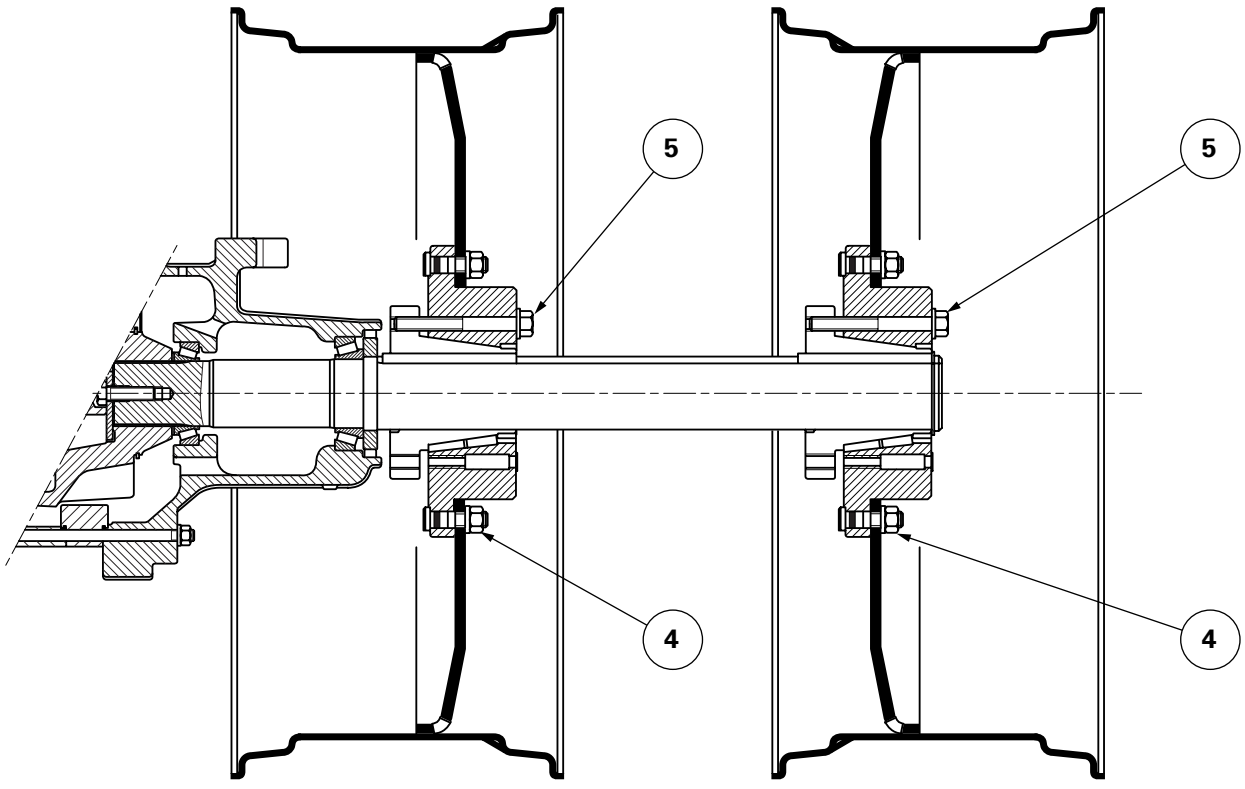


Fig. 3

2G01.6

Splitting - *Rear wheels / Hubs*

- Trumpet: with composite reducer
- Long straight shaft (smooth): Ø 95 mm with single cone and adaptor
- "Cast iron" disc.

Tightening torque

- Nuts (**2**): 250 - 350 Nm
- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 350 - 460 Nm

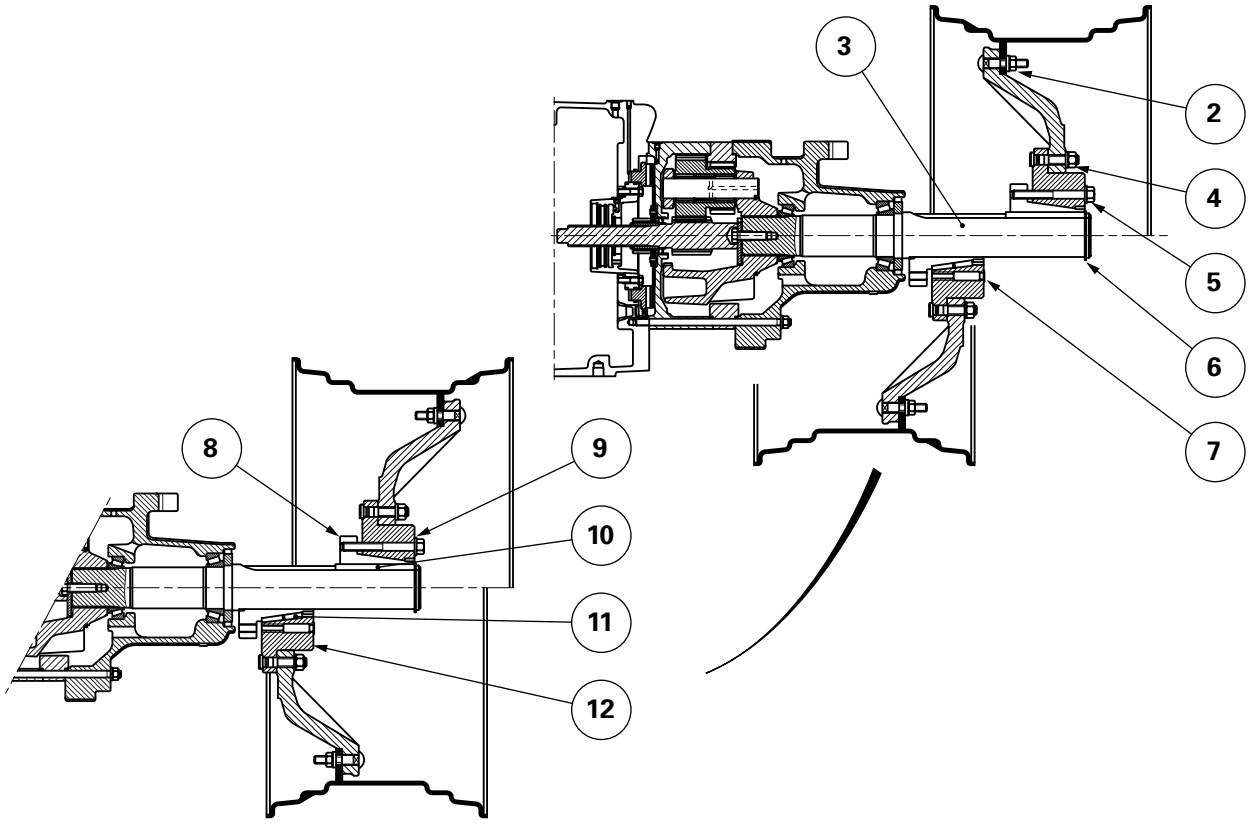


Fig. 4

Splitting - *Rear wheels / Hubs*

Type of trumpets used

- Heavy Duty
- Heavy Duty sealed
- with composite reducer
- Long straight shaft (smooth): Ø 95 mm with single cone
- "Cast iron" disc

Tightening torque

- Nuts (**2**): 250 - 350 Nm
- Screws (**5**): 350 - 460 Nm

Note: The section of cone (8) is identical for figures 2, 4 and 5.

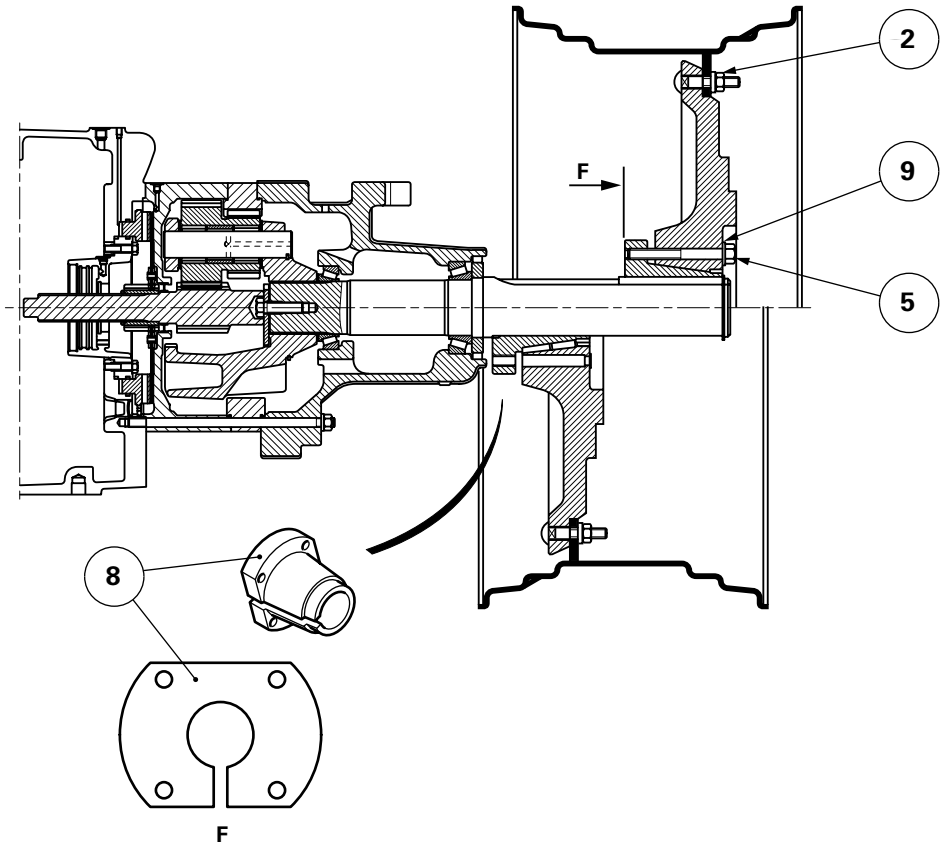


Fig. 5

2G01.8

Splitting - *Rear wheels / Hubs*

Parts list (Figs. 6 to 8)

(**3**) Stubshaft
(**6**) Circlips
(**7**) "Plastic" plug
(**8**) Single cones
(**10**) Spline
(**11**) Spline
(**12**) Adaptor

Trumpet with dual reducer

- Long straight shaft (smooth): Ø 110 mm with single cones and adaptor
- "Cast iron" disc.

