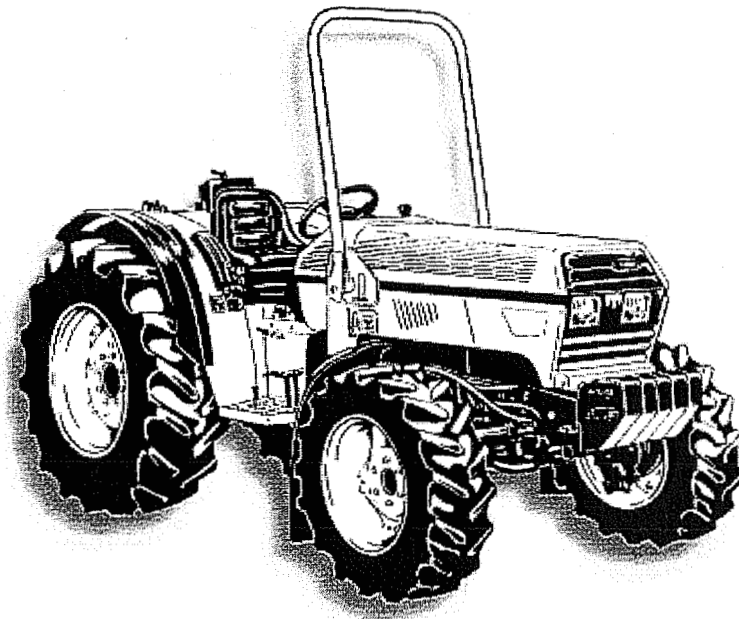


GOLDONI STAR SERIES

Shop Manual



Mod. 55 - 65 - 75 - 75 Max

**AGRICULTURAL EQUIPMENT PLANT
GOLDONI S.p.A.**

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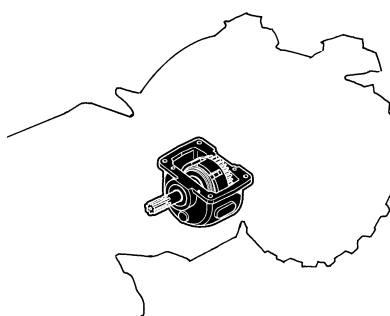
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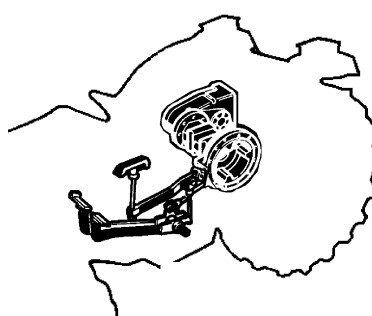
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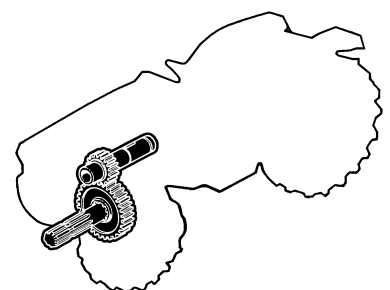
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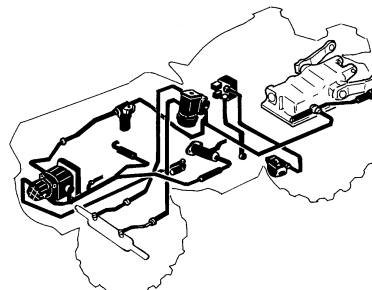
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57



75



98

Star 55, 65, 75, 75 Max

**Shop
Manual**

*Cut and insert in
the pockets in
the package*



**Series
STAR**

**S.A.T.
Goldoni**



GOLDONI *SERIES* STAR

Shop Manual

Mod. 55-65-75-75MAX

CAUTION

This manual highlights only the differences with Model 774 COMPACT tractor and is therefore an addition to the Shop Manual for the Compact Series Serial N° 6380605 that you already have to hand.

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HOW TO IDENTIFY THE TRACTOR

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HYDRAULIC CIRCUITS		
REGULATE CLUTCH CONTROL LEVERS		

SAFETY REGULATIONS



Failure to observe safety regulations is the cause of the majority of industrial accidents in a tractor repair shop.

Our tractors have been designed and built to facilitate repairs and servicing but this fact alone will not prevent accidents from happening.

Only an alert mechanic who observes all safety regulations can offer the best kind of guarantee for his own safety and that of others.

1. Always carry out the procedures as detailed in the manuals.
2. Before doing maintenance or other work on the tractor or the implements hitched to it, the following steps should always be taken:
 - Lower any implement to the floor.
 - Stop the engine and remove the ignition key.
 - Detach the “+” cable from the battery.
 - Place a notice by the driving position prohibiting the operation of any tractor control.
3. Check to make sure that all rotating devices on the tractor (PTO, drive lines, pulleys, etc.) are well protected.
4. Do not wear dangling articles or unfastened clothes which could become trapped in the moving parts of the tractor.
Depending on the nature of the work to be done, wear certified safety clothing and equipment such as helmets, reinforced shoes, gloves, overalls and glasses.
5. Do not service the tractor with a person at the controls unless the person is specially trained for this and is helping with a specific maintenance task.
6. Do not check or work on the tractor with the engine running unless this is specifically required.
In this case, ask for the help of a second person who will keep the mechanic under constant visual control from the driver's seat.
7. Operate the tractor or the implement coupled to it exclusively from the driver's seat and never from any other position.
8. Before removing caps or covers, check your pockets for items that could fall into the openings.
The same applies to tools.
9. Do not smoke near flammable liquids or products.

10.To be able to handle emergency situations, it is essential:

- to have an efficient fire extinguisher and a complete first aid cabinet within easy reach.
- Keep the telephone numbers for the emergency room at the hospital and the fire station near the telephone.

11.When due to maintenance work the brakes are inoperative, keep the tractor under control using suitable clamping systems.

12.If the tractor has to be towed, use the tow points prepared by the manufacturer and check to make sure the towing equipment is fixed correctly.

Keep well away from tow bars and wires when tension is taken up.

13.When loading a tractor onto a truck, make sure it is well tied down on the truck.

Load and unload the tractor with the truck parked on flat ground.

14.Use hoists or other lifting equipment with adequate lifting capacity when the tractor or heavy parts have to be hoisted. Always check to make sure that the hoisting chains, wires or straps are fully efficient.

Keep all other persons well away from the hoisting zone.

15.Due to its toxic nature, as a safety precaution, do not pour petrol or diesel fuel into wide mouthed or open containers. Do not use these products as detergents but, instead, always use non-flammable and non-toxic brands.

16.When you have to use compressed air to clean parts, always wear safety glasses with side panels.

17.Before starting the engine in a closed area, check to make sure that the tube exhausting the gas to the outside is attached to the exhaust pipe. If the shop has no system to exhaust the gas to the outside, make sure that shop ventilation is adequate and continuous.

18.Move carefully and apply all the necessary precautions if, during work outside the shop, you have to work under the tractor. Choose a flat area, brake the tractor adequately and wear protective clothing.

19.Keep the work area clean and remove any oil or water spilled on the floor.

20.Do not pile up rags soaked in oil or grease since this is a very real fire hazard. Dump any such rags in a metal container which should always be kept covered.

21.When using grinders, sanders and similar equipment always wear certified safety equipment such as helmets, glasses, gloves, special shoes and overalls.

22.Welding should be done wearing certified safety equipment such as helmets, dark glasses, gloves, special shoes and overalls. If a helper is needed, he must always use the safety equipment.

23.Try to avoid creating dust, which is then breathed in, when working on parts that contain asbestos.

Technological advances have eliminated, for all practical purposes, the use of asbestos. But the recommendation given above should still be respected by the mechanic since he may have to work on older machines built before the directives about the use of asbestos went into effect.

Do not use jets of compressed air, grind or brush parts containing asbestos. Whenever you have to work on them, use a respiratory protective device (face mask).

Any spare parts shipped out by Goldoni that contain asbestos are clearly marked as such.

24. Unscrew the radiator cap very slowly to allow the pressure in the cooling circuit to be discharged. If the tractor has an expansion tank, apply this same precaution when removing its cap.

25. Do not use naked flames or cause sparks near the battery since there is a real explosion hazard. Do not smoke.

26. Do not test battery charge level using metal objects as jumpers between the terminals.

27. To prevent acid burns:

- Wear rubber gloves and safety glasses.
- Top up the battery in well ventilated areas and do not breathe in the fumes since they are toxic.
- Do not allow the electrolyte to leak or drip.
- Charge the battery in well-ventilated areas.
- Do not charge a frozen battery as it can explode.

28. A pressurised fluid leaking from a tiny hole can be practically invisible but can penetrate the skin and cause serious infection or dermatitis.

In these situations, if you want to check for leaks in the hydraulic circuit, do not use your hand to find it but, rather, a piece of cardboard or wood.

29. Check hydraulic circuit pressure using the requisite instruments.

HOW TO IDENTIFY THE TRACTOR



Fig. 1

0001

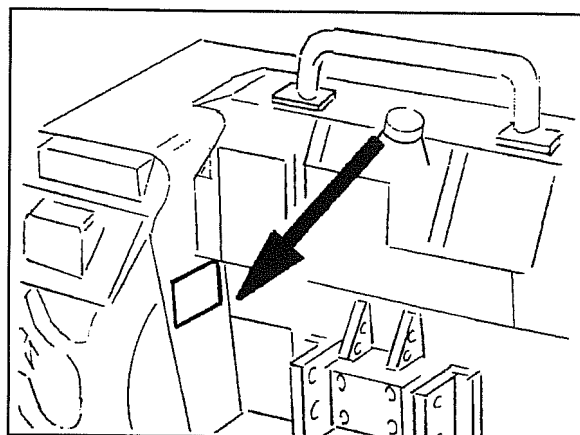


Fig. 2

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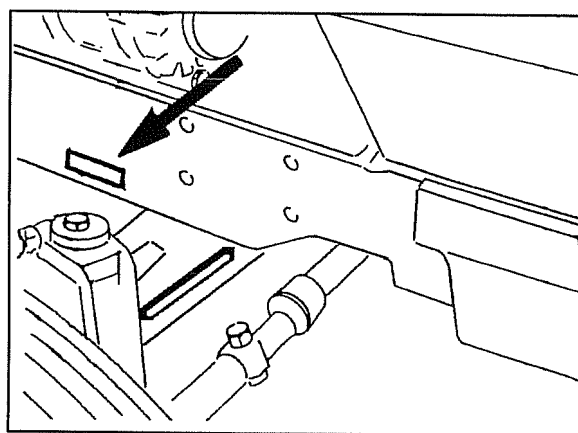


Fig. 3

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Whenever you need to contact our Technical Assistance Centre for technical information or to order parts, you will have to specify the data identifying your tractor. You will need to note:

1. Tractor Series and Model.
2. Serial and Chassis Numbers

Tractor model, Serial and Chassis numbers are given on the identification label fig. 1, delivered with every tractor and also stamped on a metal plate fig. 2, attached to the machine in a location easily accessed to read the data.

The chassis number is also stamped on the chassis as illustrated in fig. 3.

For details on the engine, refer to the shop manual from the maker and part of the tractor user kit.

SPARE PARTS AND WARRANTY

The use of **original GOLDONI spare parts**, will ensure tractor quality and performance remain unaltered down the years and guarantee application of the warranty during the time it is in force. To order spare parts correctly and clearly, always specify:

- The code number for the part taking it from the most recent microfiche illustrating the parts catalogues for the various models and series.
- The quantity for each part.
- If in doubt, specify the Model, the Serial and Chassis numbers (refer to the section on "How to identify the tractor").

Engine warranty:

Note the conditions and terms given by the makers.

Tractor warranty:

The conditions and terms are given in our "Warranty Certificate" which should be filled out, signed and mailed to Goldoni by and no later than 10 days from the date the tractor was delivered to the customer.

Under warranty service:

- This work must be accompanied by a "Under warranty service request form" (which you have) filled out and signed by the customer and the person who did the work.
Mail this to Goldoni as soon as possible but no later than 30 days after the work. Specify the date of the work as detailed on the form.
- Note that under warranty service work will only be reimbursed for tractors for which Goldoni has received the Warranty Certificate as detailed above.
- If the spare parts used for under warranty service work are not in stock at your workshop, they will be supplied as purchased parts, carriage free under the terms and conditions that govern normal supplies of spare parts.
- Replaced parts, adequately labelled, should be kept at your premises at our disposal for a minimum of 120 days from the date of the service work. This will permit us to examine the parts which we reserve the right to do without any prior notice.
- Radiators, electric and hydraulic parts must be forwarded to us within 30 days from the work accompanied by the requisite "Under warranty service request".
- If the GOLDONI S.A.T. wishes to examine other parts replaced, you will be asked to send the parts to us, carriage forward. The parts should reach us within 15 days from the request.
- Within 60 days from receipt of the "Under warranty service Request", we will grant the request (or not) by issuing the requisite document (fac-simile invoice) with which you are authorised to issue your invoice to us.

MANUAL UPDATES

Manual updates are done by reprinting the assemblies or their component parts involved in modifications or additions. The reprints will be mailed to you at your workshop address.

You are responsible for keeping the Manual updated by replacing or adding the pages mailed to you following this order:

Updates will not change the page layouts in the original manual. This is to ensure that everybody has the same references when having telephone conversations with the technical personnel at Goldoni Technical Assistance Centres and Goldoni's TECHNICAL ASSISTANCE SERVICE

This is possible because any parts to be added in each update will be inserted at the end of the appropriate assembly so that the page and figure numbering is preserved.

These parts will be further highlighted by being printed on coloured sheets.

The original manual pages should be discarded because the updates will illustrate the jobs to be done in the ante and post modification situations and will describe any work required if the new has to replace the old.

The contents pages for the modified assemblies will be updated and replace the previous pages.

In this way, you can use the Contents to find all the jobs referring to the assembly without reference to the dates the operations were added.

NOTICE

The terms "*right*", "*left*", "*front*" and "*back*", used to describe the service work always refer to tractor or implement driving direction.

INSTRUCTIONS FOR USING THE SECTION ON SERVICE JOBS

This section of the manual covers the different serving jobs on the tractor. In order to get the most out of it, the instructions below will help you understand how the manual is laid out and, therefore, how to use it effectively

- Once you have identified the tractor assembly you presume in need of service work, find the number for the assembly in the Table of Contents.
Flip through the manual at the bottom right corner until you get to the beginning of the section for the assembly number you found as the first step. This number is repeated on every page of the appropriate section
The contents page for each assembly comprises the following: *“Notes on assembly functioning”, “Trouble-shooting” and “Various schematics” as the necessary tools for defining your diagnosis of the problem.*
“Overhauling the assembly” includes the Job Code Number, A description of the job and a page reference.

The **“Job Code Number”** is a 3 or 4 figure number where:

XXX (3 numbers), indicate dismantling and later re-installing operations of parts giving access to the actual part to be worked on.

XXXX (4 numbers), indicate dismantling and later re-installing operation of parts needed to carry out the service job.

[] Job code numbers between square brackets mean: the execution of this job excludes the job under which it is called up because it is already included.

The assembly the job is to be done on and the “Service Job Code Number” must always be filled out in the “Under Warranty” job order form.

For example: 35 003 where 35 is the number of the assembly the work is to be done on and 003 means parts to be dismantled/re-installed.

The number assigned to a **“Service Job Code Number”** will always be the same if the same jobs are to be done.

- The **“Job description”** gives a short description of the job.
The **“Job description”** should not be given in the “Under warranty” Job order form since it is already identified in the **“Job Code Number”**.
The **“Job description”** can include:
 - Job Code Numbers written in normal characters. These will be added to description to create a new “Job Code Number”.
 - (+____) Job Code Numbers written in underlined italics between brackets: mean that the operations are to be added to complete the job in which they are called up provided they have not already been done.
If these Job Code Numbers belong to other assemblies, the corresponding **“Job description”** can be consulted at the bottom of the contents page.
- The **“Page”** indicates where, within an assembly, the description and illustration of the specific job begins.
- All the service jobs covered in the manual refer to the basic tractor version. Therefore, the dismantling and re-assembling operations do not include the removal and re-installment of accessories such as the cab, the front hydraulic lift, the auxiliary control valves, the front PTO, the belly plate and so on.

DUAL TRACTION CONTENTS

NOTES ON ASSEMBLY FUNCTION	Pag e 1
TROUBLE-SHOOTING	2
OVERHAULING THE ASSEMBLY:	4

Job Code..	Job Description	Page
1082 •	Separating the assembly from the tractor	4
1083 •	Complete overhaul (+ <u>1082</u>)	4
1084 •	Work on an internal quadring seal leak (+ <u>1075</u>) (+ <u>1082</u>)	11
[1083]		
1085 •	Work on a leak inside the cylinder (+ <u>1075</u>) (+ <u>1082</u>) (+ <u>1084</u>)	11
[1083]		
1086 •	Work on the dual traction clutch (+ <u>1075</u>) (+ <u>1082</u>) (+ <u>1084</u>)	11
[1083]		
1087 •	Work on the front dual traction shaft oil seal (+ <u>1082</u>)	11
[1083]		
[1085]		
[1086]		

1075 Checking circuit pressure

(+____) This job should be added to complete the work in which is called for provided that it has not already been done.

[] This job eliminates the work called for because it is included in the work.

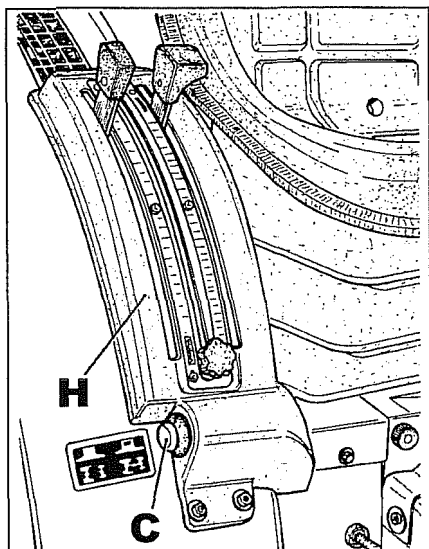


Fig. 1.1

0271

The dual traction engage system is electro-hydraulic.

When the engine is off and, hence, no electric power or hydraulic pressure, dual traction is always engaged.

When the engine is running, dual traction will be automatically disengaged. If dual traction is needed when the tractor is running, it will have to be engaged using the requisite button C fig. 1.1

TROUBLE-SHOOTING

Problem	Cause
• Dual traction does not transmit drive to the front axle. • Dual traction engages gradually without any command. • Dual traction is always engaged.	• Check if the clutch is working properly. • Internal oil leak through the Quadring seal. • Internal oil leak through the Quadring seal. Oil leak inside the cylinder.

