

WORKSHOP MANUAL

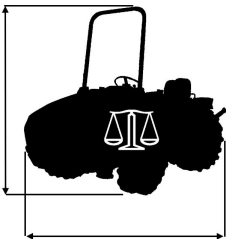
**WORKSHOP MANUAL
BASE 20
06380891 Edition 01 (English)**



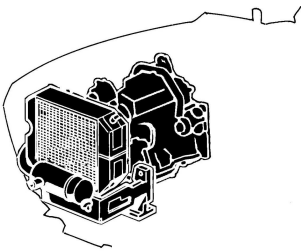
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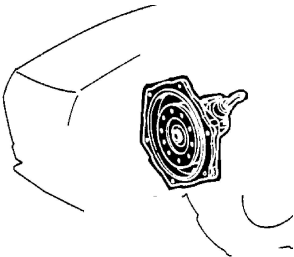
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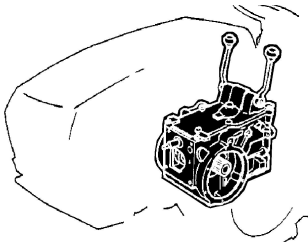
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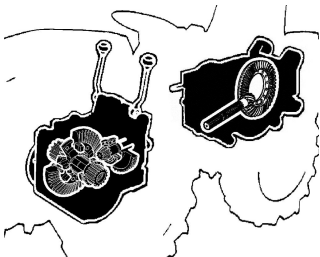
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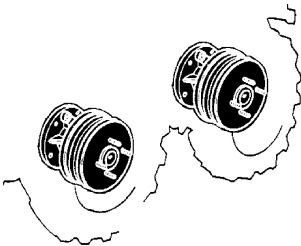
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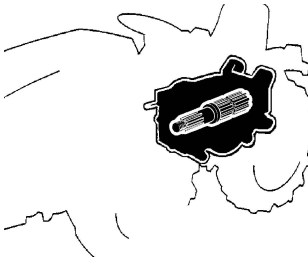
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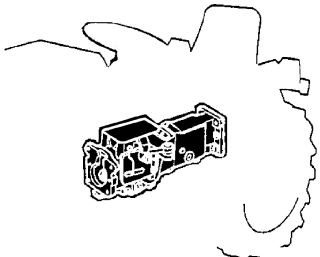
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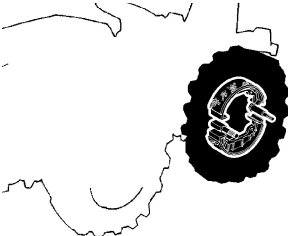
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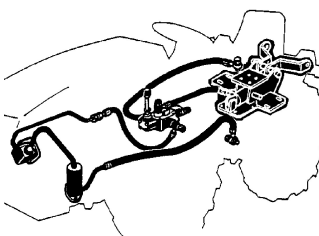
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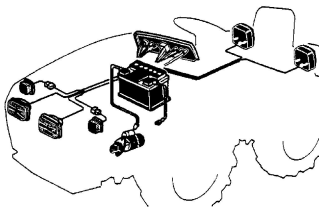
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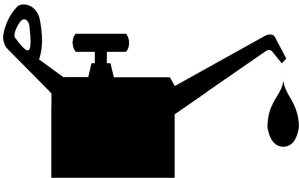
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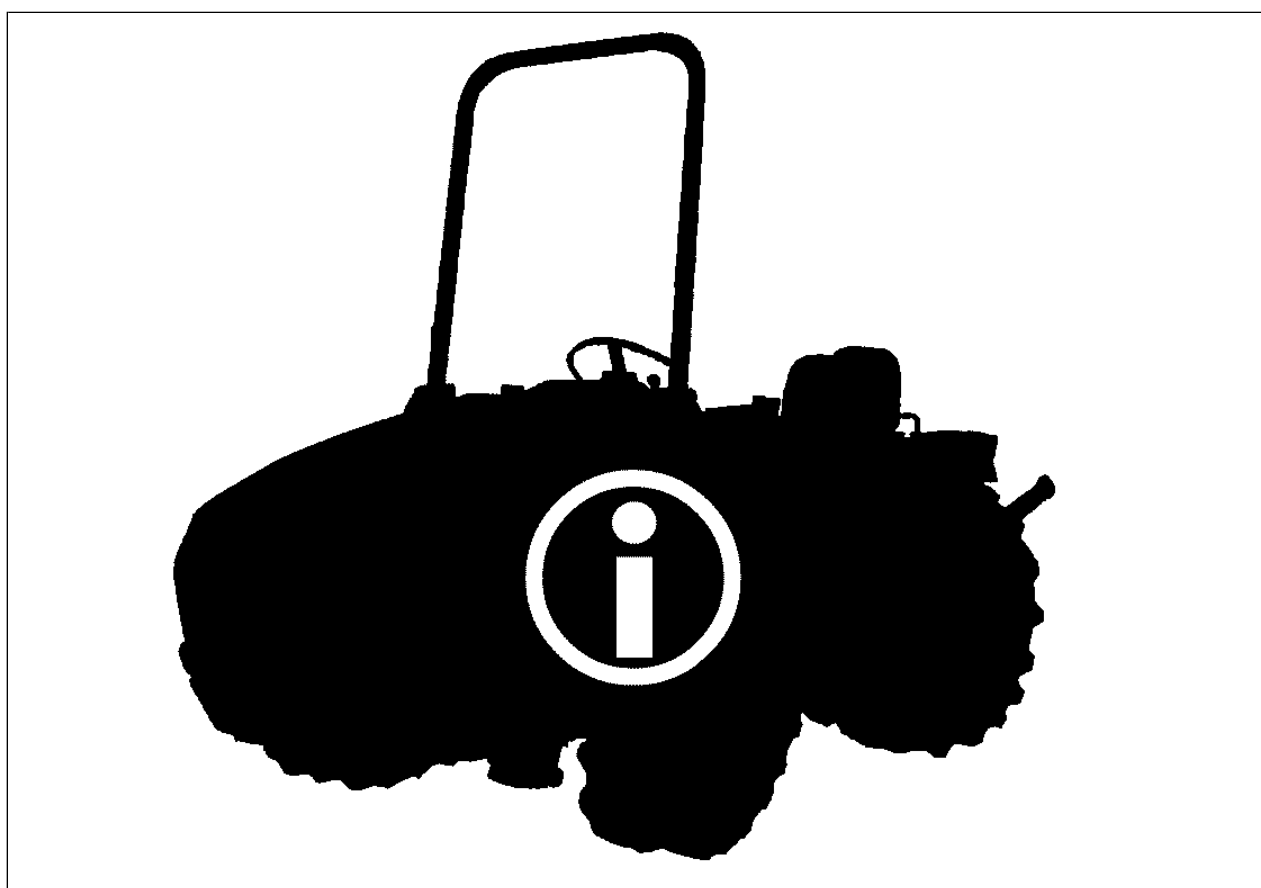
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00 - INTRODUCTION



SAFETY REGULATIONS

 **WARNING**
Failure to comply with the safety regulations is the cause of the majority of accidents in workshops.
The machines have been designed and made to make maintenance work as easy as possible. Despite this, accidents may still occur.
Only a careful mechanic who complies with the safety rules is the best guarantee for the safety of both himself and others.

1. Follow carefully the procedures as shown in the manual.
2. Before performing any maintenance or operations on the machine or equipment connected must be:
 - Lower implements to the ground.
 - Stop the engine and remove the key.
 - Disconnect the battery ground cable.
 - In the driving position have a sign prohibiting the operation of any command.
3. Make sure that all the rotating parts of the machine (power take-off, universal couplings, pulleys, etc.) are well protected.
4. Do not wear loose or unbuttoned garments or objects that could become caught up by moving parts of the machine.
Depending on the work required, use approved safety clothing such as: a hard hat, safety footwear, overalls and protective goggles.
5. Do not perform work on the machine when a person is seated at the controls unless this person is authorized and is helping with the work itself.
6. Never inspect or perform work on the machine with the engine running unless this is specifically required.
In this case, ask for help from another worker who, when seated at the controls, will keep the mechanism under constant visual control.
7. Do not operate the machine or the equipment connected from a position that is not the driving one.
8. Before removing any caps or covers, make sure that you have nothing on your person that could drop into the open housings. Take the same care with your tools.
9. Do not smoke in the presence of liquids or flammable products
10. When dealing with emergencies, it is essential to:
 - Make sure that you have an efficient extinguisher and first-aid kit ready to hand.
 - Keep the telephone numbers of the emergency services and fire brigade nearby.
11. When for reasons of maintenance must inactivate the brakes, you must maintain control of the machine through proper locking systems.
12. Use the hitching points recommended by the manufacturer when towing and make sure that the towing attachments are fastened correctly.
Keep well clear of bars and ropes when they become taut and start to pull.

13. When loading a machine onto a transport vehicle, always make sure that they are securely fastened to each other.
Loading and unloading operations should always be performed with the transport vehicle on a flat surface.
14. Use hoists or other equipment with an adequate carrying capacity when lifting or shifting heavy parts and make sure that the chains, ropes or belts used for lifting are fully efficient.
Have all bystanders move well away from the area where the operations are being performed.
15. Owing to their toxic nature and for safety reasons, never pour gasoline or diesel fuel into wide, open vessels. Do not use these products for cleaning purposes. Use the specially formulated flameproof, non-toxic products available on the market.
16. When cleaning objects need to use compressed air, wear safety glasses with side protection
17. Make sure that you have routed the gas exhaust device outdoors before you start an engine in a closed place.
In the absence of this device, make sure that there is adequate and continuous ventilation in the room.
18. Move with care and take all the necessary precautions during operations away from the workshop when you must work under the machine. Choose a flat area, place chocks under the wheels to block the machine and wear protective clothing.
19. The work area must be kept clean and dry with patches of oil and water wells.
20. Rags soaked in oil or dirtied with grease must not be thrown into corners or allowed to form heaps as they represent a constant risk of fire outbreaks. They must be put into metal containers kept tightly closed.
21. Wear approved protective clothing such as a hard hat, goggles, gloves, special overalls and footwear when using grinding wheels, lapping machines are similar.
22. Wear approved protective clothing such as a hard hat, goggles with dark lenses, gloves, special overalls and footwear when welding. If you need help from a second person, then he too must wear the garments mentioned above.
23. Do not create, and therefore inhale, dust caused by operations performed on parts containing asbestos fiber.
Thanks to the new technologies, asbestos is practically no longer used but you should still take precautions since mechanics often have to work on machines manufactured before the new standards came into force.
Do not compressed air on such parts and avoid brushing or grinding them. Always wear a protective mask during maintenance work.
If any of the parts we send should contain asbestos fiber, they will bear the relative indication.
24. Unscrew the radiator cap slowly to allow the discharge pressure in the system.
If present, even for the expansion tank cap should maintain the same precaution.
25. Close to the battery will not cause sparks or flames to not cause explosions. Do not smoke.
26. Never test the battery charge using jumpers made by placing metal objects between the terminals.
27. To avoid injury from acid must be:

- Wear rubber gloves and goggles.
- Make the topping in the ambient well ventilated and avoid breathing toxic fumes.
- Avoid spilling or dripping from electrolyte.
- Charge batteries only in well ventilated space.
- Do not charge batteries frozen because they can explode.

28. A fluid under pressure that escapes from a tiny hole may be almost invisible but have the force to penetrate under the skin and cause serious infections or dermatosis.
Never use your hands to check for leaks from the circuit. Use a piece of cardboard or wood.
29. Check the pressure of hydraulic means using appropriate tools.

 **WARNING**
The safety structures with which the tractor is equipped (front and rear roll-bar, pto guard, netting that protects the rotating parts, supports and tow hooks, seat....) have undergone type-approval tests and as such have been certified.
These structures must not be modified or used for purposes other than those envisaged by the manufacturer, otherwise the type-approval will become void.

MACHINE IDENTIFICATION



Fig.1



Fig.2

- | | |
|------------------------|--|
| ① Manufacturer's code. | ③ Type of machine |
| ② Production series | ④ Identification number (serial number). |

Always state the identification data of the machine whenever you call our assistance service for technical explanations or when ordering spare parts.

We require the following information:

1. Type or model of the machine.
2. Serial number and chassis number.

The type of machine, serial number and chassis number are stamped on the metal data plate (fig. 1) fixed in an easily accessible part of the machine.

The chassis number is stamped on the chassis itself, as shown in (fig.2).

With regard to the engine, refer to the workshop manual supplied by the relative manufacturer.

00.10 - Manual update

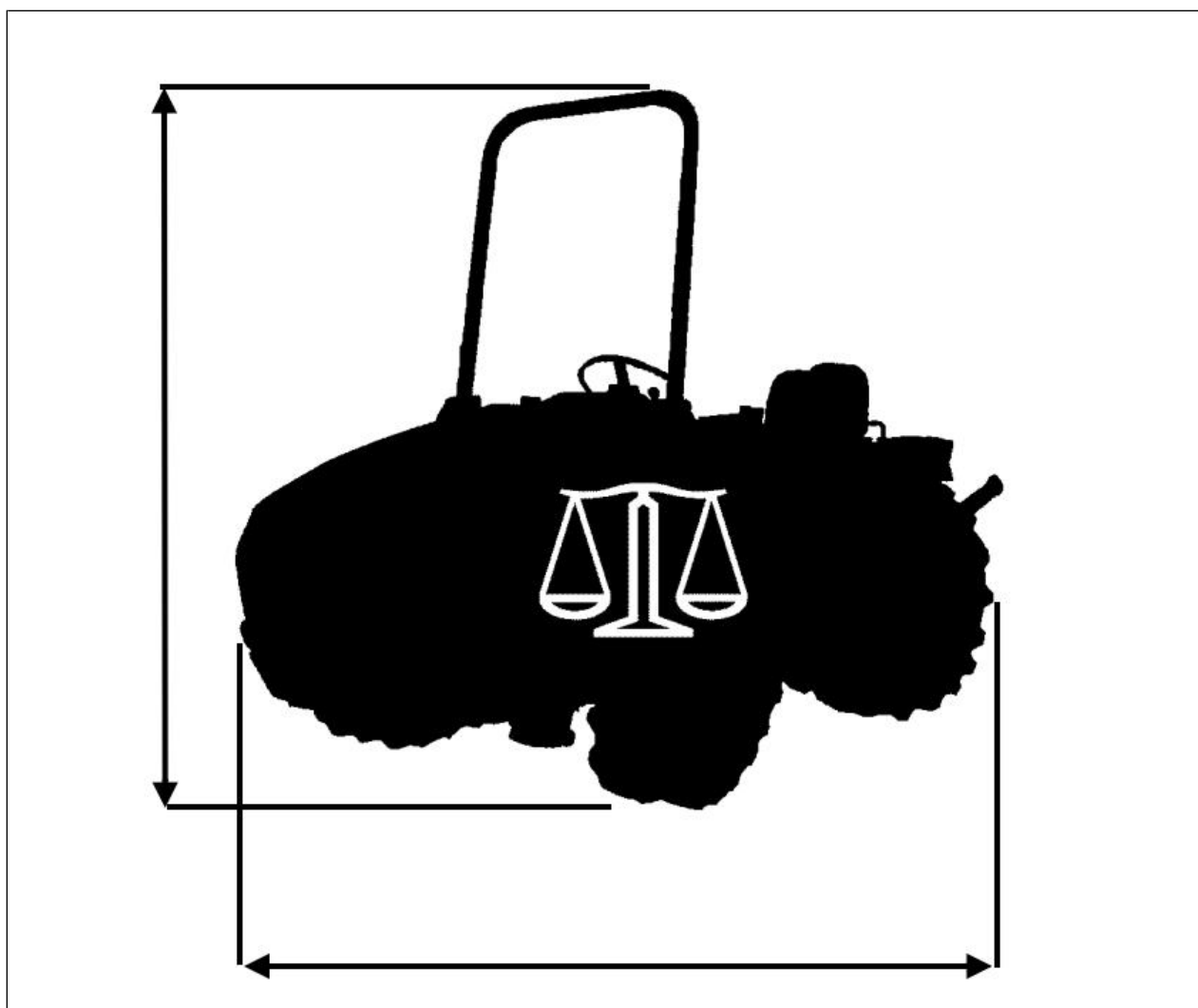
Future updates to the manual, modifications or additions to assemblies or parts of assemblies will be published in our website.

With regard to modified assemblies, the interventions prior and after the modifications will be illustrated along with the operations required should conversion be obligatory.

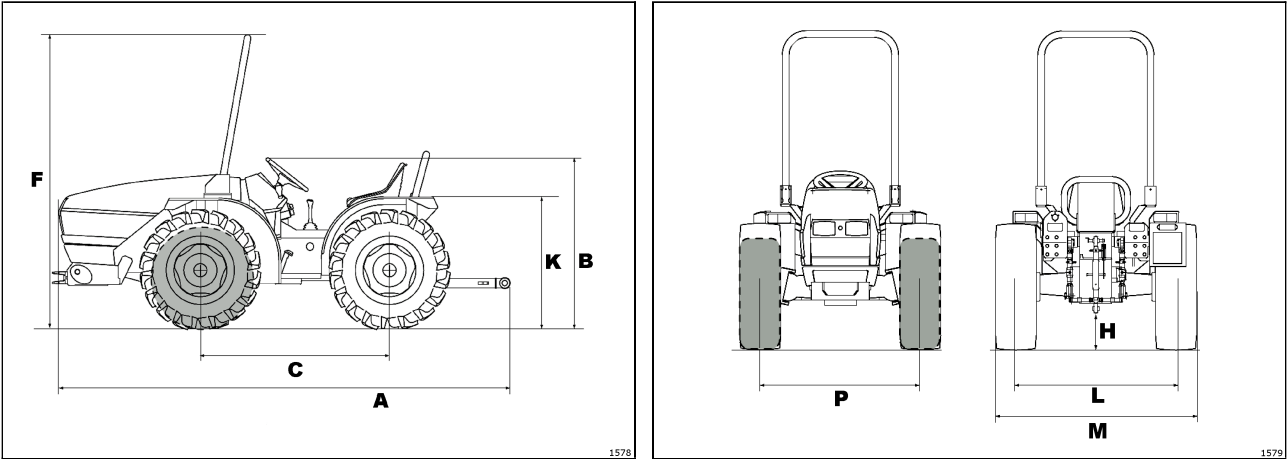
00.20 - Warnings

Entries "Right", "left", "front" and "rear", used in the descriptions of operations, always refers to the direction of travel of the machine or equipment

02 - DIMENSIONS SPEEDS WEIGHT



DIMENSIONS AND WEIGHTS



02.10 - Table of Machine Dimensions and Weights

The data are calculated with wheels: 6.00-16"

A	Max length	mm	2500
M	Min - max width	mm	800 - 810
F	Height to chassis	mm	1750
C	Wheelbase	mm	1000
P	Min - max Front track	mm	640 - 680
L	Min - max Rear track		
	Weight with safety frame	Kg	750
	Minimum turning radius without brakes	mt	1.2

02.20 - Track widths



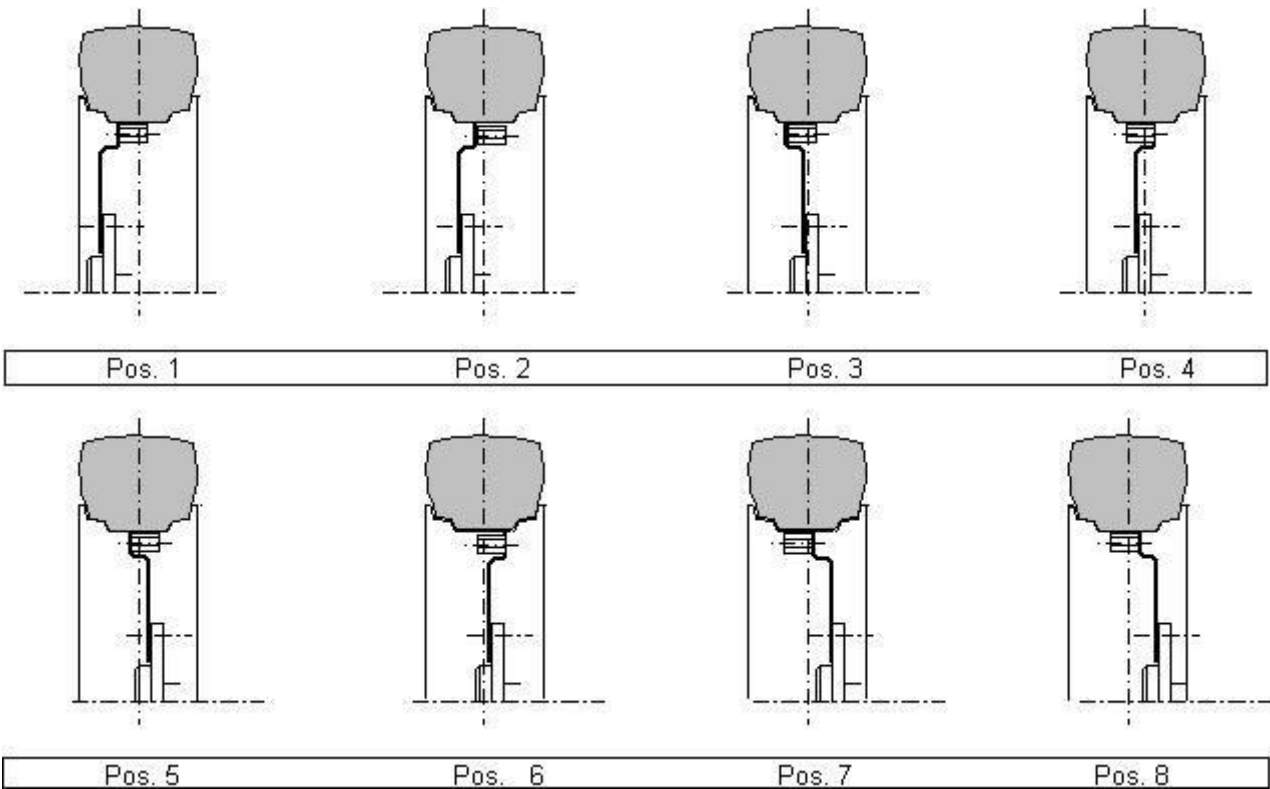
WARNING
When disassembling the tyres:
Take the greatest care.
Use tools and equipment that set the tractor in safe conditions.
Use tools to lift heavy wheels.



