

WORKSHOP MANUAL

Agrotac
110 130 150



WORKSHOP MANUAL



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Agrotac
110 130 150

introduction

This publication is intended for the trained technician who must operate on our tractors.

It contains all general information relating to our tractor range, and in particular it highlights the inspection, overhauling and adjustment procedures as well as the main instructions for dismantling and reassembling operations.

The workshop manual is a natural summary for the mechanic who has attended the vocational training and specialization courses, which are held every year at our Service School, to permit him to perform a precise and qualified work on tractor.

Its contents are therefore an exhaustive reference book for the experienced mechanic who desires to refresh his memory on the sequence of the operations to be done. It is then good practice for every authorized dealer mechanic to have at his disposal this publication, so that it may be consulted quickly when necessary.

We wish to thank in advance for the cooperation all those people, who will let us have their suggestions in order to make this publication more complete.

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SUPPLEMENTARY HYDRAULIC CIRCUIT

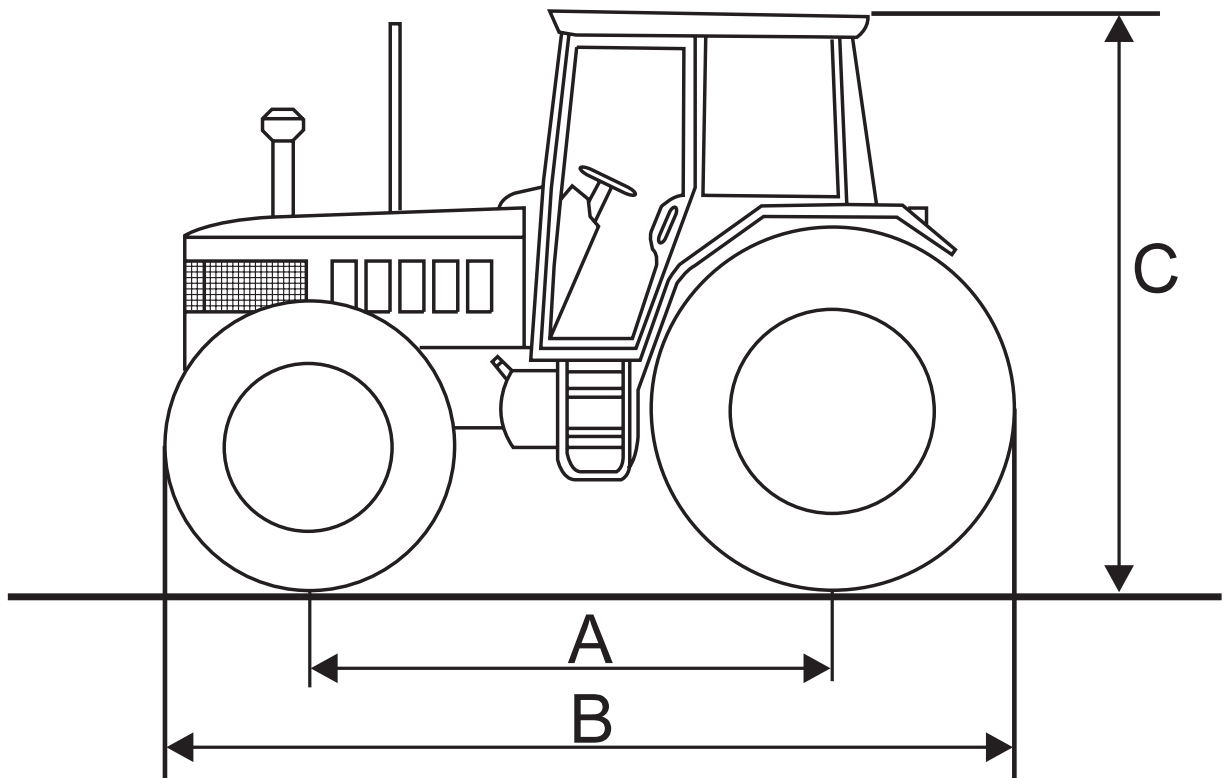
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DIMENSIONS AND WEIGHTS

Description		AGROTRAC 110	AGROTRAC 130	AGROTRAC 150
Tyres				
- front		14.9R28	16.9R28	16.9R30
- rear		16.9R38	18.4R38	20.8R38
Max length with front linkage B	mm in	4585 180,65	4620 182,03	4650 183,21
Max width	mm in	2340 92,20	2330 91,80	2360 92,98
Wheel base A	mm in	2761 108,78	2761 108,78	2761 108,78
Max. Height at safety frame	mm in	2705 106,58	2730 107,56	2765 108,94
Max. Height with cab (standard)	mm in	2690 105,99	2720 107,17	2748 108,27
Operating weight with driver platform	kg lb	4880 10758	4990 11001	5090 11221
Total max permissible load	kg lb	7500 16535	8100 17857	8500 18739
Operating weight with cab	kg lb	4800 10582	5300 11684	5800 12787



PRESCRIBED LUBRICANTS AND FUELS

PRESCRIBED LUBRICANTS AND FUELS AGROTRAC 110 - 130 - 150

Part to be supplied	Litres (U.S. gal)	Product	Specifications SDFG	Change hours
Engine	16.2** (4.28)**	AKROS TURBO	SAE 15W40 SAE 10W30 ACEA E 3-96 API CF SDFG OM-1991 MIL-L-2104 E level MB 228.3 level	300*
Gearbox and Rear axle	76 (20.06)	AKROS MULTI FCT	SAE 10W30 UTTO / API GL4 / SDFG OT1891-A	1200
Central axle	13 (3.43)	AKROS MULTI FCT	SAE 10W30 UTTO / API GL4 / SDFG OT1891-A	1200
Side reductions	2.5 (0.66) x2			
Brakes and clutch control	MAX	AKROS MATIC	ATF DEXRON II D / SDFG OF 1691	50
Lubrication points		AKROS GREASE T2	NLGI 2 SDFG GR-1202 L	1200
Radiator antifreeze	16 (4.22)	AKROS FREEZE	SDFG EC-1599 A	1200

(*) 1° replace after 50 hours

(**) With filter + 1 l.