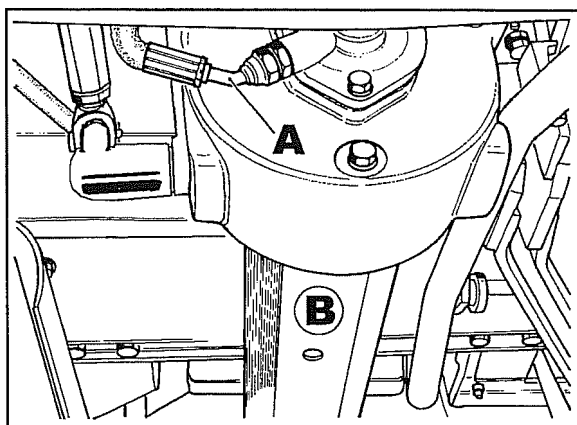


Fig. 1

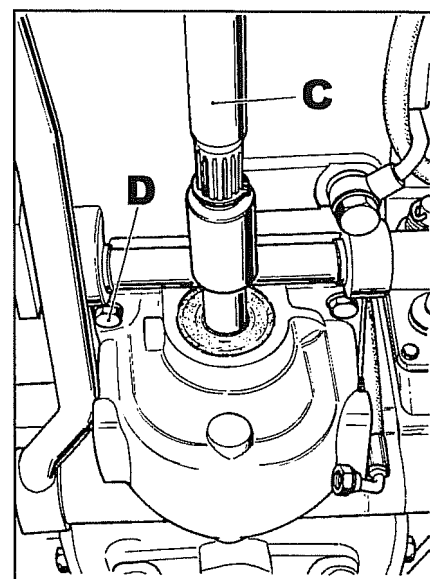


Fig. 2

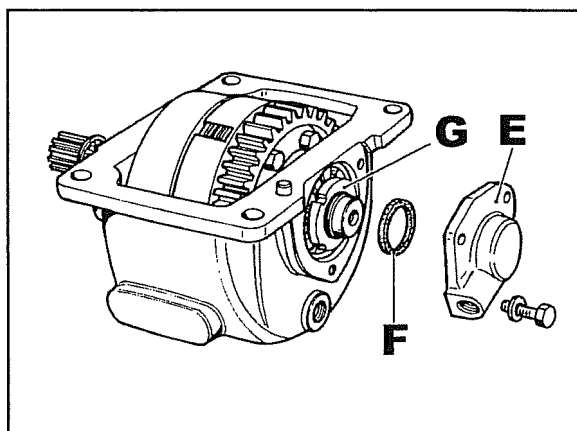


Fig. 3

Separating the ass'y from the tractor

- 1 Hoist the tractor up under safe conditions.
- 2 Disconnect the oil delivery hose **A** fig. 1, remove the guard **B** and disconnect the transmission shaft **C** fig. 2.
- 3 Drain the oil from the transmission and the differential and then drain the oil from the dual traction.
- 4 Remove the 4 screws **D** fig. 2 and remove the dual traction box.

Complete overhaul

- 5 Remove the cover **E** fig. 3 and then remove the quadring seal ring **F**.
- 6 Remove locking ring **G** fig. 3.

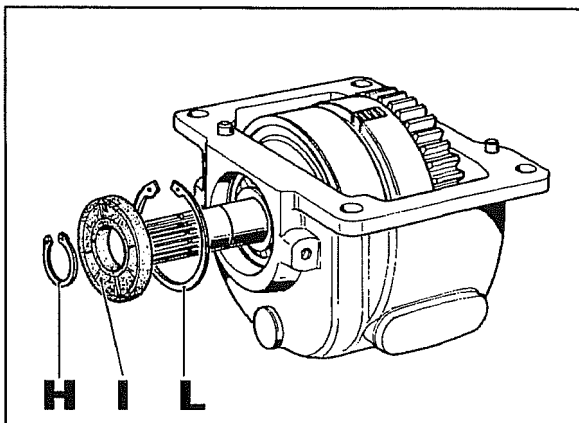


Fig. 4

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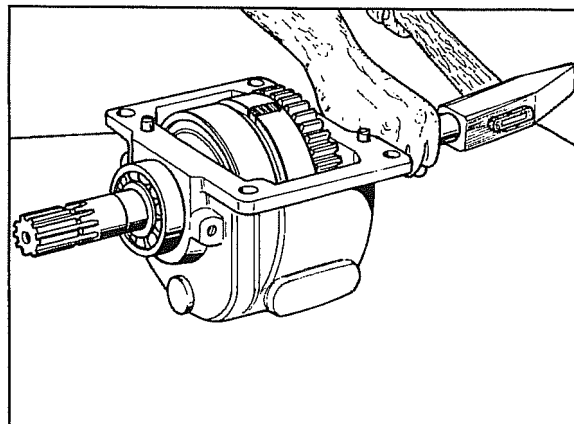


Fig. 5

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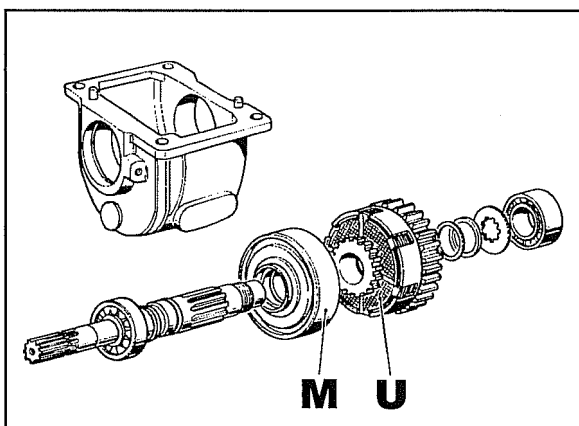


Fig. 6

0260

- 7 On the other side remove the sleeve locking snap ring **H** and oil seal **I** fig. 4.
- 8 Remove snap ring **L** fig. 4 and then remove the centre shaft as shown in fig. 5.
Figure 6 illustrates the parts comprising the dual traction ass'y.
- 9 To dismantle cylinder **M** fig. 6 use a press which, together with tool **N** fig. 7, can compact the ass'y so that the split ring **O** can be removed.

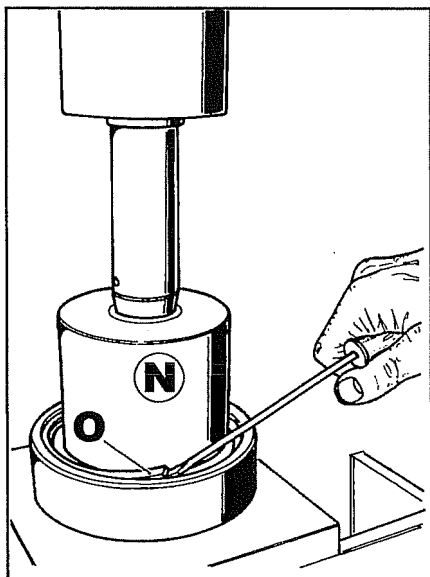


Fig. 7

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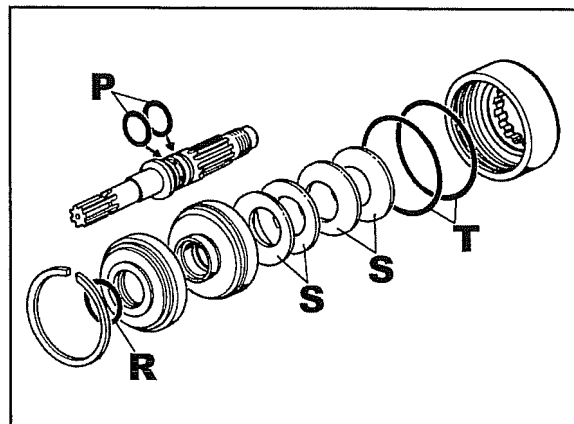


Fig. 8

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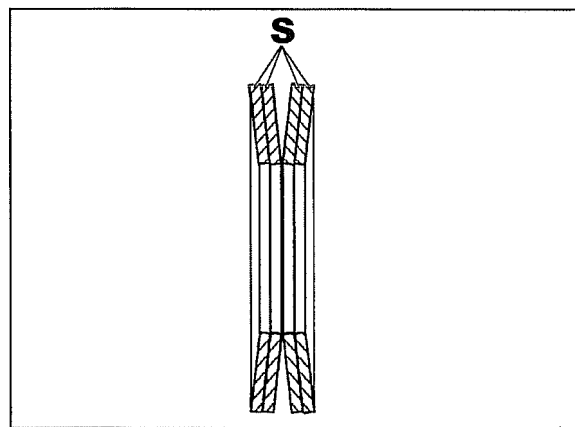


Fig. 9

0292

Figure 8 shows the components comprising the dual traction ass'y cylinder

10 Replace seal rings **P-R** and **T**.

11 Dismantle the clutch **U** fig. 6 which will appear as shown in fig. 11.

12 Change bushing **C** fig. 10 if there is too much play caused by wear.

13 Change sintered rings **D** fig. 11 when the disk pack measures less than **23.3 mm**. Check to make sure the steel rings are in good condition.

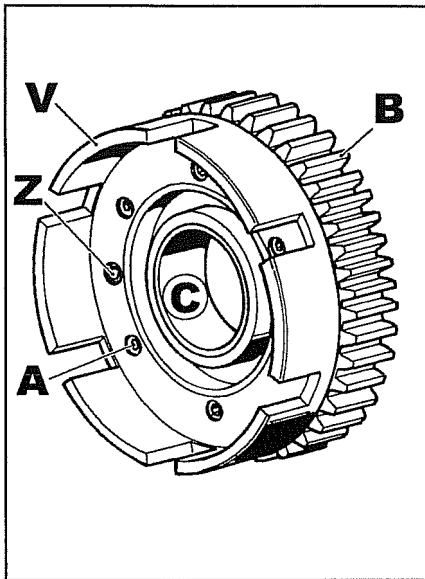


Fig. 10

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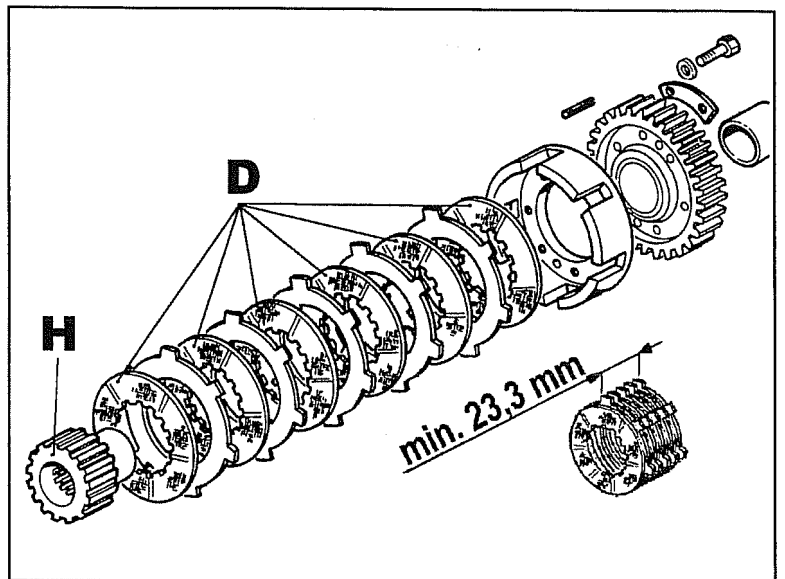


Fig. 11

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Things to note during re-assembly:

- If the clutch bell housing **V** fig. 10 had to be separated from transmission **B**, make sure that when you re-assemble them, pins **Z** and screws **A** do not protrude from the wheel housing where the last clutch disk has to work. Transmission **B** should be fixed to the bell housing on the side that allows the geared sector to be held away from the bell housing.
- When reinstalling the Belleville washers **S** fig. 8 and 9 line them up as shown in fig. 9. Once split ring **O** fig. 7 has been installed, use the press to compress and release the piston a number of times to make sure that the ring is correctly seated and connects with the stop on the other side when the piston is released.

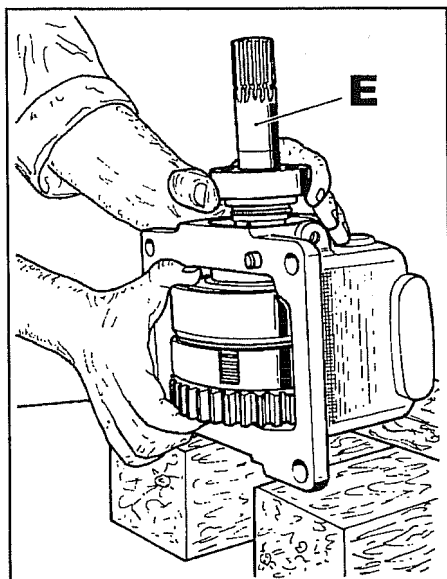


Fig. 12

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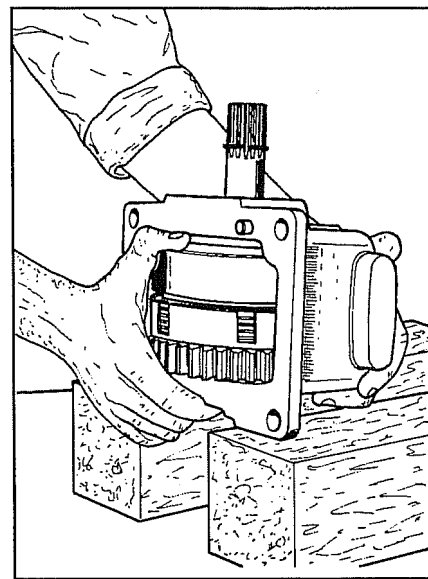


Fig. 13

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- When reinstalling, make sure you insert cylinder ass'y **M** (fig. 6) and the clutch ass'y **U** in the casing and keep them closely packed as illustrated in fig. 12. This will ensure that all the disks in the pack stay in the correct position. While holding the assembly in the position described above, use the punch to insert shaft **E** fig. 12 and its bearing. Install the two snap rings **L** and **H** fig. 4. Take hold of the ass'y as shown in fig. 13 and the turn it upside-down and insert it on tool **F** fig. 14 previously locked in the vice.

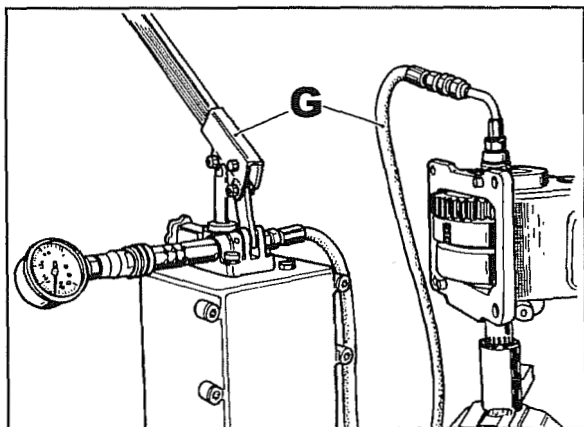


Fig. 14

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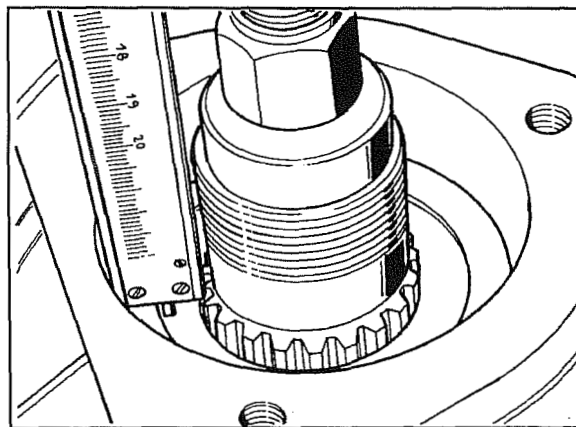


Fig. 15

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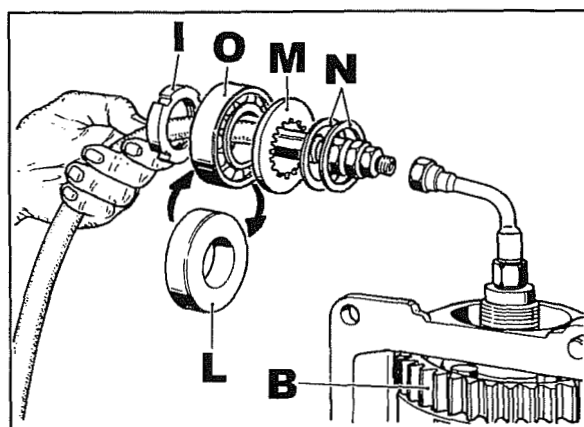


Fig. 16

0251

- Connect the test device **G** fig. 14 and bring the pressure to $50 \div 60$ bar. Use a gauge to measure the gap between keyed bushing **H** fig. 11 and gearwheel **B** fig. 10 as shown in fig. 15.

This measurement will be used to calculate the shimming needed to make the inside of the keyed bushing **1.2 mm** higher than the outside plane of the gearwheel.

Once the shimming has been calculated, disconnect the instrument as shown in fig. 16, slip locking ring **I**, test spacer **L**, washer **M** and spacers **N** on the hose to make the shimming measurement found as detailed above.

Connect the instrument again and bring the pressure up as before and then seat all the items mentioned above by tightening the last locking ring. Turn the pressure off and on a couple of times to settle the entire assembly.

At this point, gradually bring the instrument back up to pressure and, at the same time, turn gearwheel **B** fig. 16 by hand. Check to make sure it can still turn when the pressure gauge shows **35 bar** and it becomes completely free at **40 bar**. If this is not the case, increase or decrease the shimming performance of spacers **N**.

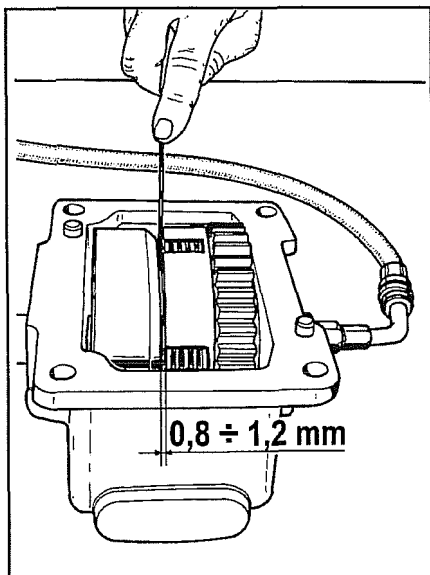


Fig. 17

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With the ass'y in a horizontal position, use a feeler gauge to check to make sure that the gap between cylinder and clutch pack is between **0.8** and **1.2 mm** as shown in fig. 17.

Once the ass'y has been registered, replace the test spacer **L** fig. 16 with bearing **O**.