The overall width of the tractor is governed by laws when the tractor is driven on the roads: comply with the laws in force in the country of use.

The tractor can be equipped with adjustable, reversible wheel discs that allow the track width to be changed.
The wheel track can be changed by moving the wheel disc on his flange.

Whenever the wheels are reversed, check to make sure that the arrows indicating the turning direction on the tyre are pointing in the correct direction.



FRONT AND REAR AXLETRACK WIDTHS								
	Position							
	1	2	3	4	5	6	7	8
Front 6.00-16"	640	/	/	/	/	/	/	/
Rear 6.00-16"	640	/	/	/	/	/	/	/

02.30 - Table of tyre inflation pressures

Tyres	Bar (MAX)	kPa (MAX)	Position
6.00-16"	1,6	160	Front and Rear

02.40 - Maximum load per axle



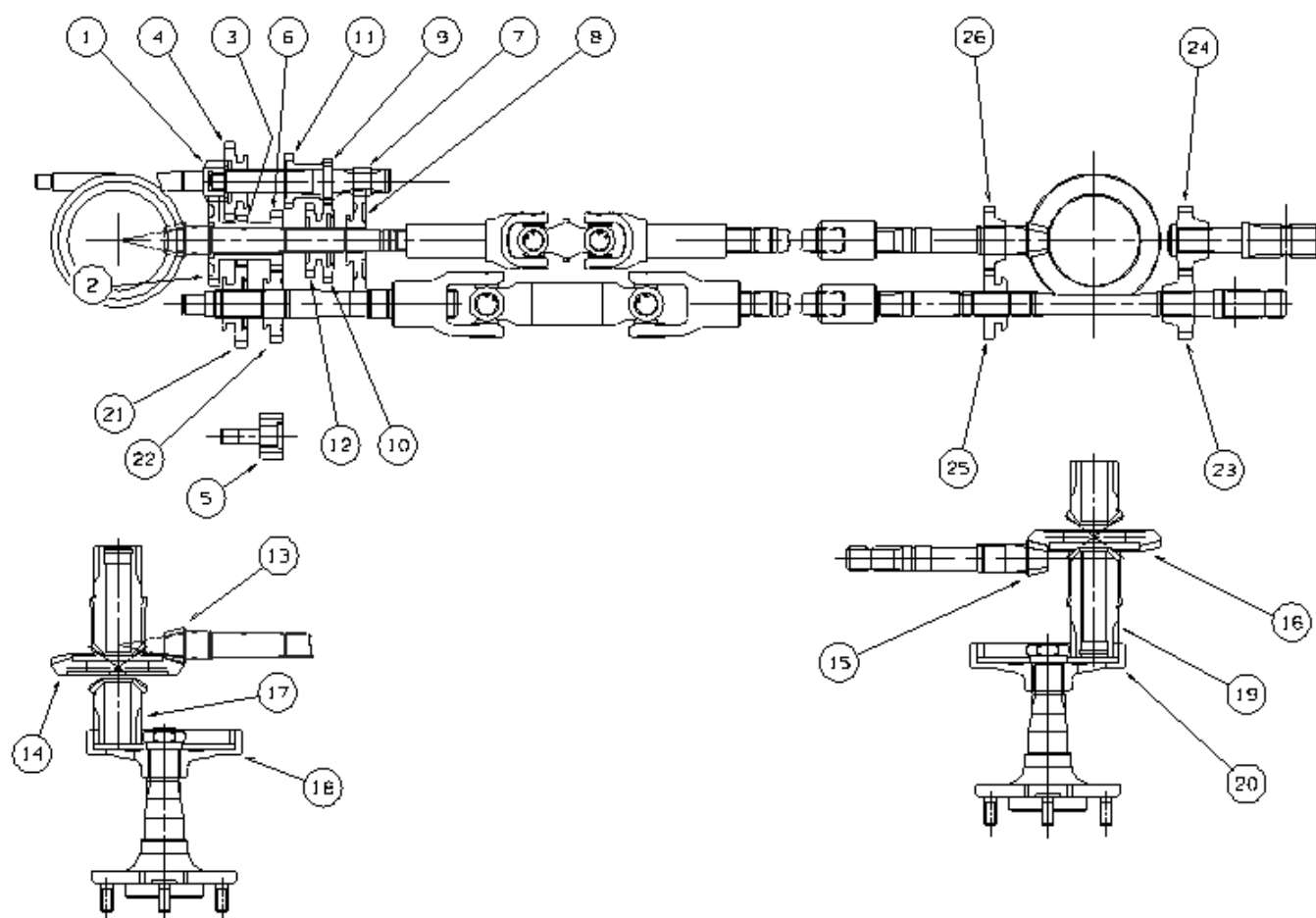
For information about the maximum loads per axle, refer to the **certificates of conformity** supplied with the machine

	Loading capacity	Maximum load per axle (kg)		Total weight
Tyres	Kg	Front	Rear	Kg
6.00-16"	750	460	730	1190

02.50 - Speed Chart

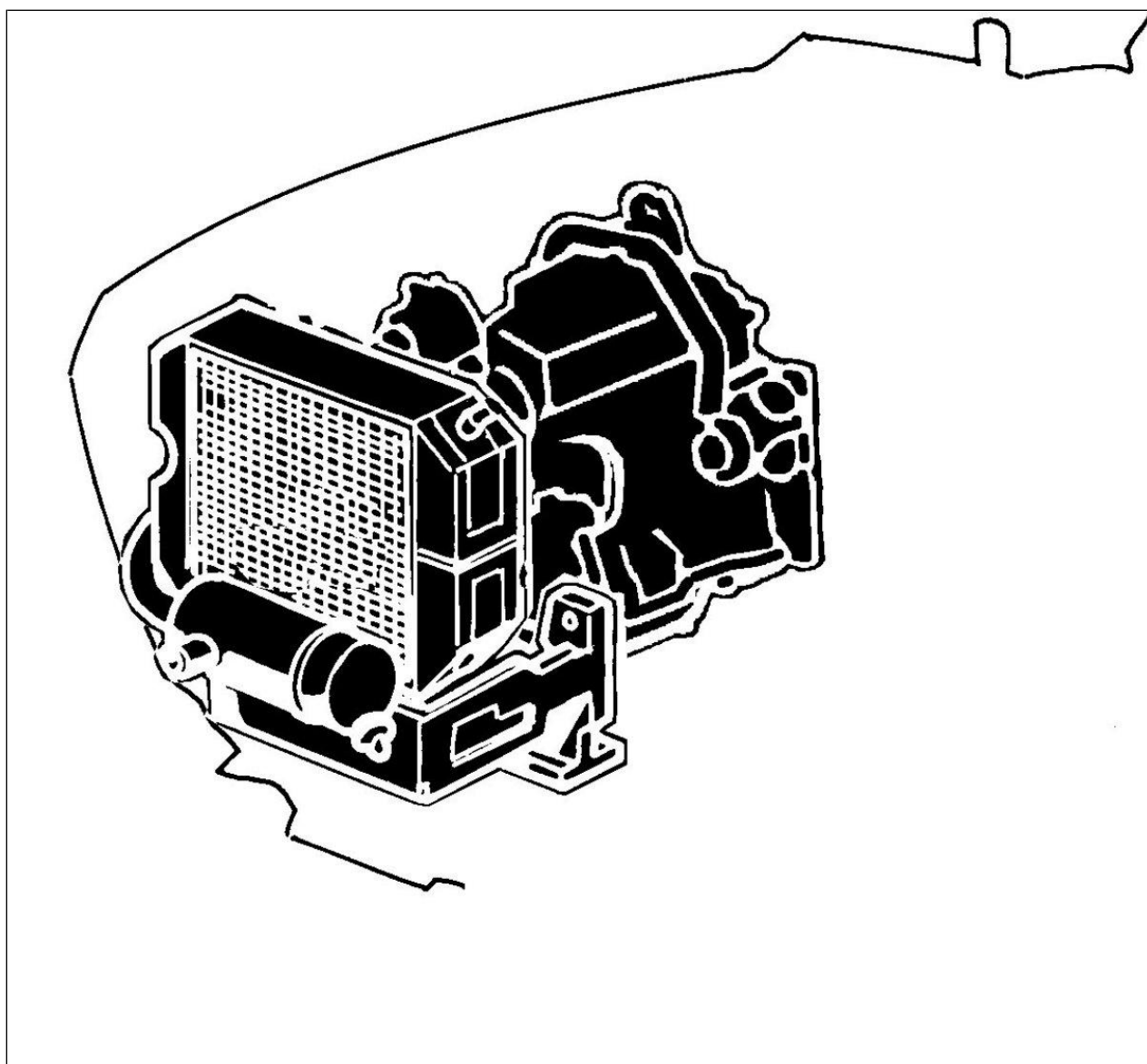
In **kph** with engine at 3000 Rpm and 6.00-16" wheels (Speeds are purely indicative)

	Forward	Reverse
1° normal speed	1,2	0,8
2° normal speed	2,5	1,7
3° normal speed	3,9	2,6
1st Fast	5,6	/
2nd Fast	12,0	/
3rd Fast	18,4	/

02.60 - Transmission scheme

POSITION	DESCRIPTION	NUMBER OF TEETH	
REDUCER (L - F - REV)			
1	Drive wheel 1 st reduction	Z=	11
2	Driven wheel 1 st reduction	Z=	30
3	Drive wheel 2 nd reduction	Z=	15
4	Driven wheel 2 nd reduction	Z=	26
5	REV drive gear	Z=	14
6	REV driven gear	Z=	19
GEARBOX			
7	Drive wheel 1 st gear	Z=	8
8	Driven wheel 1 st gear	Z=	37
9	Drive wheel 2 nd gear	Z=	13
10	Driven wheel 2 nd gear	Z=	28
11	Drive wheel 3 rd gear	Z=	17
12	Driven wheel 3 rd gear	Z=	24
BEVEL GEAR PAIR			
13	Bevel pinion front axle	Z=	9
14	Bevel gear front axle	Z=	44
15	Bevel pinion rear axle	Z=	9
16	Bevel gear rear axle	Z=	44
FINAL REDUCERS			
17	Drive wheel front reductor	Z=	13
18	Driven wheel front reductor	Z=	40
19	Drive wheel rear reductor	Z=	13
20	Driven wheel rear reductor	Z=	40

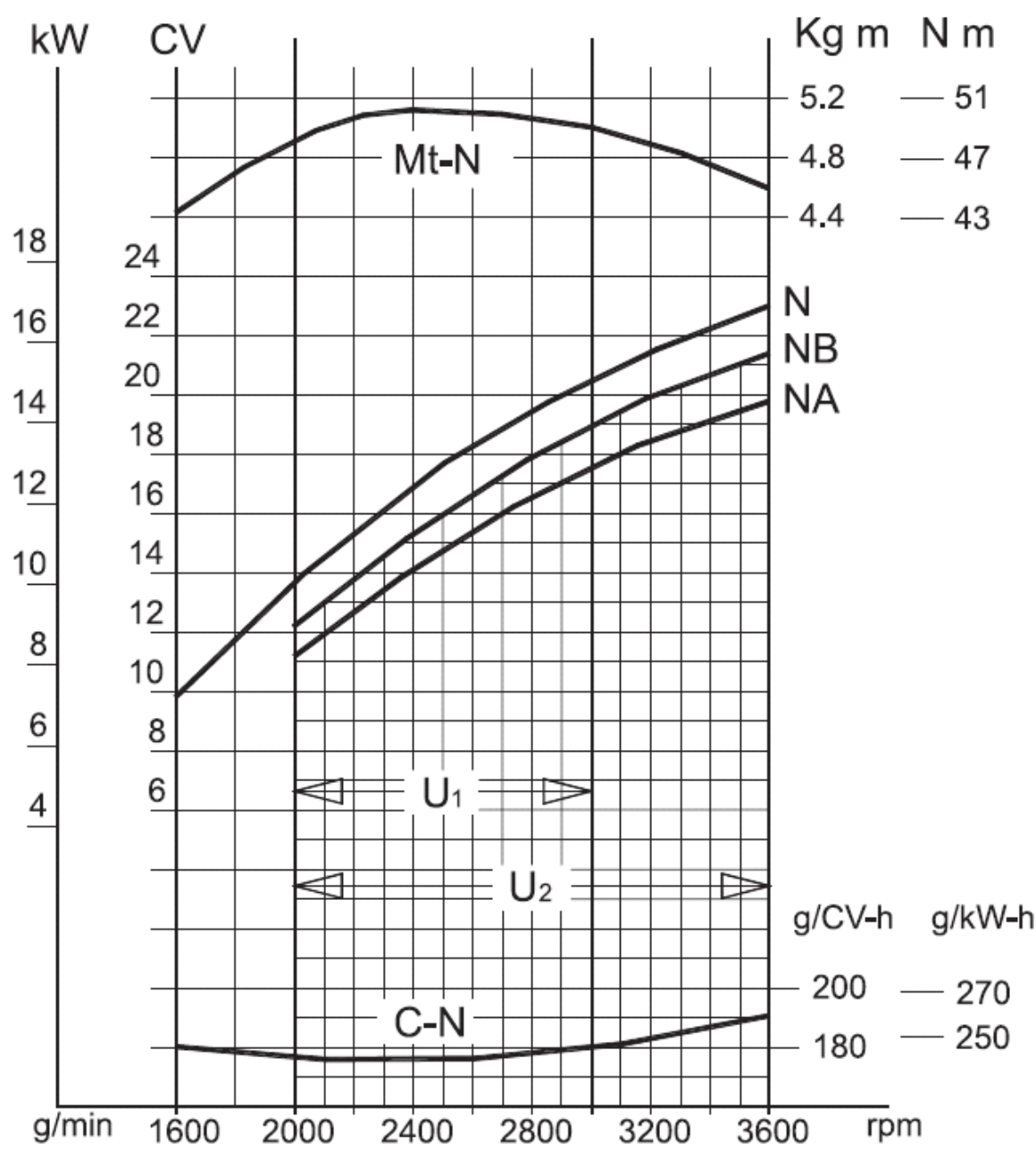
15 - ENGINE



ENGINE SPECIFICATIONS

15.10 - Engine performance graph

CHARACTERISTIC CURVES **NB**:(Power KW) **Mt**:(Torque Nm) **C**:(Specific consumption g/KW)

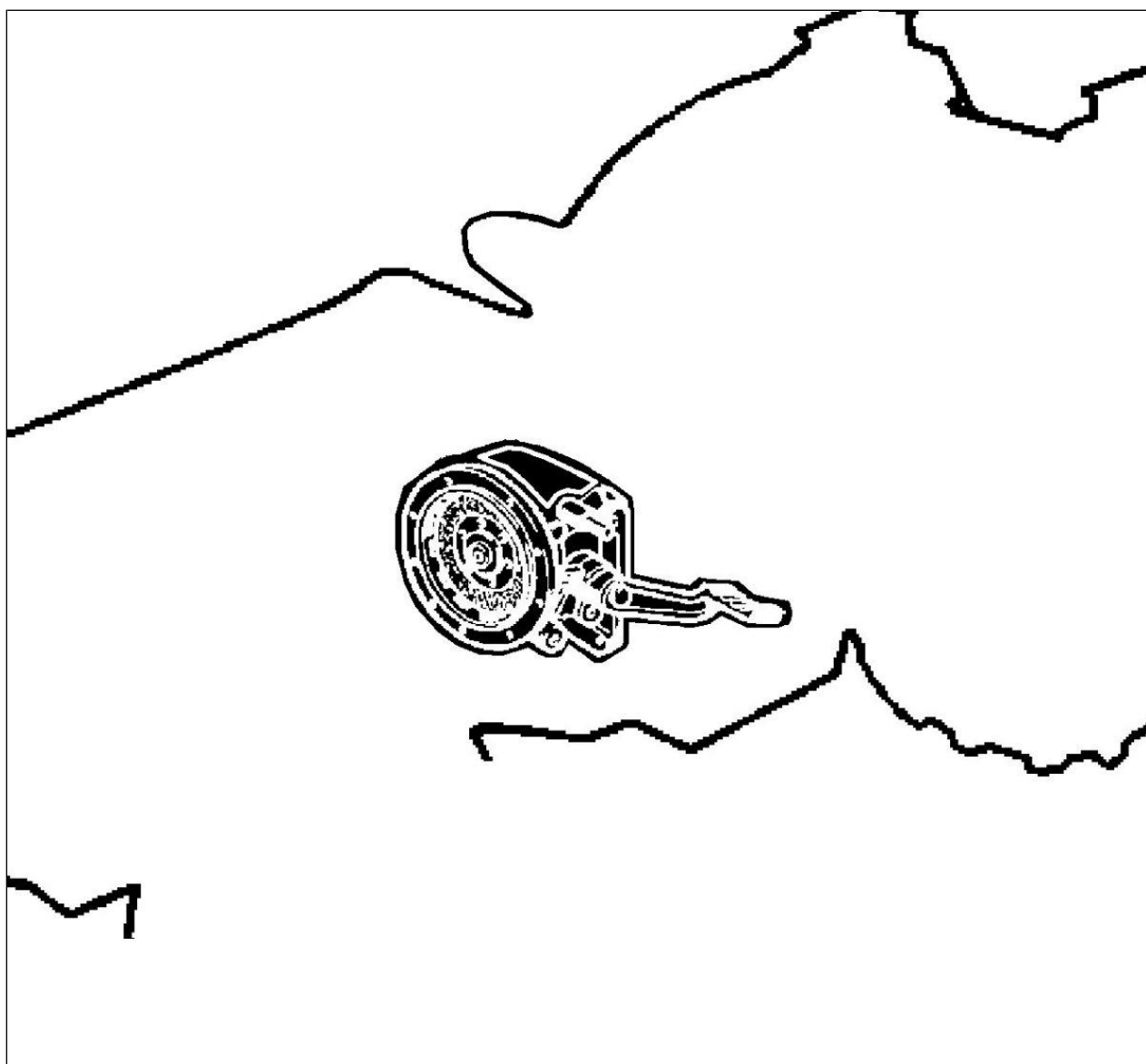


Prior to working on the engine, please contact an authorized LOMBARDINI workshop.
For replacement of filters, oil and grease consult the Owner's Manuals for engine and tractor.