Tightening torque

- Nuts (**2**): 250 - 350 Nm
- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 500 - 600 Nm

Note: The section of the single cones (8) is identical for Figures 7 and 8.

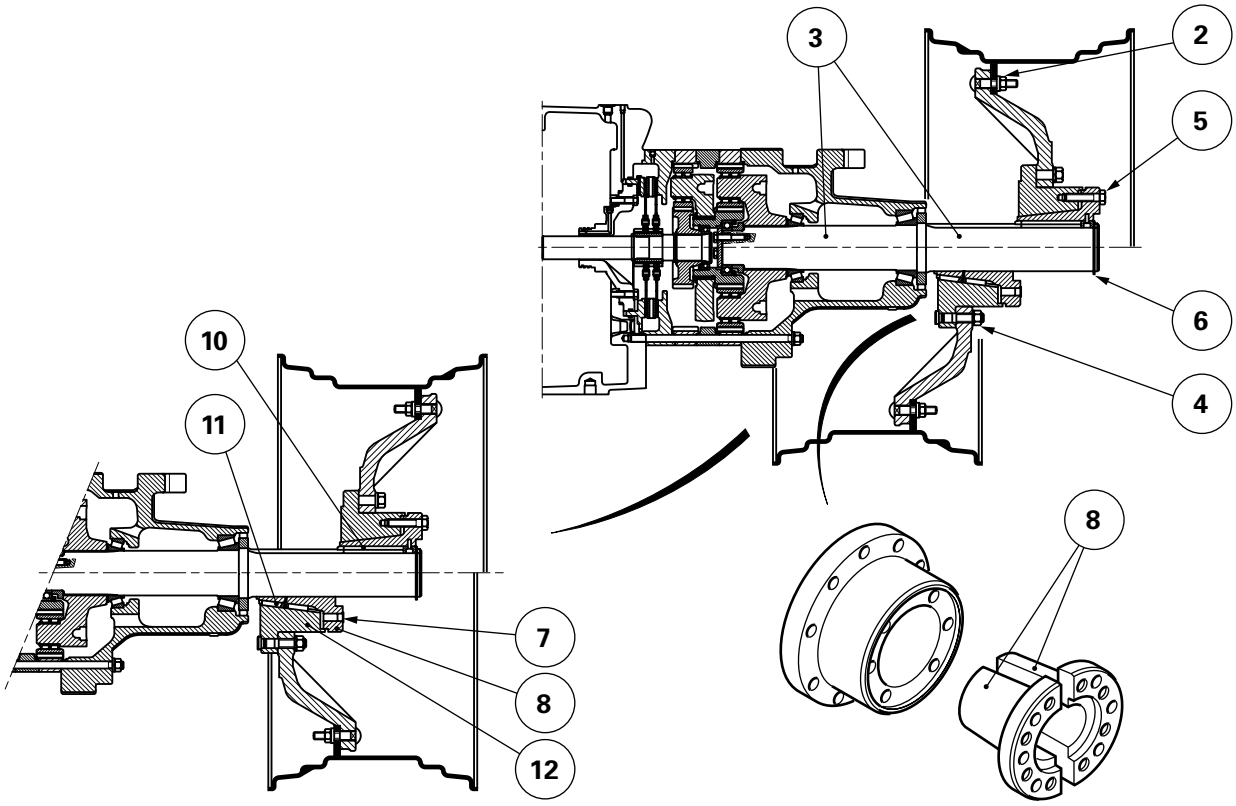


Fig. 6

Splitting - *Rear wheels / Hubs*

Trumpet with dual reducer

- Long straight shaft (smooth): Ø 110 mm and with single cones and adaptor
- "Steel" disc

Tightening torque

- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 500 - 600 Nm

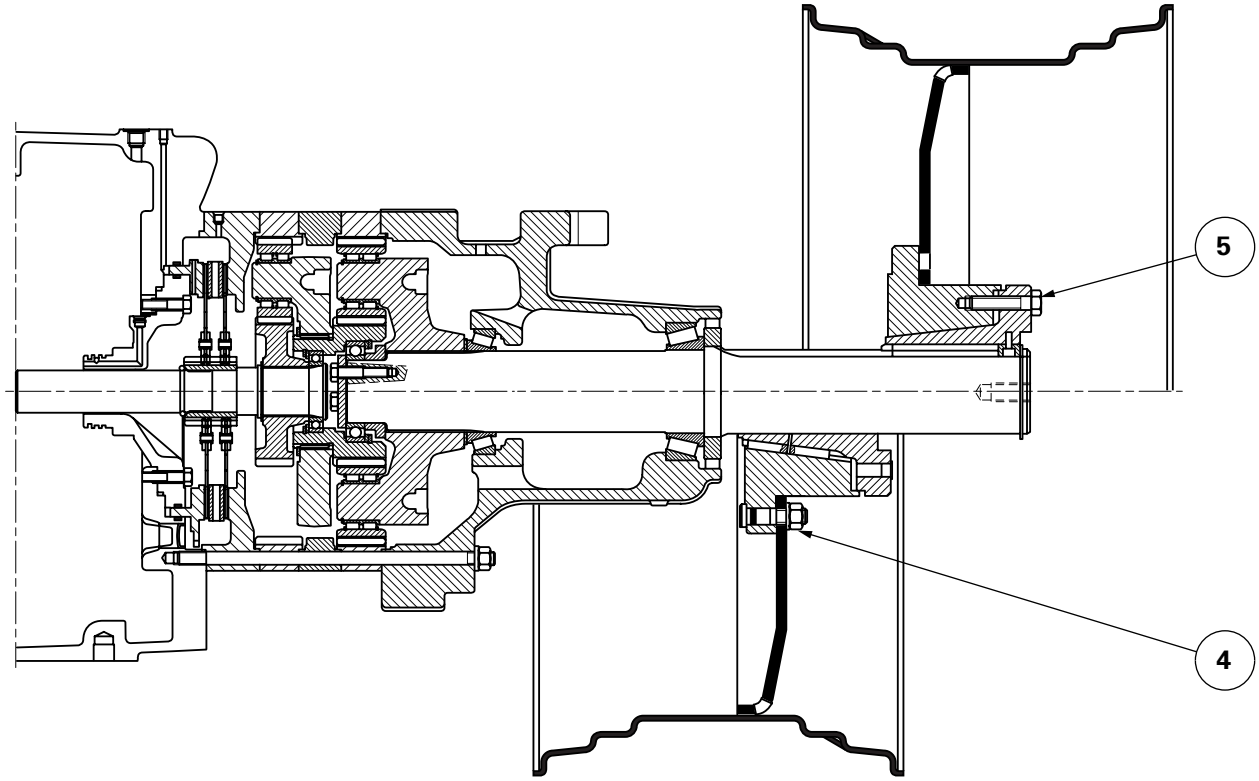


Fig. 7

2G01.10

Splitting - *Rear wheels / Hubs*

Trumpet with dual reducer

- Long straight shaft (smooth): Ø 110 mm with single cones and adaptor
- "Steel" disc

Tightening torque

- Nuts (**4**): 640 - 680 Nm
- Screws (**5**): 500 - 600 Nm

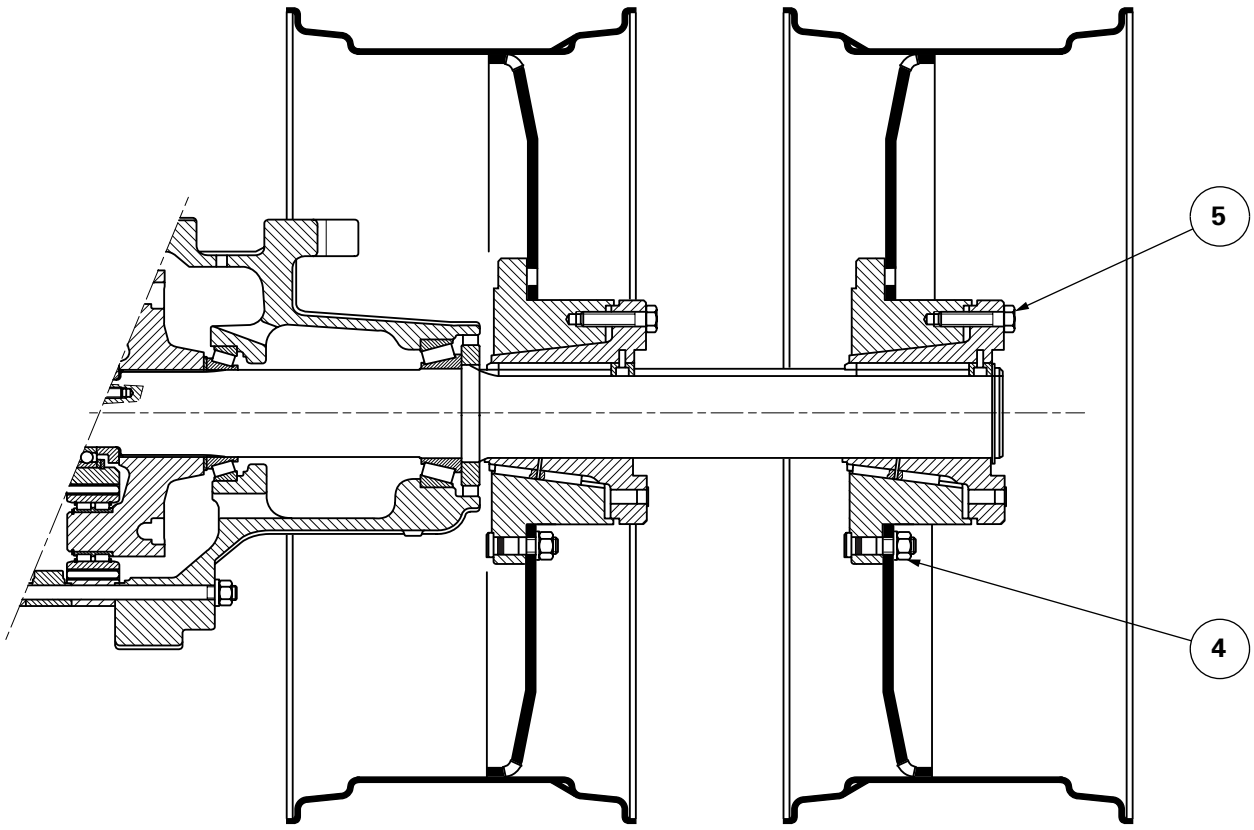


Fig. 8

B . Changing track

Preliminary operations

1. Immobilise the tractor. Set the handbrake.
2. Chock the front wheels.

Setting and positioning the wheels

Flange shaft (Fig. 1)