- Tighten locking ring **I** fig.16 at **22.5 Kgm**.
- If when the cover **E** fig. 3 is replaced you note play between the bearing and its stop on the cover, adjust by shimming as needed.

Action to eliminate leaks inside the quadring seal

To discover whether there are leaks inside the dual traction ass'y, the first step is to check circuit pressure.

To do this, refer to the section on "Check circuit Pressure" in unit 57.

Do steps 1, 2, 3, 4 and 5.

14 Connect device **G** as illustrated in fig. 14 and pressurise the circuit to **50 ÷ 60 bar**.

If the gauge does not show a drop in pressure, this means that the leak is at the quadring seal.

If the gauge shows a drop in pressure, this means that the leak is in the cylinder. In this latter case, refer to the corresponding service work.

Eliminating leaks inside the cylinder

Carry out all the steps described above for the quadring seal.

Do steps 6, 7, 8, 9 and 10.

Special attention required during re-assembly:

See notes on the overhaul procedures.

Work on the dual traction clutch

First determine of the cause of the problem is electric or hydraulic.

To do this, refer to the section "Checking circuit pressure" in unit 57.

If you find that both systems are fine, this means that the problem is caused by the clutch slipping. The clutch should only slip if it is subjected to stress over and above its setting.

To check this last possibility, follow these steps:

15 Jack the front axle up.

16 Disconnect hose **A** fig. 1 and connect device **G** fig. 14.

Gradually pressurise the circuit and at the same time try to turn the two front wheels by hand.

Check if this can be done only when the pressure gauge shows **35 bar** and the wheels are completely free at **40 bar**.

If the clutch has to be overhauled to replace excessively worn disks and to reset the pressure setting, follow these steps:

Do steps 1, 2, 3, 4, 5, 6, 7, 8, 11 and 13.

Points to bear in mind when re-assembling:

Refer to the notes on the overhauling procedures.

Work on the dual traction front axle oil seal

If there is a leak at the oil seal **I** fig. 4 follow these steps:

Do steps 1, 2, 3, 4 and 7.

BRAKE CONTENTS

NOTES ON ASSEMBLY FUNCTIONS	Page 1
TROUBLE-SHOOTING	2
ELECTRIC SCHEMATIC	3
OVERHAULING THE ASSEMBLY:	4

Job Code	Job description	Page
	Checking the electric components	4
012	• Finishing: dual traction solenoid valve covering plate	4
	•	
1067	• Check dual traction solenoid valve (+012)	4
013	• Finishing: hoist the tractor and remove the rear right wheel	6
1068	• Checking and registering switches: brake lights, parking lights, dual traction engage or dual traction sensor in the max version (+013)	6
1069	• Check dual traction button	7
009	• Finishing: steering wheel, throttle lever, creep and reverse lever and dashboard	8
1071	• Check dual traction engage relay (+009)	8
1072	• Changing the central control unit	9
1073	• Change central control unit (+009)	9
014	• Finishing: front braking proportional solenoid valve (+014)	10
1074	• Check front brake proportional solenoid valve (+014)	10
	Checking hydraulic components	11
1075	• Checking circuit pressure	11
1076	• Work on the pressure relief valve (+012)	11
1077	• Work on dual traction solenoid valve (+012)	12
011	• Finishing: bonnet	13
015	• Finishing: ballast holder and dual traction pump hoses	13
1078	• Work on dual traction hydraulic pump (+011) (+015)	13
1079	• Work on proportional solenoid valve (+014)	14
	Work on brakes	16
016	• Finishing: wheel	16
1080	• Work on a front brake (+016)	16
1081	• Work on front brake hydraulic piston (+016)	19
[1080]		

(+____) This job is to be added to complete the job where it was called for provided it has not already been done.

[] This job when done eliminate the job called for since it is included as part of it.

Full electronic braking for the Star 75max tractor

When both main brake pedals are depressed at the same time, the following devices are operated:

1. The rear oil filled multiple disk brakes.
2. Dual traction engaged with the oil filled multiple disk clutch.
3. Braking action on the front axle (power assisted) by means of oil filled disk brakes.

Operation 2 and 3 are controlled by an electronic braking control unit that receives two signals:

- One from switch E fig.5 under the right brake pedal (this switch also controls the brake lights).
- One from the induction sensor D fig.5 near the mechanical return on the left brake pedal.

These signals are transmitted in sequence so that, during the first section of pedal take-up (needed to recover play), the brake light switch is activated and the induction sensor is energised only when the braking action of the rear brakes begins.

This sensor controls proportional solenoid valve opening which, in turn, operates the front brakes. The central braking control unit is designed to up-date and, hence, maintain front braking performance in relation to rear brake wear. It also guarantees front traction engage that switches rear braking action also to the front axle.

Central electronic control unit updating to maintain the functions described above is automatically done every five times the sensor is pressed with the brake pedals.

If work has to be done on the sensor, the central control unit or rear brake registration, front braking settings will have to be re-memorised by resetting the central control unit (see corresponding section).

When the tractor is operating, the electronic braking control unit monitors all the elements involved in front braking and can diagnose the problems as detailed in the Trouble-Shooting section.

When the brake pedals are not coupled, tractor turning performance is improved without having to engage dual traction or front braking.

Full electronic braking for the Star STAR IST mod. 55 – 65 and 75 tractors

When both main brake pedals are depressed at the same time, the following devices are operated:

1. The rear oil filled multiple disk brakes.
2. Dual traction is engaged with a multiple disk oil-filled clutch.

These operations are controlled respectively by the brake light switch E fig.5 and switch G fig.6 under the left brake pedal.

When the brake pedals are not coupled, tractor turning performance is improved without having to engage dual traction.

Front brake control unit for STAR 75 max

Causes of the different flash sequences and the solutions.

The brake indicator light on the instrument panel flashes, this means that the central control unit has detected a fault.

There can be a variety of faults:

2 FLASHES + PAUSE = Brake sensor short-circuited with the earth circuit

SOLUTION = Replace sensor (see page 7)

3 FLASHES + PAUSE = Brake sensor disconnected

SOLUTION = Check the sensor cable for breaks. Change the sensors as it is defective (see page 7)

4 FLASHES + PAUSE = Dual traction or brake solenoid coil short-circuited

SOLUTION = Check the short-circuited coil and replace it if necessary (see page 4).
Check if the coil wiring is short-circuited

5 FLASHES + PAUSE = Brake solenoid disconnected

SOLUTION = Check the short-circuited coil and replace it if necessary (see page 10).
Check if the coil wiring is short-circuited

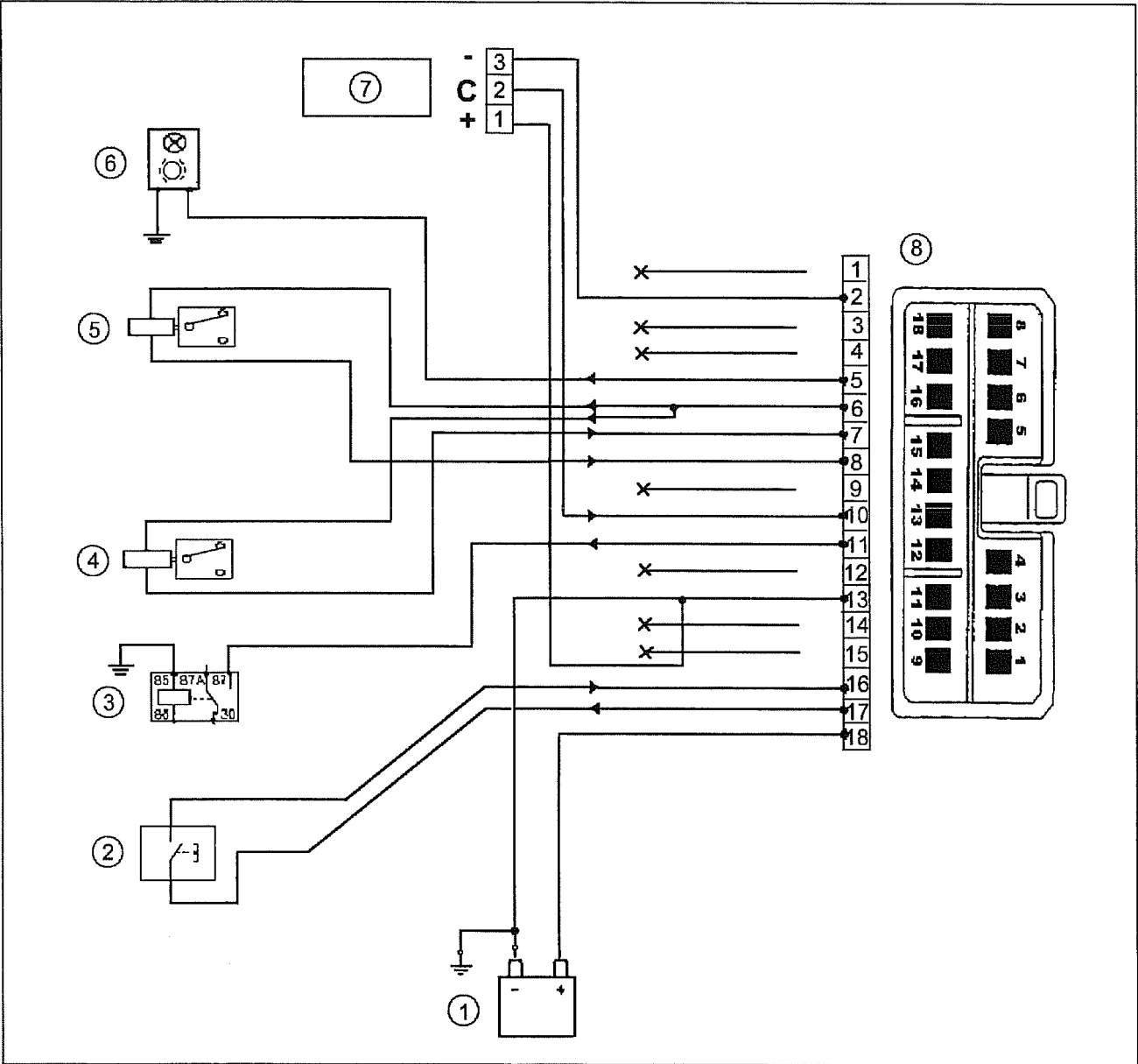
CONTINUOUS FLASHING = Max. brake wear

SOLUTION = Register rear brakes

LIGHT STAYS ON = Central control unit defective

SOLUTION = Replace central control unit (see page 9)

Problem	Cause
• Inefficient front braking performance caused by dual traction engage failure. • Inefficient front braking performance due to non-simultaneous rear brake action. • (For Max. version) Inefficient front braking performance due to front brake failure. • (For Max. version) Over-sensitive front braking action. • (For Max. version) The front brakes are locked.	• Electrical or hydraulic fault in the dual traction solenoid valve. See pages 4 and 12. • Register the brake pedals so that they engage at the same time. For the Max. version, register only the right pedal with the left to prevent having to reset the central control unit. • Electrical faults. Refer to the control unit LED displays on page 1.1 • Hydraulic fault in the proportional solenoid valve. See page 14. • Reset the central control unit. See page 9. • Check hydraulic performance of the proportional solenoid valve. See page 14. • Proportional solenoid valve electrical or hydraulic fault. See page 10 and 14. • Check if the hydraulic hoses and connections to the front brakes have been damaged or crimped with consequent lower fluid volume. • Front brake cylinder fault. See page 19.



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Ref.	Description
1	Battery.
2	Central control unit reset button.
3	Dual traction solenoid relay.
4	Dual traction solenoid valve.
5	Front brake proportional solenoid valve.
6	Brake indicator light.
7	Brake sensor.
8	Central control unit connector.

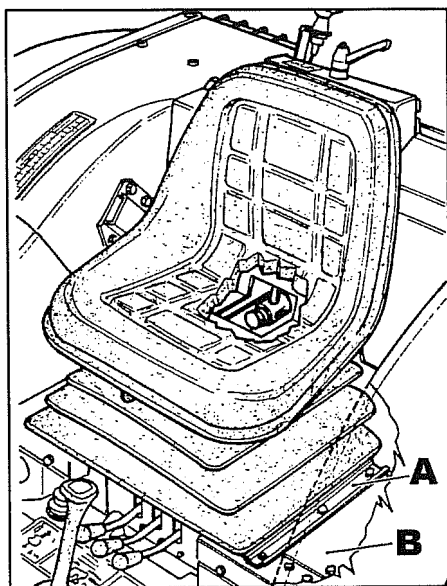


Fig. 1

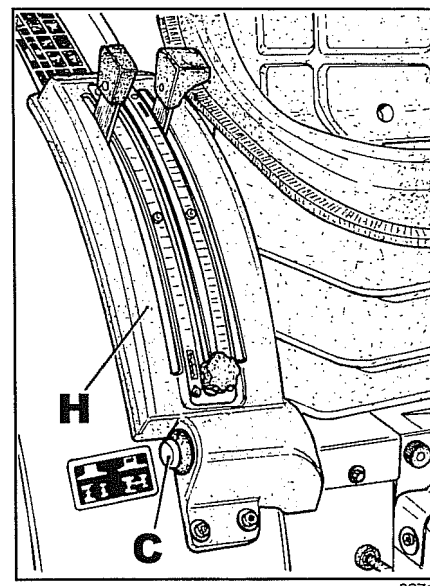


Fig. 2

Checking the electric components

Whenever there is a problem with engaging dual traction with the manual control button or the simultaneous command with braking using both brake pedal coupled together, the following checks should be made::

Check the fuses in the fuse box under the dashboard.

Checking the dual traction solenoid valve

Identify the dual traction solenoid valve. To do this:

- 1 Unfasten the left bar **A** fig. 1 that retains the seat mount guard.
Remove the guard **B** fig. 1.
- 2 Underneath this find the unmarked cable that supplies power to the dual traction solenoid. The other cable marked **A** supplies power to the differential lock solenoid.
- 3 With the ignition switched on, check the dual traction solenoid coil testing its magnetic performance with a piece of metal (e.g. a screwdriver).

If it is magnetic and attracts the screwdriver, this means that the coil is energised and the solenoid is working.

Next check if the magnetic effect is cancelled by working the coupled brake pedals and also by pressing the dual traction button **C** fig. 2. If it is, this means that the solenoid problem is hydraulic (refer to the appropriate section).

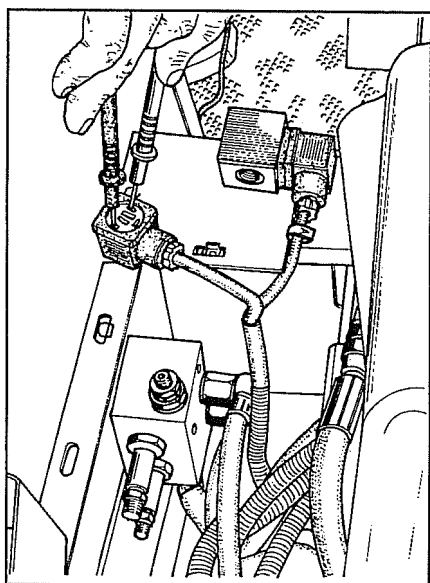


Fig. 3

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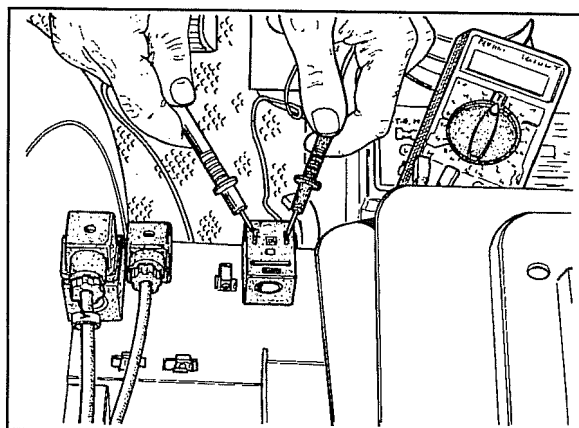


Fig. 4

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If the magnetic effect is not cancelled by the pumping the pedals, follow these steps:

- 4 With the ignition on, use a tester to check if the voltage on the dual traction cable plug (the one not marked "A" is 12V (see fig. 3). This reading should drop to 0V when both brake pedals are depressed at the same time or drop to a reading between 5.6 V and 2 V when the dual traction button is pressed (the reading between 5.6 V and 2 V is given by an induced current effect).
- 5 When you get 12 V on the plug, measure the resistance on the dual traction solenoid coil, see fig. 4.

The resistance should be around 7.6 ohm.

Readings close to 0 indicate a short circuit. There is an induced circuit when there is no reading whatsoever (a short circuit will also be signalled by the central control unit in the max version with 4 flashes followed by a pause). In both situations, change the coil.

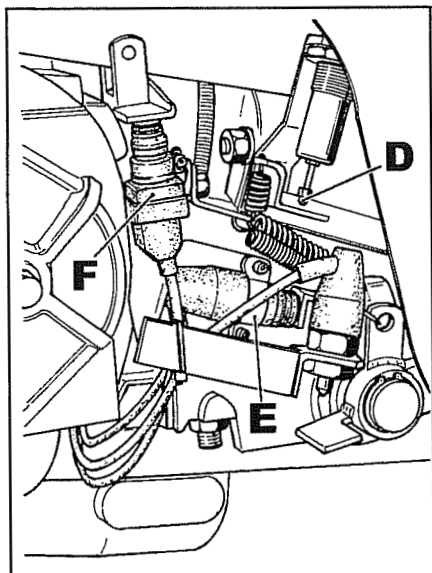


Fig. 5

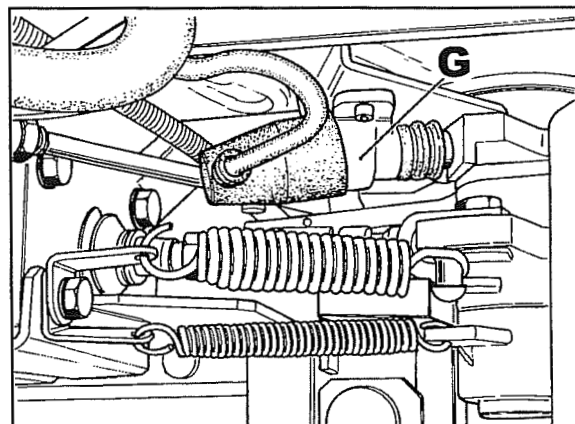


Fig. 6

Checking and registering the following switches: brake lights, parking brake, dual traction engage or sensor in the max version.