15.20 - Engine technical data

Engine		Lombardini 12LD 477/2
Type		Diesel
Cooling		Air
Cylinders	N	2
Displacement	cc	954
Bore	mm	90
Stroke	mm	75
Compression ratio		19:1
Engine RPM		3000
Rated power Power rating in kW according to 80/1296/EC - ISO 1585	Kw (hp) / rpm	16 / (22)
Max torque	Nm (Kgm) / rpm	50.0 (5.0)/ 2400
Idling rpm	Engine RPM	900 - 1000
Oil consumption (Max, rpm - Power NA)	Kg/h	0.025
Standard sump capacity	L	3
Dry weight	Kg	79
Max. tolerated gradientfor discontinuous service (instantaneous)		25° (35°)
Battery	V / ah	/
Fuel tank	L	24

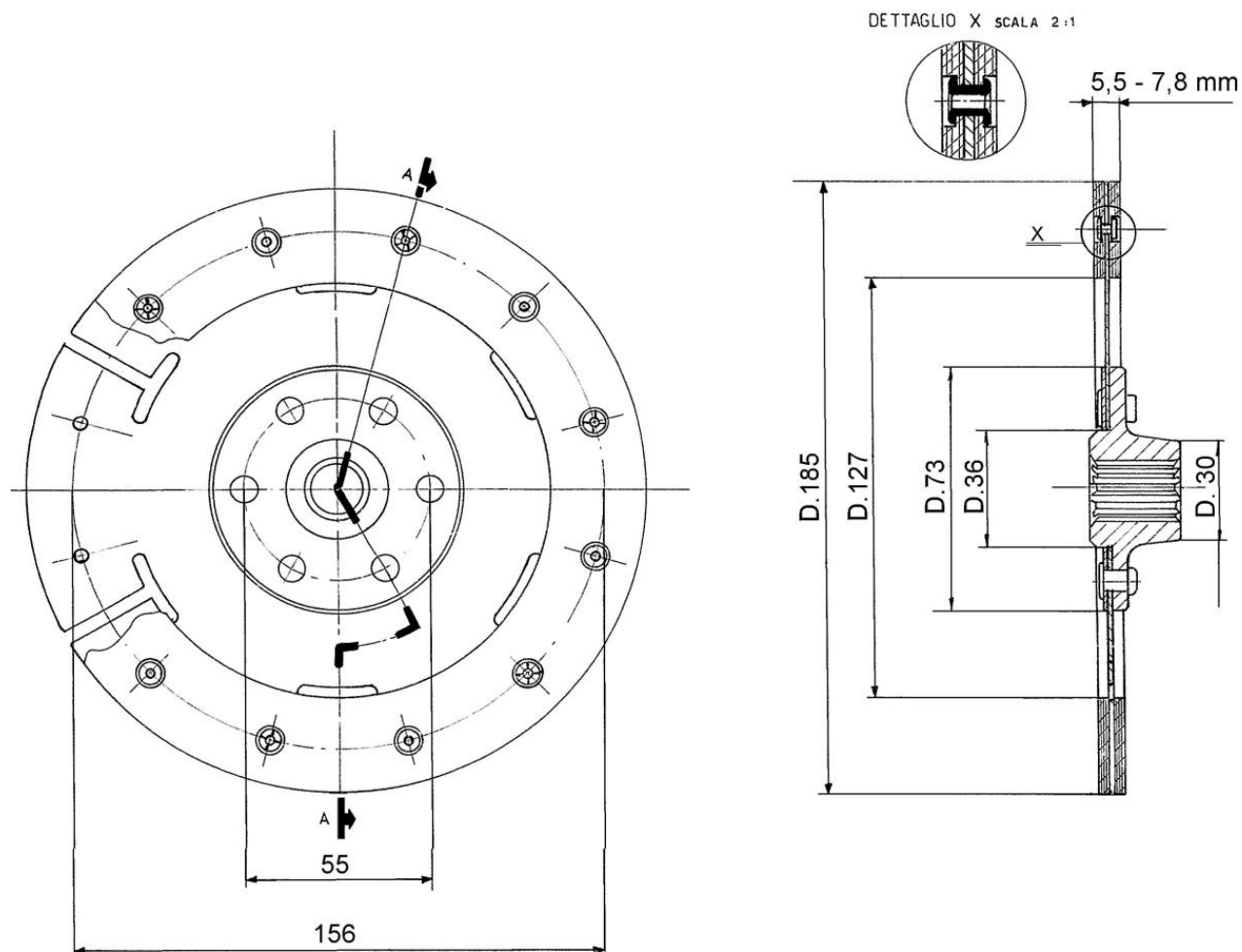
27 - CLUTCH



ASSEMBLY CLUTCH ADJUSTMENT**27.10 - Specifications assembly clutch**

CLUTCH: Dry, single-plate clutch with pedal control

TYPE: F 187.2



27.20 - Clutch lever adjustment

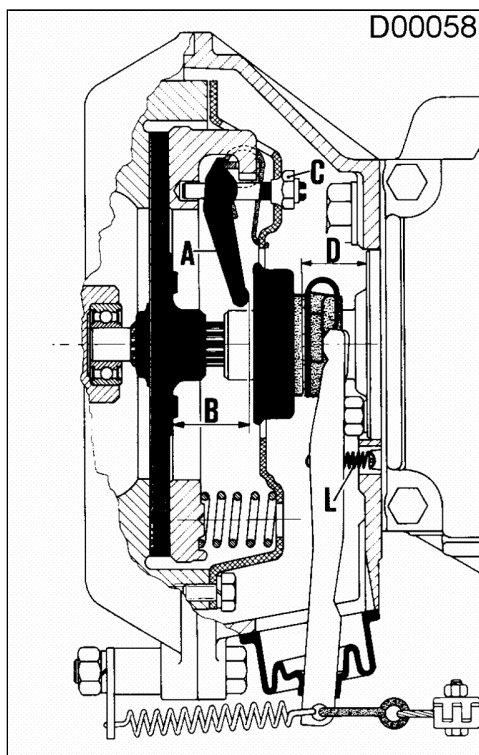


Fig.4



Fig.5

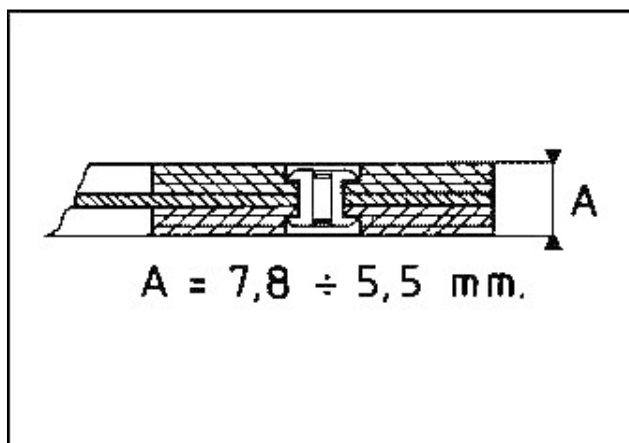


Fig.6

Lever adjustment

After having mounted the pressure plate ring on the flywheel, make sure that the levers are precisely adjusted **A** (fig. 4) **B** = 34 mm.

Work on the adjuster screw as shown in (fig. 5) to obtain the exact measurement. Lock the nuts by punching after the adjustments have been made.

Ball head screw adjustment

Measure **D** (fig. 4). Measurement **D=26-27 mm** must be obtained to precisely adjust ball head screw **I**. Work on nut **C** (fig. 4) to obtain the correct measurement. After the adjustments have been made, the eccentricity of screw **I** must point towards the spring, as shown in (fig. 4)

Note:

The measurements refer to the thickness of the new plate. This thickness must be always up to 5,5 mm (fig. 6)

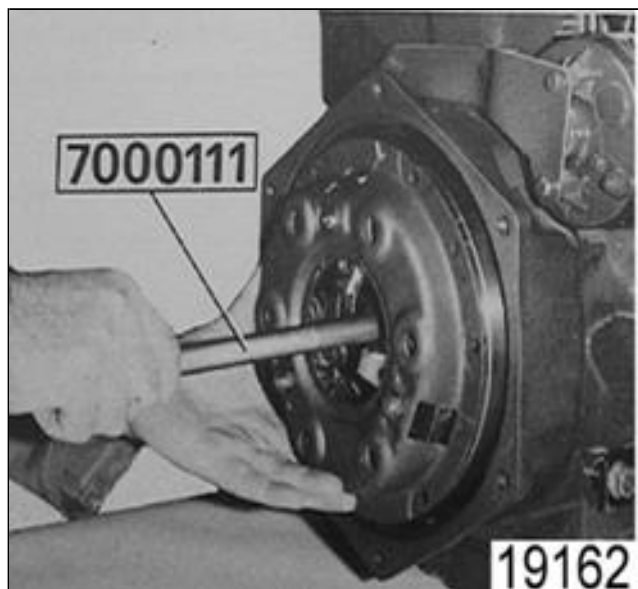


Fig.7

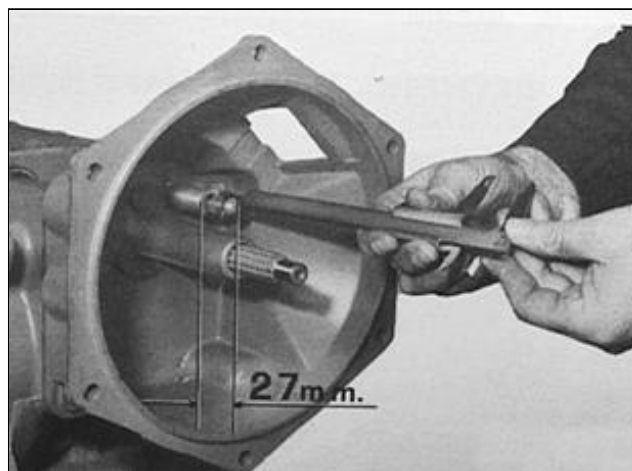


Fig.8

Figures 7 show how to center the clutch plate coupling with the aid of a piece of the main shaft (part 7000111).

Figures 8 show how to adjust the eccentric screw.

27.30 - Adjustment of traction clutch pedal

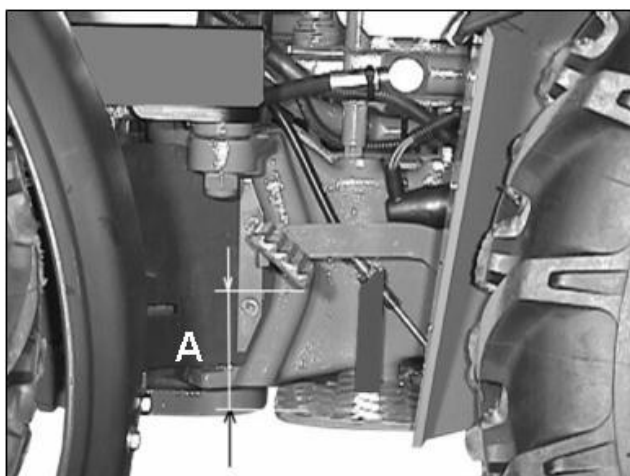


Fig.1

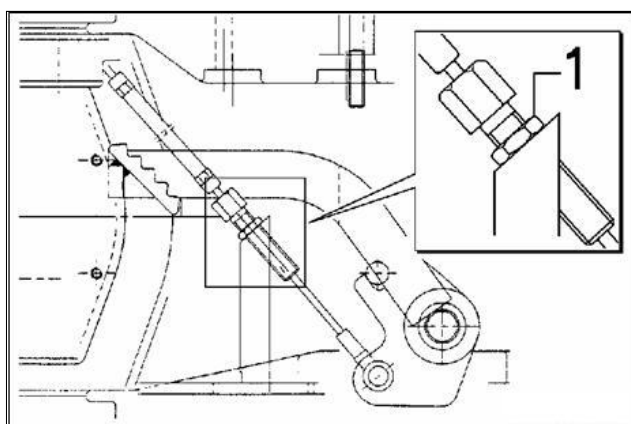


Fig.2

Regulate with adjuster screw **1** (fig. 2) when the idle travel of the pedal is less than 10 mm. In optimum conditions, the pedal will be about 9 cm, about 2,5 are idle travel **A** (fig. 1).

27.40 - Greasing

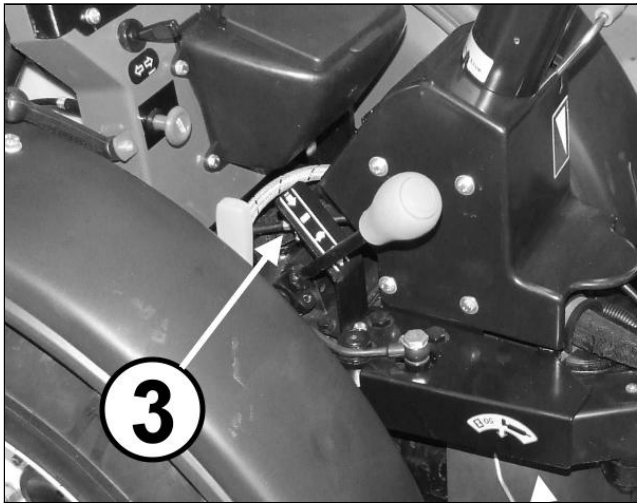


Fig.9

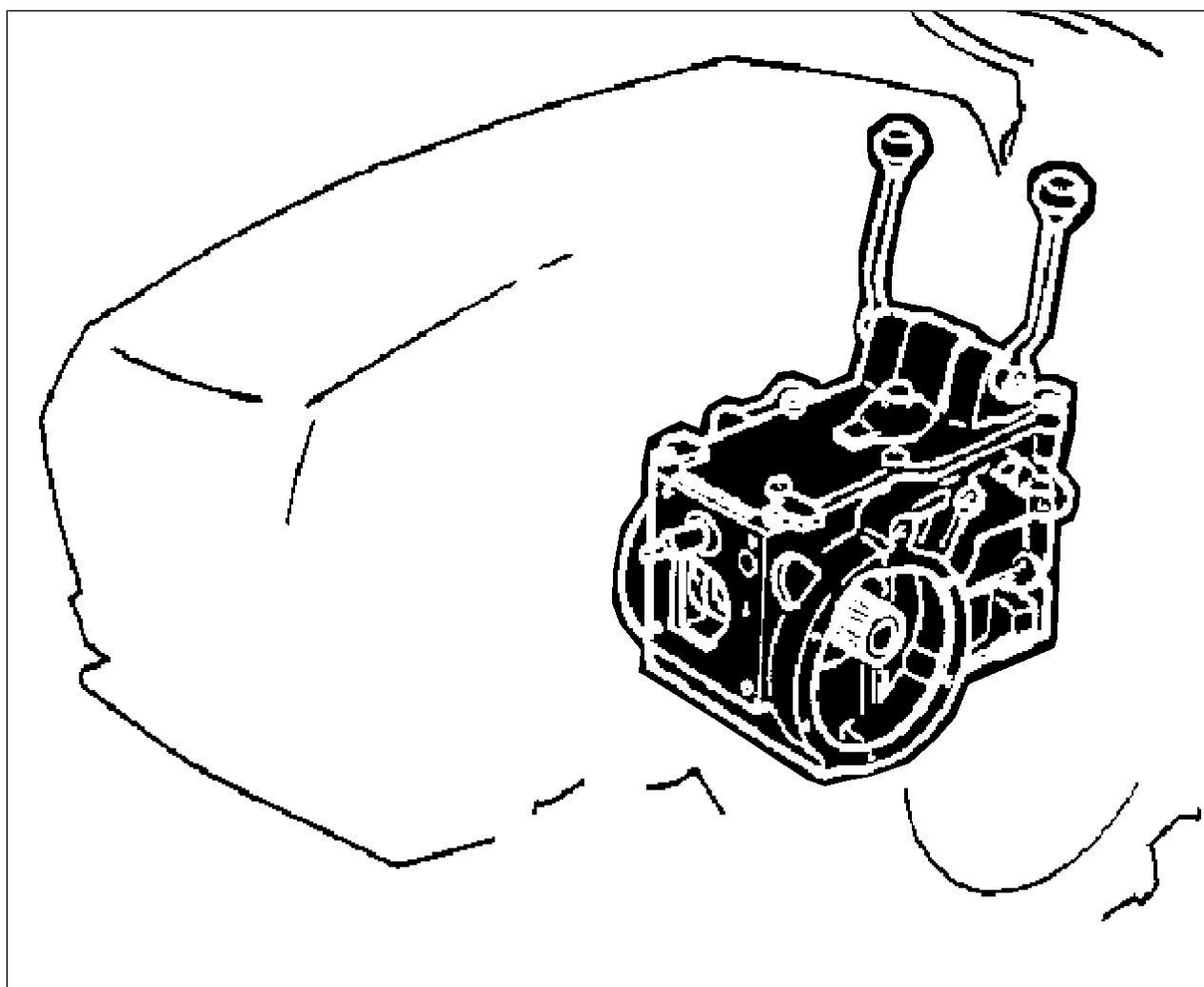
Grase point Nr. 3 shown in (fig. 9) after every 50 hours service

27.A - Tightening torque for assembly clutch

Tightening torque expressed in kgm

Description	Kgm
M 8x20 screw that fixes the clutch assembly - flywheel	2.5
M 8 nut to fix the ball-head screw	1.5
M 10x35 engine - gearbox fixing screw	6
M 10x40 engine - gearbox fixing screw	6

33 - GEARBOX



GEARBOX ADJUSTMENT

33.10 - Gearbox characteristics

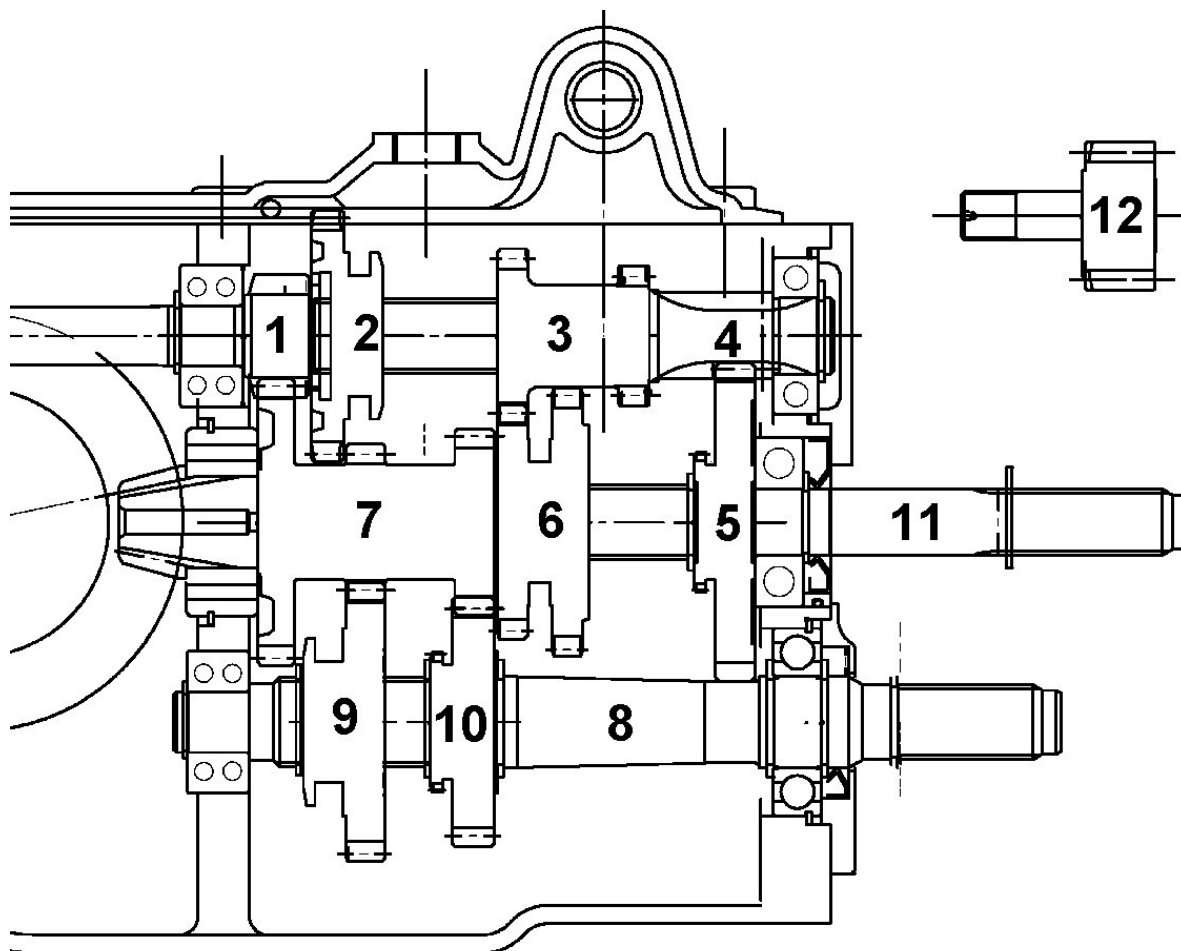


Fig.4

Fig. 4 shows the power train diagram of the gearbox.

All the gears have been numbered and will be referred to in the following pages as shown in the table below:

- | | |
|----------------------------------|-----------------------|
| 1 Main shaft | 7 Triple gear |
| 2 V-R-REV sliding reduction gear | 8 PTO shaft |
| 3 2nd 3rd speed fixed gear | 9 PTO sliding gear |
| 4 1st speed transmission shaft | 10 PTO splined gear |
| 5 1st speed idle gear | 11 Transmission shaft |
| 6 2nd 3rd speed sliding gear | 12 REV gear |

It is important for the level of the oil in the gearbox reach the MAX level dipstick mark in order to ensure that triple gear 7 of (fig. 4) is lubricated correctly.

The bushes of this gear are lubricated through the hole in shaft 11.

Oil capacity: 6.5 kg Type: ARBOR TRW 90

33.20 - How to adjust the speed selection

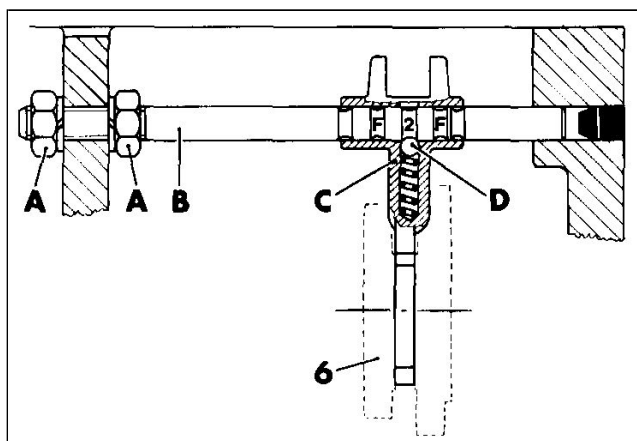


Fig.1



Fig.2

Set the fork **C** (fig. 1) on the rod so that ball **D** is in position **2**.

Use nuts **A** on rod **B** in order to obtain the exact alignment between the gear teeth when the gear is being selected.

Before locking nuts **A**, make sure that there is play in the end of travel points of the sliding gear corresponding to **1st** and **2nd** speed selection.

