

WORKSHOP MANUAL

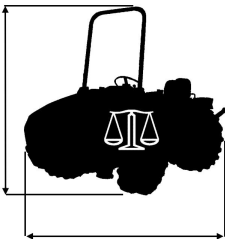
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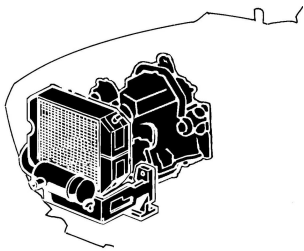
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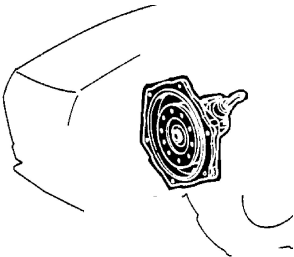
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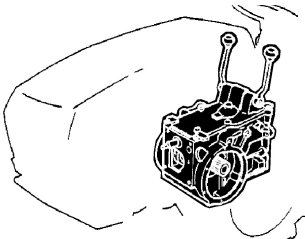
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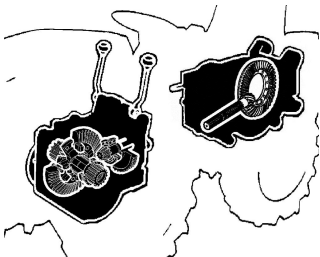
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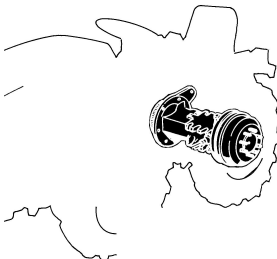
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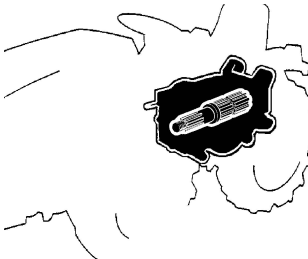
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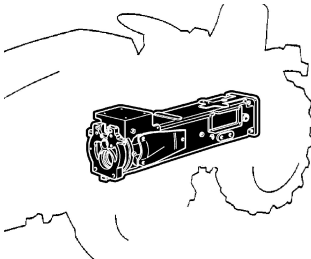
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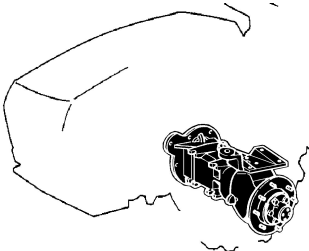
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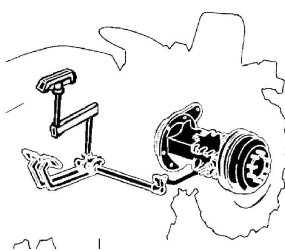
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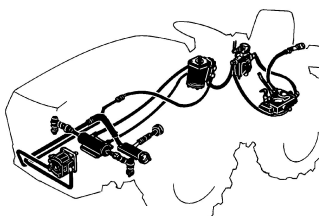
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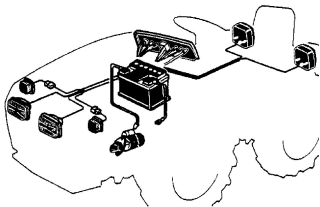


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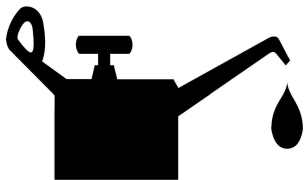


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00 - INTRODUCTION



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-over guard, netting that protects the rotating parts, supports and tow hooks, seat....) 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

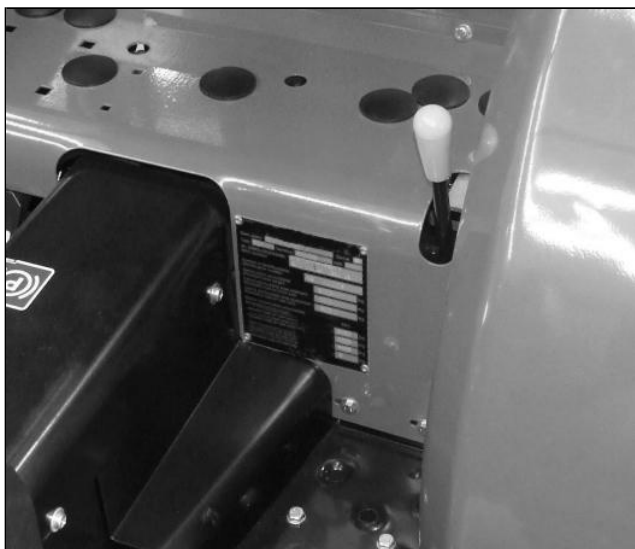


Fig.1

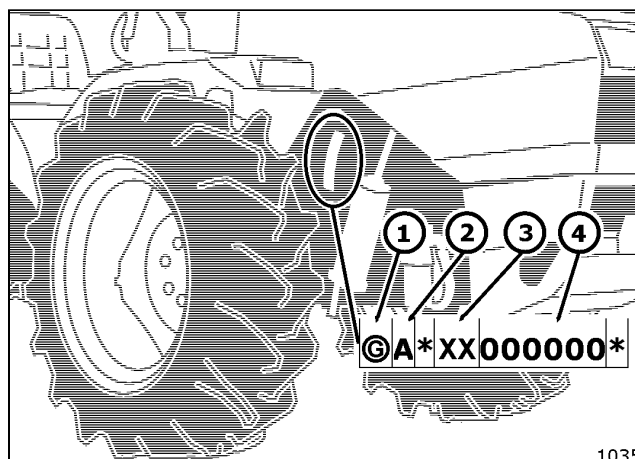


Fig.2

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.

Manual update

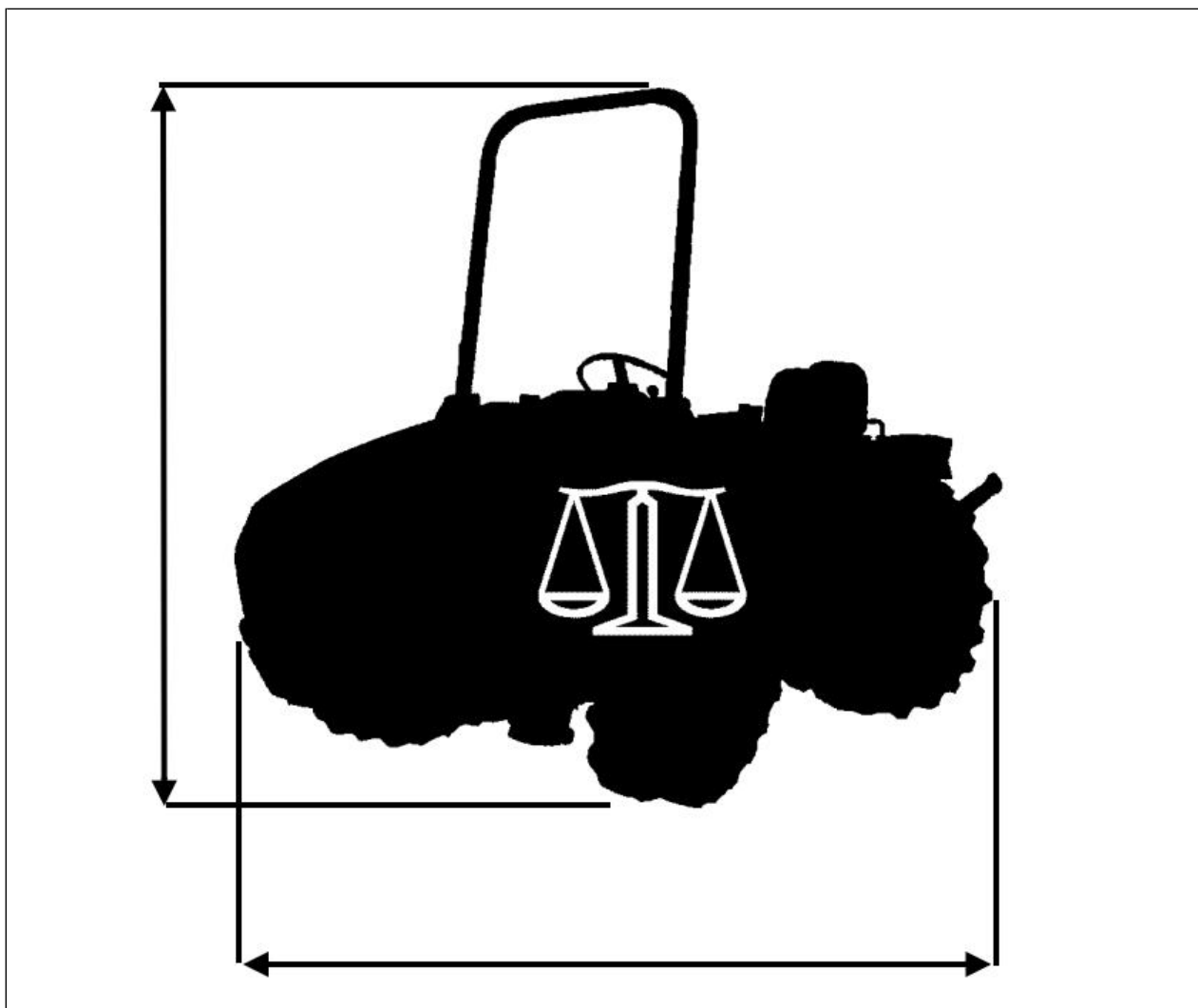
Future updates to the manual, modifications or additions to assemblies or parts of assemblies will be published in our website.

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

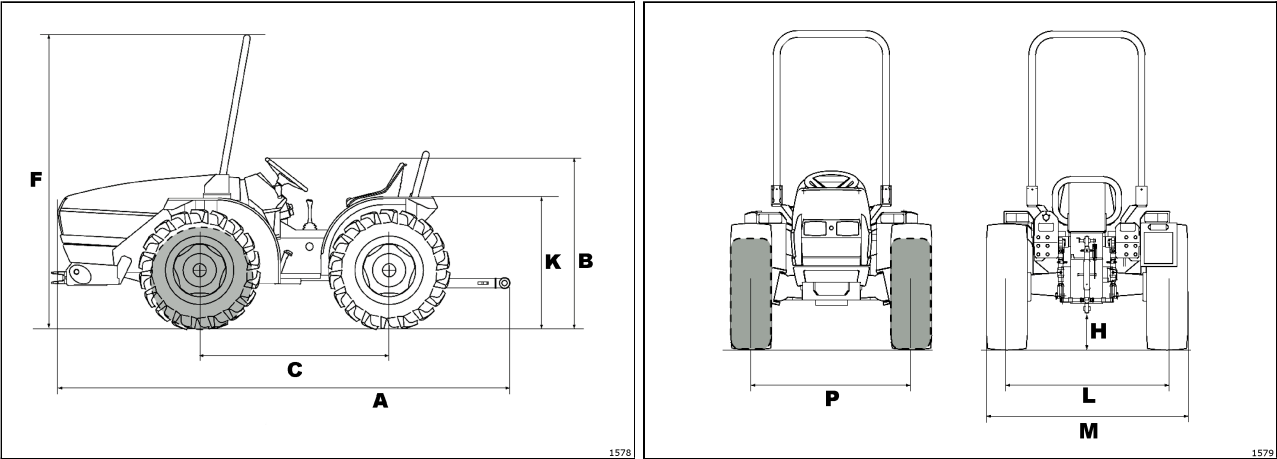
Warnings

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: 7.50-16"

A	Max length	mm	2870
M	Min - max width	mm	1103 - 1203
F	Height to chassis	mm	1970
C	Wheelbase	mm	1155
P	Min - max Front track	mm	896 - 996
L	Min - max Rear track		
	Weight with safety frame	Kg	1100

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.

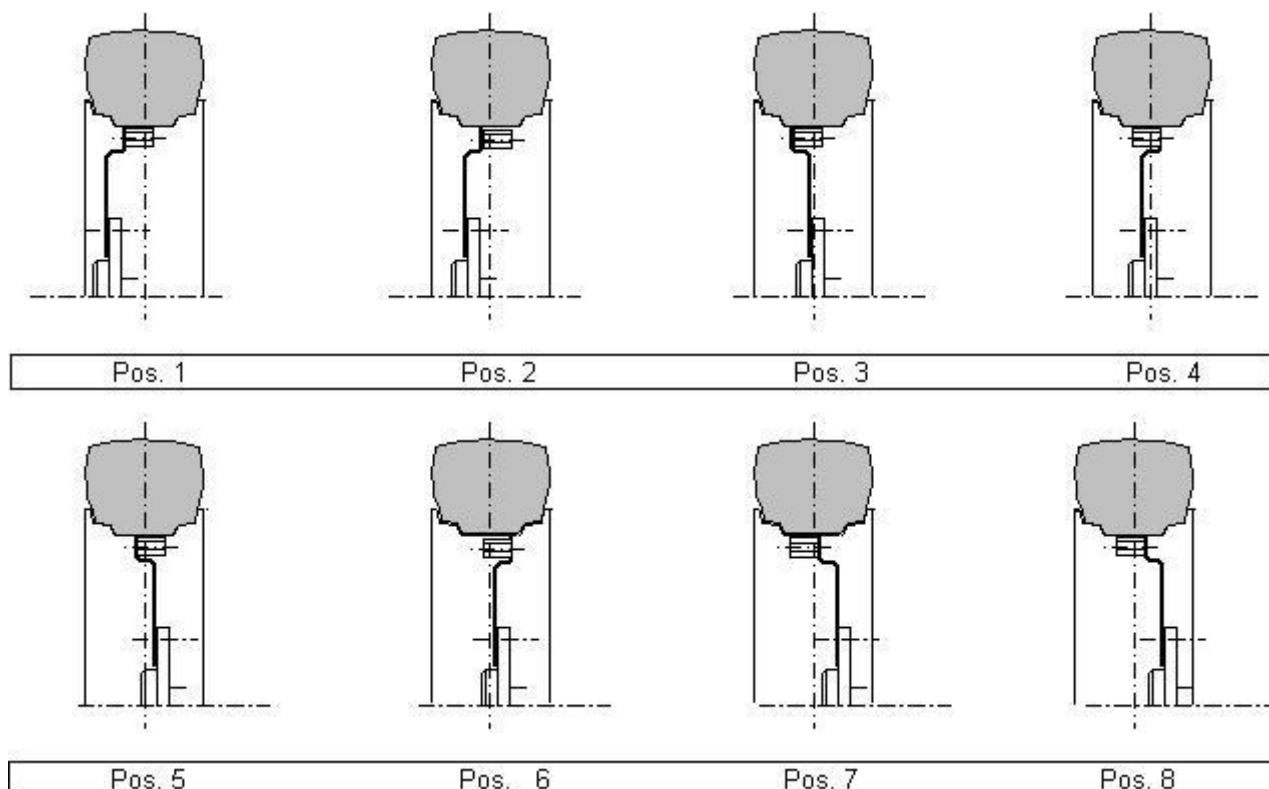


The overall width of the tractor is governed by laws when the tractor is driven on the roads: comply with the laws in force in the country of use.

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 7.50-16"	896	/	/	/	/	/	/	996
Rear 7.50-16"	896	/	/	/	/	/	/	996

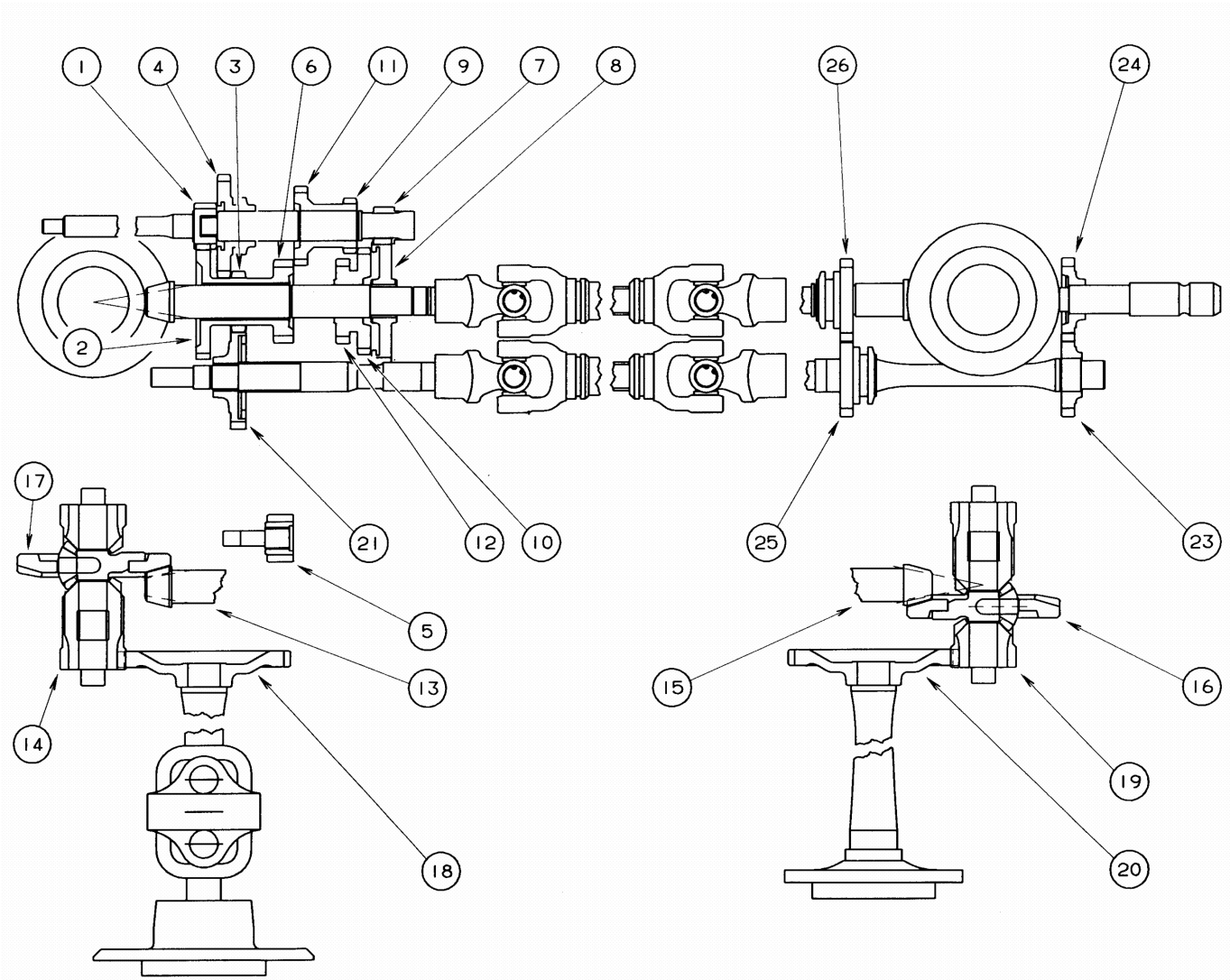
02.30 Table of speeds 6+3

FORWARD SPEED WITH ENGINE AT MAXIMUM POWER				
N° SPEED GEARS		GEAR RATIO		3000 Rpm
				Speed with tires (Km/h)
		GEARBOX	TOTAL	7.50-16" ROLLING CIRC. mm 2356
STANDARD SPEEDS				
FORWARD	1	4.30	349.68	1,2
	2	2.06	167.43	2,4
	3	1.05	85.02	4,8
	4	4.30	65.06	6,3
	5	2.06	31.15	13,2
	6	1.05	15.82	26
REVERSE	1	4.30	266.43	1,5
	2	2.06	127.56	3,2
	3	1.05	64.78	6,3

02.40 Inflation pressures table, loads and masses

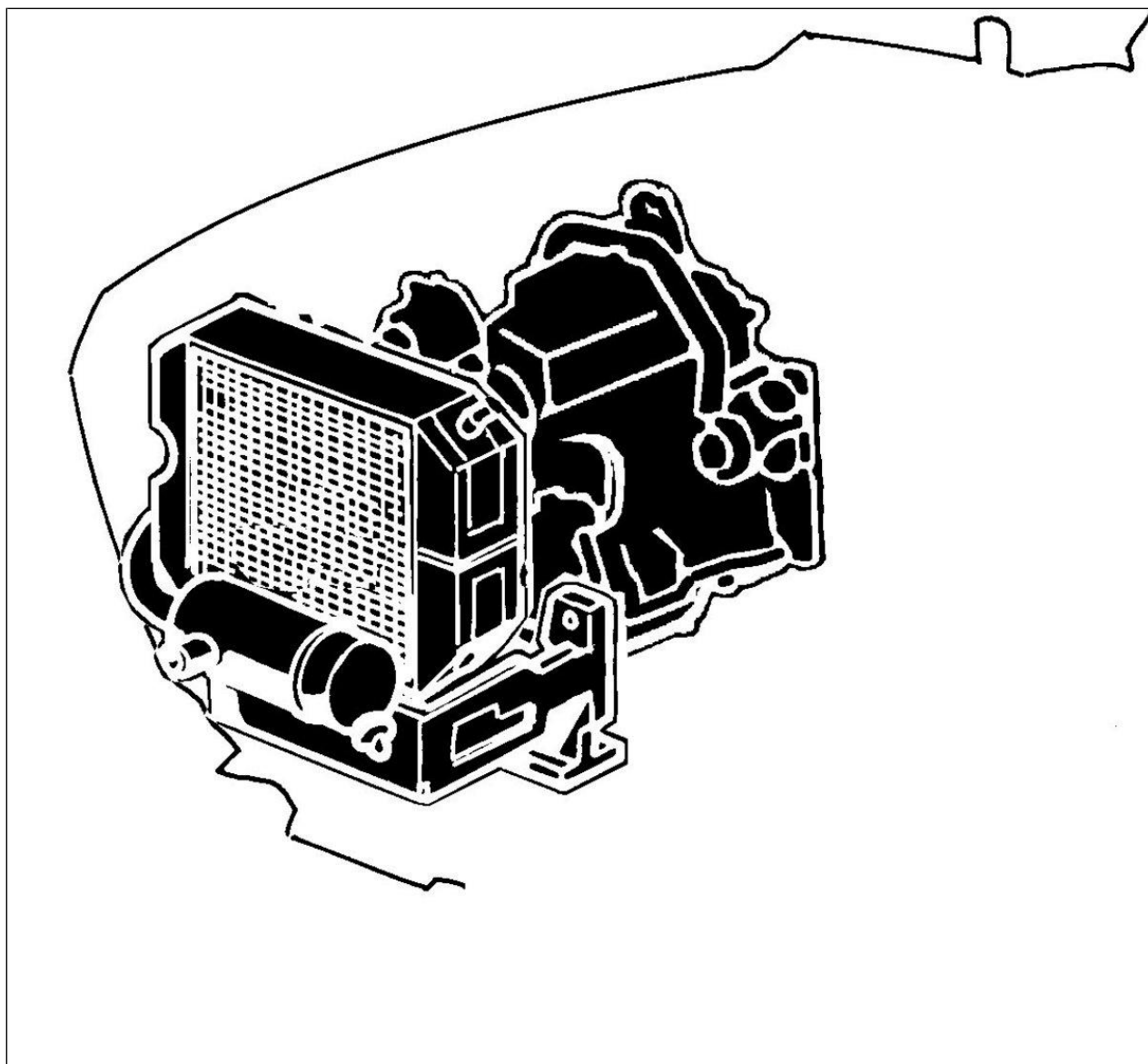
TYRES	TYPE	MAXIMUM LOAD PER AXLE (KG)	PRESSURE Bar (MAX)	SPEED Kph
FRONT	7.50-16"	700	3.0	30
REAR	7.50-16"	980	3.0	30