- 6 If you do not get 12V on the plug, check switch functional performance. Do this:
 - 6.1 Jack the tractor up so that it is perfectly safe and remove the rear right wheel.
 - 6.2 Check if there are foreign bodies (lumps of soil or other) under switches **E-F** fig. 5, for the brake light and parking brake or under switch **G** fig. 6 for dual traction engage.
 - 6.3 (for the Max version) Make the same check under tip **D** fig. 5 on the sensor installed instead of switch **G** in fig. 6.
- 7 Next check if the brake light and parking brake switches are working correctly:
 With the ignition on, depress the coupled brake pedals which turn the brake lights on. Then, keeping the brake pedal down, pull up the parking brake and check if the brake lights turn off when the parking brake indicator light comes on the instrument panel.

- 8 If the checks described in point 7 above do not give the results detailed, check the switches and register them as needed. Register the switches with their fixing screws.
Also check to make sure the dual traction engage switch **G** fig. 6 is perfectly registered. To do this follow these steps:
Depress the coupled brake pedals and check if the brake lights come on thanks to switch **E** fig. 5.
Hold the brake pedals down and check if the linkage operating the stem of switch **G** fig. 6, when it detaches has a travel of 4-5 mm before reaching maximum tip extension and moves 1-2 mm off when the brake action is terminated.
If necessary use a tested to check if the switches are working correctly and replace them if they are not.
- 9 (For the Max version) Check if tip **D** fig. 5 of the brake sensor is correctly registered. Follow these steps:
- 9.1 Depress the coupled brake pedals and check if the brake lights come on thanks to switch **E** fig. 5.
- 9.2 Hold the brake pedals down and check if the tip retracts about 2-3 mm.
When the pedals are released, the gap between the sensor tip and its contact surface should be around 2-3 mm.
- 9.3 If it is not, register the sensor for the settings detailed above and reset the central control unit (see appropriate section)
- NB** - Sensor electric efficiency need not be tested because a short circuit would be signalled by LED **T** fig. 11 on the central control unit with two flashes followed by a pause. In this case, change the sensor.
- If these tests do not highlight problems, the next step is to check the relays.

Checking the dual traction button

If the magnetic effect mentioned under point 4 above is not cancelled with the dual traction button, follow these steps:

- 10 On the mudguard slacken off lift control lever guard **H** fig. 2 and then remove the locking ring retaining the dual traction button **C**.
- 11 Check the button with a tester to see if it is working. If it is not, change it.

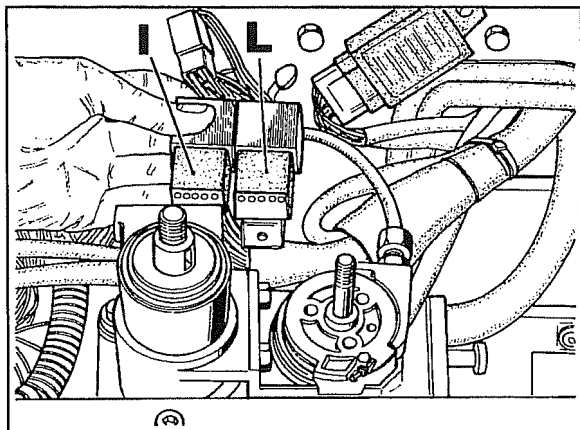


Fig. 7

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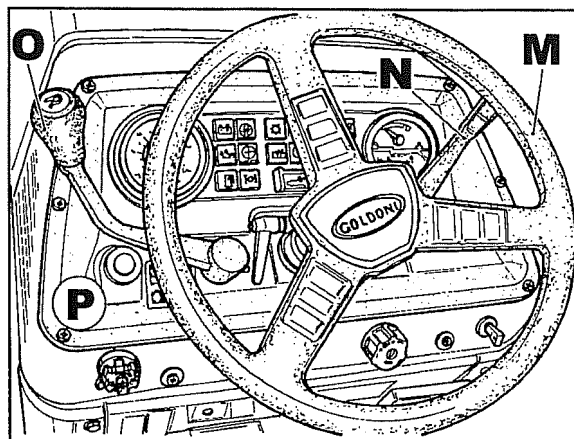


Fig. 8

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Checking dual traction engage relays

To access relays I-L fig. 7 follow these steps:

- 12 Remove the steering wheel **M** fig. 8, the hand throttle lever **N**, the creep and reverse lever - **O** and then remove the instrument panel **P**.
- 13 Use a tester to check if there is GND on the relay connectors. The GND wire is fixed underneath the turning indicator blinkers on the engine compartment side. Check relay efficiency with the tester and replace them as needed.

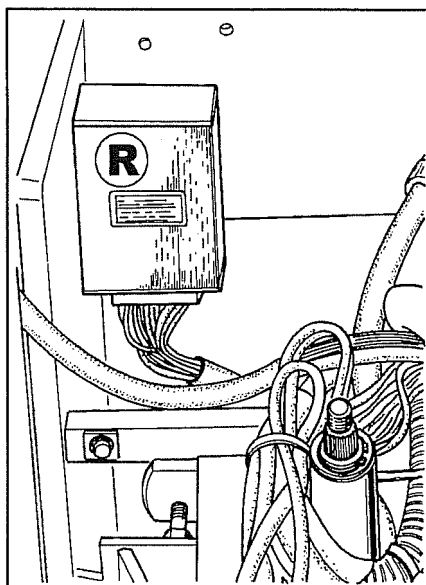


Fig. 9

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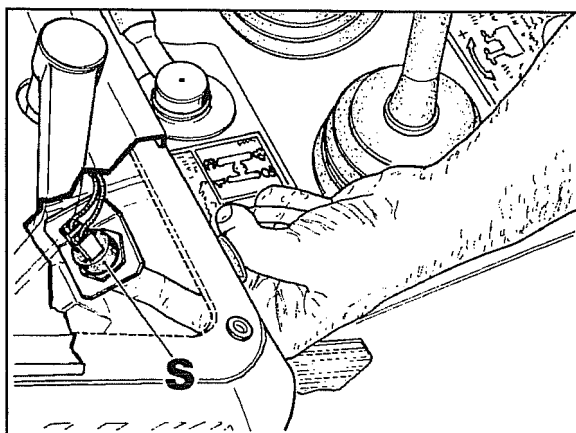


Fig. 10

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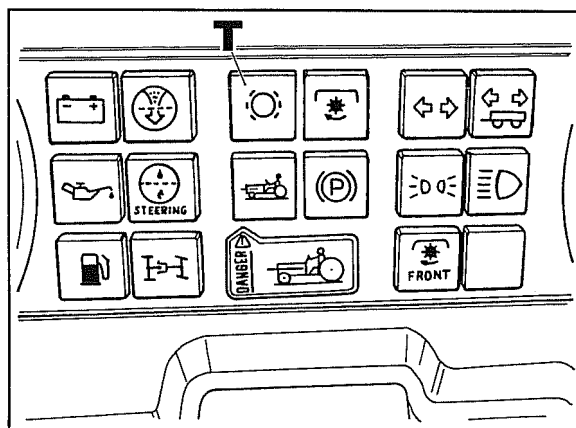


Fig. 11

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Resetting the central control unit (Max version)

Whenever the braking sensor is worked on or the rear brake pedals are registered, the central control unit **R** fig. 9 must be reset to cancel the previous front brake settings memorised. To do this follows these steps:

- 14 The ignition is on, press reset button **S** fig. 10 through the PTO clutch lever slot and hold the button down until LED **T** fig.11 stops flashing.

Do not press the brake pedals or pull up the hand brake during the reset operation.

- 15 Press the coupled brake pedals 5 times applying medium force.

NB - After a reset, test the brakes driving the tractor at low speed to avoid the risk involved in a sharp braking action. If the braking action is excessive, repeat the previous operation.

Changing the central control unit (Max versions)

When the central control unit LED on the instrument panel stays lit, this means that the central control unit has to be changed. To do this, follow these steps:

Do operation 12.

- 16 Disconnect central control unit wiring and then replace the unit.

Do a reset on the new central control unit (see operation 14 and 15).

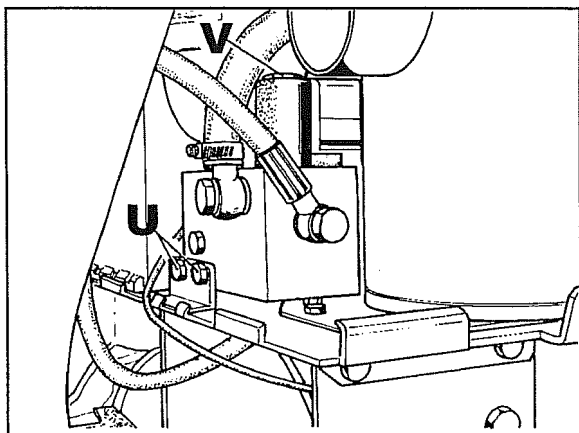


Fig. 12

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Checking the front brake proportional solenoid (Max version)

For this solenoid problems such as short circuits or electric disconnections are signalled by the LED on the central control unit flashing 4 or 5 times as the case may be followed by a pause.

Follow these steps to access the coil:

17 Open the engine cowl.

Remove screws **U** fig. 12 fixing the solenoid assembly and then move the unit forward to be able to unscrew nut **V** fixing the coil to the solenoid.

18 Use a tester to check solenoid coil resistance applying the same method used to check the dual traction solenoid coil as shown in fig.4.

The resistance should be around 7.4 ohm.

Readings around 0 indicate a short circuit and the circuit is broken when no reading at all is found.

In both cases, change the coil.

If you get a reading of 7.4 ohm, look for a problem with the cable supplying power to the coil.

Checking hydraulic components

Checking circuit pressure

To determine whether the problem is hydraulic or electric, check circuit pressure on the oil delivery hose to the dual traction assembly.

Follow these steps:

- 19 Connect the special device **A** illustrated in fig. 13. to the above-mentioned hose located under the tractor. Close the stopcock on the device and run the engine at 1000 Rpm. Check if the pressure is around 42 bar.

Check if the pressure drops to 0 bar either by depressing the couple brake pedals or pressing the dual traction button.

If this is the case, it means that the electric and hydraulic systems are working.

This test can reveal various types of problems:

Electric:

- 19.1 When the pressure does not drop to 0 but stays at 42 bar, this means that power is still reaching the solenoid.

- 19.2 When the gauge gets no pressure reading at all, this means that the power supply is not reaching the solenoid

Refer to the appropriate section for what to do in both situations.

Hydraulic:

- 19.3 When the gauge does not get a reading of 42 bar but rather a reading close to 0, this means that (excluding filter problems) the problem lies with the pressure relief valve, the dual traction solenoid or the hydraulic pump.

- 19.4 If with the gauge reading 42 bar, you open the special device stopcock, rather than holding steady, the pressure gradually drops. This means that there is a leak inside the dual traction unit (see Ass'y 42).

Minor leaks are more easily discovered during the checks described above, if the front axle is jacked up and both wheels turned in the same direction.

Work on the pressure relief valve

After the previous checks:

Do operation 1.

- 20 Pressurise the circuit by screwing in grubscrew **B** on the valve fig. 14.

If no increase in pressure is noted, switch the tractor off and clean the valve as follows:

- 21 Unscrew the valve from the solenoid assembly and dismantled it as shown in fig. 15.

Check seal rings **C-D** fig. 15 and replace them as necessary. Wash and dry all the parts with compressed air to eliminate all soiling.

Reassemble the valve lubricating the parts with the same oil used in the hydraulic circuit.

Start the tractor and run the engine at 1000 Rpm. Pressurise the circuit and bring the pressure to 42 bar.

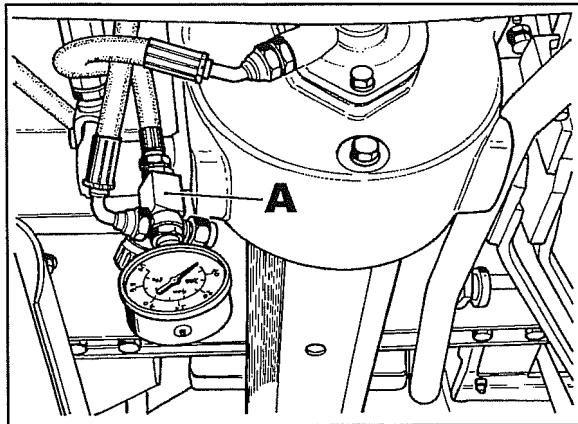


Fig. 13

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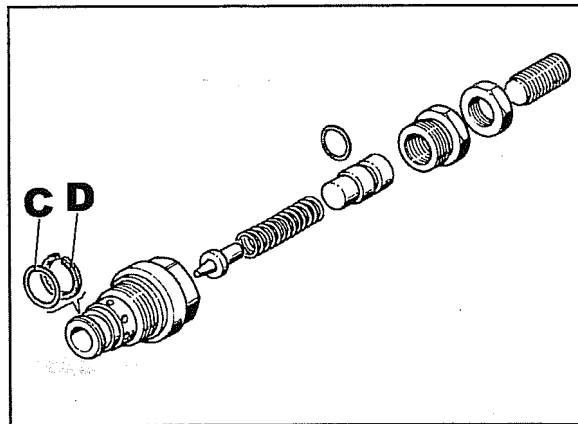


Fig. 15

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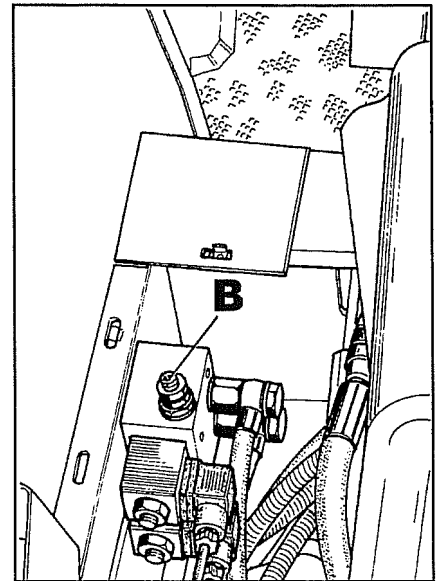


Fig. 14

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Work on the dual traction solenoid

After the previous check:

Do operation 1.

22 Identify the dual traction solenoid. It is connected to the hose with the pressure gauge as shown in fig. 13.

23 Remove the coil from the solenoid in the solenoid valve ass'y.

Unscrew the solenoid and remove it from the solenoid valve casing.

Fig. 16 gives a detailed view of the solenoid component parts. Wash them, dry them with compressed air and lubricate them with the same oil used in the circuit. Reassemble the parts and use medium strength Locktite on tapped fitting **G**.

Check solenoid functional performance. To do this:

Replace the coil on the solenoid.

Connect it to the tractor electric wiring.

Turn the circuit on by switching the ignition on.

Press the dual traction engage button repeatedly and, at the same time, check if you hear the parts inside the solenoid click.

Check seals **E-F** fig. 16 and change them as needed.

Switch the tractor on and set the engine at 1000 Rpm. Pressurise the circuit bringing the pressure to 42 bar.

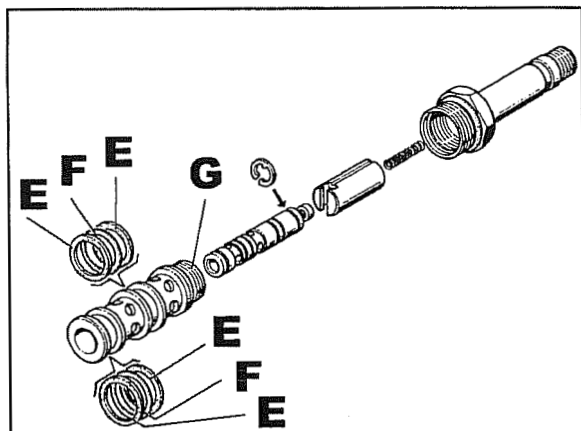


Fig. 16

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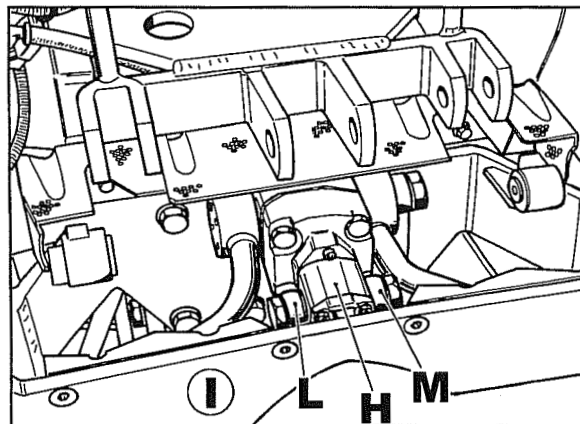


Fig. 17

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Work on the dual traction hydraulic pump

If no problems were found on the pressure relief valve or the dual traction solenoid valve, this means that the problem lies with the hydraulic pump **H** fig. 17.

If the pump shows internal or external leaks, the seal rings will have to be changed. Follow these steps to do this:

24 Remove the cowling.

Slacken off the ballast holder fixing screws and push the holder forward so that you can disconnect hoses **L-M**, the pump's delivery and suction lines.

Remove the pump.

25 Dismantle the pump which will look like the illustration in fig. 18.

NB - Before dismantling the pump mark its centre casing **N** against side flanges **O-P**. Also make sure each internal part is kept in the same position in relation to the others. Keep the positions of the two gear casings **R** and remember that on both the larger oil passage is turned toward the suction hose hole.

If the gear casings **R** or centre casing **N** are excessively worn, change the pump. If wear is not found, change all the seal rings and then reinstall the pump.