33.30 - Final drive control adjustment

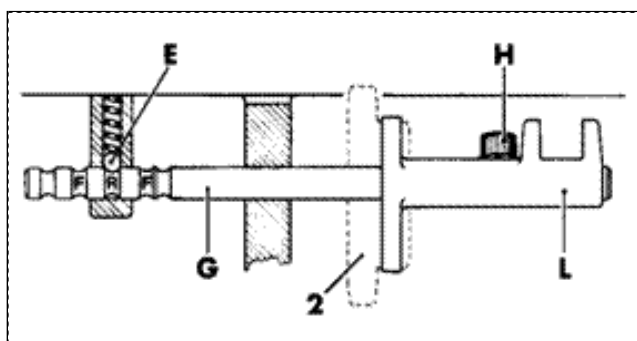


Fig.3

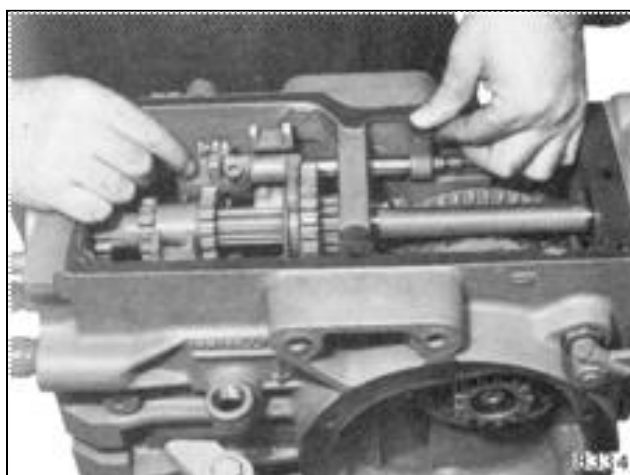


Fig.4

Set the rod **G** (fig. 3) so that ball **E** is in the position shown in fig. 3

Position fork **L** so as to exactly align the gear toothing in the meshed condition.

Before locking screw **H**, make sure that there is clearance in the end of travel points of the sliding gear corresponding to REV and fast range selection.

33.40 - Bevel pinion float

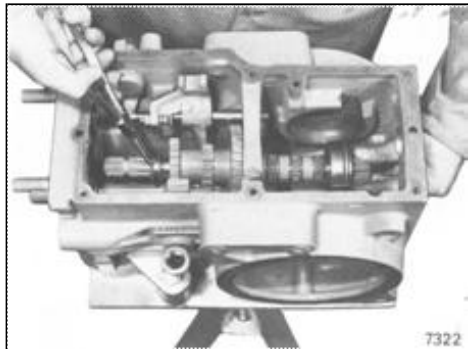


Fig.7

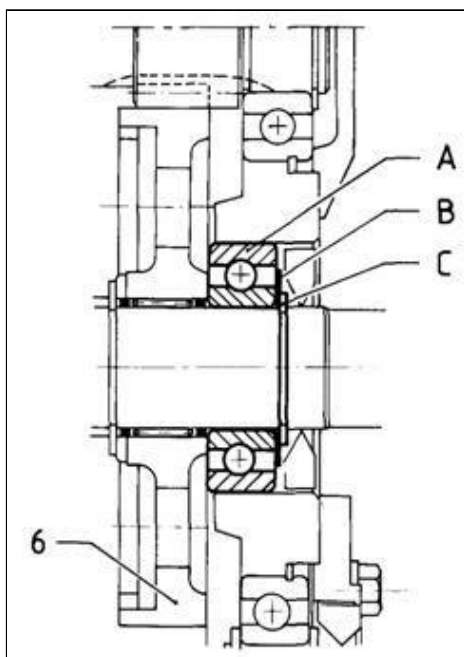


Fig.6

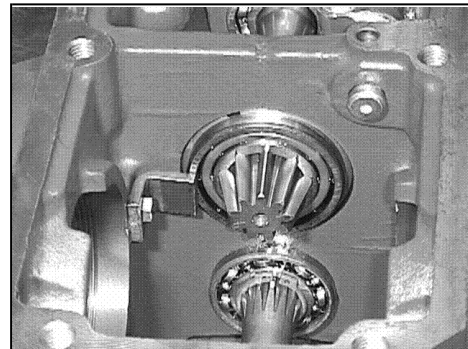


Fig.5

After having tightened the screw that fixes the bearing on the pinion (fig. 5), move bearing **A** (fig. 6) to the other side of the bevel pinion until the float of the idle gear mounted on roller cage **6** of (fig. 6) has been eliminated.

When circlip **C** that closes the pack on the other side of the bevel pinion is mounted (see fig 6), insert spacers **B** to keep bearing **A** in position.

33.50 - Main shaft float

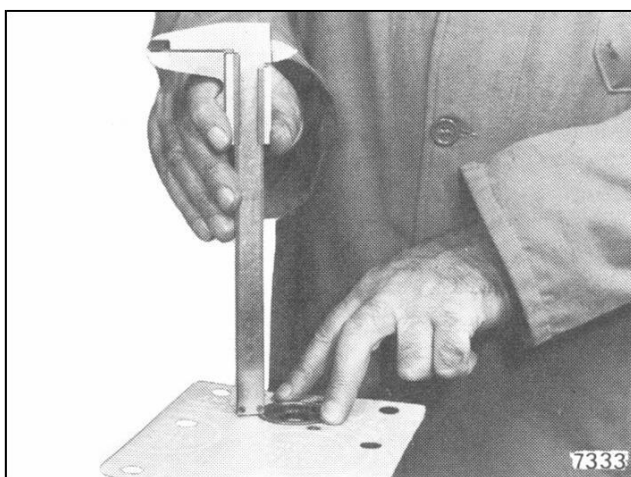


Fig.13

Take the measurements shown in (fig. 13) to establish the shims **R** required to keep bearing **P** of (fig. 12) in position, then mount the cover **Q**.

33.60 - Transmission shaft float

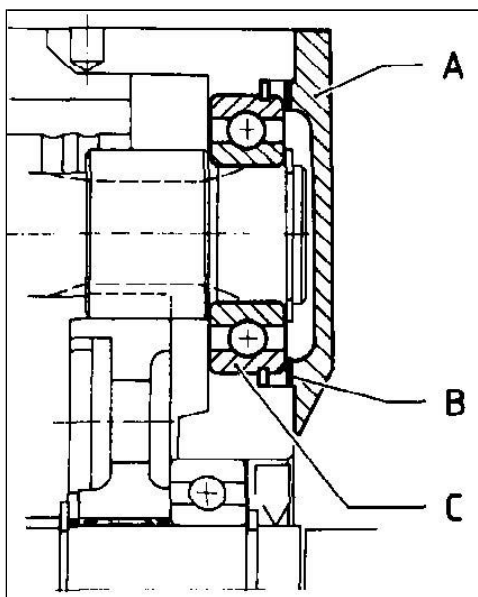


Fig.10

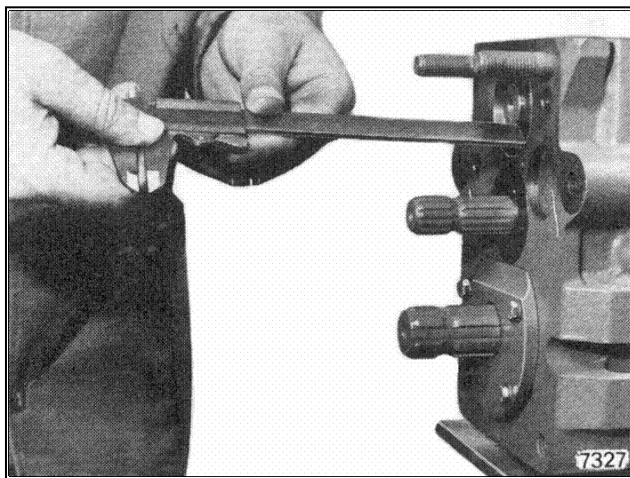


Fig.11

Move bearing **C** (fig. 10) forward through to its stop point on the housing and take the measurements of (fig. 11) to establish the number of spacers **B** (fig. 10) to mount before fixing cover **A**.

33.70 - Main shaft - transmission shaft clearance

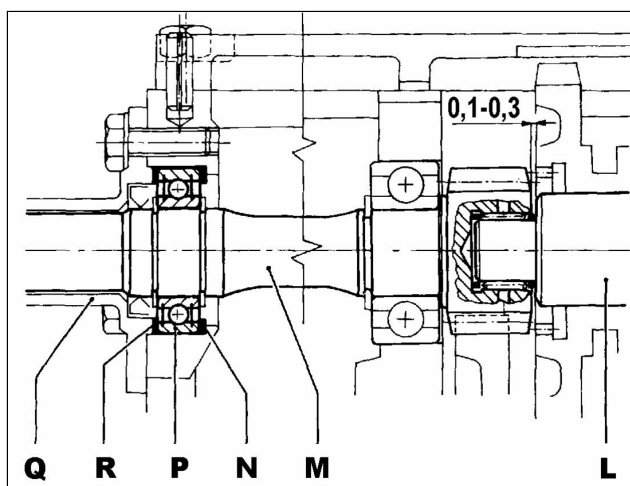


Fig.12

Move shaft **M** of (fig. 12) forwards in the direction of transmission shaft **L** through to the stop point on the housing and make sure that the play is between 0.1 and 0.3 mm. If this fails to occur, insert spacers **N** between bearing **P** and the stop point.

33.80 - Triple gear assembly

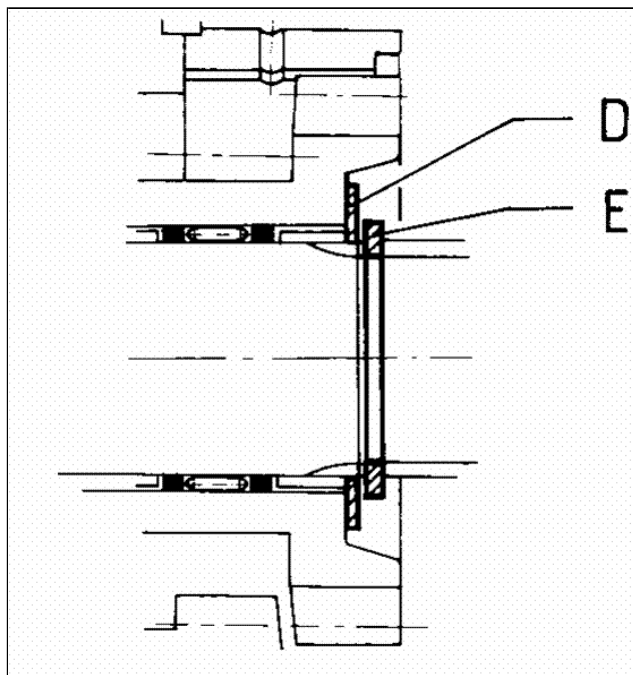
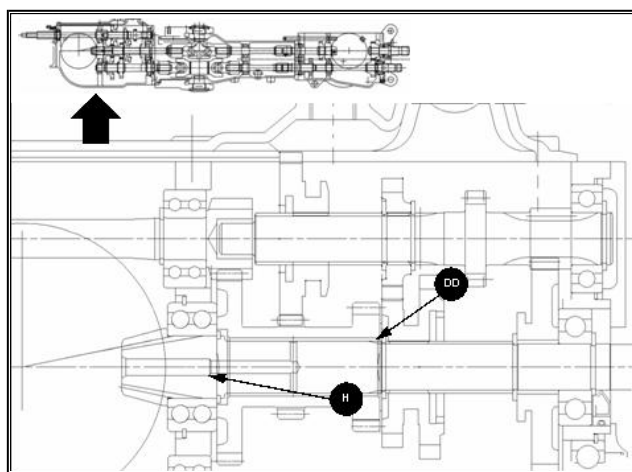


Fig.7

The clearance between spacer **D** (fig.7) and circlip **E** must be **0.2-0.3 mm**.



During the assembly phase, do not forget to insert the spacer **DD** under the triple gear mounted on bushes, from the circlip side.

Always take care to check the level of the oil in the gearbox housing in order to ensure that the bushes under the triple gear are lubricated through the lubrication hole inside the front bevel pinion **H**.

33.90 - Reverse speed shaft

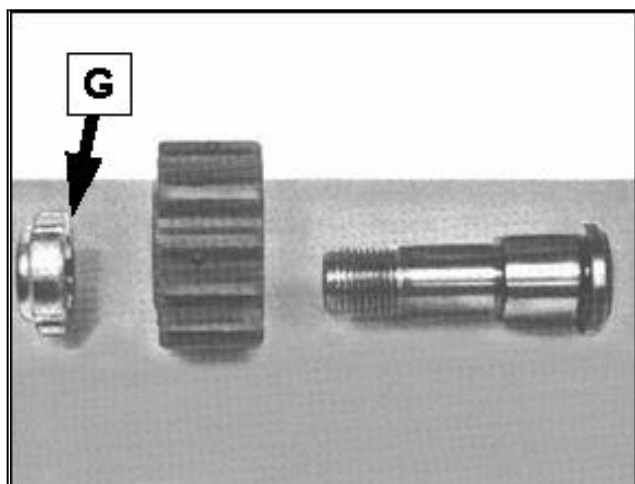


Fig.13

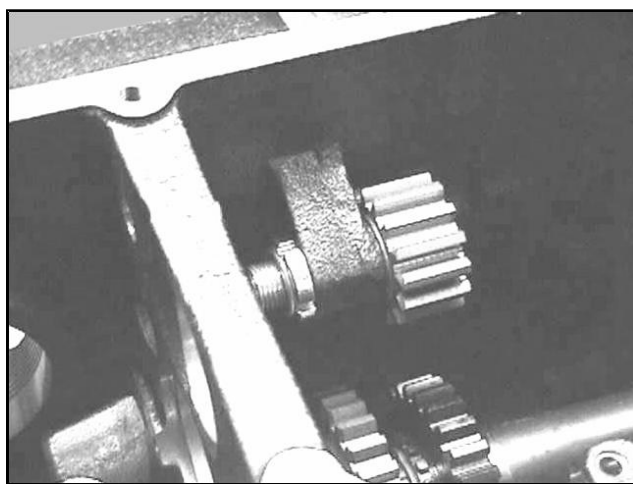


Fig.14

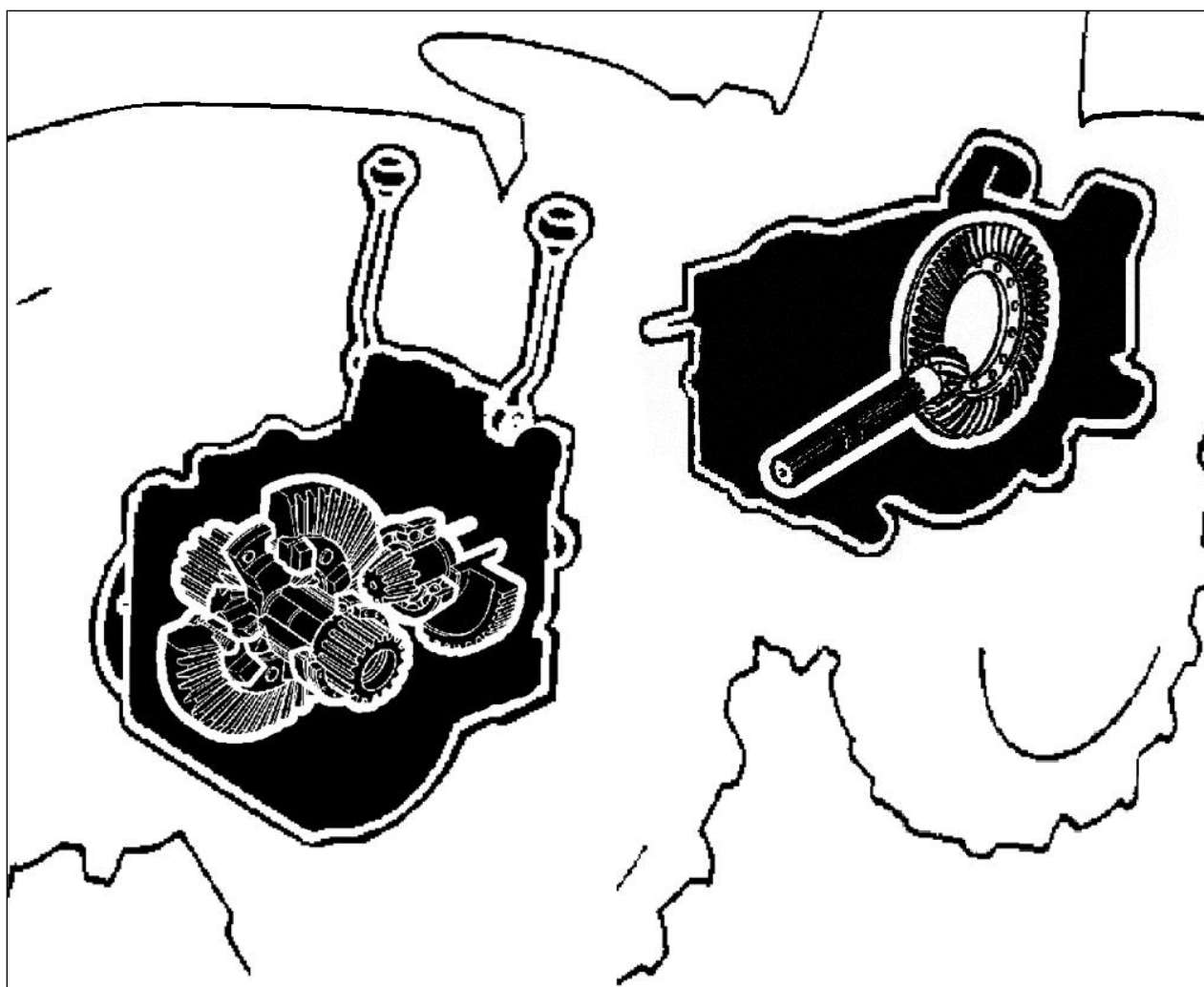
As shown in fig. 13 the ring nut **G** must be torqued to a value of 9 Kgm.

33.A - Tightening torque for assembly gearbox

Tightening torque expressed in kgm

Description	Kgm
M 12x35 screw that fixes the gearbox - clutch bowl	9
M 8x25 main shaft cover fixing screw	2.5
M 8x30-M 8x25 screw that fixes the gearbox cover	2.5
M 6x15 transmission shaft cover fixing screw	1.5
M 10x45 gearbox lever fixing screw	7
M12x10 nut fixing speed selection lever	8

36 - REAR & FRONT DIFFERENTIALS



ADJUSTMENT FRONT DIFFERENTIALS

36.10 - Pinion - bevel gear coupling

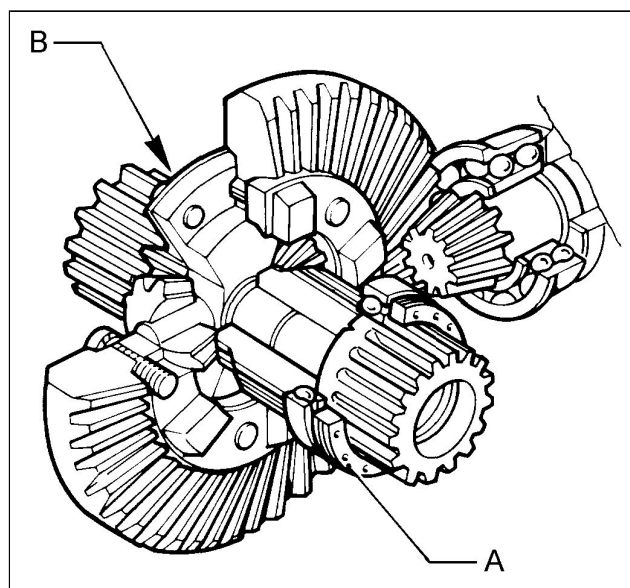
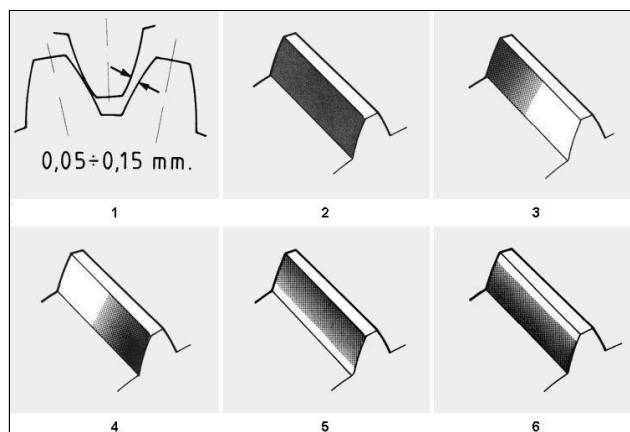
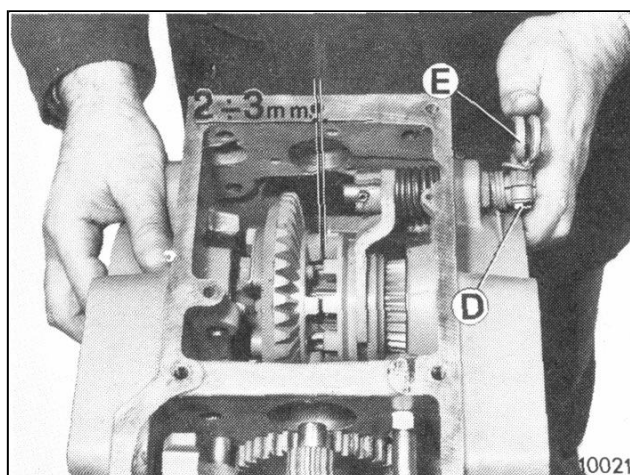


Fig.1

- 1) To achieve a good coupling, the play must be between 0.05 – 0.15 mm.
- 2) Correct adjustment: contact between the teeth is uniform throughout the entire length.
- 3) The pinion is excessively forward and works on the bottom of the tooth too much. In this case, the bevel gear pair must be replaced.
- 4) The pinion is excessively retracted and works on the crest of the tooth too much: in this case, add shims between the bearing and housing;
- 5) The ring gear is too far away from the pinion and works on the crest of the tooth: in this case, remove spacers **A** (fig. 3) and then add them to an equal extent on the opposite part.
- 6) The ring gear is too near the pinion and works on the bottom of the tooth: in this case, remove spacers **B** (fig. 3) and then add them to an equal extent on the opposite part.