3. Loosen nuts (**1**). Using a trolley jack of suitable capacity, lift the appropriate side of the tractor. Complete removal of the nuts.
4. Change the rim or the disc in order to obtain the required track.

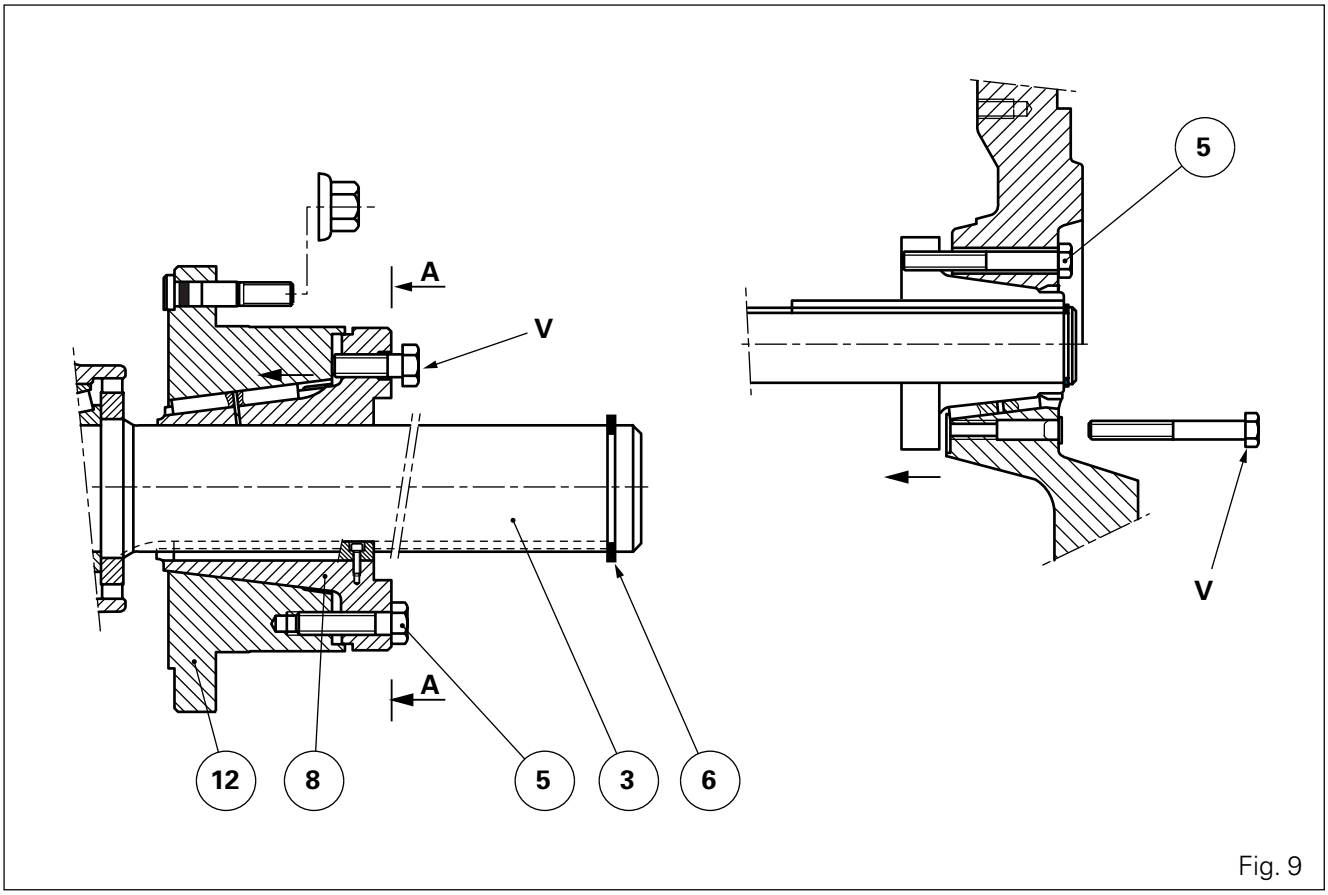


Fig. 9

Splitting - Rear wheels / Hubs

Long straight shaft (Fig. 2 to 8)

5. Unblock screws (**5**). Using a trolley jack of suitable capacity, lift the appropriate side of the tractor. Finish slackening the screws by a few turns.

6. Take the "**V**" screw from the tractor toolbox (see Fig. 9), this is a special device for changing the tread.

7. Remove the push-on "plastic" protectors from the tapped holes in male single cones (**8**), adaptor (**12**) or the "cast iron" disk (depending on option).

8. Lubricate, install and tighten the "**V**" screw uniformly and alternately to extract taper-fitting (Fig. 9).

9. Remove any traces of mud or dried earth on the stubshaft (**3**). Assisted by an operator, pull or push on the wheel in order to slide the cone or the male single cones on the shaft to obtain the sought position.
Note: Circlip (6), installed on the end of the shaft, is to limit the axial travel of the taper fitting.

Special point:

- The tapered part of male single cones (**8**), adaptor (**12**) or the "cast iron" disk (depending on option) must not be greased. Before assembly, clean and dry the parts. On the other hand, the stubshaft must be lightly coated with "Antiseize" grease or equivalent, along the full length, in order to avoid any corrosion spots and thus facilitate travel movement of the wheel during tread-changing.

Danger

- When removing tractor wheels, use lifting equipment and a suitable sling.

With the wheel in the required position, fix as follows:

Flange shaft

10. Tighten nuts (**1**) (see tightening torque § A).

Long straight shaft

11. Remove "**V**" screw (Fig. 9). Tighten original screws (**5**) uniformly and alternately. During tightening, ensure that male single cones (**8**) remain aligned on "**A**" (Fig. 9).

12. Tighten screws (**5**) to the torque recommended in § A.

13. Grease the tapped holes in the "**V**" screws and install the "plastic" protectors.

Final operation

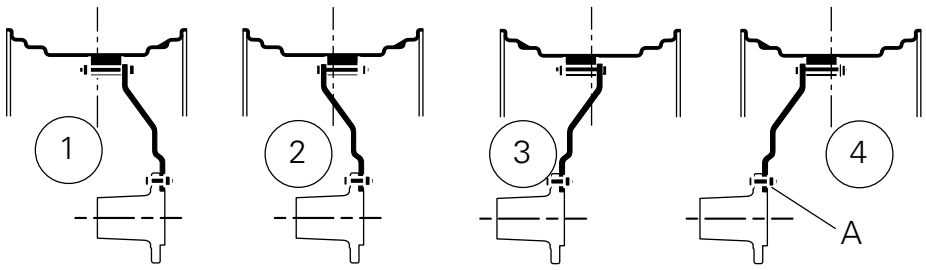
14. Remove the chocks from the front wheels, and release the handbrake.

Splitting - *Rear wheels / Hubs*

Steel wheels, reinforced axle, hub Ø 203 mm

Theoretical treads (mm)

1	1600
2	1804
3	2100
4	2304



Theoretical treads (mm)

- A (M18)=40 to daNm

Fixed steel wheels, long straight shaft

	Short shaft		Long shaft	
	Min.	**Max.**	**Min.**	**Max.**
Theoretical tread 1				
reinforced axle	1636	2006	1636	2600
sealed trumpet	1658	2020	1658	2664
composite Ø 95	1702	2124	1702	2624
Theoretical tread 2				
reinforced axle	1960	2330	1960	2924
sealed trumpet	1982	2344	1982	2988
composite Ø 95	2026	2448	2026	2948

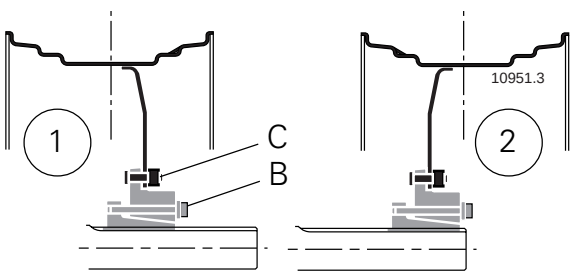
Tightening torques

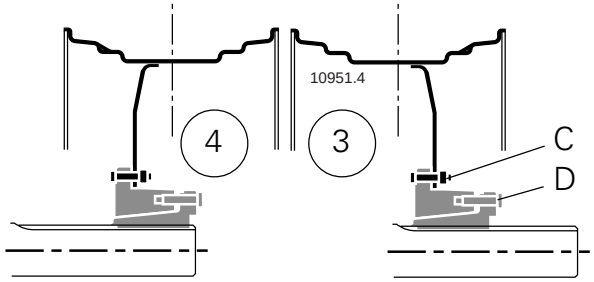
- B = 35 to 46 daNm
- C = 64 to 68 daNm

Theoretical tread 3				
composite Ø 110	1632	2054	1632	2554
Dual reductions	1674	2052	1664	2552
Theoretical tread 4				
composite Ø 110	1954	2376	1954	2876
Dual reductions	2004	2382	1994	2882