02.50 Transmission scheme



TRANSMISSION					
POSITION		NUMBER OF TEETH		POSITION	
1	Z=	15		11	Z= 22
2	Z=	43		12	Z= 23
3	Z=	16		13	Z= 9
4	Z=	30		14	Z= 12
5	Z=	11		15	Z= 9
6	Z=	21		16	Z= 43
7	Z=	10		17	Z= 43
8	Z=	43		18	Z= 38
9	Z=	17		19	Z= 12
10	Z=	35		20	Z= 38
				21	Z= 29

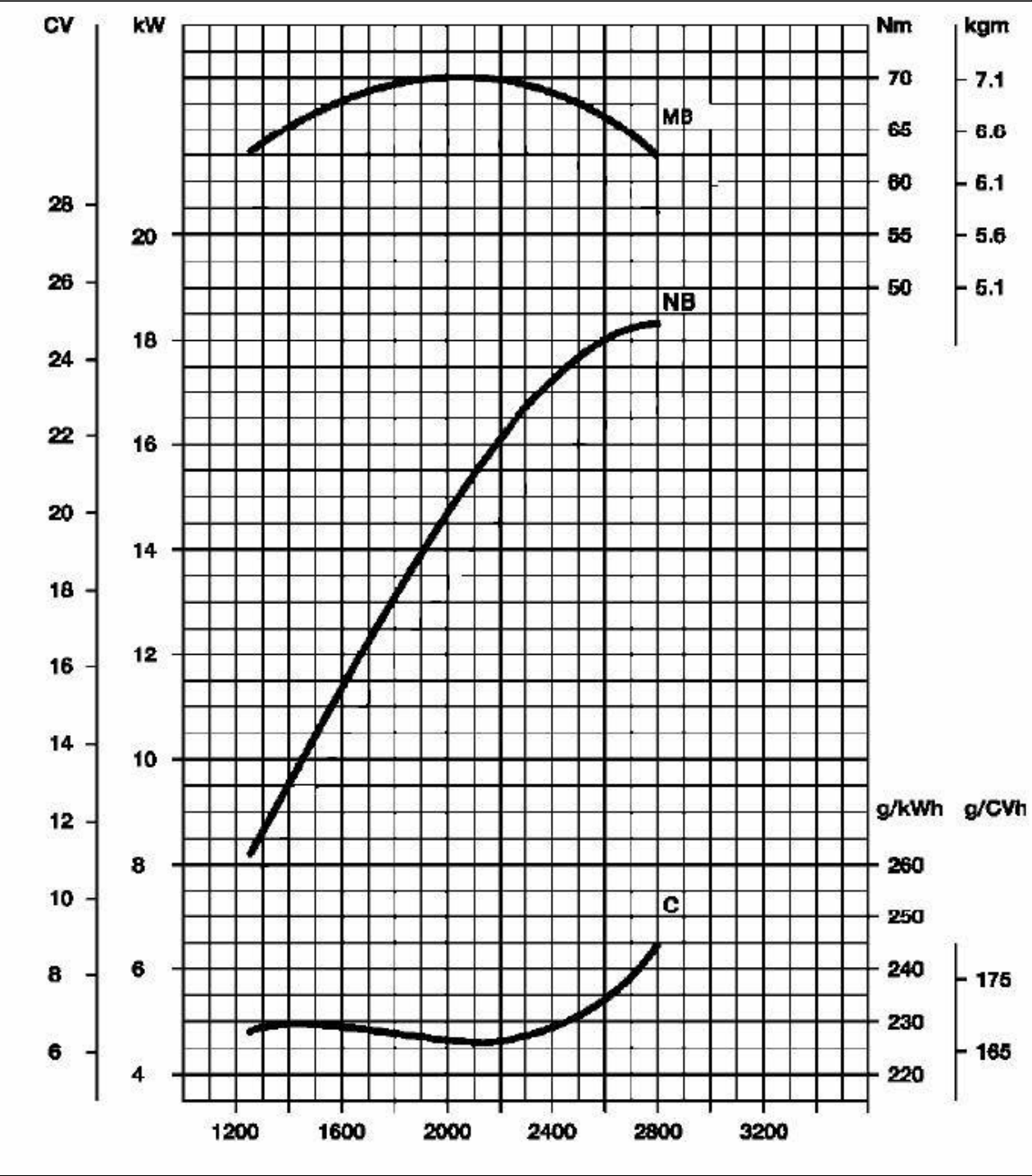
15 - ENGINE



ENGINE SPECIFICATIONS

15.01 Engine performance graph

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

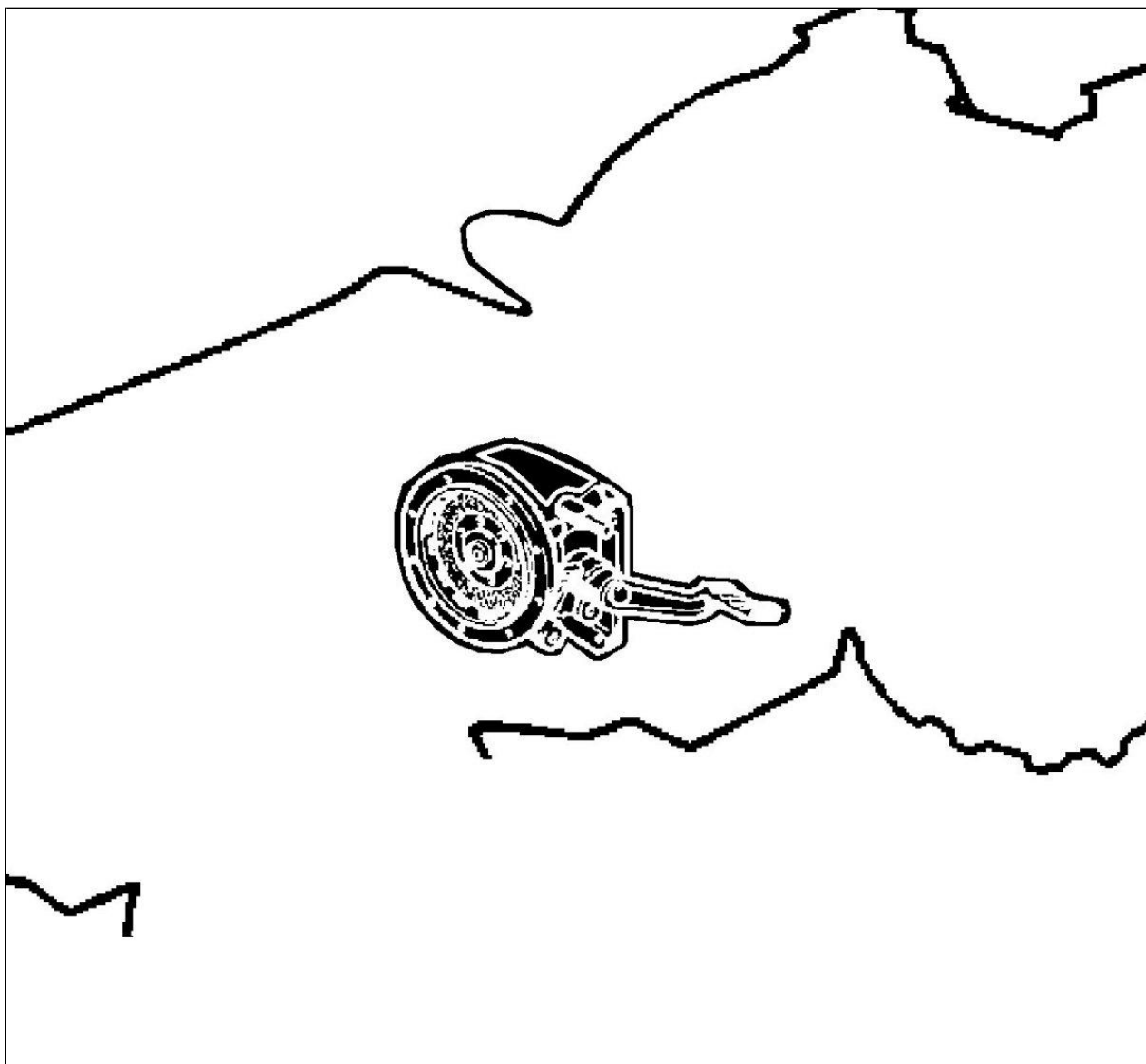


Prior to working on the engine, please contact an authorized LOMBARDINI workshop.
For replacement of filters, oil and grease consult the Owner's Manuals for engine and tractor.

15.02 Engine technical data

Engine		Lombardini 9LD 626/2 B2 NR
Type		Diesel
Cooling		Air
Cylinders	N	2
Displacement	cc	1248
Bore	mm	95
Stroke	mm	88
Compression ratio		17.5:1
Engine RPM		2800
Rated power Power rating in kW according to 80/1296/EC - ISO 1585	Kw (hp) / rpm	18,2 (24,7) / 2800
Max torque	Nm (Kgm) / rpm	68 (6,9) / 2200
Idling rpm	Engine RPM	1000 ± 100
Oil consumption (Max, rpm - Power NA)	Kg/h	0.013
Standard sump capacity	Kg	3.1
Dry weight	Kg	110
Max. tolerated gradient for discontinuous service (instantaneous)		25° (35°)
Battery	V / ah	12 / 44
Fuel tank	lt.	24

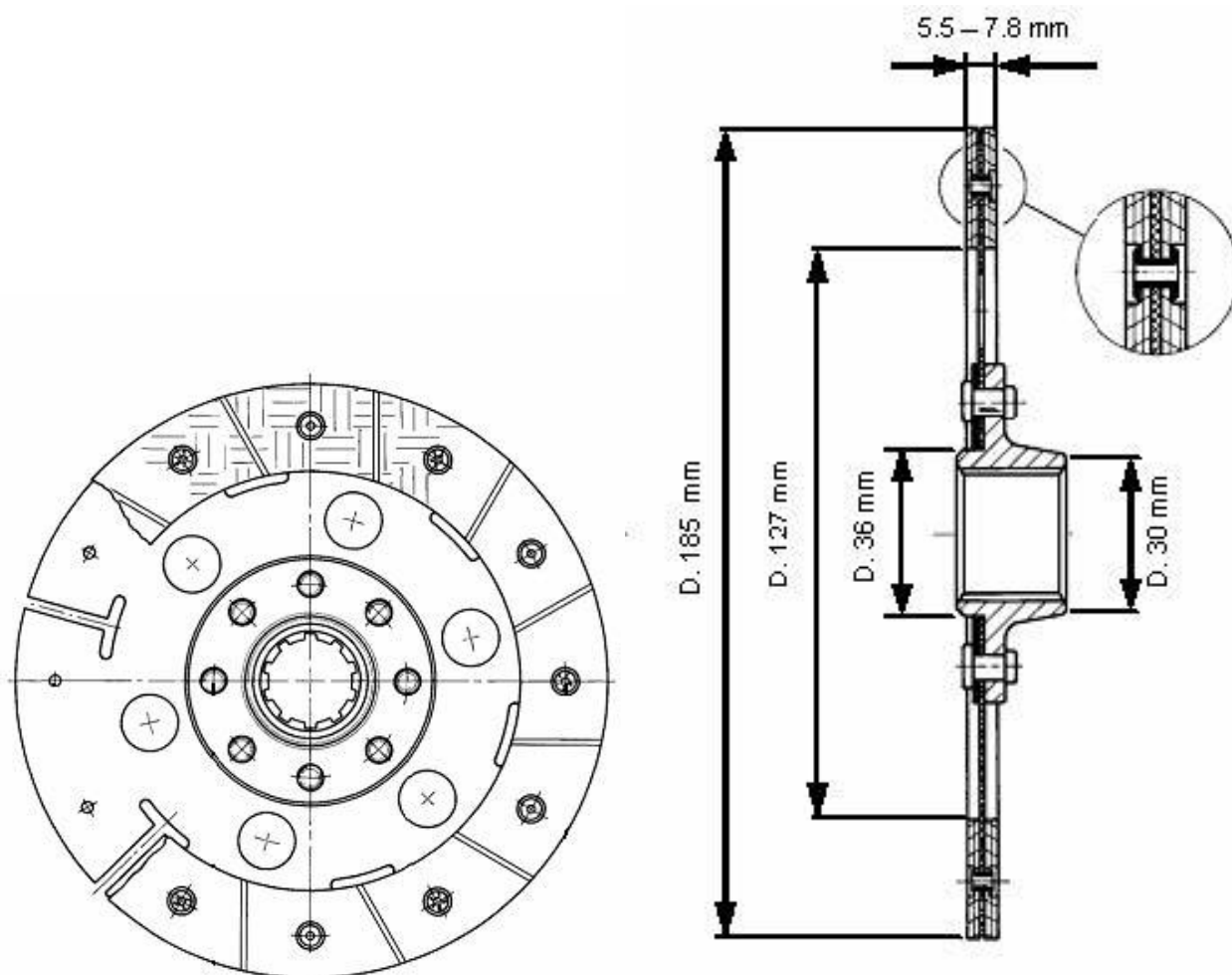
27 - CLUTCH



ADJUSTMENT ASSEMBLY CLUTCH**27.10 Specifications assembly clutch**

CLUTCH: Dry, single-plate clutch with pedal control **monodisco a secco con comando a pedale**

TYPE: F 215



27.20 - Adjustment of traction clutch pedal

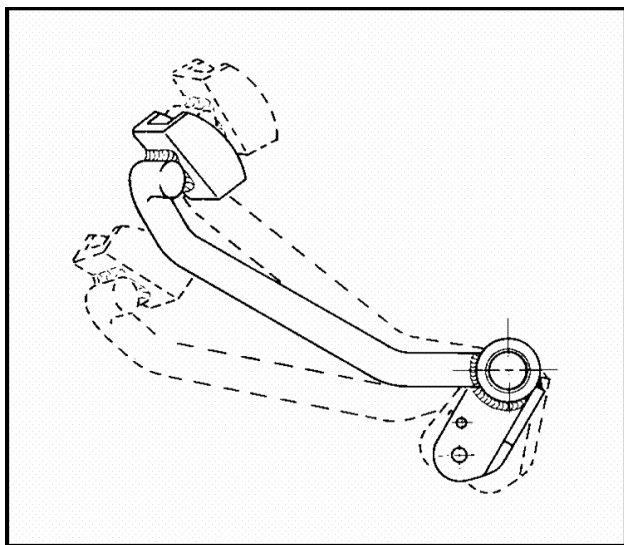


Fig.1

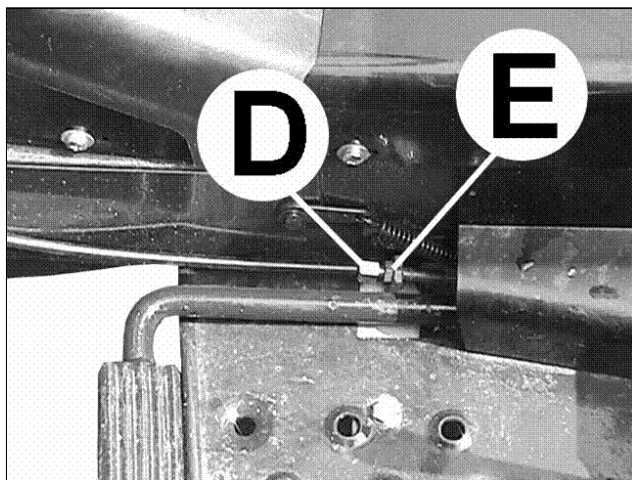


Fig.2

- The play at the point where the clutch pedal detaches must be $\frac{1}{3}$ rd of the pedal's total travel (fig. 1).
- Loosen nut **E** (fig. 2).
- Unscrew adjuster screw **D** to reduce pedal play. Tighten the screw to increase the play. Lock nut **E** once the adjustments have been made.

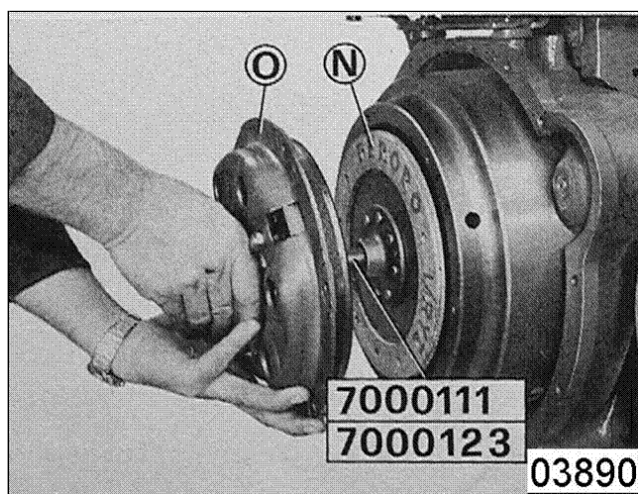


Fig.3

Pay particular attention when mounting driven disc **N** (fig. 3) and pressure plate **O** on the fly- wheel. Remember to keep disc **N** centered before fixing pressure plate **O**. Use a piece of the main shaft as a guide in order to correctly mount the clutch assembly.

27.30 - Clutch lever adjustment

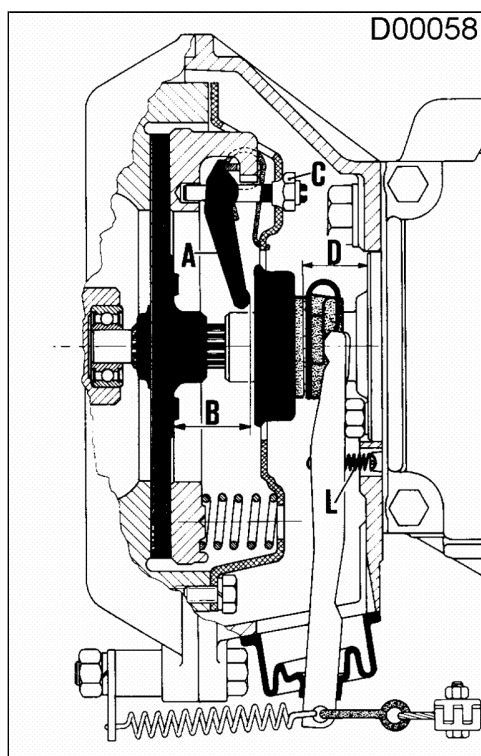


Fig.4

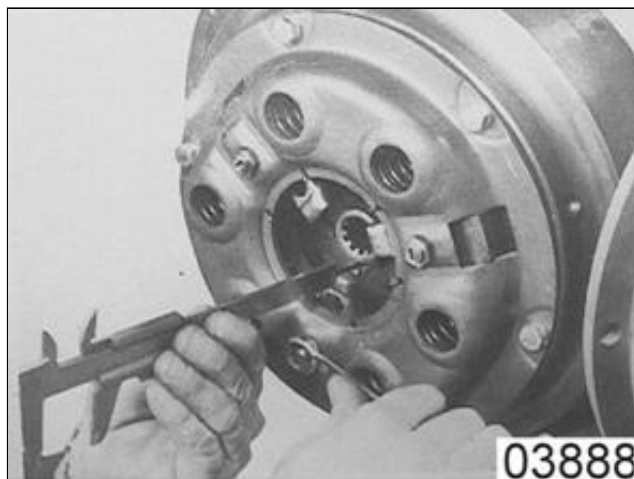


Fig.5

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.

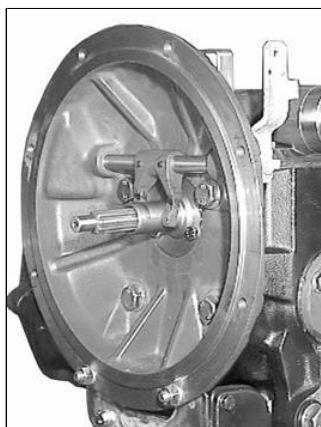


Fig.4A

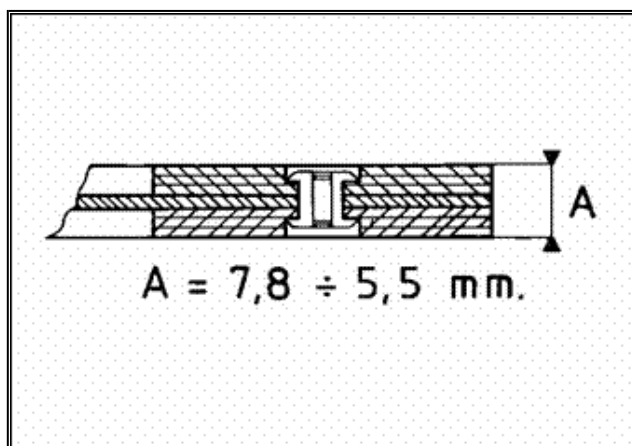


Fig.6

The picture 4A shows the orientation of the internal levers for the thrust bearing control, in respect to the external lever for the clutch control, which is positioned on the clutch bell.

The internal levers are fixed on the rod by two spring pins.