36.20 - Front locking ring adjustment

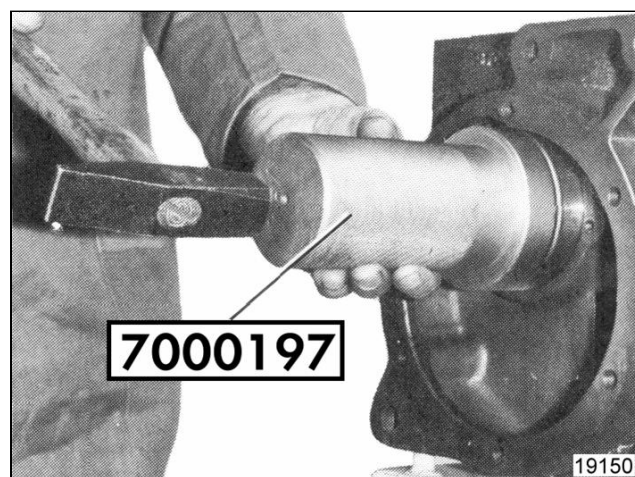
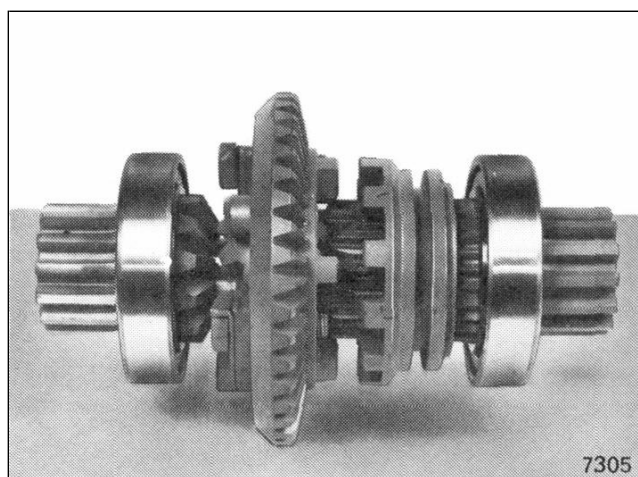
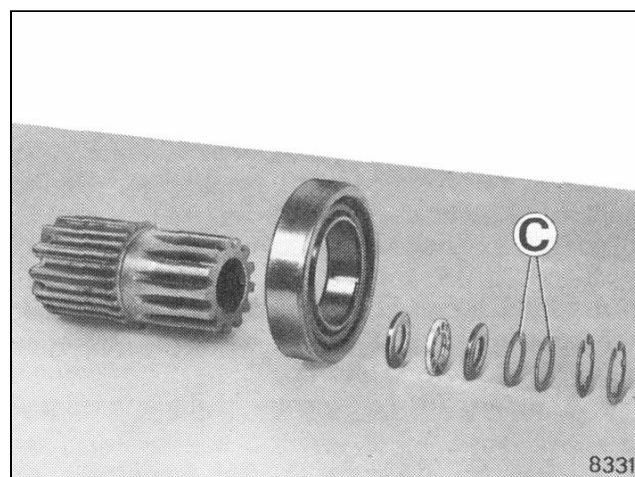
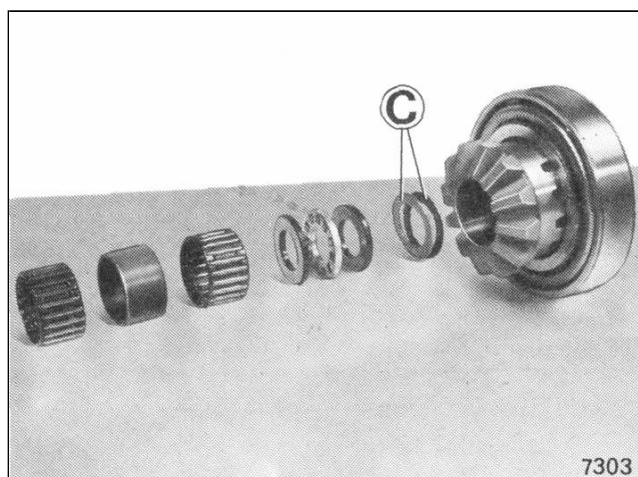


The clearance between the teeth of the locking device must be 2-3 mm. The clearance between the pinion and ring gear must be adjusted before the play between the teeth of the locking device can be regulated.

Proceed in the following way to adjust:

- main a space of 2-3 mm between the fixed and sliding rings
- loosen nut **D**
- eliminate the flat on the control pin by moving lever **E**
- lock nut **D**

36.30 - Crown wheel adjustment



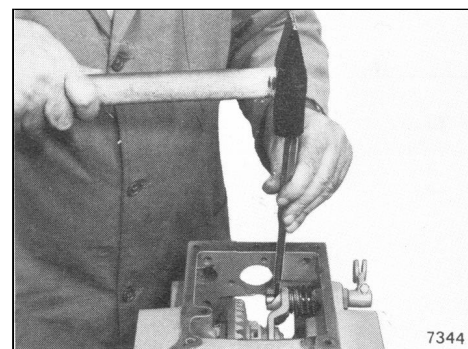
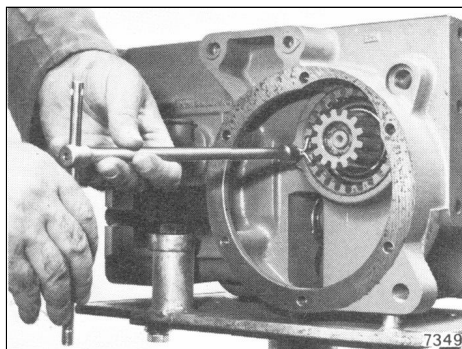
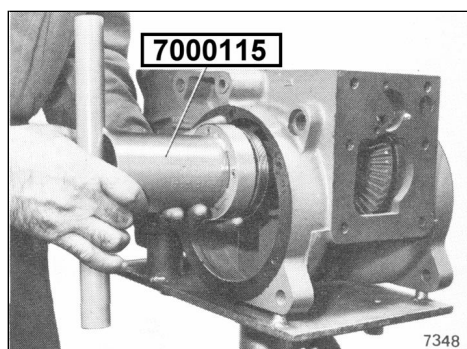
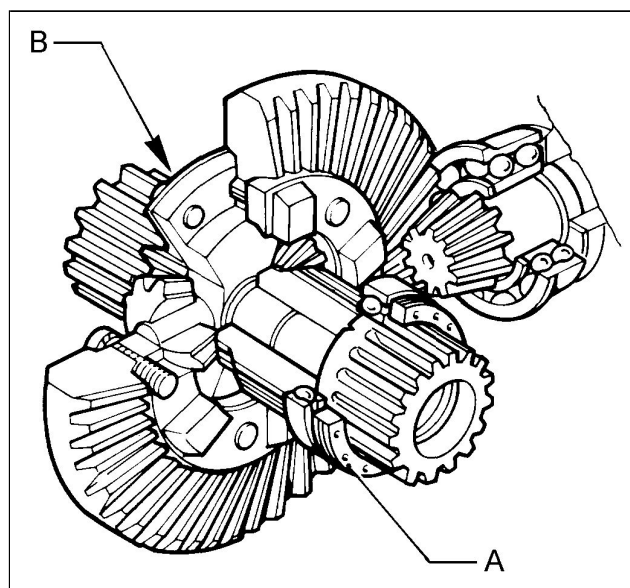
The clearance between the planetary gears and crown wheels must be 0.1 - 0.2 mm.
 Use shims **C** to obtain this clearance.
 Overall shim **C** on the crown wheel is usually about 1.4 mm, while the short one is 0.4 mm.

IMPORTANT:

Remember that crown wheel assembly includes two retention rings.



36.40 - Adjustment of the Pinion - bevel gear coupling



Correct operation of the differential requires:

0.1 - 0.15 mm operating clearance between the pinion and ring gear.

Use ring nuts **A** and **B** to adjust the coupling.

Push the bevel gear pair against the pinion until the clearance has been annulled, then adjust the correct clearance. Check meshing along the entire ring gear.

Tighten the retainer screws that lock the adjuster springs on the ring nuts and lock the screws with Loctite 270 as shown in the photo.

ADJUSTMENT REAR DIFFERENTIAL

36.50 - Rear differential lock assembly

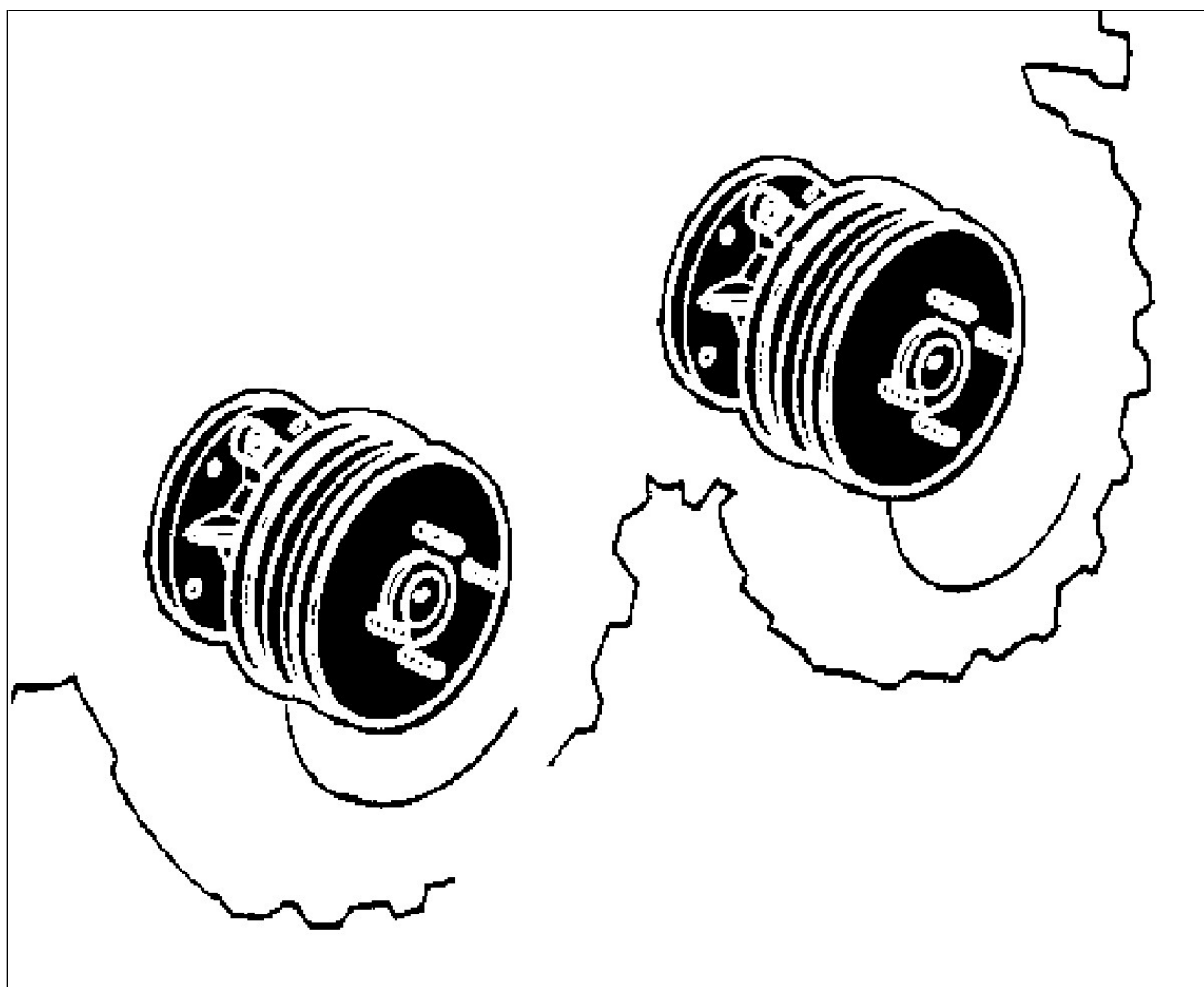
COMPLY WITH THE INSTRUCTIONS GIVEN FOR THE FRONT DIFFERENTIAL WHEN MOUNTING THE REAR DIFFERENTIAL.

36.A - Tightening torque to front and rear differential

Tightening torque expressed in kgm

Description	Kgm
M 10 x 35 screw that fixes the bevel gear pair-shaft	6
M 10x25 fixed locking ring fastening screw	4.5
M 6x16 retainer ring fixing screw	1.5
M 8x16 bevel pinion bearing fixing screw	2.5
Differential bearing preload nut	1.9
A and B preload nut	2

39 - FRONT AND REAR FINAL DRIVE



ADJUSTMENT ON REAR FINAL REDUCERS

39.10 - Assembly of the final reduction gear



Fig.1

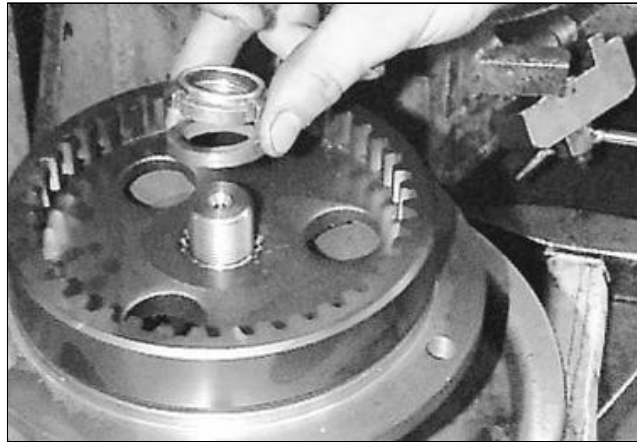


Fig.2



Fig.3

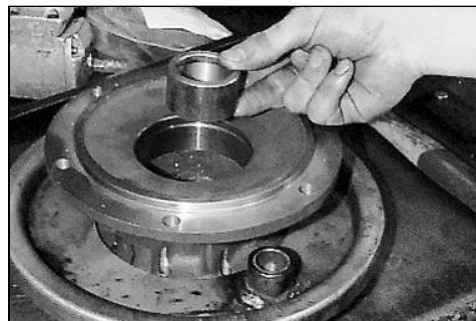


Fig.4

(Fig. 1) illustrates how to correctly assemble the final drive unit.
 Use plugs to mount the bearings of (fig. 3).
 The shimming required is established previously (fig. 4)
 The ring nut M 25x1.5 must be torqued to **14 Kgm** (fig. 2)

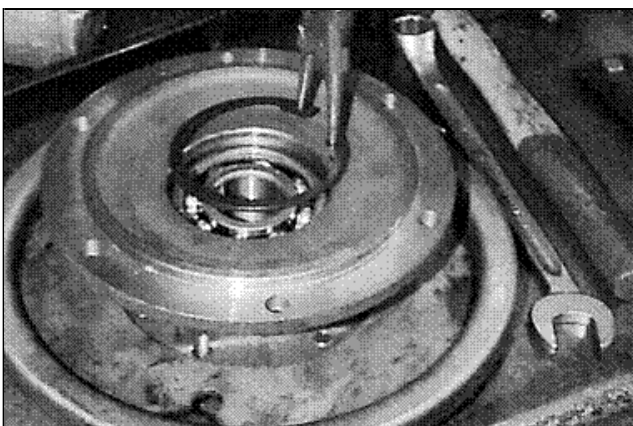


Fig.5

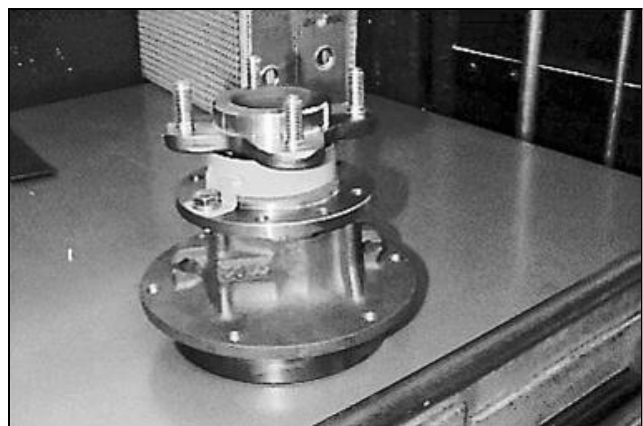
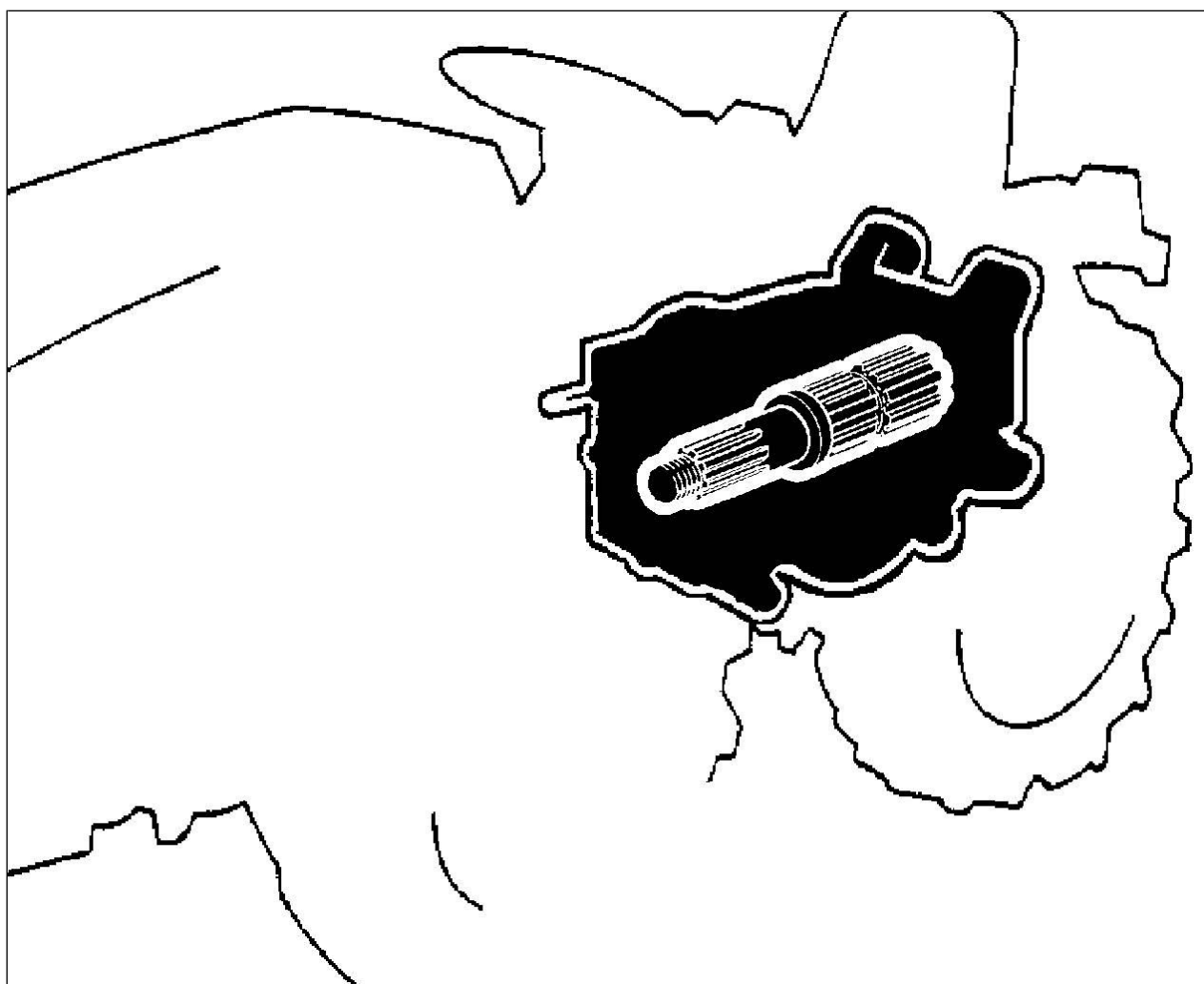


Fig.6

Do not forget the circlip that closes the pack (Fig. 5)

45 - REAR PTO



ADJUSTMENT TO REAR PTO

45.10 - Rear PTO ring nut adjustment

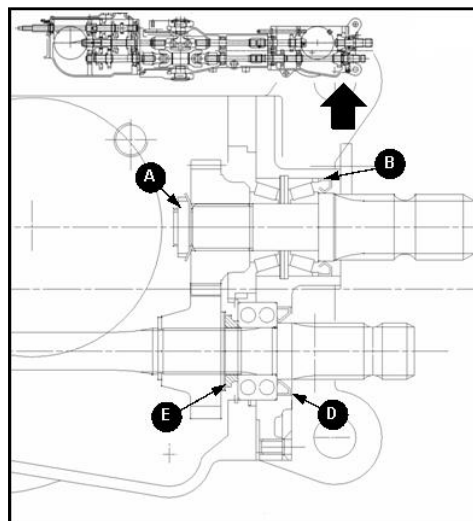


Fig.1

When mounting the two bearings as illustrated in (fig. 1), tighten ring nut **A** to a 2.5 Kgm torque value, position the ring nut retainer tab and then punch the ring nut.