Tightening torques

- C = 64 to 68 daNm
- D = 50 to 60 daNm





2G01.14

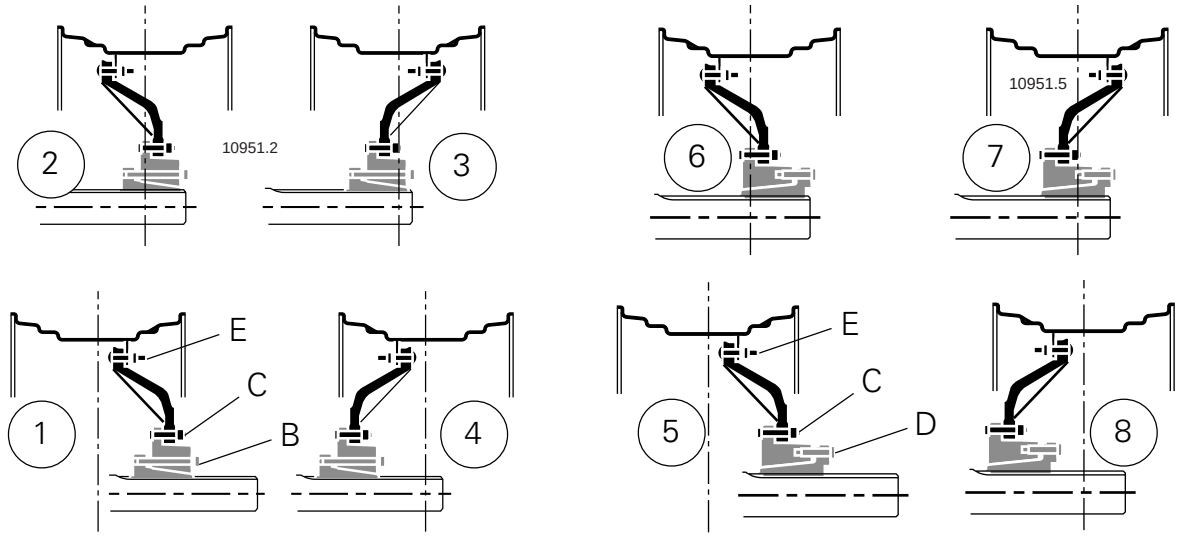
Splitting - *Rear wheels / Hubs*

Wheels fitted with cast-iron disk, hub with two single cones

	Short shaft		Long shaft	
	Min.	**Max.**	**Min.**	**Max.**
Straight shaft Ø 95				
Theoretical treads 1	1490	1912	1490	2412
2	1810	2232	1810	2732
3	1962	2384	1962	2884
4	2294	2716	2294	3216
Theoretical tread				
- B = 35 à 46 daNm				
- C = 64 à 68 daNm				
- E = 25 à 35 daNm				
Theoretical tread 5				
composite Ø 110	1418	1840	1418	2340
Dual reductions	1460	1838	1450	2338
Theoretical tread 6				
composite Ø 110	1744	2166	1744	2666
Dual reductions	1785	2163	1776	2664
Theoretical tread 7				
composite Ø 110	1896	2318	1896	2818
Dual reductions	1938	2316	1928	2816
Theoretical tread 8				
composite Ø 110	2222	2644	2222	3144
Dual reductions	2264	2642	2254	3142

Tightening torques

- C = 64 to 68 daNm
- D = 50 to 60 daNm
- E = 25 to 35 daNm



C . Replacing a wheel stud

15. Drive out the bad stud.
16. Clean the new stud and its housing in the hub.
17. Coat the splined part of the replacement stud lightly with Loctite 270 or equivalent.
18. Fit the new stud using a bronze drift and a suitable hammer.

3 . ENGINE

Contents

3 A01 General

CONTENTS

A . Introduction

This section is limited to providing general information on the engines fitted in the 8200 range.

To obtain all information about technical data, adjustments, disassembly and assembly procedures, refer to the following publications:

1. Perkins engines

- Workshop manual covering all Perkins diesel engines in the 4.41, 900 and 1000 series for all Massey Ferguson tractors and published by AGCO with the following reference numbers:
  . 1857075 M1 in English
  . 1857076 M1 in French
  . 1857077 M1 in Spanish
  . 1857078 M1 in German
  . 1857243 M1 in Italian

2. Valmet engines

- Workshop manual covering all 620 DS and 634 DS type engines published in English by Valmet, reference number 836 640 364.
- Workshop manual specific to the 645 engine published in English by Valmet, reference number 836 841 000.

B . Main characteristics

Tractors fitted with Perkins engine

		8210	8220
Type of engine		1006-60TWG	1006-60TWG
Perkins engine list no.		YH31441	YH31441
No. of cylinders		6	6
Bore (mm)		100	100
Stroke (mm)		127	127
Capacity (litre)		6	6
Compression ratio		17.25/1	17.25/1
DIN (kw) at 2200 rpm		145 (107)	155 (114)
Max. torque (Nm)		620	663
at (rpm)		1400	1400
Idle speed (rpm)		950	950
Nominal speed (rpm)		2200	2200
Max. speed at no load (rpm)		2354	2354
Injection pump			
Make and type		Lucas DP203	Lucas DP203
Boost control		Yes	Yes
Reference		8921A512T	8921A283T
Code		2644K622	2644D133
Pump code letter		FH	DH
Governor spring code		1	1
Rotation		Clockwise	Clockwise
Static timing angle		7°	6°
Engine position		TDC	TDC
Pump / engine check angle		Timing (using a measuring gauge)	Timing (using a measuring gauge)
Injectors			
Make		Lucas	Lucas
Code		KP	KH
Nozzle holder		2645A318	2645A314
Nozzle		2645A636	2645A630
New and service calibration		294 atm	294 atm
Suction system		Turbowastegate	Turbowastegate intercooler
Min. boost pressure at 2200 rpm at full load (mm Hg)		1035	1035
	(Kpa)	138 ± 5	138 ± 5
	(PSI)	20.03	20.03
Valve spring		Single	Single
Valve seat insert (inlet / exhaust)		Yes	Yes
Valve angle (degree) (in / ex)		45 / 45	30 / 30
Valve clearance (mm) (in / ex)		0.2 / 0.45	0.2 / 0.45
Oil cooler		Yes	Yes
No. of thermostats		2	2
Opening temp. (begin / full)		82° / 96°	82° / 96°
Fan		Viscostatic	Viscostatic
Piston cooling nozzle		Yes	Yes
Oil filter		2	2
Fuel filter		2	2

Tractors fitted with Valmet engine

		8240	8250
Type of engine		620DSRAE	634DWE
Perkins/Valmet engine list no.		V620DSRAE	V634DSBAE
No. of cylinders		6	6
Bore (mm)		108	108
Stroke (mm)		120	134
Capacity (litre)		6.6	7.4
Compression ratio		16.5 / 1	16.5 / 1
DIN (kw) at 2200 rpm		170 (125)	185 (136)
Max. torque (Nm)		744	811
at (rpm)		1400	1400
Idle speed (rpm)		950	950
Nominal speed (rpm)		2200	2200
Max. speed at no load (rpm)		2354	2354
Injection pump			
Make and type		Stanadyne DB4	Bosch type P
Boost control		Yes	Yes
Reference		DB4629/5347	PES6P
Code		5347 or 5535	3382
Pump code letter		A	G
Governor spring code		-	-
Rotation		Clockwise	Clockwise
Static timing angle		16º	13º
Engine position		TDC	TDC
Pump / engine check angle		Timing (using a measuring gauge)	Timing (using a measuring gauge)
Injectors			
Make		Stanadyne	Stanadyne
Code		446	876
Nozzle holder		M34446	M33876
Nozzle		M34447	M33877
New and service calibration		270 atm	270 atm
Suction system		Turbo intercooler	Turbo intercooler
Min. boost pressure at 2200 rpm at full load (mm Hg)		900	900
	(Kpa)	120	120
	(PSI)	17.42	17.42
Valve spring		Single	Single
Valve seat insert (inl / ex)		Yes	Yes
Valve angle (degree) (in / ex)		35 / 45	35 / 45
Valve clearance (mm) (in / ex)		0.35 / 0.45	0.35 / 0.45
Oil cooler		Yes	Yes
No. of thermostats		2	2
Opening temp. (begin / full)		82º / 96º	82º / 96º
Fan		Viscostatic	Viscostatic
Piston cooling nozzle		Yes	Yes
Oil filter		2	2
Fuel filter		2	2