CONVERSION TABLE FROM

FROM	TO	multiply by:
inch	cm	2.540
cm	inch	0.394
foot	m	0.305
m	foot	3.281
yard	m	0.914
m	yard	1.094
Eng. miles	km	1.609
km	Eng. miles	0.622
Sq.in.	cm ²	6.452
cm ²	Sq.ft.	0.155
Sq.ft.	m ²	0.093
m ²	Sq.ft.	10.77
Sq.yard	m ²	0.835
m ²	Sq.yard	1.197
Cu.in.	cm ³	16.39
cm ³	Cu.in.	0.061
Cu.ft.	Liter	28.36
Liter	Cu.ft.	0.035
Cu.yard	m ³	0.763
m ³	Cu.yard	1.311
Imp.gall.	Liter	4.547
Liter	Imp.gall.	0.220
US gall.	Liter	3.785
Liter	US gall.	0.264
pint	Liter	0.568
Liter	pint	1.762
quart	Liter	1.137
Liter	quart	0.880
oz.	kg	0.028
kg	oz.	35.25
lb.	kg	0.454
kg	lb.	2.203
lb.ft.	kgm	0.139
kgm	lb.ft.	7.233
lb/in.	kg/m	17.87
kg/m	lb/in.	0.056
lb./sq.in.	kg/cm ²	0.070
kg/cm ²	lb/sq.in.	14.22
lb./Imp.gall.	kg/l	0.100
kg/l	lb./Imp.gall.	10.00
lb./US gall.	kg/l	0.120
kg/l	lb./US gall.	8.333
lb./cu.ft.	kg/m ³	16.21
kg/m ³	lb./cu.ft.	0.062
cu.ft./lb.	m ³ /kg	0.062
m ³ /kg	cu.ft./lb.	16.21
Nm	kgm	0.102
kgm	Nm	9.81
kW	PS	1.36
PS	kW	0.736
bar	kg/cm ²	1.014
kg/cm ²	bar	0.981
dm ³	l	1
l	dm ³	1

HOW TO ORDER SPARE PARTS

To ensure perfect tractor efficiency thus avoiding serious drawbacks, and to optimize your investment and the operational expenses, the use of “ORIGINAL SPARE PARTS” is recommended.

Spare parts orders must specify the following:

- Tractor serial number and engine serial number (if the engine is concerned).
- Spare part name and reference code.

TRACTOR IDENTIFICATION DATA PLATE



ENGINE TYPE AND SERIAL NUMBER



TRACTOR FRAME TYPE AND SERIAL NUMBER



ENGINE

Important: For all the instructions of assembly-disassembly, testing and adjustments, and the regulations of the engine, please refer to the specific manual of reparation Motors series 1000/W (code 307.1072.3.5)

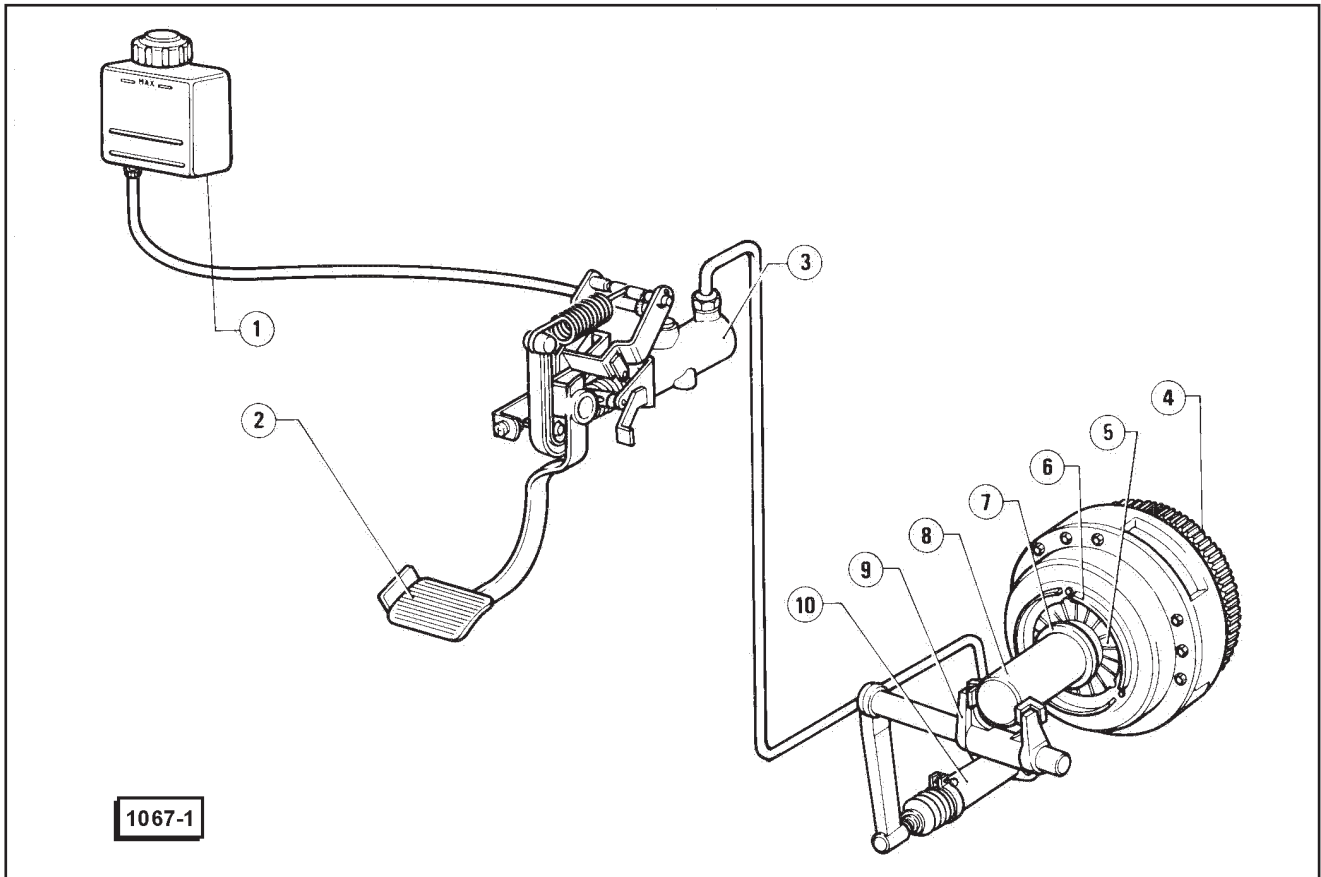
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GEARBOX CLUTCH

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GENERAL FEATURES



- 1 - Clutch and brakes hydraulic system supply tank
- 2 - Clutch pedal
- 3 - Clutch master cylinder
- 4 - Engine flywheel
- 5 - Diaphragm spring

- 6 - Pressure plate
- 7 - Thrust bearing
- 8 - Sliding sleeve
- 9 - Fork
- 10 - Clutch operating cylinder

The clutch is of single dry plate type; it is composed of a clutch disk, pressure plate 6, fitted with a diaphragm spring 5, and a thrust bearing 7.