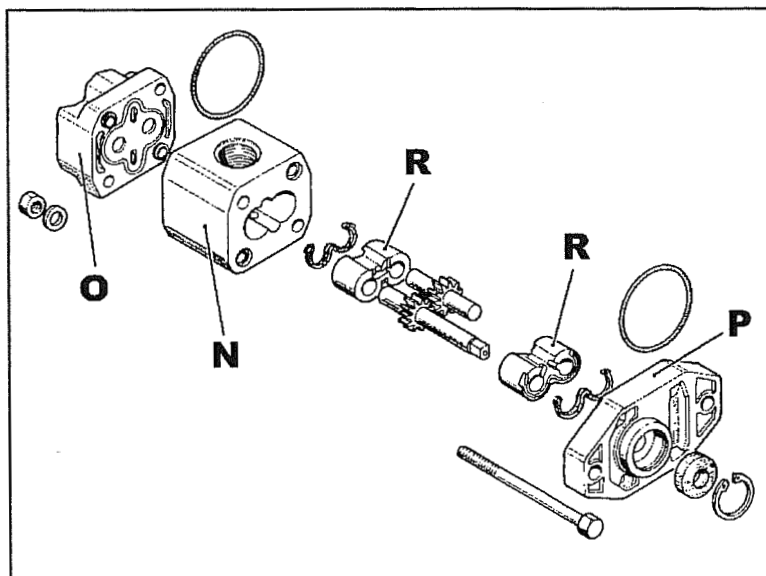


Fig. 18

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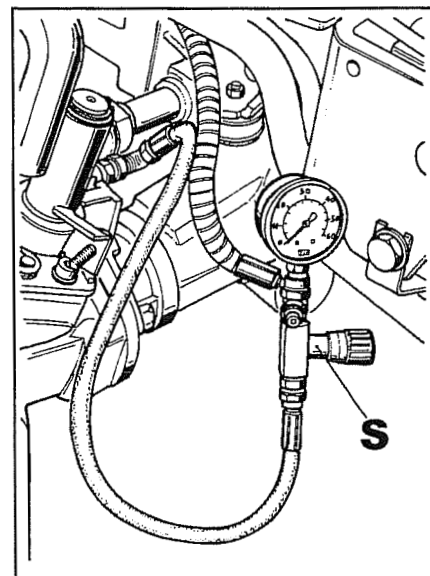


Fig. 19

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Work on the proportional solenoid (Max version)

Braking system hydraulic problems can also be caused by the front brake proportional solenoid. Therefore:

If we exclude hydraulic problems such as those described previously

If we exclude solenoid valve electric problems since they will be signalled by the central control unit (refer to the appropriate section)

Follow these steps:

- 26 Install the special device shown in fig. 13 on the brake solenoid delivery hose as shown in fig. 19. Don't forget to close the stopcock **S** to cut out the circuit that would go from the gauge to the brakes.

Do operation 14.

- 27 Start the tractor, press the brake pedals once and check at the same time if the pressure is around 40 bar.

If it does not and the pressure reading stays much lower, this means that the proportional solenoid is clogged.

To clean it:

Do operation 17.

- 28 Remove the solenoid from the solenoid valve ass'y and dismantle it as shown in fig. 20.

Check the condition of seals **T-U-V-Z** fig. 20 and change them as needed. Wash the parts to eliminate all dirt.

As regards assembly **D** fig. 20 whose components are illustrated in fig. 21, just wash it are removing pin **E** and then blow compressed air through the holes in the outer casing without removing grub screw **B** and ball **C**.

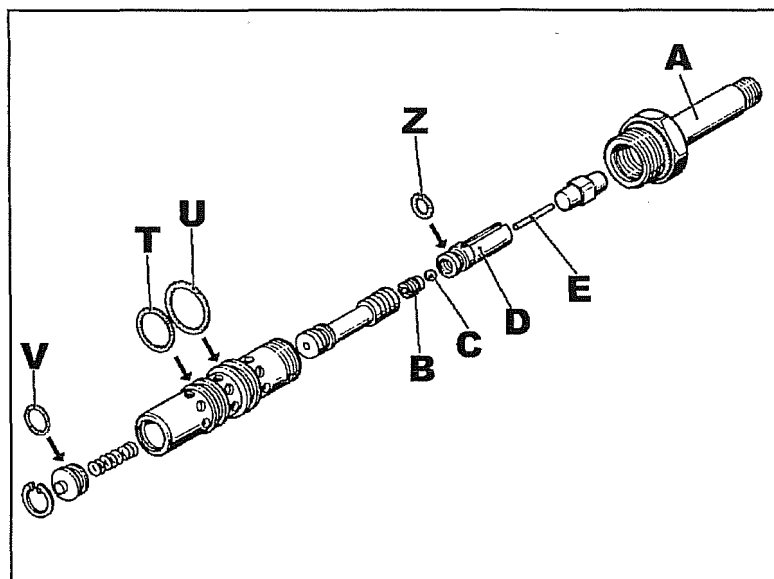


Fig. 20

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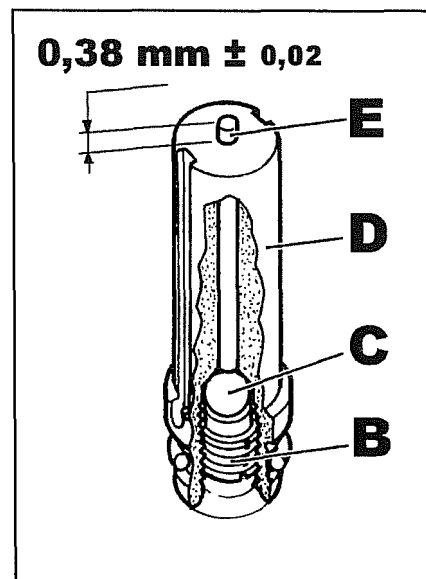


Fig. 21

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Special attention when reassembling:

- If grubscrew **B** was remove or dismantled, parts **B-C-D-E** in fig. 21 should be reassembled with the following pointers:
 - grubscrew **B** will be reinstalled using medium strength Loctite
 - pin **E** illustrated in fig. 21, must protrude **0.38 mm** with a $\pm$ tolerance of **0.02 mm**. The one with the concave head must be towards the ball.
- Reassemble all the parts lubricating them with the same oil used in the circuit and fill the solenoid casing **A** with oil.
- Reset the central control unit by doing operation 15.

29 If after doing operation 27, the pressure is exact-i.e., around 40 bar, continue to look for the problem by opening stopcock **S** fig. 19.

If the pressure drops gradually after the stopcock is opened, this means that there is an oil leak in one or both brakes (refer to the appropriate section).

Reset the central control unit with operation 15.

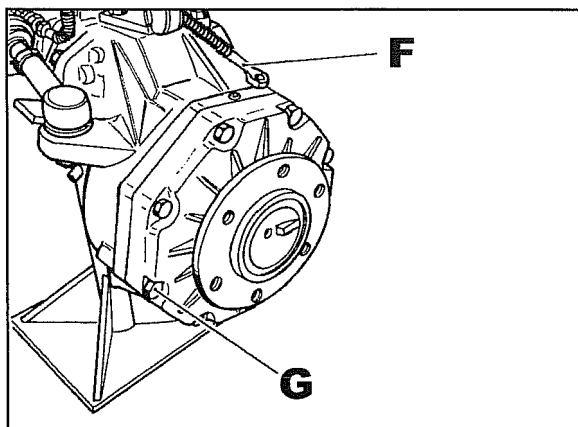


Fig. 22

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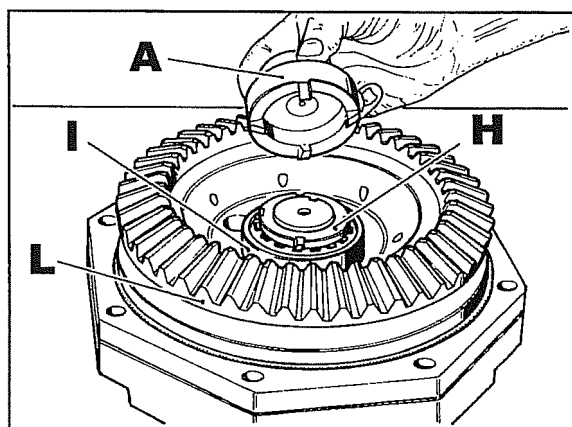


Fig. 23

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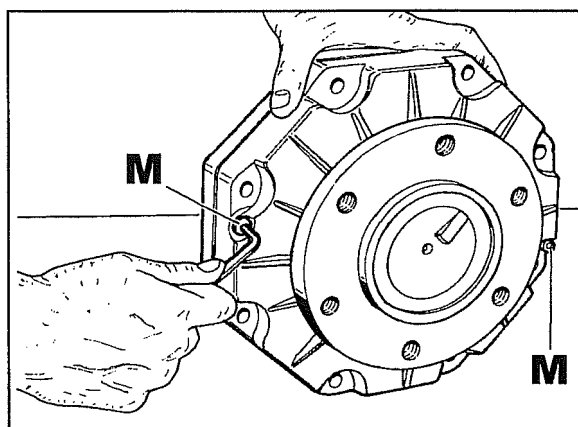


Fig. 24

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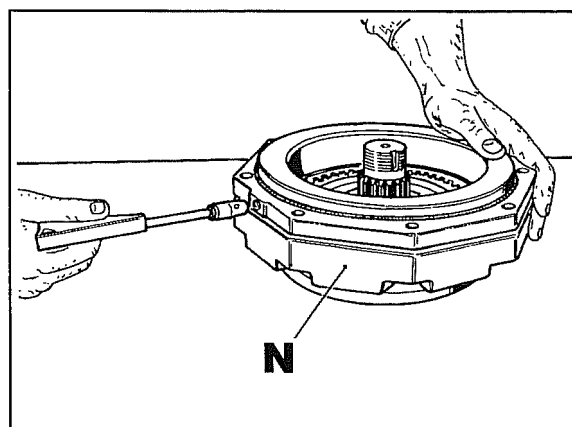


Fig. 25

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Work on the brakes

Work on the front brakes

- 30 Jack up the tractor under safe conditions and remove the wheel involved.
- 31 Disconnect hose **F** fig. 22 oil delivery to the brake.
- 32 Place a container underneath to catch the brake fluid, remove the brake ass'y by removing screws **G** fig. 22.
- 33 Use special tool **A** fig. 23 to remove locking ring **H**. Use a commercially available extractor to remove bearing **I** and then remove the ring gear **L**.
- 34 Turn the brake ass'y over and remove screws **M** fig. 24. Turn the brake ass'y over again and use a compressor to blow (carefully) air into the piston supply orifice to separate the brake from flange **N** as shown in fig. 25.

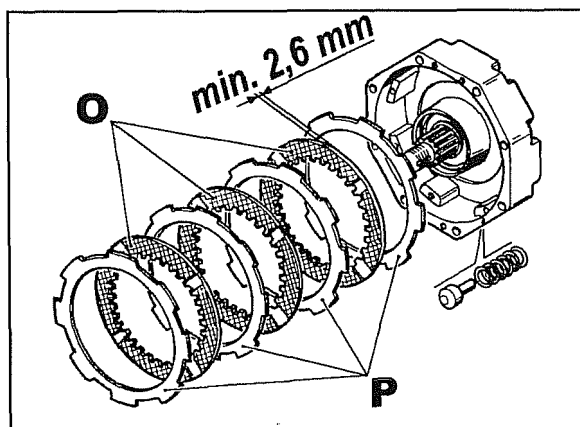


Fig. 26

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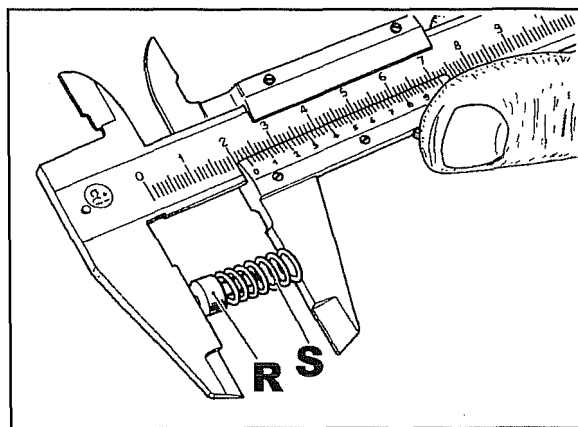


Fig. 27

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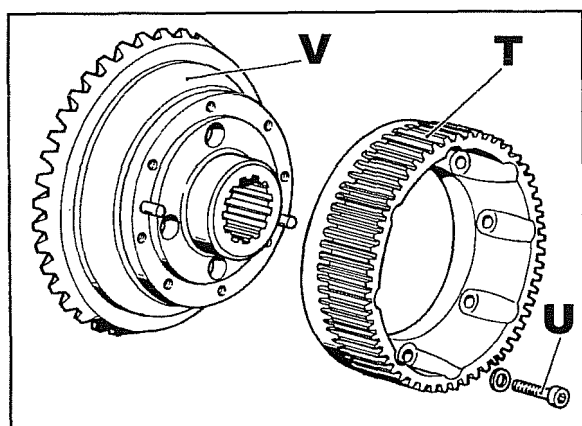


Fig. 28

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Fig. 26 illustrates the parts making up the brake.

- 35 Check wear on disks **O** fig. 26 by measuring their width which should never be less than **2.6 mm**. Also check to make sure the steel disks **P** are in good condition and, if necessary change them. Use a gauge to check the 8 pins **R** fig. 27 with their springs **S**. Their measurement should not be less than **22.5 mm**. If necessary replace the springs.
- 36 Check the wear status of keyed ring **T** fig. 28. If it has to be replaced, separate from ring gear **V** by removing screws **U**.

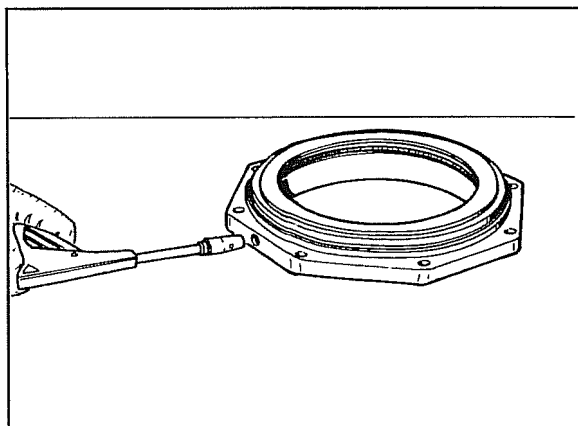


Fig. 29

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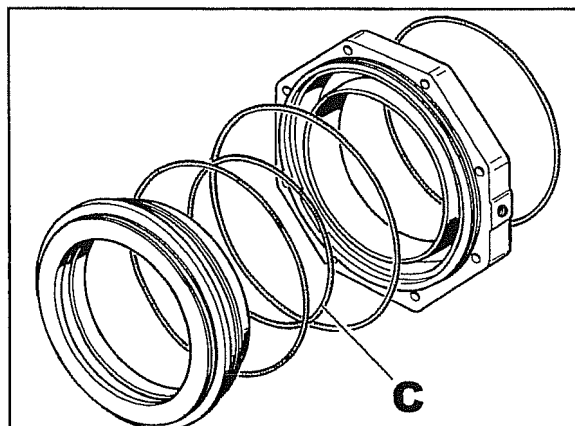


Fig. 30

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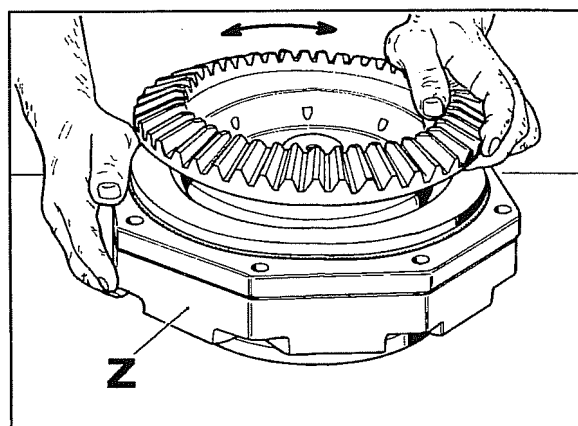


Fig. 31

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37 Separate the cylinder from the piston by blowing compressed air through the oil orifice as shown in fig. 29.

Fig. 30 shows an exploded view of the cylinder, piston and seal rings

Check the condition of the seal rings and check for burring or scoring on the contact surfaces between cylinder and piston. Replace damaged parts.

Special attention during reassembly:

- When reinstalling the piston in the cylinder, pay special attention to make sure that inside diameter seal ring **C** fig. 30 stays in its seating during operations.
- When reassembling ring gear **V** fig. 28 on the brake **Z** fig. 31, pay special attention to ensure that all the disks **O** fig. 26 couple with the keyed ring **T** fig. 28. Assemble the parts with a rotary movement as illustrated in fig. 31 to achieve this.
- Locking ring **H** fig. 23 and its washer should be changed. When reassembling, tighten the new locking ring to **12 Kgm**, bend the washer and punch the locking ring

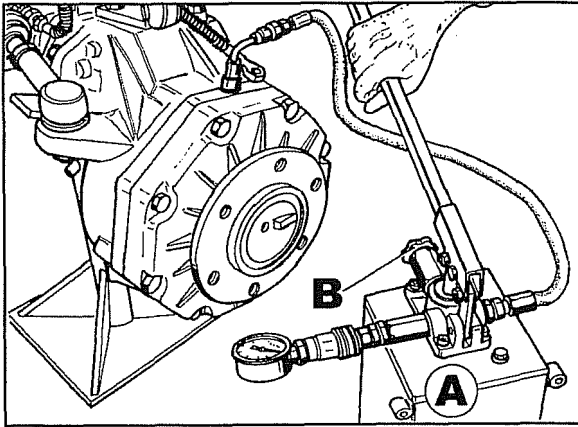


Fig. 32

0249

Work on the front brake ass'y cylinder

Follow these steps to check for any internal oil leaks:

Do operations 30 and 31.

38 Connect special device **A** fig. 32 to the brake assembly oil delivery hole.

Pressurise the circuit to 50 bar Vent the circuit through stopcock **B** to remove any air from the circuit. Repressurise the circuit and check the pressure gauge on the special device.

39 If the gauge holds the pressure, look for the problem by repeating steps 30, 31 and 38 on the other brake ass'y.

If, on the other hand, the pressure gradually drops, this means that there is an internal brake fluid leak and to correct it, follow these steps:

Do operations 32, 33, 34 and 37.

Important points to observe when reassembling:

Refer to the notes on overhauling.

FRONT PTO CONTENTS

	Pag e
NOTES ON ASSEMBLY FUNCTIONS	1
TROUBLE-SHOOTING	2
ELECTRIC SCHEMATIC	3
OVERHAULING THE ASSEMBLY:	4

Job Code	Job description	Page
	Check electrical equipment	4
1057	• Work on the earth circuit, the switch or the central control unit.(+009)	5
	Registering the electromagnetic clutch	6
010	• Finishing: finishing 011 + battery, air filter and mounting.	6
1058	• (+010)	6
	Work on the flex coupling, bearings, disks, electromagnetic clutch spline electromagnet spline.	7
1059	• Work on the flex coupling.(+010)	7
1061	• Work on bearings.(+010) (+1059)	8
1062	• Work on disks, spline or electromagnet.(+010) (+1059)	9
	Work on: bearings, PTO shaft and transmission oil seals.	10
1063	• Work on bearings. (+010) (+015) (+1059) (+1062)	10
1064	• Work on bearing PTO shaft. (+011) (+015)	13
[1063]		
1065	• Work on electromagnetic clutch side oil seal.(+010) (+1059) (+1062)	13
[1063]		
1066	• Work on front PTO casing side oil seals. (+011) (+015)	13
[1063]		
[1064]		
009	Finishing: steering wheel, throttle lever, creep & reverse range lever, instrument panel.	
011	Finishing: cowling.	
015	Finishing: ballast carrier and dual traction pump hoses.	

(+___) This work should be added to complete the job called for provided it has not already been done.

