

MANUFACTURER



Tractors for Life

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WORKSHOP MANUAL

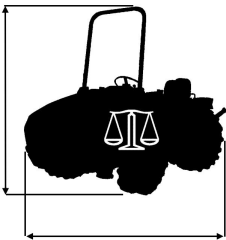
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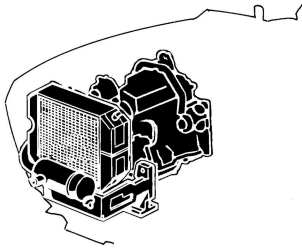
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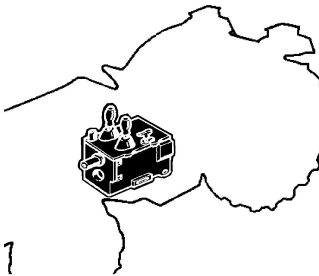
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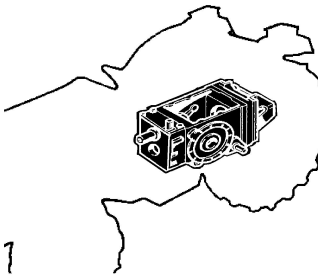
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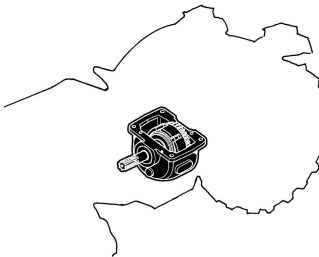
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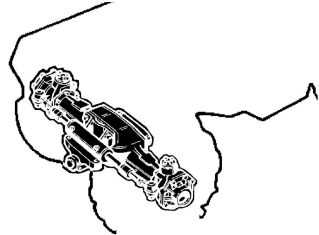
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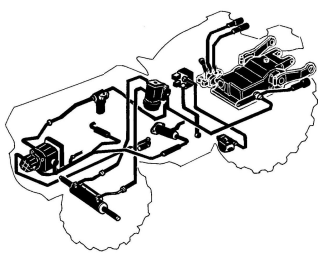
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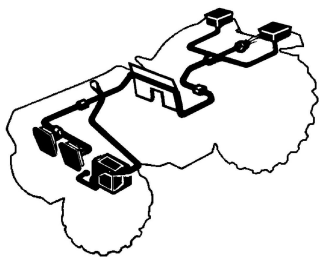
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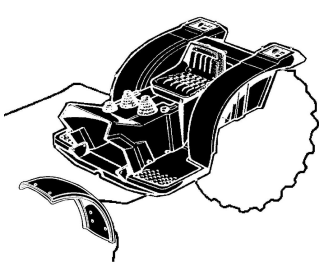
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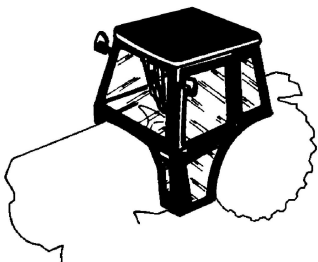
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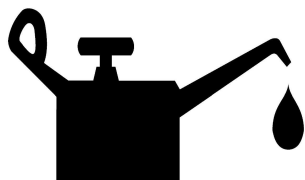
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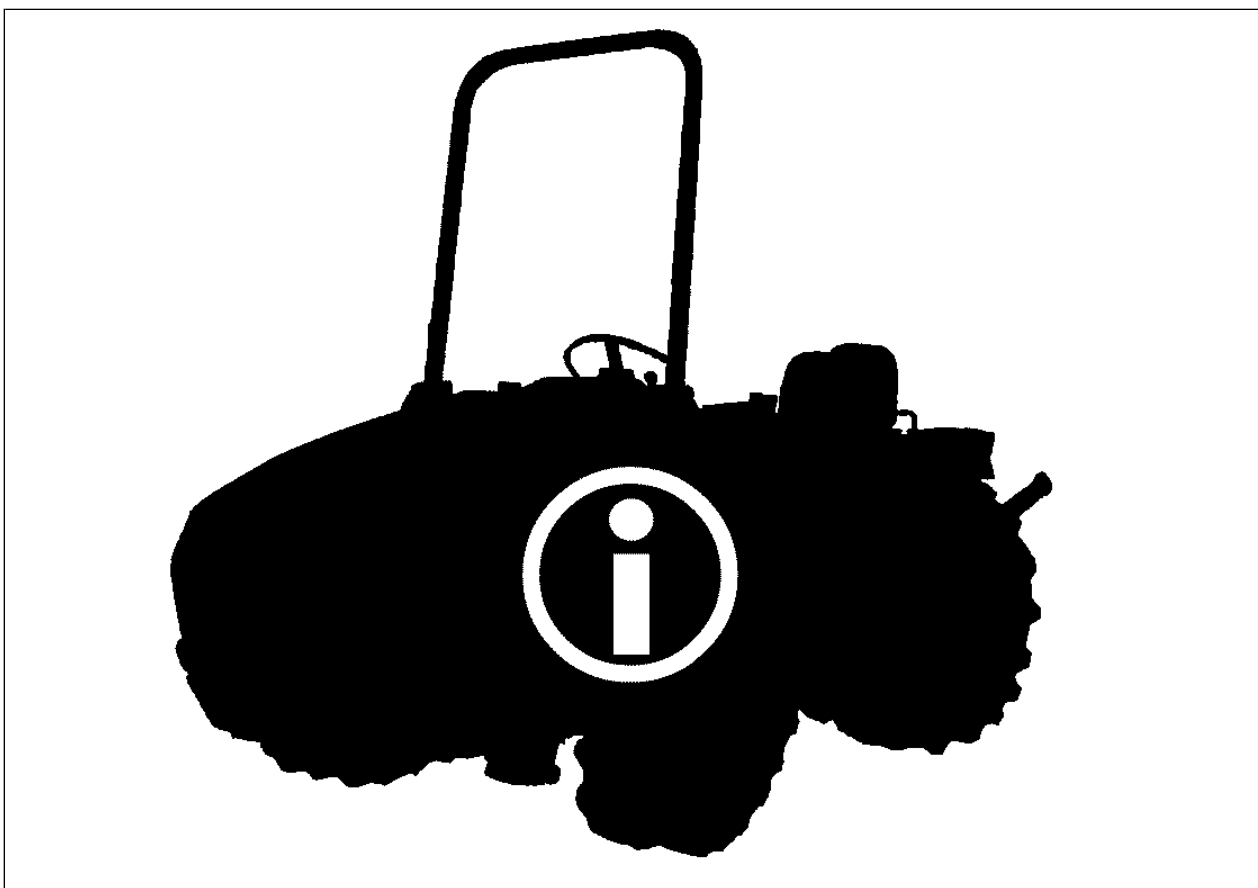
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00 - INTRODUCTION



SAFETY REGULATIONS

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

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

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

- Wear rubber gloves and goggles.
 - Make the topping in the ambient well ventilated and avoid breathing toxic fumes.
 - Avoid spilling or dripping from electrolyte.
 - Charge batteries only in well ventilated space.
 - Do not charge batteries frozen because they can explode.
28. A fluid under pressure that escapes from a tiny hole may be almost invisible but have the force to penetrate under the skin and cause serious infections or dermatosis.
Never use your hands to check for leaks from the circuit. Use a piece of cardboard or wood.
29. Check the pressure of hydraulic means using appropriate tools.

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

MACHINE IDENTIFICATION



Fig.1

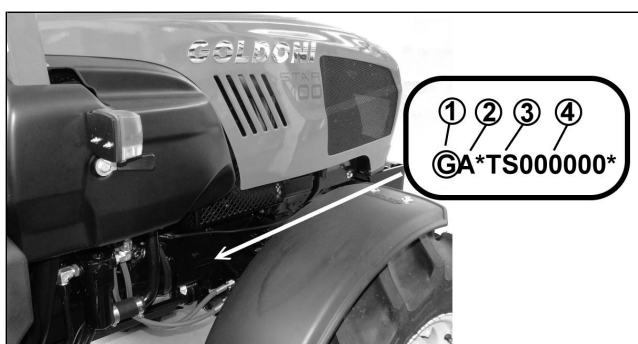


Fig.2

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

We require the following information:

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

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

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

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

Manual update

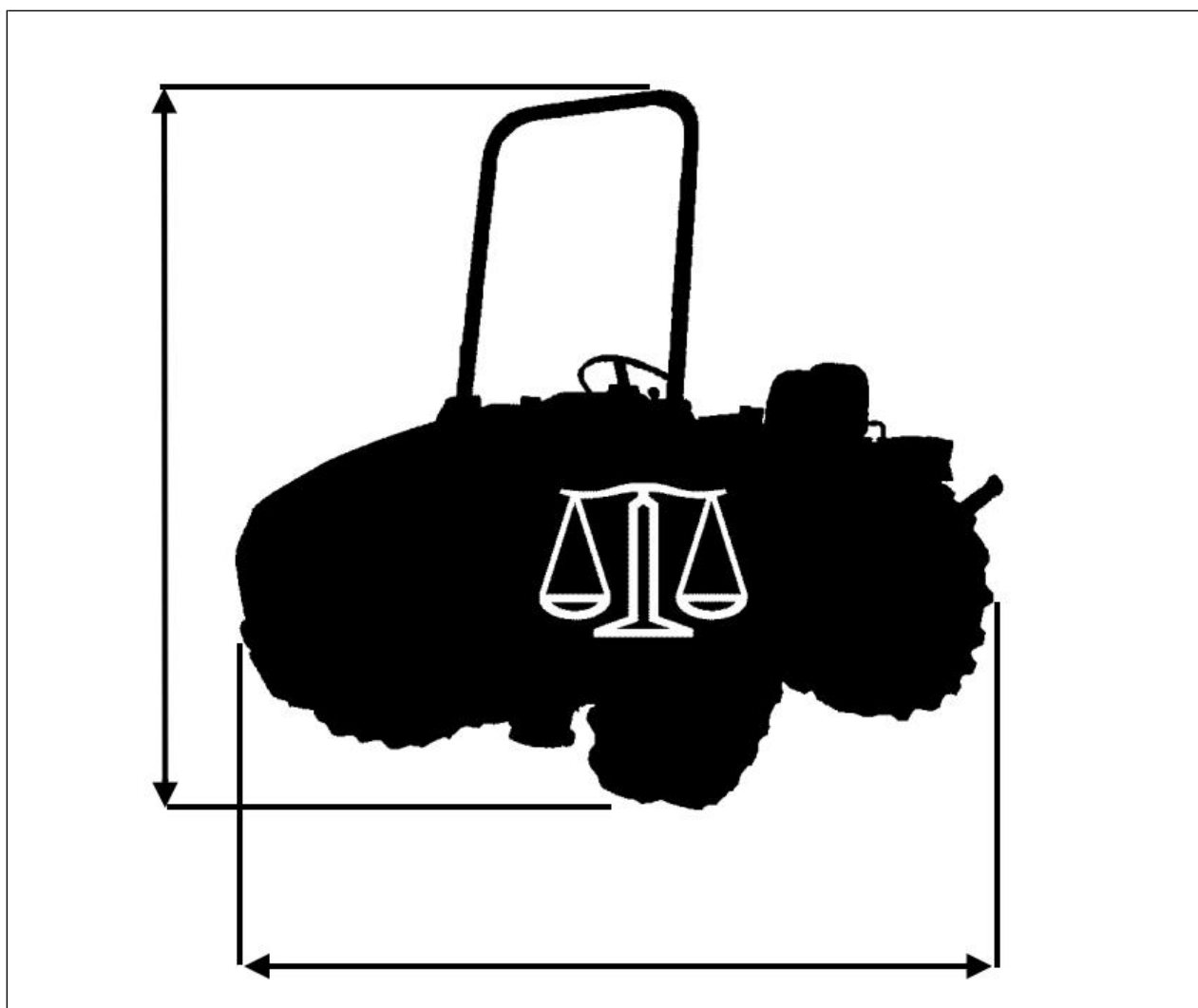
Future updates to the manual, modifications or additions to assemblies or parts of assemblies will be published in our website.

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

Warnings

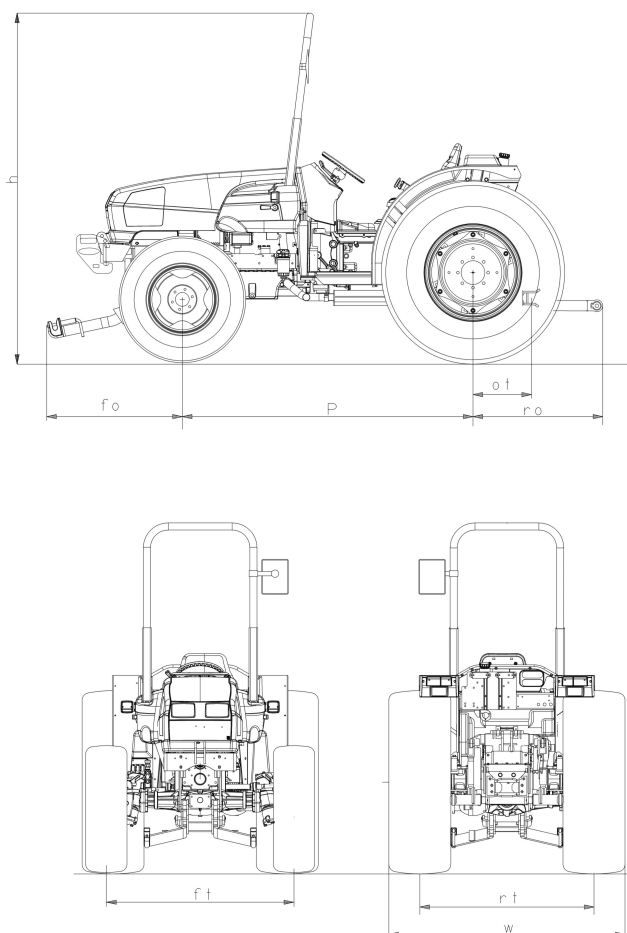
Entries "Right", "left", "front" and "rear", used in the descriptions of operations, always refers to the direction of travel of the machine or equipment

02 - DIMENSIONS SPEEDS WEIGHT



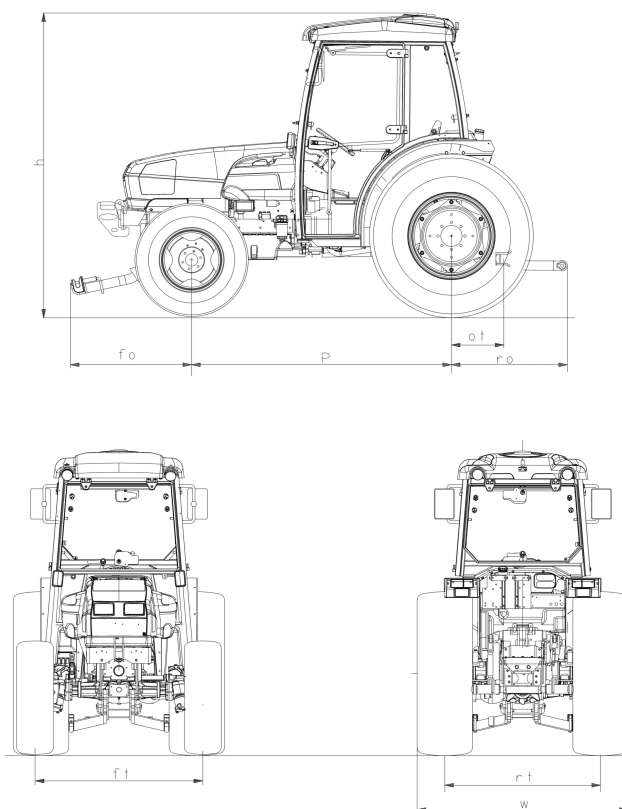
DIMENSIONS AND WEIGHTS

02.10 - Table of Machine Dimensions and Weights - roll bar



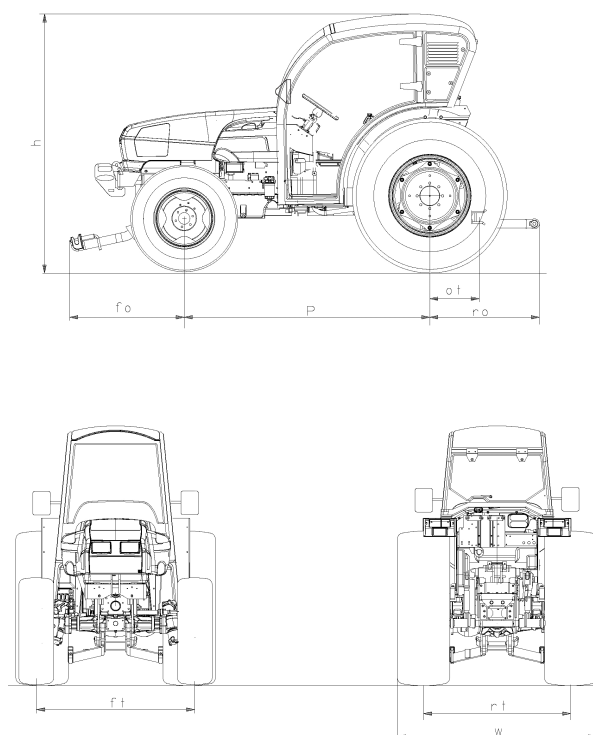
Roll bar version			Low version	High version
	(p+fo+ro) length	mm	3348 - 3863	
w	Min - max width	mm	1400 - 1800	
h	Height to chassis	mm	2210 - 2275	2295 - 2360
p	Wheelbase	mm	1968	1948
fo	Front overhang	mm	530 - 895	550 - 915
ro	Rear overhang	mm	850 - 1000	
ot	Tow hook overhang (min and max of 2 different tow hooks)	mm	400 - 675	
ft	Min - max Front track	mm	1147 - 1493	1106 - 1514
gc	Ground clearance	mm	230 - 291	313 - 376
rt	Min - max Rear track	mm	1038 - 1548	1038 - 1514
	Total weight	Kg	2320 - 2375	
	Maximum load on front axle	Kg	970 - 990	
	Maximum load on rear axle	Kg	1350 - 1385	
	Minimum turning radius with brakes	mt	2,9	

02.20 - Table of Machine Dimensions and Weights - GL cab



Cab version GL			Low version	High version
	(p+fo+ro) length	mm	3348 - 3863	
w	Min - max width	mm	1400 - 1800	
h	Height to chassis	mm	2100 - 2165	2185 - 2250
p	Wheelbase	mm	1968	1948
fo	Front overhang	mm	530 - 895	550 - 915
ro	Rear overhang	mm	850 - 1000	
ot	Tow hook overhang (min and max of 2 different tow hooks)	mm	400 - 675	
ft	Min - max Front track	mm	1147 - 1493	1106 - 1514
gc	Ground clearance	mm	230 - 291	313 - 376
rt	Min - max Rear track	mm	1038 - 1548	1038 - 1514
	Total weight	Kg	2550 - 2610	
	Maximum load on front axle	Kg	1050 - 1070	
	Maximum load on rear axle	Kg	1500 - 1540	
	Minimum turning radius with brakes	mt	2,9	

02.30 - Table of Machine Dimensions and Weights - SG1 cab



Cab version SG1			Low version	High version
	(p+fo+ro) length	mm	3348 - 3863	
w	Min - max width	mm	1400 - 1800	
h	Height to chassis	mm	1842 - 1957	1977 - 2043
p	Wheelbase	mm	1968	1948
fo	Front overhang	mm	530 - 895	550 - 915
ro	Rear overhang	mm	850 - 1000	
ot	Tow hook overhang (min and max of 2 different tow hooks)	mm	400 - 675	
ft	Min - max Front track	mm	1147 - 1493	1106 - 1514
gc	Ground clearance	mm	230 - 291	313 - 376
rt	Min - max Rear track	mm	1038 - 1548	1038 - 1514
	Total weight	Kg	2515 - 2575	
	Maximum load on front axle	Kg	1050 - 1070	
	Maximum load on rear axle	Kg	1465 - 1505	
	Minimum turning radius with brakes	mt	2,9	

02.40 - Table of tyre inflation pressures

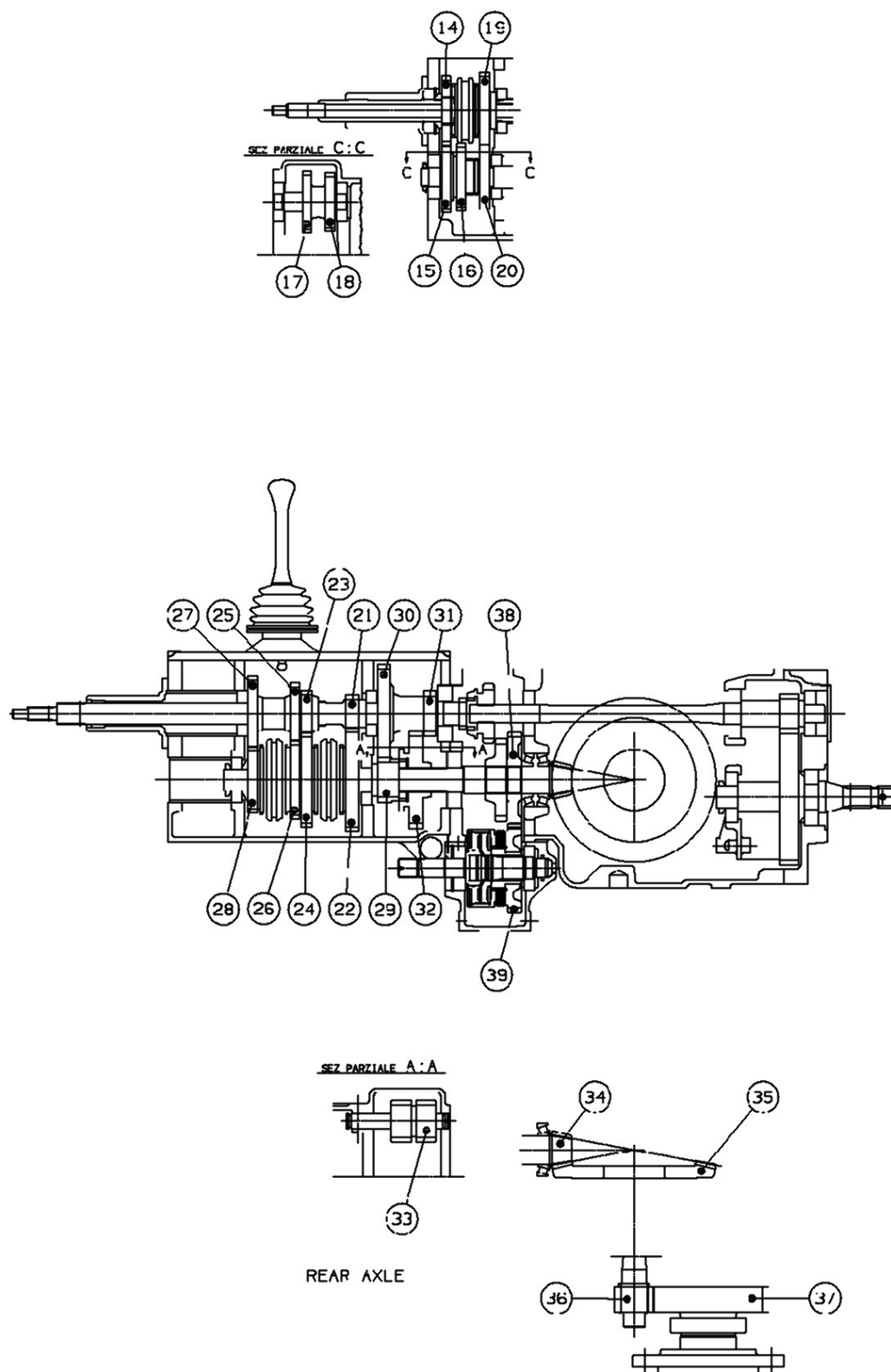
High version					Low version				
Front and Rear	Type	Maximum load per axle (kg)	Bar (MAX)	Speed Kph	Front and Rear	Type	Maximum load per axle (kg)	Bar (MAX)	Speed Kph
280/70-R18"	114 A8	2360	2,4	40	280/70-R16"	112 A8	2240	2,4	40
360/70-R28"	125 A8	3300	1,6	40	380/70-R24"	125 A8	3300	1,6	40
250/80-18"	8PR	1800	3,2	40	260/70-R16"	109 A8	2060	2,4	40
320/85-R28"	124 A8	3200	1,6	40	360/70-R24"	122 A8	3000	1,6	40
250/80-18"	8PR	1800	3,2	40	260/70-R16"	109 A8	2060	2,4	40
280/85-R28"	118 A8	2640	1,6	40	320/85-R24"	122 A8	3000	1,6	40
250/80-18"	8PR	1800	3,2	40	240/70-R16"	104 A8	1800	2,4	40
12.4-R28"	121 A8	2900	1,6	40	320/70-R24"	116 A8	2500	1,6	40
250/80-18"	8PR	1800	3,2	40	260/70-R16"	109 A8	2060	2,4	40
11.2-R28"	116 A8	2500	1,6	40	12.4-R24"	119 A8	2720	1,6	40
280/70-R18"	114 A8	2360	2,4	40	240/70-R16"	104 A8	1800	2,4	40
420/70-R24"	130 A8	3800	1,6	40	380/70-R20"	122 A8	3000	1,6	40
250/80-18"	8PR	1800	3,2	40	280/60 x 15.5"	6PR	1010	1,5	40
380/85-R24"	131 A8	3900	1,6	40	375/75-R20"	143 B	3620	2,0	40

High version					Low version				
Front and Rear	Type	Maximum load per axle (kg)	Bar (MAX)	Speed Kph	Front and Rear	Type	Maximum load per axle (kg)	Bar (MAX)	Speed Kph
280/70-R16"	112 A8	2240	3,2	40	29x12.50-15"	4PR	1260	2,1	40
380/70-R24"	125 A8	3300	1,6	40	44x18.00-20"	4PR	3250	1,4	40
8.25-16"	9PR	1464	3,0	40	29x12.50-15"	4PR	1370	2,1	30
340/85-R24"	125 A8	3300	1,6	40	44x18.00-20"	4PR	3250	1,4	30
280/80-18"	8PR	1800	3,2	40					
14.9-R24"	126 A8	1400	1,6	40					
8.25-16"	8PR	1464	3,0	40					
13.6-R24"	121 A8	1900	1,6	40					
29x12.50-15"	4PR	1260	2,1	40					
44x18.00-20"	4PR	3250	1,4	40					
29x12.50-15"	4PR	1260	2,1	30					
44x18.00-20"	4PR	3250	1,4	30					

02.50 - Table of mechanical transmission 16+8 - 8+8

DUAL POWER MODE (16-8 SPEEDS) HIGH VERSION															
FORWARD SPEED WITH ENGINE AT MAXIMUM POWER															
N° SPEED GEARS	RATIO		2600 Rpm												
	GEARBOX	TOTAL	Speed with tires (Km/h)												
			360/70	320/85	280/85	12.4	11.2	420/70	380/85	380/70	340/85	14.9	13.6	44x18.00	
			R28	R28	R28	R28	R28	R24	R24	R24	R24	R24	R24	R24	R20
			C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	C.R.	
			3768	3768	3611	3768	3611	3768	3768	3611	3611	3768	3611	3402	
STANDARD SPEEDS															
FORWARD	1	3,67	316,86	1,86	1,86	1,78	1,86	1,78	1,86	1,86	1,78	1,78	1,86	1,78	1,67
	2	2,23	192,47	3,05	3,05	2,93	3,05	2,93	3,05	3,05	2,93	2,93	3,05	2,93	2,75
	3	1,29	111,51	5,27	5,27	5,05	5,27	5,05	5,27	5,27	5,05	5,05	5,27	5,05	4,75
	4	0,97	83,95	7,00	7,00	6,71	7,00	6,71	7,00	7,00	6,71	6,71	7,00	6,71	6,31
	5	3,67	55,52	10,59	10,59	10,15	10,59	10,15	10,59	10,59	10,15	10,15	10,59	10,15	9,55
	6	2,23	33,73	17,43	17,43	16,70	17,43	16,70	17,43	17,43	16,70	16,70	17,43	16,70	15,71
	7	1,29	19,54	30,08	30,08	28,83	30,08	28,83	30,08	30,08	28,83	28,83	30,08	28,83	27,13
	8	0,97	14,71	39,96	39,96	38,29	39,96	38,29	39,96	39,96	38,29	38,29	39,96	38,29	36,03
REVERSE	1	3,67	132,64	4,43	4,43	4,25	4,43	4,25	4,43	4,43	4,25	4,25	4,43	4,25	4,00
	2	2,23	80,57	7,30	7,30	6,99	7,30	6,99	7,30	7,30	6,99	6,99	7,30	6,99	6,58
	3	1,29	46,68	12,59	12,59	12,07	12,59	12,07	12,59	12,59	12,07	12,07	12,59	12,07	11,35
	4	0,97	35,14	16,73	16,73	16,03	16,73	16,03	16,73	16,73	16,03	16,03	16,73	16,03	15,08
20% REDUCER															
FORWARD	1	3,67	422,48	1,39	1,39	1,33	1,39	1,33	1,39	1,39	1,33	1,33	1,39	1,33	1,25
	2	2,23	256,63	2,29	2,29	2,20	2,29	2,20	2,29	2,29	2,20	2,20	2,29	2,20	2,07
	3	1,29	148,67	3,95	3,95	3,79	3,95	3,79	3,95	3,95	3,79	3,79	3,95	3,79	3,56
	4	0,97	111,93	5,25	5,25	5,03	5,25	5,03	5,25	5,25	5,03	5,03	5,25	5,03	4,74
	5	3,67	74,03	7,94	7,94	7,61	7,94	7,61	7,94	7,94	7,61	7,61	7,94	7,61	7,16
	6	2,23	44,97	13,07	13,07	12,53	13,07	12,53	13,07	13,07	12,53	12,53	13,07	12,53	11,79
	7	1,29	26,05	22,56	22,56	21,62	22,56	21,62	22,56	22,56	21,62	21,62	22,56	21,62	20,34
	8	0,97	19,61	29,97	29,97	28,72	29,97	28,72	29,97	29,97	28,72	28,72	29,97	28,72	27,02
REVERSE	1	3,67	176,85	3,32	3,32	3,19	3,32	3,19	3,32	3,32	3,19	3,19	3,32	3,19	3,00
	2	2,23	107,43	5,47	5,47	5,24	5,47	5,24	5,47	5,47	5,24	5,24	5,47	5,24	4,93
	3	1,29	62,24	9,44	9,44	9,05	9,44	9,05	9,44	9,44	9,05	9,05	9,44	9,05	8,52
	4	0,97	46,85	12,55	12,55	12,02	12,55	12,02	12,55	12,55	12,02	12,02	12,55	12,02	11,31
REVERSE SHUTTLE MODE (8+8 SPEEDS)															
FORWARD	1	3,67	316,86	1,86	1,86	1,78	1,86	1,78	1,86	1,86	1,78	1,78	1,86	1,78	1,67
	2	2,23	192,47	3,05	3,05	2,93	3,05	2,93	3,05	3,05	2,93	2,93	3,05	2,93	2,75
	3	1,29	111,51	5,27	5,27	5,05	5,27	5,05	5,27	5,27	5,05	5,05	5,27	5,05	4,75
	4	0,97	83,95	7,00	7,00	6,71	7,00	6,71	7,00	7,00	6,71	6,71	7,00	6,71	6,31
	5	3,67	55,52	10,59	10,59	10,15	10,59	10,15	10,59	10,59	10,15	10,15	10,59	10,15	9,55
	6	2,23	33,73	17,43	17,43	16,70	17,43	16,70	17,43	17,43	16,70	16,70	17,43	16,70	15,71
	7	1,29	19,54	30,08	30,08	28,83	30,08	28,83	30,08	30,08	28,83	28,83	30,08	28,83	27,13
	8	0,97	14,71	39,96	39,96	38,29	39,96	38,29	39,96	39,96	38,29	38,29	39,96	38,29	36,03
REVERSE	1	3,67	372,78	1,58	1,58	1,51	1,58	1,51	1,58	1,58	1,51	1,51	1,58	1,51	1,42
	2	2,23	226,44	2,60	2,60	2,49	2,60	2,49	2,60	2,60	2,49	2,49	2,60	2,49	2,34
	3	1,29	131,18	4,48	4,48	4,29	4,48	4,29	4,48	4,48	4,29	4,29	4,48	4,29	4,04
	4	0,97	98,76	5,95	5,95	5,70	5,95	5,70	5,95	5,95	5,70	5,70	5,95	5,70	5,37
	5	3,67	65,32	9,00	9,00	8,62	9,00	8,62	9,00	9,00	8,62	8,62	9,00	8,62	8,11
	6	2,23	39,68	14,81	14,81	14,20	14,81	14,20	14,81	14,81	14,20	14,20	14,81	14,20	13,36
	7	1,29	22,99	25,57	25,57	24,51	25,57	24,51	25,57	25,57	24,51	24,51	25,57	24,51	23,06
	8	0,97	17,31	33,97	33,97	32,55	33,97	32,55	33,97	33,97	32,55	32,55	33,97	32,55	30,63