Engine - General

		8260	8270
Type of engine		634DSBIE	645DSBIE
Perkins/Valmet engine list no.		V634DSBIE	V645DSBIE
No. of cylinders		6	6
Bore (mm)		108	108
Stroke (mm)		134	145
Capacity (litre)		7.4	8.4
Compression ratio		16.5 / 1	16.5 / 1
DIN (kw) at 2200 rpm		210 (154)	230 (169)
Max. torque (Nm)		897	1002
at (rpm)		1400	1400
Idle speed (rpm)		950	950
Nominal speed (rpm)		2200	2200
Max. speed at no load (rpm)		2354	2354
Injection pump			
Make and type		Bosch type P	Bosch type P
Boost control		Yes	Yes
Reference		PES6P	PES6P120D
Code		3382	3382
Pump code letter		C	A
Governor spring code		-	-
Rotation		Clockwise	Clockwise
Static timing angle		13º	14º
Engine position		TDC	TDC
Pump / engine check angle		Timing (using a measuring gauge)	Timing (using a measuring gauge)
Injectors			
Make		Stanadyne	Bosch
Code		876	-
Nozzle holder		M33876	DLLA143P45
Nozzle		M33877	P495
New and service calibration		270 atm	250 atm
Suction system		Turbo intercooler	Turbo intercooler
Min. boost pressure at 2200 rpm at full load (mm Hg)		1275	1125
	(Kpa)	170	150
	(PSI)	24.67	21.77
Valve spring		Single	Single
Valve seat insert (inl / ex)		Yes	Yes
Valve angle (degree) (in / ex)		35 / 45	35 / 45
Valve clearance (mm) (in / ex)		0.35 / 0.45	0.35 / 0.35
Oil cooler		Yes	Yes
No. of thermostats		2	2
Opening temp. (begin / full)		82º / 96º	82º / 96º
Fan		Viscostatic	Viscostatic
Piston cooling nozzle		Yes	Yes
Oil filter		2	2
Fuel filter		2	2

Engine - General

		8280
Type of engine		645DSBIE
Perkins/Valmet engine list no.		V645DSBIE
No. of cylinders		6
Bore (mm)		111
Stroke (mm)		145
Capacity (litre)		8.4
Compression ratio		16 / 1
DIN (kw) at 2200 rpm		260 (191)
Max. torque (Nm)		1150
at (rpm)		1400
Idle speed (rpm)		950
Nominal speed (rpm)		2200
Max. speed at no load (rpm)		2354

Injection pump

Make and type		Bosch type P
Boost control		Yes
Reference		PES6P120A
Code		3382
Pump code letter		-
Governor spring code		-
Rotation		Clockwise
Static timing angle		14º
Engine position		TDC
Pump / engine check angle		Timing (using a measuring gauge)

Injectors

Make		Bosch
Code		-
Nozzle holder		DLLA143P455
Nozzle		P495
New and service calibration		250 atm
Suction system		Turbo intercooler
Min. boost pressure at		
2200-rpm at full load (mm Hg)		1275
	(Kpa)	170
	(PSI)	24.67

Valve spring		Single
Valve seat insert (inl / ex)		Yes
Valve angle (degree) (in / ex)		35 / 45
Valve clearance (mm) (in / ex)		0.35 / 0.35
Oil cooler		Yes
No. of thermostats		2
Opening temp. (begin / full)		82º / 96º
Fan		Viscostatic
Piston cooling nozzle		Yes
Oil filter		2
Fuel filter		2

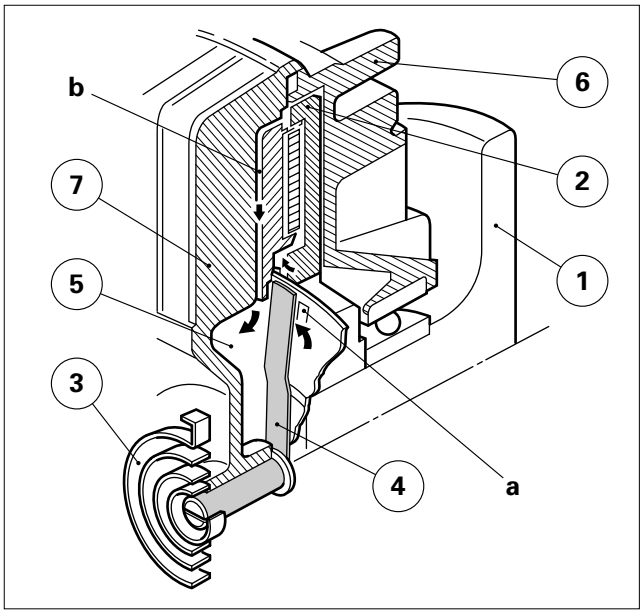
C . Viscostatic fan

Description

The engines are fitted with a cooling fan equipped with a viscostatic coupling. This device permits a gain in power in the order of 2 to 3 horsepower.

The viscostatic coupling comprises three main parts:
- the driving part driven by the engine and composed of a shaft (**1**) integral with a plate (**2**) fitted with annular grooves,
- the driven part constituted by a hub (**6**) receiving the fan and the body (**7**) and equally fitted with annular grooves,
- the regulating section comprising a thermostatic spring (**3**) that controls valve (**4**).

The centre of the device contains a tank (**5**) filled with a viscous silicone fluid.



Operation

When the temperature of the air passing through the radiator reaches a preset value, thermostatic spring (**3**) acts upon valve (**4**) which opens port **a**. The liquid is directed by centrifugal force to the annular grooves of hub (**2**) and body (**7**). The torque is transmitted through the internal friction of the extremely viscous liquid and its adherence to the inner walls. The fan is thus driven and permits a better air cooling of the radiator.

The speed of the fan varies continuously over the whole range of regulation depending on the temperature.

When the temperature of the air passing through the radiator drops, the spring closes the valve and stops the liquid from reaching the friction area. The fluid gradually returns to the tank (**5**) via channel **b**, the fan thus becomes de-clutched, leaving only residual resistive torque.

3 B01 Flywheel and dampers

CONTENTS

A . General

The "Luk" type damper (**3**) installed on the flywheel is secured by splines onto main shaft (**6**)**.** It provides a flexible connection between the engine and gearbox and damps any vibrations caused by the transmission. It is installed on 8200-Series tractors fitted with the Full Powershift (AG150 - AG250) and Heavy Duty gearboxes

AG 150 - AG250 versions (Fig. 1)

- Bearing (**1**) fit in the flywheel is sealed on both faces. The seal is to give better reliability. The bearing supports main shaft (**6**) and does not itself rotate. Its position in the flywheel remains variable depending on the type of gearbox and the engine type. It may be bearing on a shoulder of the flywheel, or on a circlip.
- Spring (**5**) maintains the main shaft in position.
- The damper, the main shaft and the bearing form an assembly rotating at the speed of the flywheel.

Heavy Duty version (Fig. 2)

- The principle of installation and operation remain similar. Note, however, that:
  . the spring is excluded, since the main shaft installation differs from that shown for the previous version;
  . the bearing has one position only, and is in contact with the shoulder of the flywheel.

Note

The part number of damper (**3**) differs according to the version.

B . Removing and refitting the damper (Figs 1 - 2)

Removal

1. Split the tractor between the engine and the gearbox (see section 2B01).
2. Remove screws (**4**).
3. Remove damper (**3**).

Refitting

4. Check the parts and replace any that are faulty.
   Special point
   If the operation consists in changing the damper, also replace the bearing (see § C).
5. Lightly coat the splines of the damper hub with GN grease + Molycote. Refit and centre the damper using service tool, P/N 3378262M1 (see § E) , the offset on the hub pointing towards the gearbox (Figs. 1 - 2).
6. Lightly coat the threads of screws (**4**) with Loctite 270 and torque to following values:
   - Full Powershift gearbox (AG150-AG250):
     . M10 screws: 68 - 92 Nm.
   - Heavy Duty gearbox:
     . M12 screws: 102 - 138 Nm
7. Reassemble the tractor between the engine and gearbox (see section 2B01).