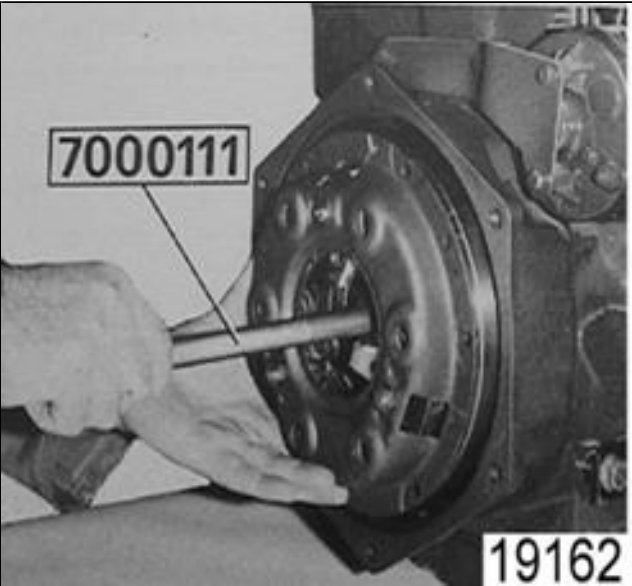


Fig.7

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

27.40 - Greasing

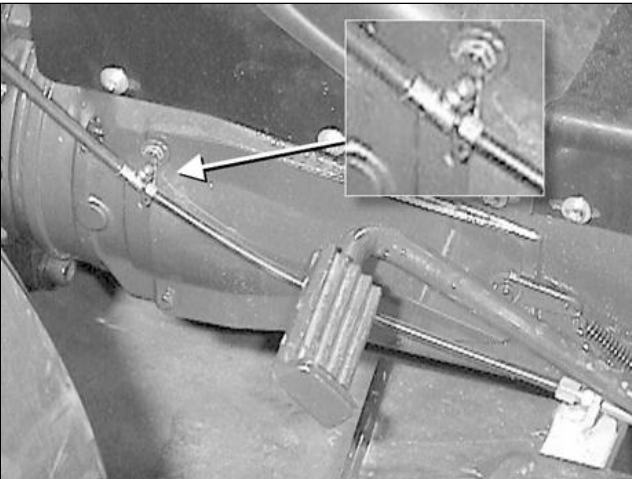


Fig.9

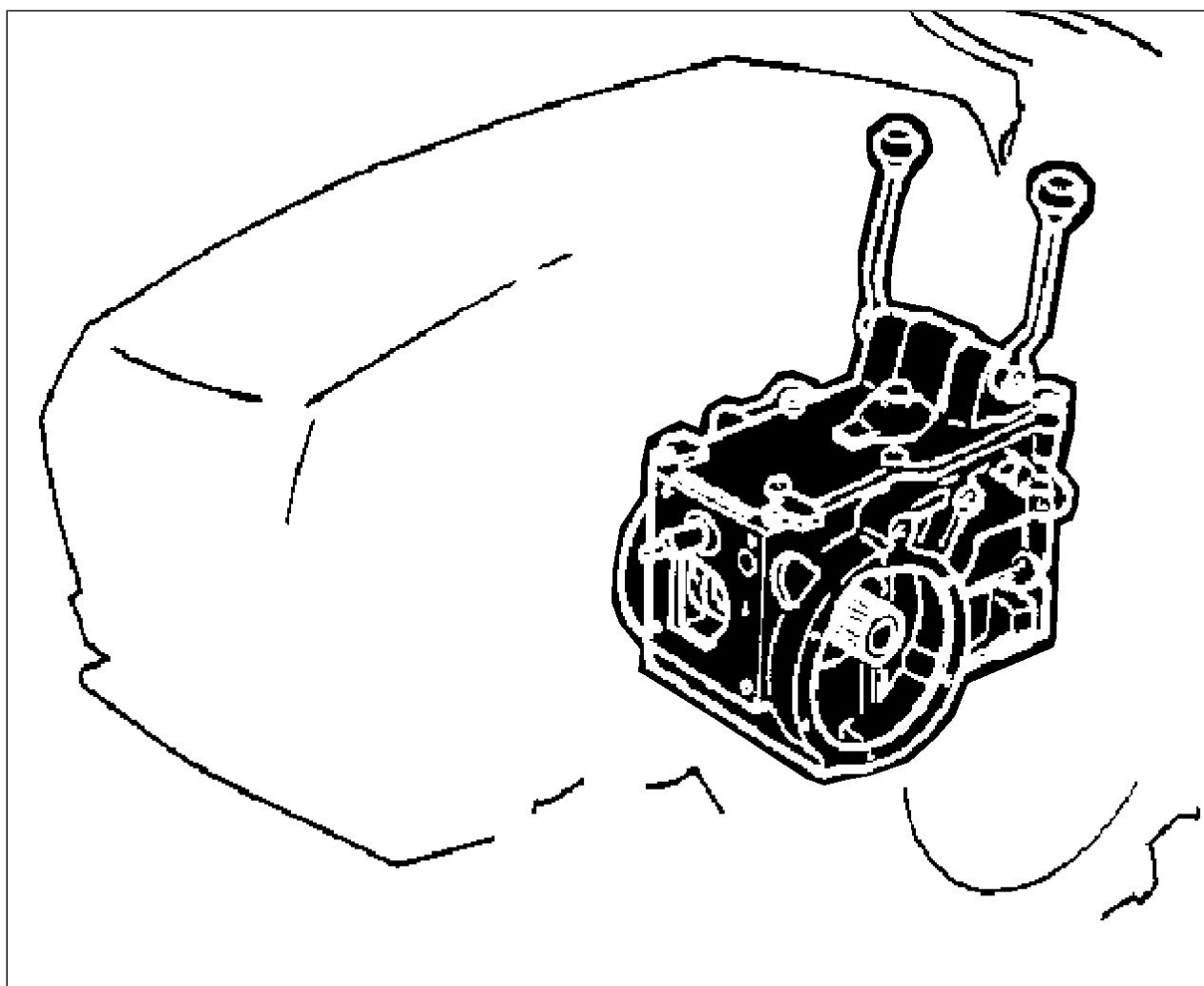
Grase point Nr. 3 shown in (fig. 9) after every 50 hours service

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

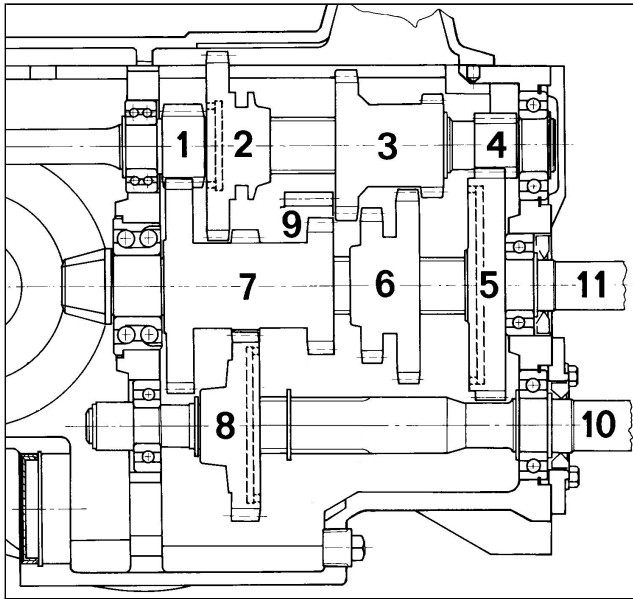


Fig.4

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 splined gear |
| 3 2nd 3rd speed fixed gear | 9 REV gear |
| 4 1st speed transmission shaft | 10 PTO shaft |
| 5 1st speed idle gear | 11 Transmission shaft |
| 6 2nd 3rd speed sliding 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: 13.5 kg Type: UNIVERSAL 15W-40

33.20 - How to adjust the speed selection

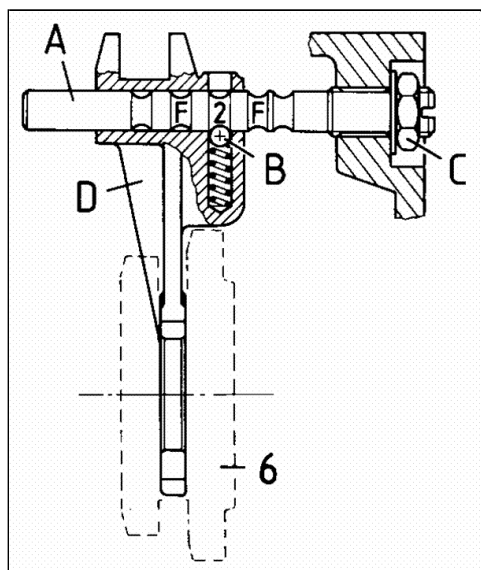


Fig.1

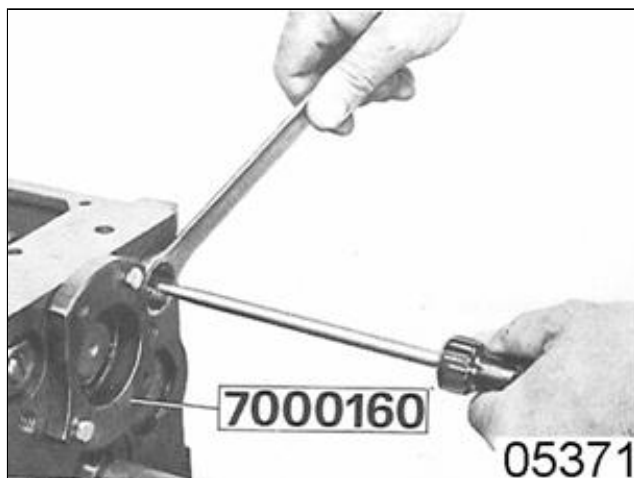


Fig.2

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

Tighten or loosen rod **A** in order to obtain the exact alignment between the gear teeth when the gear is being selected (fig. 2).

Before locking nut **C**, make sure that there is play in the end of travel points of the sliding gear corresponding to **1st** and **3rd** speed selection.

33.30 - Final drive control adjustment

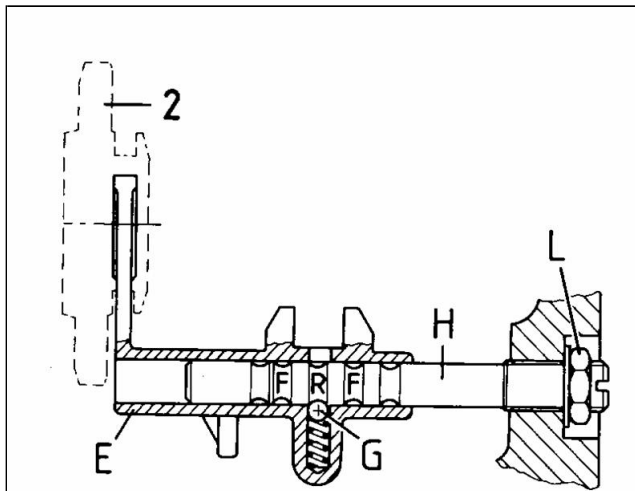


Fig.3

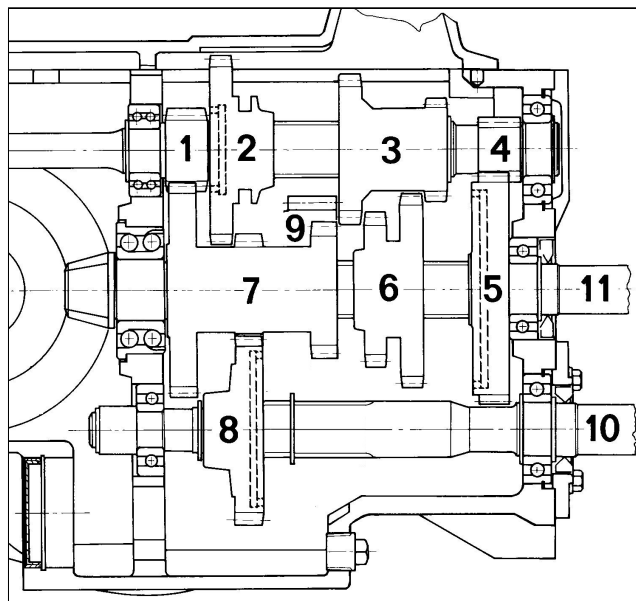


Fig.4

- Position fork **E** (fig. 3) on the rod so that ball **G** is in position **R**
- Tighten or loosen rod **H** in order to exactly align the teeth of gears **2** and **7** of (fig. 4) when one of the 3 speed gears is engaged.
- Before locking nut **L**, make sure that there is play in the end of travel positions of the gear that slides on the main shaft, corresponding to selection of the **REV** and **fast** speeds.

33.40 - Bevel pinion float

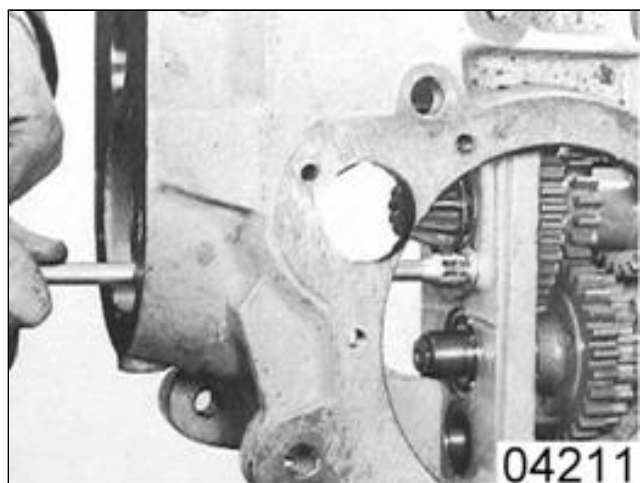


Fig.5

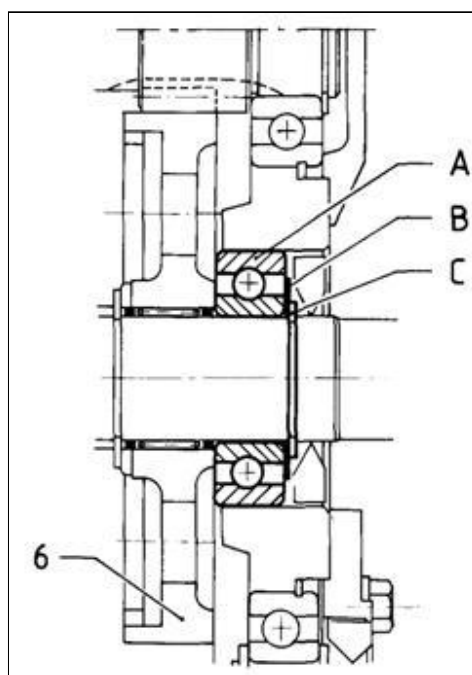


Fig.6

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 - Triple gear assembly

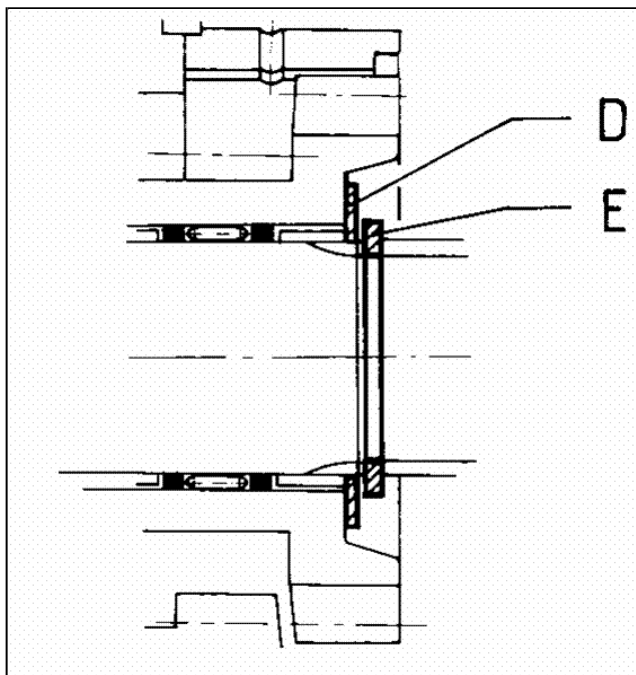


Fig.7

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

33.60 - PTO shaft float

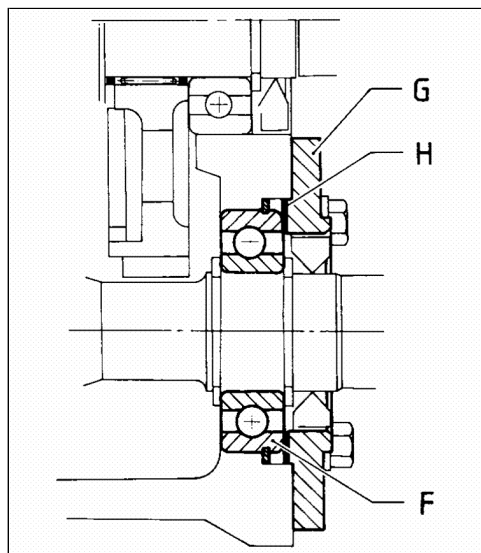


Fig.8

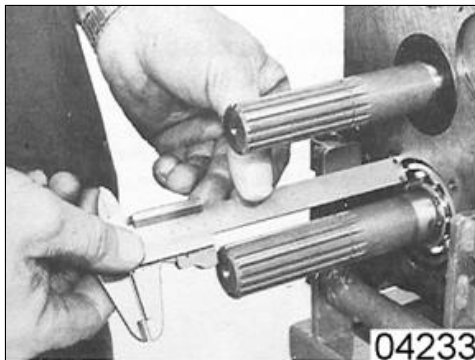


Fig.9

Move bearing **F** (fig. 8) forward through to the stop point on the housing and then take the measurements of (fig. 9) to establish the number of spacers **H** to mount before fixing cover **G**.

33.70 - Transmission shaft float

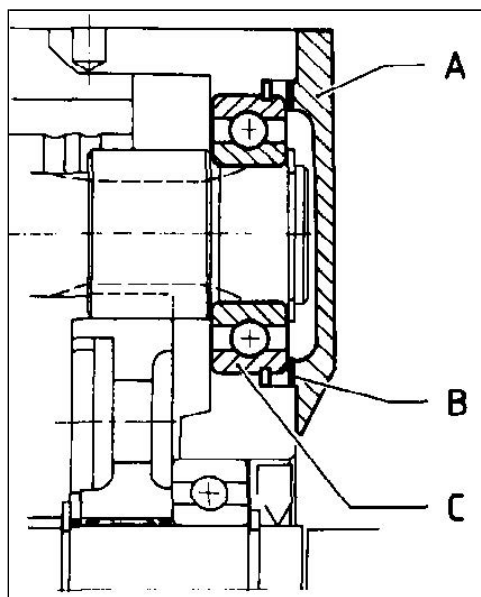


Fig.10

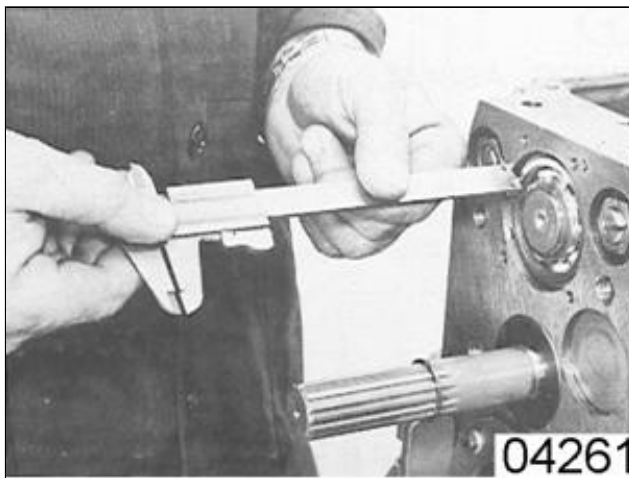


Fig.11

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**.

33.80 - Main shaft - transmission shaft paly

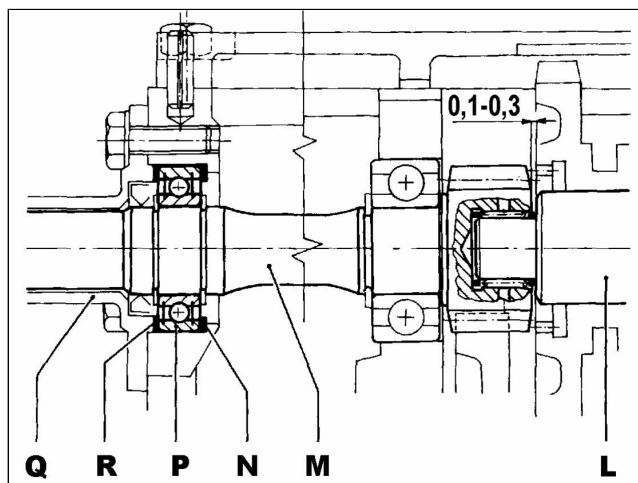


Fig.12

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.

33.90 - Main shaft float

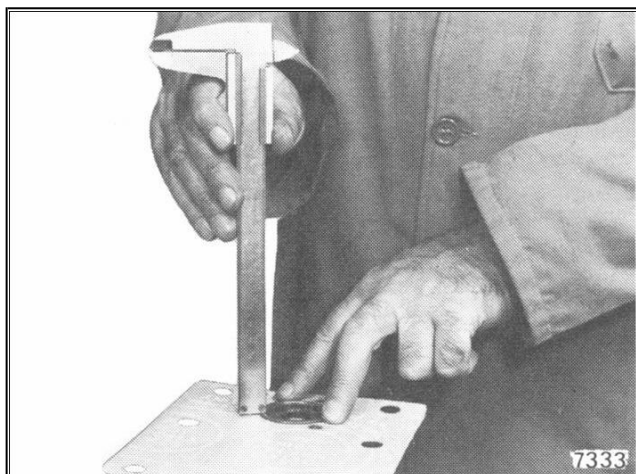


Fig.13

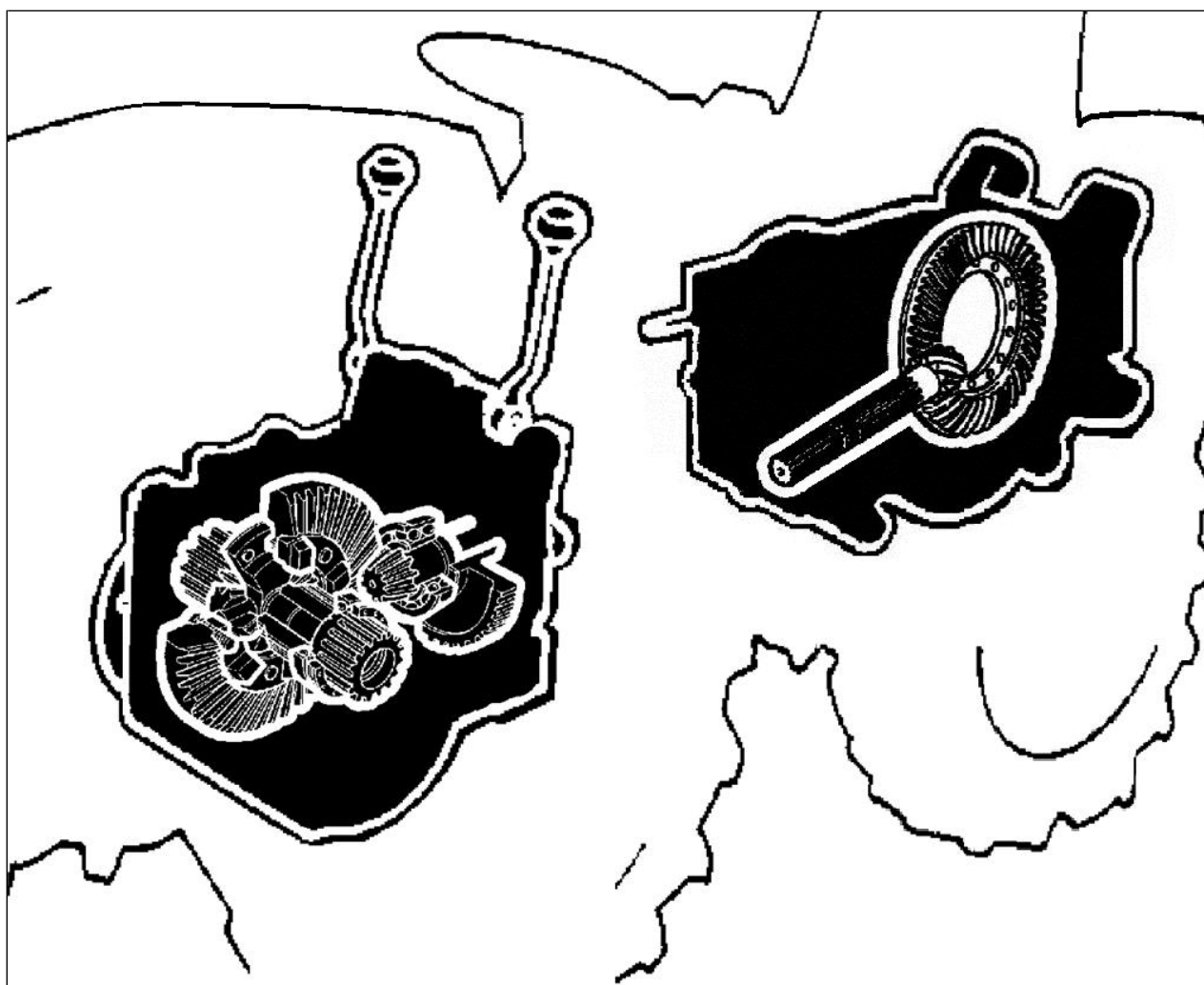
Take the measurements shown in (fig. 13) to establish the shims **R** required to keep bearing **P** of (fig. 12) in position, then mount the cover **Q**.