The thrust bearing is kept in constant contact with the diaphragm spring through a spring inside jack 10.

The clutch plate is circular for the models 110 or star-shaped for the models 130-150, it is made of a high friction coefficient material with extremely limited wear.

The clutch casing is fitted with air intakes to permit the heavily stressed components to be effectively cooled down.

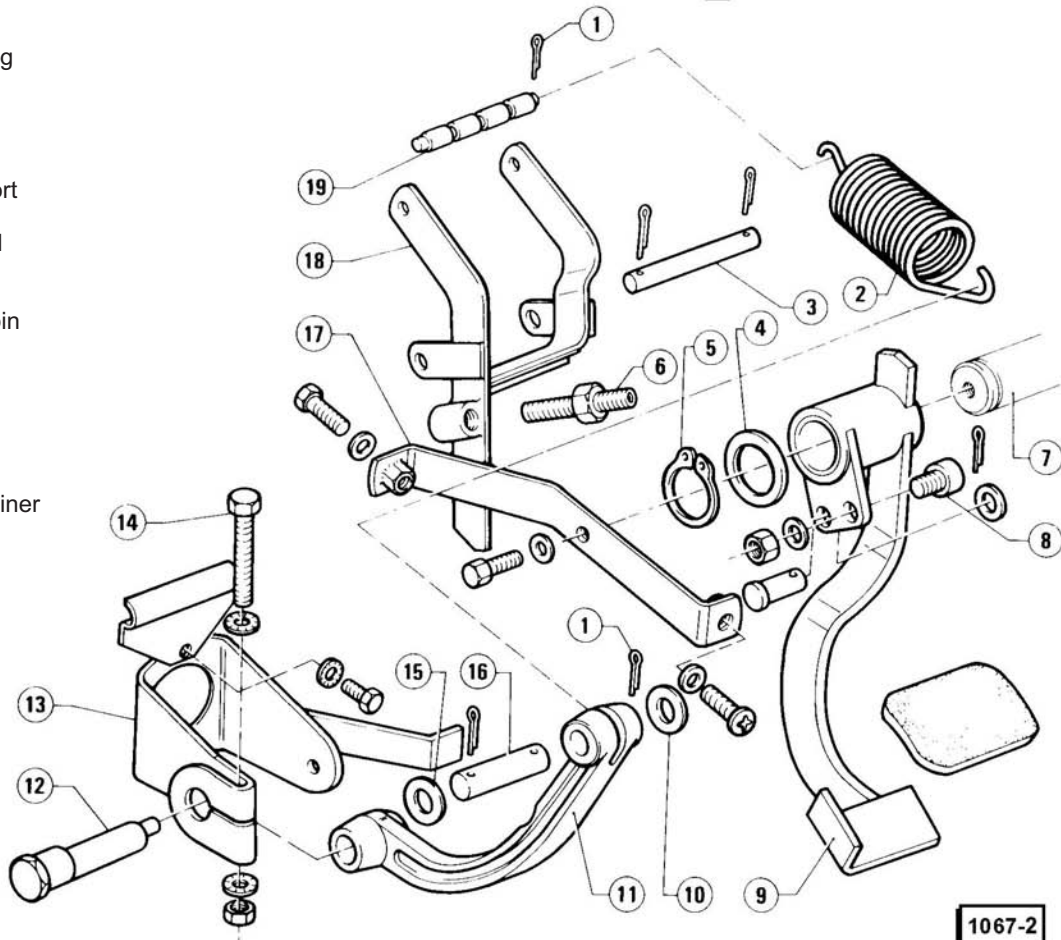
The pressure exerted by diaphragm spring 5, drives the driven plate.

The clutch disengagement is realized through master cylinder 2 which, operated by pedal 3, transmits the liquid pressure increase to the piston of operating cylinder 10. This last, acts on clutch disengagement control fork 9 through a pushrod, and moves sleeve 8 and thrust bearing 7 which overcomes the diaphragm spring action.

Through the seal rings that exert friction on operating cylinder, the piston takes up the possible backlash, thus automatically recovering the clutch plate wear.

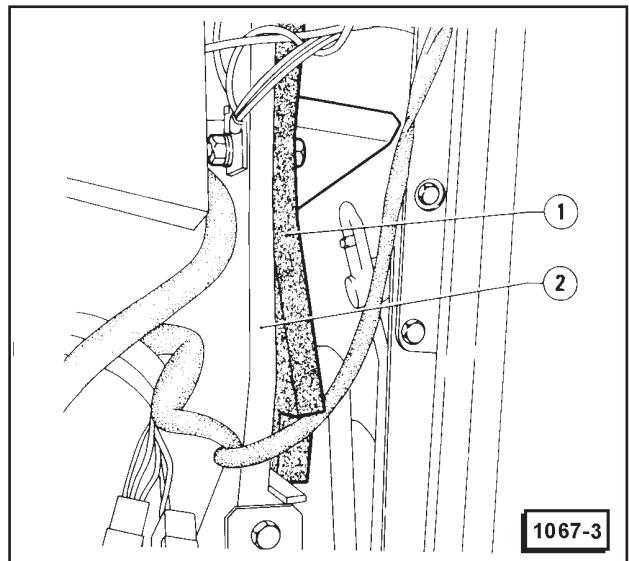
CLUTCH PEDAL

- 1 - Split pin
- 2 - Return spring
- 3 - Pin
- 4 - Washer
- 5 - Seeger ring
- 6 - Adjuster
- 7 - Pedal support
- 8 - Screw
- 9 - Clutch pedal
- 10 - Washer
- 11 - Lever
- 12 - Eccentric pin
- 13 - Bracket
- 14 - Bolt
- 15 - Washer
- 16 - Pin
- 17 - Bracket
- 18 - Frame
- 19 - Spring retainer