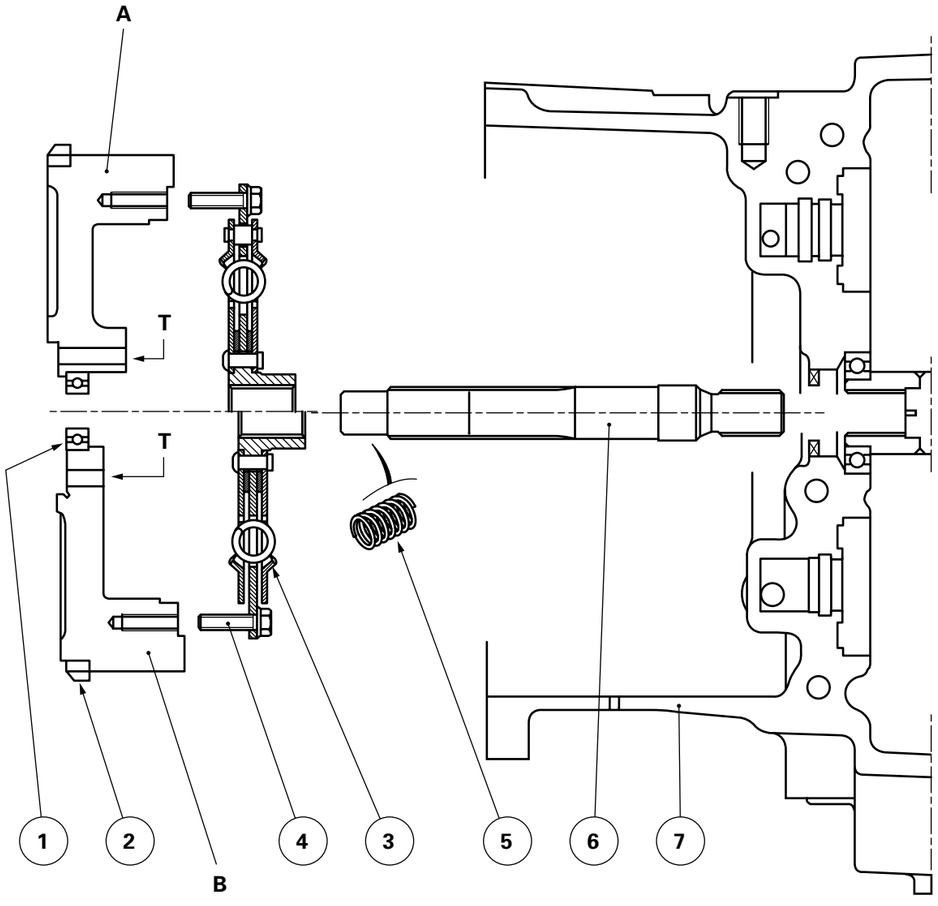
Engine - Flywheel

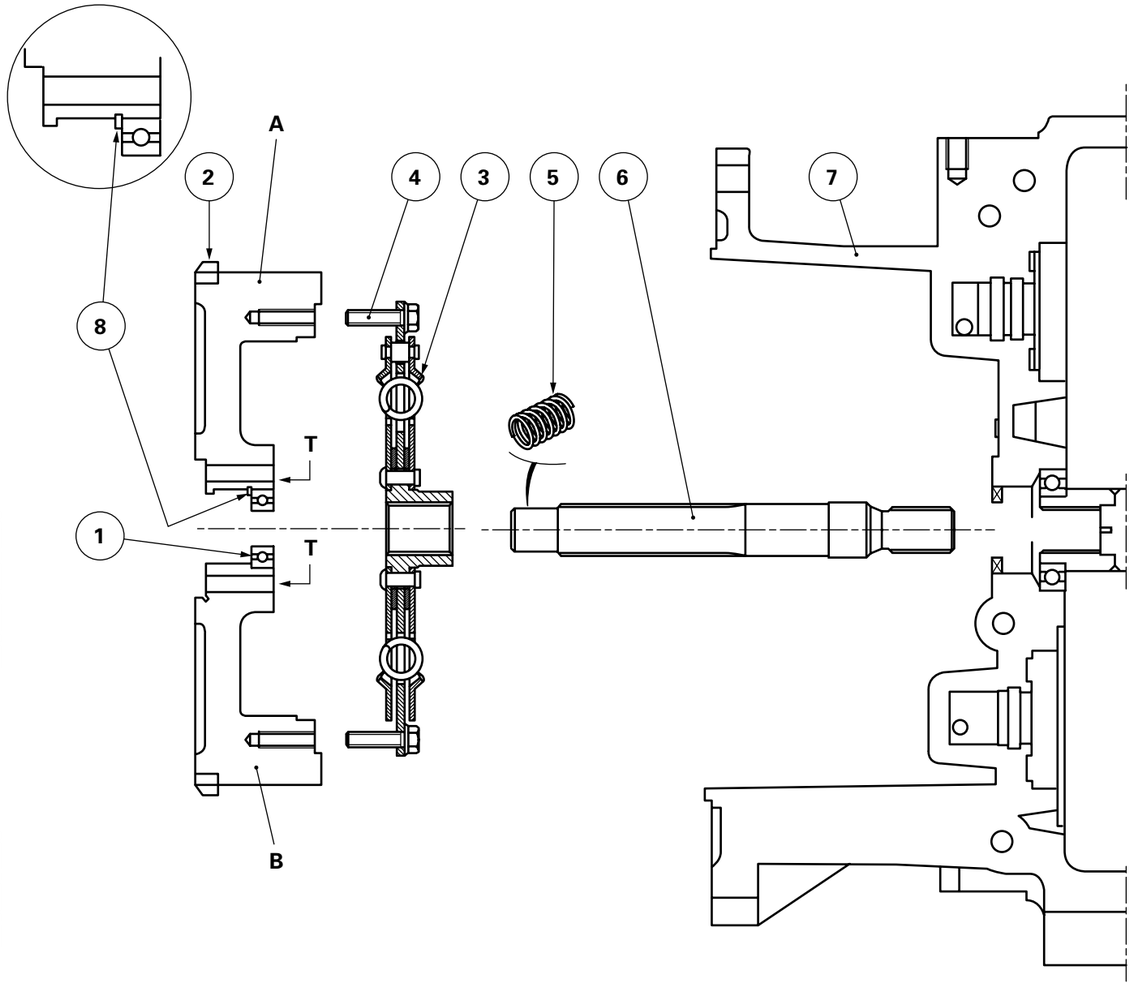
Full Powershift gearbox AG150

Parts list

(**1**) Bearing
(**2**) Starter ring gear
(**3**) Damper
(**4**) Screw
(**5**) Spring
(**6**) Main shaft
(**7**) Gearbox

Flywheel	Distance btw. centres of attachment holes "**T**"	Perkins	Valmet
A	86 mm	-	X
B	107,95 mm	X	-





Full Powershift gearbox AG250

Parts list

(**1**) Bearing
(**2**) Starter ring gear
(**3**) Damper
(**4**) Screw
(**5**) Spring
(**6**) Main shaft
(**7**) Gearbox
(**8**) Circlip

Flywheel	Distance btw. centres of attachment holes "**T**"	Valmet
A	86 mm	X
B	94 mm	X