[] If this operation has been done it eliminates the need for the job called for.

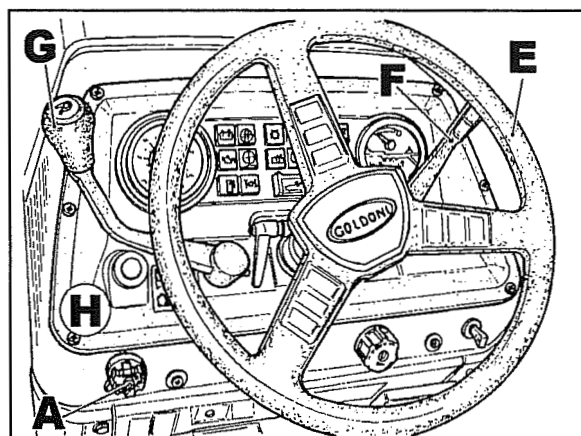


Fig. 1.1

0262

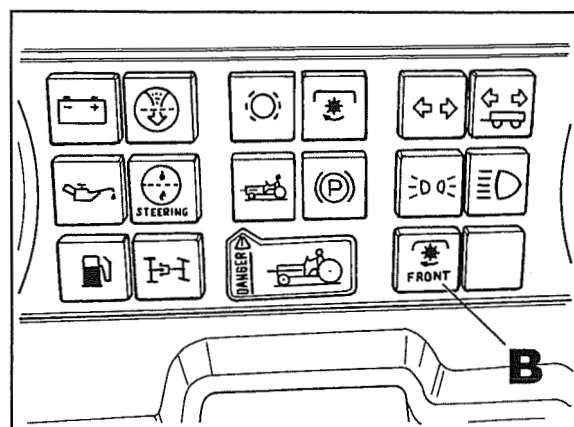


Fig. 2.1

0279

The front PTO electromagnetic clutch should only be engaged with the engine running and set for from 1200 to 1600 Rpm. There is a tolerance for the lower Rpm settings which can be as low as 900 Rpm. Depending on the implement coupled, use the lower Rpm band to eliminate excessive strain on the transmission.

To engage the PTO, follow these steps:

Press switch **A** fig. 1.1 and turn it to the right. LED **B** fig. 2.1 on the instrument panel will begin to flash to signal gradual engagement by means of the central control unit. When the PTO is engaged, the LED will stop flashing and stay lit.

If the clutch does not engage, press switch **A** fig. 1.1 again to reset it to its original position, set the engine at higher Rpm and repeat the steps described above.

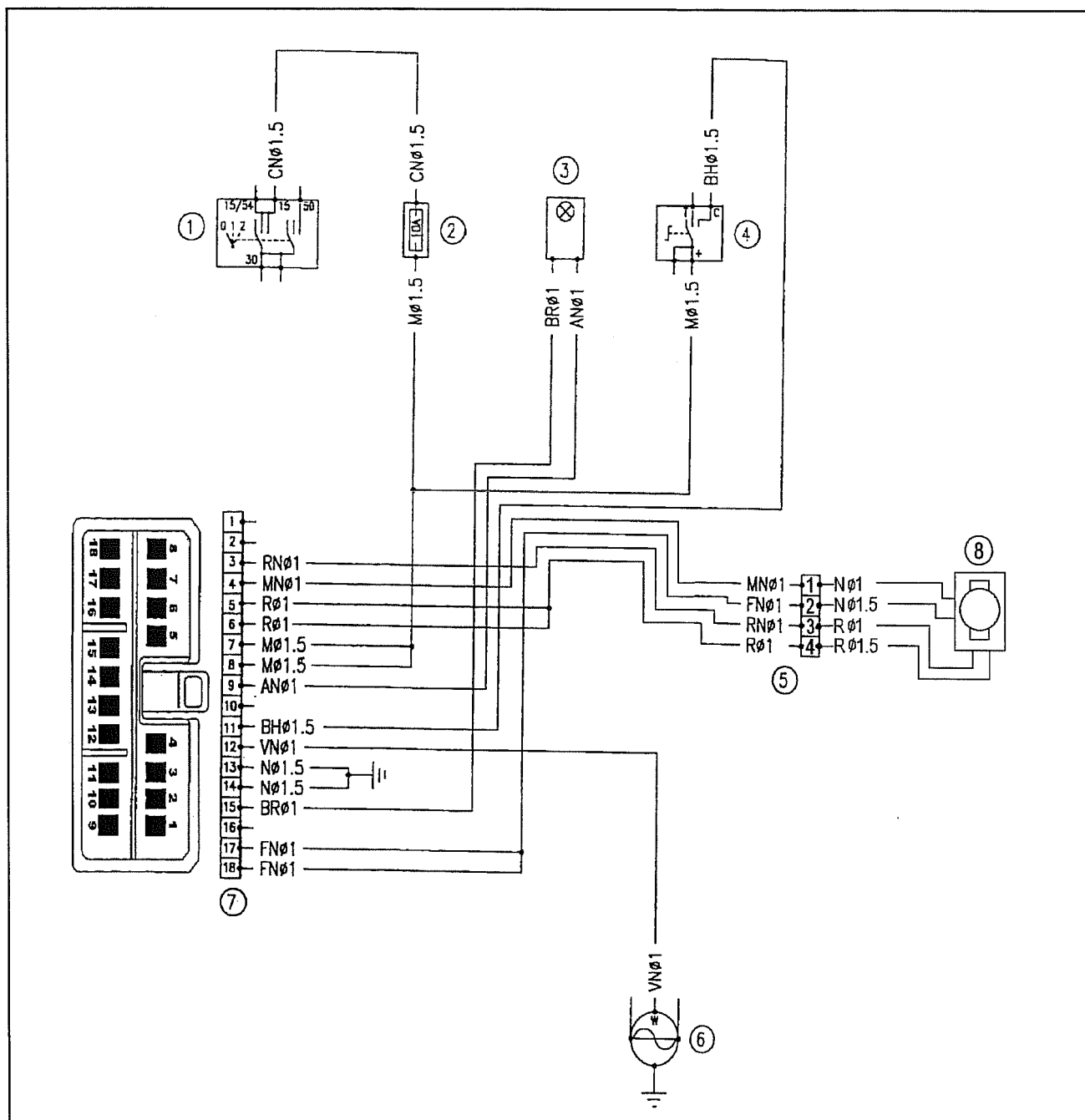
When the PTO is running, and this can be at all Rpm settings, the central control unit will also automatically disengage the clutch if the strain transmitted would cause the disks to slip.

To disengage the clutch, just press the switch again and it will reset to its original position.

TROUBLE-SHOOTING

Problem	Cause
• The clutch does not engage. • The clutch disengages even though it is not under full load. • When the clutch is disengaged it makes a lot of noise. When the clutch is engaged it does not transfer drive to the PTO. • Oil leaks between the clutch disks and the electromagnet. • There is a lot of noise with the PTO engaged. • Oil leaks at the PTO shaft.	• Short circuit to breaks in the power supply circuit. Look for the cause in the electromagnet or the power circuit. • Excessive gaps between the disks so that the electromagnet cannot hold the contact during the work when drive transmission is under most strain. • Outer disk holder flange bearings are worn and this generates uneven wear on the disks. • Spline broken. • PTO output shaft oil seals worn. • Possible wear on output or input PTO shaft bearings. • PTO shaft oil seal worn.

ELECTRIC SCHEMATIC



9024

Ref.	Description
1	Ignition switch
2	Fuse 10A
3	Front PTO clutch indicator light
4	Front PTO clutch control switch
5	Electromagnetic clutch connector
6	Alternator
7	Front PTO clutch central control unit connector
8	Electromagnetic clutch

Wire colours	
A	Orange
B	White
C	Pink
D	Grey
E	Green
F	Blue
G	Yellow
H	Light-blue
M	Brown
N	Black
R	Red
V	Purple

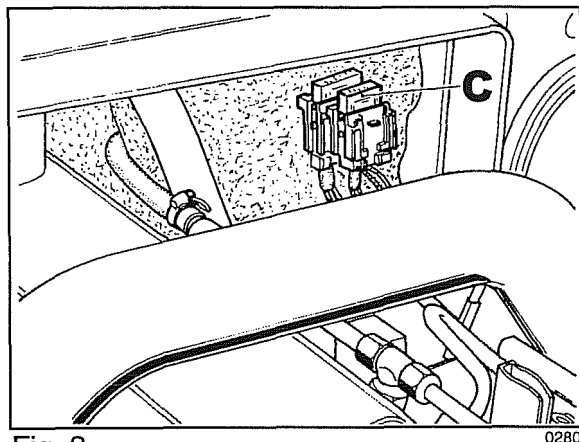


Fig. 3

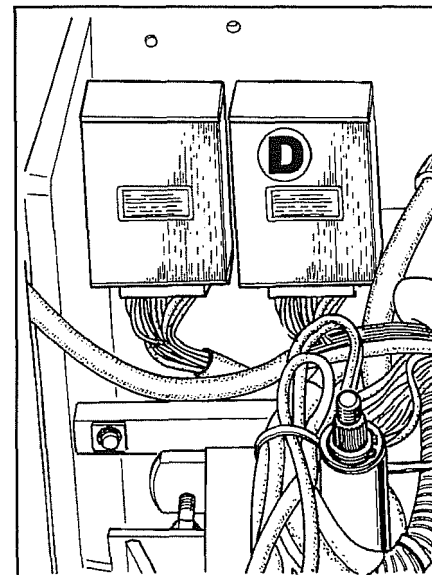


Fig. 4

Checking the electric components:

- 1 Check if fuse **C** fig. 3 protecting the front PTO power circuit has blown.
- 2 Use a tester to check the efficiency of the connection between tractor wiring and front PTO wiring near the battery mount.
- 2.1 you should get the following readings on the tractor wiring connector (engine running and PTO engaged):

<i>Tester positive on double red wire.</i>	<i>Reading</i>
<i>Tester negative on double Blue/Black wire.</i>	<i>12 V</i>

<i>Tester positive on Red/Black wire.</i>	<i>Reading</i>
<i>Tester negative on Brown/Black wire.</i>	<i>0 V</i>

If instead of 12V you get a lower reading or none at all, you will have to find the fault: on the wiring, on the earth circuit, on the switch **A** fig. 1.1 or on the central control unit **D** fig. 4.

Work on the earth circuit, the switch on the central control unit:

2.2 Remove the steering wheel **E** fig.1.1, the hand throttle lever, the creep/reverse range lever **G** and the instrument panel **H**.

If there is a good earth contact (on the power steering mount) and the switch is working correctly, the central control unit should be replaced.

2.3 You should get the following readings on the front PTO connector (with the engine switched off):

<i>Tester positive on the thick red cable.</i>	<i>Reading</i>
<i>Tester negative on the thick black cable.</i>	<i>3 ohm</i>

<i>Tester positive on small red wire.</i>	<i>Reading</i>
<i>Tester negative on small black wire</i>	<i>16.8 ohm</i>

If you do not get these reading, fix the problem by replacing the electromagnet (refer to the appropriate section).

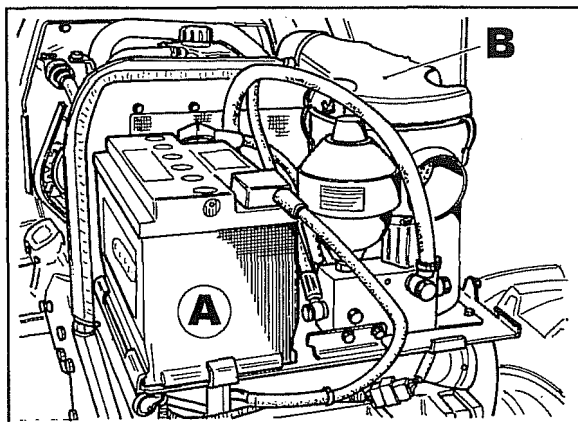


Fig. 5

0205

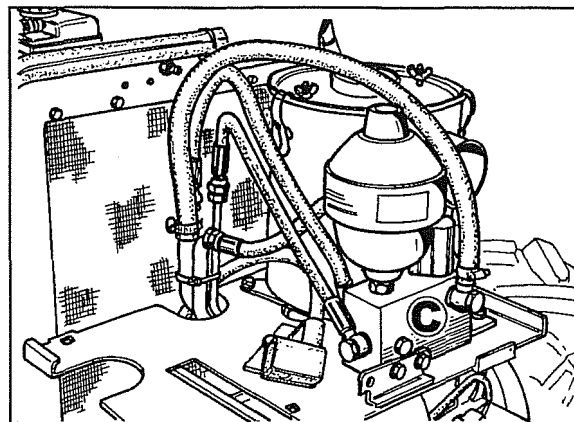


Fig. 6

0206

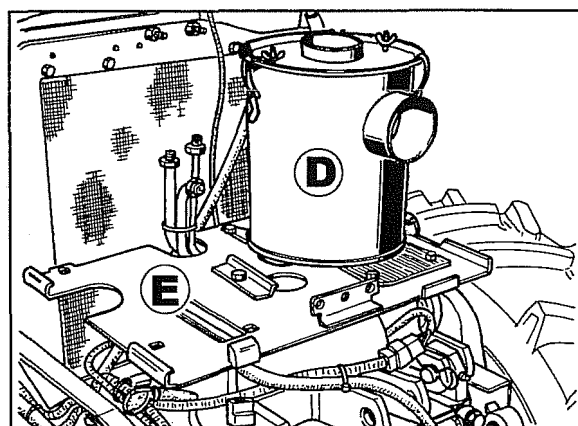


Fig. 7

0207

Registering the electromagnetic clutch

3. Remove the cowl, remove battery **A** fig. 5 and disconnect air filter baffle **B**.
4. (For the Max version) Disconnect the proportional solenoid valve ass'y **C** fig. 6 from its mounting and tip it back behind the radiator
5. Remove the filter ass'y **D** fig. 7 and its mounting **E** the horn and the battery GDN cable will also be removed with this.
6. At this point, you will be able to register the electromagnetic clutch as follows:
 - 6.1 Use a feeler gauge **A** fig. 8 to check the gap between disks **F** and **G**.
This gap, in order to transmit drive, should be between **0.6 mm** and **2 mm** but not more (don't forget that at **2 mm** drive transmission could be critical for implements that require considerable power).
Before making any registration measure the thickness of disk **G** fig. 8 which must not be **6.4 mm** or less because, in this case, the clutch should be replaced.
 - 6.2 If due to wear the gap between the disks is at least **1.6 mm**, shim them by slackening off the three screws **H** fig. 9, remove the screws one at a time and insert the spacing washers **I** as shown in the Figure. Spacing washers **I** are 1 mm thick.
 - 6.3 Re-tighten the three screws and turn the two disks to make sure there is no friction.
NB - If there is friction or the spacing washers cannot be inserted, dismantle the clutch and lower flange **L** fig. 14.
Refer to the steps described later for instructions on how to dismantle the clutch.

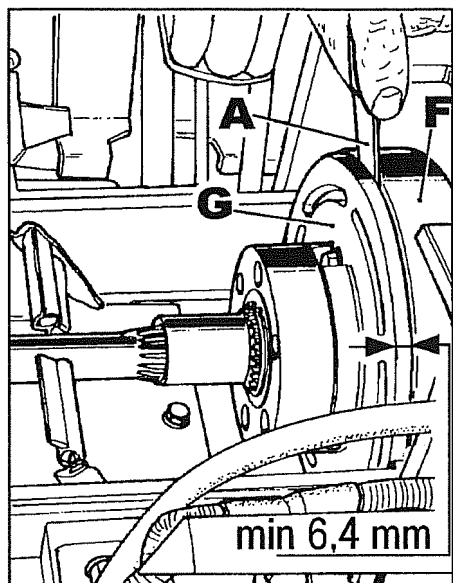


Fig. 8

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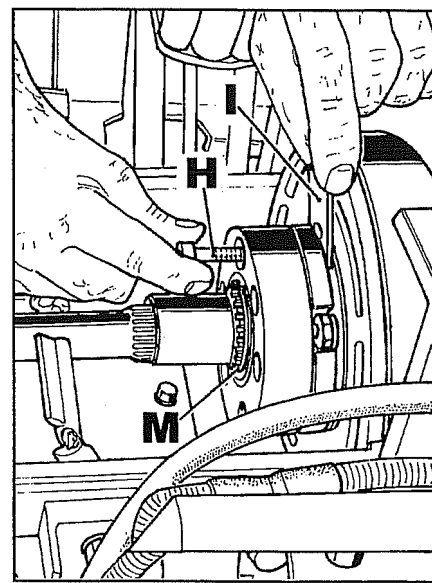


Fig. 9

0289

Work on the flex coupling, bearings, disks, spline and electromagnet.

Work on the flex coupling:

Do steps 3, 4 and 5.

7. Remove screw **R** fig. 10 and then remove from below metal piece **S** and the one underneath it.

If you cannot slip out the metal sheets, it will help to jack the tractor up leaving the front axle free. The ability to swivel will make it possible to remove the metal sheets.

8. Remove screws **H** fig. 9 and snap ring **M**.

Slide the flex coupling **N** fig. 10 towards the engine and then remove ring **O**.

Slide the keyed sleeve **P** fig. 10 towards the engine holding back the coupling which can then be removed from above.

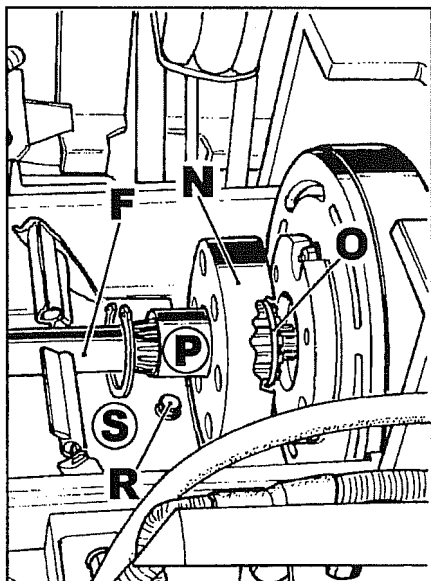


Fig. 10

0290

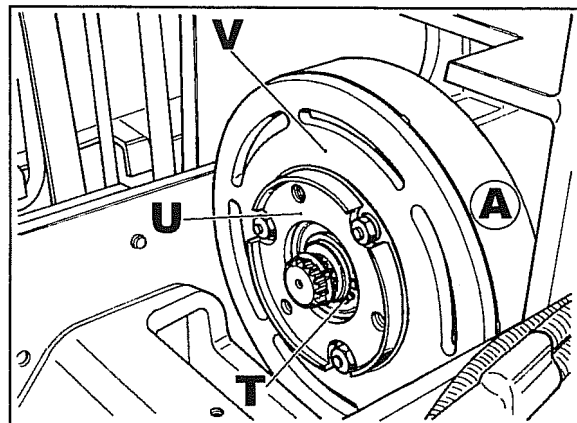


Fig. 11

0225

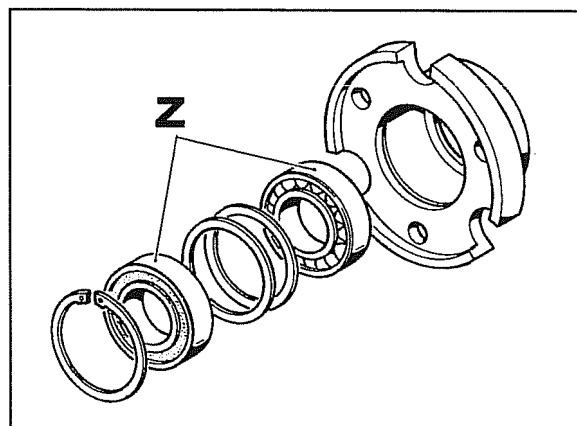


Fig. 12

0215

Work on the bearings:

Do steps 3, 4, 5, 7 and 8.