02.60 - Transmission scheme - Version with 20% reducer and reverser



POS	DESCRIPTION	N° OF TEETH	
ENTRY GEAR DUAL POWER TRANSMISSION 16+8 AND REVERSE			
14	Drive wheel 1 st reduction	Z=	35
15	Driven wheel 1 st reduction	Z=	35
16	Inverter entry drive wheel	Z=	34
17	Inverter entry driven wheel	Z=	30
18	Inverter exit drive wheel	Z=	30
19	Driven wheel 2 nd reduction	Z=	40
20	Drive wheel 2 nd reduction	Z=	30
GEARBOX			
21	Drive wheel 1 st gear	Z=	15
22	Driven wheel 1 st gear	Z=	55
23	Drive wheel 2 nd gear	Z=	22
24	Driven wheel 2 nd gear	Z=	49
25	Drive wheel 3 rd gear	Z=	31
26	Driven wheel 3 rd gear	Z=	40
27	Drive wheel 4 th gear	Z=	35
28	Driven wheel 4 th gear	Z=	34
CENTRAL REDUCER (L - M - F - REV)			
29	Drive wheel 1 st reduction	Z=	18
30	Driven wheel 1 st reduction	Z=	43
31	Drive wheel middle gear	Z=	18
32	Driven wheel middle gear	Z=	43
33	REV idle gear	Z=	17

BEVEL GEAR REAR AXLE GROUP			
34	Bevel pinion rear axle	Z=	11
35	Bevel gear rear axle	Z=	53
REAR FINAL REDUCTION			
36	Drive wheel final reductor	Z=	21
37	Driven wheel final reductor	Z=	66
VENTRAL PTO FOR FRONT WHEEL DRIVE			
38	Drive wheel	Z=	42
39	Driven wheel	Z=	39
BEVEL GEAR FRONT AXLE GROUP			
40	Bevel pinion front axle	Z=	10
41	Bevel gear front axle joint	Z=	29
BEVEL JOINT FRONT AXLE			
42	Drive bevel wheel	Z=	12
43	Driven bevel wheel	Z=	13
FINAL REDUCER FRONT AXLE			
44	Final front drive bevel wheel	Z=	13
45	Final front driven bevel wheel	Z=	45

02.70 - Table of PTO gear

WHEEL FINAL DRIVE	BEVEL GEAR PAIR	SYNCRO PTO GEAR	540 IND PTO	750 IND PTO	1000 IND PTO
66	53	35	14	17	28
21	11	24	63	59	62

02.80 - Table of PTO speeds

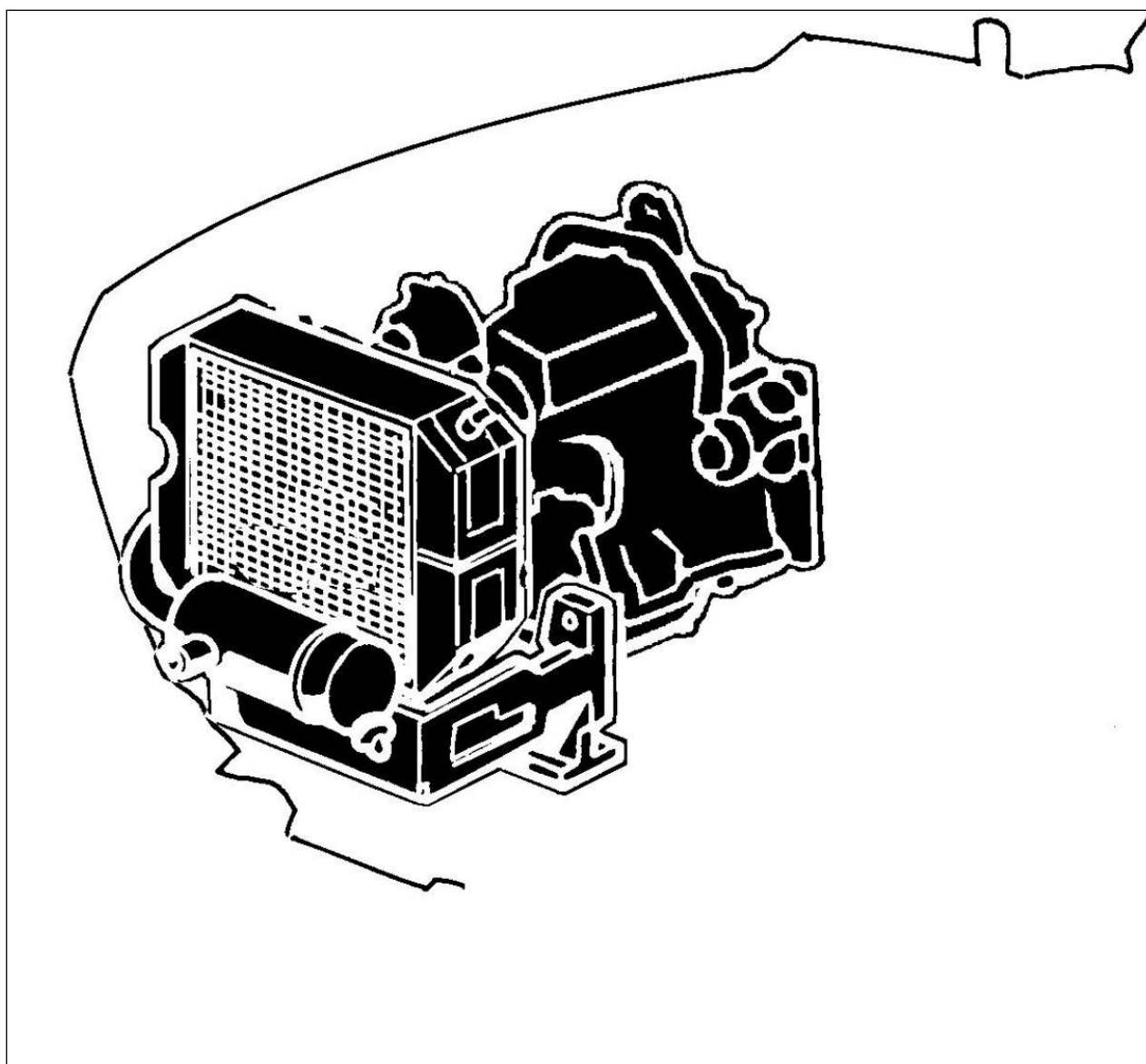
PTO speed selector lever	Turning direction:	Ratio	PTO idling rate	Engine RPM
540	Clockwise rotation 1-3/8" profile with 6 splines	4,500	540	2430
540E		3,471	750	2603
			540	1874
1000		2,214	1000	2214

02.90 - Table of Synchronized PTO speeds

These are the revolution of the PTO for every wheel revolution

Speed		
540	540E	1000
4,907	6,363	9,973

15 - ENGINE

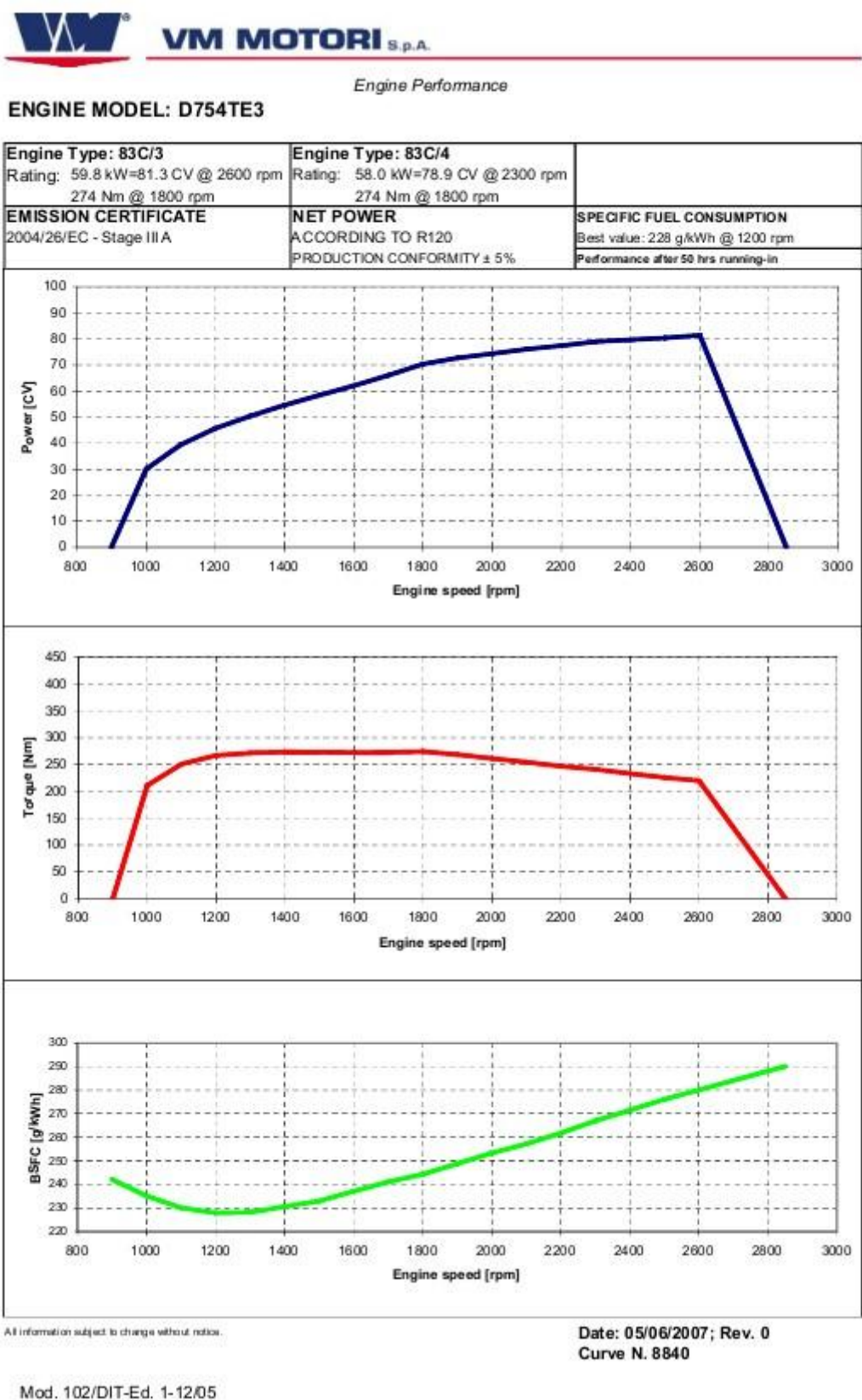


ENGINE SPECIFICATIONS

15.10 - Engine technical data - STAR 90

Engine		VM direct injection D754TE3 - 83C/3
Type		Diesel
Cooling		Water
Cylinders	N	4 Turbo
Displacement	cc	2970
Bore	mm	94
Stroke	mm	107
Compression ratio		17.8±0.5:1
Engine RPM		2600
Rated power Power rating in kW according to 80/1296/EC - ISO 1585	Kw (hp) / rpm	60 (82) / 2600
Max torque	Nm (Kgm) / rpm	274 (28) / 1500
Torque reserve		25%
Idling rpm	Engine RPM	900 ± 50
Standard sump capacity	Kg	5.8 / 4.8
Dry weight	Kg	260
Battery	V / ah	12 / 92
Fuel consumption (2600 - 2000 - 1500) r.p.m.	g/Kwh	275 - 263 - 233
Fuel tank	L	60

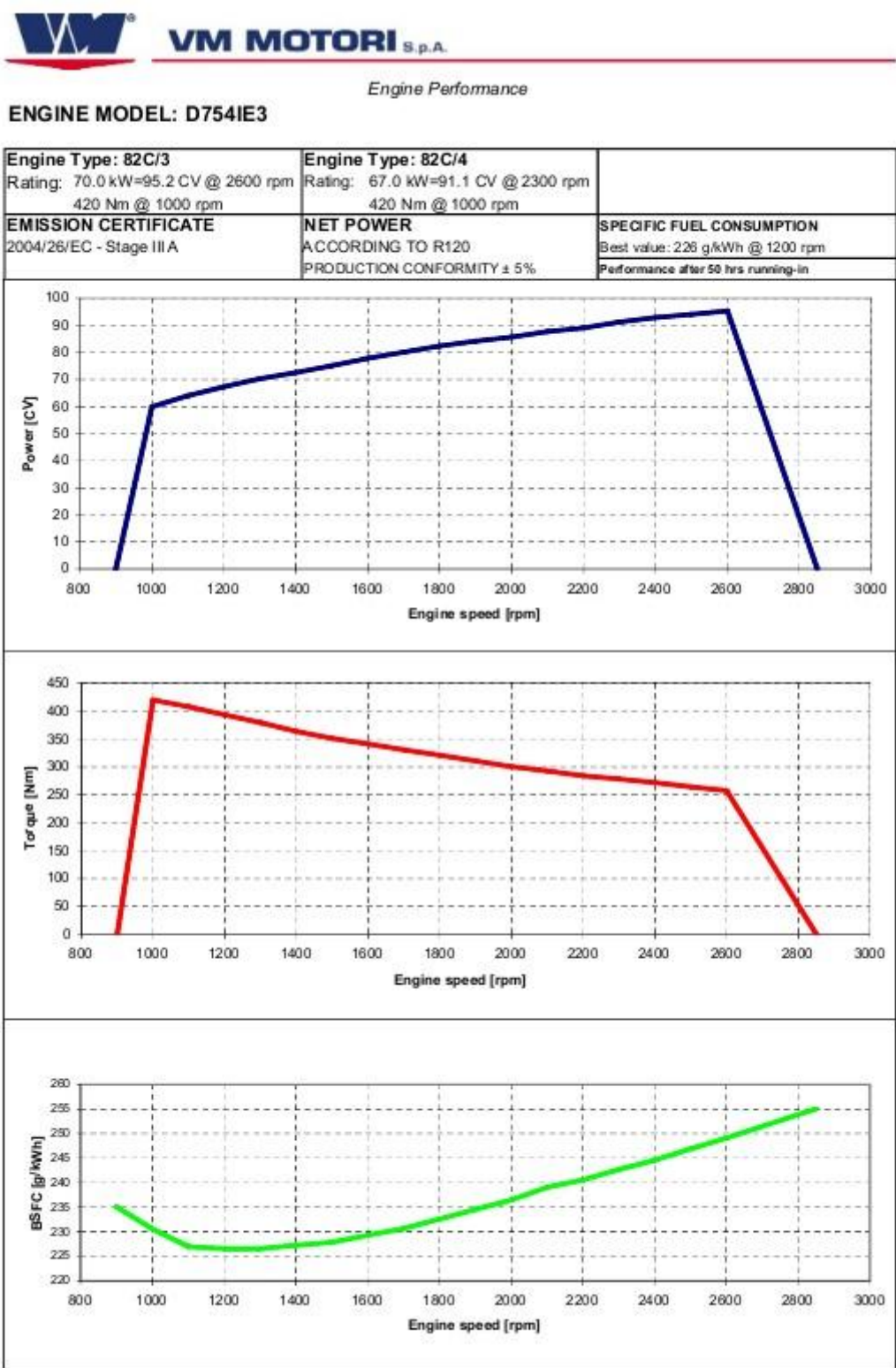
15.20 - Graph engine performance - Star 90



15.30 - Engine technical data - STAR 100

Engine		VM direct injection D754IE3 - 82C/3
Type		Diesel
Cooling		Water
Cylinders	N	4 Turbo Intercooler
Displacement	cc	2970
Bore	mm	94
Stroke	mm	107
Compression ratio		17.8±0.5:1
Engine RPM		2600
Rated power Power rating in kW according to 80/1296/EC - ISO 1585	Kw (hp) / rpm	70 (95) / 2600
Max torque	Nm (Kgm) / rpm	420 (43) / 1000
Torque reserve		63%
Idling rpm	Engine RPM	900±0.5
Standard sump capacity	Kg	7.5 / 6
Dry weight	Kg	260
Battery	V / ah	12 / 92
Fuel consumption (2600 - 2000 - 1500) r.p.m.	g/Kwh	249 - 240 - 231
Fuel tank	L	60

15.40 - Graph engine performance - Star 100



All information subject to change without notice.

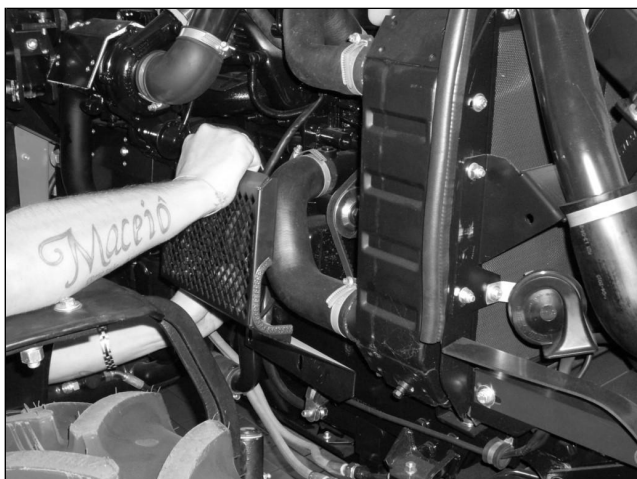
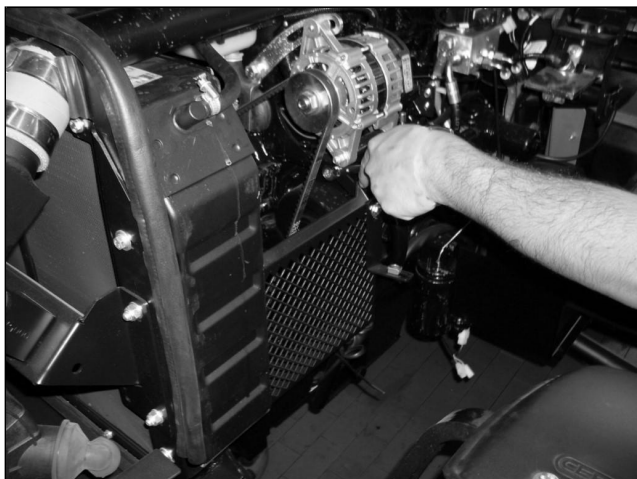
Date: 29/05/2007; Rev. 0
Curve N. 8838

Mod. 102/DIT-Ed. 1-12/05

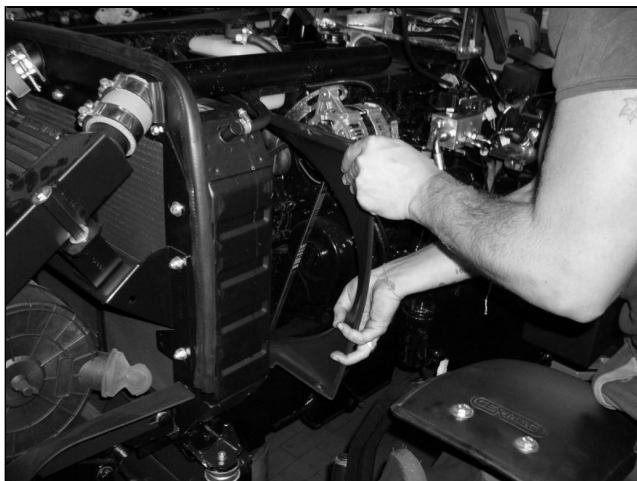
ENGINE ADJUSTMENT

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

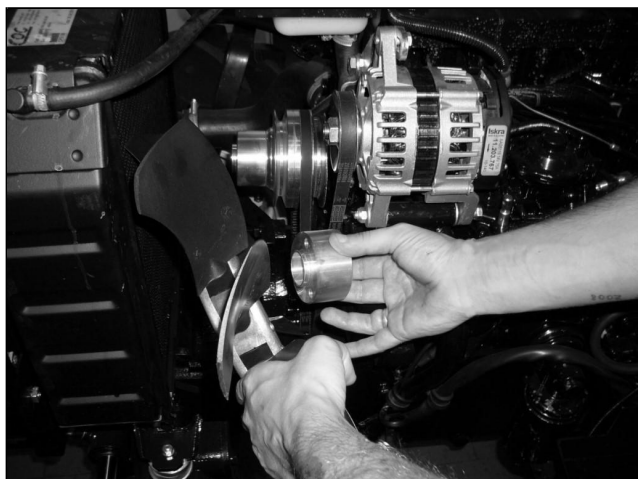
15.50 - Replacement of belts and fan



If you need to change belts or fan motor you need to do the following operations:
remove the two guards, left and right, of the fan.



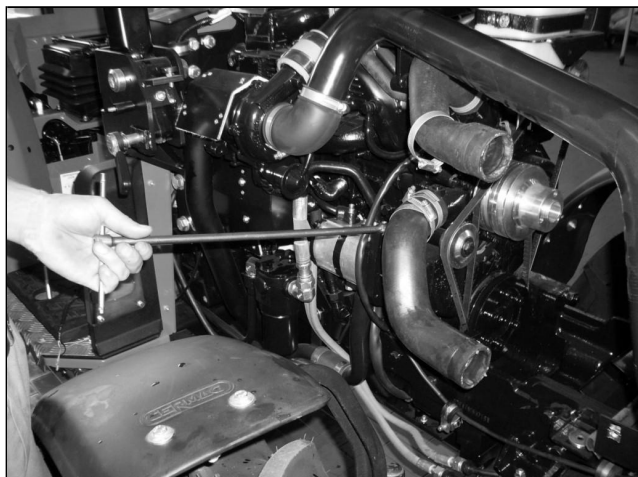
Unscrew the bolts of the fan conveyor to the radiator, turn the blower 90 degrees counter-clockwise and remove it from the side.



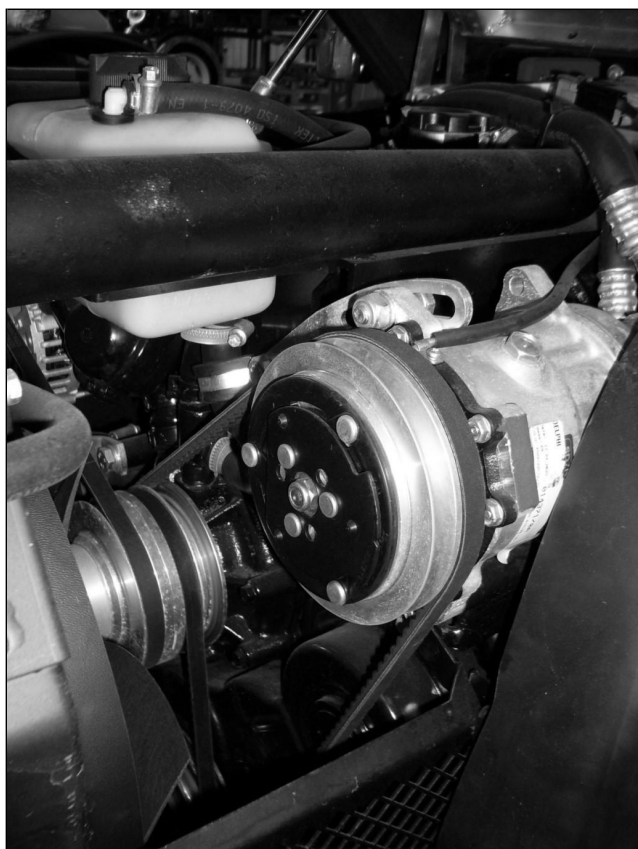
Remove the three screws holding the fan to the pulley and remove the fan motor.



To remove the alternator drive belt, loosen the tension screw of the alternator and pull it. In the cab version, the alternator is on the right and the removal procedure is the same.



To remove the water pump drive belt, loosen the screw tension pulley and remove it.



To remove the compressor drive belt, loosen the compressor tension screw and pull it.

15.60 - Radiator Replacement



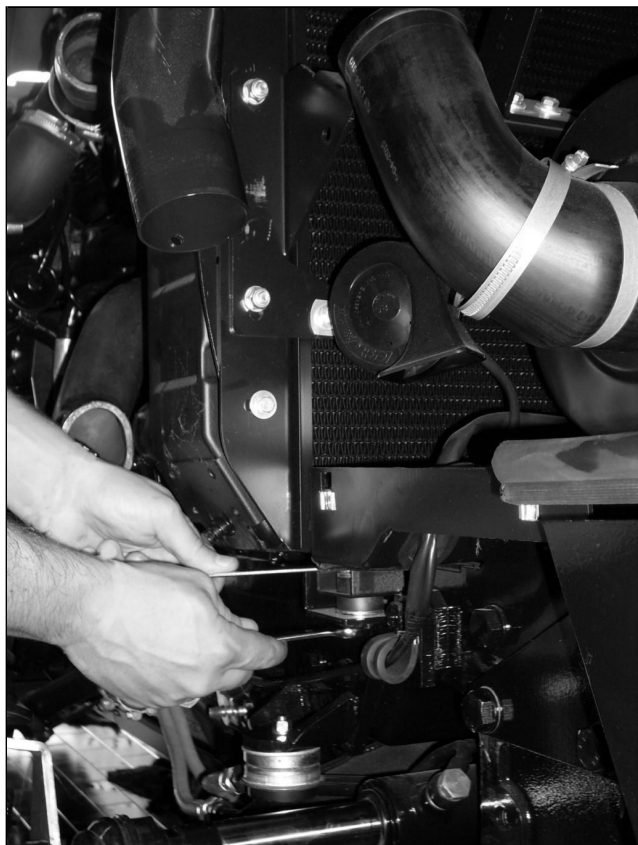
If you need to replace the radiator, it should do the following: remove the two guards left and right of the fan, unscrew the screws of the fan conveyor/shroud to the radiator, turn the conveyor 90 degrees counter-clockwise and remove it from the side (as explained in the previous pages). Remove all the attachments of the two sleeves of the radiator hoses intercooler and turn up the two tubes. Disconnect the pipe connecting the expansion tank to the radiator.



Disconnect the two water hoses and the radiator air intake pipe from the air filter.



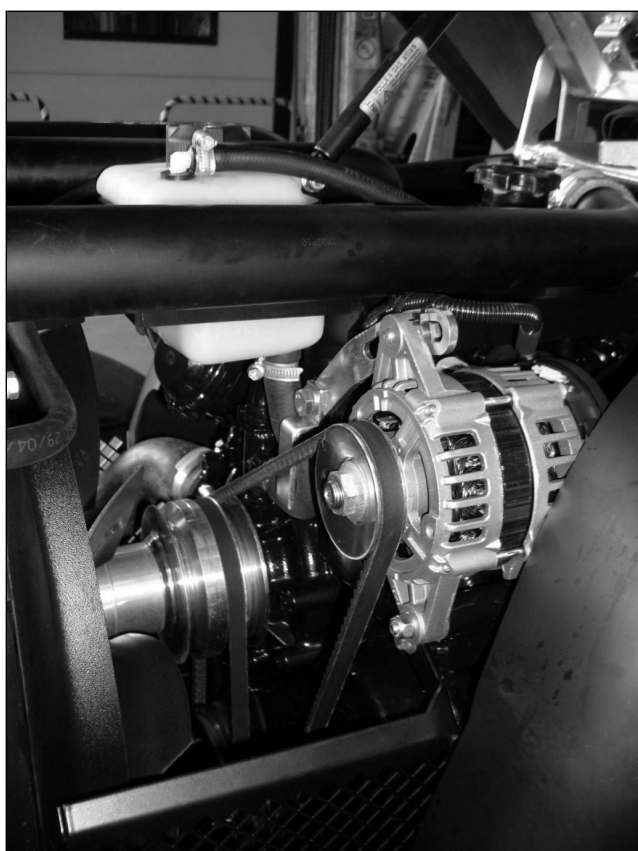
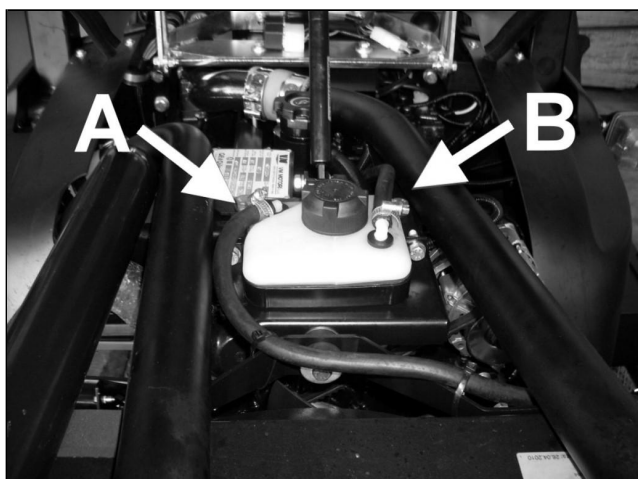
Remove the complete support with the radiator intercooler mounted.



Unscrew the two screws securing the radiator to the rubber buffers.

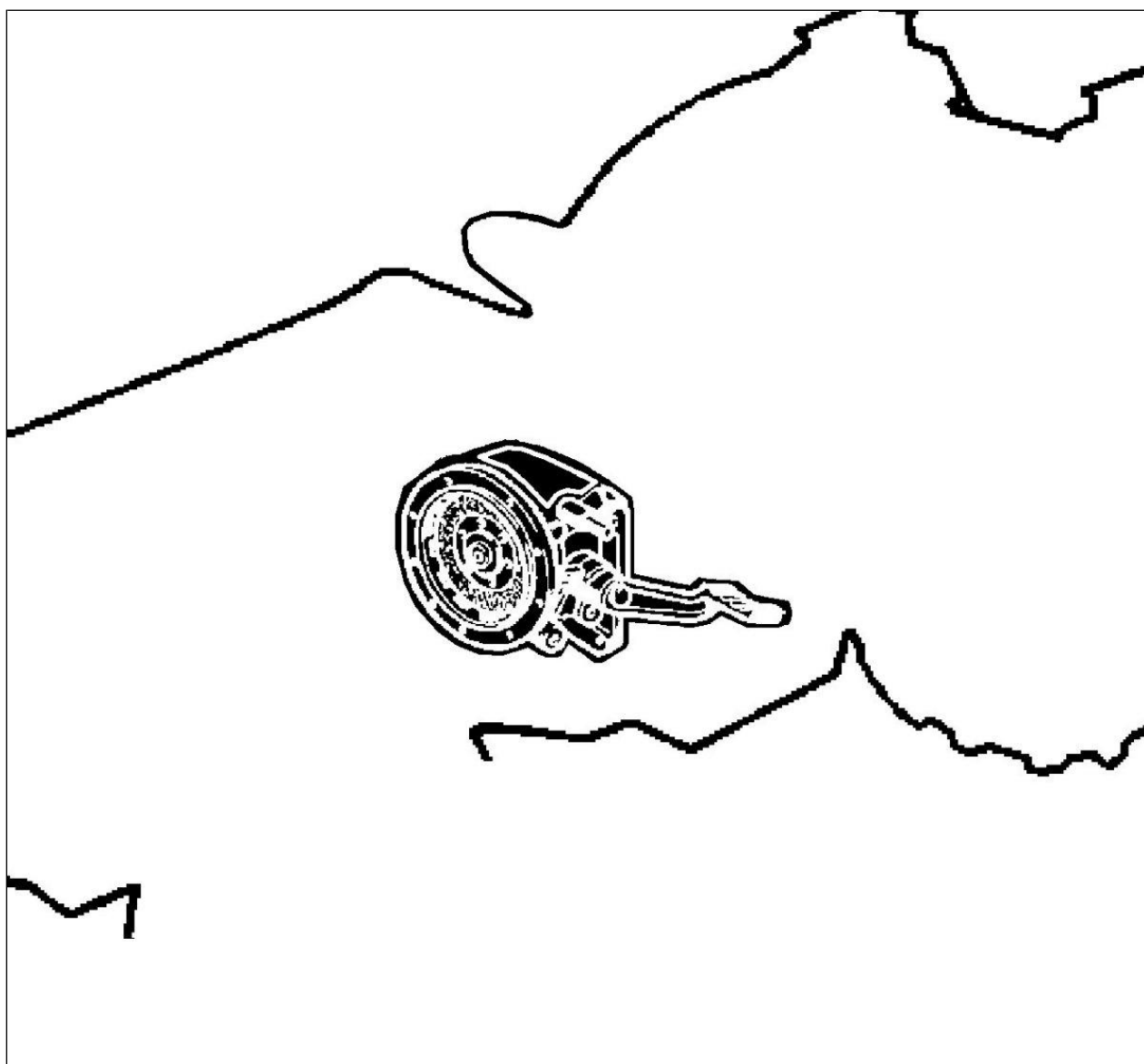
At this point you can remove the radiator from the machine. On the workbench, take off all the air deflection plate. To replace the radiator you must reassemble the parts previously removed in reverse order of disassembly.