Do not forget to insert spacer **B** of (fig. 1) between the bearing and oil retainer on the top rear PTO shaft.

Mount oil retainer **D** of (fig. 1) on the PTO shaft. Spread sealant all around to guarantee a good seal and position.

During the remounting phase, make sure that the 3 spacers and the spacer with rounded edge **E** have been fitted on this shaft, as shown in (fig. 1)

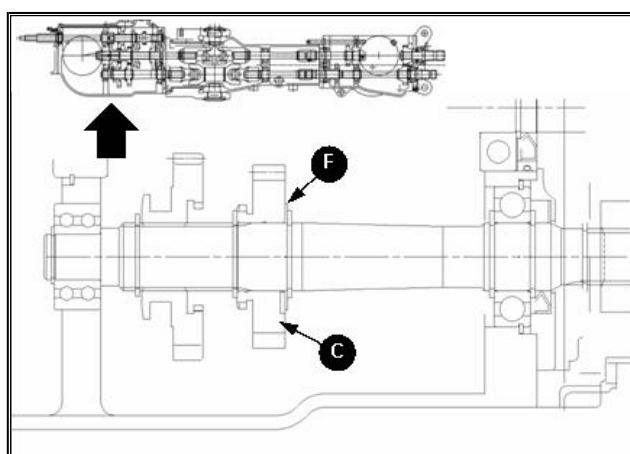
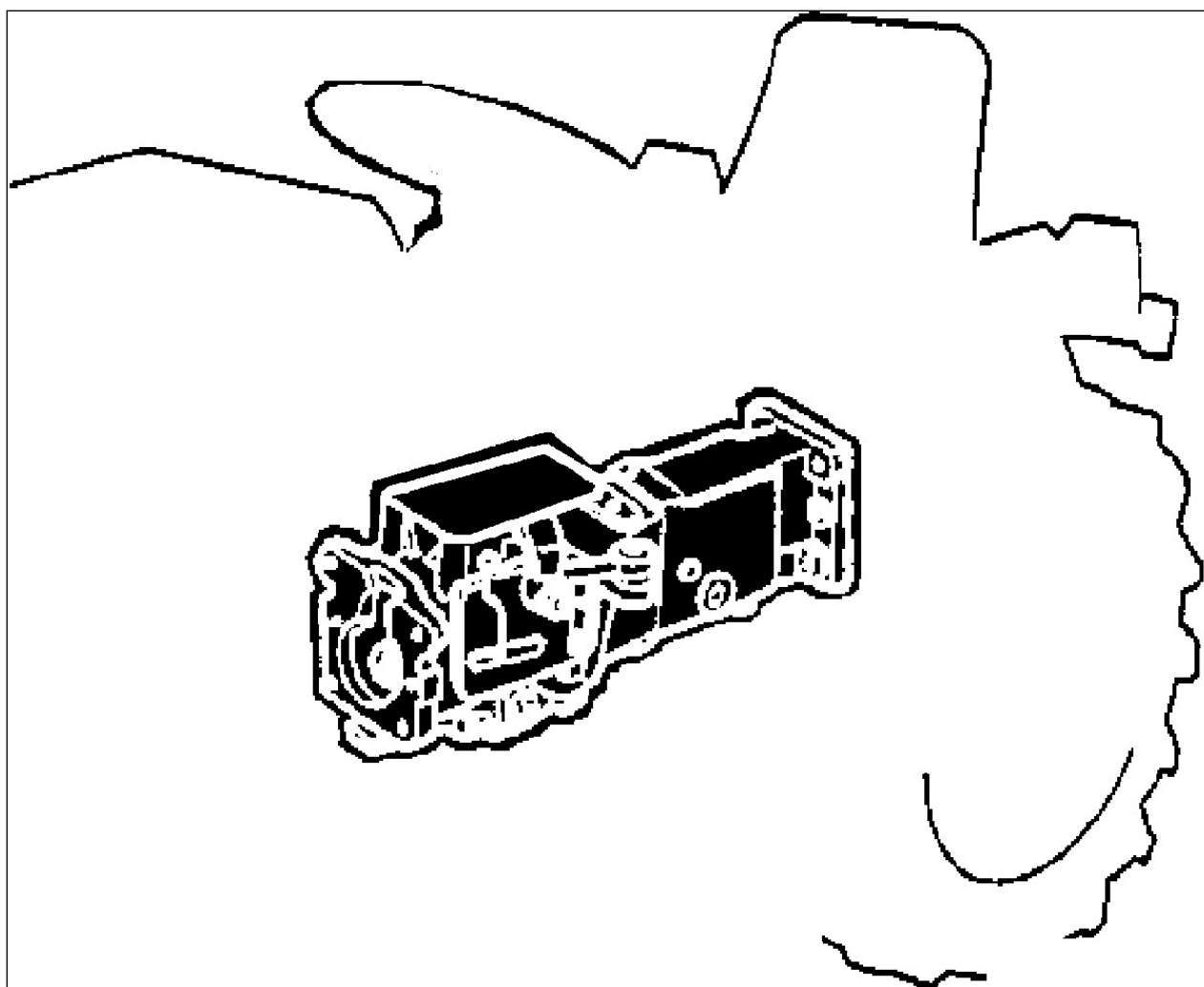


Fig.2

Tighten the two screws that fix the bushing to a 2 Kgm torque value and apply strong Loctite 270, after having made sure that the circlip has been fitted (fig. 3).

The retention plates in (fig. 3) should be positioned under the 2 screws.

48 - CENTRAL JOINT



ADJUSTMENT ON CENTRAL JOINT

48.10 - Central joint group



Fig.1



Fig.2

The central pivot with its plastic bushes shown in (fig. 1), must be mounted with a press as illustrated in (fig. 2).

The groove in the plastic bushes must point upwards (driving position).



Fig.3

Tighten the two screws that fix the bushing to a 2 Kgm torque value and apply strong Loctite 270, after having made sure that the circlip has been fitted (fig. 3).

The retention plates in (fig. 3) should be positioned under the 2 screws.

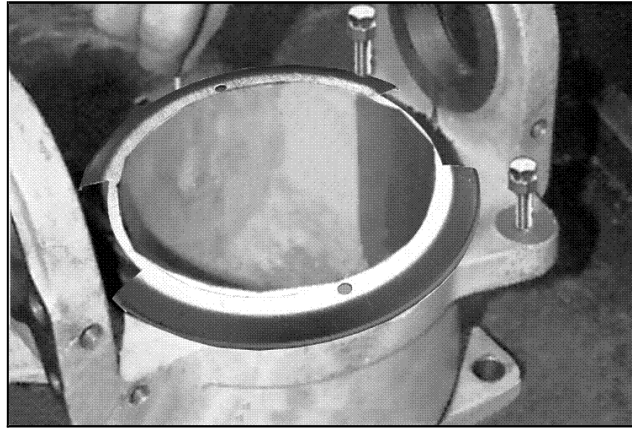


Fig.4

Mount the retainer adjuster screws of the tractor pivot as illustrated in (fig. 4) then tighten them fully on to the check nut.

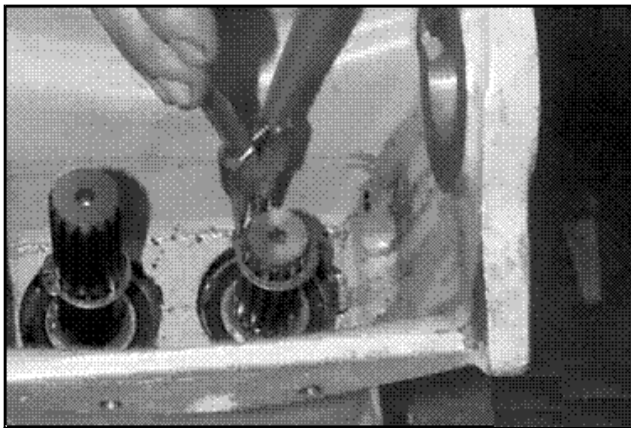


Fig.5

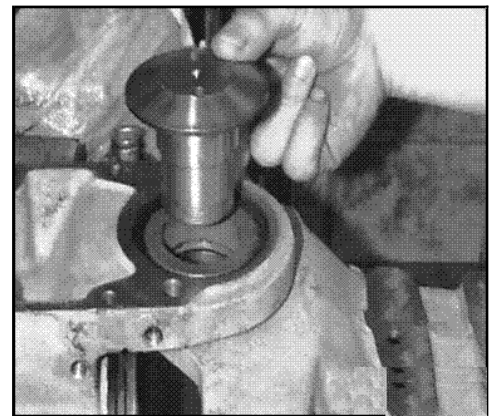


Fig.6

Mount the lower and upper pivot pins after having housed the relative bushes, the O-rings and the dust guards as shown in (fig. 6).

Tighten the ring nuts to a 14 Kgm torque value, clinching the plates and punching the ring nuts to prevent the assembly from working loose.

Grease the entire pivot after having fitted the grease nipples into their housings.

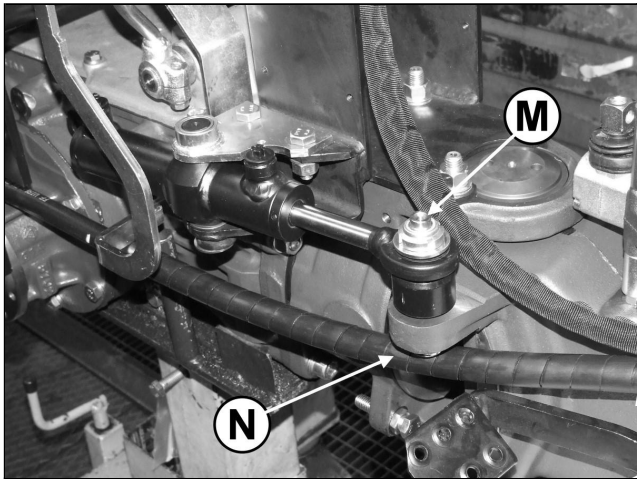


Fig.7

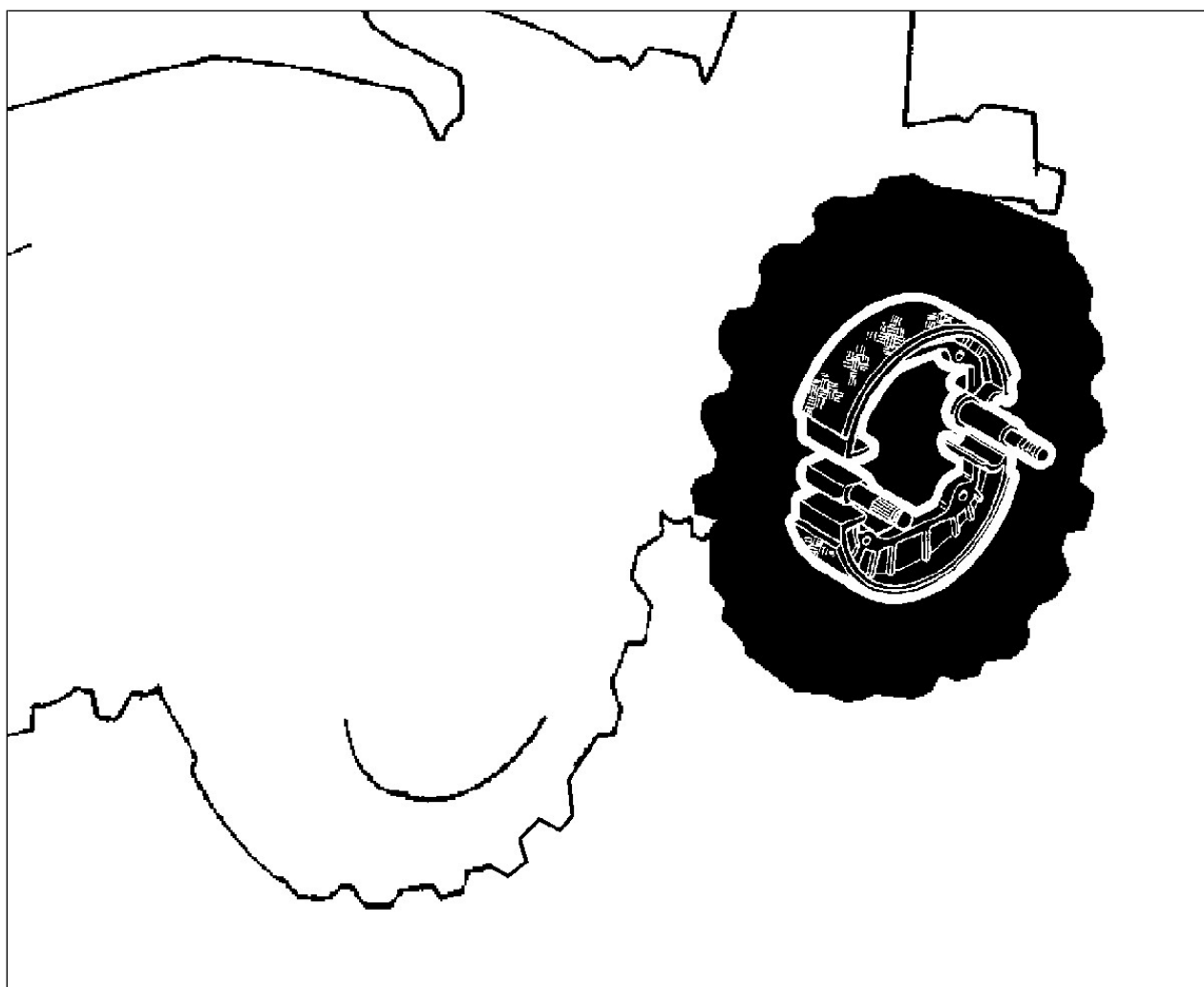
After having mounted the steering cylinder as shown in (fig. 7), tighten the two ring nuts M and N to 9 Kgm torque value.

48.A - Tightening torque to central pivot

Tightening torque expressed in kgm

Description	Kgm
M 14 bolts that connect the central pivot to the rear differential housing and front gearbox	10

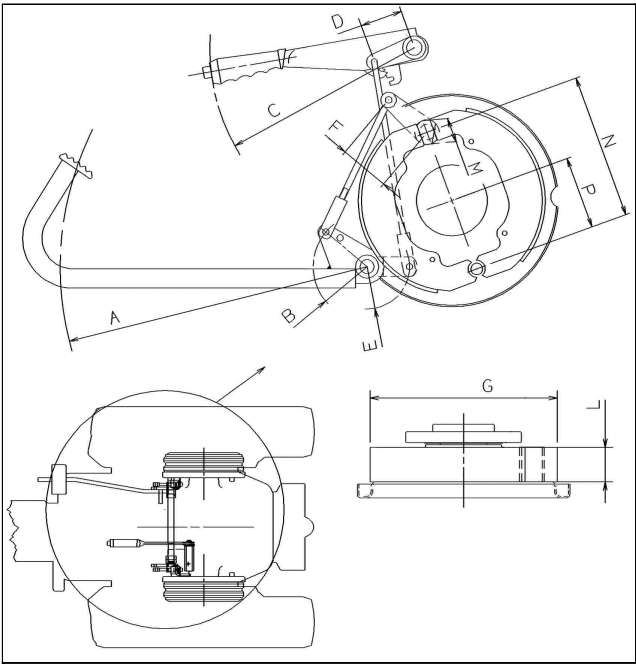
GROUP 57 - BRAKES



BRAKES ADJUSTMENT

57.10 - Braking devices

- SERVICES
 - 1. Mechanical brake type break shoe, operated straight on the rear wheels
- PARKING
 - Act on the rear service breaking device, with mechanical transmission manually operated equipped with a mechanism for the irreversibility of the commad.



MAIN BRAKE LEVER SPECIFICATIONS				BRAKE SPECIFICATIONS		
SERVICE BRAKE PEDAL	A	mm	398	BRAKING AXLE	Rear	
TRANSMISSION LEVER	B	mm	70	TOTAL BRAKING SURFACES	cm ²	227
PARKING BRAKE LEVER SPECIFICATIONS				MATERIAL USED (FRENOLYTE WW)	TI	401
PARKING BRAKE LEVER	C	mm	265	DIAMETER BRAKE LINING	G	mm 243
TRANSMISSION LEVER	D	mm	55	DIAMETER BRAKE LINING	L	mm 44.5
TRANSMISSION LEVER	E	mm	55	BRAKE LEVER	F	mm 65
				INTERNAL BRAKE DIAMETER	N	mm 189
				BRAKING SHOE LEVER	M	mm 26.5
				INTERNAL BRAKE RADIUS	P	mm 94.5

57.20 - Adjusting service brake

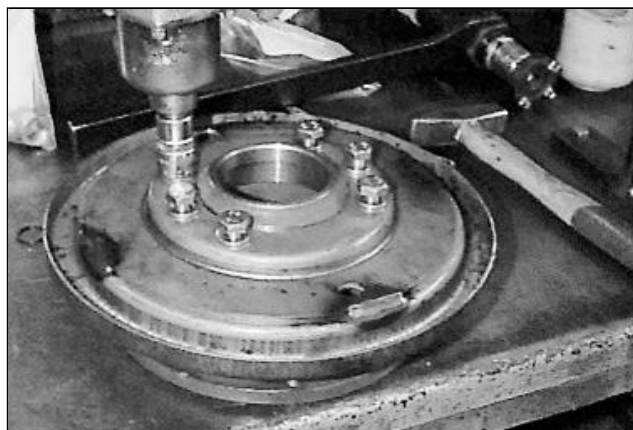


Fig.1

As shown in (fig. 1) the support of the braking unit is screwed on the wheel hub with six M 10 bolts tightened to 6 Kgm torque value.

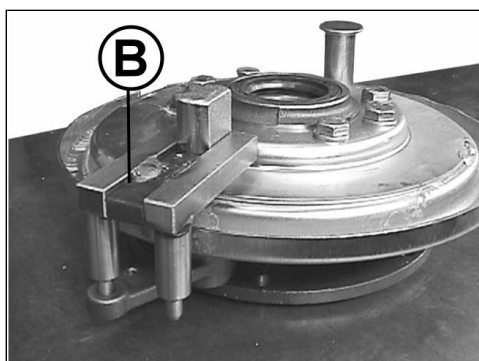


Fig.2

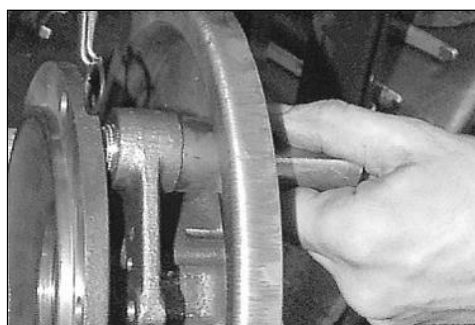


Fig.3

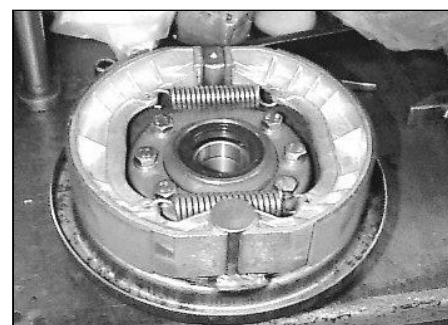


Fig.4

After having mounted the shoe expander as shown in (fig. 2), position the external brake shoe control lever using tool **B**, that sets it in position depending on whether the hub is on the right or left. Now mount the closing circlip as shown in (fig. 3) and complete the brake assembly as shown in (fig. 4).

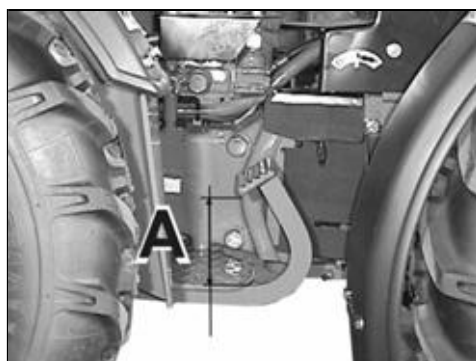


Fig.5

The idle pedal travel is 110 mm (dimension **A**) when the shoes are new, the machine starts to brake when the pedal is about 85 mm from the surface of the footboard (fig. 5).

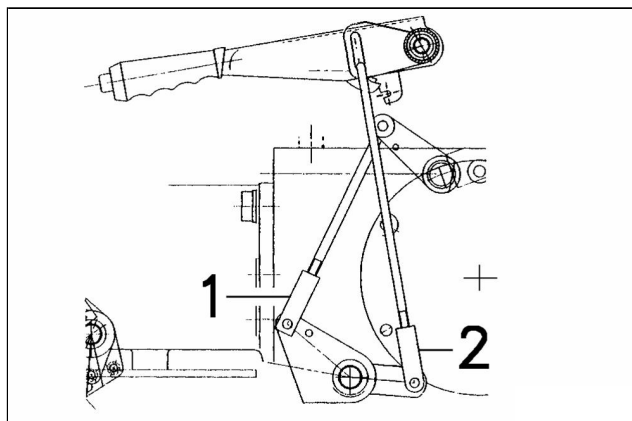
57.30 - Record of emergency and parking brake

Fig.6

Use the adjuster screw **1** to adjust the main brake (fig. 6)

Use rod **2** of (fig. 6) to correctly adjust the hand brake and allow the handgrip of the device to be held in a comfortable way.