Parts list

Fig. 2

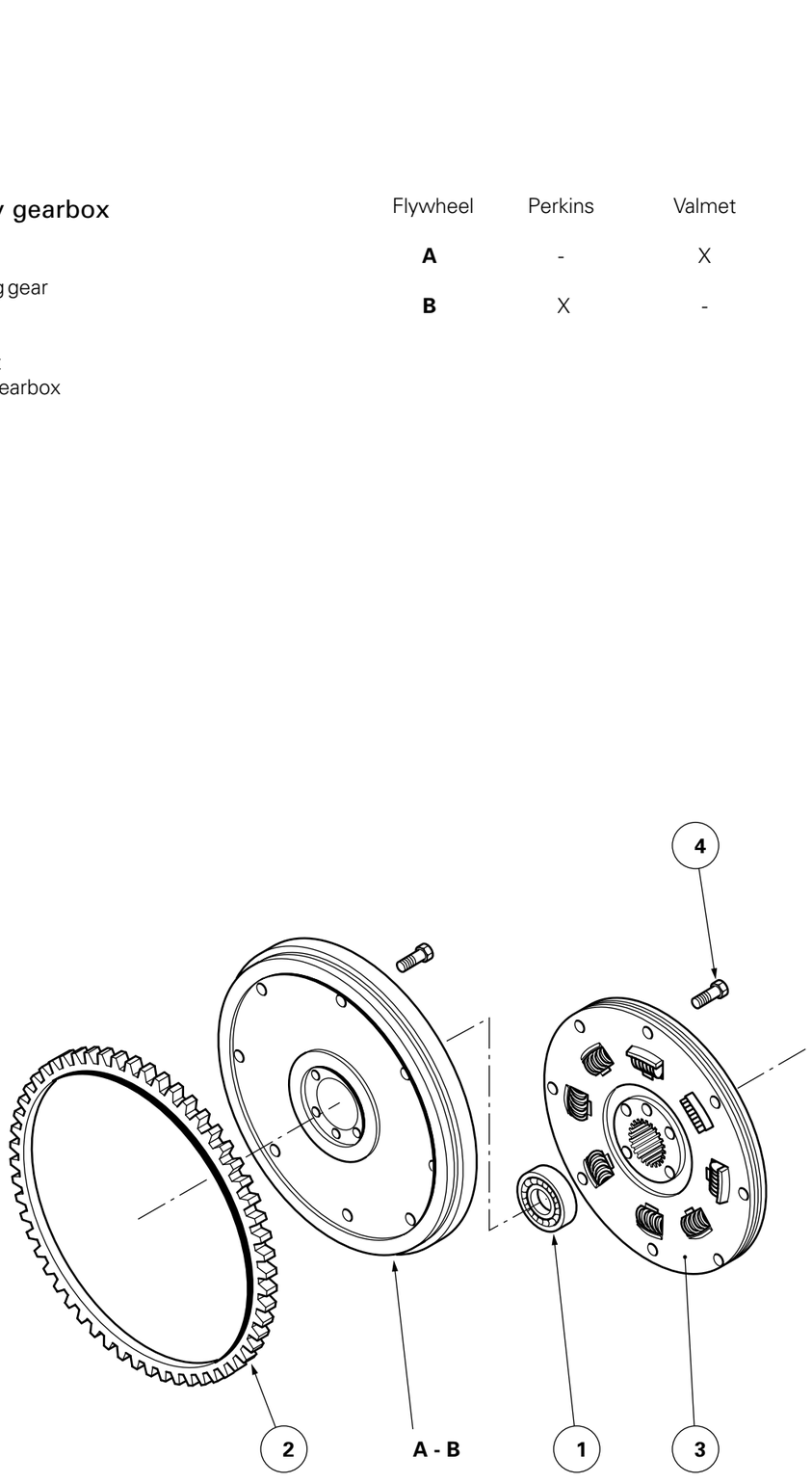
Fig. 1

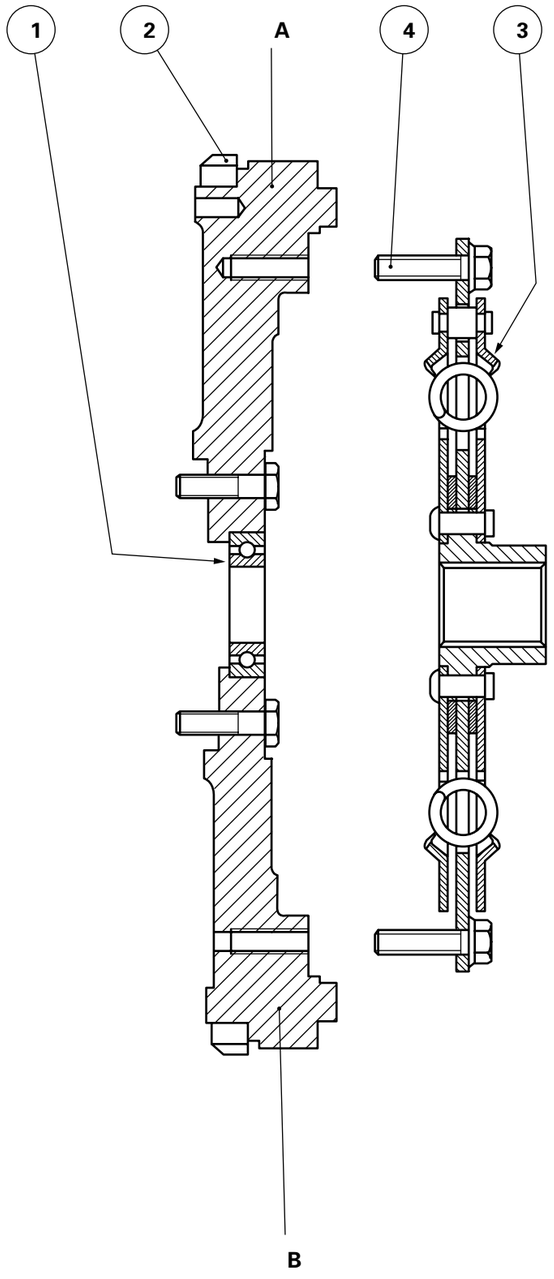
Heavy Duty gearbox

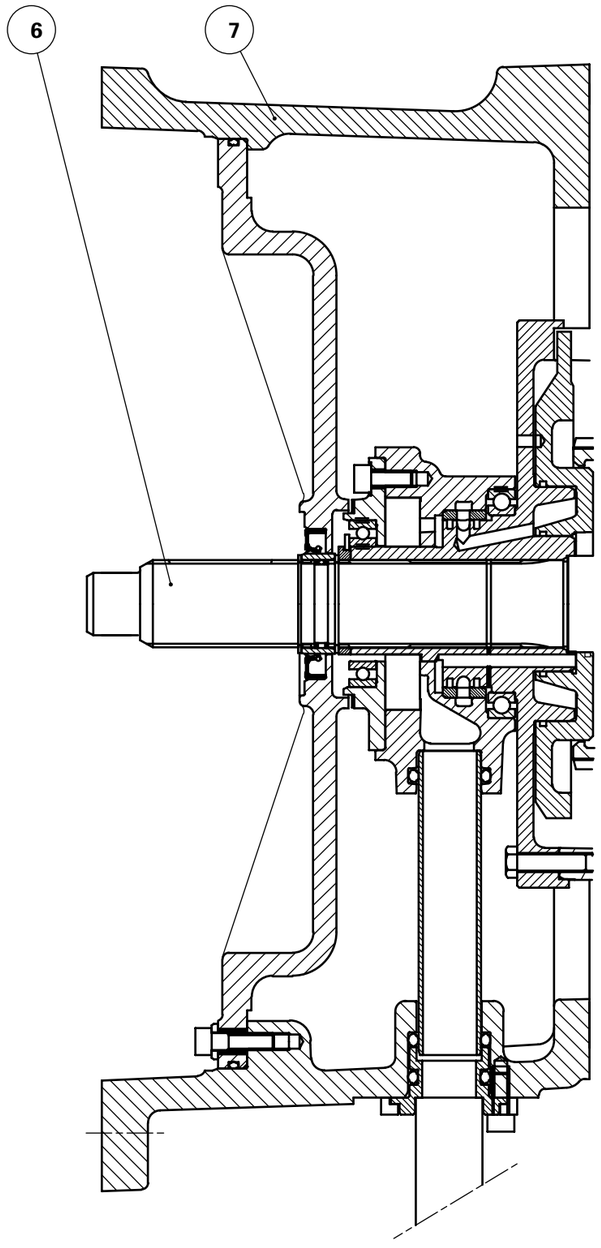
Parts list

(**1**) Bearing
(**2**) Starter ring gear
(**3**) Damper
(**4**) Screw
(**6**) Main shaft
(**7**) Spacer / Gearbox

Flywheel	Perkins	Valmet
A	-	X
B	X	-







Parts list | **Fig. 1**

Fig. 2

C . Removing and refitting the flywheel and the bearing

Removal

8. Split the tractor between the engine and the gearbox (see section 2B01).
9. Lock the flywheel using a suitable fixture.
10. Remove the damper (see § B).
11. Remove the flywheel.
12. Drive out bearing (**1**) (Figs. 1 - 2)
Remarks
- On certain types of installation (Figs. 1 - 2) , extraction of the bearing is possible without removing the flywheel, using a slide hammer.
- If installing a type **A** flywheel and a Full Powershift gearbox AG250, replace circlips (**8**) and the bearing (Fig. 1)

Refitting

13. Check the parts, replacing any that are defective.
14. Screw two guide studs opposite one another into the holes used for attaching the flywheel on the crankshaft.
15. Refit the flywheel.
Note: Depending on the type of fixture, fit bearing (1) before or after refitting the flywheel, using a suitable mandrel (dia. 62 mm, corresponding to the hole in the external cage of the bearing).
16. Remove the guide studs. Torque the screws to 140 Nm (Perkins engine). For the screw torquing values on Valmet flywheels, refer to the engine repair manual.
17. Refit the damper (see § B).
18. Reassemble the tractor between the engine and gearbox (see section 2B01).

D . Replacing the starter ring gear

Disassembly

19. Split the tractor between the engine and gearbox (see section 2B01).
20. Remove the damper (see § B).
21. Remove the flywheel (see § C).
22. Using a suitable-strength drill bit, drill a hole (Ø 5) to the same depth as the width of ring gear (**2**) to avoid touching the flywheel. Use a suitable cold chisel to split the ring gear (Fig. 3).
Note: When breaking the ring gear, provide some protection to stop splinters of material.

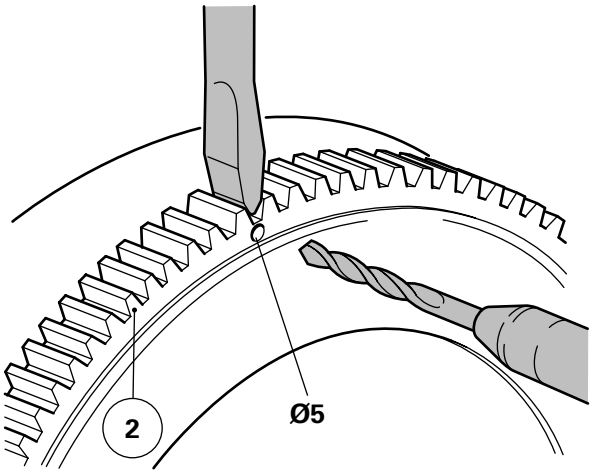


Fig. 3

Reassembly

23. Heat a new ring gear to 245° C in a furnace only.
24. Install ring gear (**2**) on the flywheel, with the teeth opening pointing towards the starter, and fit rapidly into abutment. Allow to cool slowly.
25. Refit the flywheel (see § C) and the damper (see § B).
26. Reassemble the tractor between the engine and gearbox (see section 2B01).

E . Service tools

Tool available in the AGCO network
- 3378262M1 - Damper centring tool (Fig. 4)

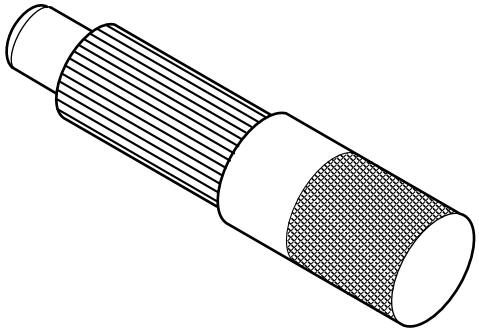


Fig. 4

3 C01 Spacer

CONTENTS

A . Removing and refitting the spacer

General

Type-8210 - 8220 -8240 and 8250 tractors may be fitted with either a Heavy Duty gearbox or a Full Powershift gearbox.

This section is limited to parts concerning the Heavy Duty gearbox. The Heavy Duty gearbox comprises two casings:

- the main housing which encloses the pinions, the shafts and the input unit,
- the spacer, providing the connection with the engine.

Preliminary operations

1. Split the tractor between the engine and gearbox (see section 2B01).
2. Disassemble the four screws (dia. 10 mm) on each front Silent Block on the right- and left-hand engine bearers.
   Note: If the side fuel tank was not removed during the separation operation, drain the gas-oil and remove the footstep in question then the fuel tank.
3. Raise and block the cab. Remove the cab supports (right and left) and any adjacent parts likely to obstruct removal of the spacer. Drain the gearbox.
4. Install protector, P/N 3378012M2 (see § B) on main shaft (**7**) (Fig. 1).
5. Remove screws (**5**) (**62**) in order to facilitate unsticking of closure disk (**10**) (Fig. 1). Use the tapped holes and two screws of sufficient length to extract and maintain the disk before removing it.
6. Scrap seal (**8**) (Fig. 6).
7. Remove lube tube (**17**) from the engine clutch located under the gearbox between spacer (**16**) and intermediate housing (**19**) (Fig. 4).
8. Remove tubes (**20**) (**65**) (**70**) and union (**66**) (Figs. 2 - 3).
9. Remove the clutch using locally procured tooling (see section 4A01).