15.70 - Replacement Expansion tank



To replace the expansion tank, you should do the following: loosen the fixing clamps of the two sleeves of the radiator hoses intercooler and turn up the two tubes; disconnect the three flex hoses and remove the attachment blade of the tank. Be especially careful not to reverse the two upper flex hoses, the one marked with the letter A (long plastic pipe fitting /tube) connects the expansion tank to the radiator while the one marked with the letter B (short connector piece refusal) connects the engine to the expansion tank.

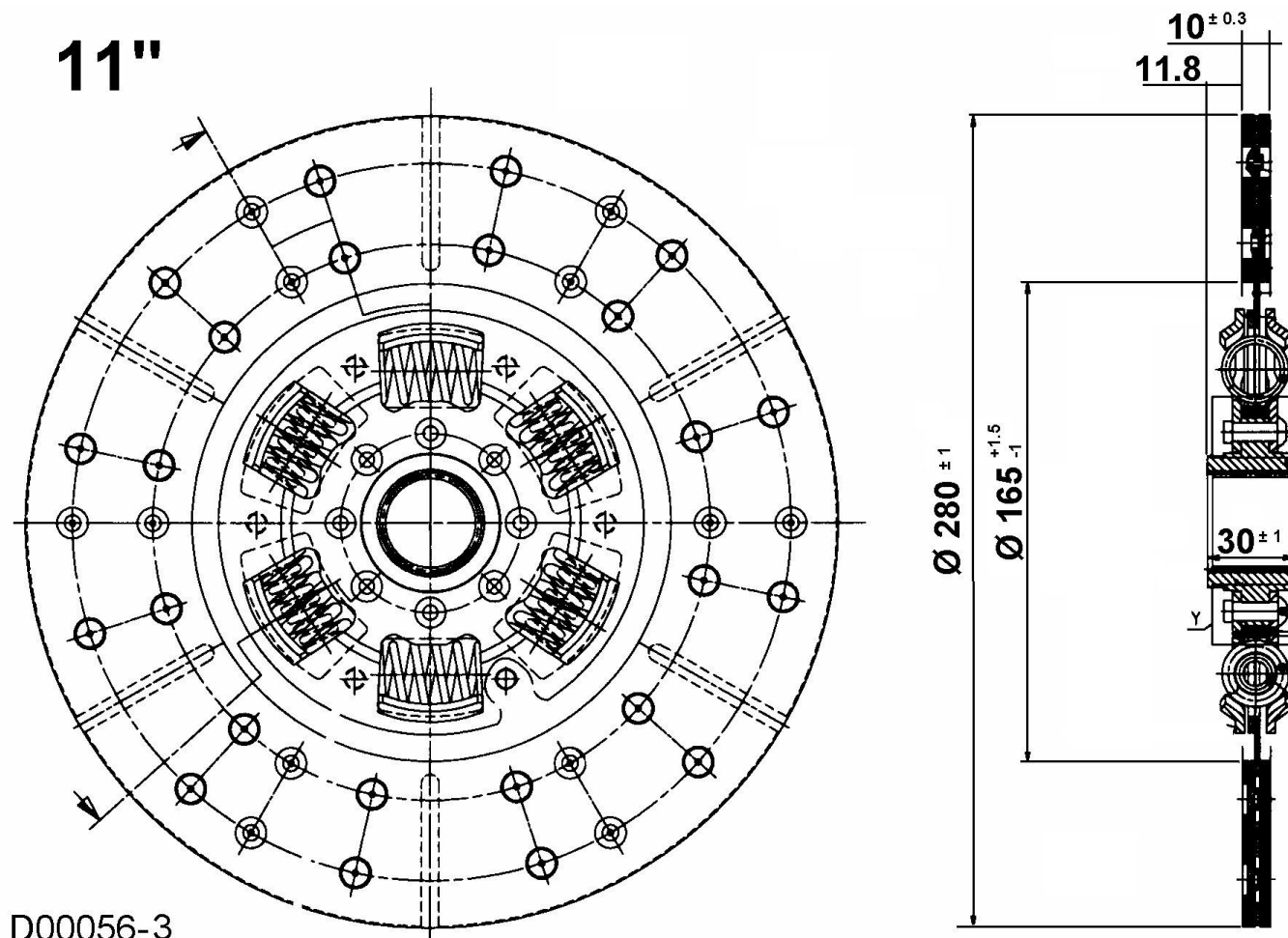
27 - CLUTCH



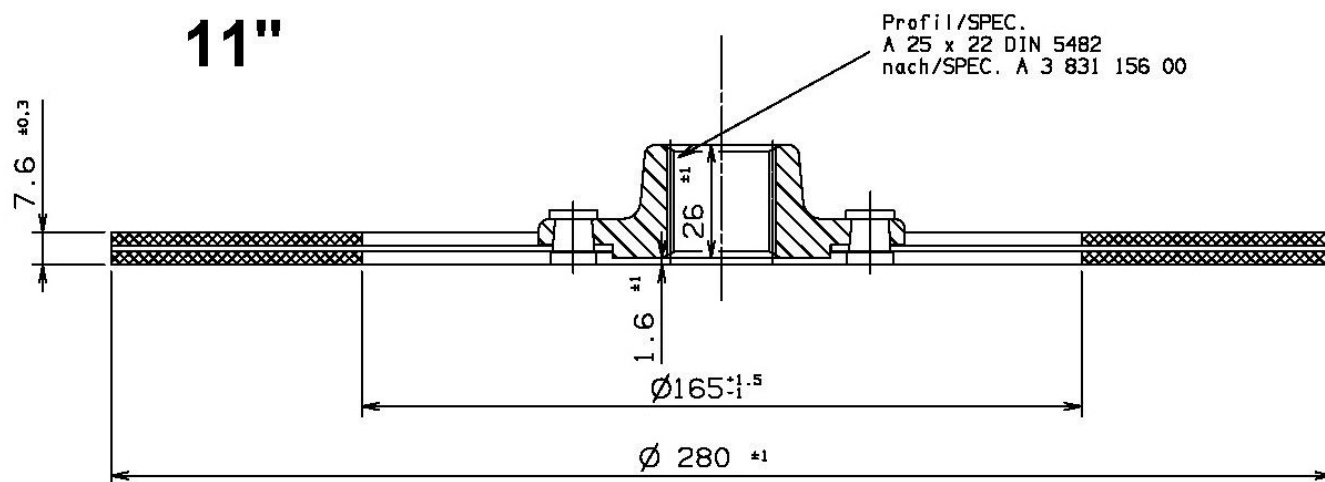
ADJUSTMENT ASSEMBLY CLUTCH

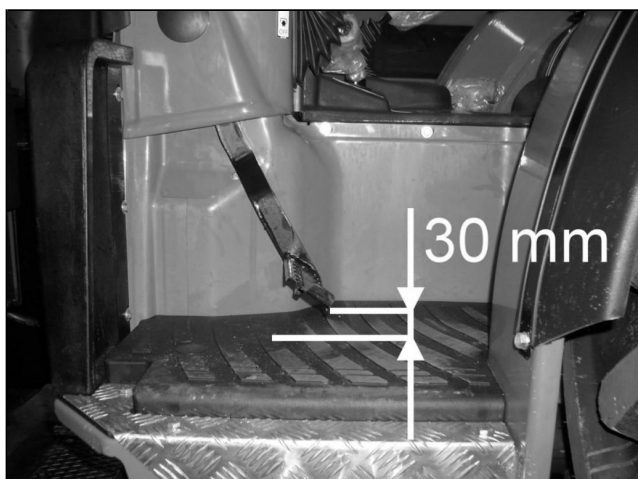
27.10 - Specifications assembly clutch

GEARBOX



POWER TAKE-OFF

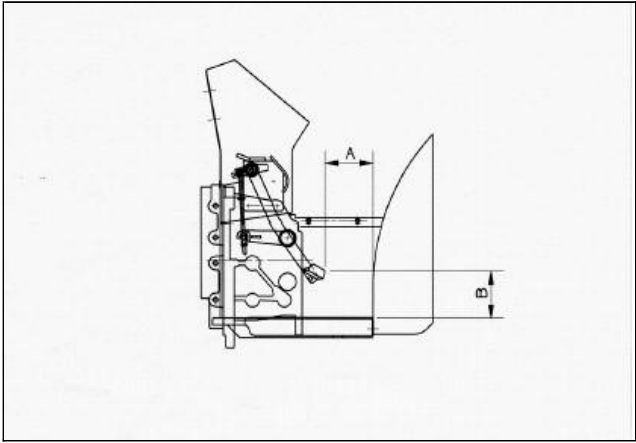


27.20 - Adjustment of traction of the clutch pedal (gear)

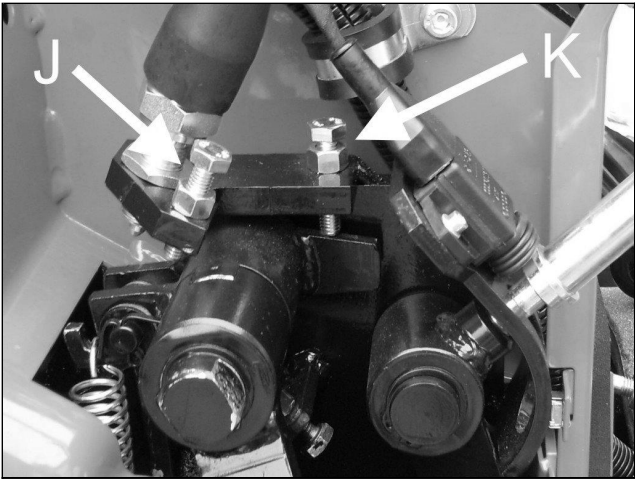
The free range of the pedal must be equal to 30 mm. The total range of the pedal is 130 mm.



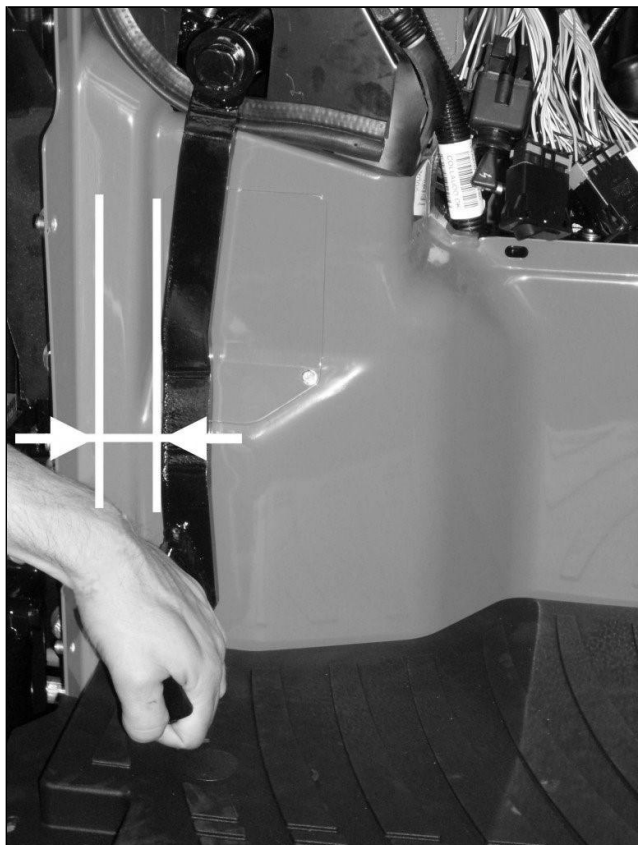
To make the adjustment, take off the clutch control cover. Loosen the screw 1 to increase the free play of the pedal, screw it to decrease the free play. After the adjustment, replace the cover.



Pedal free		Pedal as it begins to disengage.		Pedal after disengagement	
A	B	A	B	A	B
165		205		364	



In the picture, labelled with letters K and J, are shown the two adjusting nuts of the limit stop of the clutch pedal. To gain access, remove the left side bonnet. Once you have made the adjustments of the pedal, which will be described, the check nuts must be tightened to lock these adjustments.

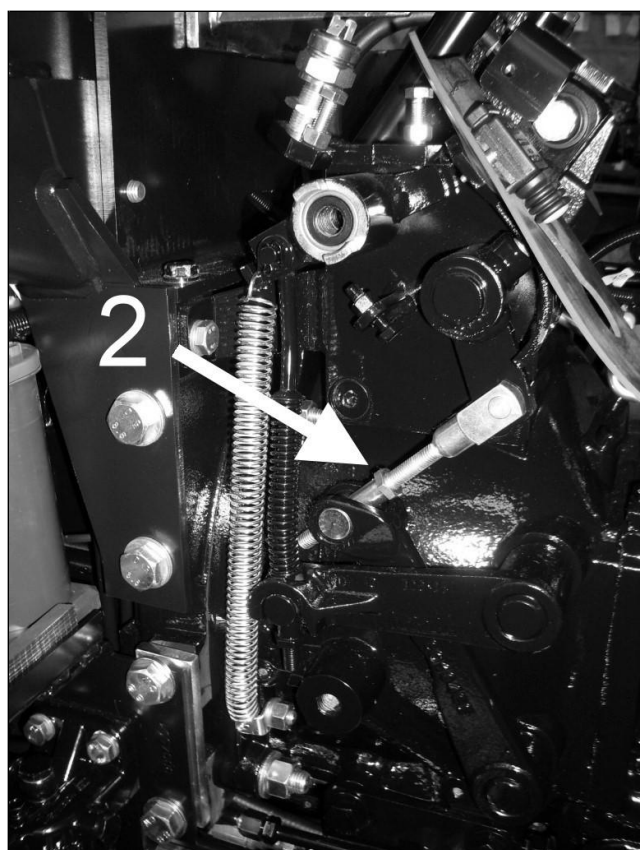


As shown in the picture, with the pedal pushed till the limit stop (complete separation of the clutch), there should be a space between the pedal and the platform of about 10 mm.

27.30 - Clutch lever PTO adjustment

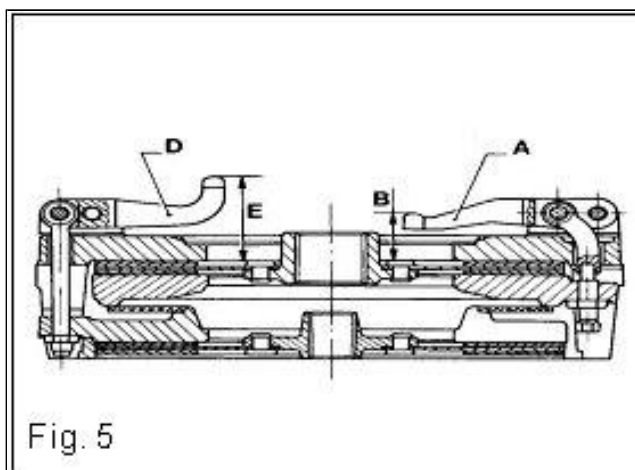


The free range of the lever must be at least 20 mm.

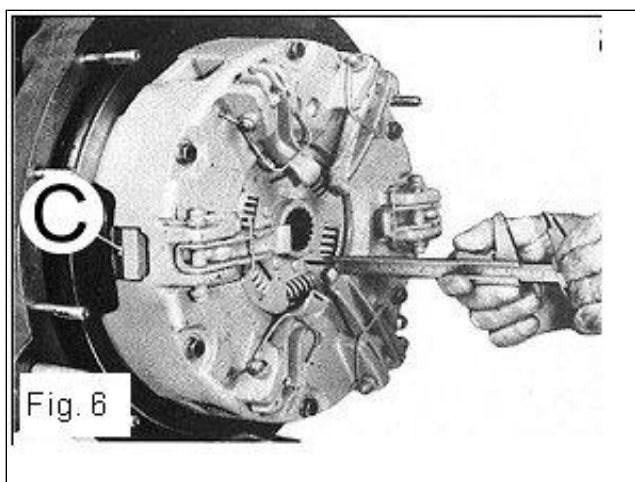


To make the adjustment, remove the cover of the clutch control levers and loosen the screw 2 to increase the free play of the lever, screw it to decrease. After the adjustment, replace the cover.

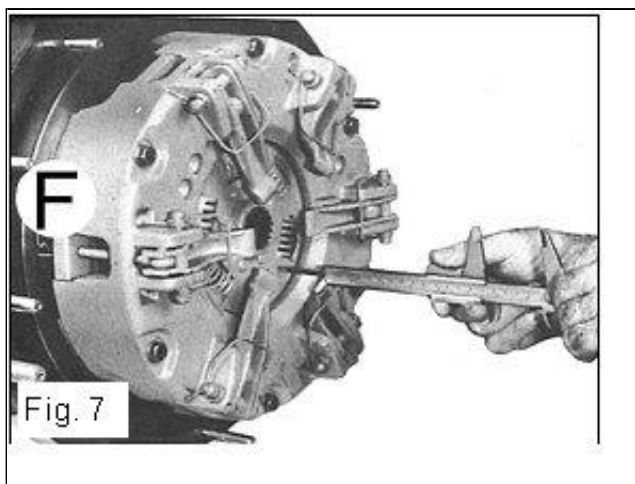
27.40 - Clutch lever adjustment



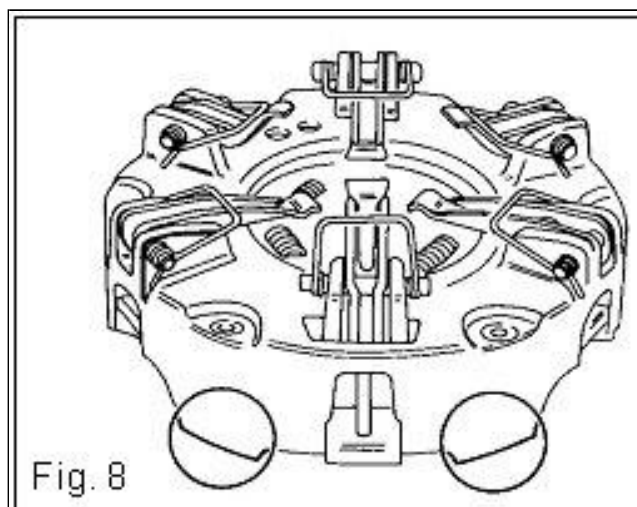
The clutch levers A in picture 5 must be adjusted in order to obtain the distance $B = 25 \text{ mm}$. To make the adjustment you need to loosen the lock nuts and operate on nuts C picture 6 to obtain the required distance. Once adjustment finished, tighten the locknuts.



The PTO levers D fig. 5 must be adjusted in order to obtain the distance $E = 50 \text{ mm}$. For the adjustment you must operate on the nuts F fig. 7 to obtain the required distance. After the adjustment, press by means of a **snap collet gun** the edge of the nut and mark it with some colour.

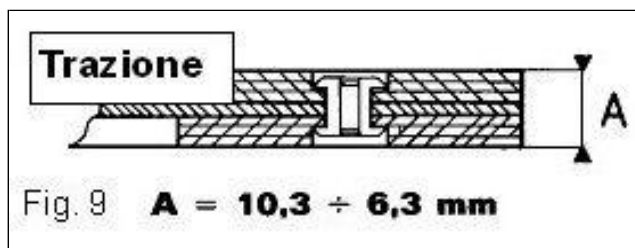


27.50 - Cheking components



If the clutch plate rings present scratches or signs of overheating it is necessary to rectify the surface plate by removing material from the original thickness by 0.5mm. For further removals (max 1 mm) it is necessary to remove material equally from the place of the clutch coupling of the flywheel fig. 8.

TRACTION



POWER TAKE-OFF

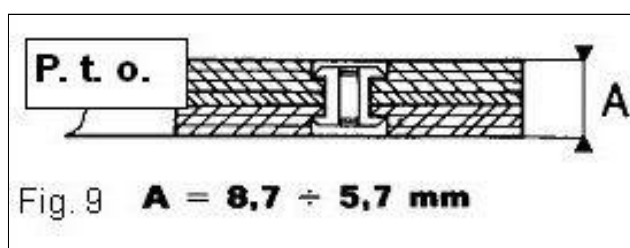
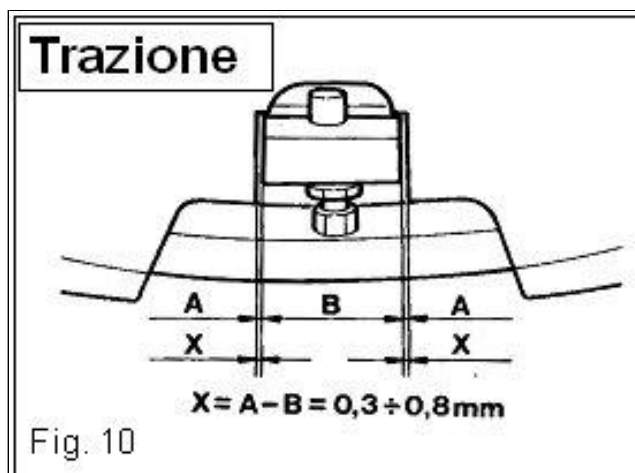
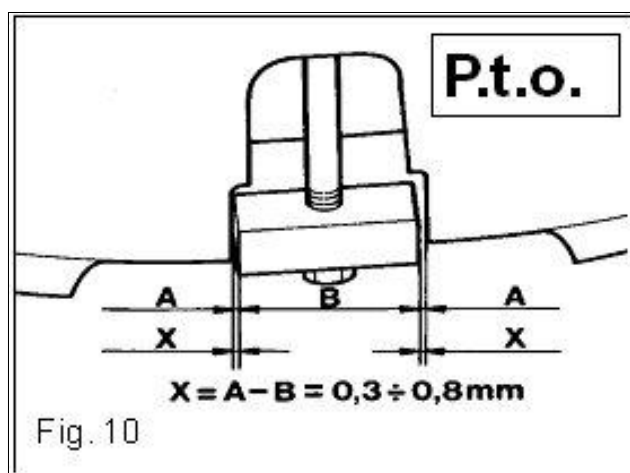


Fig. 9 shows the thickness of the wear of the two clutch plates: one of the PTO and that of traction.

TRACTION



POWER TAKE-OFF



Pics.10 show the max range of plays that must be determined on the studs of the two clutch assemblies (one for the PTO and that for traction).

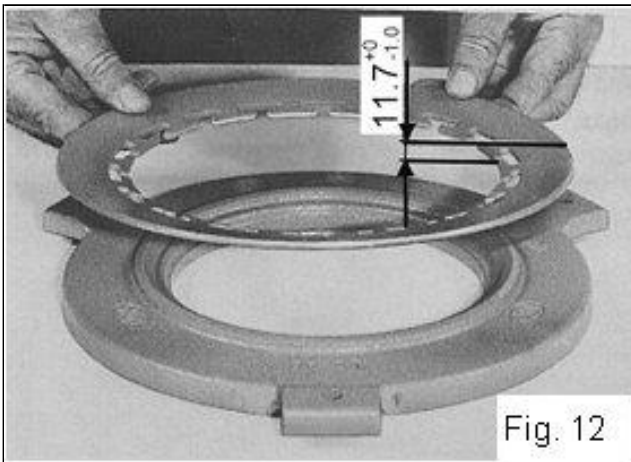


Fig. 12

REMOVING THE CLUTCH ASSEMBLY

Before mark to separate the various components. Fig. 12 shows the surface distance of the spring drive clutch.

The spring at rest must present this distance to ensure a proper push on the clutch disk.

CLUTCH ASSEMBLY REPLACING

Observe the position of marks on the various components to maintain the balancing of the assembly

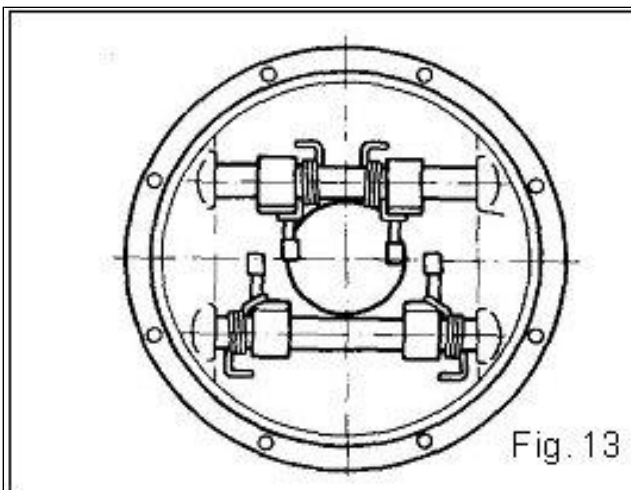
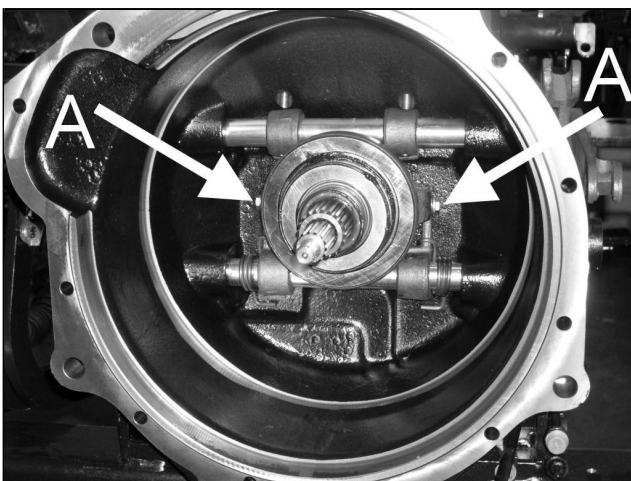
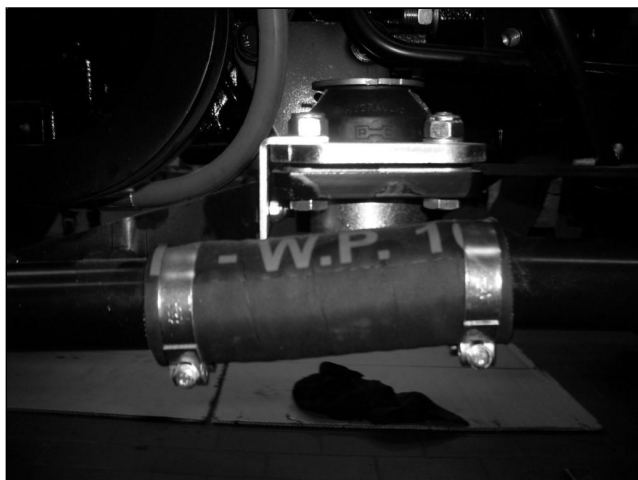


Fig. 13

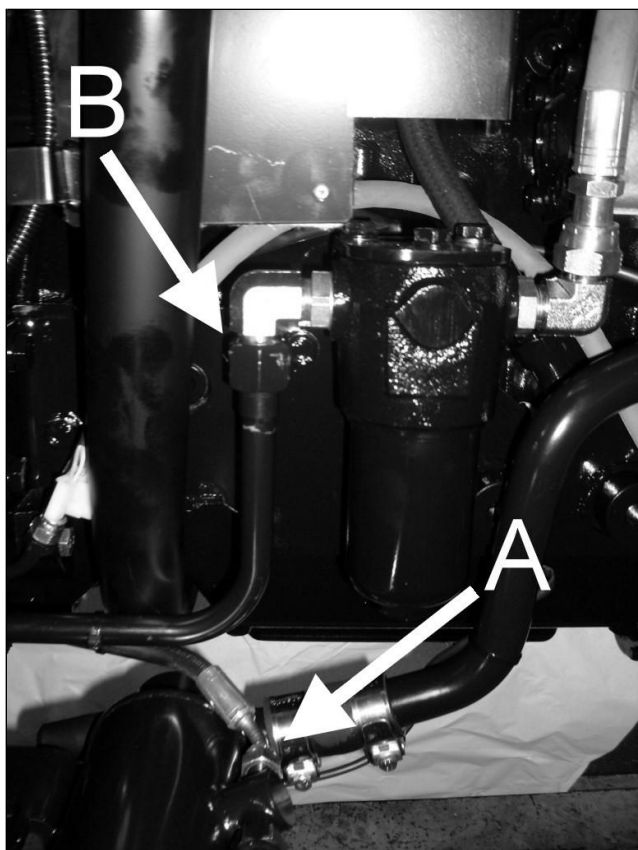
Fig. 13 shows the correct positioning of the clutch levers inside the clutch bell: both those for PTO drive clutch that those for traction clutch.



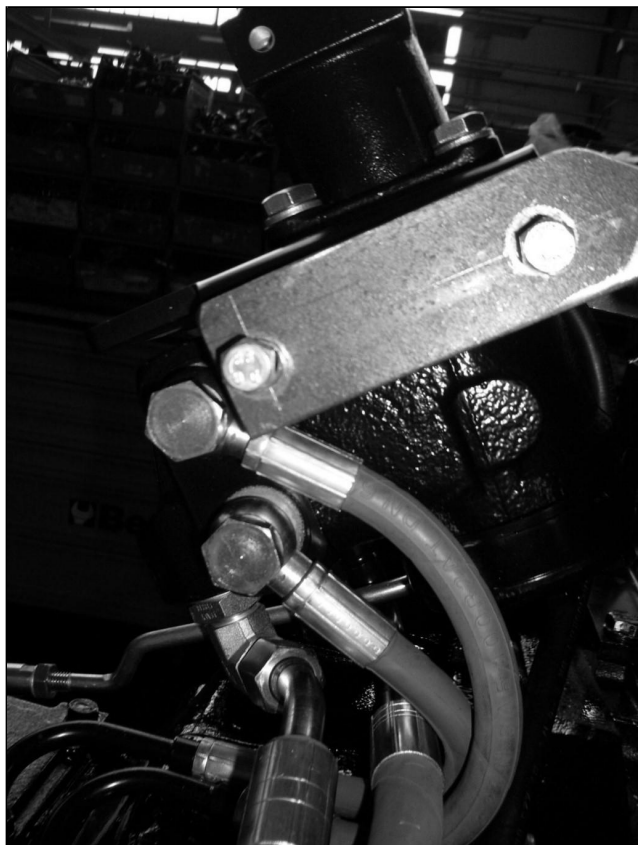
A proper assembling of the clutch levers on the thrust bearings plans to tighten the screws A to 4 kgm.

27.60 - Replacement or revision of the clutch assembly

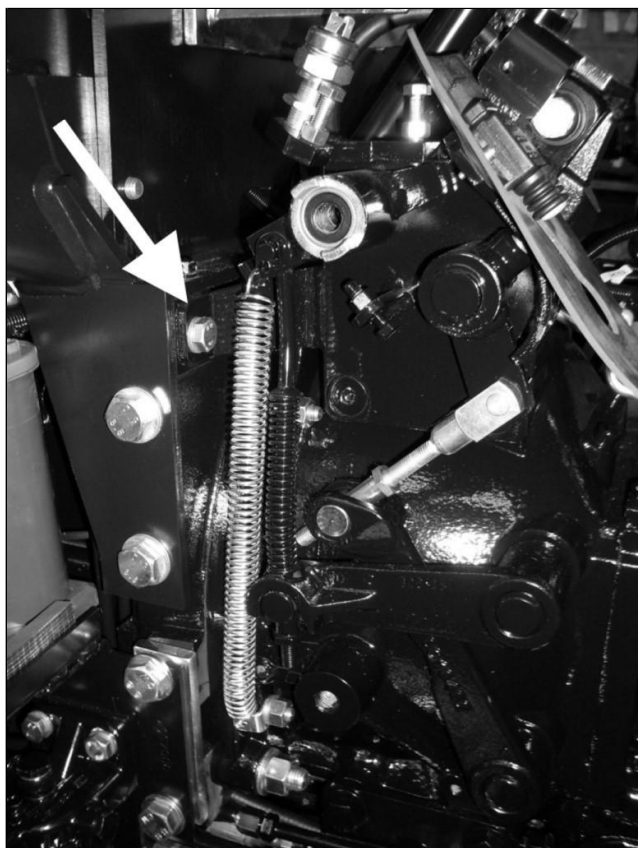
After removing the platform (see Charter 66), proceed as follows: loosen the two clamps securing the flex hose connecting the intake hose from the differential housing and the pipe intake filter assy. Close the intake hose from the differential housing with the cap code 07000XXX.