33.A - Tightening torque for assembly gearbox

Tightening torque expressed in kgm

Description	Kgm
M 14 X 50 screw that fixes the gearbox - clutch bowl	12
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 6x20 screw that fixes the PTO cover	1.5
M 8x5 nut to fix the PTO adjuster screw	1.9
M 14x14 Nut the fixes the gearbox-central pivot	9
M 14x45 Screw the fixes the gearbox-central pivot	12
M 16x1.5x15 Nut that fixes the REV shaft	12
M 16x1.5x8 Nut that fixes the gearbox control rods	7

36 - REAR & FRONT DIFFERENTIALS



ADJUSTMENT FRONT DIFFERENTIALS

36.10 - Front diffrential lock adjustment

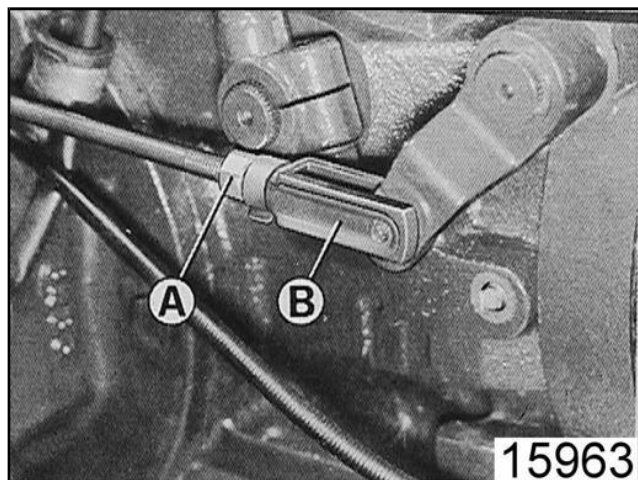


Fig.1

The assembly is correctly adjusted when the lock control lever releases the differential 50-60mm from its on-hold position. Proceed in the following way to adjust:

- loosen nut **A** (fig. 1);
- detach lever fork **B**;
- adjust the length by tightening or loosening fork **B**;
- after adjusting, connect the fork back on the lever and lock nut **A**.

36.20 - Front locking ring adjustment

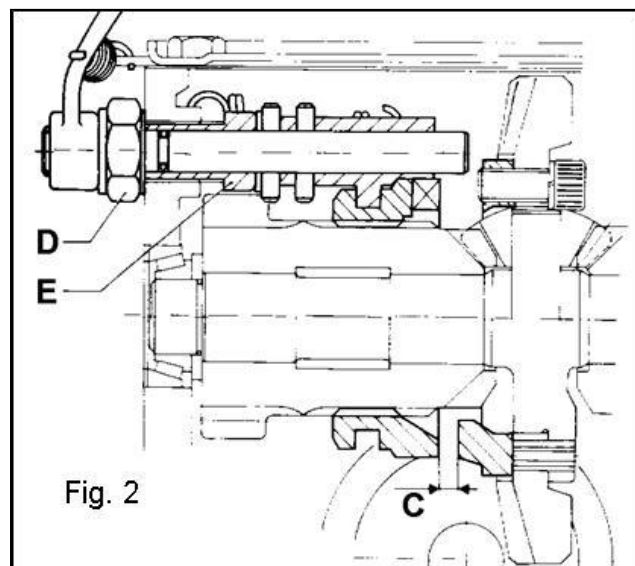
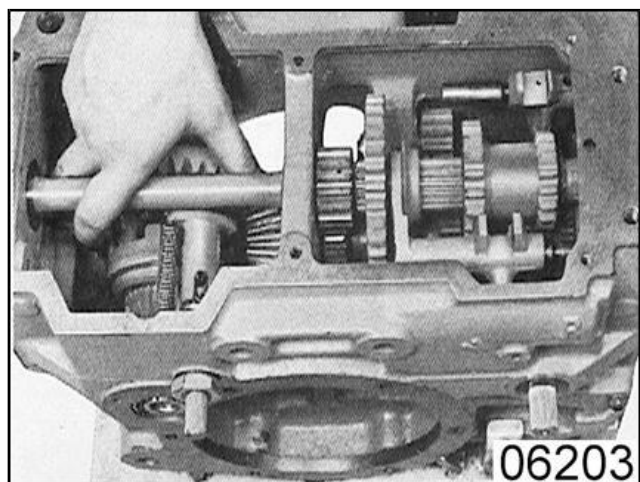


Fig. 2

Fig.2

Play **C** (fig. 2) must be 2.5-3 mm.

The crown wheel and pinion must be adjusted (see next section) before this play can be regulated. After this:

- Loosen nut **D**.
- Tighten or loosen perforated screw **E** until the exact setting has been obtained.
- Lastly, lock nut **D**.

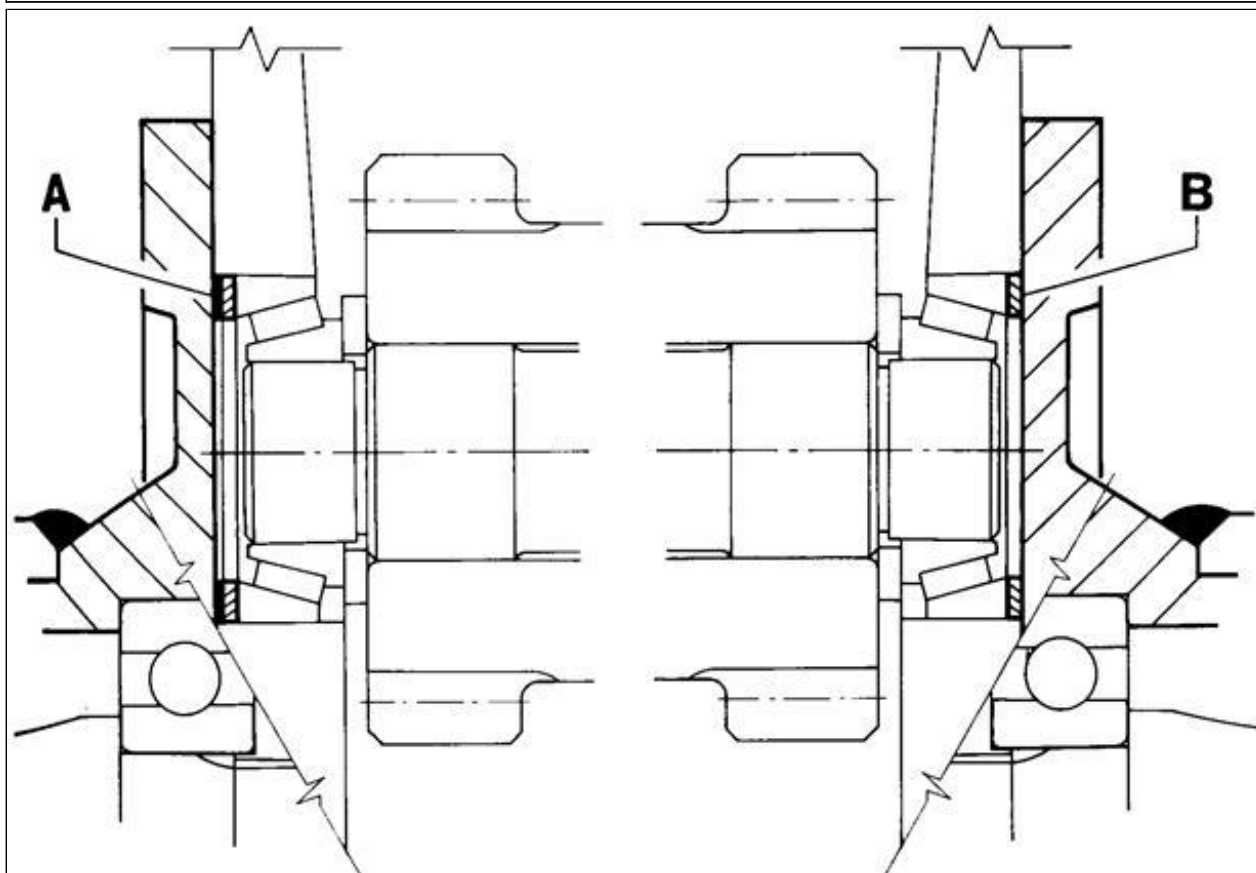
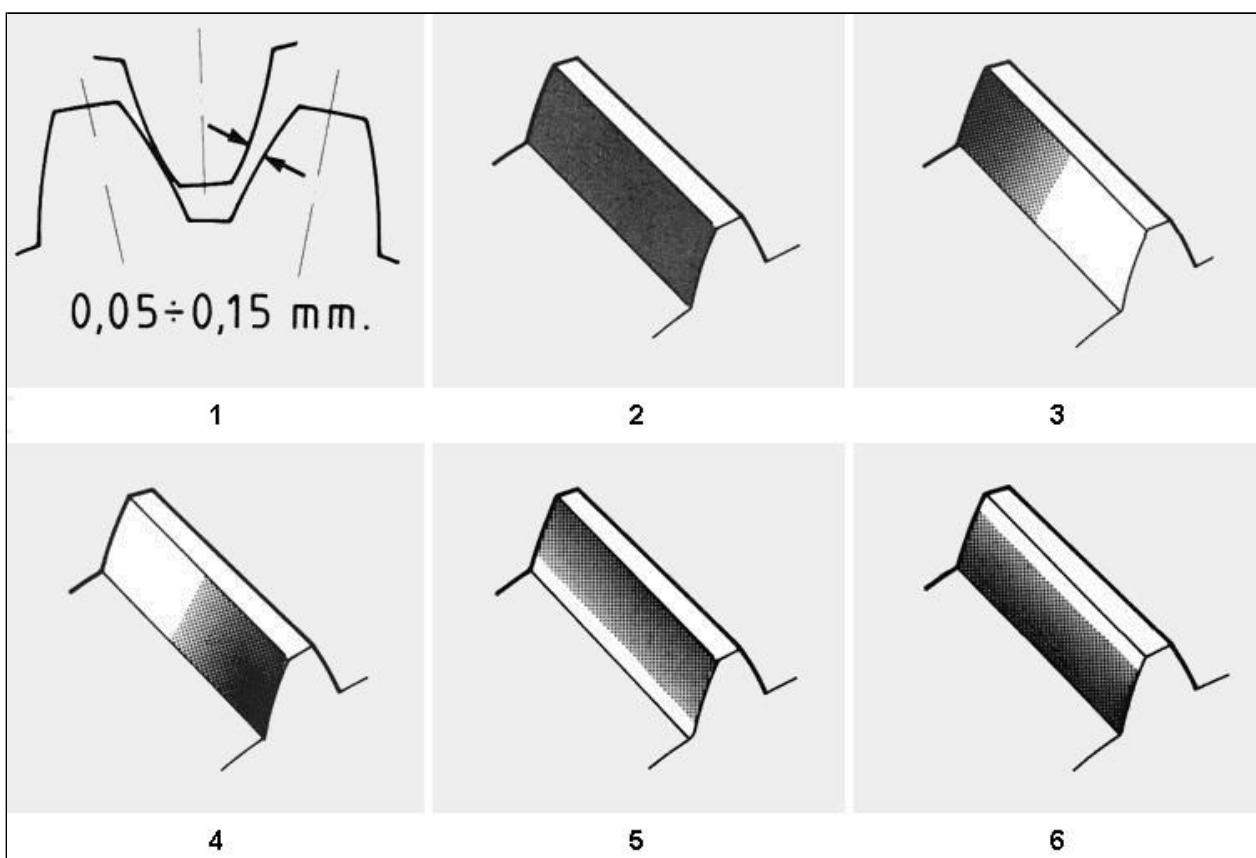
36.30 - Pinion - bevel gear coupling

Fig.3

- 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.

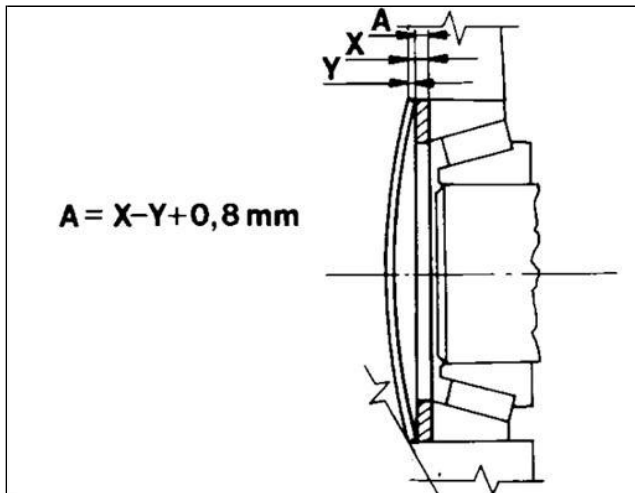


Fig.5

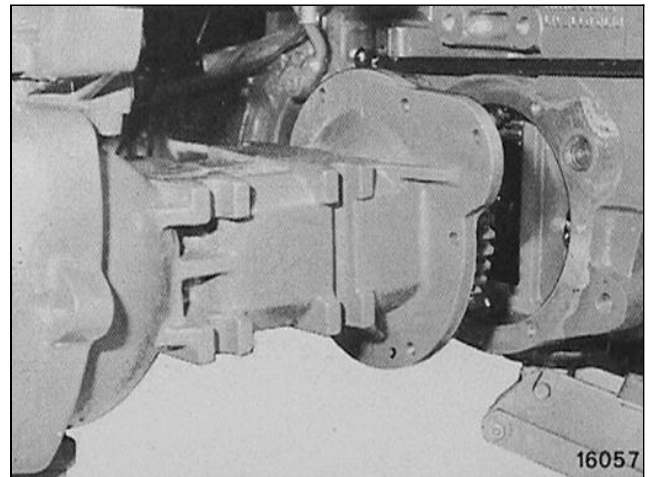
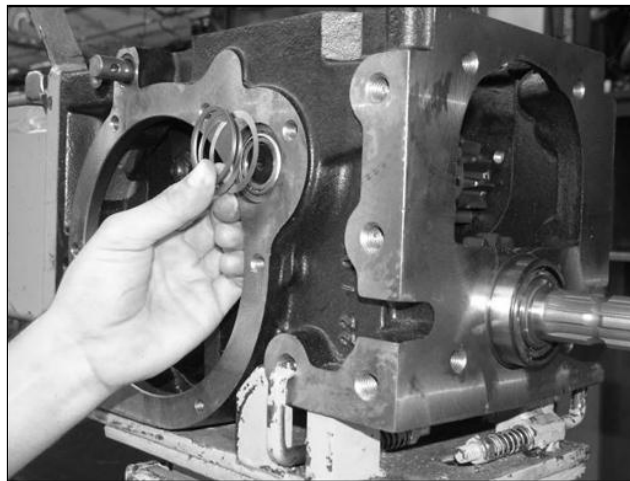


Fig.4



When the hubs are mounted on the housing, take care of the two through holes in the housing itself: the relative screws must be wrapped in Teflon to prevent oil from leaking or oozing out (fig. 4).

The Belleville washer must be preloaded **0.8 mm** in relation to the bearing surface of the housing (fig. 5).

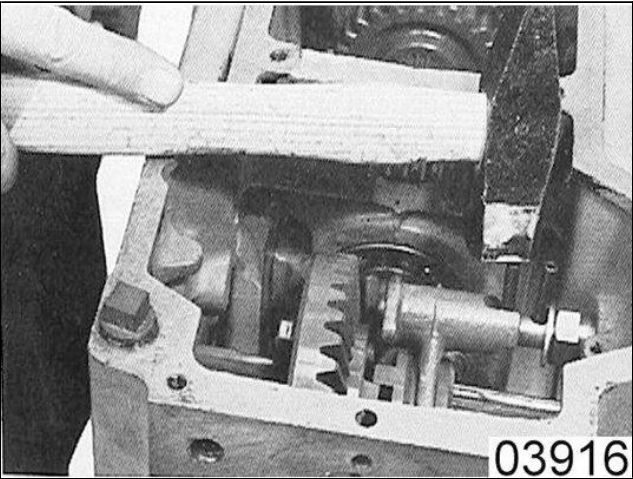


Fig.6

Take care of the position of the notch in the spring pins as it must not touch the operating surfaces (fork and washer) (fig. 6).

ADJUSTMENT REAR DIFFERENTIAL

36.40 - Rear differential group

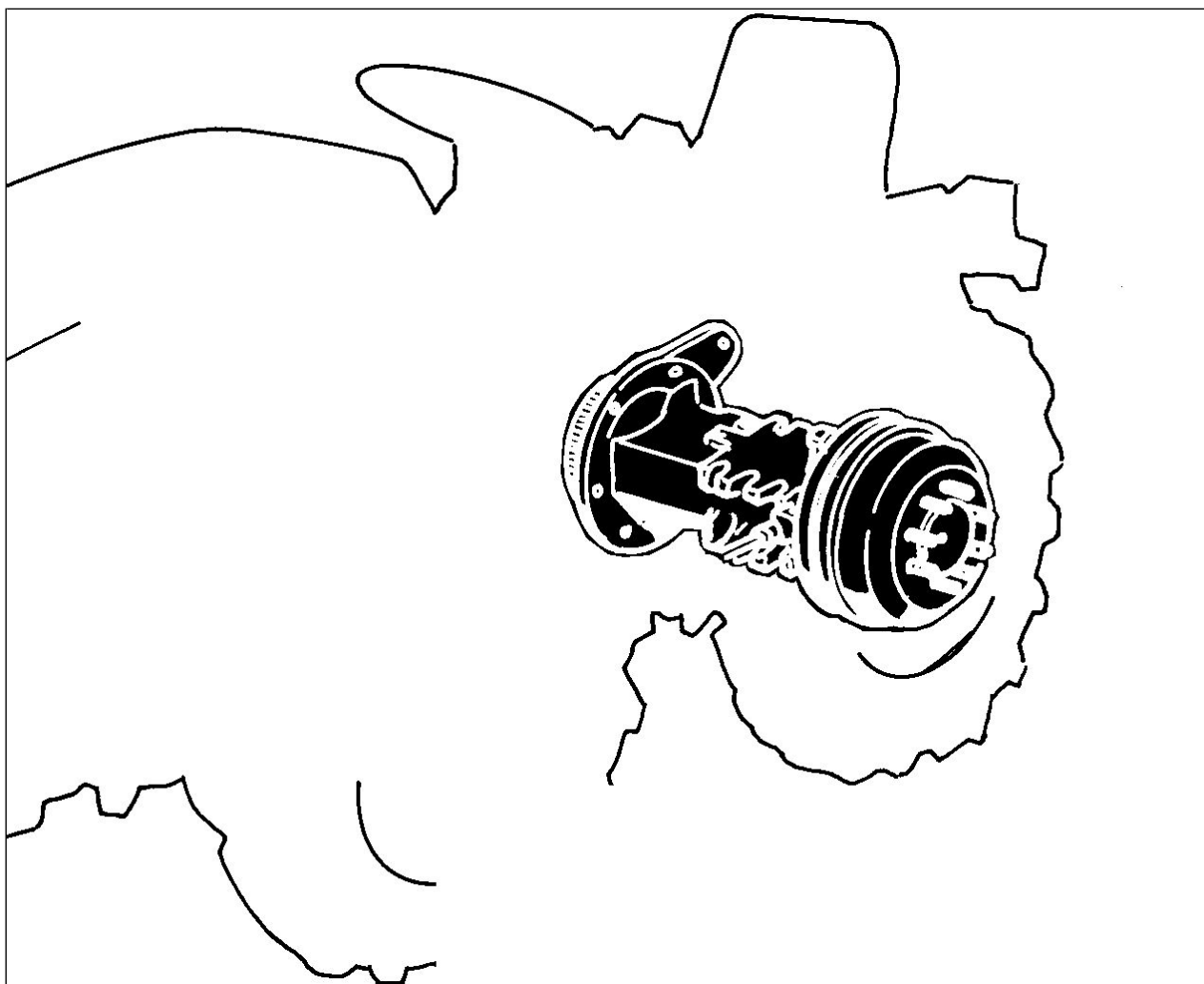
COMPLY WITH THE INSTRUCTIONS GIVEN FOR THE FRONT DIFFERENTIAL WHEN MOUNTING THE REAR DIFFERENTIAL.