9 Remove snap ring **T** fig. 11 and slip out the bearing carrier hub **U** complete with disk **V** and flange **L** fig. 14.

10 Dismantle the hub as shown in fig. 12 and replace the two bearings **Z**.

Helpful hints when reassembling:

When inserting the new bearings, do so with the non-shielded side turned towards the inside and give them a good coating of grease.

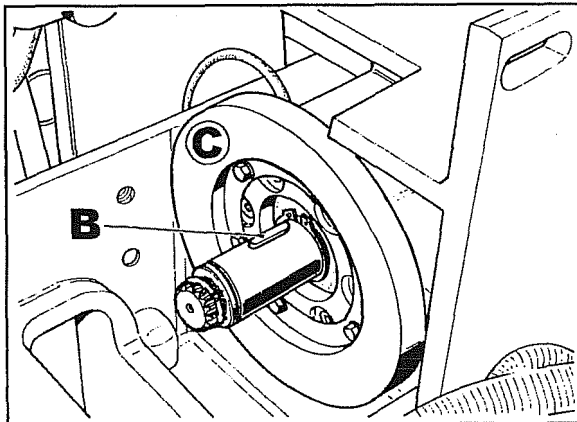


Fig. 13

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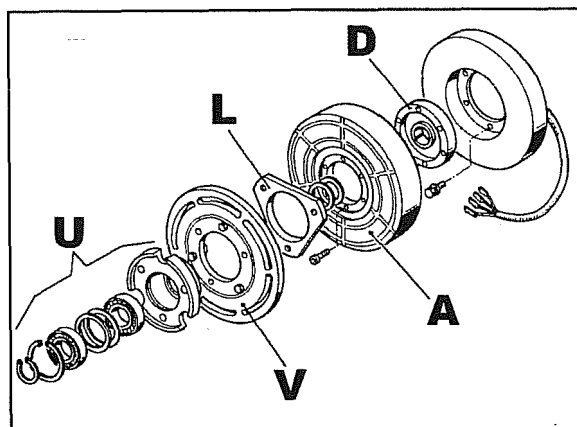


Fig. 14

0214

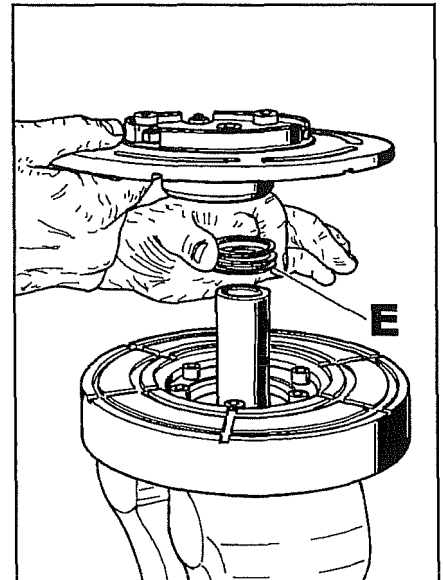


Fig. 15

0217

Work on disks, spline or electromagnet:

Do steps 3, 4, 5, 7, 8 and 9.

11 Remove **A** fig. 11.

12 Remove the spline **B** fig. 13.

13 Slacken off its screws and remove the electromagnet **C** fig. 13.

Fig. 14 illustrates the electromagnetic clutch parts.

Helpful hints when reassembling:

If disks **V** and **A** fig. 14 or flange **D** are changed in the operations described above because the spline breaks, the disks will have to be shimmed following this procedure:

- Reassemble the bearing carrier hub **U** fig. 14 with disk **V** and flange **L**. Remove any spacer washers used for previous registrations (**I** fig. 9).
- Use a pipe suitable for the bearings, clamp it in the vice and then assemble everything as shown in fig. 15. Use the spacer washers removed previously
- Use feeler gauge **F** fig. 16 to measure the gap between the two disks. The gap should be 0,6 mm. Use spacer washers **E** fig. 15 to adjust the gap up or down.

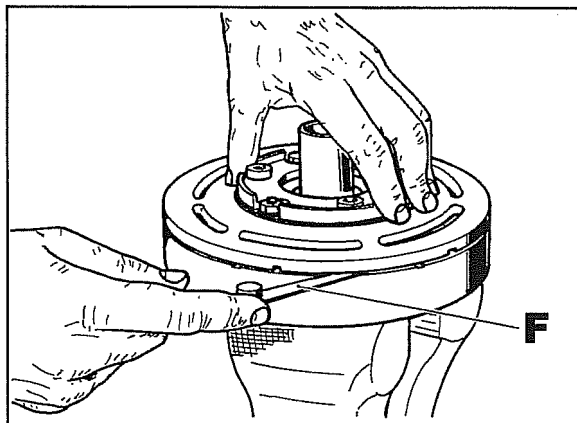


Fig. 16

0219

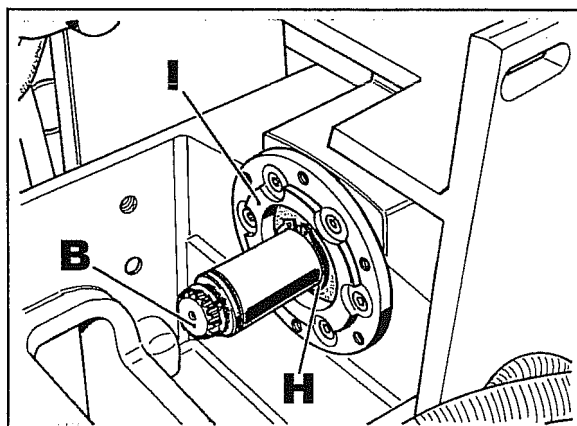


Fig. 17

0216

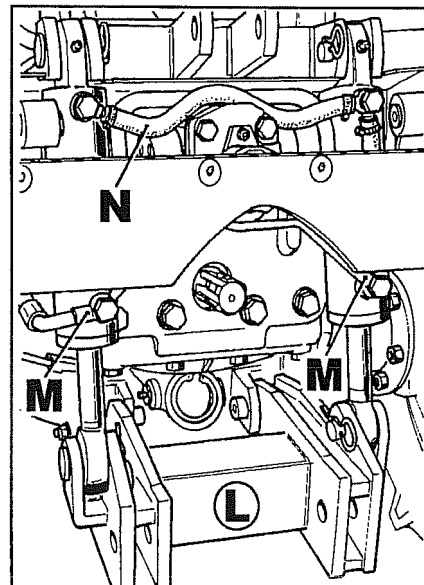


Fig. 18

0224

Work on: bearings, PTO shaft and transmission.

Work on bearings:

- Do steps 3, 4, 5, 7, 8, 9, 11, 12 and 13.
- 14 Drain the oil out through plug **G** fig. 22.
- 15 Remove snap ring **H** fig. 17 and then flange **I** complete with seal ring and O-ring (**R-S** fig. 24).
- 16 Disconnect shaft **F** fig. 10 from the engine shaft and shift it to the side.
- 17 Slide shaft **B** fig. 17 out by hand. It transmits drive to the pump.
- 18 Remove lift linkage mount **L** fig. 18.
- 19 Disconnect cylinder oil delivery and return hoses **M** and **N** fig. 18.

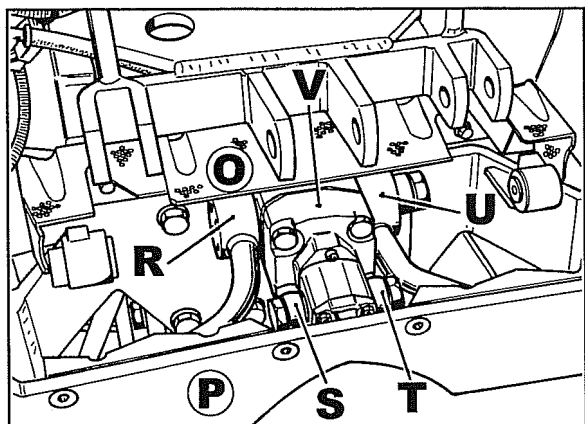


Fig. 19

0218

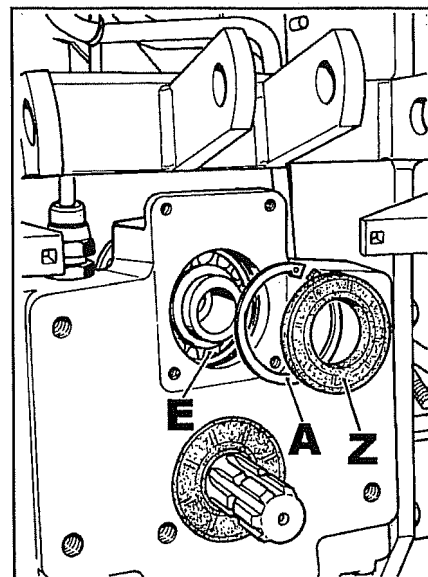


Fig. 20

0212

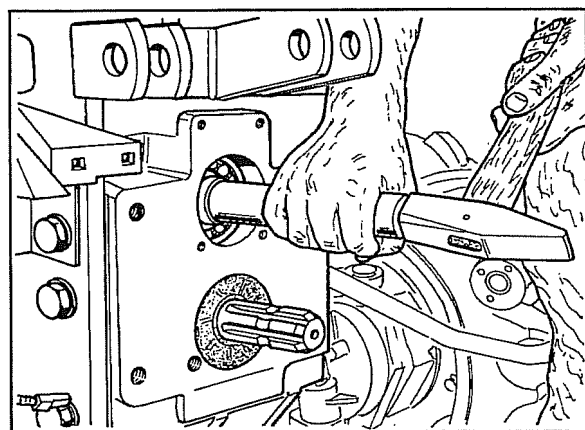


Fig. 21

0221

- 20 Remove guard grille **O** fig. 19.
- 21 Slacken off ballast mount **P** fig. 19, disconnect hoses **R**, **S**, **T** and **U**, the delivery and suction lines for both pumps and then remove the ballast mounting.
- 22 Remove pump **V** fig. 19.
- 23 Remove oil seal **Z** fig. 20.
- 24 Remove snap ring **A** fig. 20.
- 25 Slip the output PTO shaft towards the rear with its back bearing as shown in fig. 21 (**C** and **D** fig. 24). Remove the other bearing **E** fig. 20 from the opposite direction.

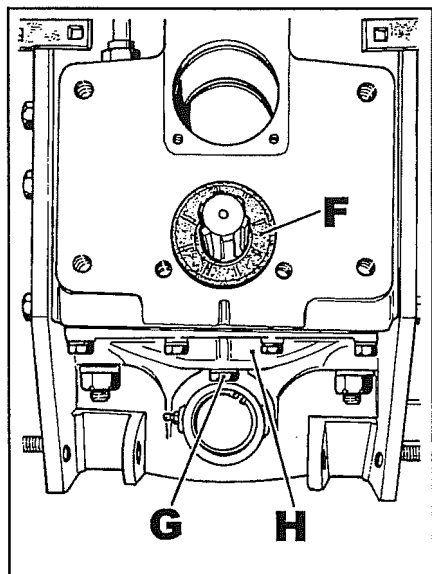


Fig. 22

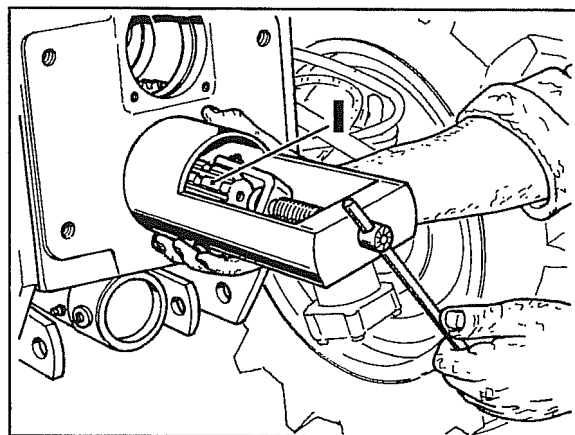


Fig. 23

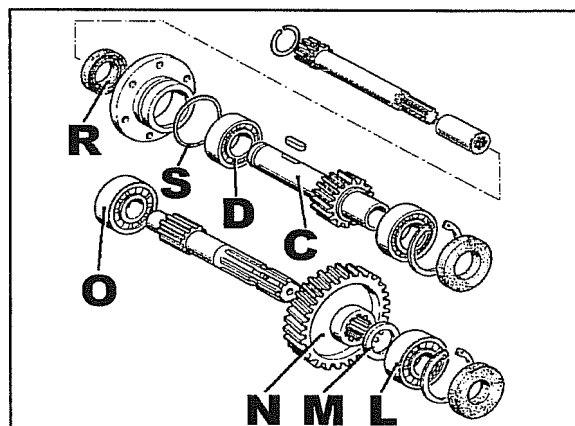


Fig. 24

26 Remove oil seal **F** fig. 22 and the snap ring underneath.

27 Remove bottom cover **H** fig. 22.

28 Use an extractor to remove the PTO shaft **I** as shown in fig. 23, complete with bearing and spacer washer **L** and **M** fig. 24.

NB - Take steps to make sure that gear **N** fig. 24 does not fall to the floor during the dismantling operations.

29 Use a commercially available extractor to remove bearing **O** fig. 24.

Fig. 24 illustrates the front PTO component parts.

Helpful hints when reassembling:

- When reinstalling gear **N** fig. 24 make sure that the side with the larger undercut **P** fig. 25 faces the front.
- When reassembling, handle flange **I** fig. 17 oil seal delicately so as not to damage it when installing it on the shaft. The seatings for the snap rings and the spline are on this seal.

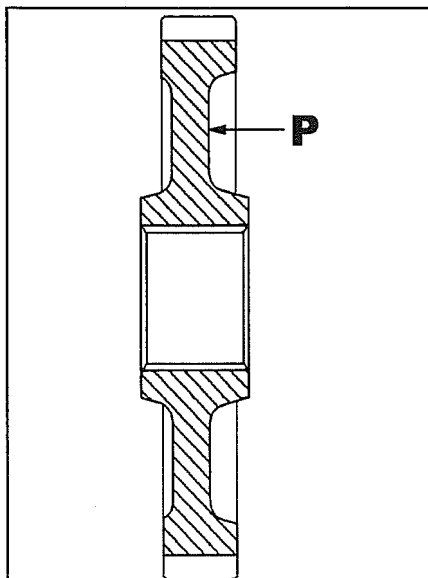


Fig. 25

0220

Work on the PTO shaft:

If work has to be done directly on the front PTO shaft, the time required can be reduced considerably following this procedure:

30 Remove the engine cowling.

Do steps 14, 18, 19, 21, 26, 27, 28 and 29.

Work on the electromagnetic clutch side oil seal:

Do steps 3, 4, 5, 7, 8, 9, 11, 12, 13, 14 and 15.

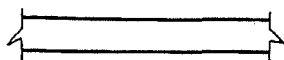
Helpful hints when reassembling:

Refer to the notes for the various steps.

Work on the front PTO casing oil seal:

Do steps 30, 14, 18, 19, 21, 22, 23 and 26.