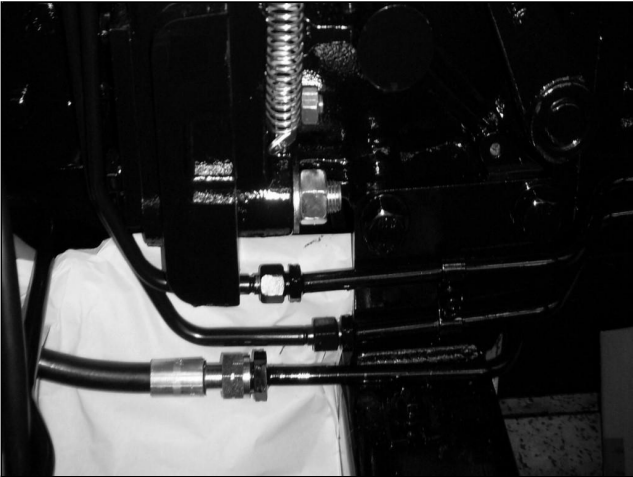
Disconnect the exhaust flex hose of the steering unit to the hose intake filter assy (A) and disconnect the delivery pipe from the filter to the steering unit (B).



Disconnect the two delivery pipes from the steering unit to the steering cylinder.
Before disconnecting the pipes, mark them to avoid changing the direction.



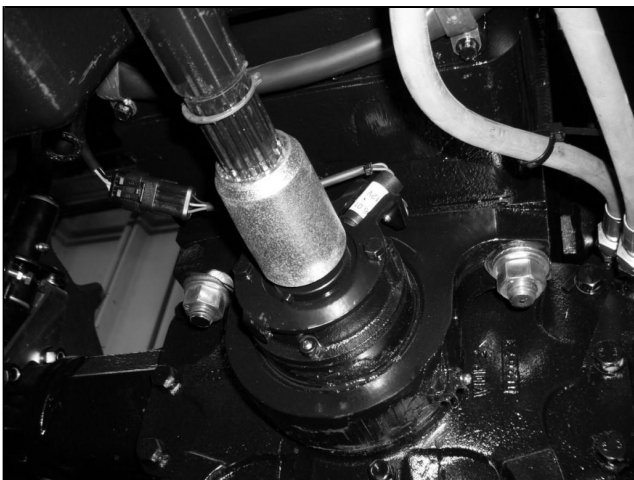
Unscrew the screw securing the clutch control support to the engine clutch bell spacer and release the clutch pedal return spring.



Disconnect the delivery pipes to the drive transmission, BD and that of the forced lubrication of the gear.



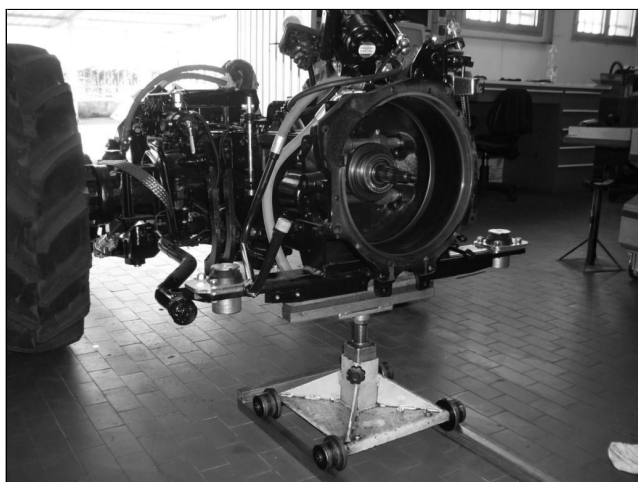
Loosen the clamp securing the silencer to the exhaust pipe of the engine, loosen the screw of the muffler support blade to the rear hub and remove the muffler.



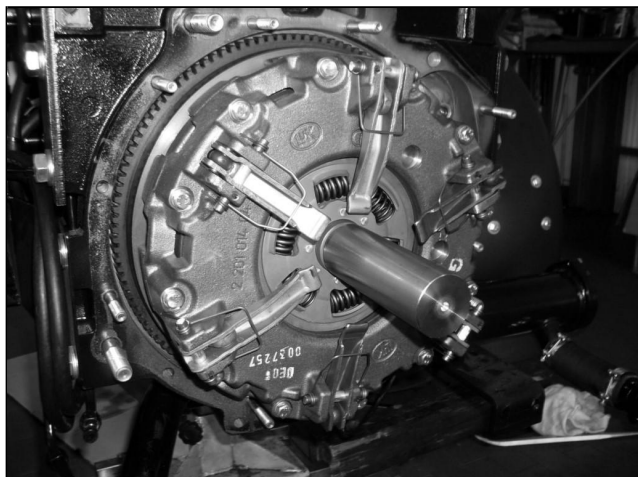
Remove the protection of the drive shaft, remove the snap ring retainer and slide the sleeve onto the drive shaft, both front and back side, unscrew the two screws securing the drive shaft bearing support and remove the drive shaft.



Ensure the two parts of the machine with the appropriate support for the separation of the tractor, code 07000245.



Loosen all the screws and bolts of the clutch bell to the spacer of the engine bell. At this point you can separate the tractor.



When replacing the clutch assy on the flywheel, use the special pin code 07000226 to centre the clutch disks and tighten the screws to 4 kgm. It is recommended to replace the screws M8 fixing the clutch.

After reassembling of the transmission and before mounting the platform, verify the functioning of the clutch pressing the pedal and running the tractor with the fourth fastest inserted. Verify the PTO clutch functioning, inserting the PTO and moving manually the rear shaft.

27.A - Tightening torque for assembly clutch

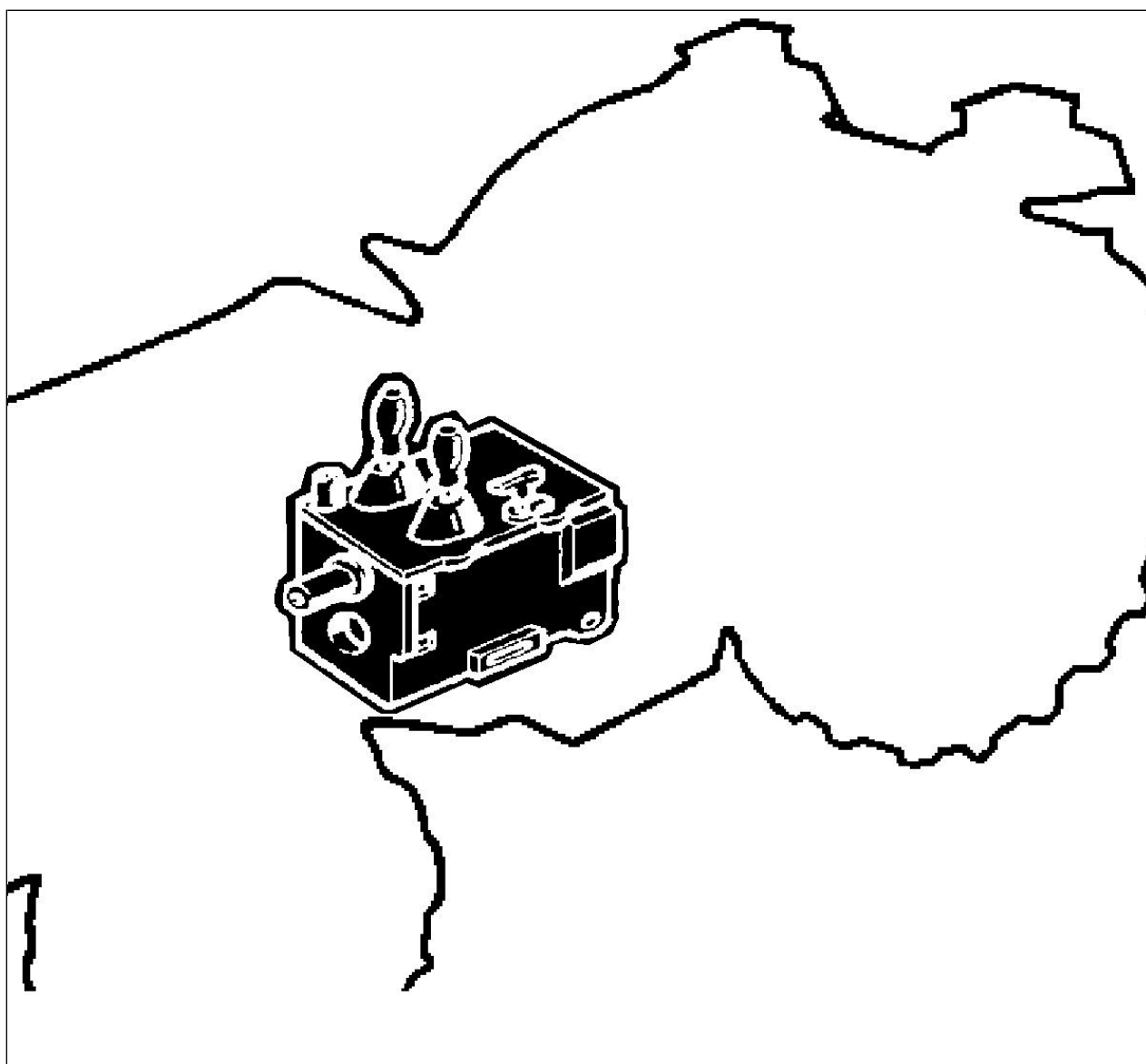
Tightening torque expressed in kgm

Description	Kgm
Bolt securing clutch to engine flywheel M 8X90	4
Fixing nut engine flange - clutch bell M 10x12.5	6
Screw fixing coupling - main shaft M 8x20	3.5
Screw fixing dashboard support M 12x35	8
M 16x140 engine - clutch bowl flange fixing screw	8

27.B - Needed tools for back reduction gear

CODE	DESCRIPTION	QUANTITY
07000226	CLUTCH CENTERING PIN 1616	1
07000245	TRACTOR SEPARATION SUPPORT	1

33 - GEARBOX



GEARBOX ADJUSTMENT

33.10 - Gearbox characteristics

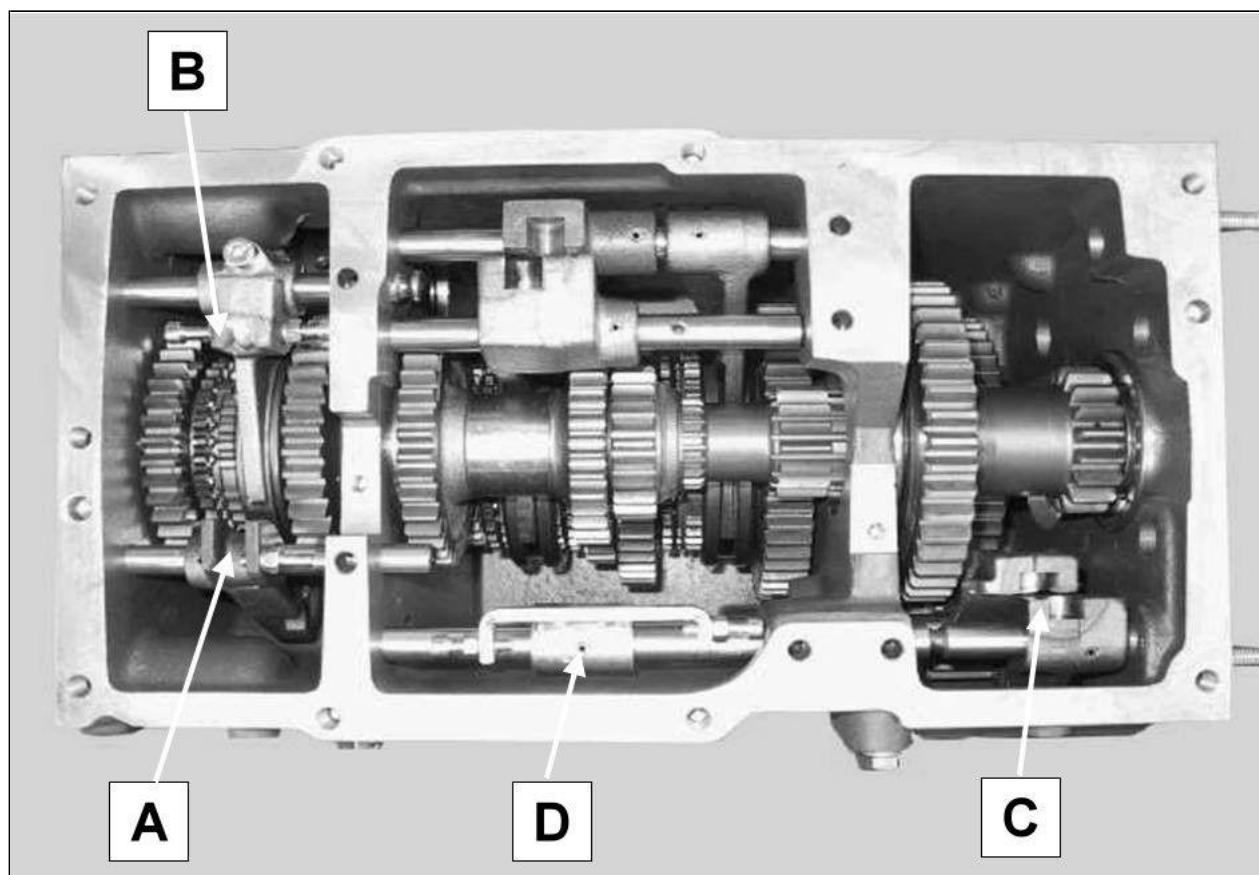


Fig.1

Referring to (Fig. 1), the selectors indicated by the letter **C** are placed as in the figure for the machines to lateral levers

For the adjustment of the screws limit consider what will be made even later
Adjustment of the screws should prevent the limit is exceeded the groove of selection.

All images, settings and installation instructions on the following pages refer to the version of 16 +8 / 8 +8 speeds which is the most complete and widespread.

For super creeper version, will, in future updates, insert some information specific to that version, though many parts are common and specific to the version described in the following pages.

In fig. 1 shows the overall construction of the gearbox.

In the following pages we will analyze the construction phases starting from the reverse group.

This version of the gearbox is a double cone synchronizer with the reverser.

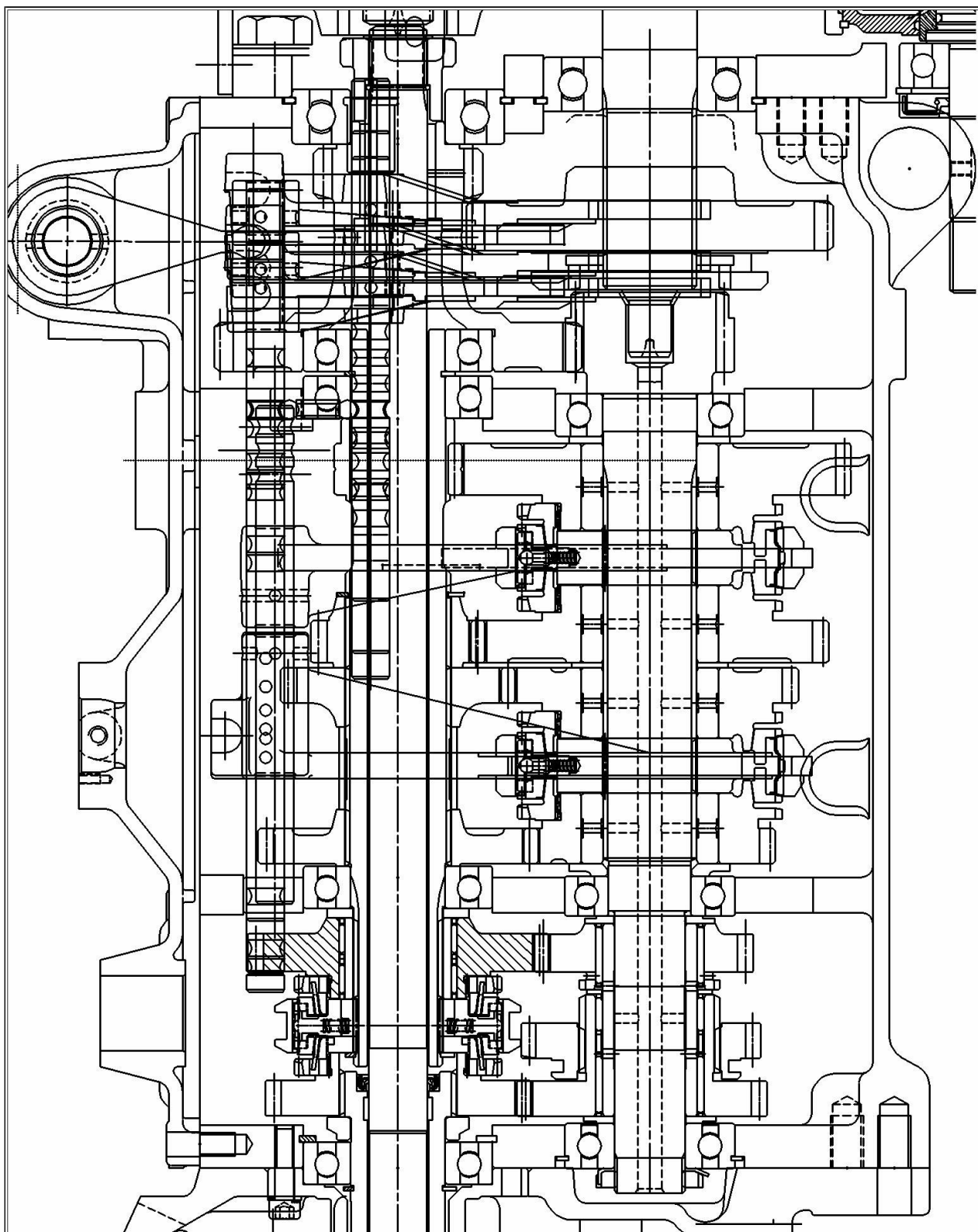


Fig.1a

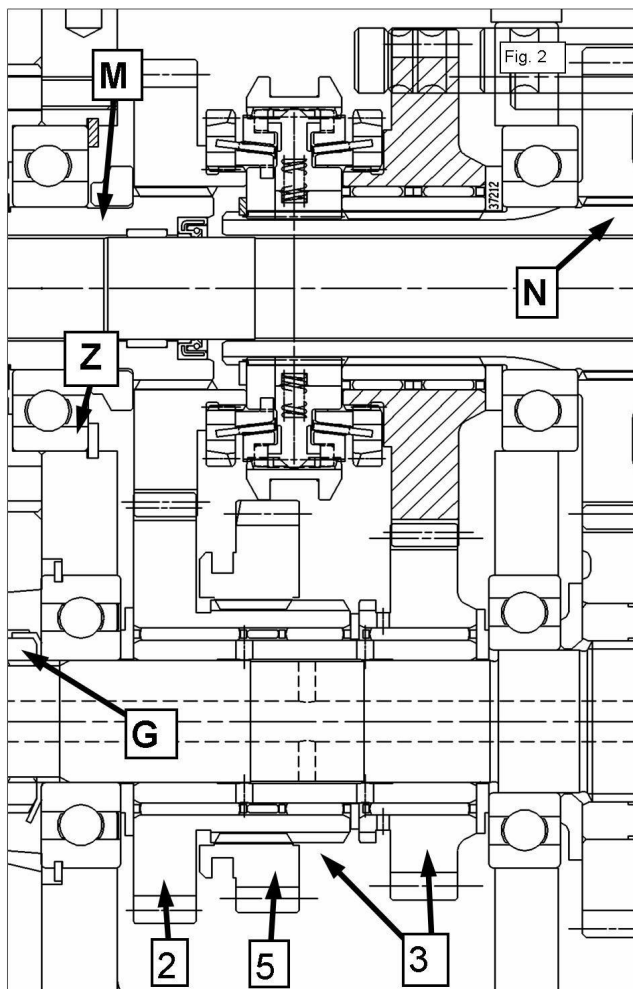


Fig.2

Before was shown the first portion of the gearbox, which is the section where it is housed, the shuttle speed and the selection reversing -20%.

The gear 5 of (Fig. 2) is controlled by the fork **A** of (Fig. 1) and when it is in position 5 is selected the reverser, while when it is in position 3 is selected -20%.

The fork of **B** (Fig. 1) controls the selection or -20% or the reverser according to the position of the fork **A**.

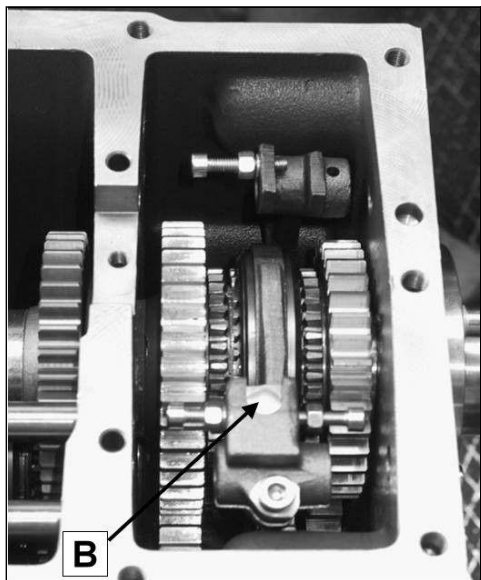


Fig.4

Once mounted forks A and B, block the screws visible in (fig. 4) so that it is not possible to exit from the selection made by the balls that are positioned in the grooves of respective rods.

For the fork B, after the synchronizer ring centered on the neutral tighten the screw that holds the fork on the rod to 3.5 kgm.

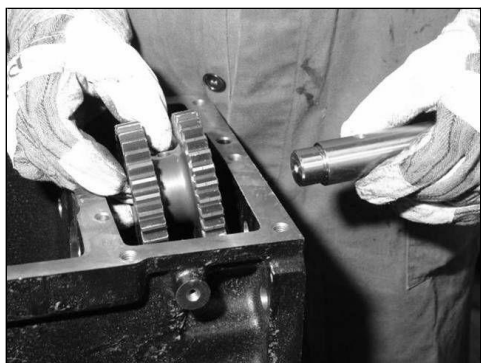


Fig.5

In Fig. 5 presents the early stages of assembly of the inverter.

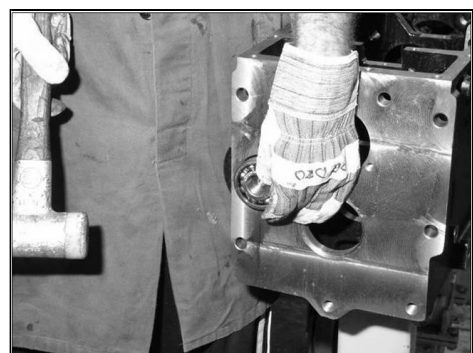


Fig.6

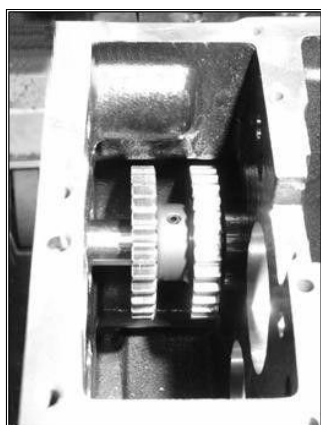


Fig.7

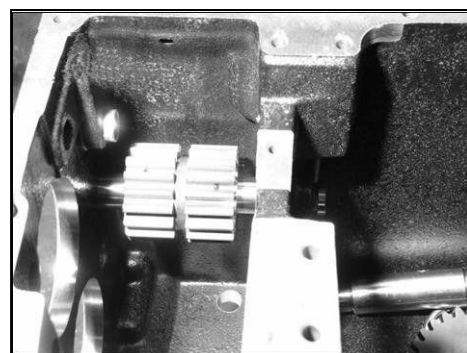


Fig.8

In fig. 6, using the aid of a plastic hammer, the bearings are positioned inside the housing.

In fig. 7, the gear is blocked on the shaft.

In fig. 8 is presented the next stage, the assembly of the reversing, in the rear of the housing

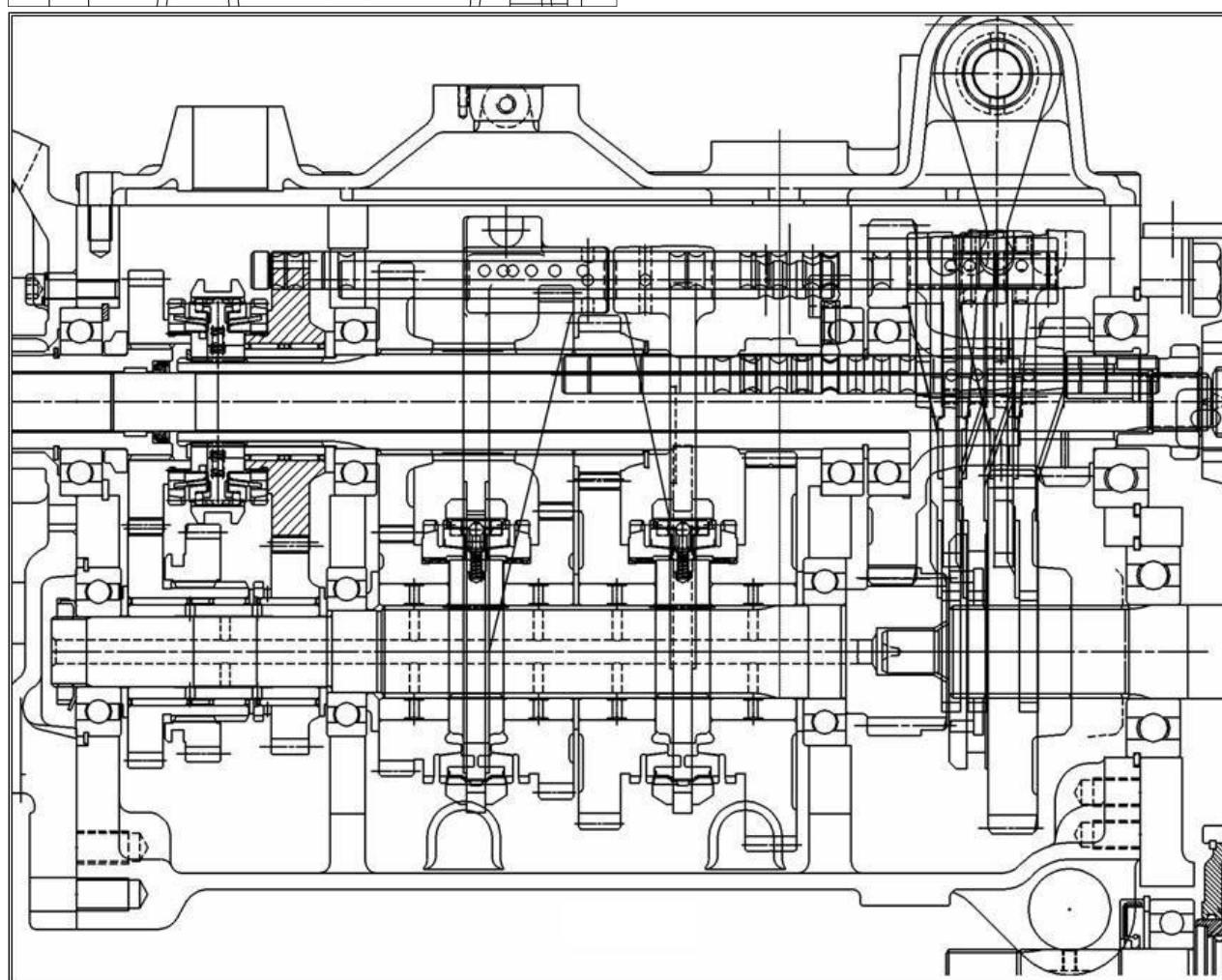
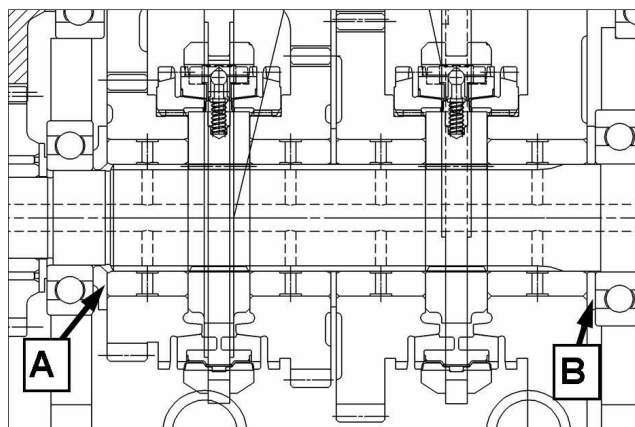


Fig.9a

In fig. 9a is shown the overall lower mounting shaft on which are placed the packages synchronizers. It also presented the overall complete gearbox to highlight the location of the lower shaft gear inside the housing.



Fig.9



Fig.16

The fig. 9 shows the pair of synchronizers that actuate the gear change. These synchronizers have a larger diameter and made more modern than the previous versions.

To bench are preassembled groups synchronizers complete of the relevant spacers, following the overall assembly of Fig. 9a



Fig.10

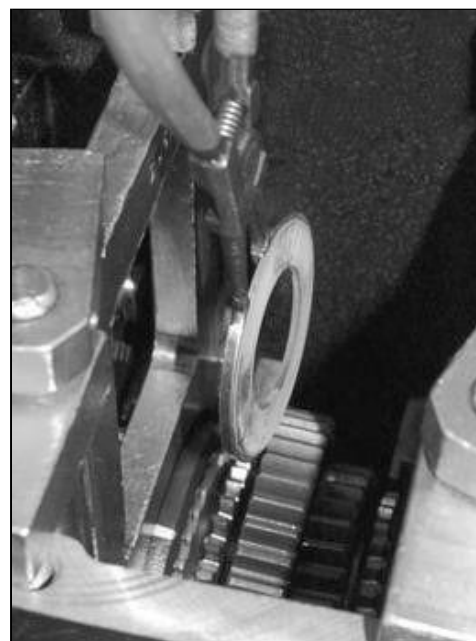


Fig.11

In fig. 10, using a special equipment, are positioned the complete synchronizers inside the housing. In fig. 11 is positioned, with a pair of pliers the spacer **A** in fig. 9a



Fig.12

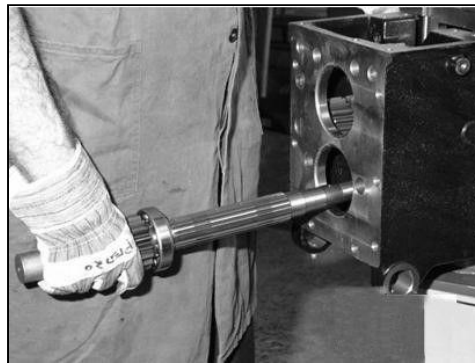


Fig.13

In fig. 12 before inserting the lower shaft inside the synchronizers, the spacer is mounted to the shaft B and introduced all within the gearbox Fig. 13



Fig.14



Fig.15

In fig. 14 and in Fig. 15 are highlighted the insertion of the shaft inside of the packs of gears and synchronizers; final positioning is made with the aid of a buffer to place the bearings in the right position.



Fig.17

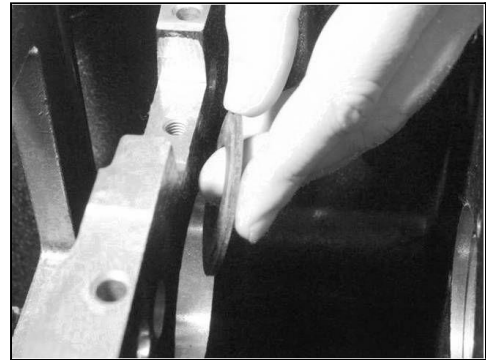


Fig.18

Before introducing all the shaft fit the last gears that are mounted in the front of the housing. In fig. 17 is prepared in the bench the gear assembly that makes up the lower part of the group reverser - reducer 20%

In practice these gears are indicated with the numbers 2-5-3 in Fig. 2. While introduces the package prepared, are positioned also the fork and the spacers, visible in the total of fig. 2, as shown in Fig. 17 and 18.