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 20x1.5x9 locking guide retainer nut	5
M 10x30 hub fixing screw	6
M 10x35 hub fixing screw	6

39 - REAR FINAL DRIVE



ADJUSTMENT ON REAR FINAL REDUCERS

39.10 - Rear final reducers

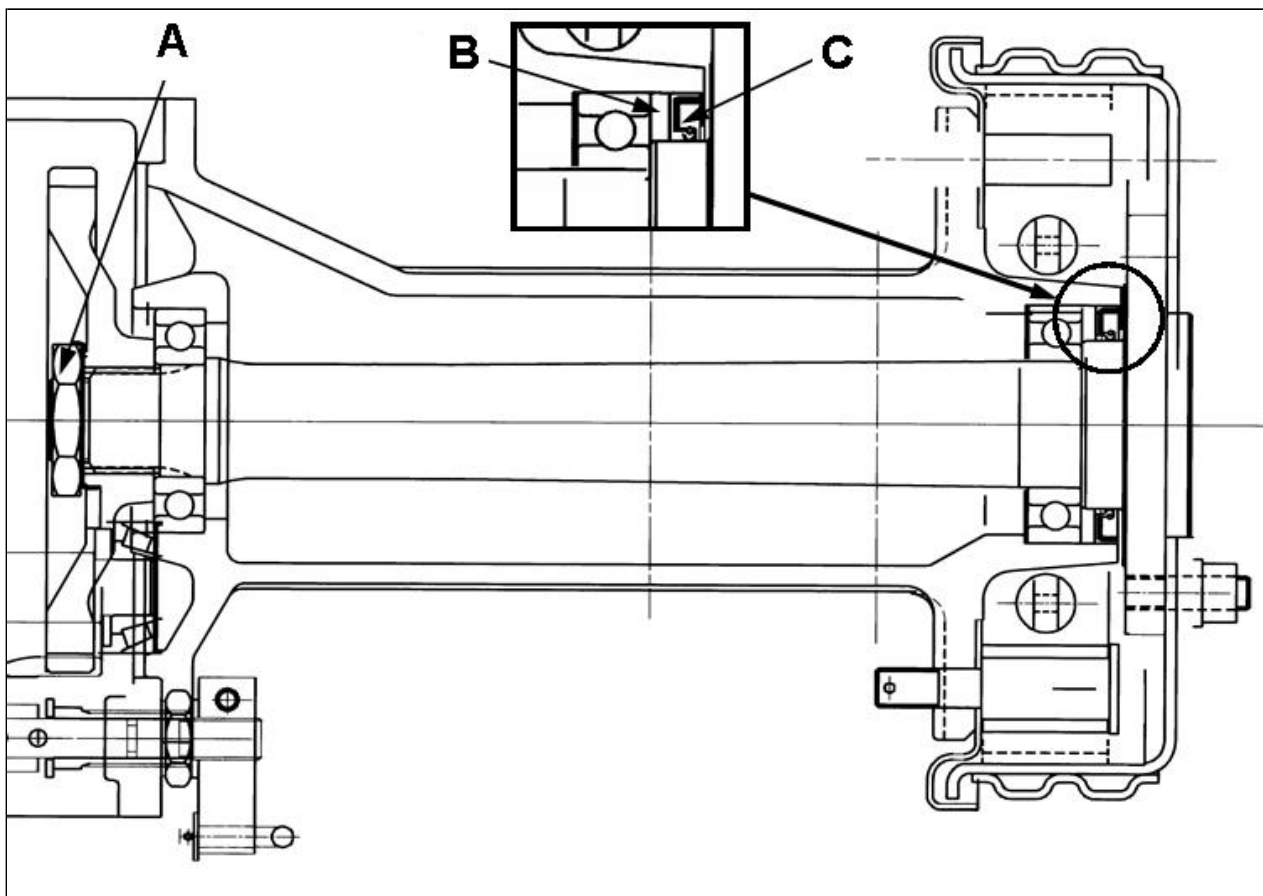


Fig.1

No particular operations are required when the rear final drivers are mounted: tighten the ring nut **A** to (M20=15Kgm-M25=20Kgm) torque (fig. 1) and then punch it so that the metal lip enters the slot on the axle shaft.

Do not forget to position spacer **B** before mounting oil retainer **C** (Fig. 1)



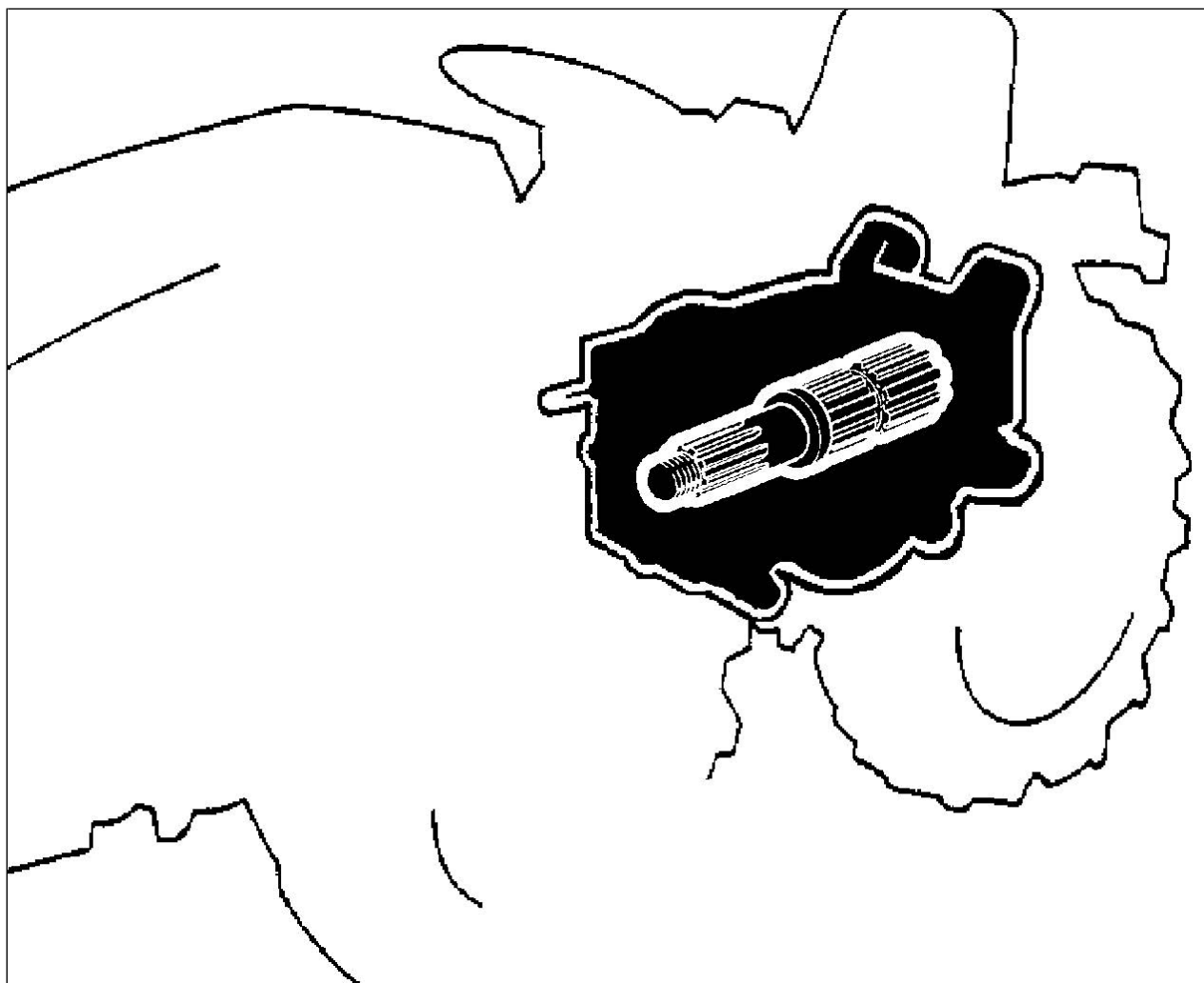
Fig.2

Punch the ring nut after having torqued it to the indicated load (Fig. 2)

39.A - Tightening torque to back reduction gear**Tightening torque expressed in kgm**

Description	Kgm
M 10x35 screw that fixes the hub to the rear differential	6
M 12 screw fixing the wheel to the axle shaft	8
M 20 wheel control gear fixing nut	15
M 25 wheel control gear fixing nut	20

45 - REAR PTO



ADJUSTMENT TO REAR PTO

45.10 - Rear PTO fork adjustment

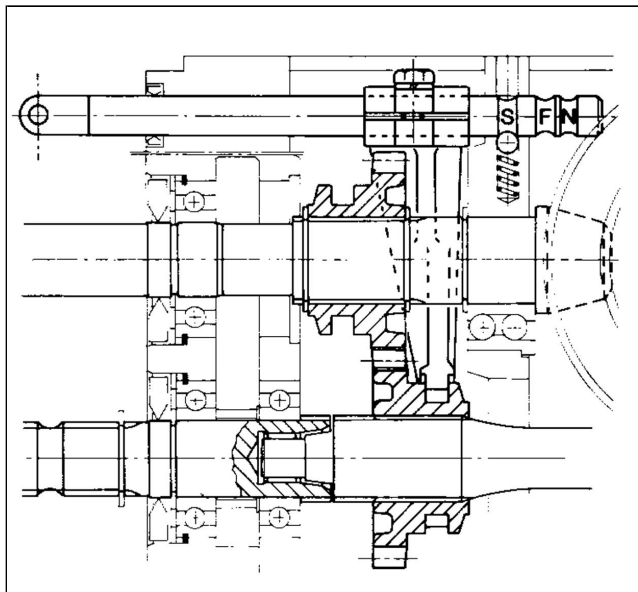
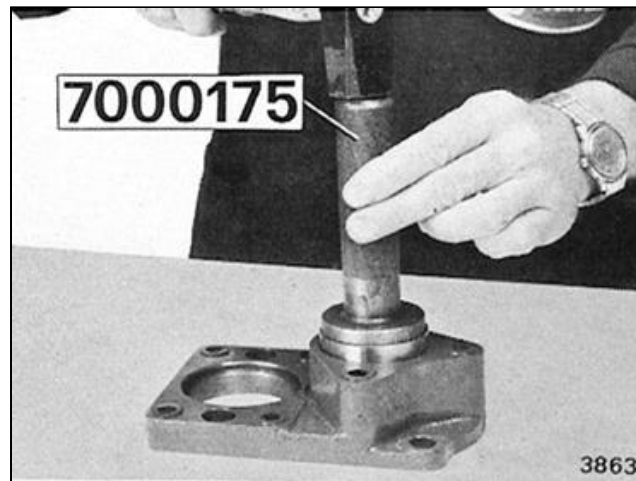


Fig.1



- Set the selector rod to **S** (synchronized) as shown in (Fig. 1).
- Align the two gears and lock the fork on the rod.
- Make sure that there is play in the sliding gear and of travel points on a level with the **S** (synchronized) and **N** (normal) selection settings.

45.20 - Rear PTO ring nut adjustment

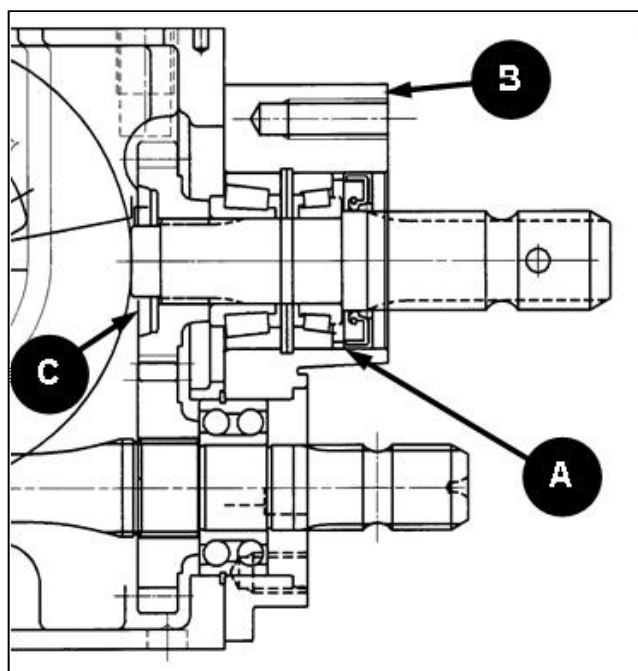
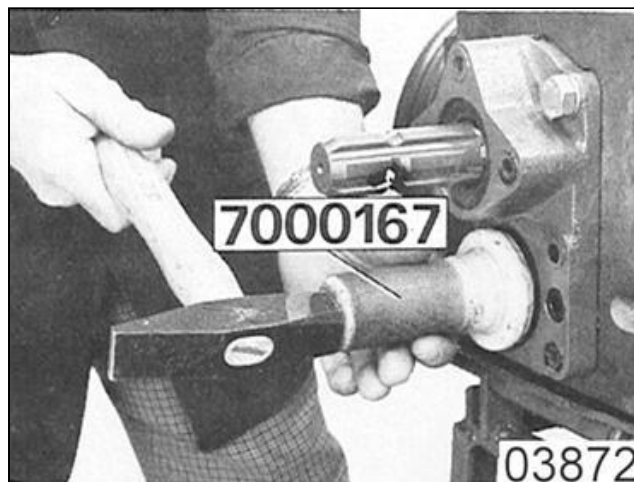


Fig.2



The following operations must be carried out to correctly preload the taper bearings: (fig. 2)

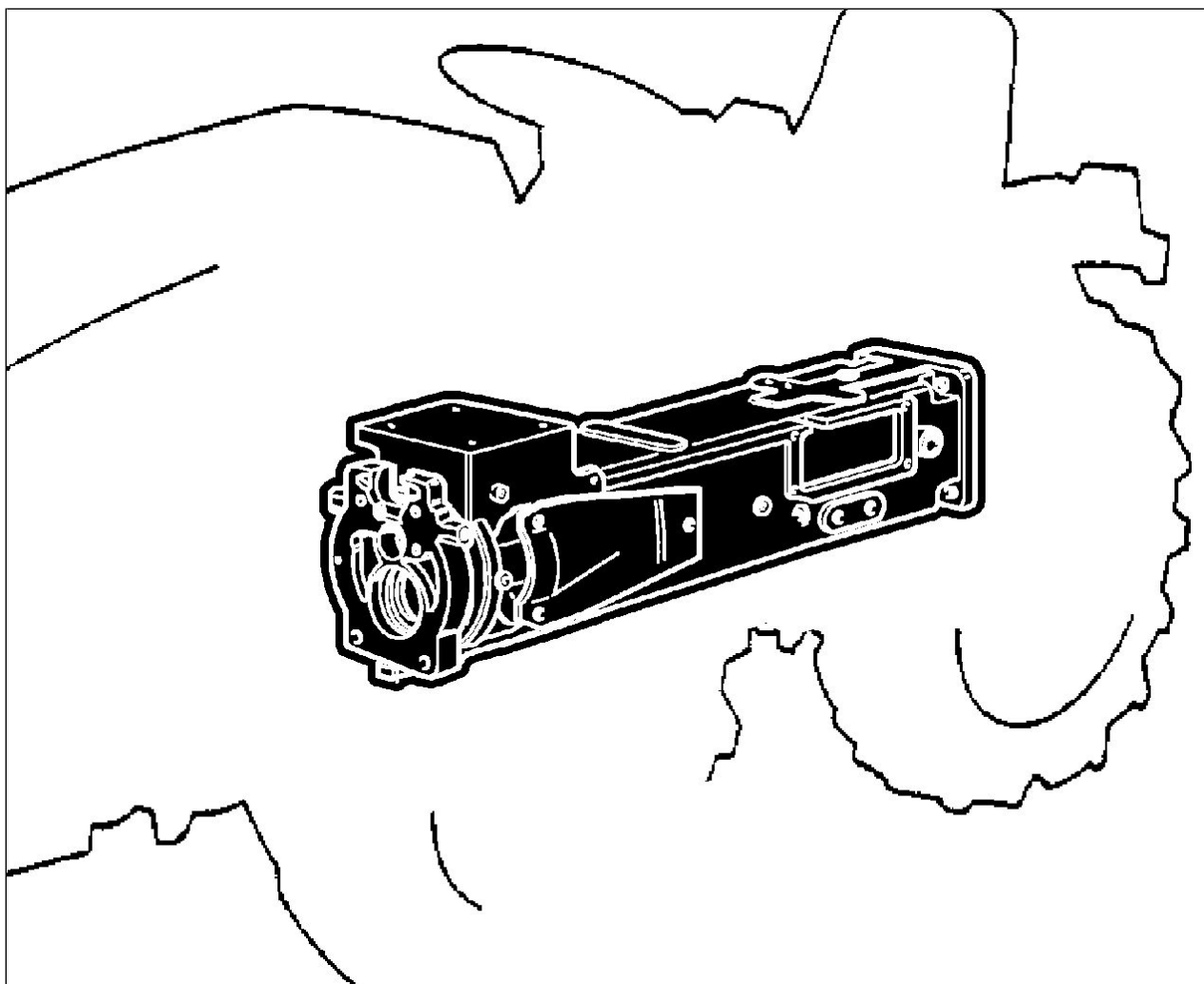
- Demount the complete PTO cover (part **B**).
- Remove the retainer and tighten the ring nut until the play has been eliminated.
- Now unscrew the ring nut and retighten it with the aid of a torque wrench with a 2 Kgm setting (part **C**).
- Fit the retainer back on the ring nut and remount the PTO cover.
- Do not forget spacer **A** behind the oil retainer.

45.A - Tightening torque to rear PTO

Tightening torque expressed in kgm

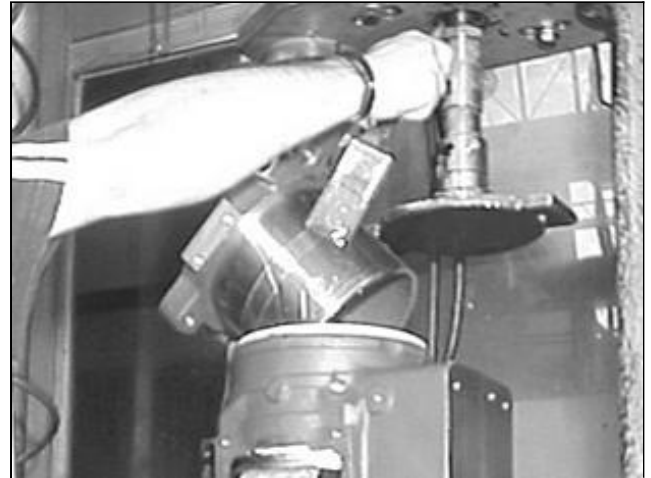
Description	Kgm
M 25x1.5 ring nut that fixes the rear PTO shaft	2
M 14x35 screw that fixes the PTO cover	12
M 14x25 screw that fixes the PTO cover	8
M 8x25 diff lock control fork fixing screw	2.5
M 8x30 PTO control lever screw	2

48 - CENTRAL JOINT



ADJUSTMENT ON CENTRAL JOINT

48.10 - Central joint group



The sequence illustrated shows how the central pivot is mounted. The sheared plastic bushes must be inserted inside the pivot. Their cuts must not be mounted aligned with each other but staggered to prevent the lubricating grease from oozing out. The front plastic bush (engine side) must have the cut at the bottom, the rear bush at the top. The pivot must be assembled with a press and relative plug able to exercise a thrust of at least 3500 N.

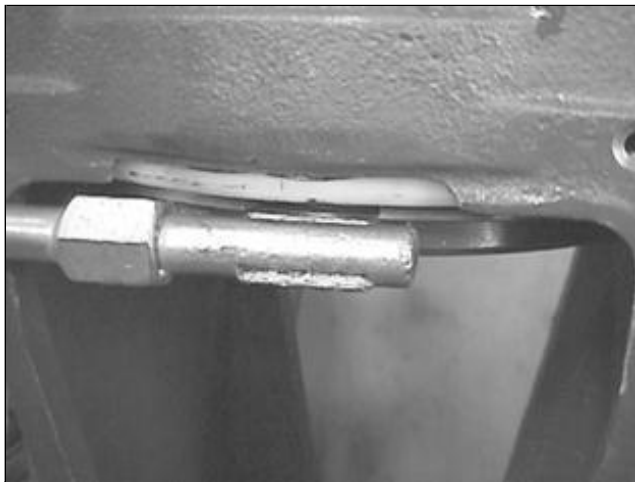


Fig.1

Once the pivot has been assembled with the press, check to make sure that the circlips enter their housing without jamming, as illustrated in (Fig. 1)



Fig.2

Now install the relative protection ring on the circlips and tighten the two M6 screws to a 30 Nm torque after locking them with Loctite 270 thread-locker as shown in (Fig. 2).

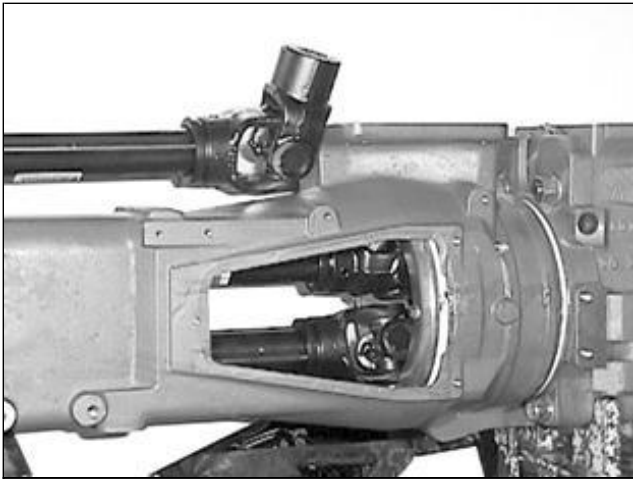


Fig.3

After having fitted the two couplings in the central pivot and remembering that the top coupling is the smaller one, turn both couplings so that the fine keying points towards the gearbox (Fig. 3). Connect the central pivot to the gearbox and front differential and tighten the screws to a 150 Nm torque value.

Mount the grease nipples and lubricate until grease oozes from the bushes.

Turn the pivot with the aid of a hoist or jack to make sure that the pivot turns correctly.

Mount the side plates to protect the couplings.