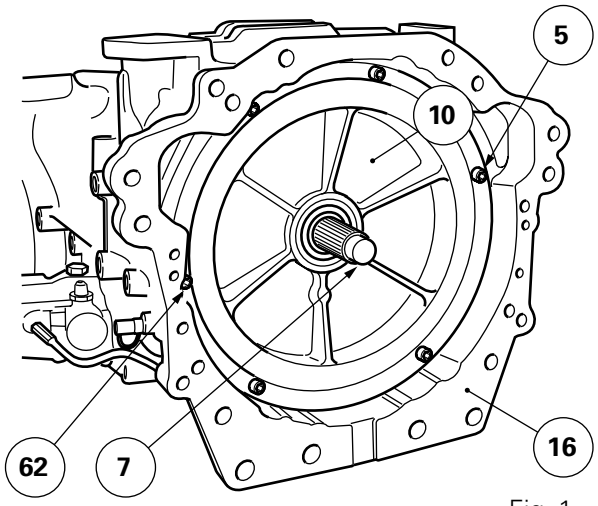


Fig. 1

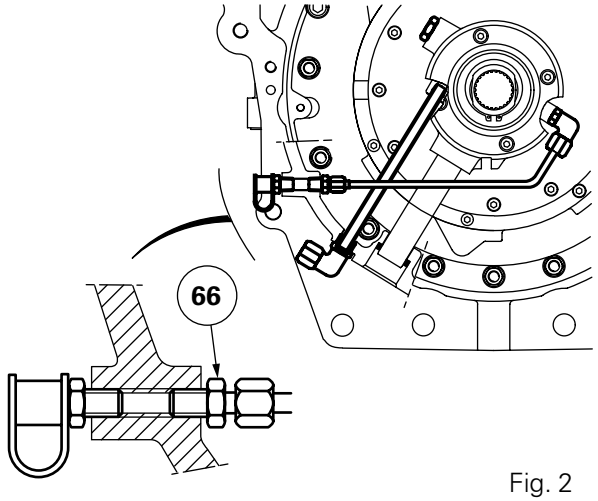


Fig. 2

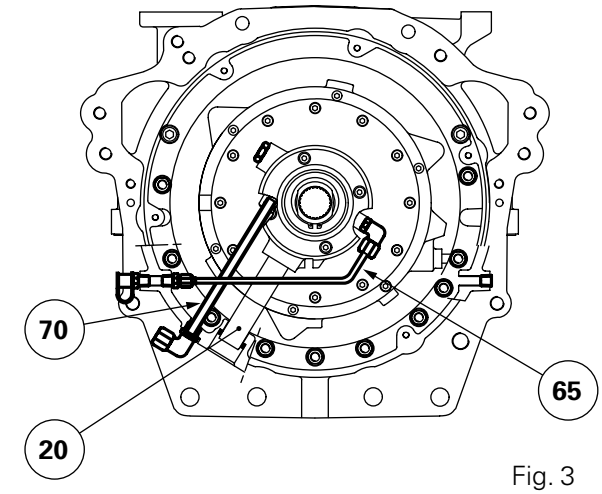


Fig. 3

Engine - *Spacer*

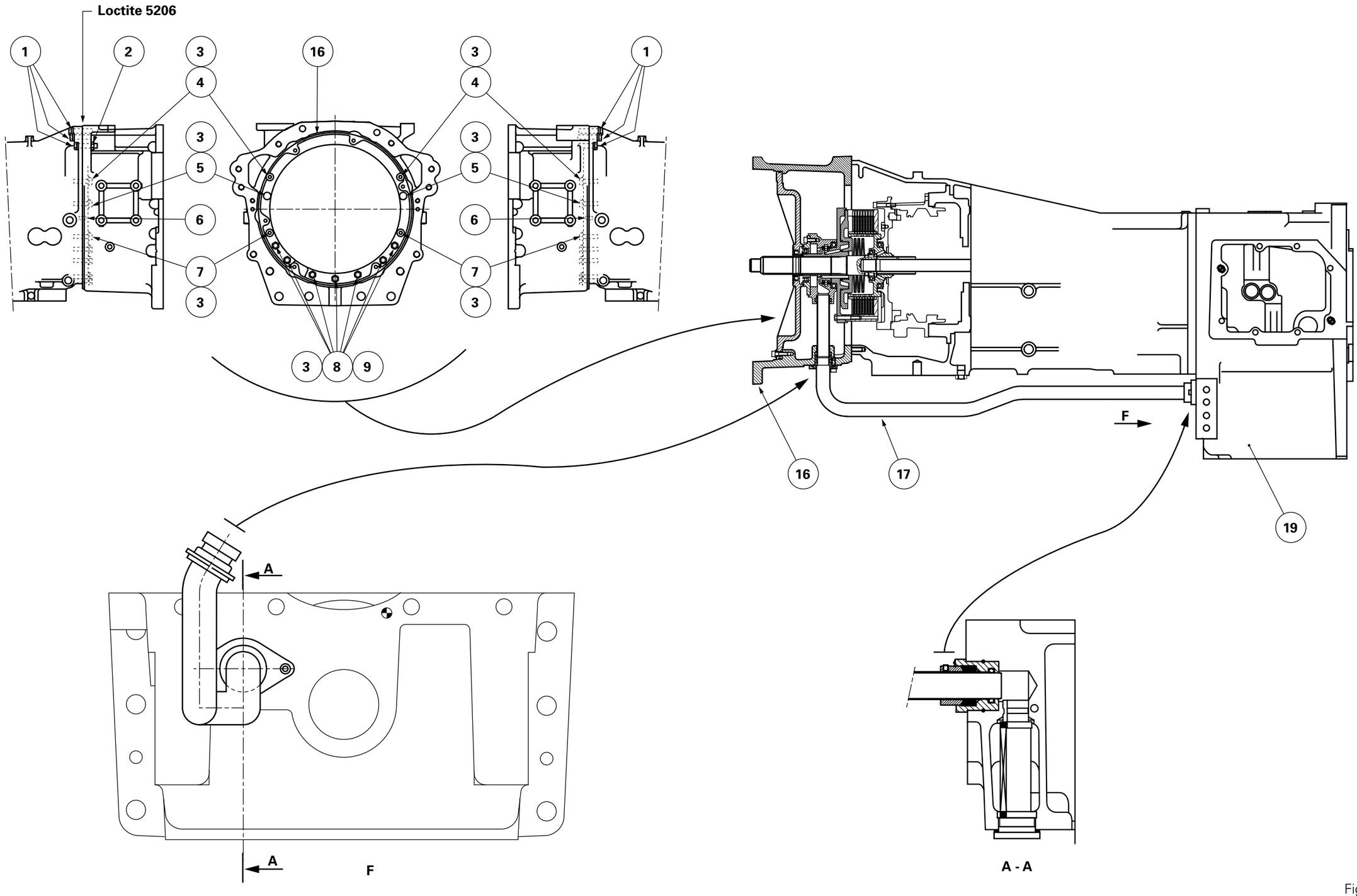


Fig. 4

Removing the spacer (Fig. 4)

Note

The cab inner floor contains an access door. If necessary, use the latter for accessing the top screws securing the spacer to the gearbox.

10. Remove screws (**1**) (**4**) (**5**) (**7**) and nuts (**8**) on spacer (**16**)**.** Remove washers (**3**)**.**

11. Assisted by an operator, unstick and remove the spacer.

12. If necessary, extract studs (**9**) from the gearbox housing.

Refitting

13. Clean the parts and replace any that are defective.

14. Remove all traces of old Loctite from the mating surfaces. Coat the mating face of the spacer (gearbox side) with Loctite 5206 or equivalent.

15. Ensure presence of locating pins (**6**) (Fig. 4).

Note: Studs (9) are smeared with Loctite 270 and locked into the gearbox.

16. Refit the spacer. Coat the screws and nuts with Loctite 270 and torque to following values:
- screws (**1**) and nuts (**2**): 150 - 200 Nm,
- screws (**4**) (**5**) (**7**) and nuts (**8**): 100 - 130 Nm.

17. Coat union (**66**) with Loctite 542 then screw onto the spacer (Fig. 2).

Final operations

18. Refit the clutch and tubes. Reverse operations 7 to 9.

19. Ensure the presence of centring pins on the closure disk, and shims on the clutch assembly. Replace O'rings (**8**) (Fig. 6).

20. Coat surrounds **P** of the tapped holes with Loctite 5206. (Fig. 5).

21. Grease the lip of the seal. Fit the shaft with the protector used during disassembly. Screw two guide studs in opposing locations on the spacer, and reinstall closure disk (**10**) and finger (**63**) in the slot in pump body (**12**) (Fig. 6).

Install long screws (**62**) in the same holes as those provided for the centring pins. Install screws (**5**) (Fig. 1). Torque all screws to 25 - 35 Nm.

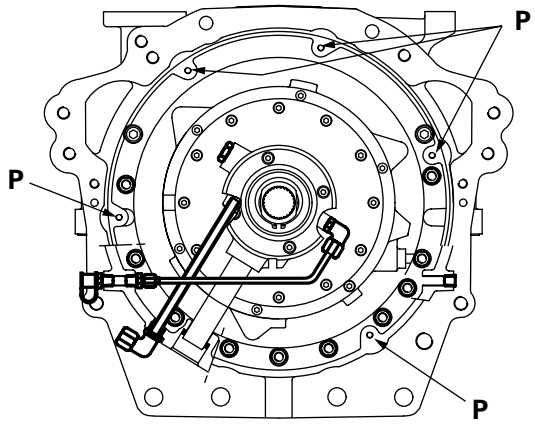


Fig. 5

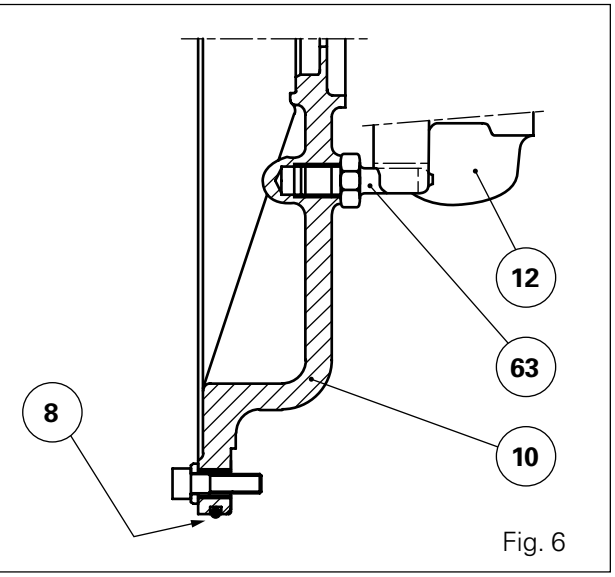


Fig. 6

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