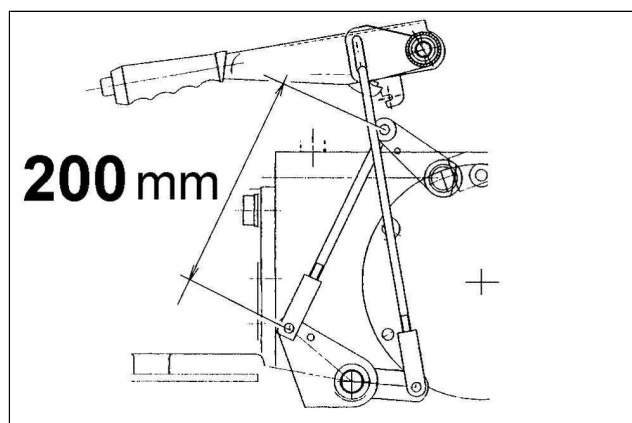
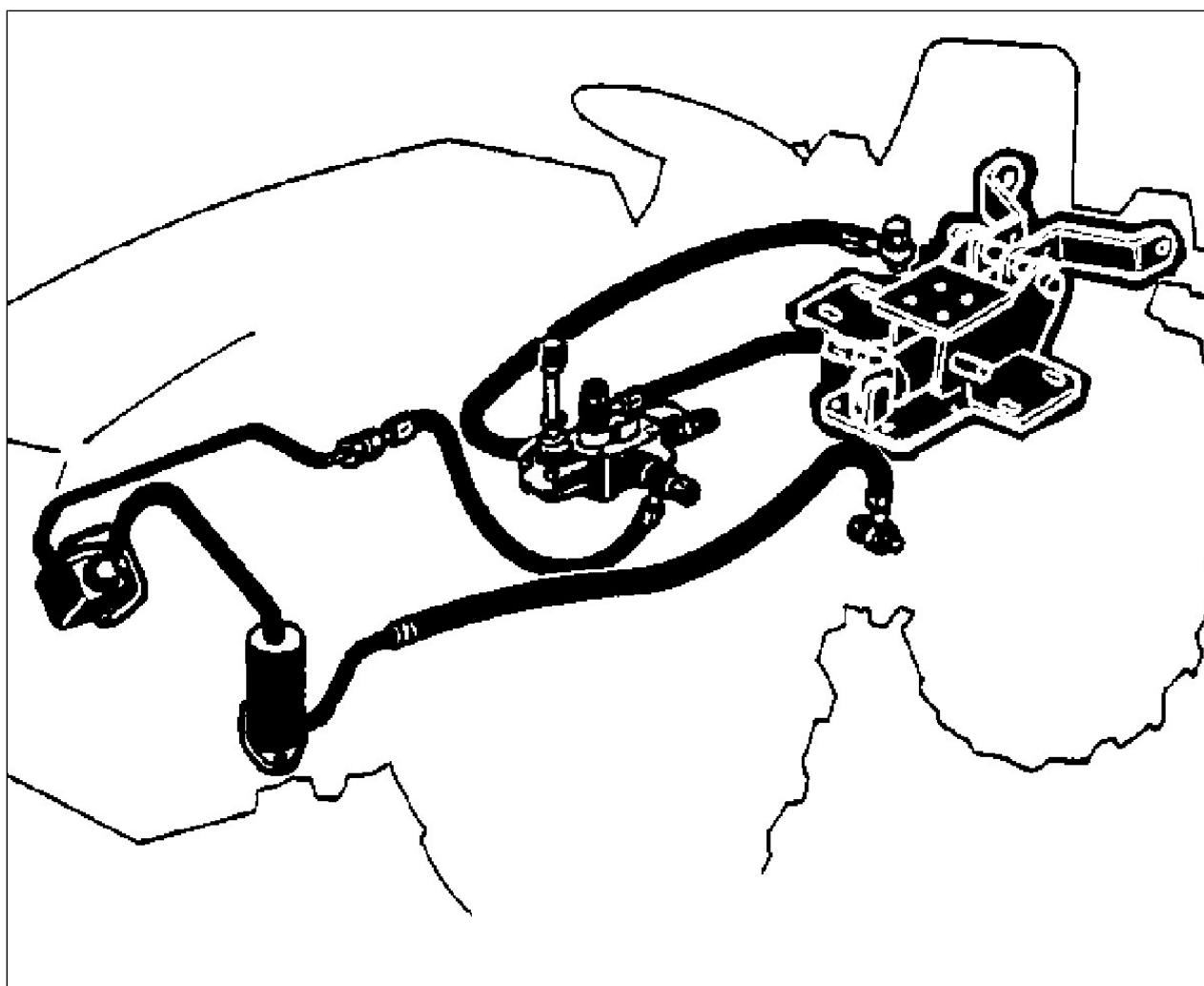


Fig.7

The brakes are correctly adjusted when the length of the adjustable rod is about 200 mm as shown in (fig. 7)

60 - HYDRAULIC SYSTEM

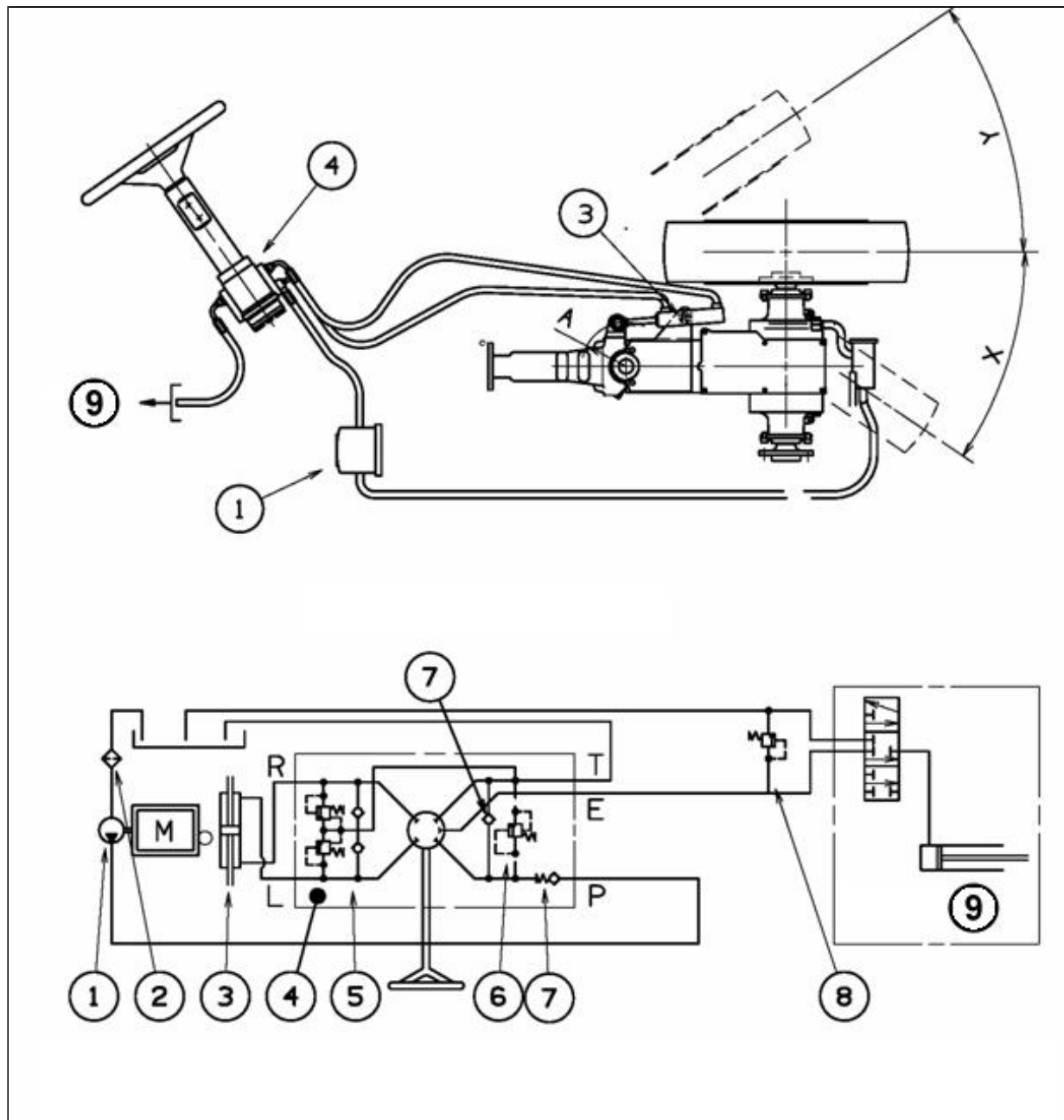


HYDRAULIC SYSTEM ADJUSTMENT

60.10 - Hydraulic steering plan

The hydraulic circuit mainly consists of the hydraulic gear pump, which is supplied with the oil of the rear differential filtered by a filter with a gauze cartridge, the power steering system and the power lift valve system. The 4 cc pump supplies the 32 cc power steering system and, by the power beyond port, the power lift valve system.

The max pressure of the entire circuit is set by the steering unit relief valve, which is set to the max pressure of 125 bar.



- | | | |
|---------------------|--------------------------|---------------------------|
| ① Hydraulic pump | ④ Hydraulic drive system | ⑦ Monodirectional valve |
| ② Oil Cartridge | ⑤ Antishock valve | ⑧ Sectional control valve |
| ③ Steering cylinder | ⑥ Relief valve | ⑨ Hydraulic auxiliaries |

60.20 - Steering unit



Fig.1



Fig.1B

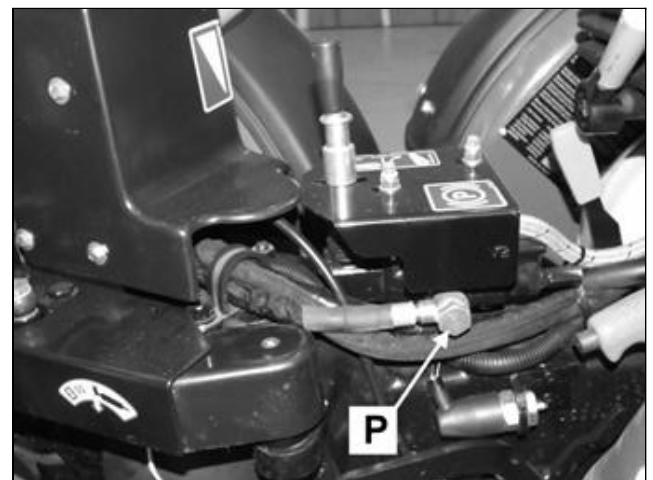


Fig.1C

It's possible to adjust the max pressure acting the screw Y visible in (Fig. 1B) but it's not possible to go over 125 bar.

To check these settings, use a pressure gauge with 150 bar full scale and connect it using a double 3/8" hollow screw to the P port of the distributor (Fig. 1C).

In order to reach the max pressure it's necessary to full extend the rear lifter acting on the distributor lever.



Fig.1A

If the power steering system must be demounted and then remounted, take care to connect the pipes in the correct way. The delivery pipe from the gear pump must be connected to inlet **P** of the power steering system (Fig. 1A).

The rear power lift, or the auxiliary distributor, must be connected to outlet port **E** of the steering unit.

60.30 - Power lift system valve

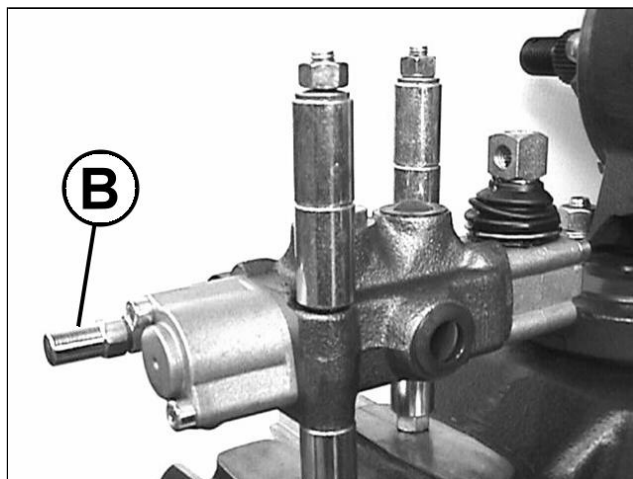


Fig.3

The max pressure of the system is defined by the steering unit (125 bar).

If on the gauge you see a lower value adjust the screw **B** of (Fig. 3) in order to reach this value, remember that it's not possible to go over 125 bar.

Remove the metal guard above the distributor to operate the adjuster screw **B** of (fig. 3) if the value is incorrect.

To make the adjustments remove the cap **B** shown in (fig. 3), then tighten the plug to increase the pressure or unscrew it to lower the pressure

Since the rear differential housing acts as the inlet and discharge reservoir for the entire hydraulic circuit, the oil used in the rear differential housing must posses determinated hydraulic specifications. Use **ARBOR UNIVERSAL 15W-40**. Approx 7 L of oil is required.

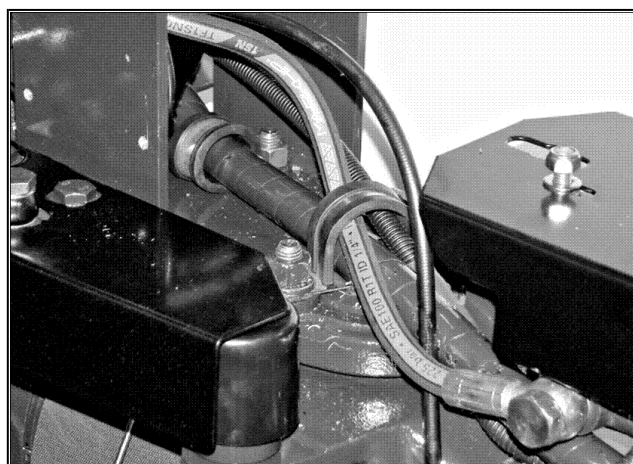
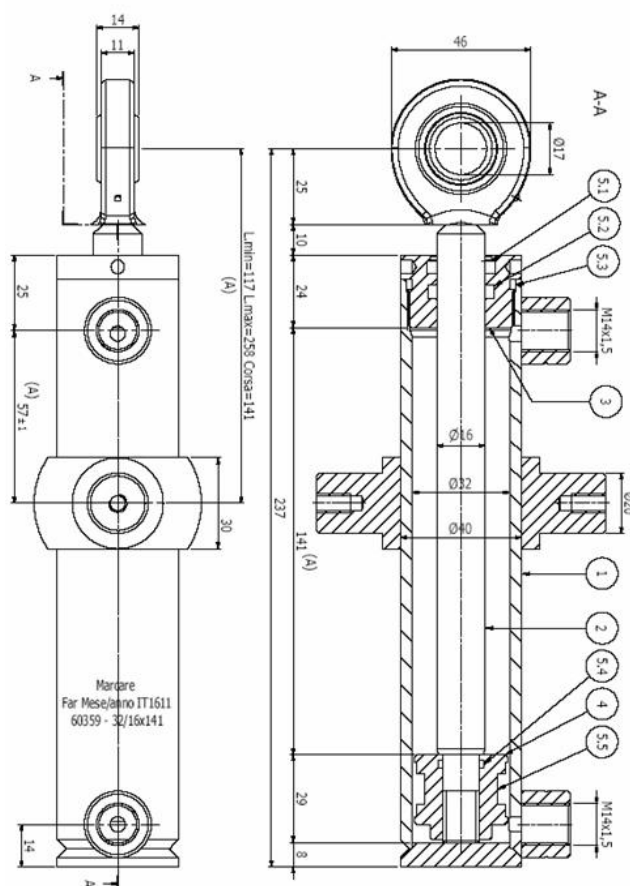


Fig.4

As shown in (fig. 4) the hydraulic hoses must be restrained by two clamps

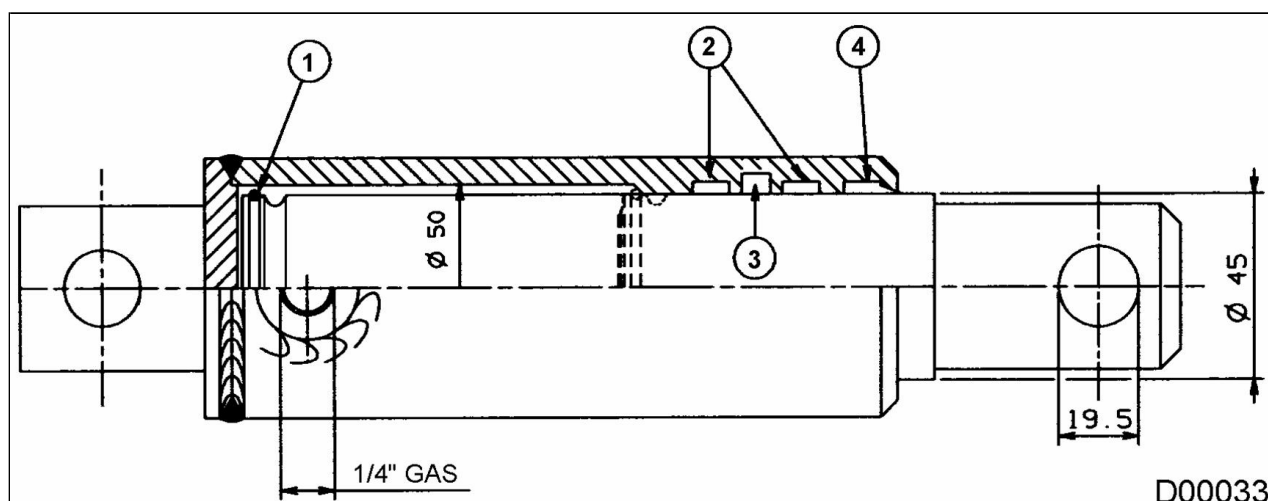
60.40 - Steering cylinder



Proceed as described below if the seals parts 5.1, 5.3 e 5.5 need replacing:

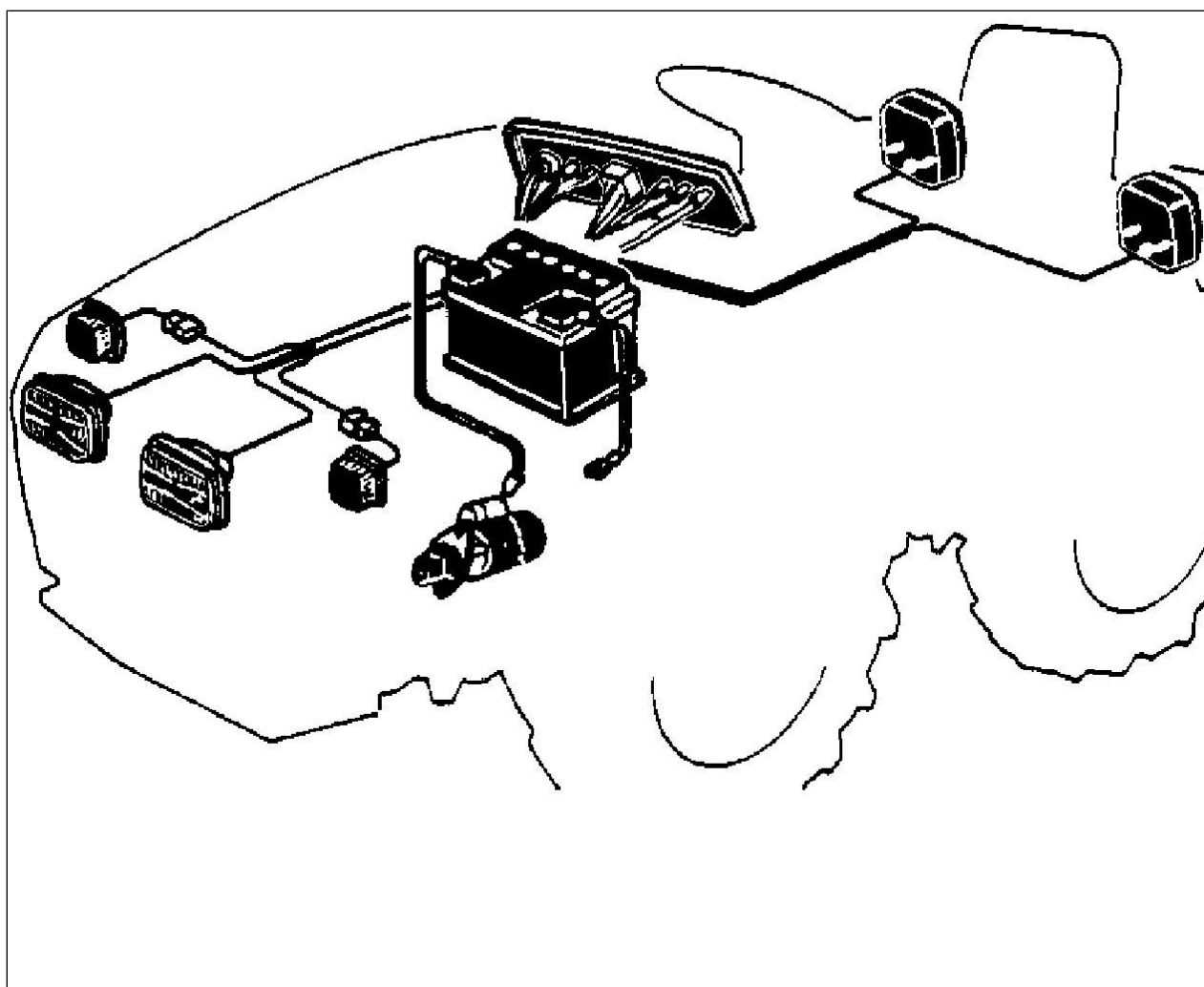
- Unscrew the cylinder head **3**.
 - Take out the plunging piston and replace any damaged seals on the cylinder head.
Make sure that the chromium part of the stem is not scored.
 - Remount all parts by working through the previously described operations in reverse order.
- The plunging piston seals must be changed when there are consistent oil leaks.