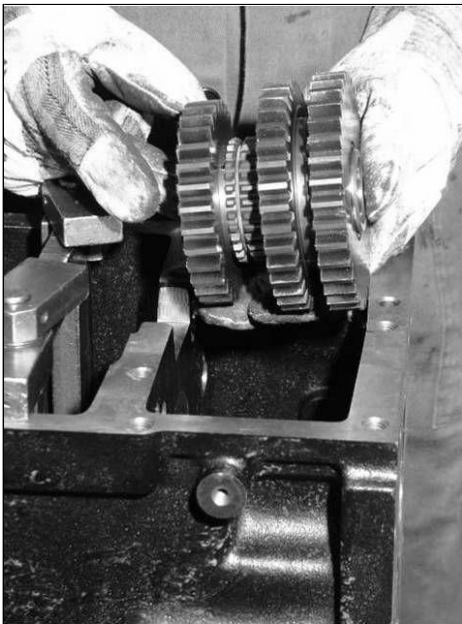


Fig.19



Fig.20

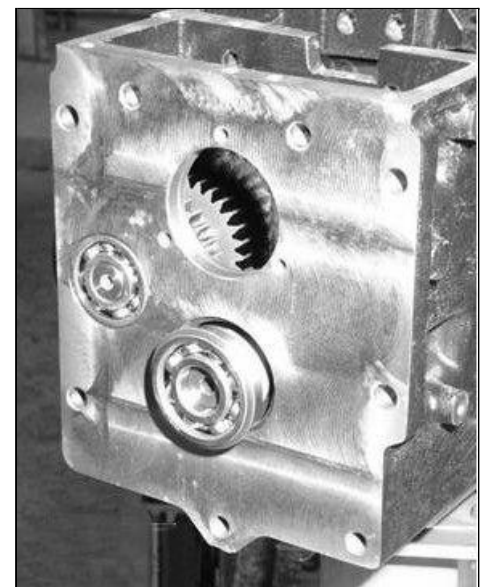


Fig.21

In fig. 19 placing the pack, in Fig. 20 is positioned the spacer and Fig. 21 assembling the bearing of closure, with the aid of a buffer and a plastic hammer.

After fixed the bearing, insert the stop sheet and the ring nut that makes the set of synchronizers.



Fig.23

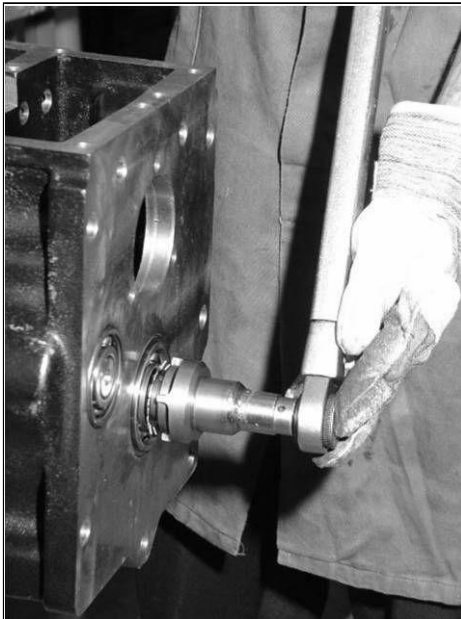


Fig.24



Fig.25

In fig. 19 placing the pack, in Fig. 20 is positioned the spacer and Fig. 21 assembling the bearing of closure, with the aid of a buffer and a plastic hammer.

After fixed the bearing, insert the stop sheet and the ring nut that makes the set of synchronizers.

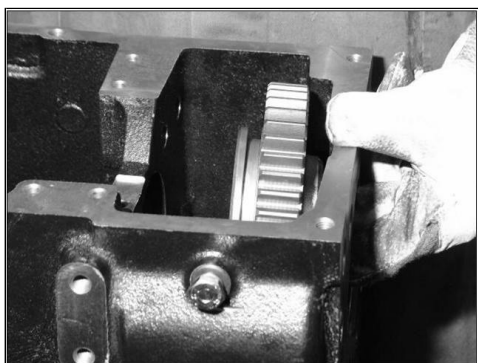


Fig.26

In fig. 9a is shown the overall lower mounting shaft on which are placed the packages synchronizers. It also presented the overall complete gearbox to highlight the location of the lower shaft gear inside the housing.

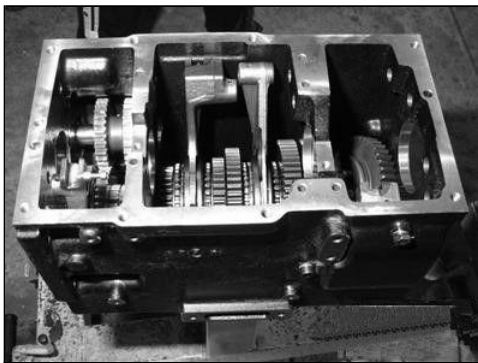


Fig.27

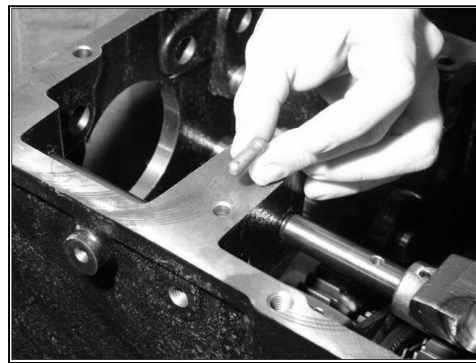


Fig.28

In fig. 27 you can see the gear selector forks in the housing, positioned on the synchronizers. Positioned forks, the rods are mounted (see fig. 28) and are positioned selections (spring + ball) and the impediment visible in fig. 28 prevent being accidentally selected two gears.

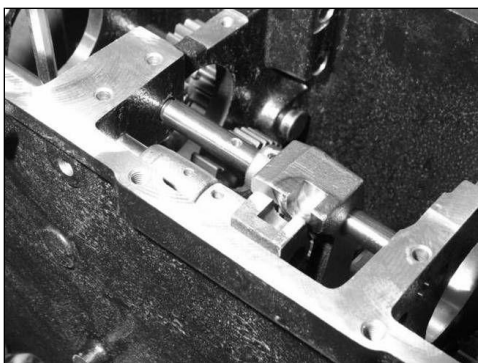


Fig.29



Fig.30

In fig. 29 are blocked with thorns SPIROL sleeves gear on each rod. In fig. 30 is shown a pin punch used for fitting the connector SPIROL.

In fig. 9a are visible the positioning of the gears forks on the synchronizer rings and placements of pinned sleeves on both rods.

At this point you can go to the upper main shaft assembly.

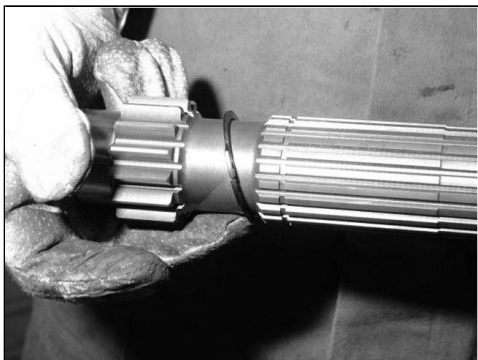


Fig.31

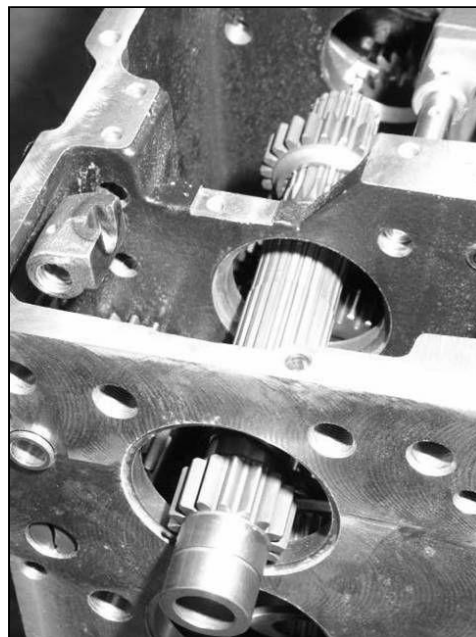


Fig.32

The first thing to do is mount the snap ring shown in fig. 31 which can be performed outside the housing. Then you can insert the shaft inside the gearbox as shown in Fig. 32. positioning of the sleeves pinned on the rods.

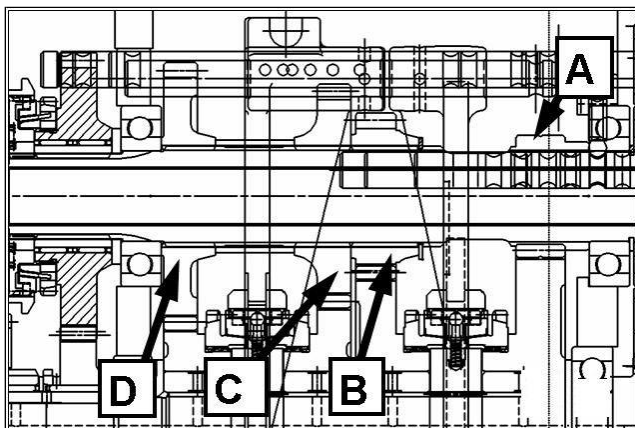


Fig.33

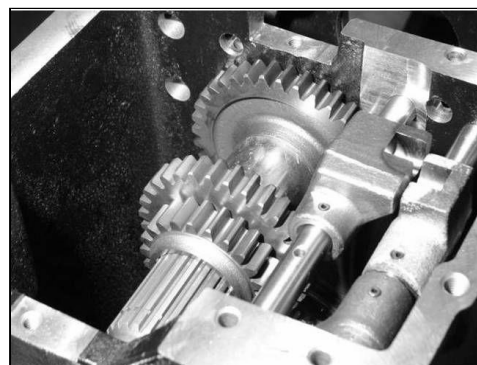


Fig.34

Inserting the shaft (detail A of Fig. 33) proceed to the assembly of the gears B-C and D of Fig. 33. The gear B is retained in position by snap rings visible in the overall assembly of Fig. 33. Sometimes you need to insert spacers between the gear and the circlip to properly position the B gear than the other combined lower.

In fig. 34 is visible the top part of the primary shaft mounted with the 4 gears that realize the 4 speeds. Check for all 4 bands toothed that there is a correspondence with the lower ones.

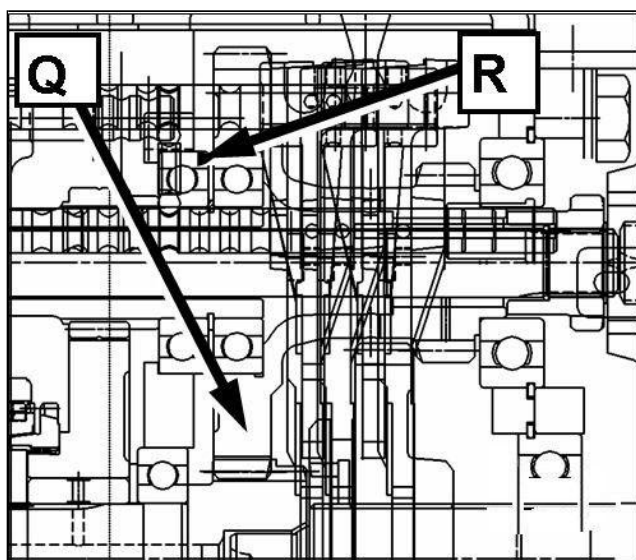


Fig.36

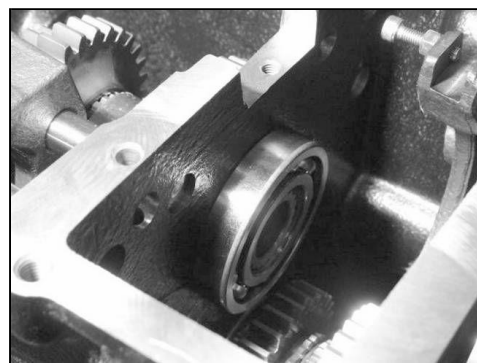


Fig.34a



Fig.35

In fig. 34a is mounted the first of the two bearings indicated with the letter **R** in Fig. 36. The second is positioned within gear reducer shown in fig. 35.

In fig. 36, indicated by the letter **Q**, shows the position of the gear reducer inside the gearbox.

Also for this gear is the speech made earlier: check for proper alignment with the lower gear.



Fig.37

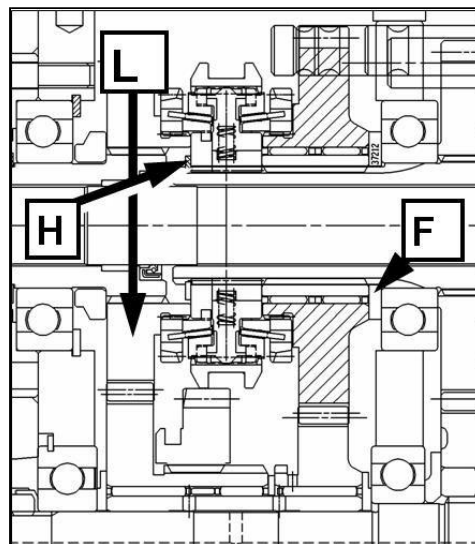


Fig.39

In fig. 37, is prepared the package comprising the synchronizer bicone which is positioned on the front of the primary shaft. In fig. 39 is visible the overall assembly of the entire group.



Fig.38

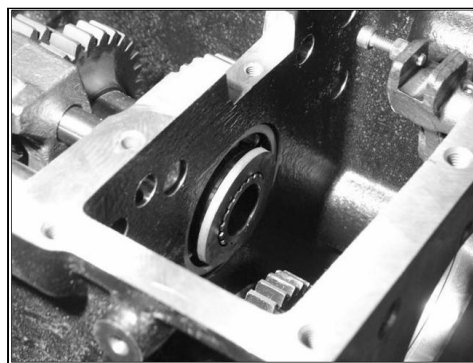


Fig.40



Fig.41

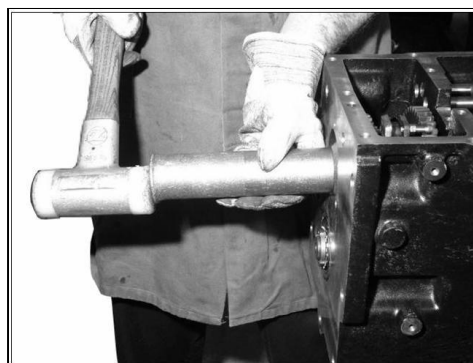


Fig.42

With the letter **F** indicates the spacer shown in fig. 38 and which is positioned inside the casing in Fig. 40. Always in Fig. 40 is visible the fork which acts on the lower selection reverser -20% already inserted inside the housing. In fig. 41 the entire group preassembled, is lowered and positioned inside the casting, going with a buffer, as shown in Fig. 42, to place in the right position the behind the spacer **F** of Fig. 39.



Fig.43

Do not forget to lock the whole pack with the snap ring identified by the letter **H** in Fig. 39, as shown in Fig. 43.

In fig. 43 is also visible a simple tool made up of two blades and a screw that holds the gear position indicated with the letter **L** in fig. 39 until it is inserted the initial portion of the main shaft.

Always in Fig. 43, is performed as well as said, the mounting of the snap ring using a pair of pliers with the tips bent at 90 degrees.

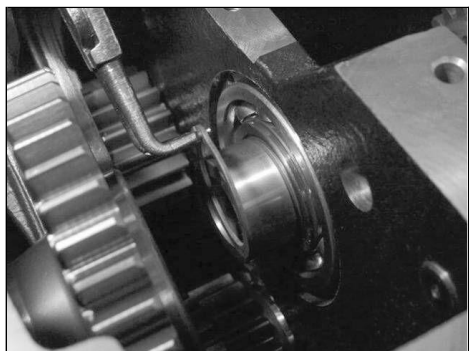


Fig.44

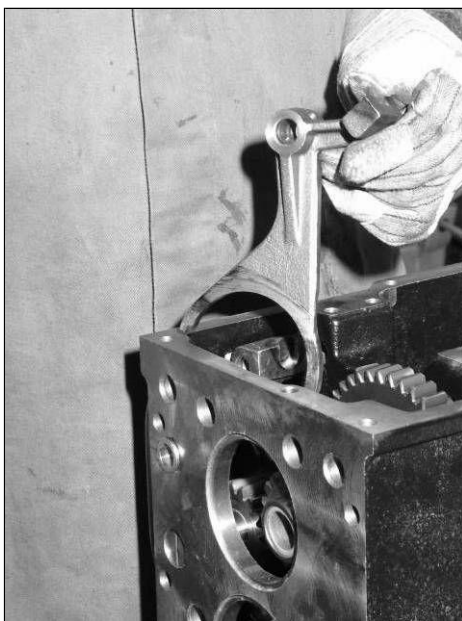


Fig.45a



Fig.45

Before concluding the front of the gearbox is better to end the rear.

In fig. 44 is mounted the snap ring between the two bearings paired (**R** of Fig. 36). Subsequently place inside the housing the selection reducer fork as shown in Fig. 45a and proceed to assembly the upper reducer gear.

In fig. 45 is a spacer interposed between the gear and bearing that may be necessary or not depending on the clearance that remains between the bearing and gear.

In fig. 45 is a spacer interposed between the gear and bearing that may be necessary or not depending on the clearance that remains between the bearing and gear.

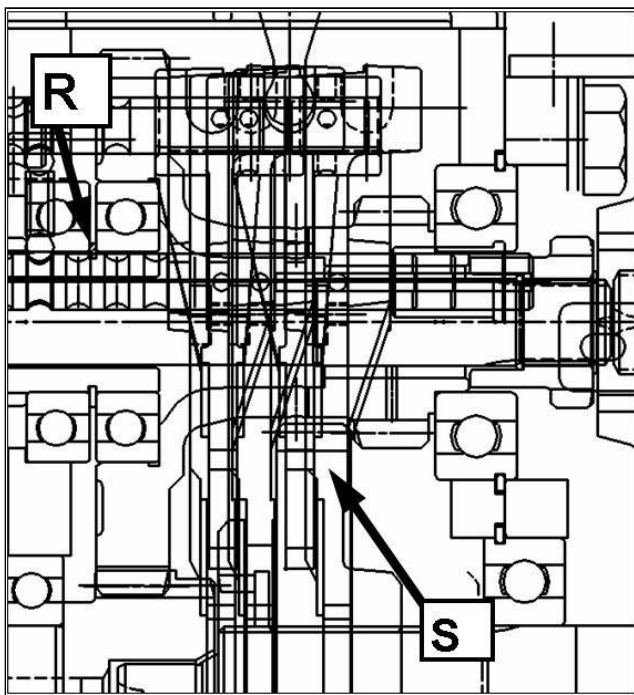


Fig.48

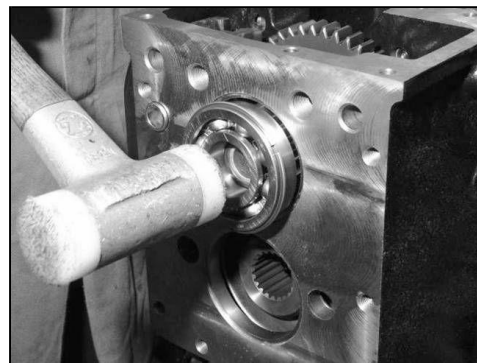


Fig.46

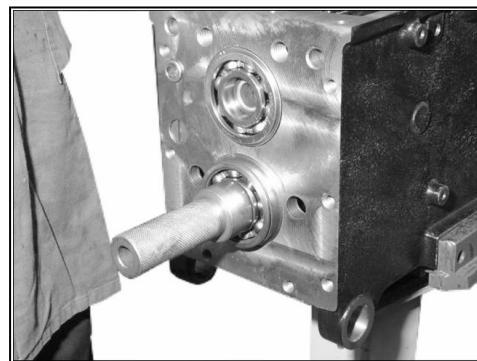


Fig.47

To verify if such spacer is required or not, mount the bearing as shown in fig. 46 and see if there is space between the bearing and gear. With a feeler gauge, measure the space, fit the spacer and replace permanently the bearing. At this point, once positioned the gear **S** of fig. 48 inside the housing, you can go to position the lower bearing as shown in Fig. 47 using the aid of a buffer. Returning to the front of the gearbox, we proceed with the assembly of rods and shift forks on the reverser and the selection reverser-reducer 20%.

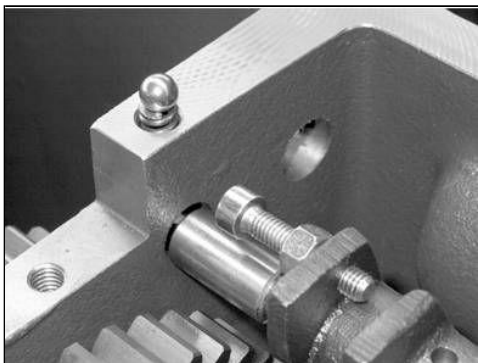


Fig.50

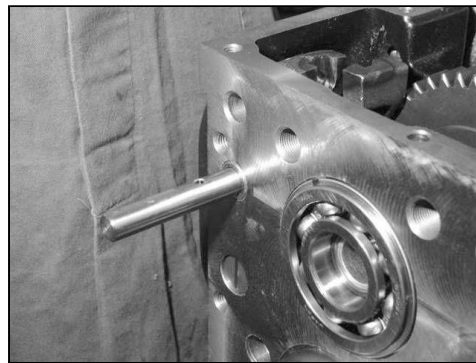


Fig.51a

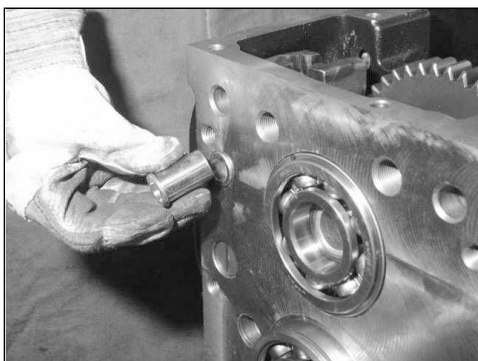


Fig.50a

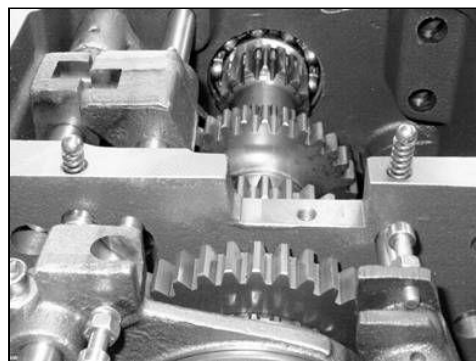


Fig.51

In fig. 50, after having inserted the rod inside the fork, and prior to straighten it, are positioned spring and ball.

In fig. 50a is inserted the bushing of the fork lower gear selection.

The fork has already been positioned inside the housing in the previous phases and in fig. 51a is inserted the lower rod, which is placed on the sleeve.

Top will be pinned on the shaft with the grooves of selection. The fig. 50 and 51 show the positioning of the springs and related spheres for the selection of 20% and reverser.

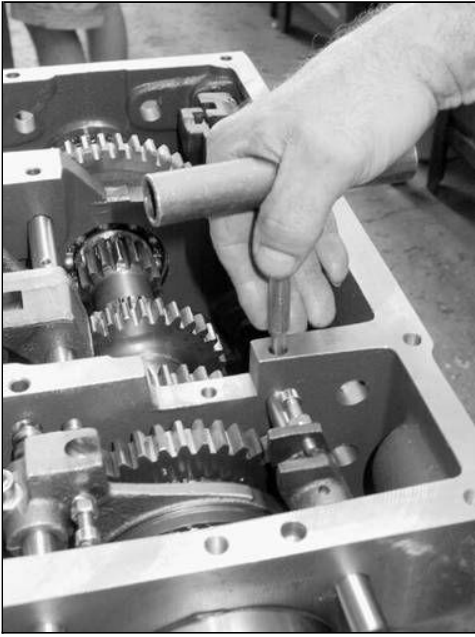


Fig.52

In fig. 52 with the aid of a rod is made the mounting of the spring packs + sphere, packing the spring and sliding the rod on the supports until fully insertion in the right place.

Then install any plugs, aligning the hole on the shaft and fork using the aid of a punch.

It will then try the selection, verifying the various positions assumed by the fork of selection and fix the set screws present on the blocked sleeves on the rods (by means of pins SPIROL) so that in the end position the ball can not exit the groove. Once that happens, you might have a premature wear and damage to the fork on the synchronizers.

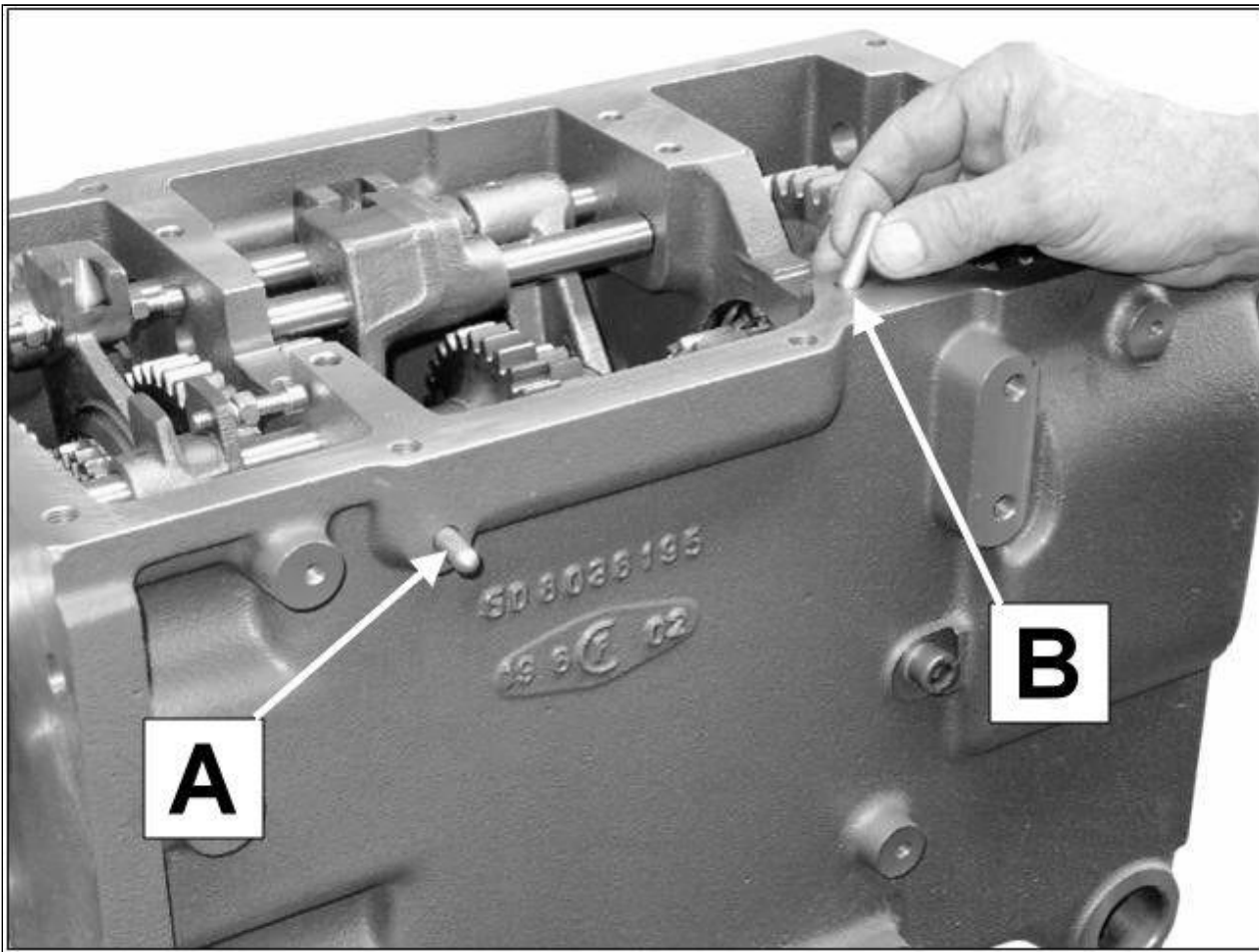


Fig.53a

Fig. 53a shown the other impediments that are to be mounted in the gearbox during assembly. The impediment **A** in fig. 53a is what inhibits the insertion of the reverser once selected reverse and enables the insertion of reverser if selected 20%. The impediment **B** of Fig. 53a is an impediment that works between the reverser and the reducer and prevents that you can put together two ranges.

These impediments are to be considered together with the one explained above, that works between the two rods of the gears and that prevents the simultaneous insertion of two ranges.

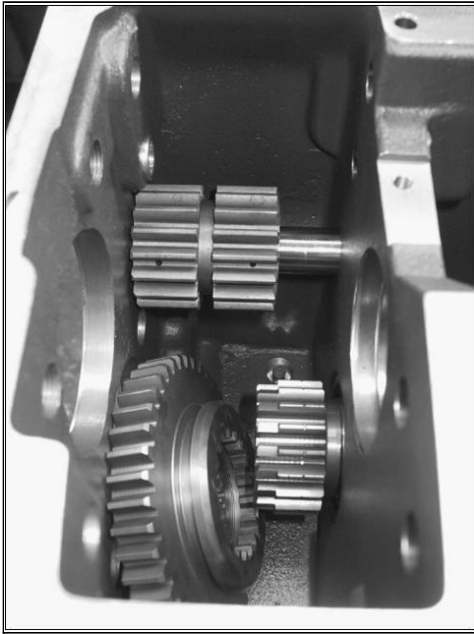


Fig.53

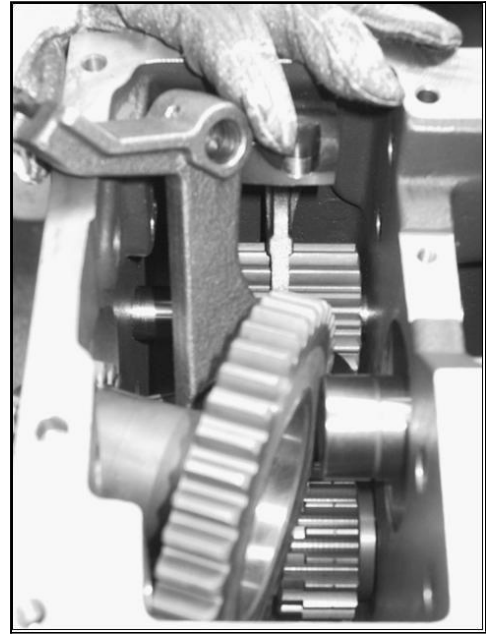


Fig.54

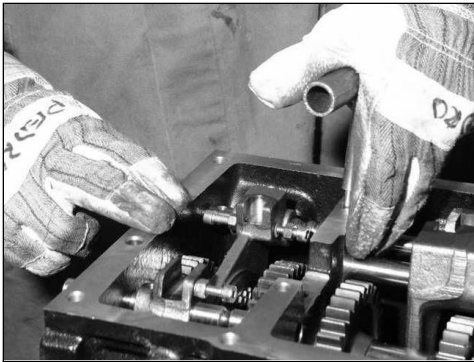


Fig.55

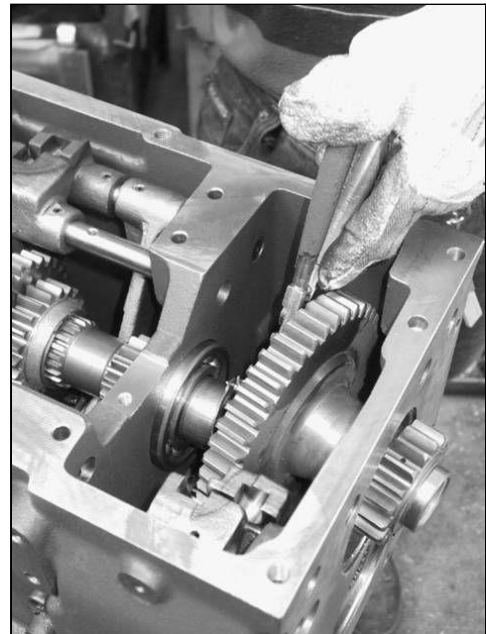


Fig.54a

Before proceeding further illustration of the phases, it is worth dwelling on a lower fork acting the reducer group.

In Fig. 54 is shown the positioning of the fork inside the housing.

We have already talked about the reverser assembly and the gear reducer selection in the case before mounting the rear lower bearing on the shaft bevel pinion. (see fig. 53).

In fig. 54 is shown the mounting of the fork gear unit. Once mounted the reverser gear and its fork, it is necessary to correctly orient the fork of the gearbox as shown in fig. 54 to allow for proper placement within the housing.