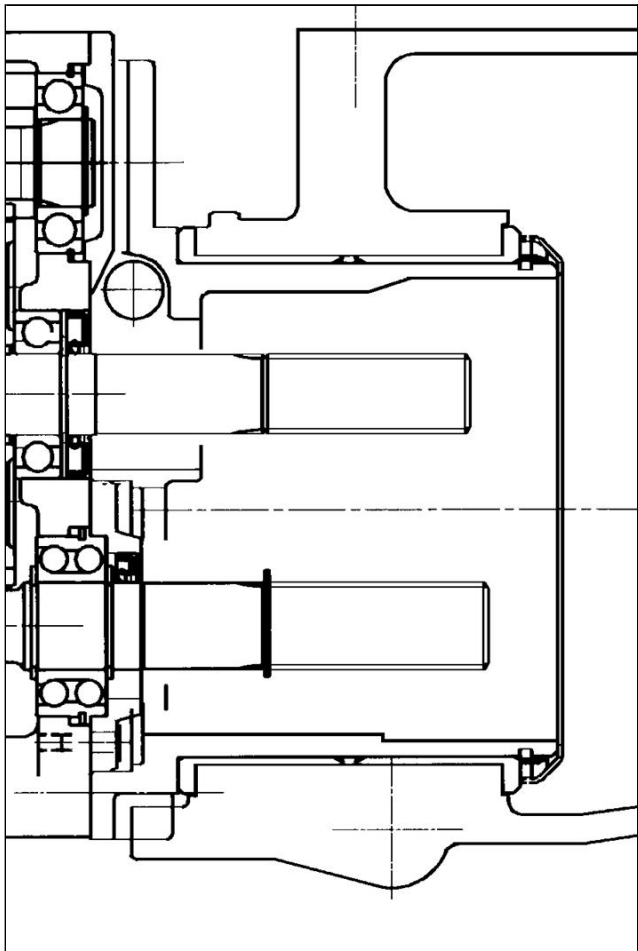


Fig.4

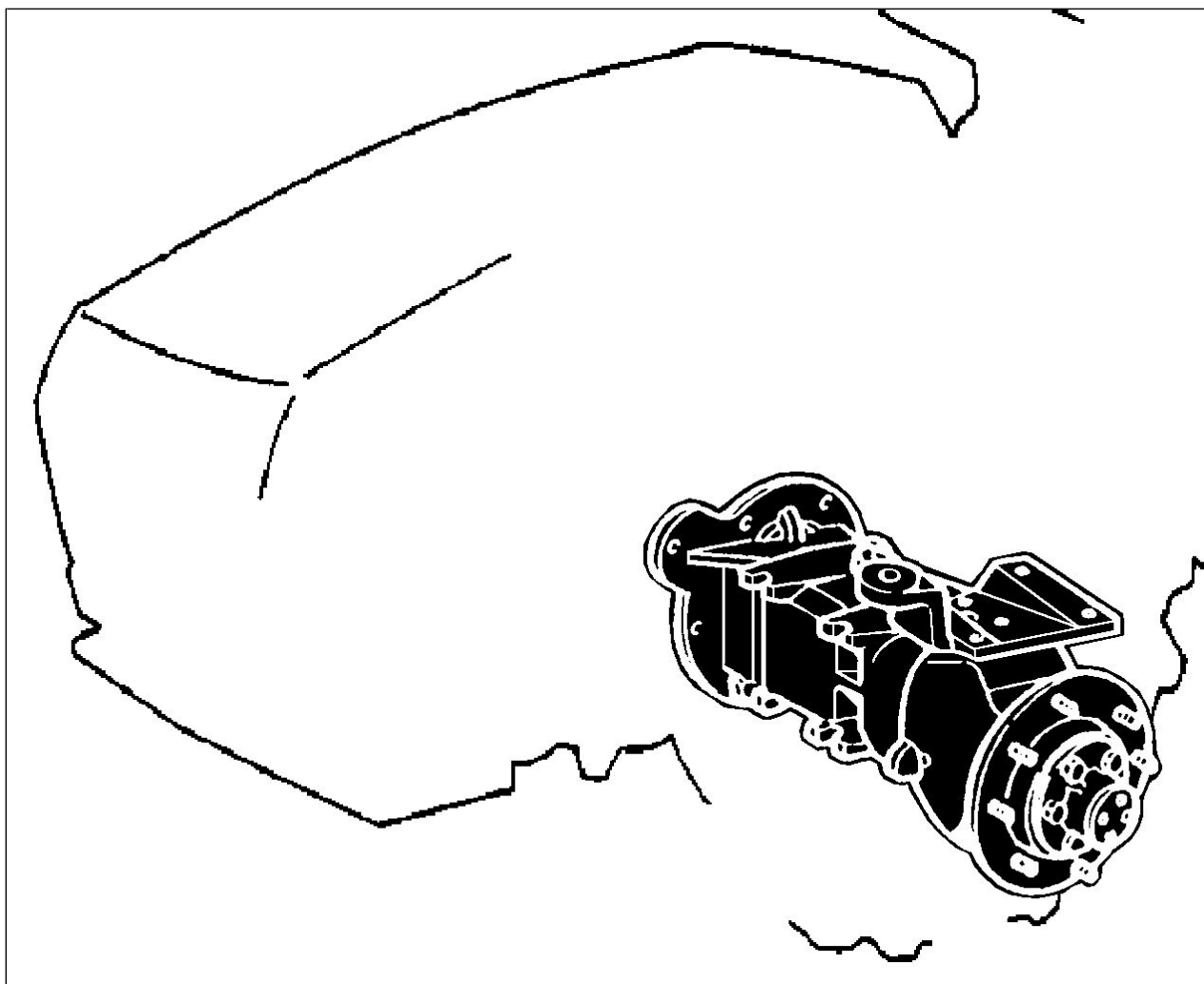
(Fig. 4) illustrates the complete pivot assembly.
When the play on the central pivot in the tractor exceeds 0.8 mm through wear on the plastic bushes, these latter must be replaced by working through the sequence illustrated on the previous page in reverse order.
To ensure that the plastic bushes last the right lenght of time, it is important to comply with the lubrication frequencies specified in the Operation and Maintenance manual.

48.A - Tightening torque to central pivot

Tightening torque expressed in kgm

Description	Kgm
Gearbox casing - pivot flange fixing screws	8

54 - FRONT FINAL REDUCERS



ADJUSTMENT FRONT FINAL REDUCERS

54.10 - Front reducers group

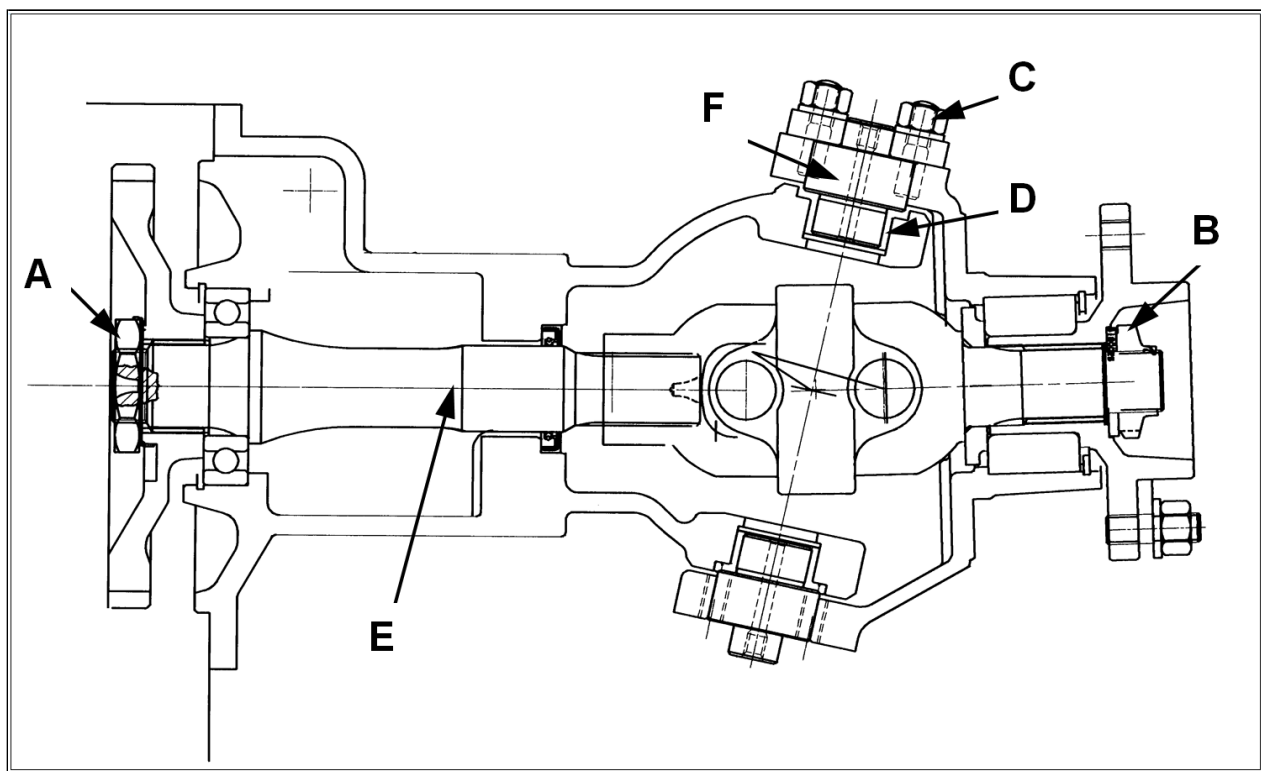


Fig.1



Fig.2

Mount shaft **E** of (Fig. 1) and tighten the ring nut **A** to (M20=15Kgm-M25=20Kgm) torque. Punch the ring nut and make sure that the metal edge enters the groove on the shaft (Fig. 2). Mount the coupling, the spacer, the bearing and wheel hub. Tighten ring nut **B** to 14 Kgm torque and spread Loctite 270 thread-lock on the thread. Remember that the front axle shaft with left threading must be mounted on the right front hub while the front axle shaft with right threading must be mounted on the left front hub.

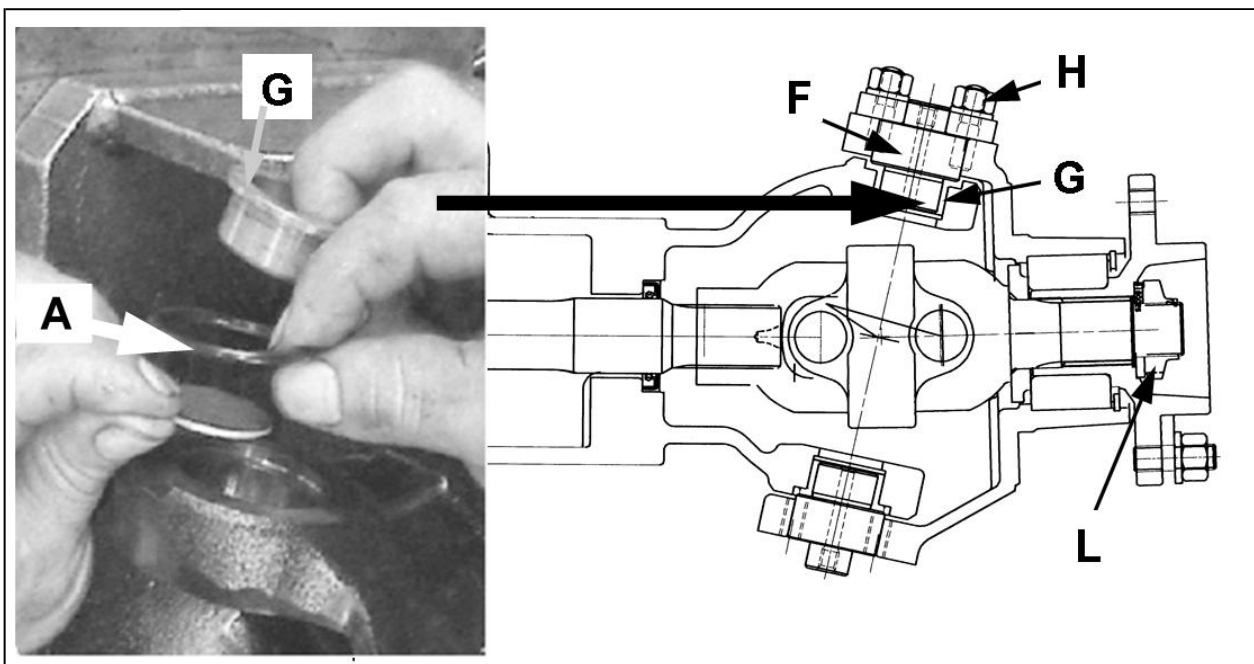


Fig.4



Fig.5

Part. **A** - O-Ring to retain the lubrication grease

(Fig. 4) shows the correct sequence to comply with when mounting the front wheel pivot pins, part. **F**. Bushes **G** (Fig. 4) must be replaced if the play between bush **G** and pin **F** exceeds 0.3 - 0.4 mm. The stud bolts that lock pivot pin **H** must be tightened to 6 Kgm torque (Fig. 4).

Stud bolts **H** and the ring nut **L** of (Fig. 4) must be locked with Loctite type 270 thread-locker. Ring nut **L** must also be held in place by punching the safety lip. To complete the front hub assembly, mount the grease nipples of (Fig. 5) and adequately grease the entire mechanism.

54.20 - How to adjust toe-in

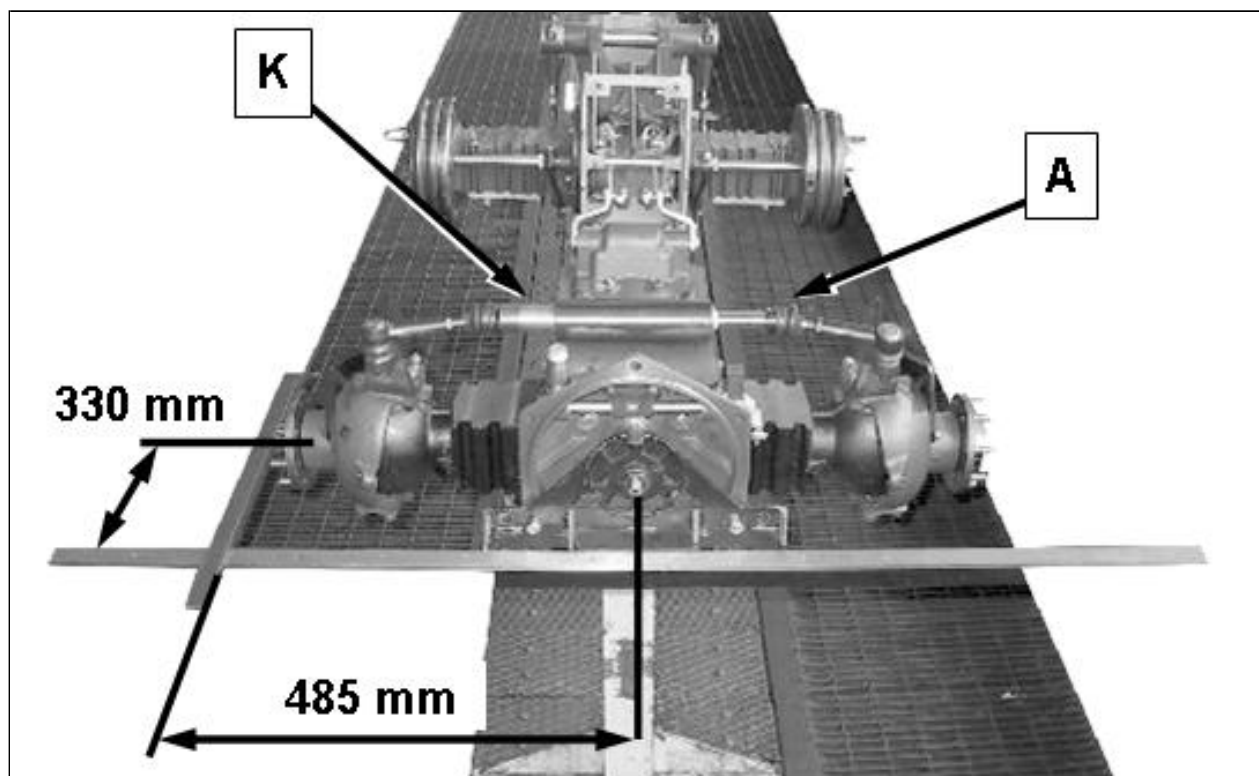


Fig.6

After having assembled the entire front axle as shown in (Fig. 6), arrange the geometry of the front axle in order to correctly adjust the toe-in of the front spindles to ensure that the front tyres are worn in a regular way.

Mount spacer **K** of which the dimensions are given on the steering cylinder (first on the left and then on the right side).

Move the spindle control coupling up against the spacer on the cylinder (after having unscrewed the thread of the coupling in order to achieve a dimension of 25-26 mm).

After making the distances of (Fig. 6) spread Loctite 270 thread-locker on the threads of the joints and tighten the lock nuts fully on the joints in order to block the adjustment you have made.

The steering cylinder is fastened with M 10 stud bolts tightened to 6 Kgm and locked with Loctite 270 thread-locker.

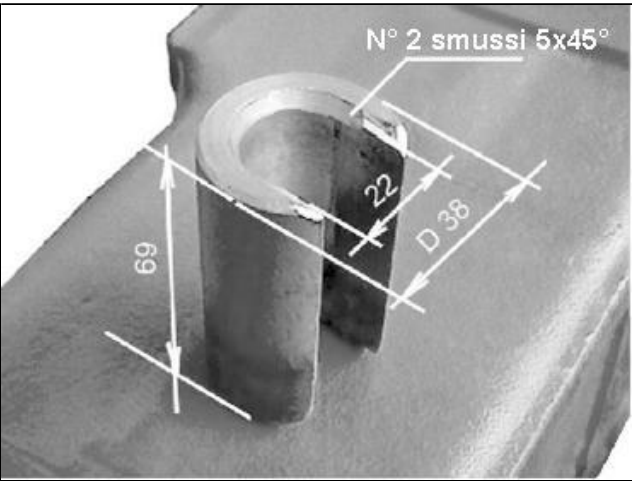


Fig.7

(Fig .7) shows the dimensions of the spacer K to position on both sides of the steering cilinder to adjust the toe-in.

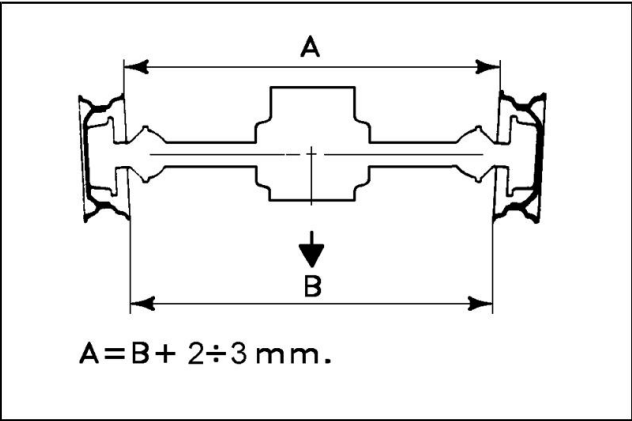


Fig.8

Front wheel toe-in adjustment with the tractor fitted.

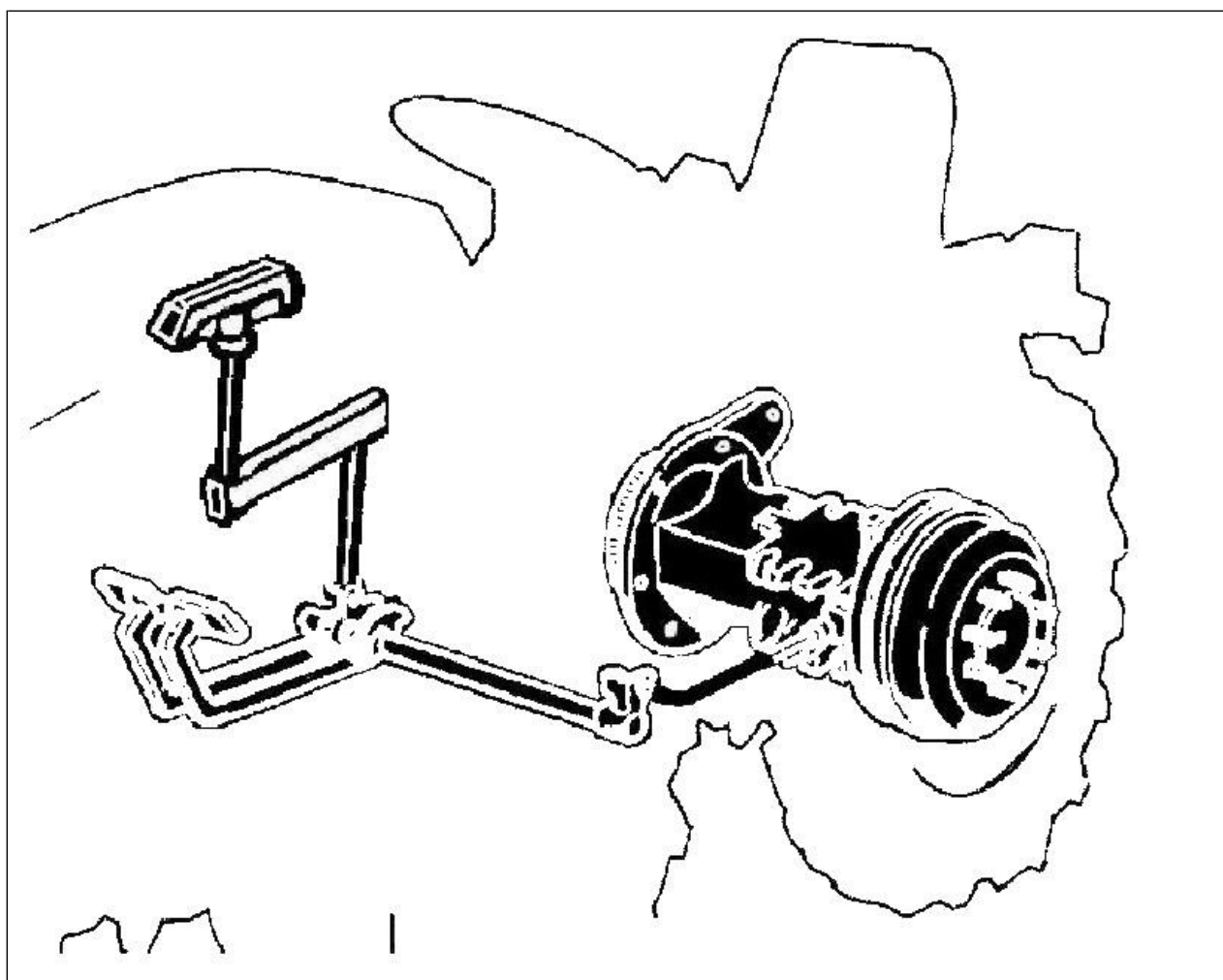
The front wheel toe-in is correct when it respects the measurements shown in (Fig .8).