REMOVAL

1. Remove the tractor engine side lids, and unscrew the two bolts securing heat shield 1 to rear bulkhead 2.



- 1 - Heat shield
- 2 - Rear bulkhead

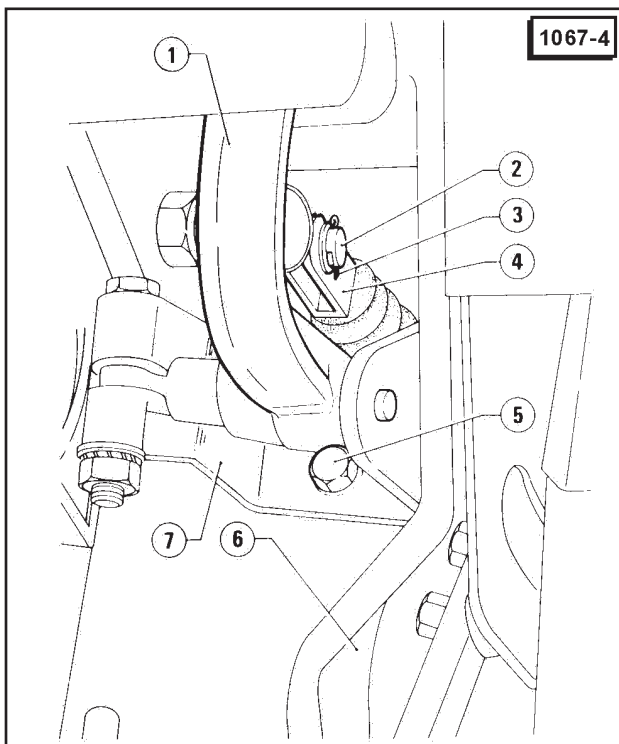
GEARBOX CLUTCH

2. Operating from the inside of the cabin, remove the split pin 3 and take off the retaining pin 2 from the fork 4 the pedal 6 recovering the washer.

CAUTION

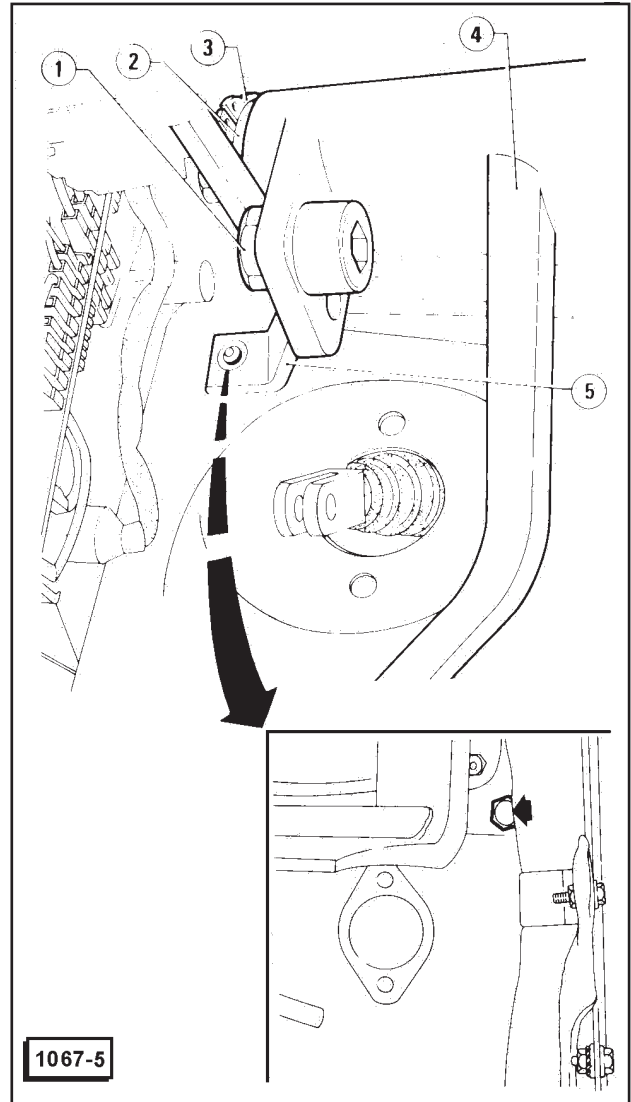
Take care not to press the clutch pedal since it is fitted with a return spring that moves the pedal abruptly to the end of travel.

3. Unloosen the two retaining screws 5 from the pump to the bracket 7. Take off with caution from the engine bay the pump without removing the entrance and exit piping.



- 1 - Lever
- 2 - Pin
- 3 - Split pin
- 4 - Master cylinder fork
- 5 - Screw
- 6 - Pedal
- 7 - Lever support bracket and pedal return spring

4. Unloosen the two retaining screws of the bracket 5 displaced in the engine bay and beneath the instruction panel, then unloosen the retaining screw 1 of the pedal 4 to the support, remove the Seeger ring 3 and the washer 2 then take off the pedal 4 from the support integral with the instruction panel removing contemporarily the leverage of the pedal.



- 1 - Pedal retaining screw
- 2 - Washer
- 3 - Seeger ring
- 4 - Clutch pedal
- 5 - Bracket

CHECKS AND VERIFICATIONS

Visually inspect all the disassembled components, and replace those that are worn or damaged, verifying in particular the following:

- 1. Verify that both pedal and related pad are not deformed or strained.
- 2. Check that pins and related seats are not too worn or seized.
- 3. Verify that spring is not damaged or strained.
- 4. Check that bearing rotates freely and that no excessive backlash is present.

INSTALLATION

Install the clutch pedal by reversing the order of removal, complying with the following.

- Refer to the enlarged view, and lubricate the bush of pedal **9**, pins **16** and **12** of lever **11**, and retaining pin of the pump fork, using the prescribed grease.
- Replace the split pins.
- Adjust the clutch pedal (refer to: Adjustment).

ADJUSTMENT

After having installed the various components, perform the adjustments required following the procedure below:

1. Positioning of lever **1** and clutch pedal **6**.

- (1) Keep pedal **6** against end-of-travel **1**
- (2) Loosen locknut **2**, tighten screw **3** until lever **1** is at the end of travel; tighten locknut **2**.