After the installation of the circlip between the two bearings of which has already been mentioned and which is briefly summarized in Fig. 54a, can proceed as presented in Fig. 55 to the assembling of the rods and associated sleeves which control the insertion of the reverser and the reducer, by mounting the springs and balls inside the housing. (fig. 55). To do this, need the help of a strut as shown in fig.

Then fix the sleeves on both rods and check the correct position in groove of the selection and placement of the gears inside the box.

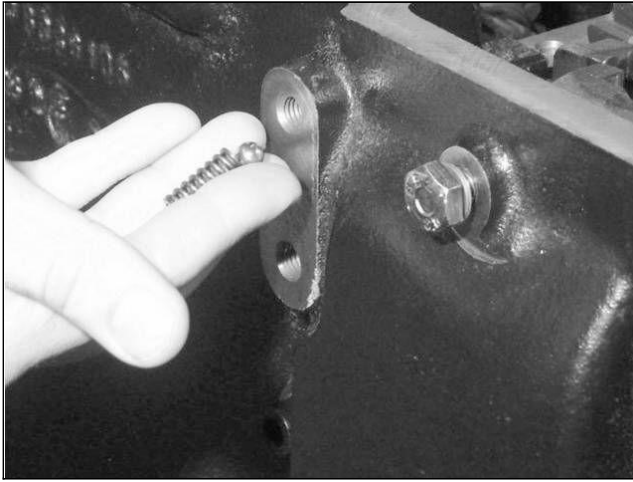


Fig.56

In fig. 56 are mounted springs and balls that realize the double selection of the reducer: this to have a selection safer and with a higher load on the rod. Then install the two screws that hold in place the two springs and two balls, tightening to 3 kgm.

Done this operation and make selections of reducer, you can assembly the inner PTO shaft, the whip which transmits motion from the 2nd disc clutch to transmission rear PTO.



Fig.57

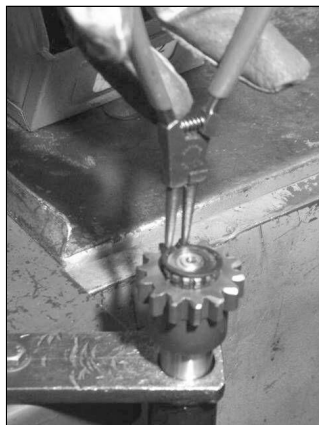


Fig.57a



Fig.58

In fig. 57 is illustrated the preparation of the whip and in fig. 58 its insertion into the gearbox and the upper shaft.

Once inserted the whip from the rear side of the housing, can proceed with the last phases mounting the gearbox, the insertion of the front part of the primary shaft and the cover which works on the clutch bearing.

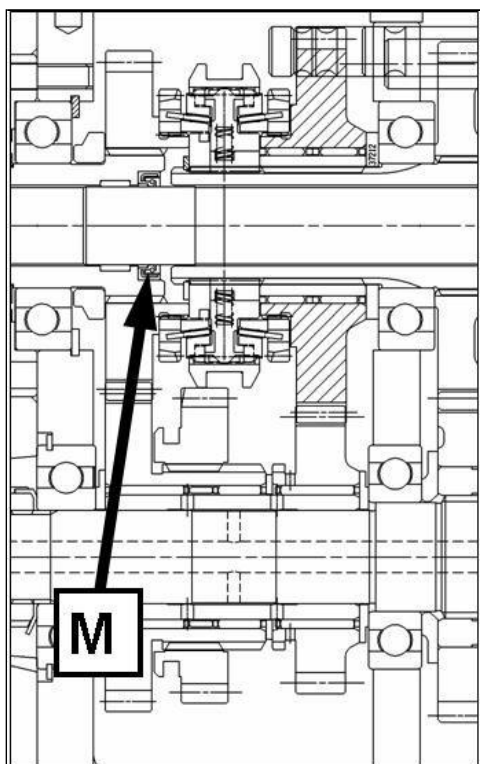


Fig.59

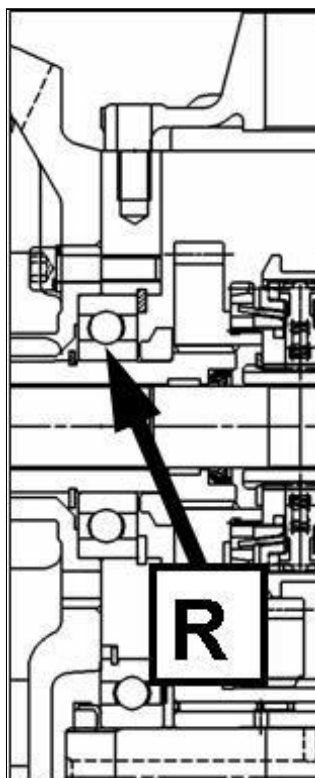


Fig.59a



Fig.60



Fig.61



In fig. 59 is shown the overall assembly of the initial part of the primary shaft that in fig. 60 and fig. 61 is pre assembled by placing the seal in place that will operate on the whip fitted in the previous steps. This seal is highlighted with the letter **M** in Fig. 59. Then you can mount the shaft rear bearing (bearing **R** in Fig. 59a).

Such a bearing is retained in position by two snap rings. The shimming be made on that bearing to give right clearance at the synchronizer, is as follows:

as a function of the individual constituents tollerannze the shimming is equal to 1.6 mm.

Normally need a thickness of 1 mm between the bearing and the snap ring on the shaft and a thickness of 0.6 mm in front of the bearing. The spacer of thickness greater always goes from the side of the snap ring while the other, from the other side of the bearing, must be such that the sum of their thicknesses always give 1.6 mm. Made these operations can proceed to the shaft assembly into the housing.

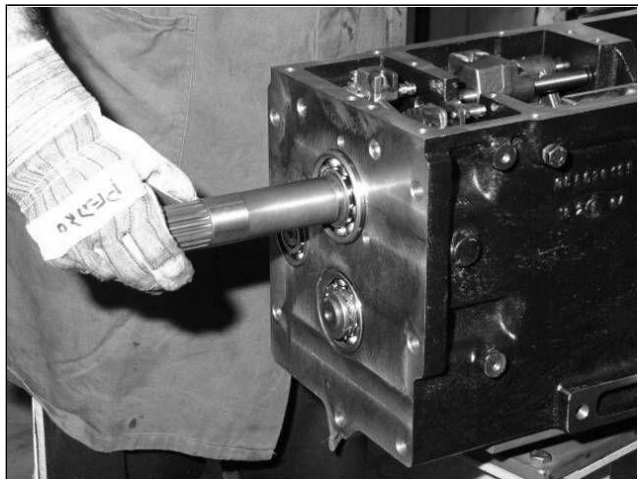


Fig.64

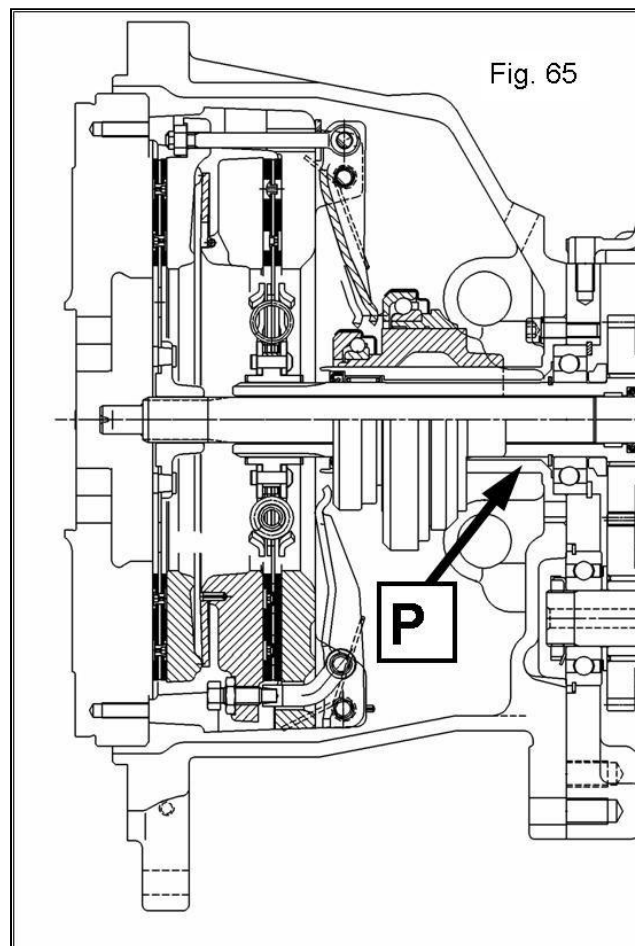


Fig.65

In fig. 64 is illustrated the last operation, which precedes the placement of the sleeve, part. **P** of Fig. 65, which supports the thrust bearing of the clutch.



Fig.66



Fig.67

In fig. 66 with the help of a buffer is added to the oil seal on the sleeve, before these are mounted on the gearbox.

In fig. 67 is siliconized with care the supporting surface of the sleeve on the housing to prevent oil leakage.

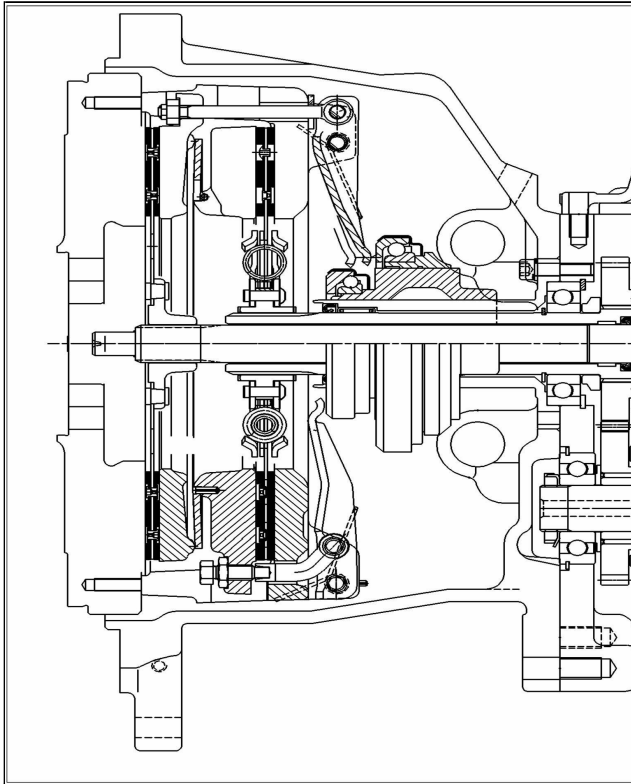


Fig.70

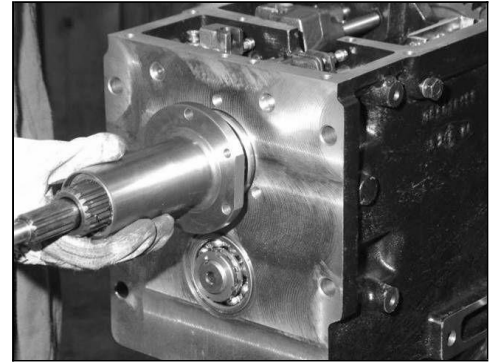


Fig.68

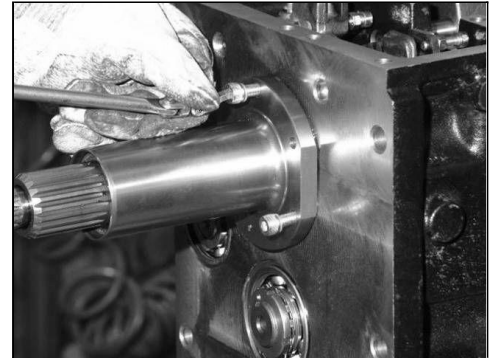


Fig.69

In fig. 68, the sleeve is positioned on the primary shaft and approached to the gearbox to allow the silicone create the seal.

In fig. 69 are tightened to 3 kgm the screws that secure the sleeve.

Insert the sleeve on the splined input shaft carefully so as not to cut or damage the seal mounted above inside the sleeve.

Made these operations, the assembly of the gearbox is almost completed, remains to be mounted only that the clutch bell as shown in Fig. 70 completes the assembly of the shaft and lower shaft of inversion of the reverser.

Between the clutch and the gear casing spacers will be introduced that will be specified on the next phases.

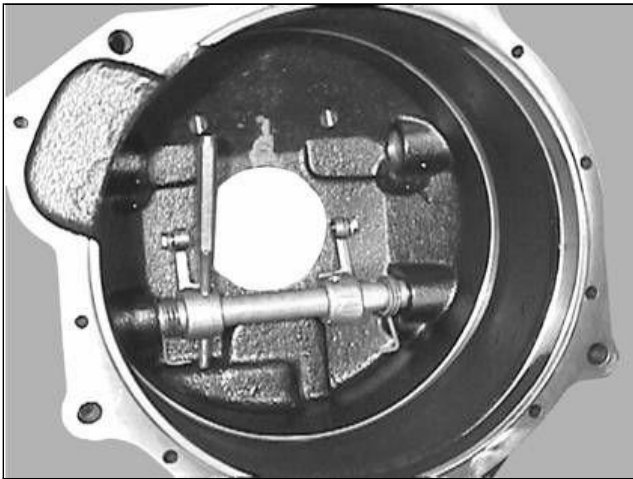


Fig.71

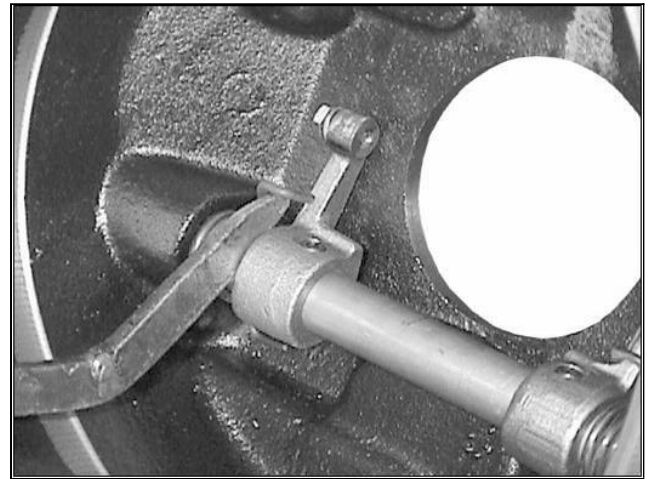


Fig.72

Before fixing on the clutch bell on the gearbox is necessary to perform the pre-assembly of the components of the clutch control.

As shown in Fig. 71 using the aid of a punch fix the lower shaft and the drive control lever.

With the help of a piece of shaped blade positioning the terminals of the torsion springs as shown in Fig. 72.

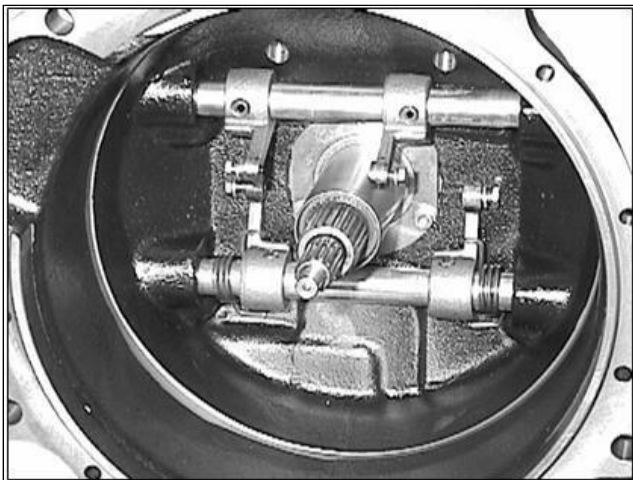


Fig.73

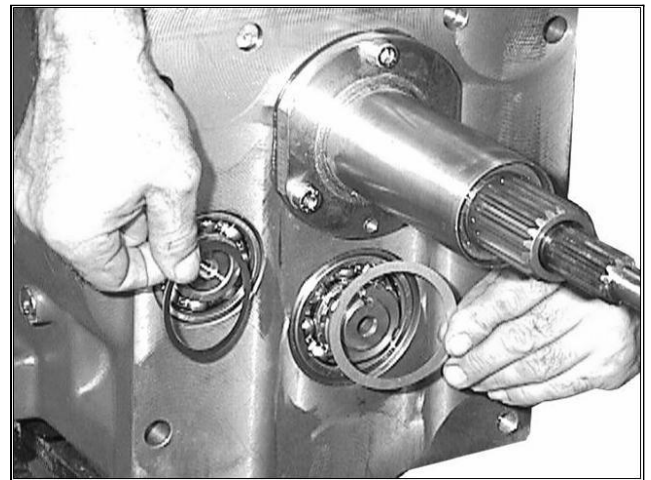


Fig.74

Subsequently fix the shaft and the upper control levers as illustrated in Fig. 73

The orientation of the levers is that illustrated in Fig. 73

After mounting the drive sleeve of the thrust bearings as shown in Fig. 73, perform the shimming of the lower shaft bearing as described in the previous pages (shims ranging from 0.2 to 0.4 mm), and make the assembly of the clutch to gearbox and tighten the terminal screws to 7.0 kgm.

Do not forget to shim also the shaft of the pulley on the reverser, as shown in Fig. 74.

The usual shimming is between 0.2 and 0.4 mm.

Once the clutch is flanged need to preassembly the gearbox cover with levers acting reducer and reverse gears.

This operation can be done on the bench.

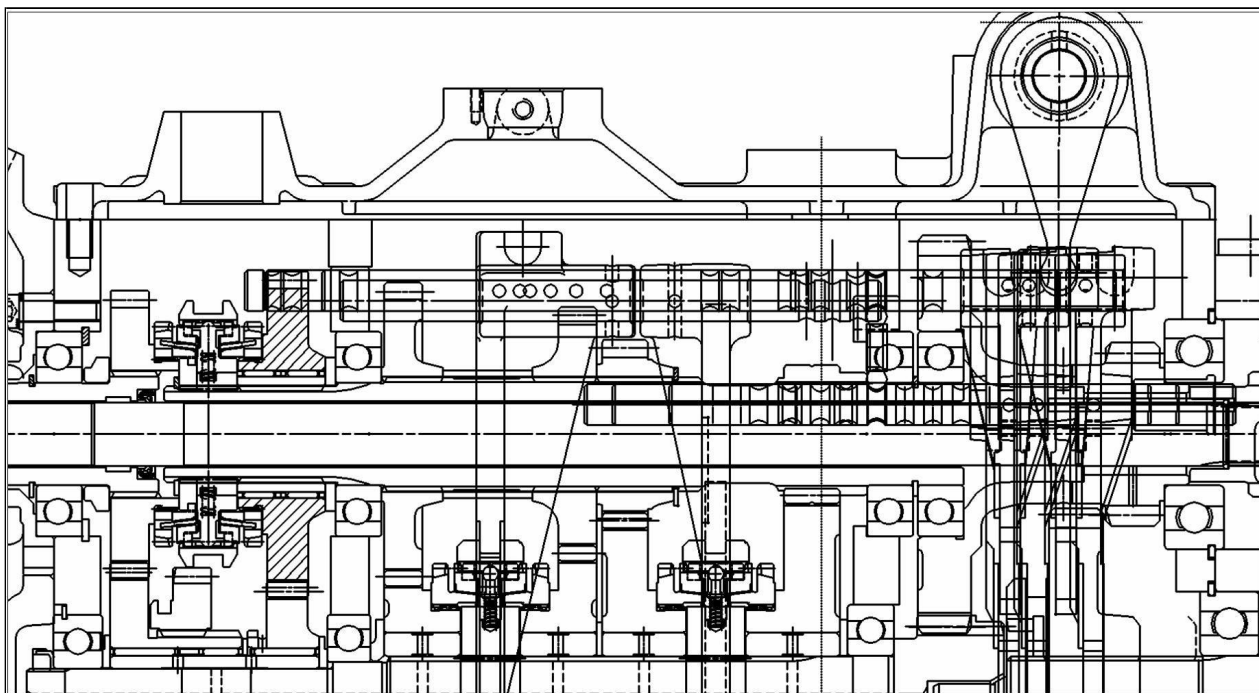


Fig.75

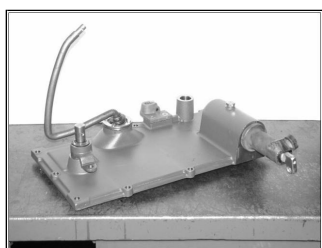


Fig.76



Fig.80

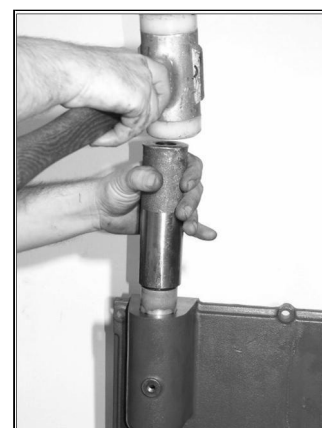


Fig.78

In fig. 76 is shown the complete cover of the gearbox and in fig. 75 shows the placement of the cover on the gearbox. In this overall assembly is also visible the position of the levers on the gearbox with the internal commands. In fig. 80 begins the assembly sequence of the gearbox cover by inserting the bushing, sprinkled with loctite blocker, which supports the control of the reducer. In fig. 78 with the help of a buffer, the bushing is inserted in the casting.

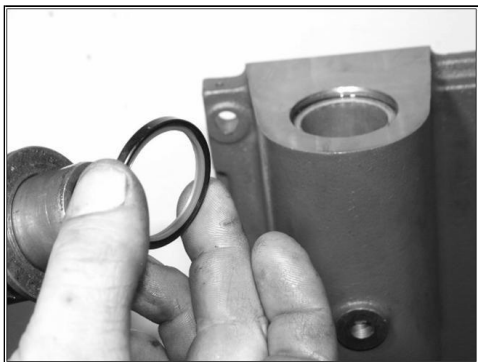


Fig.77



Fig.79

In fig. 77 inserted the bushing, is mounted a seal to prevent the oil leak from the cover.

In fig. 79 with the help of a buffer also the seal is positioned in front of the bushing, into the place of the cover.



Fig.81



Fig.82

In fig. 81 begins assembling the gear lever on the cover.

The lever is placed on the spherical seat and from the bottom of the cover begins the mounting of the conical spring shown in Fig. 82.

The conical spring rests on a collar of containment that is placed on the casting.



Fig.83



Fig.84

In fig. 83 displays the direction of mounting of the spacer which is placed above the conical spring, as shown in Fig. 84.



Fig.85



Fig.86

In fig. 85 shows the ring that will be placed in the groove and that will keep tension on the spring and close the package.

In fig. 86 shows the tool that allows you to load the spring and to create space for the insertion in the lever groove of the stop ring of the package.



Fig.87

Concluded mounting the gear lever goes to the assembly of the reducer lever. In fig. 87 is lubricated with grease the place of the OR and the seal that are placed inside of the lever.



Fig.88



Fig.89



Fig.90

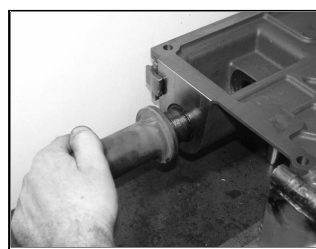


Fig.91

In fig. 88 and 89 are mounted these elements that are made to ensure the sealing of the oil also performing axial movements. In fig. 90 is greased the other end of the support lever which is then inserted in the casting as illustrated in Fig. 91



Fig.92

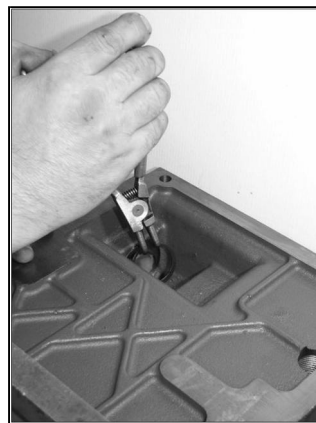


Fig.93

In fig. 92 is inserted a spacer which block into place the support lever and acts as a support for the snap ring that is mounted in fig. 93.

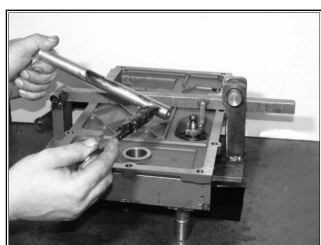


Fig.94



Fig.95



Fig.96



Fig.97

In fig. 94 is greased the inner lever, which in fig. 97 is inserted inside the support, taking care to insert the spring and also the internal lever as Fig. 95 and 96.

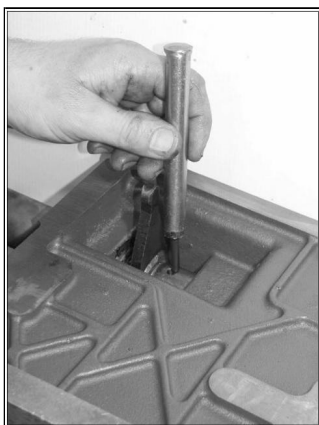


Fig.98



Fig.99

The internal lever in fig. 98 is pinned on the lever. To finish this assembly is missing only the external lever.

We pass now to the control linkage of the selection -20% reverser and the leverage that act on the reverser or 20%, connected to the lever located under the steering (fig. 99)



Fig.100



Fig.101



Fig.102

In fig. 100 is shown a simple tool to facilitate assembly of the seals on the pin selection reverser, without that the existing machining on the pin may damage the sealing elements while they are placed on their place.

In fig. 101 is removed the element that was used for mounting and in fig. 102 is visible O-ring mounted in place.

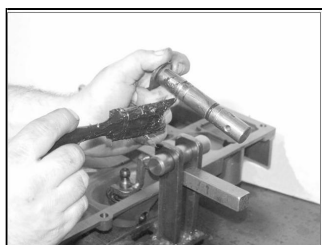


Fig.103

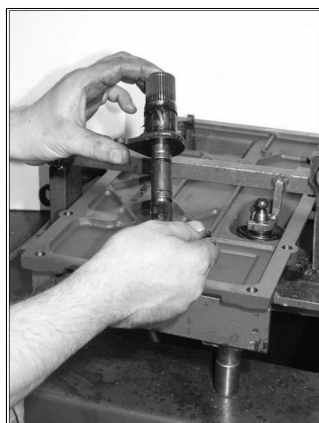


Fig.104

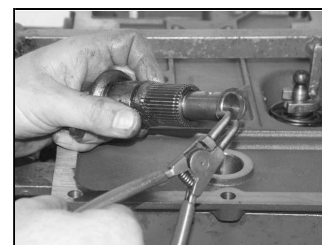


Fig.105

In fig. 103 is greased the pin to facilitate insertion of the external shaft visible in fig. 104.

In fig. 105 is mounted the snap ring which holds in position the two pins, after in the external pin has been mounted the OR which prevents any leakage of oil from the gearbox cover.



Fig.106



Fig.107

In fig. 106 the two pins are inserted in the casting, after thoroughly greased surfaces to avoid damage and pinching to seal.

In fig. 107 is visible the command from the inner side of the cover, where the two visible concentric levers actuate the selection of 20% - reverser and the actual command of the device.



Fig.108



Fig.109

In fig. 108 is completed the assembly of the gear lever with the insertion of the fulcrum of rotation of the spherical surface. This special screw with copper washer should be tightened to 3 kgm.

In fig. 109 is closed the hole on the shifter lever reducer unit, also in this case using a screw and a washer copper.

Once these operations are done need to complete some assemblies discussed in the previous pages, on the outside of the gearbox cover.



Fig.110



Fig.111

In fig. 110 is assembled the external lever that is controlled by the link connected to the lever on the steering.

Is placed on the spline, and insert the snap ring that holds it in place, using the aid of a pair of snap ring pliers (see Fig. 111)

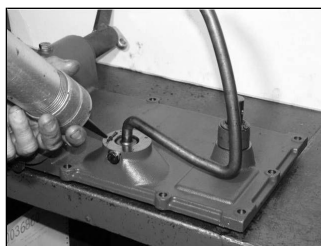


Fig.112



Fig.113

Fig. 112 shows the conclusion of the assembling of the lever insertion gears, where silicon is used on the surface of the gearbox cover, the plate is positioned to cap support shown in fig. 113.



Fig.114



Fig.115

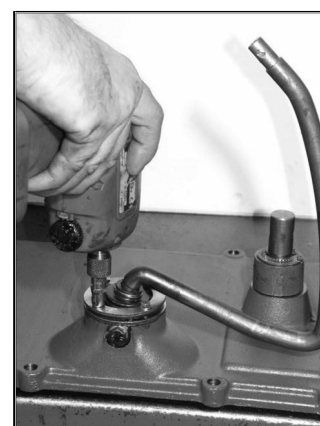


Fig.116

In fig. 114 is prepared cap, sprinkle with plenty of grease.

In fig. 115 is positioned on the plate and subsequently is inserted the other plate that locks the cap in position, by tightening the screws 4 presented in Fig. 116 to 3 kgm.

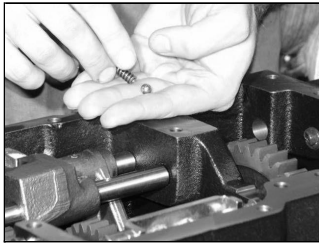


Fig.117



Fig.118

In fig. 117, before placing the cover on the gearbox, are inserted springs and balls of gear selection, is siliconized whole support surface of the gearbox cover as presented in Fig. 118. Finally, the screws are tightened to secure the cover to 5 kgm.

The platform is mounted on the tractor, you can proceed to complete the lever of the reduction gear unit.



Fig.120

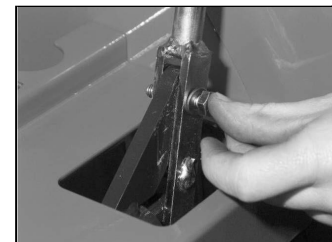


Fig.119



Fig.121

In fig. 119 the outer lever is assembled on the ends of the two levers leaving the gearbox cover. The fastening screws, equipped with self-locking are tightened to 3 kgm.

In fig. 120 the lever is completed with the rubber cap and the upper handle which is retained in position by a screw tightened to 3 kgm.

The upper cover with the indication of the ranges and the reversing complete the lever (see fig. 121).

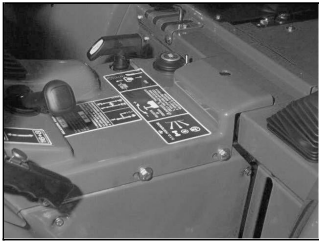


Fig.122

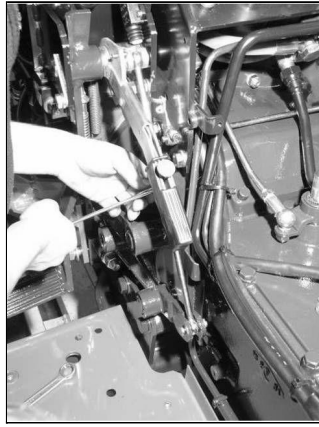


Fig.123

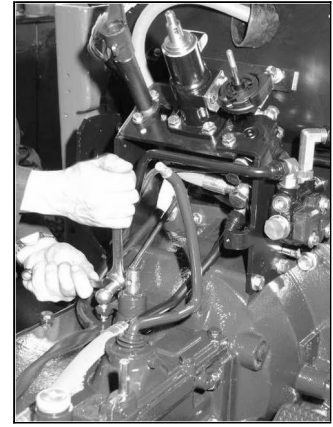


Fig.124

In fig. 122 is completed also the assembling of the lever on the central tunnel which controls the selection of the reverser or 20%.

The lever is pinned on the pin coming out of the gearbox cover and is then completed with the cap and the knob.

In fig. 123 is visible the joint that connects the lever on the steering wheel with the reverser lever - 20% on the cover change.

In fig. 124 is precisely fixed the joint to fix the position of start and end of the lever under the steering wheel.

The screw that connects the joint to cover lever should be tightened to 3 kgm.

On the steering column under the steering wheel there is a grease fitting.

Is well done every time takes off the hood grease the steering column of this lever through fitting.

Any hardening of this lever in the drive are due to lack of grease inside the tube.