**CIRCUITI IDRAULICI - CIRCUITS HYDRAULIQUES - HYDRAULIC CIRCUITS-
CIRCUITOS HIDRAULICOS - HYDRAULISCHE KREISLÄUFE - CIRCUITOS
HIDRÁULICOS**



ASPIRAZIONE – ASPIRATION – SUCTION –
ASPIRACION – SAUGLEITUNG – ASPIRAÇÃO



MANDATA – REFOULEMENT – DELIVERY –
IMPULSION – DRUCKLEITUNG – ENVIO



UTILIZZO – UTILISATION – USE – UTILIZACION –
NUTZLEITUNG – UTILIZAÇÃO



SCARICO – VIDANGE – DRAIN – DESCARGA –
RÜCKLAUFLEITUNG – DESCARGA

1 CIRCUITO IDRAULICO IST AD AZIONE FRENANTE PER STAR IST

CIRCUIT HYDRAULIQUE IST A ACTION FREINANTE POUR STAR IST
BRAKE HYDRAULIC CIRCUIT FOR STAR IST
CIRCUITO HIDRAULICO IST DE ACCION FRENANTE PARA STAR IST
HYDRAULISCHER KREISLAUF IST MIT BREMSWIRKUNG FÜR STAR IST
CIRCUITO HIDRÁULICO IST COM ACÇÃO DE TRAVAGEM PARA STAR IST

2 CIRCUITO IDRAULICO FRENI ANTERIORI E INNESTO DOPPIA TRAZIONE PER STAR 75 MAX

CIRCUIT HYDRAULIQUE FREINS AVANT ET ENCLenchement QUATRE ROUES MOTRICES
POUR STAR 75 MAX
FRONT BRAKE AND DUAL TRACTION ENGAGE HYDRAULIC CIRCUIT FOR STAR 75 MAX
CIRCUITO HIDRAULICO FRENOS DELANTEROS Y CONEXION DOBLE TRACCION PARA STAR 75
MAX
HYDRAULISCHER KREISLAUF FÜR VORDERRADBREMSEN UND EINSCHALTUNG DES
ALLRADANTRIEBS FÜR STAR 75 MAX
CIRCUITO HIDRÁULICO TRAVÕES ANTERIORES E ENGATE DUPLA TRACÇÃO PARA STAR 75
MAX

3 CIRCUITO IDRAULICO SOLLEVATORE ANTERIORE PER STAR IST E MAX

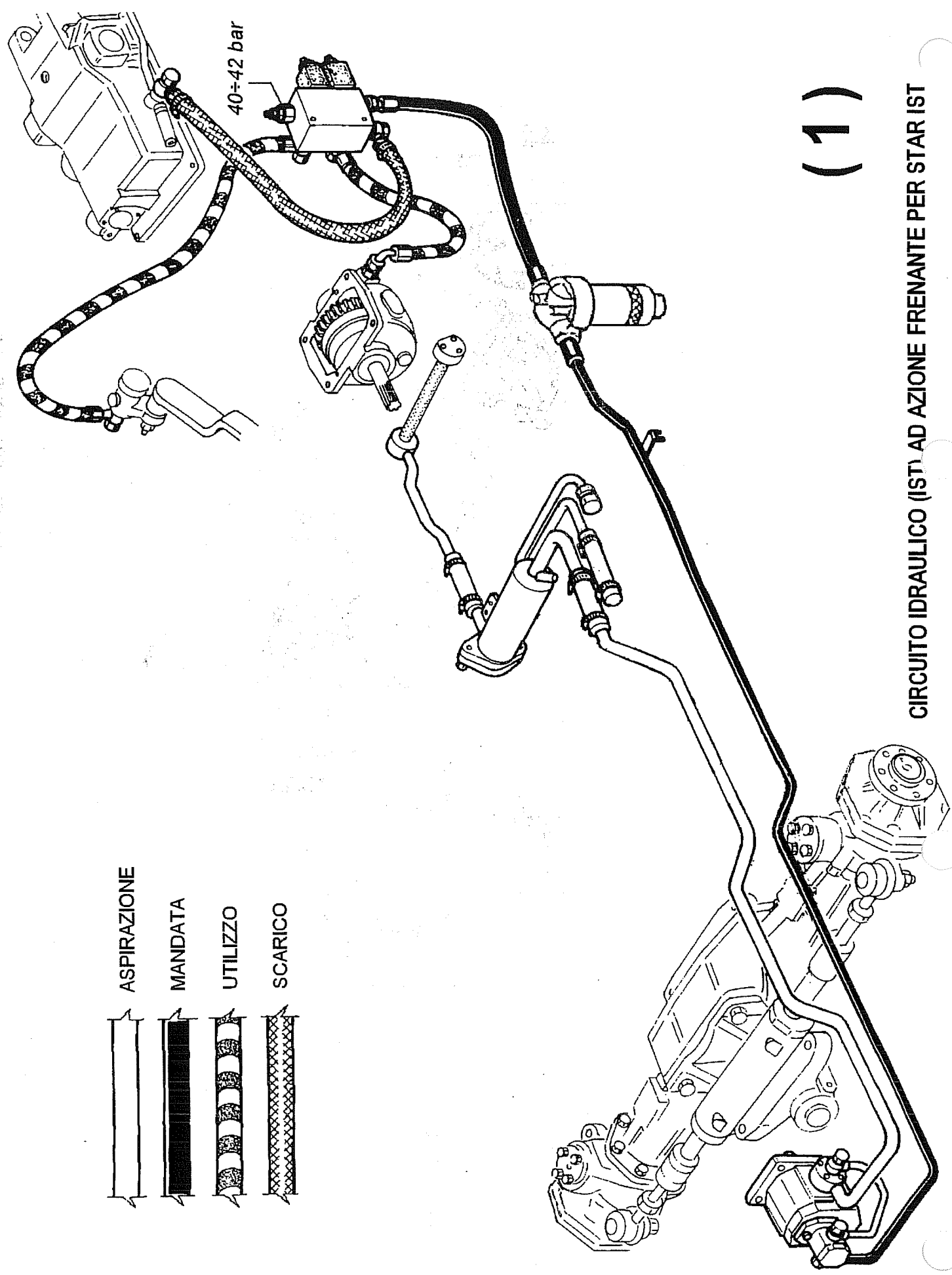
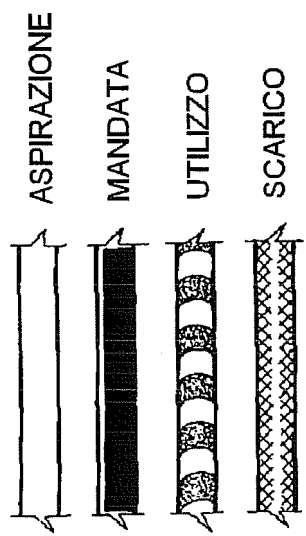
CIRCUIT HYDRAULIQUE RELEVAGE AVANT POUR STAR IST et MAX
FRONT LIFT HYDRAULIC CIRCUIT FOR STAR IST and MAX
CIRCUITO HIDRAULICO ELEVADOR DELANTERO PARA STAR IST y MAX
HYDRAULISCHER KREISLAUF FÜR FRONT-KRAFTHEBER FÜR STAR IST und MAX
CIRCUITO HIDRÁULICO ELEVADOR DIANTEIRO PARA STAR IST e MAX

4 CIRCUITO IDRAULICO STERZO E SOLLEVATORE POSTERIORE PER STAR IST E MAX

CIRCUIT HYDRAULIQUE DIRECTION ET RELEVAGE ARRIERE POUR STAR IST et MAX
STEERING AND REAR LIFT HYDRAULIC CIRCUIT FOR STAR IST and MAX
CIRCUITO HIDRAULICO DIRECCION Y ELEVADOR TRASERO PARA STAR IST y MAX
HYDRAULISCHER KREISLAUF LENKUNG UND HECK-KRAFTHEBER FÜR STAR IST und MAX
CIRCUITO HIDRÁULICO COLUNA DE DIRECÇÃO E ELEVADOR TRASEIRO PARA STAR IST e MAX

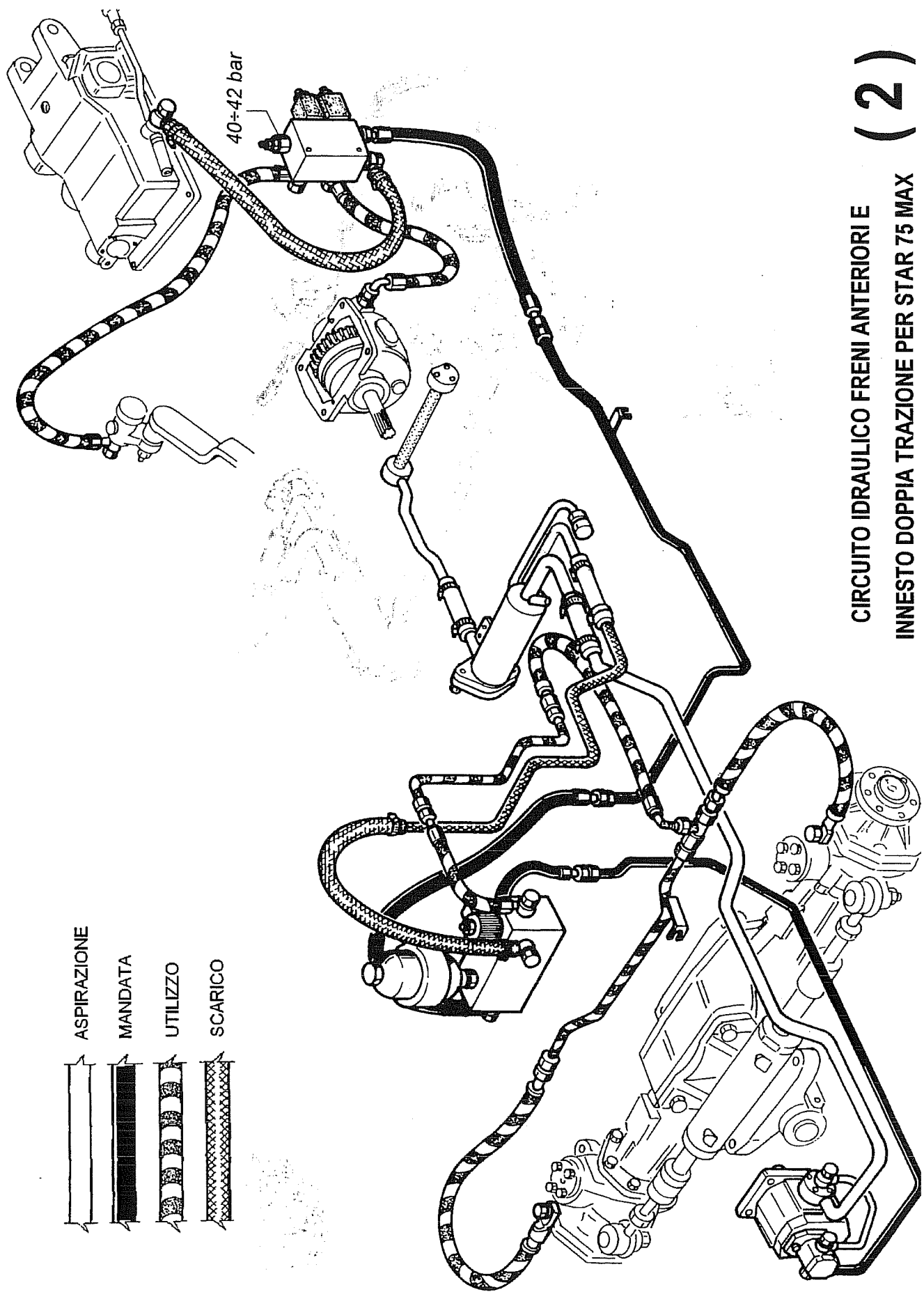
IST = INNESTO SIMULTANEO DOPPIA TRAZIONE

ENCLenchement SIMULTANE DES QUATRE ROUES MOTRICES
SIMULTANEOUS DUAL TRACTION ENGAGE
CONEXION SIMULTANEA DOBLE TRACCION
GLEICHZEITIGES EINSCHALTEN ALLRADANTRIEB
ENGATE SIMULTÂNEO DUPLA TRACÇÃO



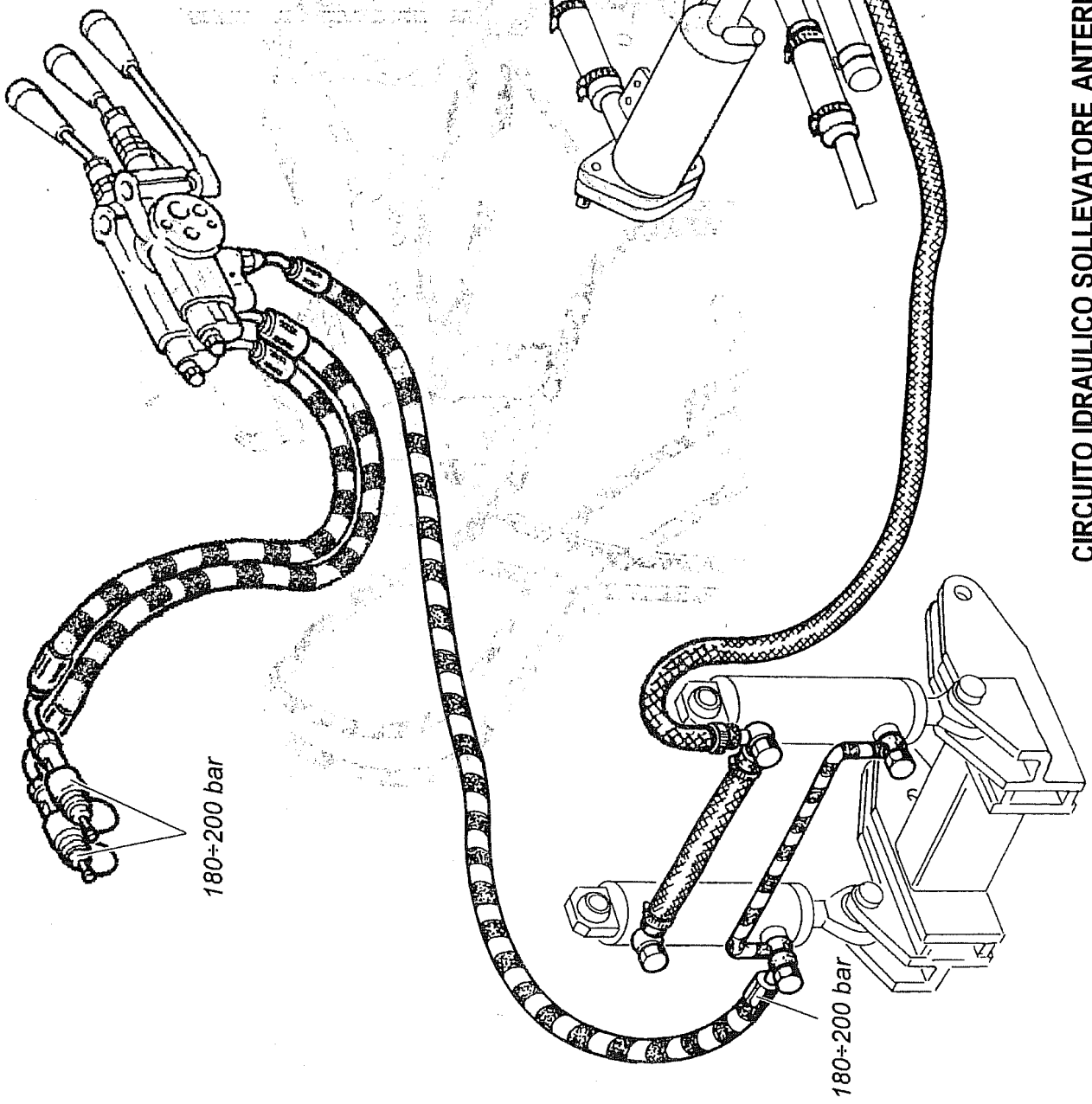
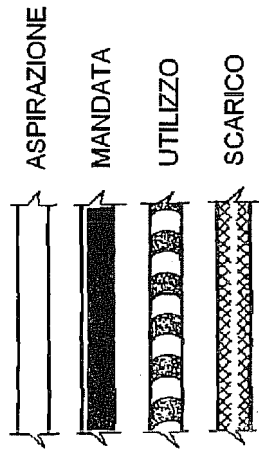
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CIRCUITO IDRAULICO (IST) AD AZIONE FRENANTE PER STAR IST

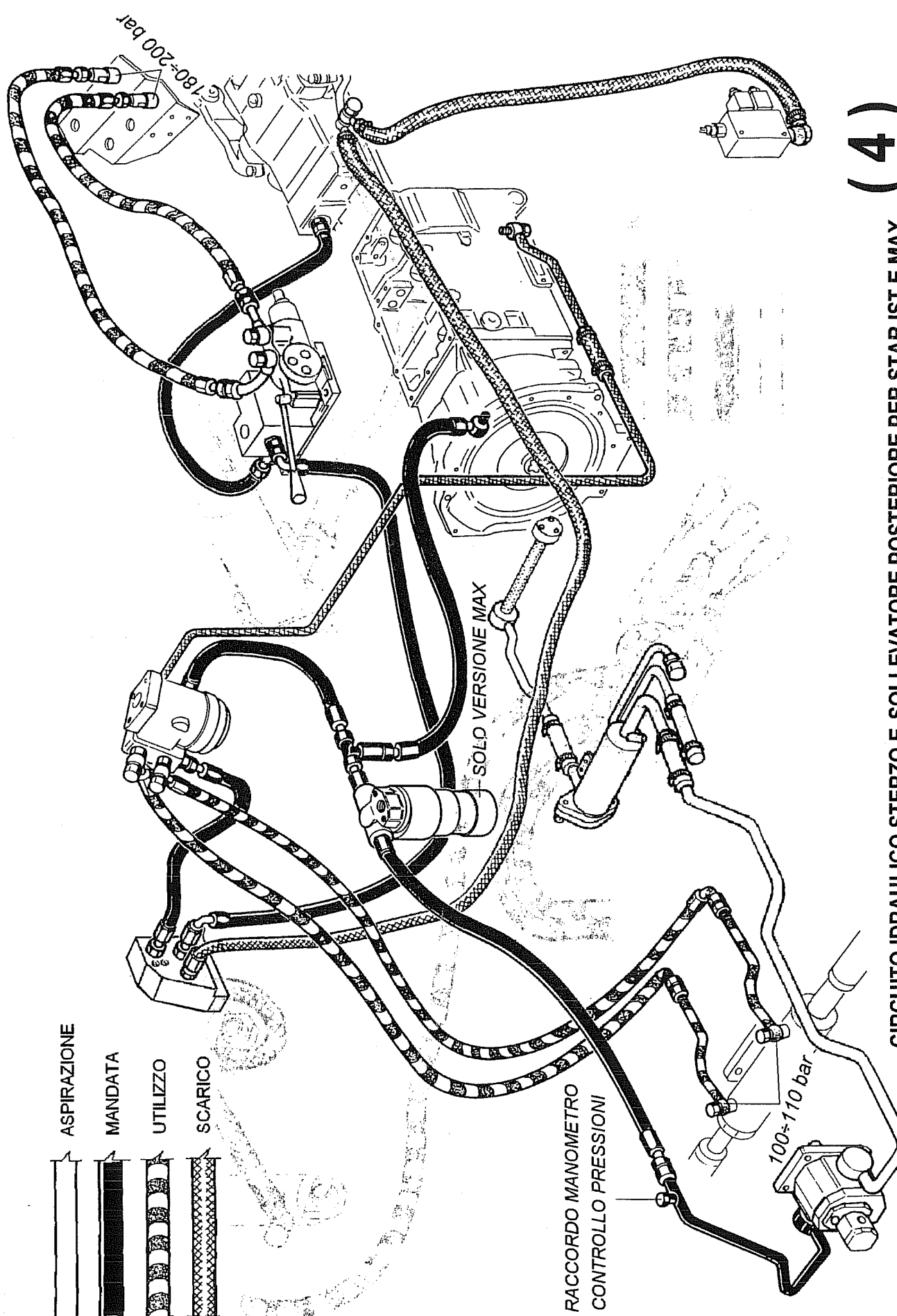
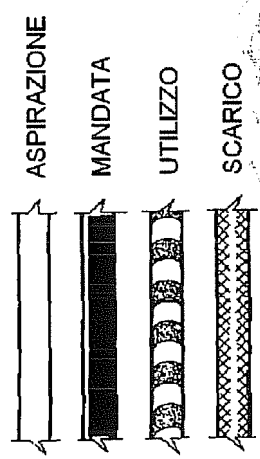


CIRCUITO IDRAULICO FRENI ANTERIORI
INNESTO DOPPIA TRAZIONE PER STAR 75 MAX

(2)



CIRCUITO IDRAULICO SOLLEVATORE ANTERIORE PER STAR 1ST E MAX



REGISTRAZIONE LEVETTE COMANDO FRIZIONE

RÉGLAGE DES LEVIERS COMMANDE EMBRAYAGE

REGULATE CLUTCH CONTROL LEVERS

REGULACIÓN PALANCAS MANDO EMBRAGUE

EINSTELLEN DER KUPPLUNGSSTEUERHEBEL

REGULAÇÃO ALAVANCAS COMANDO EMBRAIAGEM