60.50 - Rear lift cylinder



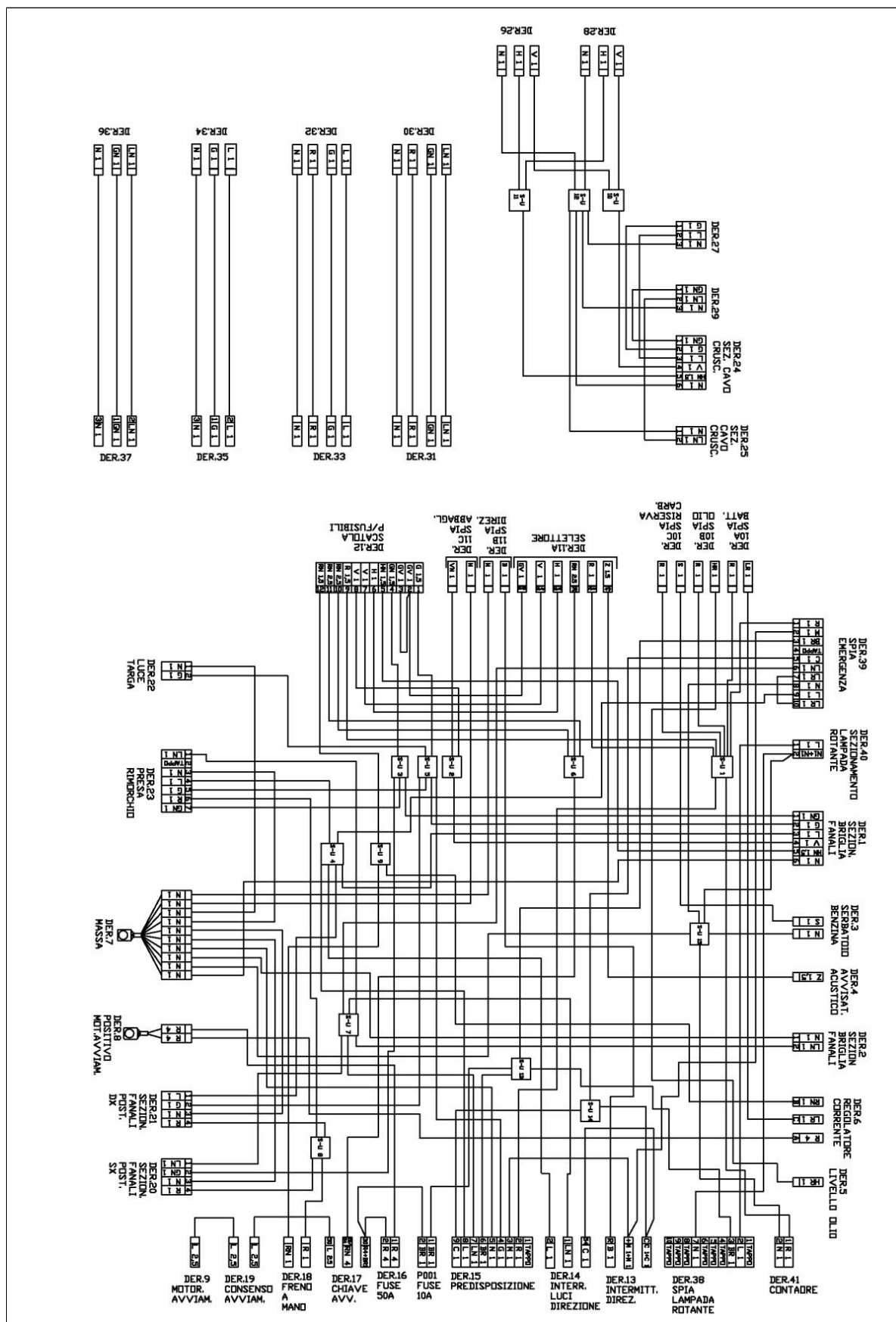
To demount the seal of lifting cylinder **3** move the retention ring **1** from the race through the feed hole **A**, using a screwdriver to lever near the ring notch.
After this, remove the stem and access the seals to make the required inspections and/or replacements.

63 - ELECTRICAL SYSTEM



ELECTRICAL SYSTEM, ENGINE, PLATFORM

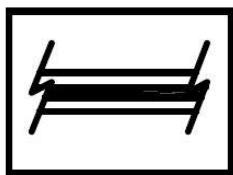
63.10 - Wiring diagram engine line



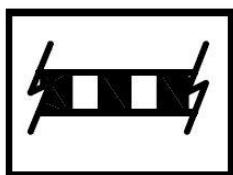
ELECTRICAL SYSTEM

1. Cable section Headlights
2. Cable section Headlights
3. Fuel tank
4. Horn.
5. Oil level
6. Current regulator
7. Grounding
8. Starter
(+) positive
9. Starter
10.
 - A. Battery charge indicator - red.
 - B. Engine oil pressure indicator.
 - C. Fuel reserve indicator - yellow.
11.
 - A. Light selector
 - B. Tractor direction indicators - green.
 - C. Driving beam indicator.
12. Fuse box
13. Turn indicator blinking function
14. Power supply of turn indicator light switch.
15. Pole connector
16. Maxifuse protection circuit 50A
17. Ignition switch
18. Parking brake switch
19. Security start switch
20. Left rear light.
21. Right rear light.
22. License plate light.
23. 7-pin socket.
24. Cable section Dashboard
25. Cable section Dashboard
26. Cable section
27. Cable section
28. Cable section
29. Cable section
30. Cable section
31. Cable section
32. Cable section
33. Cable section
34. Cable section
35. Cable section
36. Cable section
37. Cable section
38. Revolving beacon switch
39. Emergency light indicator
40. Cable section Revolving beacon
41. Total hour counter

CABLE COLOUR KEY	
A	LIGHT BLUE
B	WHITE
C	ORANGE
G	YELLOW
H	GRAY
L	BLUE
M	BROWN
N	BLACK
R	RED
S	PINK
V	GREEN
Z	VIOLET
(D)	DARK EXAMPLE: V(D) DARK GREEN
(E)	LIGHT EXAMPLE: V(E) LIGHT GREEN



A-B : Light Blue - White (Extending Laterally)



A/B : Light Blue / White (Extending Spirally)

63.20 - Enable ignition switches



This is the position of the ignition switch, which must be adjusted in an accurate way to ensure that the vehicle starts in a regular way.

63.30 - Brake switches

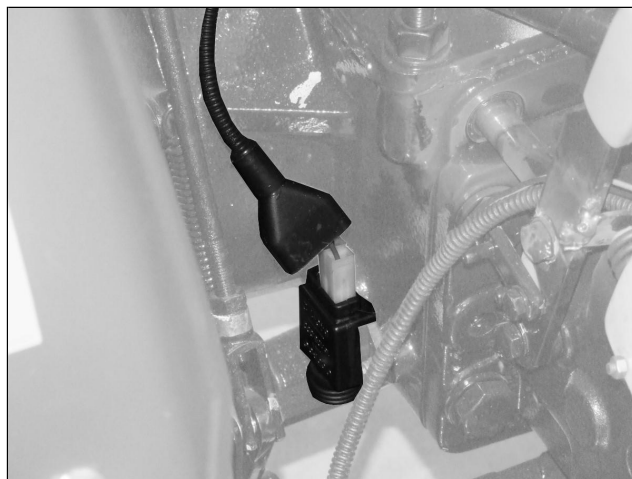
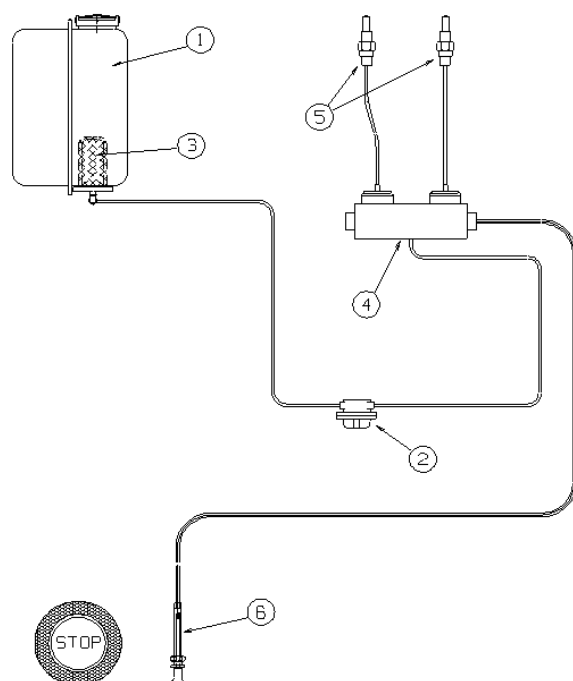


Fig.3

The machine is equipped with a switch on the service brake and when you push the pedal, the stop rear lights go on.

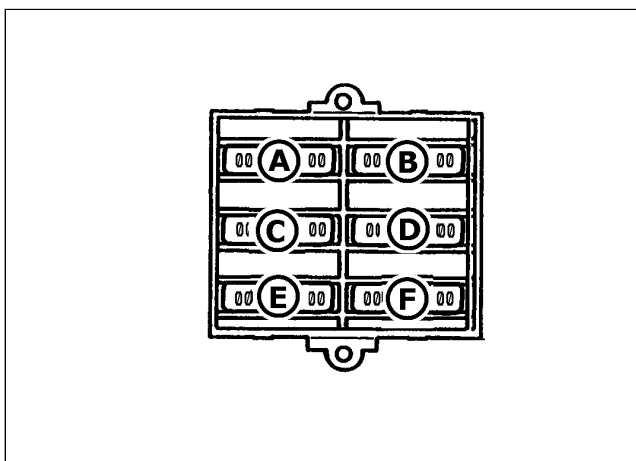
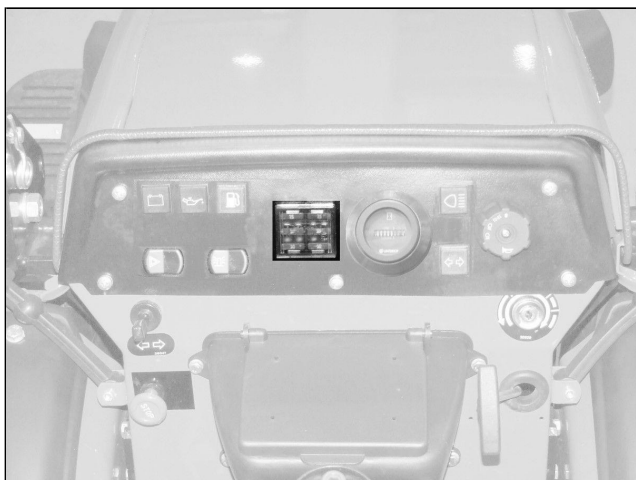
If the rear brake lights come on when the tractor is not braking, the fault may be caused by incorrect adjustment of this switch.

63.40 - Motor stop

- | | |
|---------------|--------------------|
| ① Fuel tank | ② Fuel pump |
| ③ Fuel filter | ④ injection pump |
| ⑤ injectors | ⑥ Engine stop knob |

The motor stop device in this tractor is the mechanical type and the rod connected to the knob **6** acts directly on the injection pump which shuts off fuel delivery to the injectors **5**.
Frequently check filter **3** which could become clogged with the impurities in the fuel.

63.50 - Fuses



The electrical system is protected by fuses against short circuits or abnormal power draw.



Before changing a fuse, find and eliminate the short circuit that caused it to blow.

Replace the burnt-out fuses with others possessing the same technical characteristics (see indications on the actual fuse itself). Consult specialized personnel if in doubt.

FUSE FUNCTIONS:

(A) 7.5A
Right rear side lights.

(B) 7.5A
Dipped beam

(C) 10A
Current regulator

(D) 7.5A
Left front side light.

(E) 10A
Driving beams.

(F) 10A
Tractor direction indicators - green.
Horn.

The tractor's electric system is also protected by a maxi knife-blade fuse rated at 50 A located inside the dashboard.

50A
General protection of electrical system.

90 - LUBRICANT



RECOMMENDED LUBRICANTS AND FLUIDS

90.10 - Original lubricants

GROUP	LUBRICANT	CAPACITY L
Engine oil	ARBOR UNIVERSAL 15W-40 oil • Viscosity at 40° C (mm²/s) 110 • Viscosity at 100° C (mm²/s) 14 • Viscosity at -15° C (mPa.s) 3450 • Index of viscosity 135 • Flash point V.A. (°C) 220 • Pour point (°C) -36 • Mass Volume at 15 °C (kg/l) 0.886	3
Gearbox housing	ARBOR TRW 90 oil • Viscosity at 40° C (mm²/s) 135 • Viscosity at 100° C (mm²/s) 14.3 • Viscosity at -26° C (mPa.s) 108000 • Index of viscosity 104 • Flash point V.A. (°C) 220 • Pour point (°C) -27 • Mass Volume at 15 °C (kg/l) 0.895	6.3
Rear differential housing	ARBOR UNIVERSAL 15W-40 oil • Viscosity at 40° C (mm²/s) 110 • Viscosity at 100° C (mm²/s) 14 • Viscosity at -15° C (mPa.s) 3450 • Index of viscosity 135 • Flash point V.A. (°C) 220 • Pour point (°C) -36 • Mass Volume at 15 °C (kg/l) 0.886	7

99 - PROBLEMS AND SOLUTIONS



TECHNICAL HITCHES - CAUSES - REMEDIES

ENGINE

Technical hitches	Possible causes	Remedies
The engine fails to start despite the fact that the starter motor operates	1. No fuel 2. Fuel is not reaching pump 3. Injector return tube clogged or squashed	1. Top up the fuel until the level rises above the draw pipe 2. The fuel filter in the tank is clogged 3. Restore parts to functional conditions or replace the injector return tube

CLUTCH - TRANSMISSION

Technical hitches	Possible causes	Remedies
The clutch slides	1. Clutch disk is dirty with oil. 2. Clutch without correct adjustment play.	1. Remove any oil leaks, clean the flywheel and replace the clutch disk. 2. Adjust the clutch pedal.
The clutch does not detach.	1. Clutch disk wavy or undulated. 2. Clutch release lever bent. 3. Pressure plate levers not properly registered. 4. Clutch disk glued to the engine flywheel. 5. Clutch with excessive adjustment play.	1. Replace the clutch disk. 2. Replace the clutch disengagement lever. 3. Make sure the levers are not worn out and if not, proceed with their registration. 4. Start the machine, lock the brakes, engage and disengage repeatedly the clutch and if the outcome is negative, remove and clean the clutch. 5. Adjust the external linkages, and if necessary, also the internal ones.

GEARBOX

Technical hitches	Possible causes	Remedies
The gears disengage.	1. Sliding speed selector gear control fork incorrectly adjusted 2. Speed selector rods with worn grooves 3. The selector spring is no longer elastic (correct measurement 30 mm) 4. Broken gearshift control fork or rod	1. Register the fork 2. Replace the rod and register it 3. Replace the spring and ball 4. Replace the broken part
The gears do not engage. The final drive - reverse shuttle disengages	1. Excessive play between transmission shaft and Sloe-Fast and REV gear coupling 2. REV reduction gear control fork incorrectly adjusted 3. REV reduction gear selector rod with worn grooves 4. The selector spring is no longer elastic (correct measurement 30 mm) 5. Broken REV reduction gear fork or rod	1. Replace the shaft and gear 2. Register the fork 3. Replace the rod and register it 4. Replace the spring and ball 5. Replace the broken part

FRONT DIFFERENTIAL REAR

Technical hitches	Possible causes	Remedies
The differential lock does not work.	1. Control incorrectly adjusted 2. Control blocked	1. Adjust the command. 2. Release the control rod from the bush

POWER TAKE-OFF

Technical hitches	Possible causes	Remedies
The speeds disengage	1. Control incorrectly adjusted	1. Adjust the command.
The PTO is noisy.	1. The PTO shaft is curved 2. Application of a spraying pump	1. Replace the shaft 2. None, since the noise made by the pump is transmitted to the machine and amplified
The PTO fails to turn	1. The rear PTO control lever is in the idle position	1. Engage the PTO lever

CENTRAL ARTICULATION

Technical hitches	Possible causes	Remedies
Excessive play on the central pivot	1. Worn plastic bushes	1. Replace the bushes and periodically grease them

BRAKES

Technical hitches	Possible causes	Remedies
The machine does not brake.	1. Controls not adjusted 2. Worn shoes 3. Oil leaks from wheel hub 4. Drums dirtied with mud etc...	1. Adjust the command. 2. Replace the shoes 3. Replace the oil retainer and shoes 4. Demount the drums and clean them with emery cloth
The brake pedal fails to return in correct way	1. Broken brake shoe return spring 2. Broken pedal return spring 3. Eccentric shoe expansion pin blocked on the hub	1. Demount the drum and replace the spring 2. Replace the pedal return spring 3. Demount the shoes, remove the blocked pin and clean it with abrasive cloth

HYDRAULIC CIRCUIT

Technical hitches	Possible causes	Remedies
The steering wheel is stiff to turn	1. The front and/or rear differential lock is engaged 2. The intake filter on the hydraulic circuit is clogged 3. Not enough oil in the differential lock 4. The power steering system must be overhauled or replaced 5. The hydraulic pump is out of service	1. Disengage the differential lock when turning 2. Clean the gauze filter in the intake filter 3. Top up the oil level 4. Overhaul or replace the power steering system. (The workshop manual of the power steering system is available if this operation is required, although it must be done by competent personnel and in a suitable place) 5. Replace the hydraulic gear pump
The wheel trim cannot be kept under control	1. Steering cylinder with worn retention rings 2. Power steering with badly adjusted max or antishock valve	1. Replace the cylinder retention rings 2. Reset or replace the valves if necessary
The power lift fails to operate or does not lift enough	1. Not enough oil in the rear differential housing 2. Maximum valve of the power lift valve system incorrectly adjusted 3. The intake filter is clogged 4. Valve system blocked 5. The hydraulic pump is out of service 6. Leaking cylinder seal	1. Top up the level. 2. Adjust the valve system's maximum valve 3. Clean the gauze filter in the intake filter 4. Replace the valve system 5. Replace the pump. 6. Replace the seals.

ELECTRICAL SYSTEM

Technical hitches	Possible causes	Remedies
The starter doesn't work.	1. The battery is low or damaged 2. The starter is defective. 3. The start switch is defective. 4. Battery cables oxidized or broken to the terminal. 5. Start release switch on the machine is not registered.	1. Provide for recharging the battery, if it does not stay, replace it. 2. Revise or replace the starter. 3. Replace the switch. 4. Replace or clean terminals oxidized. 5. Set the switches or replace if necessary.
The generator's light still on also with a high number of engine revolution.	1. Regulator inefficient 2. The alternator is not charging enough.	1. Replace the regulator 2. Revise or replace the alternator.
The battery is deformed.	1. The battery is too charged.	1. Revise or replace the alternator.
the battery liquid become black.	1. Damaged element.	1. Replace the battery.
the engine oil indicator light fails to go out	1. Engine oil level too low 2. Faulty bulb 3. Unsuitable lubricant	1. Top up the level. 2. Replace the bulb 3. See engine's operation and maintenance manual.
The rev counter doesn't work.	1. The pin has not been correctly inserted into the W of the voltage governor 2. The instrument is defective 3. The protection fuse has burnt out	1. Check the pins under the cap of the voltage governor 2. Replace the instrument 3. Find out why the fuse has burnt out and then replace it

99.10 - Table of Screws Torque

SCREW	6.6		8.8		10.9		12.9	
	Ⓐ	Ⓑ	Ⓐ	Ⓑ	Ⓐ	Ⓑ	Ⓐ	Ⓑ
M 8X1	14	15	25	27	36	38	43	46
M 8X1.25	13.5	14	23	25	33	35	40	42
M 10X1.25	28	30	50	55	70	75	85	90
M 10X1.50	26	28	46	50	66	70	80	85
M 12X1.25	51	55	90	97	127	135	143	155
M 12X1.75	46	48	82	86	115	120	138	145
M 14X1.5	80	85	142	153	200	215	240	260
M 14X2	73	78	130	140	182	195	220	235
M 16X1.5	120	130	215	230	300	320	360	390
M 16X2	113	120	200	215	280	300	340	360
M 18X1.5	175	185	310	330	435	470	520	560
M 18X2.5	153	165	270	295	385	415	460	495
M 20X1.5	240	265	430	460	610	660	720	770
M 20X2.5	220	235	390	415	550	585	660	705
M 22X1.5	335	350	570	620	820	880	970	1050
M 22X2.5	295	320	520	565	720	800	880	960
M 24X2	415	440	730	790	1030	1100	1250	1320
M 24X3	380	405	670	720	950	1000	1130	1220
M 27X2	600	650	1070	1150	1500	1620	1800	1950
M 27X3	560	810	990	1440	1400	2020	1640	1800
M 30X2	830	900	1460	1600	2060	2250	2500	2700
M 30X3.5	760	810	1350	1440	1890	2020	2270	2430

N.B.

tightening toques are expressed in Nm, to obtain this value in Kgm divide the value in the table by 9.81.



Zinc plated screw (friction coefficient 0.125)



Burnished screw (friction coefficient 0.14)



The tractor screws are Class 8.8, except for some special applications which will be shown later.