33.A - Tightening torque for assembly gearbox

Tightening torque expressed in kgm

Description	Kgm
M 10 x30 gearbox cover fixing screw	5.4
M14 x 7 clutch bowl - gearbox fixing nut	8
M12 x 4.6 gearbox - rear axle fixing nut	7.4
M12 x1.5 gearbox - rear axle fixing screw	7
M 30x1.5 transmission shaft fixing ring nut	10
M 35x1.5 transmission shaft fixing ring nut	10
M 8x30 main shaft cover fixing screw	2.4
M 8x16 retainer plate fixing screw	2.4
M 16x140 engine - clutch bowl flange fixing screw	10
Screw locking the fork on the rod	3.5

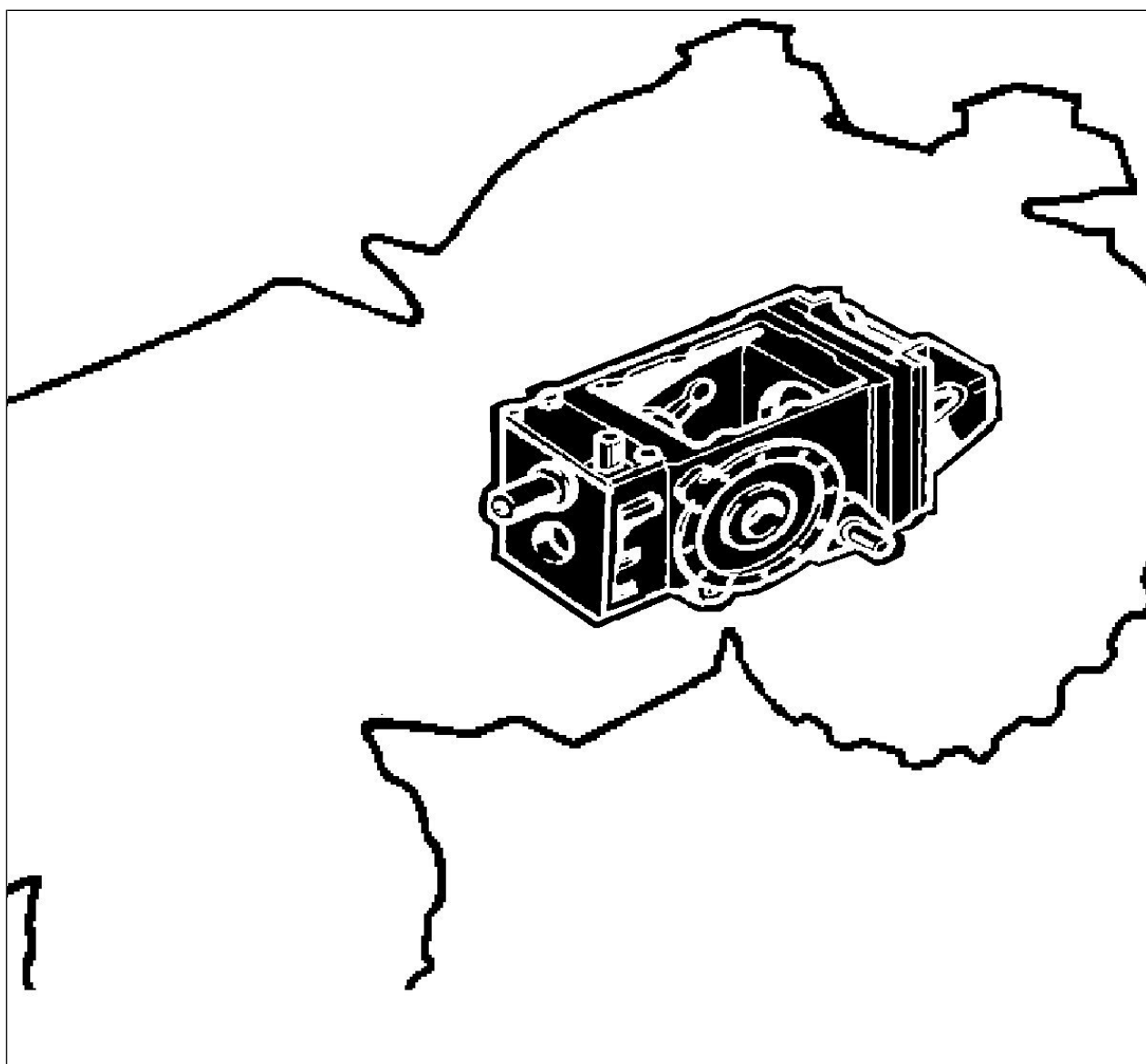
Original lubricants

We recommend Arbor oil by Petronas Lubricants: **ARBOR UNIVERSAL 15W-40**

Change the transmission oil with 32 litres of new oil.

It is advisable to use Arbor all-purpose grease by Petronas Lubricants: **ARBOR MP EXTRA**

36 - REAR DIFFERENTIAL



ADJUSTMENT REAR DIFFERENTIAL

36.10 Rear differential assembly

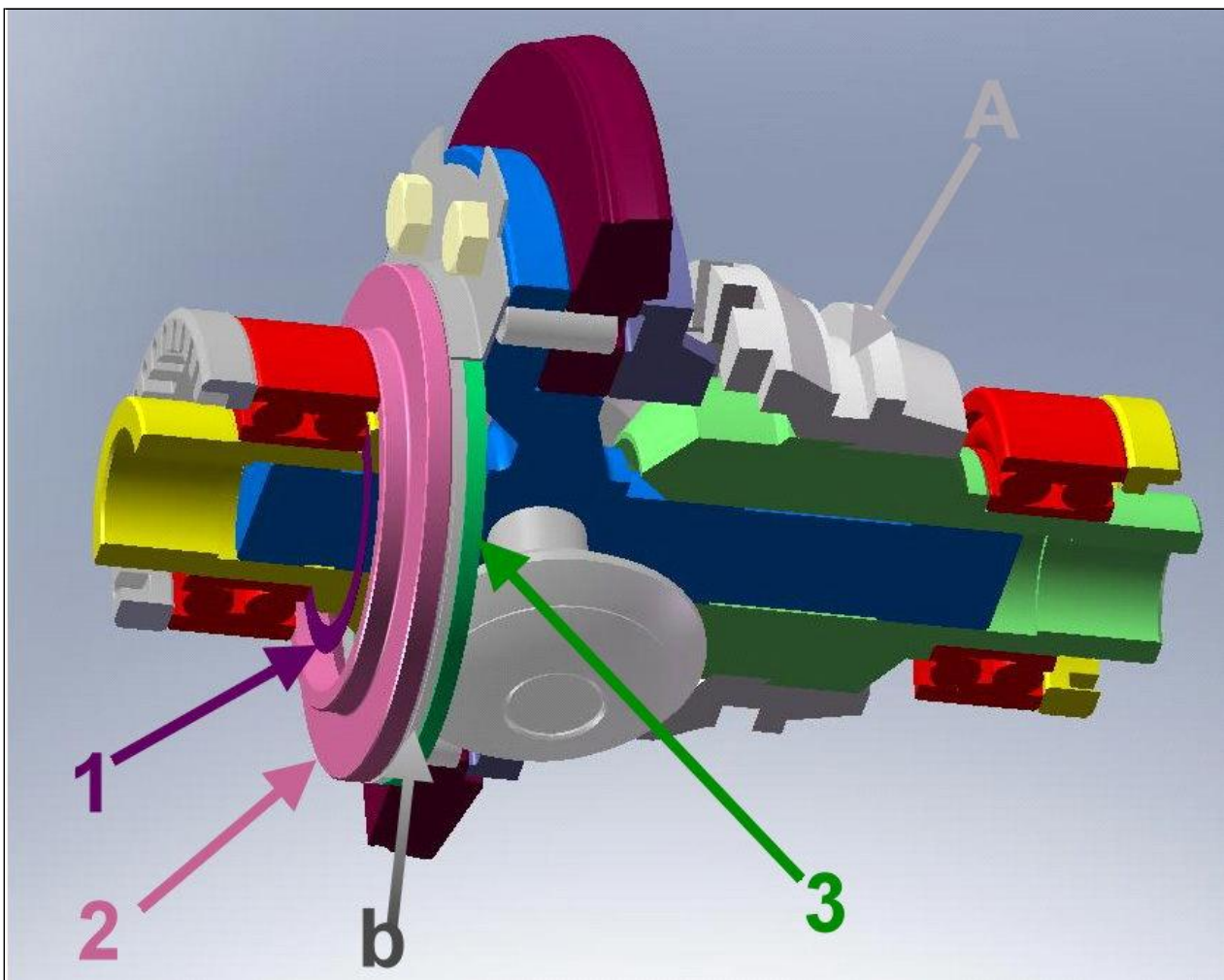


Fig.1



Fig.2

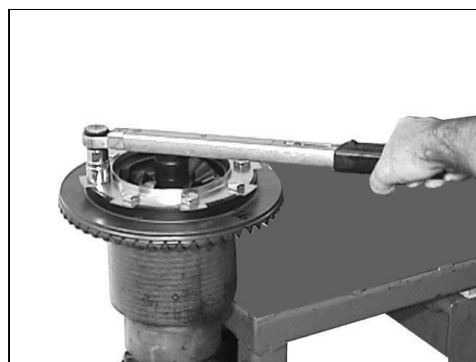


Fig.3

The first operation is the pre-assembly of the pin satellites and satellites on the central shaft. Then mount the central shaft on the crown cone as shown in Fig.2.

Insert the safety pins in their place so that the plates remain in the safety position, tighten the mounting screws of the crown to the central differential to 9 kgm reiterate the laminations around the screws to prevent loosening.



Fig.4

With the aid of the buffer cod. 07006222, preassemble the bearings on the planetary as shown in Fig.4.



Fig.5

To obtain the correct value of clearance between the planetary and satellites, which must be between 0.07 and 0.15 mm, it is necessary to insert a shim between the planetary sx and the bearing.

To check the correct adjustment of the clearance, should be checked once the group is mounted, inside the differential housing, as shown below.

In the case the clearance is not as expected, it is necessary to increase or decrease the thickness fitted earlier.

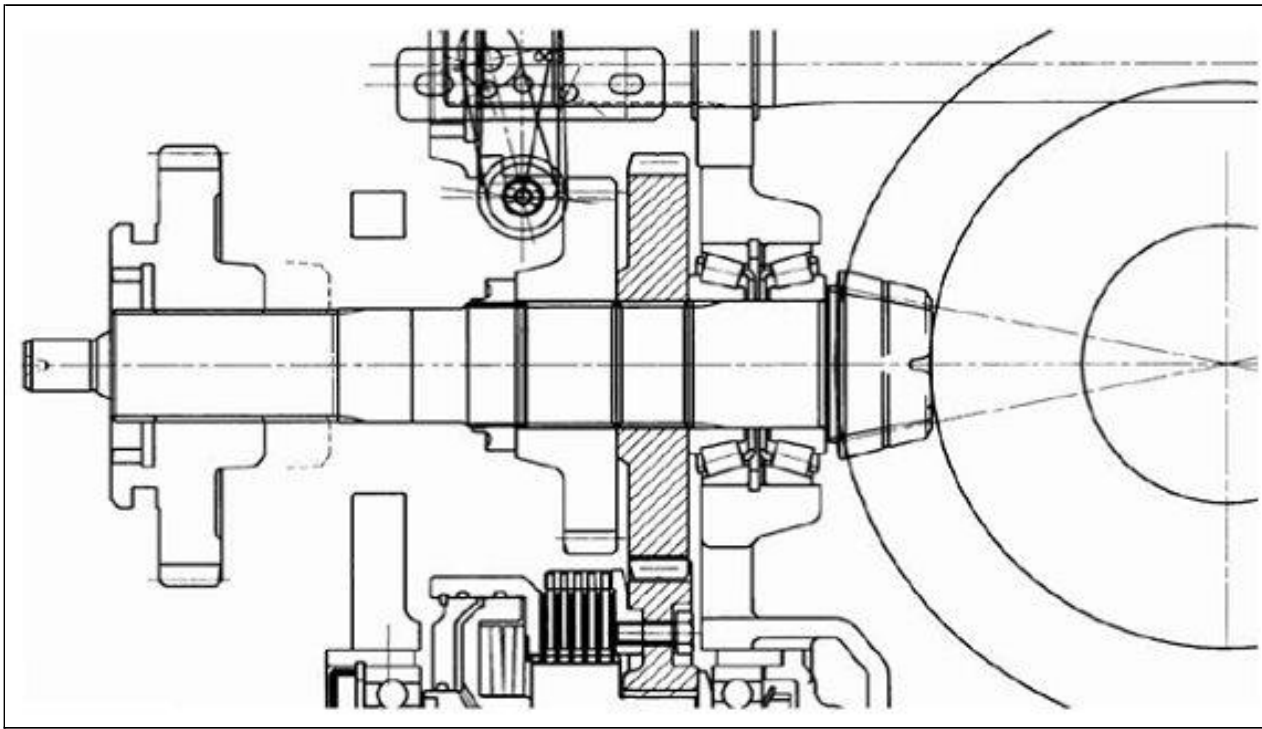


Fig.6

In Fig.6 is shown the overall assembly of the bevel pinion with the two conical bearings and the ring nut that provides the preload to the conical bearings.

When installing the rear differential unit add the adjustment of the clearance of planetary satellites and rear bevel gear.

The following explains how to perform these adjustment verifying that the correct clearance meshing remains in all conditions over the entire development circular gear set.

Therefore, without this being further emphasized, when speaking about the control of the clearance of a bevel means the extended control over the entire gear development set.



Fig.7

To determine the proper shim to be made behind the conical bearing (the one behind the head of the pinion) is necessary to measure the thickness of the conical bearing and add the necessary spacer to reach the required value of 22,75 mm.

This will allow to correctly position the bevel pinion than the crown conical and have the right clearance of meshing.

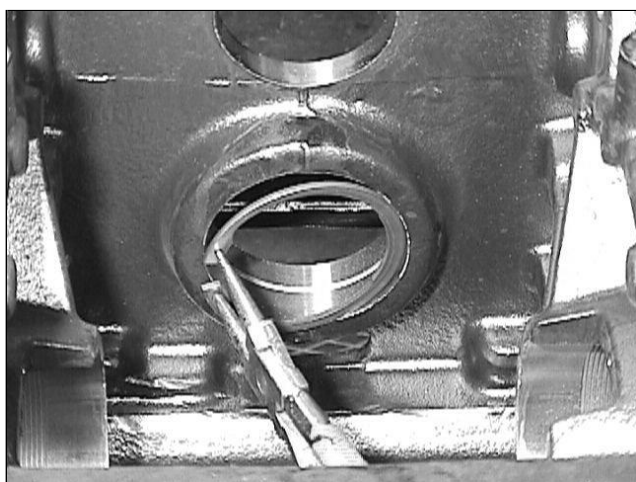


Fig.8

Attach the differential housing on the support cod. 07000247.
Install the snap ring of the bearing retainer conical bevel pinion.



Fig.9

Place the spacer previously defined with the procedure of Fig.7.

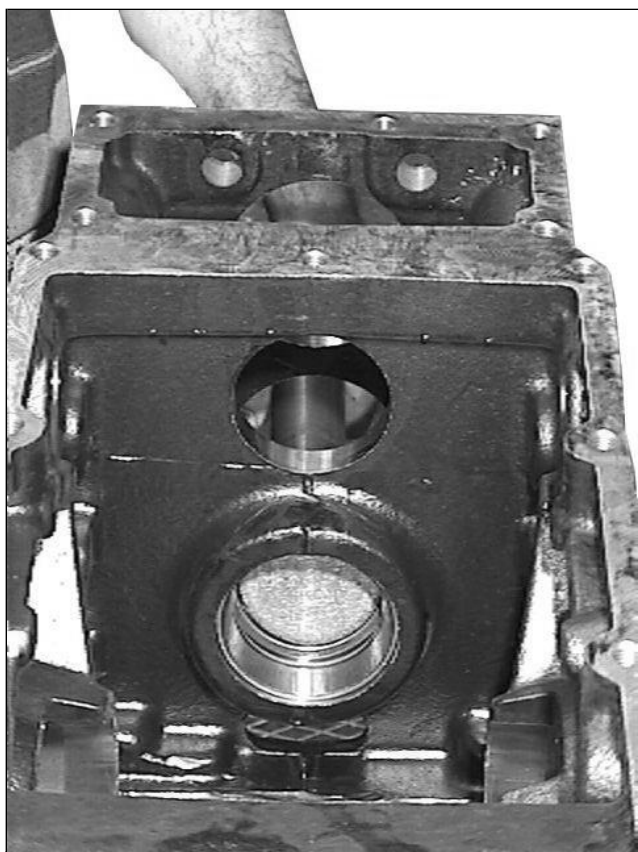


Fig.10

The Fig.10 shows the mounting of the conical bearing housing inside the differential housing using the buffer cod. 07006223.

Must be fitted both the side of the conical bearings, see Fig.6.



Fig.11

Using the code 07006224, make sure that the bearing to strike behind the head of the bevel pinion, this ensures that pre-determined shimming lie pinion in the correct position.

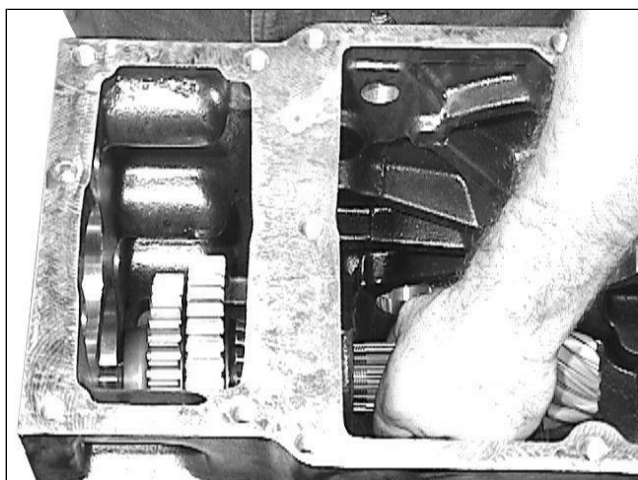


Fig.12

The Fig.12 shows the mounting of the pinion in the differential housing, place on the bevel pinion the other conical bearing and the other pto gears.

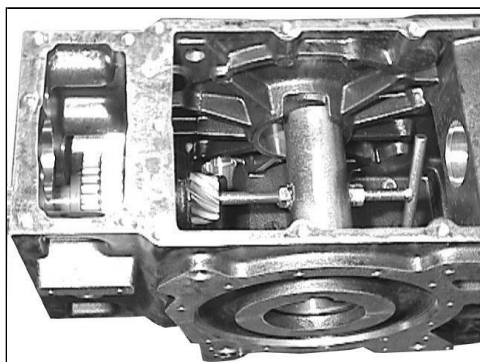


Fig.13

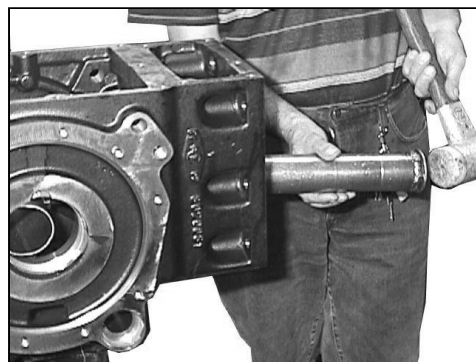


Fig.14

With the aid of the tool code. 07006225 as a block of the pinion (Fig. 13) and using the buffer cod. 07006224 (Fig. 14), make sure that the bearing to strike.

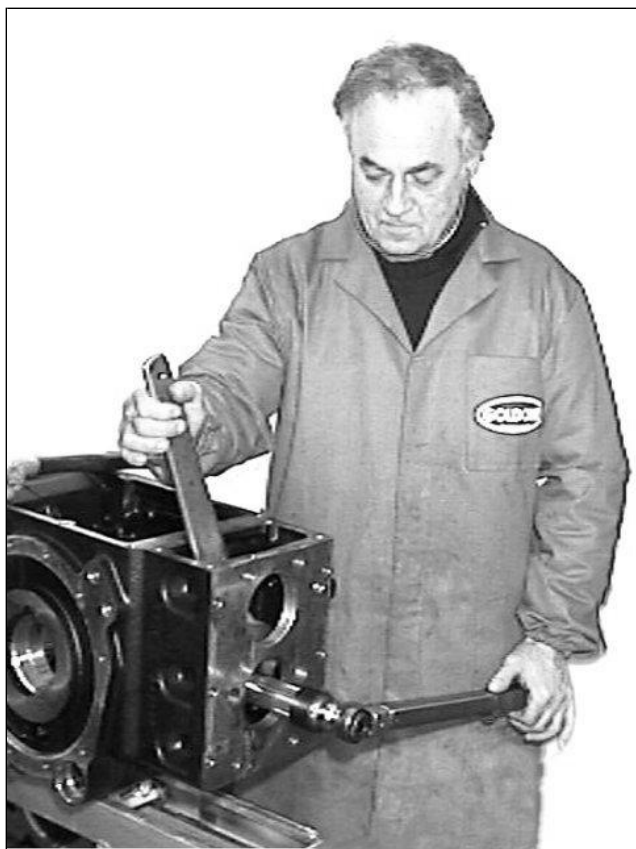


Fig.15

Screw the ring nut to 4 Kgm as shown in Fig.15, by the following procedure:
after having tightened the nut to pack everything, using an authorized key cod. 07000239 (Fig. 15),
loosen by about a quarter of a turn and retighten to 4 Kgm torque wrench.

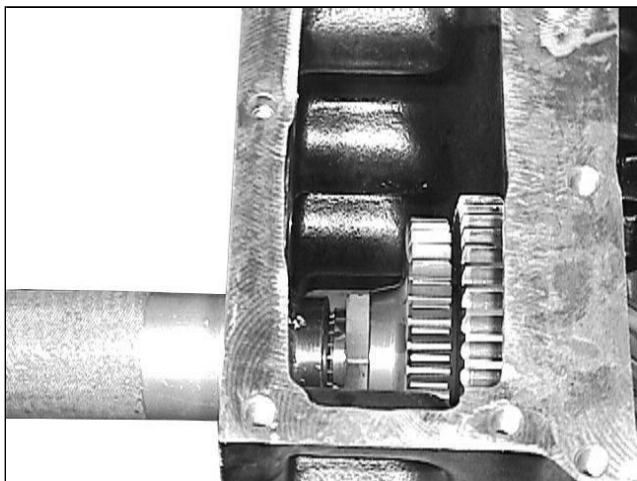


Fig.16

Once screwed the nut, to prevent the subsequent loosening mark with the appropriate buffer cod. 07006221 as shown in Fig.16.

Once the lock nut verify that the pinion rotates, but not too free, if in fact everything is made properly we have a rotation but you need a certain torque.

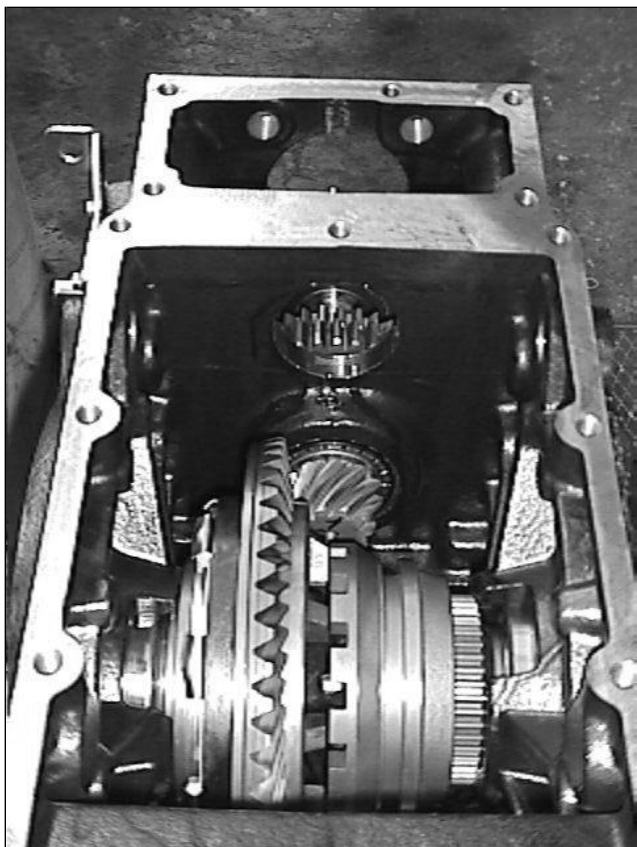


Fig.17

Place the package of pre-assembled bevel gear inside the differential housing.
Do not forget to put inside the conical crown package also the ring of the rear differential lock.

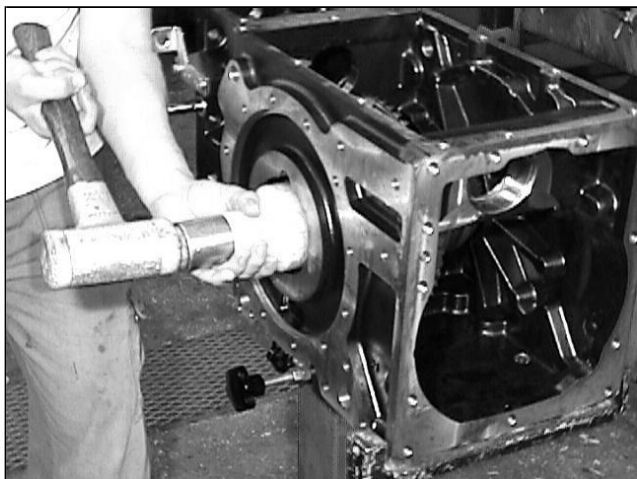


Fig.18

Using the code 07006226, place the bearings that support the planetary inside the differential housing (Fig. 18).

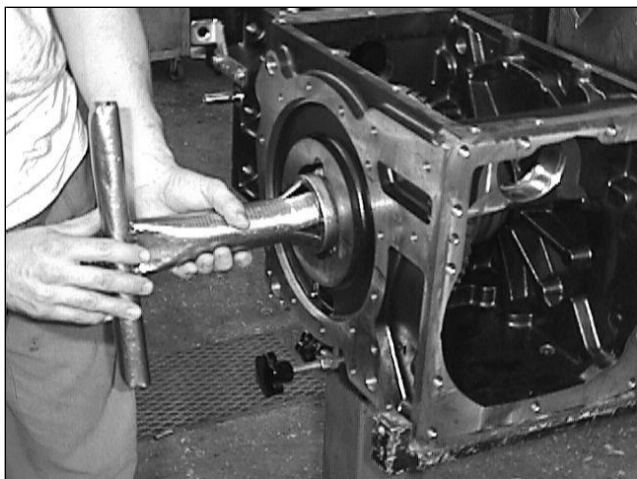


Fig.19

Tighten the left nut to the bottom of canceling the clearance between the bevel pinion and ring gear (Fig. 19) using the key code. 07000237.
Then unscrew the left ring of 3-4 notches using as a reference the hole M6 (part A) present on the differential housing Fig.23.

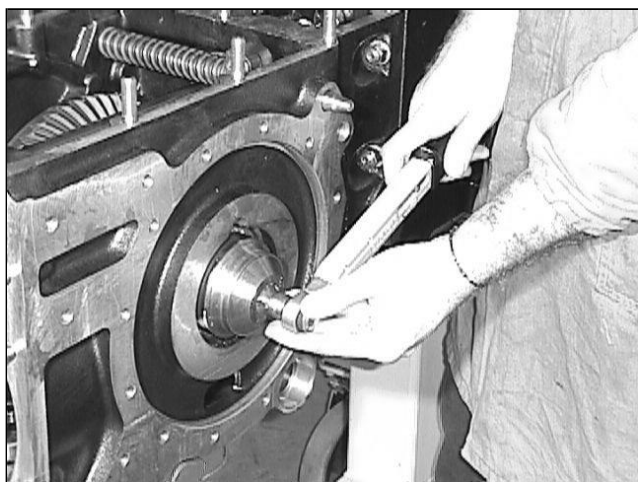


Fig.20

Tighten all the way even the ring on the right side, with a torque wrench and a preload of 2 Kgm (Fig.20).

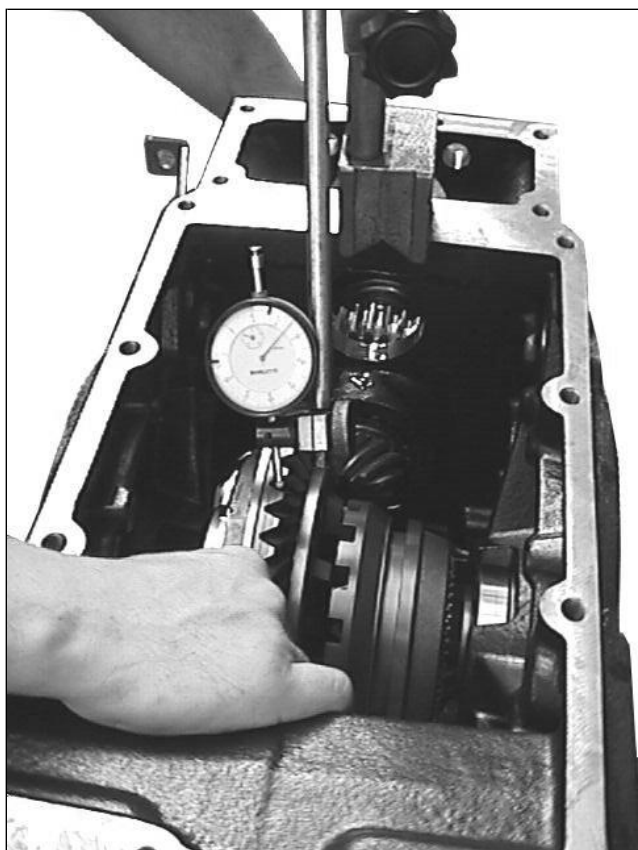


Fig.21

Measure the clearance of the crown with the aid of a comparator placed on the bottom of the tooth as shown in Fig.21.

If the clearance over the entire development of the circumference is between 0.07 and 0.15 mm proceed with following stages.

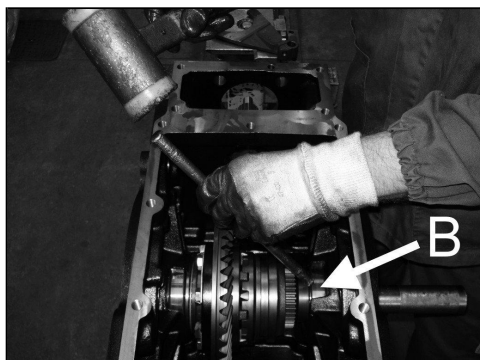


Fig.22

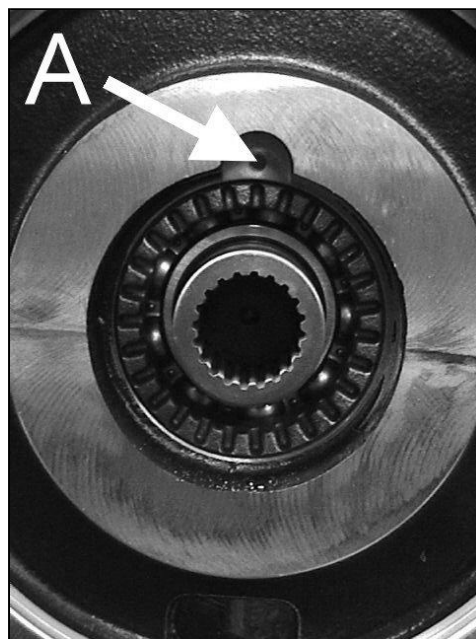


Fig.23

Loosen the right nut of 5-6 notches than refer to hole M6 (detail A in Figure 23) beat with a plastic hammer on the bearing of B Fig.22 outward.
Recheck that the pinion and the ring bevel gear wheel meshing with the right.

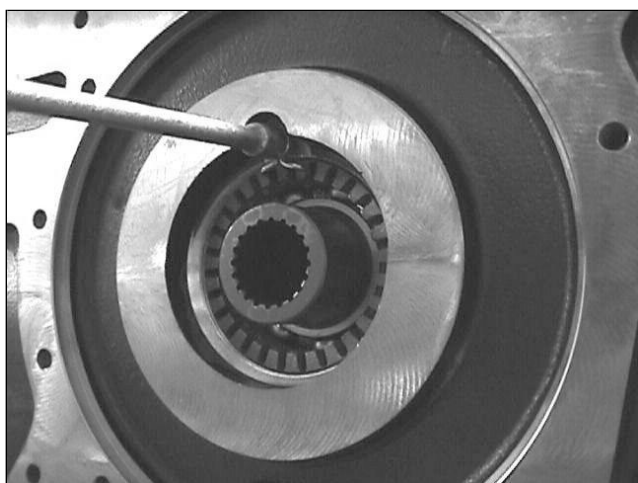


Fig.24

Fit the block ring hooks and screws as shown in Fig.24.