2. Adjustment of master cylinder control fork.

- (1) With pedal **6** against lever **1** loosen locknut **9**, and act on rod **10** (screwing or unscrewing it) until taking up the backlash between master cylinder piston and pedal **6**.
- (2) Act again on rod **10** to restore **0.5 to 1 mm (0.02 to 0.4 in)** backlash between master cylinder and pedal **6** corresponding to pedal idle travel "C".

$$C = 4 \text{ to } 8 \text{ mm (0.16 to 0.31 in)}$$

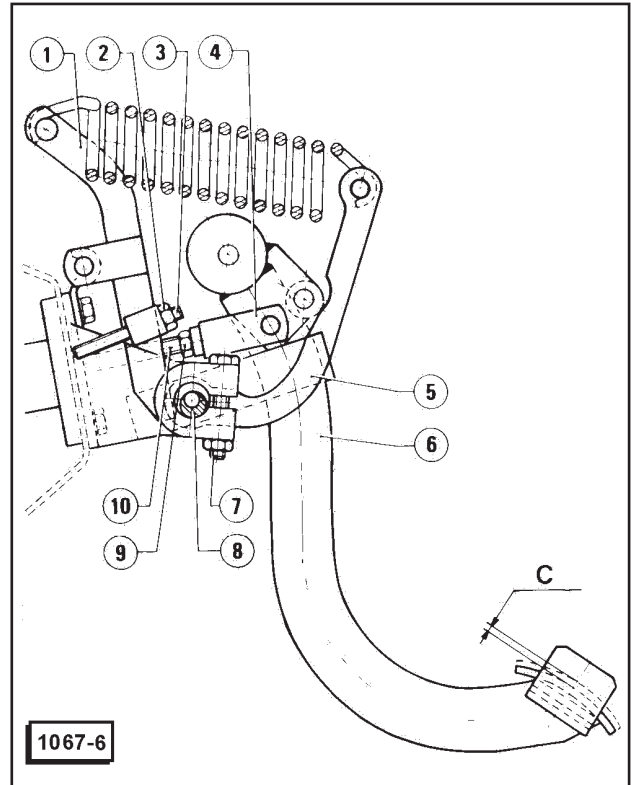
- (3) At the end of adjustment, tighten locknut **9**.

3. Adjustment of pedal return device.

- (1) Press pedal **6** fully, then release it, and verify that return takes place gradually.
- (2) If not, loosen bolt **7** and rotate the eccentric **8**; lock bolt **7**, and repeat the check. Repeat the operation until pedal returns gradually.
- (3) Should the adjustment with eccentric **8** not be sufficient, loosen locknut **2**, and gradually change the position of lever **1** by unscrewing screw **3**, until the pedal optimal return is obtained; tighten locknut **2**.

CAUTION

The adjustment through screw **3** must be carried out only when strictly necessary, since it increases the load on pedal **6**.



- 1 - Lever
- 2 - Locknut
- 3 - Adjusting screw
- 4 - Master cylinder fork
- 5 - Lock
- 6 - Clutch pedal
- 7 - Bolt
- 8 - Eccentric pin
- 9 - Locknut
- 10 - Control rod