54.A - Tightening torque front final drive

Tightening torque expressed in kgm

Description	Kgm
M 10x35 hub fixing screw	6
M 20 wheel control gear fixing nut	15
M 25 wheel control gear fixing nut	20
Wheel axle - shaft fixing ring nut	14
M 10 stud bolt fixing joint flange	6
M12 nut fixing wheel to axle-shaft	8

57 - BRAKES



BRAKES ADJUSTMENT

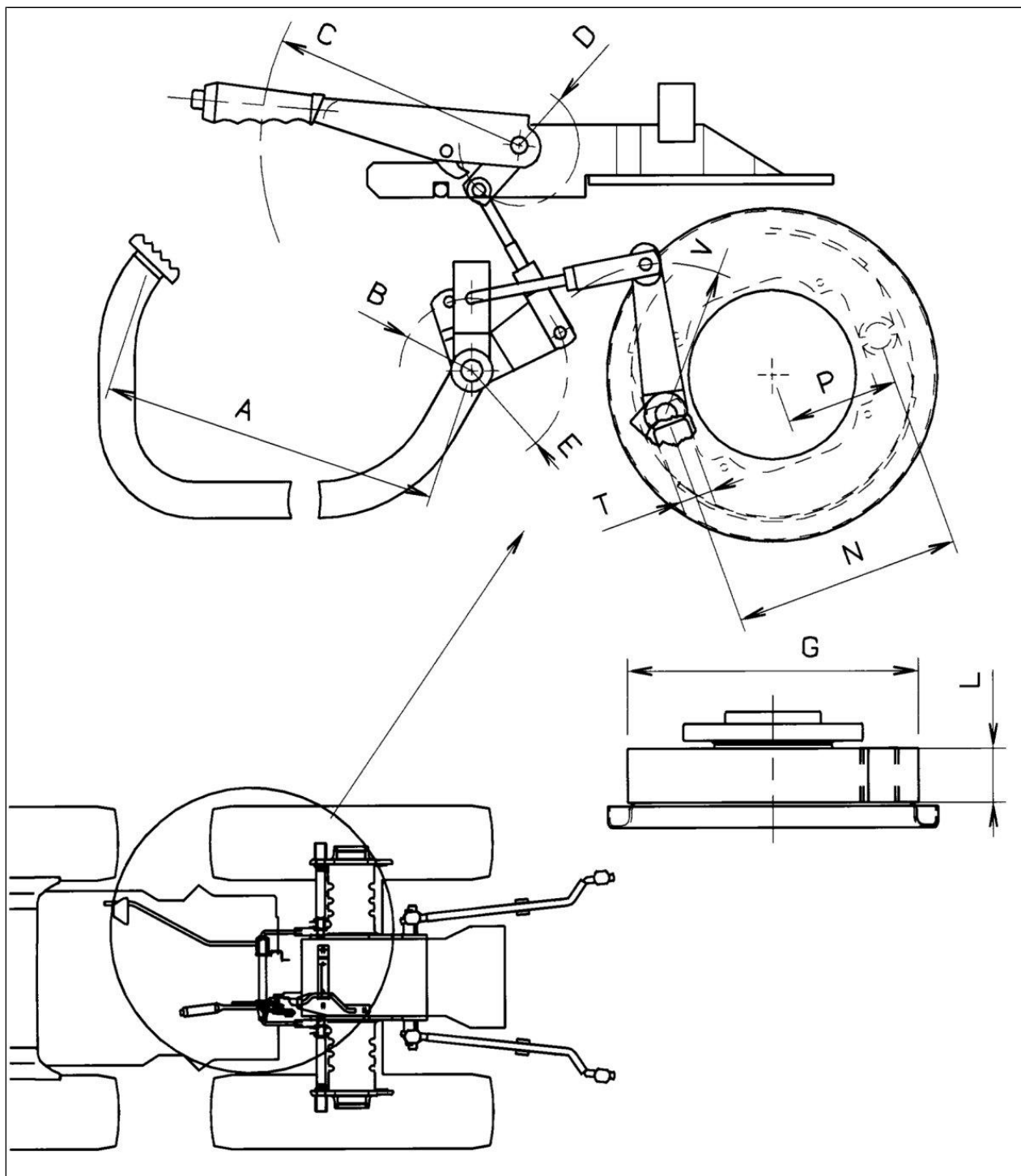
57.10 - Braking devices

- SERVICES**

1. Mechanical braking of the rear axle through mechanical transmission which acts on discs in oil bath.

- PARKING**

Discs brake in oil bath, it is the same rear service brake with mechanical transmission driven by hand with a mechanism for the irreversible control.



MAIN BRAKE LEVER SPECIFICATIONS				BRAKE SPECIFICATIONS		
SERVICE BRAKE PEDAL A	mm	415		BRAKING AXLE	Rear	
TRANSMISSION LEVER B	mm	60		TOTAL BRAKING SURFACES	cm ²	227
PARKING BRAKE LEVER SPECIFICATIONS				MATERIAL USED (FRENOLYTE WW)	TI	401
PARKING BRAKE LEVER C	mm	215		DIAMETER BRAKE LINING G	mm	243
TRANSMISSION LEVER D	mm	50		DIAMETER BRAKE LINING L	mm	44.5
TRANSMISSION LEVER E	mm	80		BRAKE LEVER T	mm	125
				INTERNAL BRAKE DIAMETER N	mm	189
				BRAKING SHOE LEVER V	mm	26.5
				INTERNAL BRAKE RADIUS P	mm	94.5

57.20 - Adjusting service brake

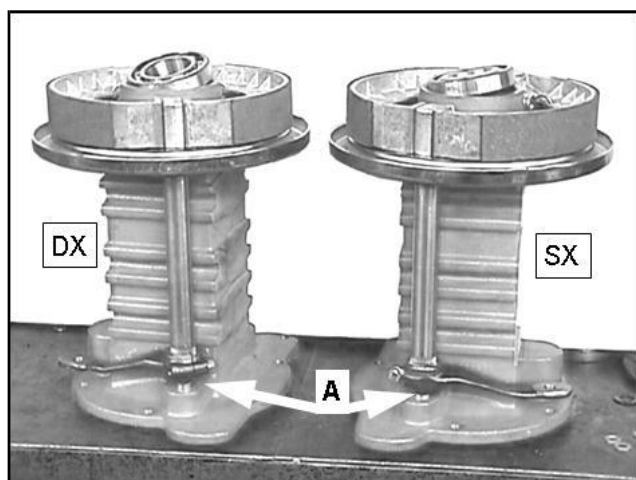


Fig.1

Fig.1 shows the position lever **A** must assume in the two right and left hubs.

No particular precautions need be taken when the brake assemblies are mounted: remember to insert the split pin into the perforated nut that position the brake assembly fulcrum.

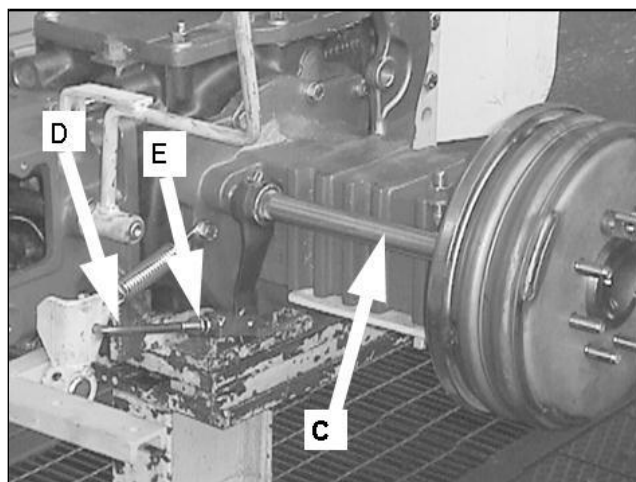
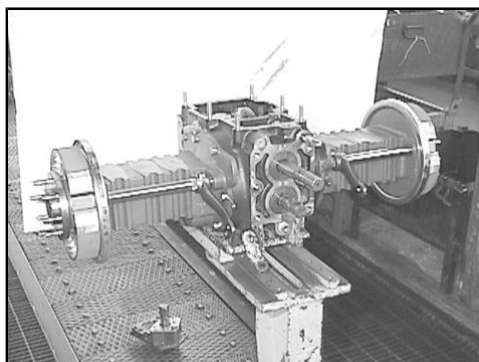
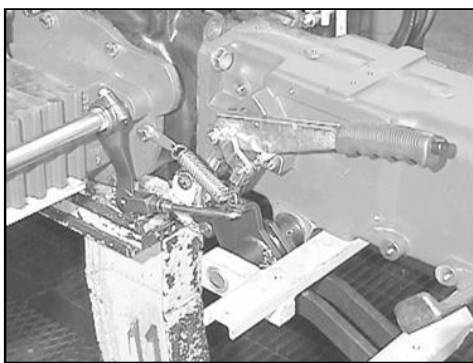
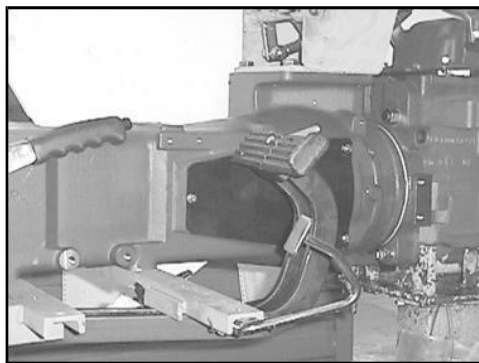


Fig.2

After having mounted the shoe expansion rod, part C of (Fig. 2) mount the hub closing lid with jointing compound to ensure oil retention.

To ensure the main brake operates correctly, the wheels must block after the pedal has travelled about 70 mm, proceed in the following way:

- loosen nut E (Fig. 2);
 - detach the fork by removing the pin that connects it to the brake control rod;
 - adjust the length of the rod by tightening and loosening the fork;
- After the adjustments have been made, re-connect the fork and tighten the nut.



Both the right and left rods must be adjusted in this way until the braking action is equally divided between the right and left brake assemblies.

57.30 - Record of emergency and parking brake

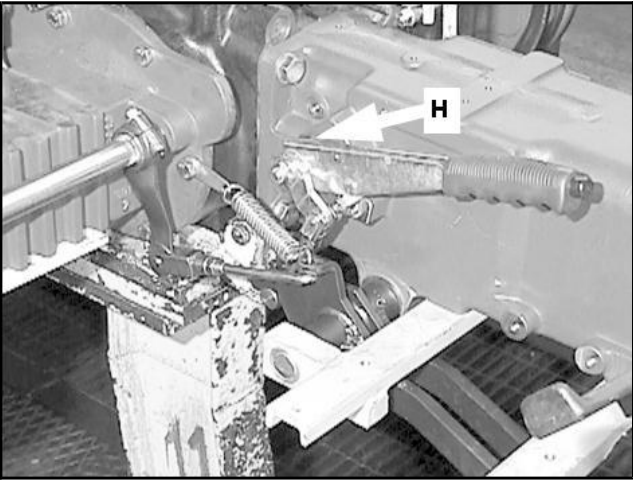


Fig.3

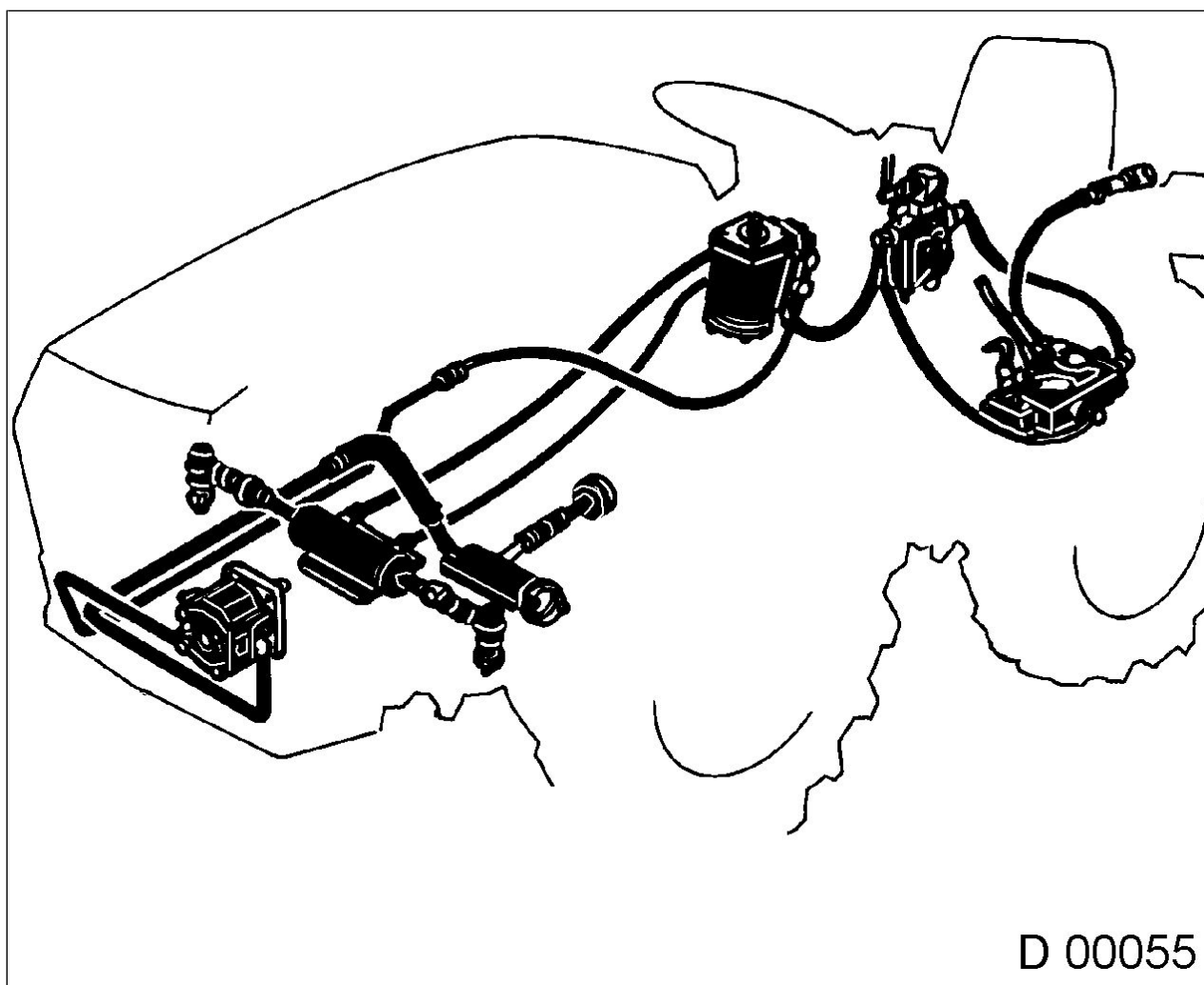
For the emergency and parking brake to operate in the correct way, the wheels must block after the control has travelled about 100 mm. Proceed in the following way:
- adjust the lenght of the rod by unscrewing or tightening nut **H** (Fig. 3)

57.A - Tightening torque assembly brakes

Tightening torque expressed in kgm

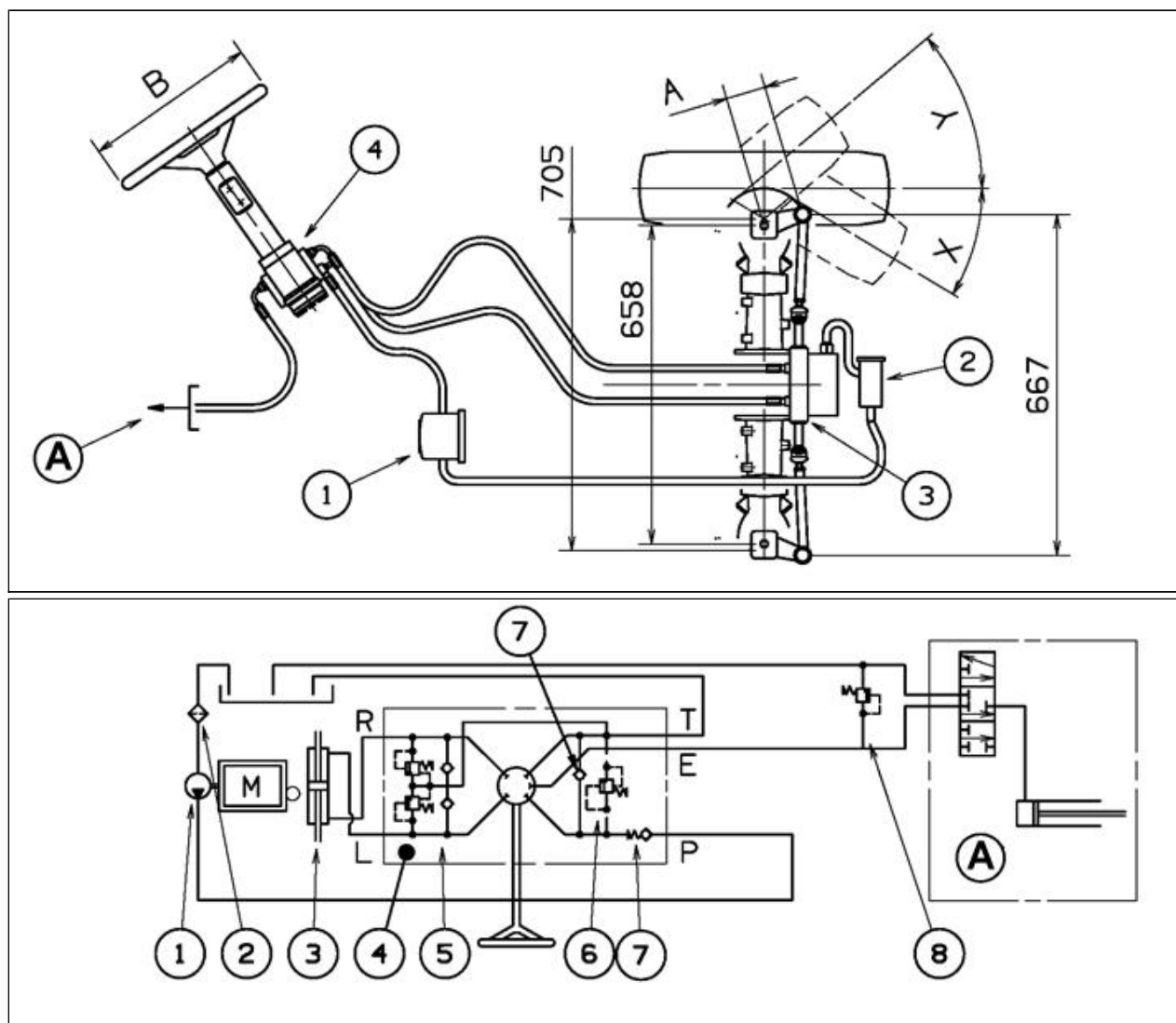
Description	Kgm
M 8x35 braking assembly screw	3

60 - HYDRAULIC SYSTEM



HYDRAULIC SYSTEM ADJUSTMENT

60.10 - Hydraulic steering plan



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

60.20 - Steering unit



Fig.1



Fig.1B

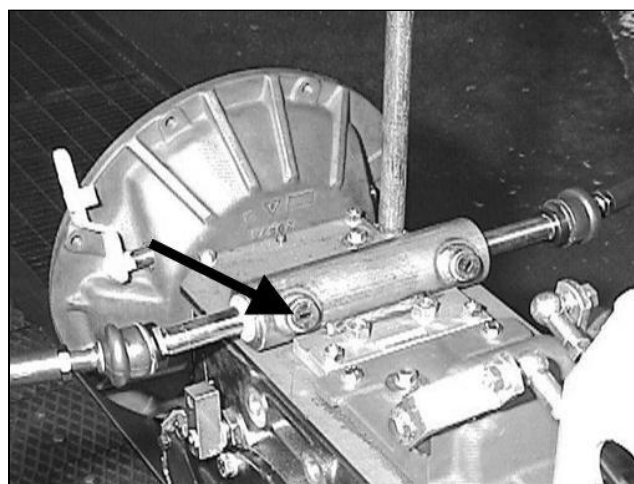


Fig.2

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 6.3 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.

It's possible to adjust this 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 to a 1/4" rubber hose with a 14 mm diameter eyelet.

Using an M14 double perforated screw, connect the pressure gauge to one of the two supply branches of the cylinder and check the pressure created in the circuit during the maximum turning phase. (Fig. 2)



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.

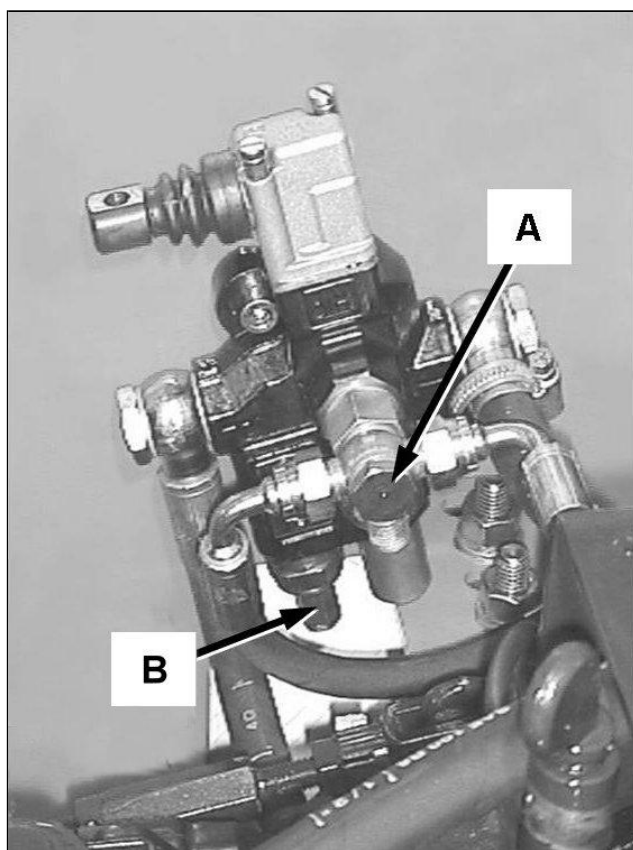
60.30 - Power lift system valve

Fig.3

To check the setting of the maximum pressure valve of the power lift valve system, connect a pressure gauge with 150 bar full scale to a 1/4" rubber tube with a 1/4" eyelet and connect it with a double perforated screw to the power lift delivery coupling **A** of (fig. 3). Move the power lift to end of up travel and check the setting of the maximum pressure valve of the valve system.

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.

Operate the adjuster screw **B** of (fig. 3) if the value is incorrect.

Remove the plastic guard from the valve system on the right hand side of the seat to access the maximum valve for adjustment purposes.

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

60.40 - Steering cylinder

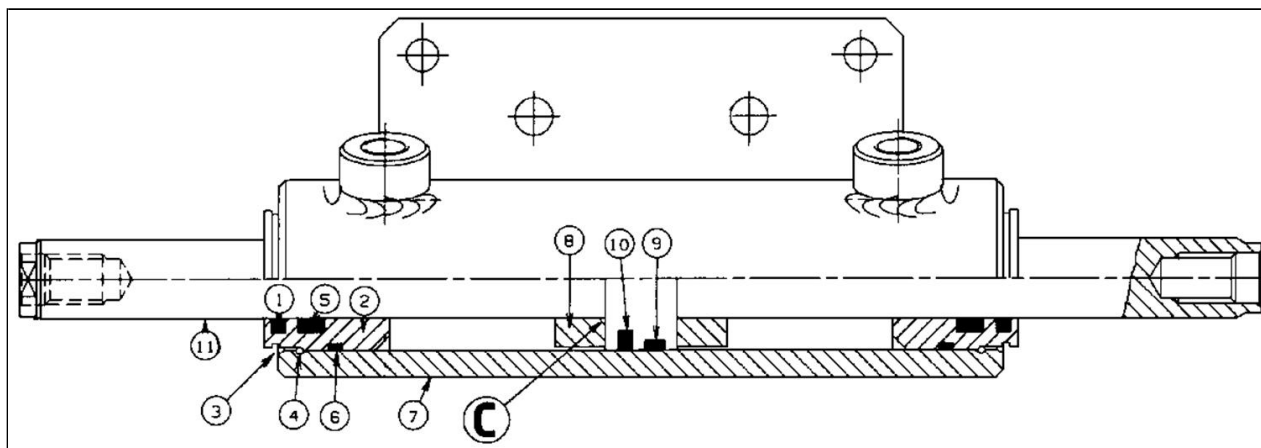


Fig.4

Since the front differential housing acts as the inlet and discharge reservoir for the entire hydraulic circuit, the oil used in the front differential housing must possess determined hydraulic specifications.