CLUTCH MASTER CYLINDER

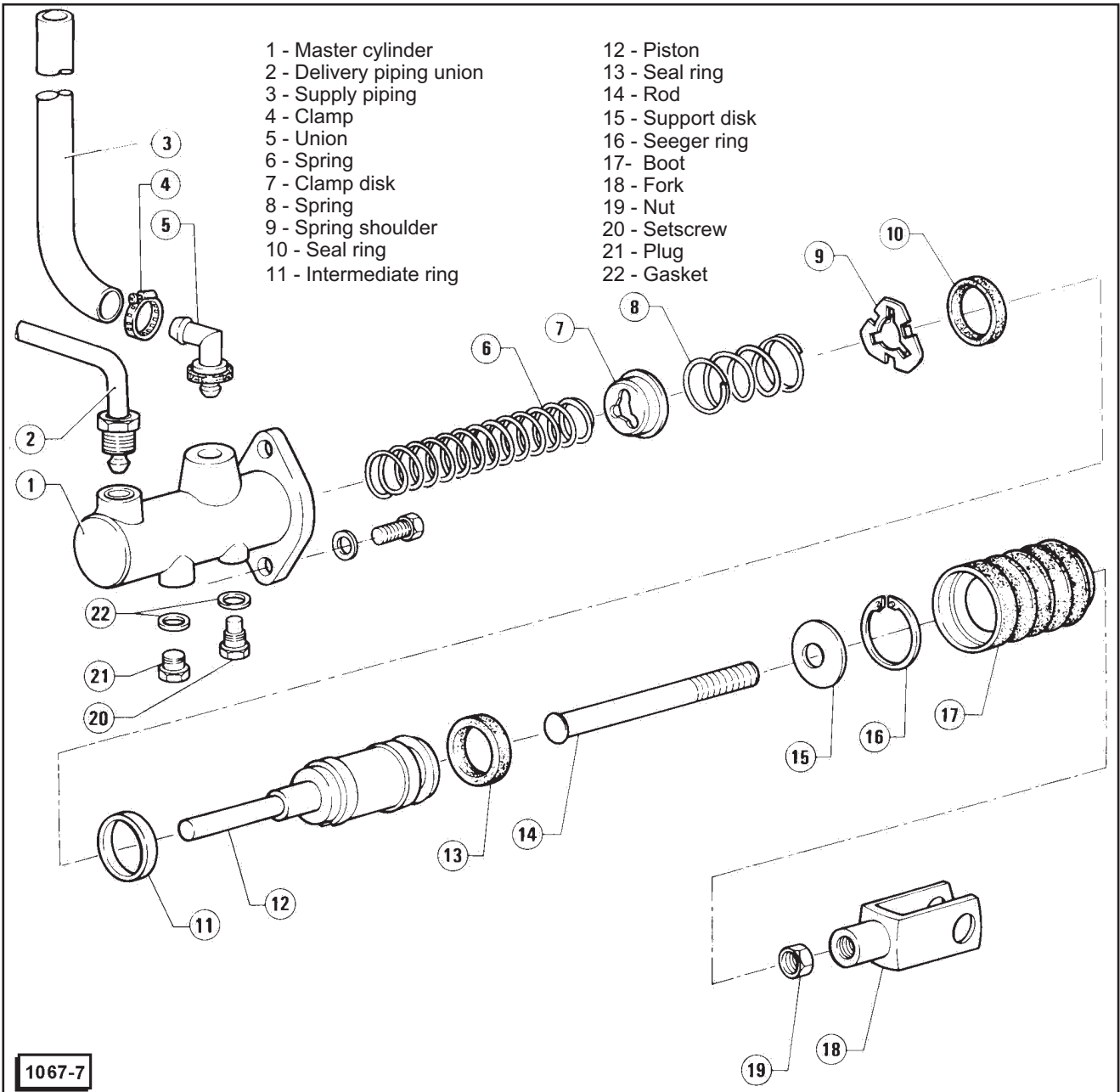
REMOVAL

1. Remove the clutch master cylinder (refer to: Clutch Pedal - Removal - Steps 1. to 3.).

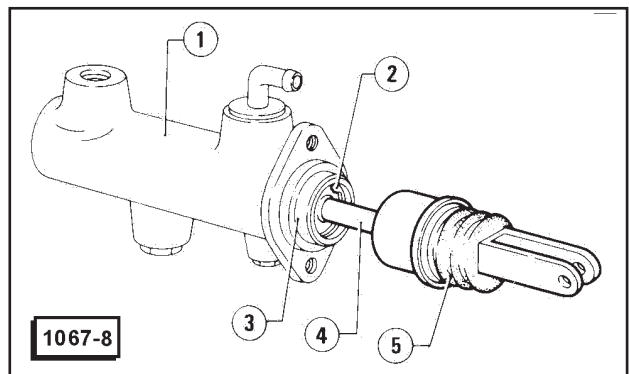
2. Referring to the following exploded view, disconnect the entry and exit piping unscrewing the pipe union **2** and extract the union **5**.

GEARBOX CLUTCH

DISASSEMBLY

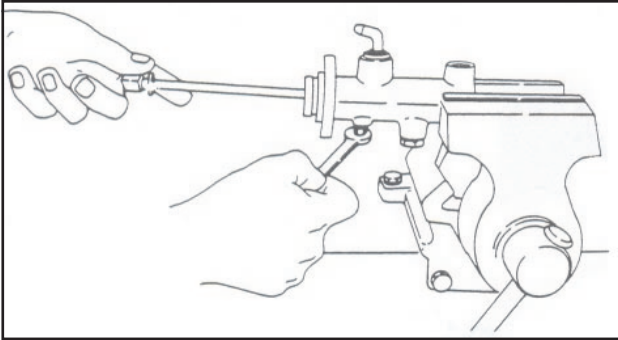


1. Withdraw boot 5, remove Seeger ring 2 and withdraw rod 4 together with support disk 3.



- 1 - Master cylinder
- 2 - Seeger ring
- 3 - Support disk
- 4 - Rod
- 5 - Boot

2. Place the master cylinder on a vice fitted with protective jaws, then, partially pushing the piston towards master cylinder inside as shown in the figure, unscrew the screw securing the piston and remove it together with the spring underneath.



3. Refer to the enlarged view and, working with the appropriate tool, remove the bowl and the second spring from the inside of the cylinder pump taking care not to damage the inside surface.

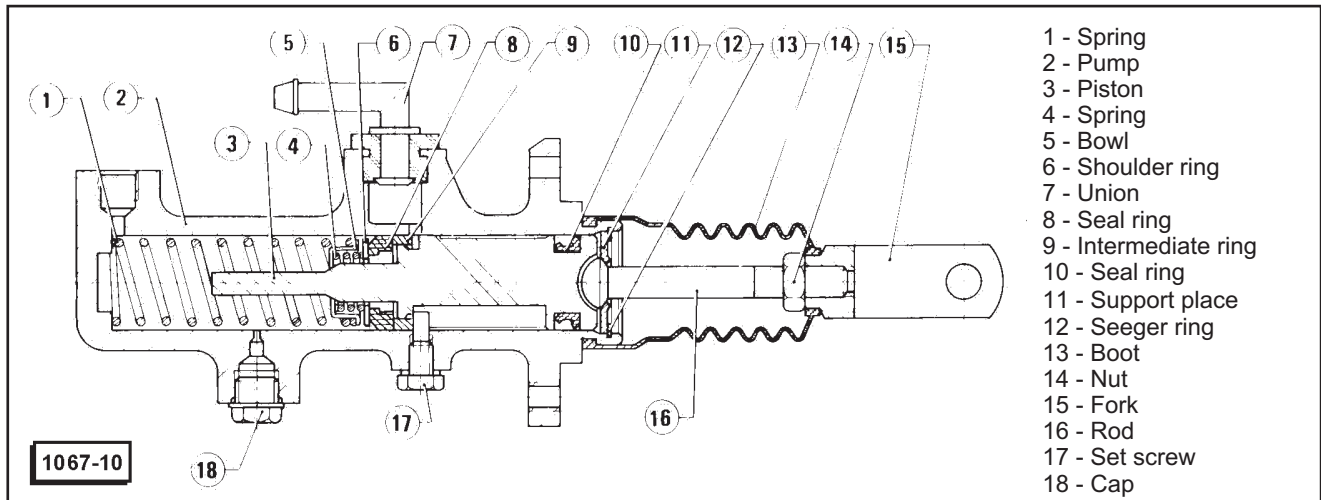
CHECKS AND VERIFICATIONS

CAUTION

To clean and wash the master cylinder components use only the oil prescribed for the brakes and clutch. Do not use petrol, kerosene, or other mineral oils to prevent damaging the rubber components.

1. Check for scratches on both inner and outer sliding surfaces of piston. Replace it if required.
2. Verify that the seal ring seats are clean. If required, blow compressed air into the seats.
3. Check conditions of seal rings and boot; replace the damaged components.
4. Check all components, openings, and master cylinder internal passages, and verify that they are clean and free from foreign matter.
5. Verify that springs are not strained or deformed, replace them if required.

REASSEMBLY

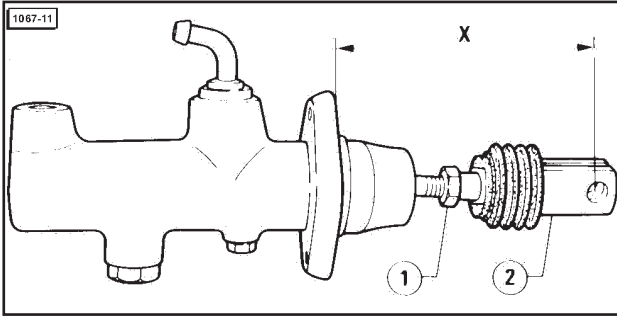


Reassemble the master cylinder by reversing the order of removal, complying with the following:

- Lubricate the relative motion sliding surfaces with the grease prescribed.
- When inserting the piston 3 into cylinder 2 verify that the slot present on the piston is correctly aligned with the set screw 17.
- Verify the master cylinder correct functioning, making sure that the piston performs the whole travel freely.

- If fork 15 has been disassembled, verify that, with the rod 16 kept completely outwards, distance "X" between the master cylinder body resting plane and the centre of fork hole is that prescribed for the model of tractor in object (refer to: Technical Data and Specifications - Checks and Adjustments).
If not so, remove the boot, loosen locknut 1 and screw or unscrew fork 2 accordingly, until the locknut is blocked; refit the boot.

GEARBOX CLUTCH

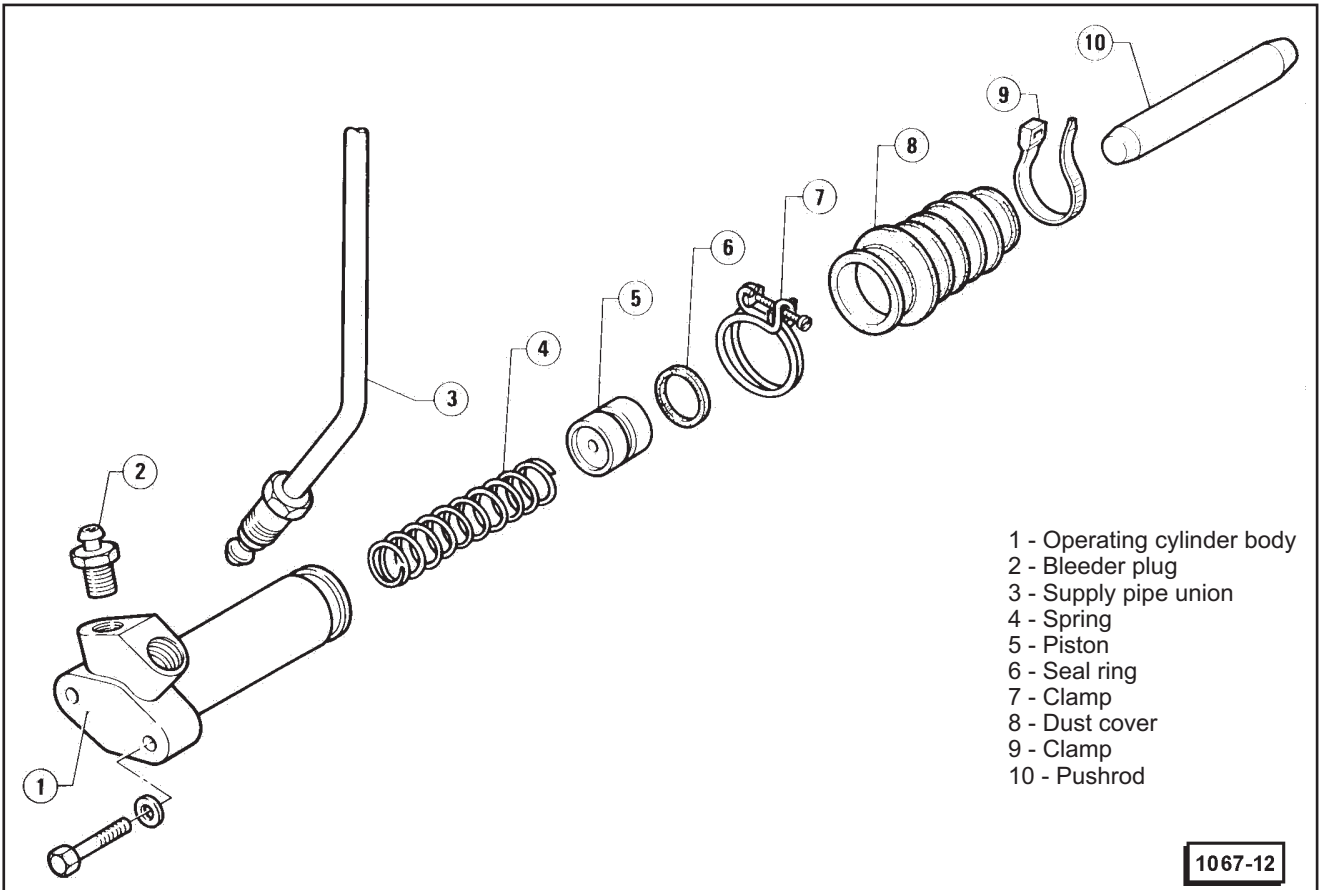


- 1 - Locknut
- 2 - Fork

INSTALLATION

Install the master cylinder on tractor by reversing the order of removal; then proceed to bleed the hydraulic system (refer to: Hydraulic System Bleeding).

CLUTCH OPERATING CYLINDER



1067-12

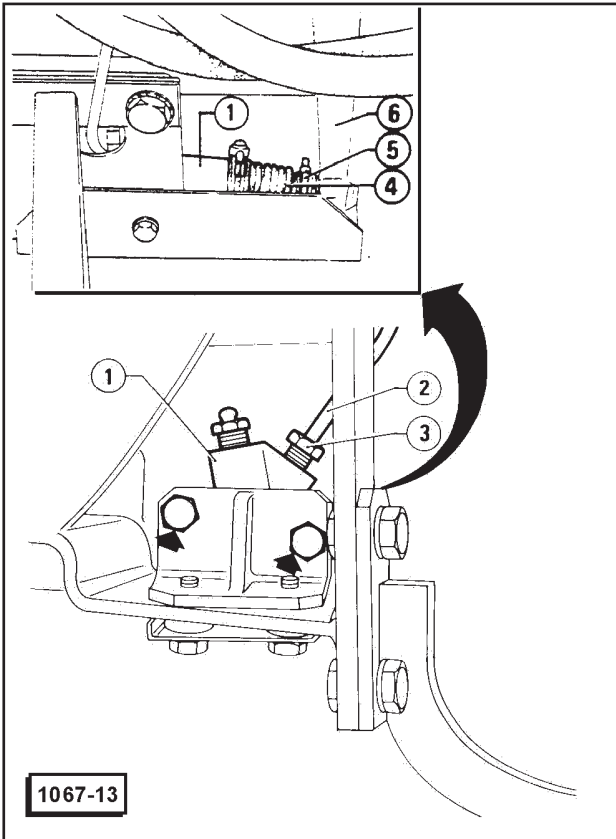
REMOVAL

1. Cut clamp 5 securing boot 4 to fork 6.
2. Unscrew union 3 and disconnect supply pipe 2 of operating cylinder 1 plugging it suitably.
3. Unscrew the two screws securing clutch operating cylinder, and remove it recovering the pushrod.