Fig. 4 illustrates the constructional drawing of the steering cylinder.

Proceed in the following way if the internal cylinder seal and relative scraper (parts **9** and **10**) of (fig. 4) need replacing:

- using a pair of pliers, remove the garter spring (part **4**) of (fig. 4) from both the rh and lh sides of the cylinders by means of the two openings on the actual cylinder itself which have been made for this purpose;
- take out the entire piston assembly and replace the seals.

Work through the instructions in reverse order to remount the parts.

The cylinder seals must be replaced when the actual cylinder starts to ooze and the ability of the tractor to maintain its direction becomes compromised.

60.50 - Rear lift cylinder

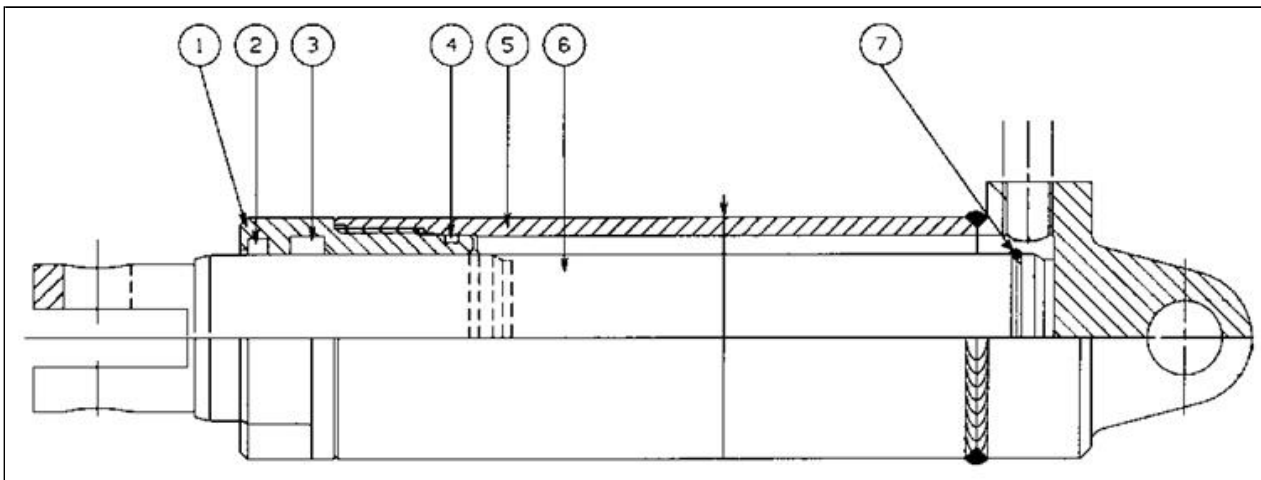


Fig.5

Proceed as described below if the power lift seals parts **2** and **3** of (fig. 5) need replacing:

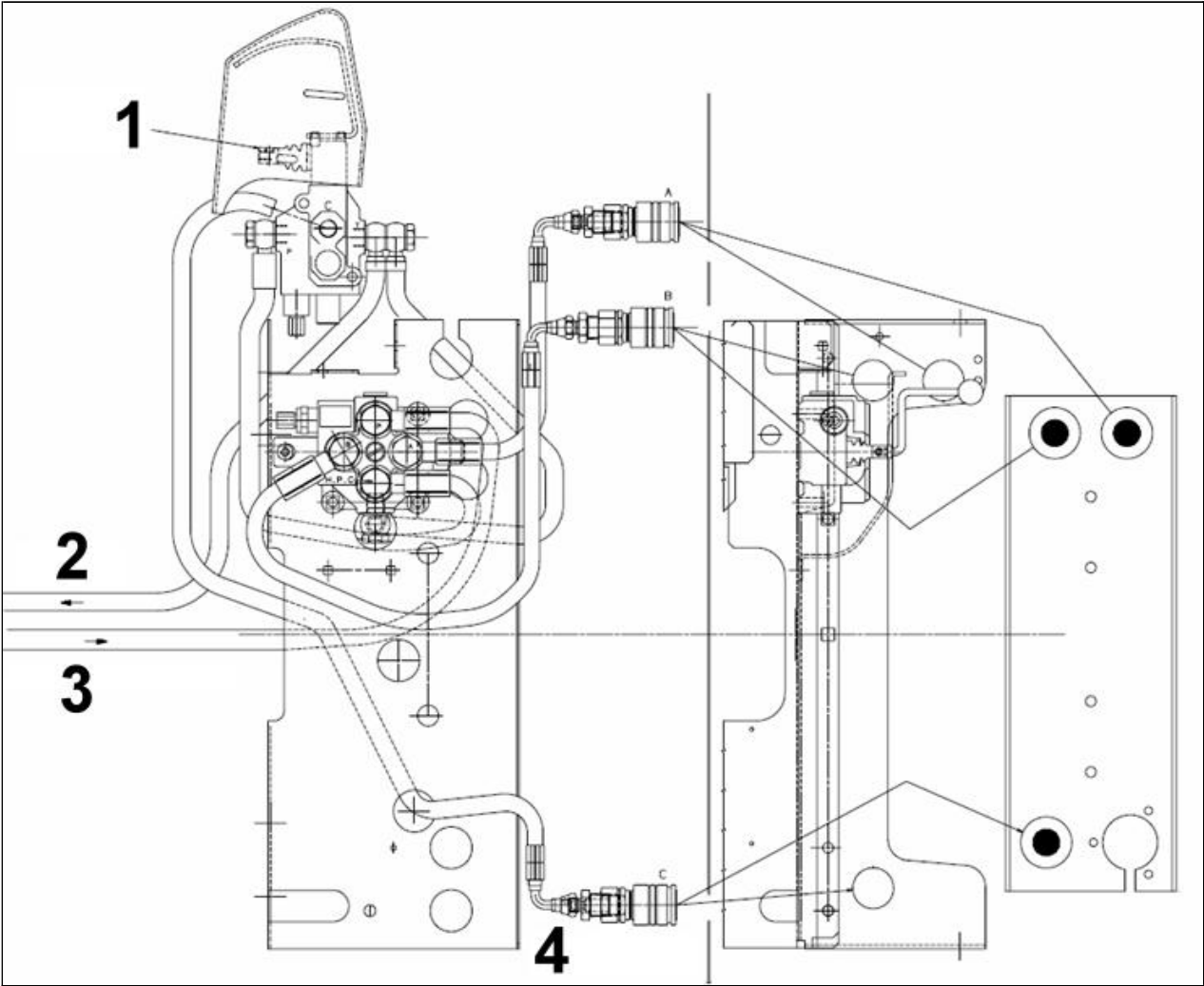
- unscrew the cylinder head (part **1**) of (fig. 5);
- take out the plunging piston and replace any damaged seals on the cylinder head.

Make sure that the chromium part of the stem is not scored;

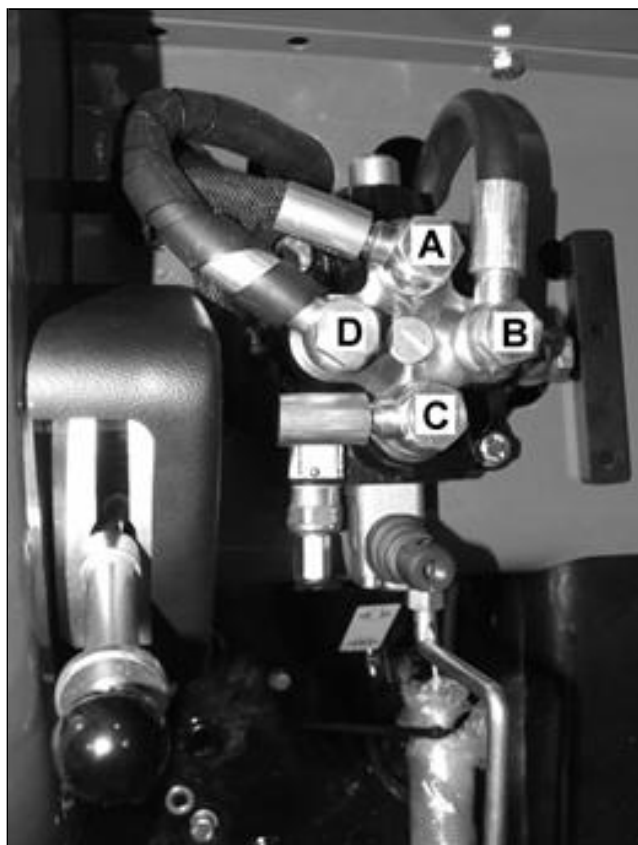
- remount all parts by working through the previously described operations in reverse order.

The plunging piston seals must be changed when there are consistent oil leaks from the lifting cylinders and the lifting capacity diminishes.

60.60 - Rear hydraulic auxiliary control valves



1	Distributor
2	Discharge
3	Oil from steering unit
4	Quick connection for any trailer with hydraulic dump



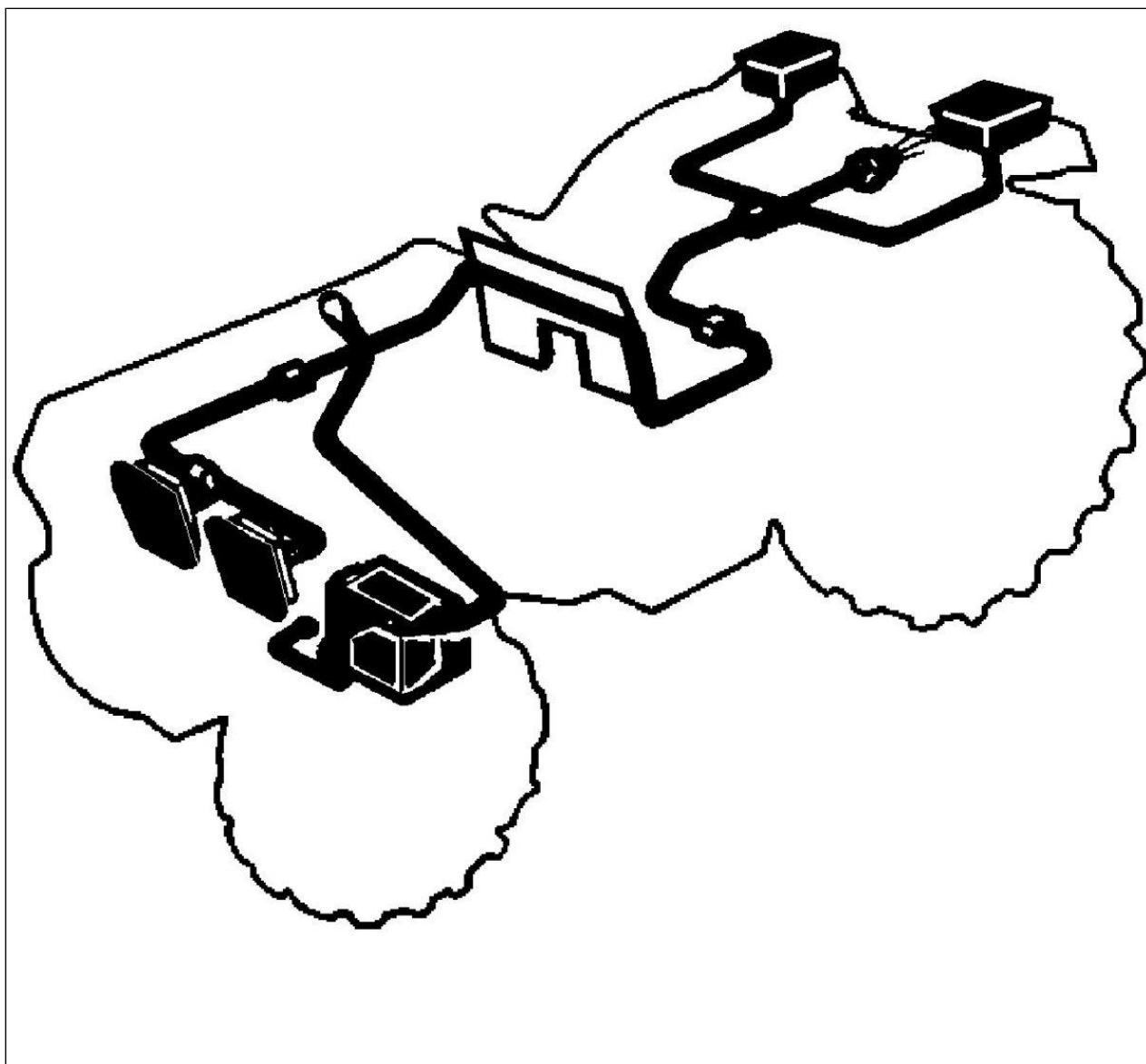
A and **C** are connected to the pair of quick release hydraulic coupling.

B is the carry-over port to the rear lifter distributor.

D receives oil from the power beyond (E) port of the steering unit (see the relative pictures).

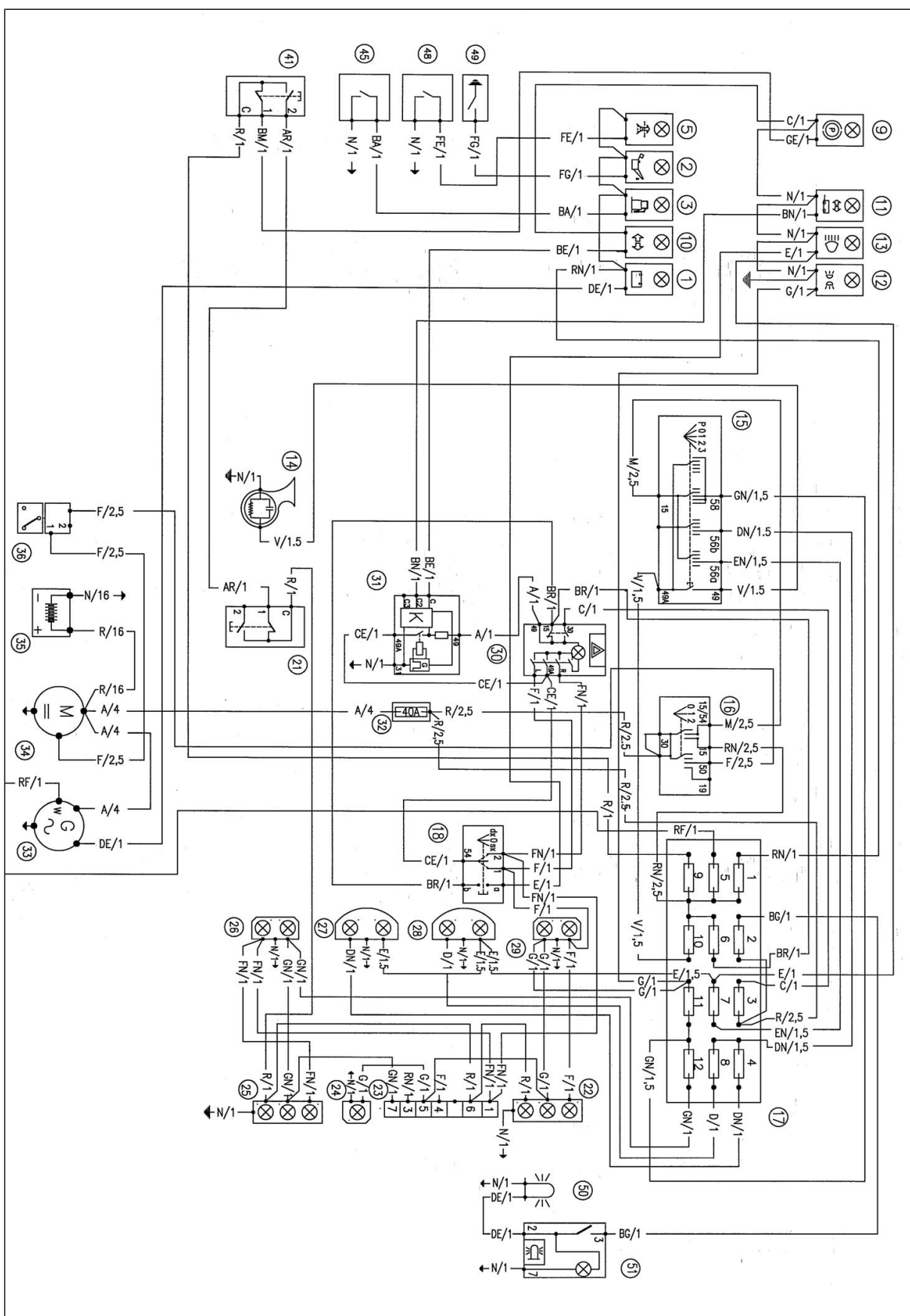
E is the discharge port and is connected to the T port of rear lifter distributor.

63 - ELECTRICAL SYSTEM



ELECTRICAL SYSTEM, ENGINE, PLATFORM

63.10 - Wiring diagram



Cable colour key							
A	orange		B	white		C	pink
D	gray		E	green		F	blue
G	yellow		H	Light blue		M	brown
N	black		R	red		V	violet
	Ground						

ELECTRICAL SYSTEM

1. Generator indicator.
2. Engine oil pressure indicator.
3. Fuel reserve indicator - yellow.
4. Not installed
5. Clogged air filter indicator light - red
6. Not installed
7. Not installed
8. Not installed
9. Hand brake engaged indicator - red.
10. Tractor direction indicators - green.
11. Trailer direction indicators - green.
12. Side light indicators - green.
13. Driving beam indicator - blue.
14. Horn.
15. Light selector
16. Ignition switch
17. Fuse box
18. Turn indicator switch
19. Not installed
20. Not installed
21. Stop switch
22. Right rear light.
23. 7-pin socket.
24. License plate light.
25. Left rear light.
26. Left light and turn indicator
27. Lh headlight
28. Rh headlight
29. Right light and turn indicator
30. Hazard light switch.
31. Turn indicator blinking function
32. Maxifuse protection circuit
33. Alternator
34. Starter
35. Battery
36. Motor stop solenoid valve
37. Not installed
38. Not installed
39. Not installed
40. Not installed

41. Parking brake switch
42. Not installed
43. Not installed
44. Not installed
45. Fuel level gauge
46. Not installed
47. Hydraulic oil filter sensor
48. Air filter clogging sensor
49. Engine oil pressure sensor
50. Revolving beacon
51. Revolving beacon switch

63.20 - Switchs

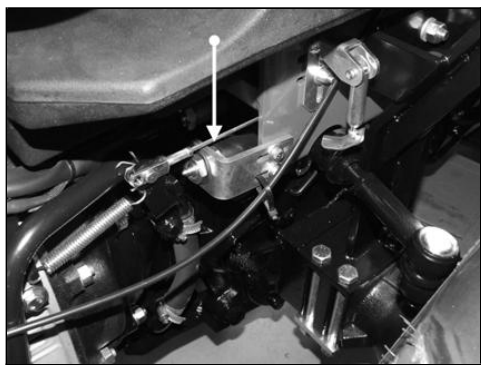


Fig.1

The arrow shows the position of the ignition switch, which must be adjusted in an accurate way to ensure that the vehicle starts in a regular way. (fig.1)



Fig.2

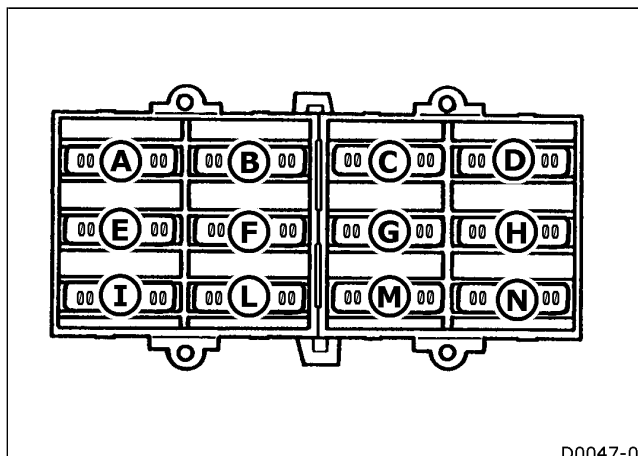
The machine is equipped with a switch on the parking brake and when you pull the lever, you see the light on the dashboard. (fig. 2)



Fig.3

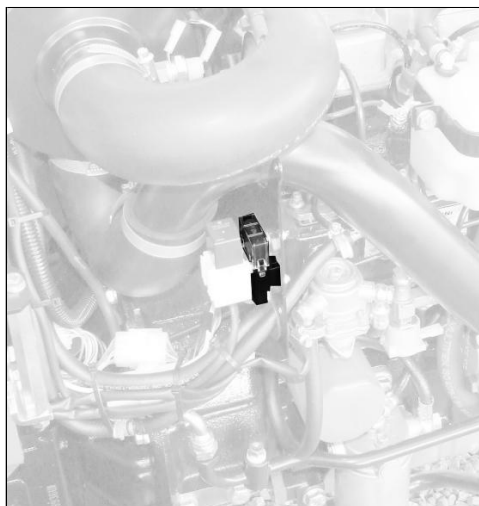
The machine is equipped with a switch on the service brake and when you push the pedal, the stop rear lights go on. (fig.3)

63.30 - Fuses



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

The machine is equipped with **main fuses**. These fuses protect the entire electric system.



Replace



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:

- Ⓐ **15A**
Light on the dashboard powering.
- Ⓑ **15A**
Revolving beacon
- Ⓒ **15A**
Hazard light switch.
- Ⓓ **7.5A**
Left dipped beam.
- Ⓔ **15A**
Alternator auxiliary power supply
- Ⓕ **15A**
Power supply of turn indicator light.
- Ⓖ **15A**
Driving beams.
- Ⓗ **7.5A**
Right dipped beam.
- Ⓘ **7.5A**
Brake lights.
- Ⓛ **15A**
Horn.
- Ⓜ **7.5A**
Right rear side lights.
Right front side light.
- Ⓝ **7.5A**
Left front side light.
Left rear side lights.

Main fuse

- 40A**
General protection of electrical system.

90 - LUBRICANT



90.10 - Original lubricants

GROUP	LUBRICANT	CAPACITY
Engine oil	See engine's operation and maintenance manual.	See engine's operation and maintenance manual.
Gearbox 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	11 Lt
Rear differential 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	7.5 Lt

99 - PROBLEMS AND SOLUTIONS



TECHNICAL HITCHES - CAUSES - REMEDIES

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.	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 fails to operate	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

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

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

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

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. Faulty 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.

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

99.10 - Table of Screws Torque

SCREW	6.6		8.8		10.9		12.9	
	(A)	(B)	(A)	(B)	(A)	(B)	(A)	(B)
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.

(A)

Zinc plated screw (friction coefficient 0.125)

(B)

Burnished screw (friction coefficient 0.14)



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