CAUTION

Keep fork 6 in contact with the clutch sliding sleeve, to prevent it unhooking.

GEARBOX CLUTCH



- | | |
|-------------------------------|-----------|
| 1 - Clutch operating cylinder | 4 - Boot |
| 2 - Supply pipe | 5 - Clamp |
| 3 - Union | 6 - Fork |

DISASSEMBLY

Refer to the exploded view and proceed as follows.

1. Loosen clamp 7, and remove it together with boot 8.
2. Supplying with low pressure compressed air, carefully withdraw piston from cylinder.
3. Extract spring 4 from operating cylinder, and unscrew bleeder screw 2. Withdraw seal ring 6 from piston 5.

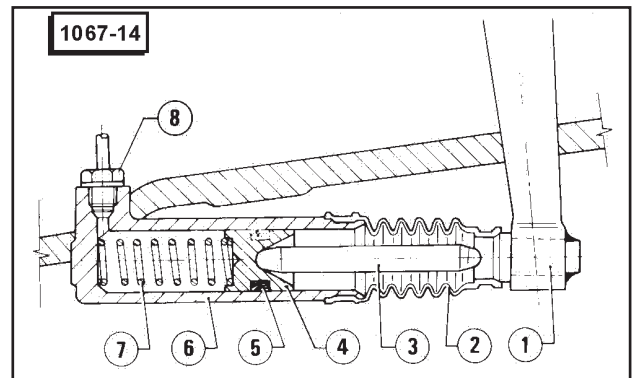
CHECKS AND VERIFICATIONS

CAUTION

To clean and wash the operating cylinder components use only the oil prescribed for the brakes and clutch. Do not use petrol, kerosene, or other mineral oils to prevent damaging the rubber components.

1. Check for scratches on both inner and outer sliding surfaces of piston. Replace it if required.
2. Verify that the seal ring seats are clean, if necessary, blow compressed air into the seats.
3. Verify conditions of seal rings, dust cover, and spring efficiency; replace the damaged components.
4. Verify that bleeder hole is free from impurities.

REASSEMBLY



- | |
|-------------------|
| 1 - Control lever |
| 2 - Dust cover |
| 3 - Pushrod |
| 4 - Piston |
| 5 - Seal ring |
| 6 - Jack cylinder |
| 7 - Spring |
| 8 - Union |

Reassemble the clutch operating cylinder on tractor by reversing the order of removal, complying with the following:

- Lubricate with the prescribed grease the relative sliding surfaces.
- Control the correct functioning of the operating cylinder, being sure that the piston 4 makes the full traverse freely.

INSTALLATION

Reassemble the clutch operating cylinder on tractor by reversing the order of removal, complying with the following.

- Verify that fork is correctly secured to the clutch sliding sleeve.
- Before connecting the operating cylinder, fill it with the prescribed oil to facilitate the bleeding operation.
- Bleed the hydraulic system (refer to: Hydraulic System Bleeding).

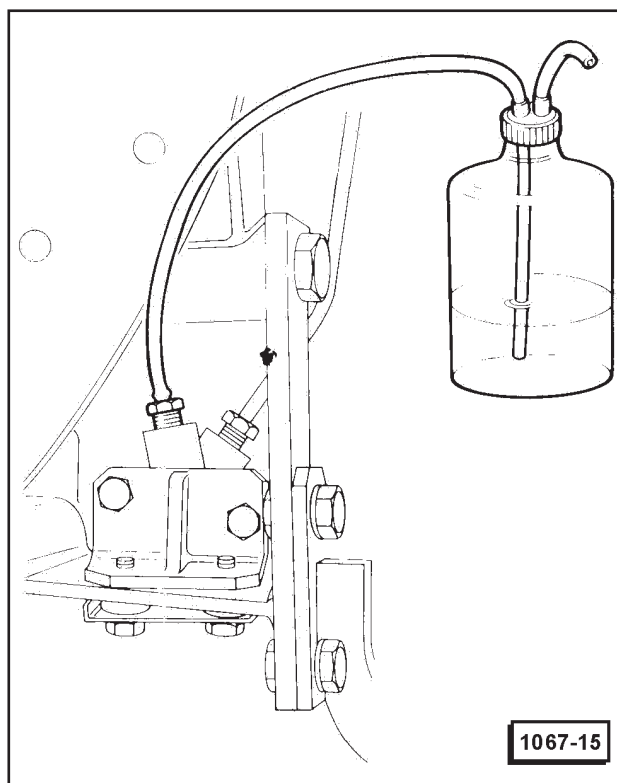
HYDRAULIC SYSTEM PIPING

CHECKS AND VERIFICATIONS

1. Visually inspect that all piping and unions of the system are in good conditions. Replace the damage components.
2. In the event of oil leaks from unions, if due to loosening, restore the correct tightening and, if required, replace the damaged components.

REMOVALS AND INSTALLATIONS

1. Remove the plug of brake and clutch hydraulic system supply tank and, by means of syringe, suck the oil from the tank.
2. Loosen the clamps securing the hose connecting tank to master cylinder, and remove it.
3. Unscrew the unions of the pipe connecting master cylinder to clutch operating cylinder and remove it.
4. Install the piping by reversing the order of removal, providing for system bleeding (refer to: Hydraulic System Bleeding).



HYDRAULIC SYSTEM BLEEDING

Bleeding of brake and clutch hydraulic system is to be carried out each time the system is connected or when air enters it.

CAUTION

- Do not reuse the oil drained during the bleeding operation.
- During the bleeding operation, keep the oil level in the tank above the min. mark.

1. Remove the top-up plug from the hydraulic system supply tank and, if necessary restore the level using the oil prescribed.
2. Fit a hose on the bleeder screw of clutch operating cylinder, and submerge its end into a transparent container filled with the same oil of the system.

3. Loosen the bleeder screw and, at the same time, fully press the clutch pedal; then tighten the bleeder screw, and slowly release the pedal. Repeat the operation until the air bubbles are eliminated.
4. With the pedal fully pressed, tighten the bleeder screw and remove the hose.

NOTE

To facilitate the bleeding operation, it is possible to disconnect the supply pipe from the clutch operating cylinder, and push the pushrod into the operating cylinder so that the air is eliminated from the supply piping. This operation is required in the event that the pedal becomes spongy when carrying out normal bleeding.

5. Restore the oil level in the tank using the oil prescribed; refit the relative plug.
6. Verify the correct functioning of the system, and adjust the clutch disengagement and speed engagement.