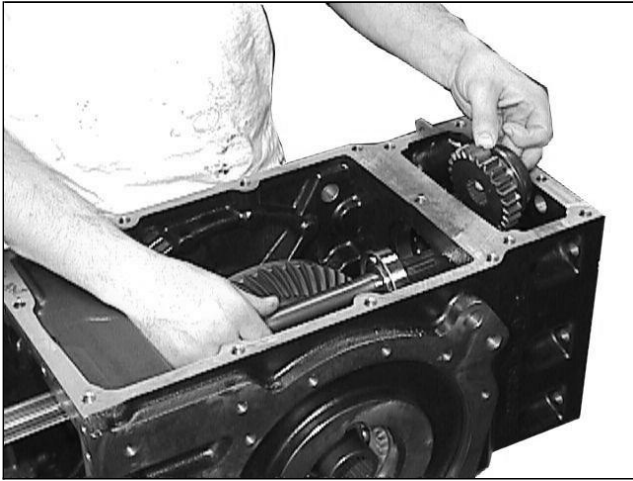


Fig.25

To bench pre-assembly the internal upper pto shaft with the bearing and the two snap retainer. In Fig.25 shows the mounting of the inside upper pto shaft and the gear engage pto on the differential housing.

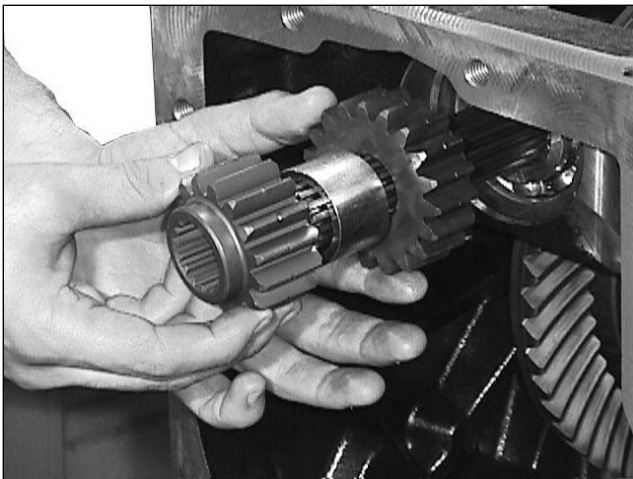


Fig.26

As shown in Fig.26, complete the assembly of the internal pto shaft with the snap ring retainer bearing, the bearing and the circlip external retainer, the primary gear, spacer and other gear.

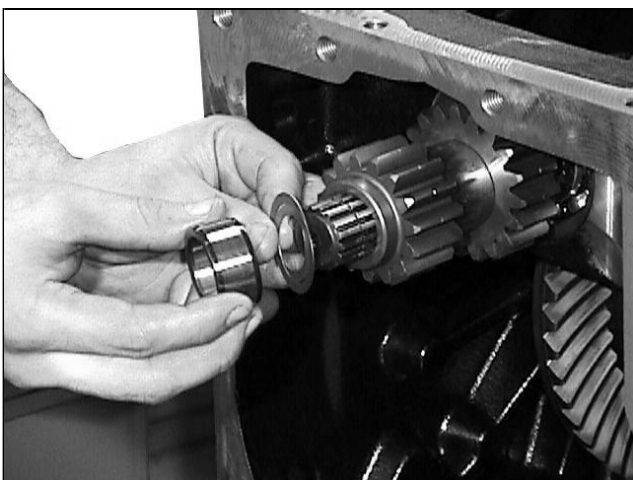


Fig.27

As shown in Fig.27, mount the spacer, the inner ring of the bearing, which will go on the side of the rear pto box and the snap ring retainer.



Fig.28

To bench perform the pre assembly of the pto lever with the spacer, spring and pin selection pto.

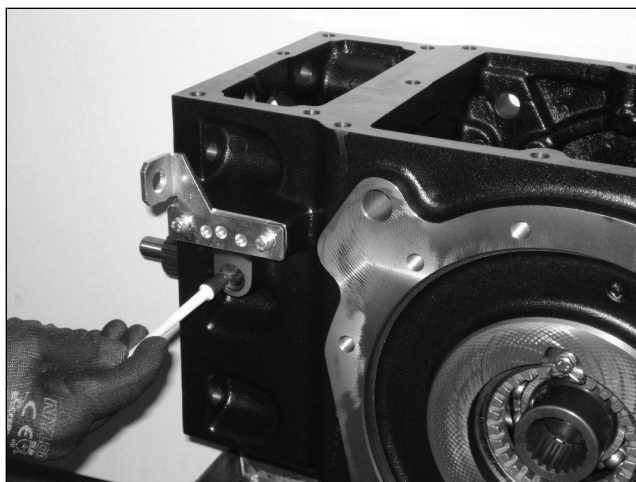


Fig.29

Mount the plate to pto selection on differential housing.
Lubricate the part of the seal and install the seal.

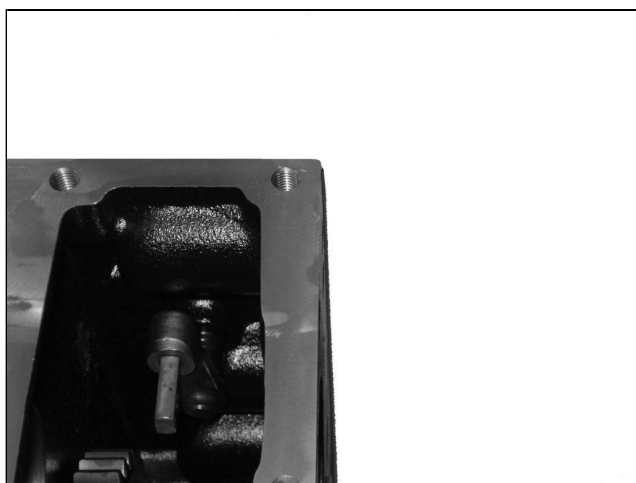


Fig.30

Mount the engage pto lever in the differential housing.

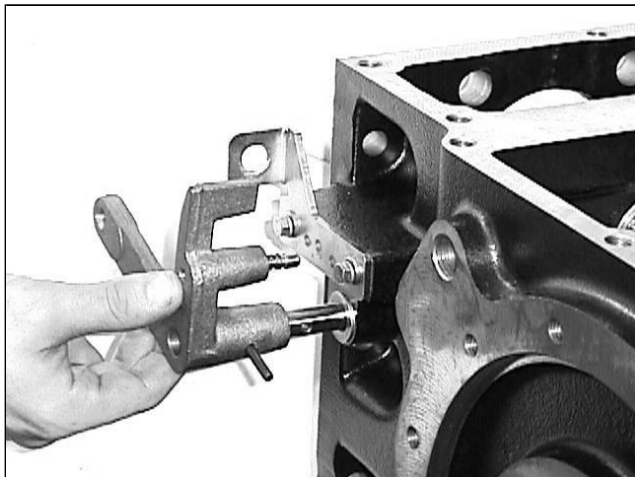


Fig.31

Place the spring and pin selection on the external control pto lever.
Then mount the external control pto lever on the inside pto engage lever, lock the lever with the plug, make the correct adjustment of the lever by adjusting the selection plate (Fig.31).

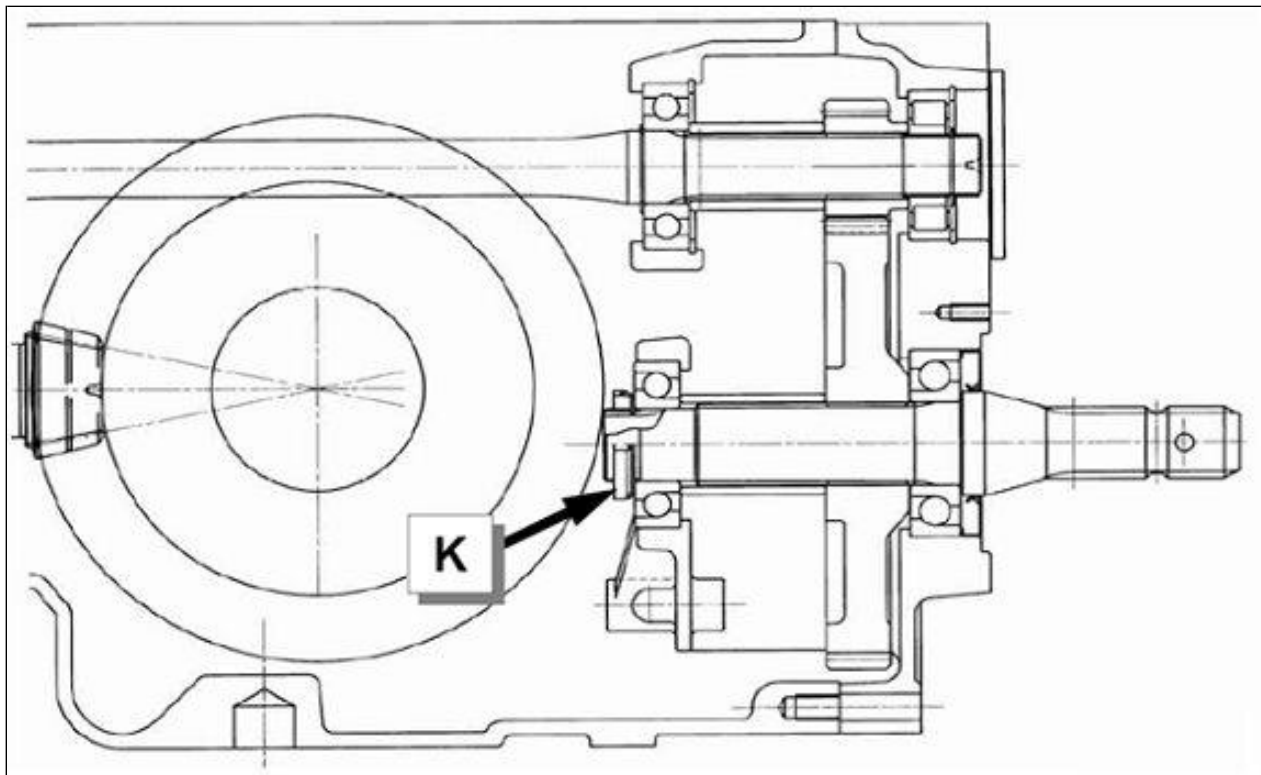


Fig.32

Once the pre-assembled bearing on the upper pto shaft you can proceed to the assembly of the rear pto group that can bring the double speed for the PTO or the single as shown in Fig.32.



Fig.33

Lubricate the shaft of the differential lock and mount the O-ring, insert the rod into the housing making sure that the O-ring is not pinched (Fig.34).



Fig.34

After mounting the spring and the front differential lock, you must register the stroke of the fork making sure that between the differential lock ring and the teeth of the crown remains 1.5 to 2 mm.

36.A - Tightening torque for rear differential lock

Tightening torque expressed in kgm

Description	Kgm
M 12x12 rear axle - gearbox fixing nut	8.5
M18x1.5 rear axle - gearbox fixing screw	16
M 12x12 rear axle - power lift fixing nut	8.5
M 12x30 screw that fixes the cover to the rear axle	8.5
M 12x12 rear axle - PTO cover fixing nut	8.5
M 12x40 screw that fixes rear axle - hubs	8.5
M 12x35 rear axle - front drive transmission support fixing screw	8.5
M 12x50 bevel ring gear fixing screw	9
M 10x35 diff lock control fork fixing screw	5.5
Pinion fixing nut ring	4
Bevel differential fixing ring nut	2
Bevel PTO fixing ring nut	2.5

36.B - Needed tools for rear differential lock

CODE	DESCRIPTION	QUANTITY
07000237	RING NUT KEY 1363	1
07000239	TOOL 1363/20 - 1363	1
07000247	DIFFERENTIAL SUPPORT	1
07006221	BUFFER FOR MULTIPLE PUNCH MARK OF THE PINION RING NUT	1
07006222	PLANETARY BEARING ASSEMBLY BUFFER	1
07006223	CONICAL BEARING DIFFERENTIAL ASSEMBLY BUFFER	1
07006224	PINION CONICAL BEARING ASSEMBLY BUFFER	1
07006225	CONICAL PINION STOP TOOL	1
07006226	DIFFERENTIAL PLANETARY BEARING ASSEMBLY BUFFER	1

39 - REAR FINAL DRIVE



ADJUSTMENT ON REAR FINAL REDUCERS

39.10 - Disassembly of the rear reduction gear

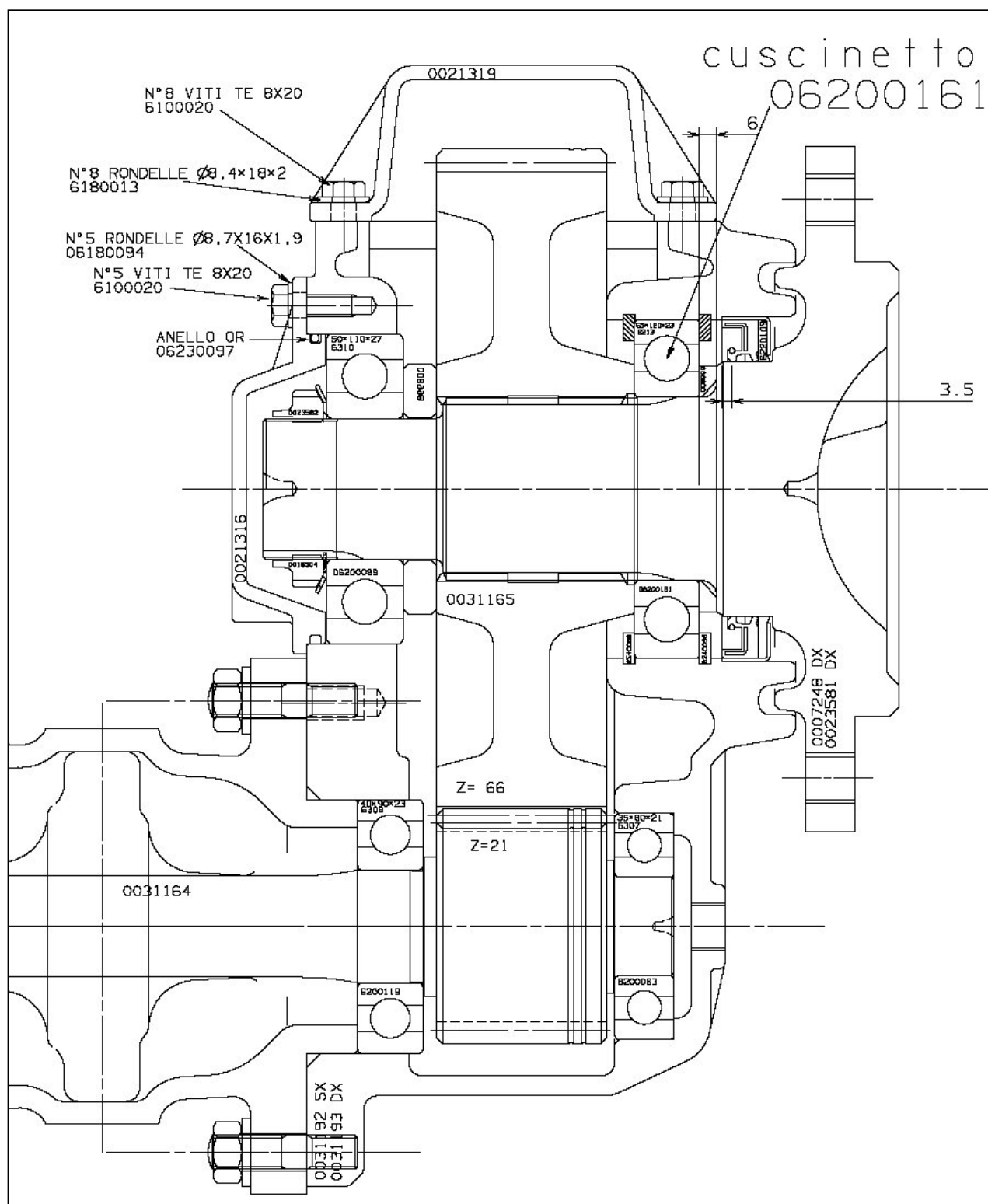
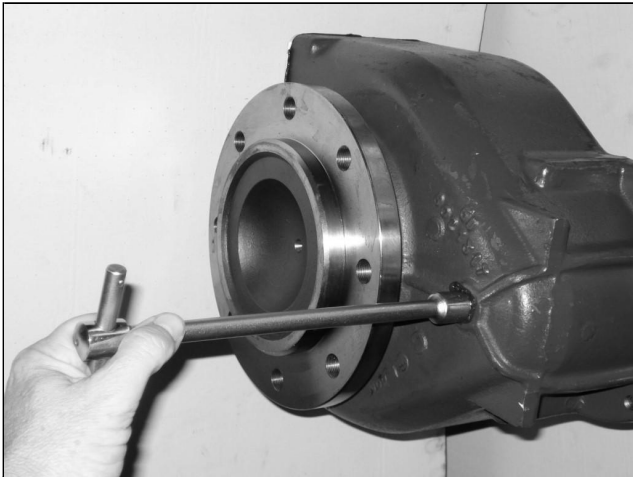


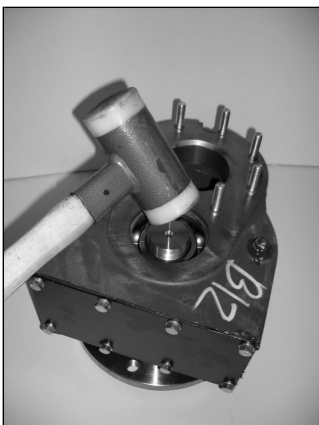
Fig.1

Fig. 1 shows the overall assembly of the rear reduction gear.

Depending on the version of the tractor, low or high one, the position of the reduction gear changes as regards the rear hub. If it is necessary to remove the rear reduction gear, be careful to the pin and orientation of the reduction gear as regards the hub, to avoid mistakes of the placement when reassembling.



Before proceeding with the next steps, it is necessary to operate the parking brake to block the braking components of the mass and consequently the brake discs. To remove the reduction gear from the hub, you must perform the following tasks: unscrew the 8 nuts of the studs of the gear reduction housing to the hub, unscrew the cap of conical shape shown in the diagram and screw in a screw acting on the axle shaft: This operation will help you remove the reduction gear housing in full.



Unscrew the locknut with the special key code 07000227, remove the washer by using a plastic hammer to pull out the axle shaft. Now you can review the reduction gear assy.

39.20 - Assembly of the rear reduction gear



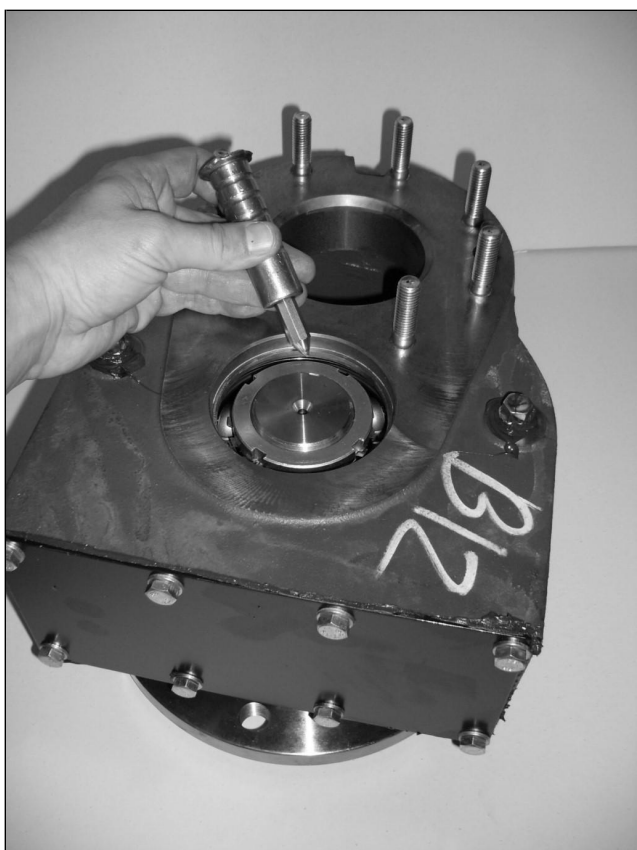
On the counter, on the reduction gear housing pre-mount the inside snap-ring retainer, the bearing support of the axle shaft, the spacers, needed to eliminate the axial play of the bearing, the outer snap-ring retainer and the oil seal leak out.



On the axle shaft, pre-fit the spacer that will be in limit stop on the bearing. Pay attention to the orientation of the spacer, the bevel must be turned towards the flange of the axle shaft.



Install the axle shaft inside the reduction gear housing, being careful to place the gear of the reduction gear and the spacer that will go to the limit stop on the inner bearing. Fit the inner bearing, the washer stops and the ring nut by using the proper key code 07000227.



Tighten up the ring nut with a torque key to 25 Kgm and lock it with the washer and punching mark as shown in the photo. This ring nut must be replaced at each removal of the axle shaft. Pay attention to the fact that on the left handed reduction gear the ring nut is threaded to the left whereas the right reduction gear on the thread is right-handed.

39.A - Tightening torque to back reduction gear

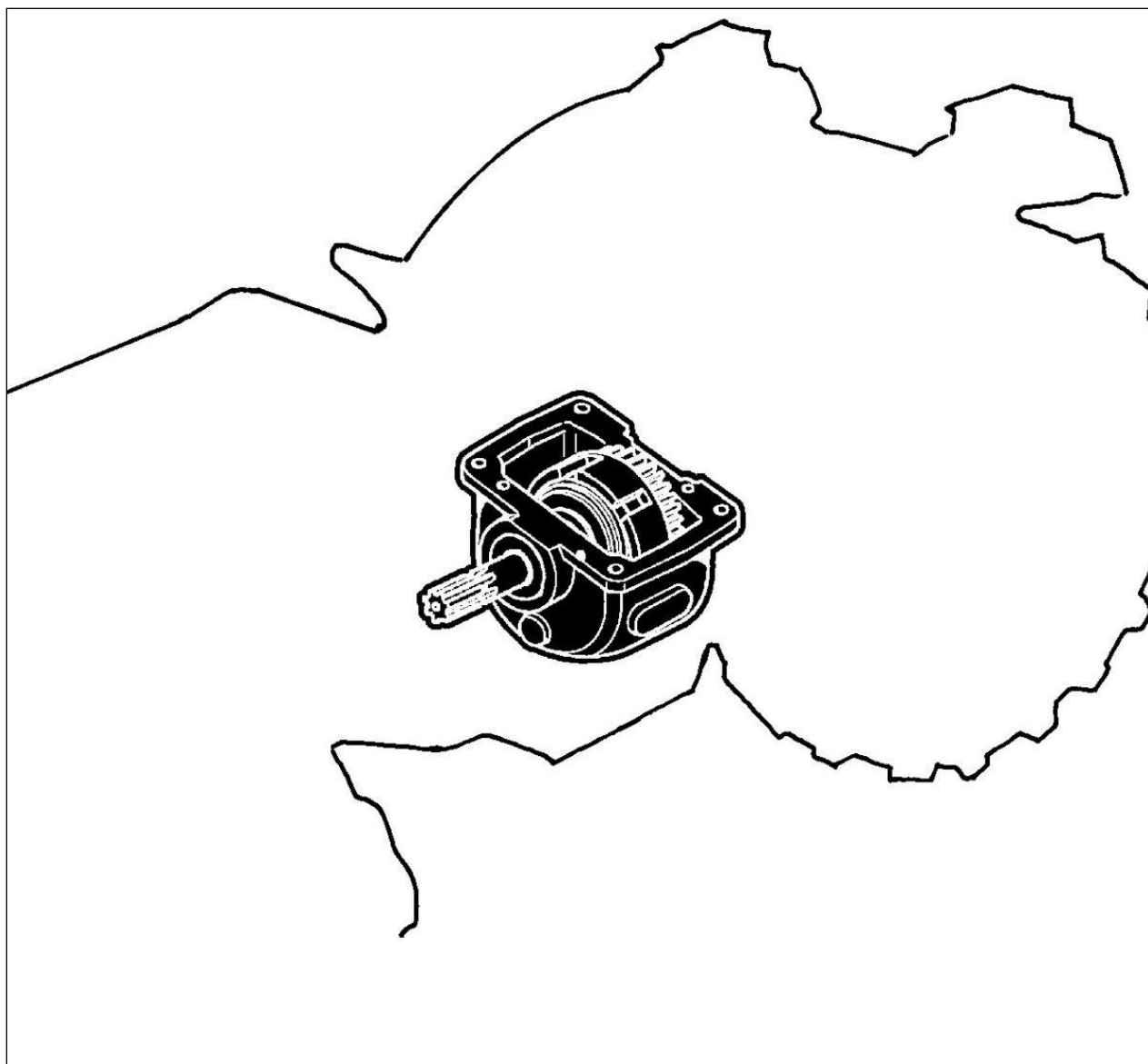
Tightening torque expressed in kgm

Description	Kgm
M 50x1.5 axle shaft fixing ring nut	25
M 18x1.5 screw that fixes the wheel to the axle shaft	31
M12 nut that fixes the final drive to the axle shaft support	8
M 8x20 axle shaft ring nut cover fixing screw	2.4
M 8x20 final drive gear cover fixing screw	2.4

39.B - Needed tools for back reduction gear

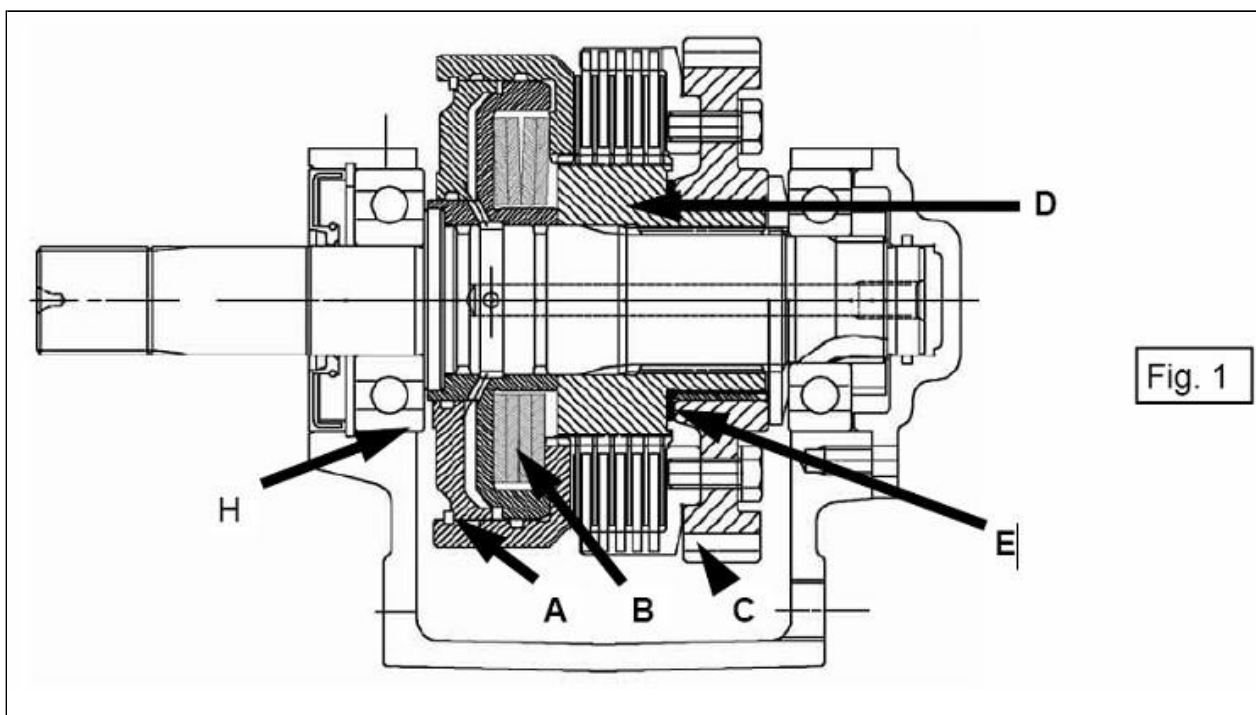
CODE	DESCRIPTION	QUANTITY
07000227	RING NUT KEY	1

42 - DRIVE TRANSMISSION



INTERVENTIONS ON THE DRIVE TRANSMISSION

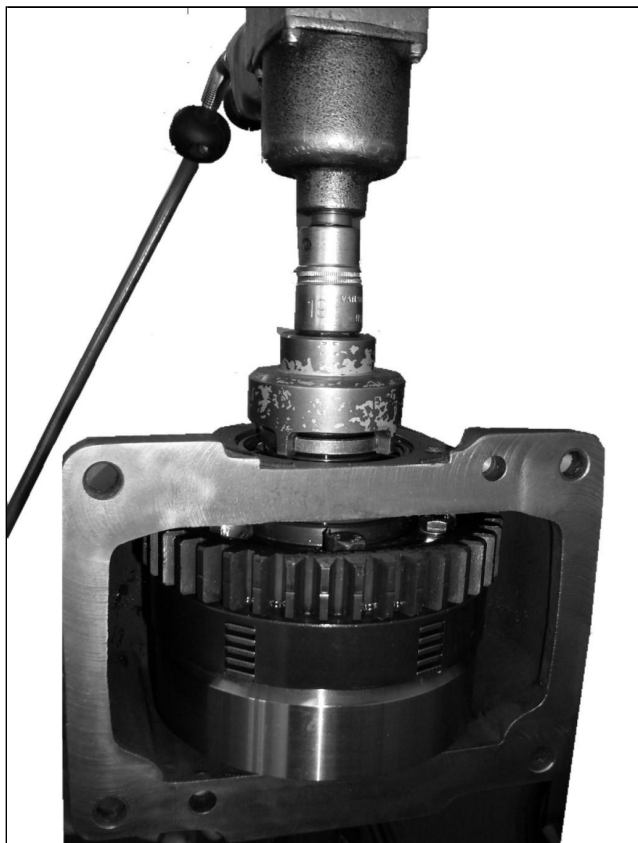
42.10 – Disassembly of the drive transmission



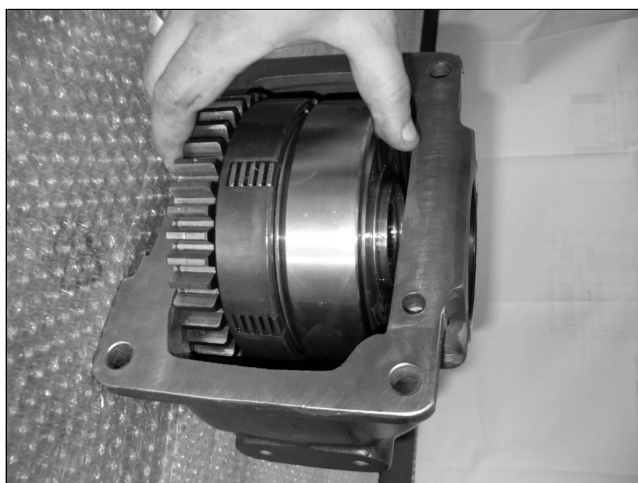
Overall assembly four wheel drive transmission.



Loosen the screws of the cover and remove the back cover.
Unscrew the locknut from the shaft front wheel drive.



On the opposite side, remove the oil seal and the seal bearing retaining circlip.



Remove the front wheel drive shaft and remove the clutch pack.



By means of a press (with a load capacity of 500 Kg), compress the piston spring pack and remove the retaining ring.



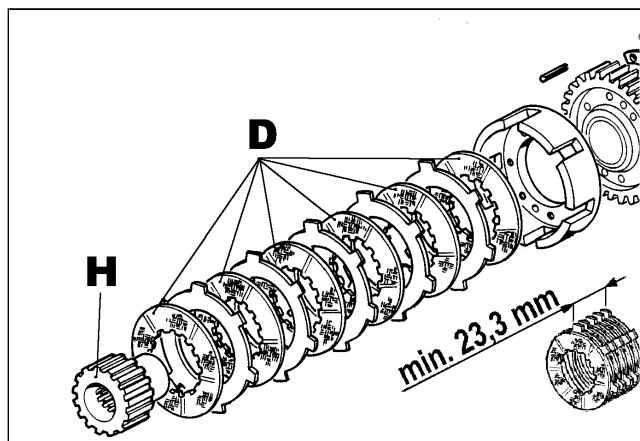
Remove rings from both the drum and the flange of the disengagement. Fit the sealing rings, taking care to position the first ring and then the anti-extrusion ring. During these operations sprinkle the seats with grease and be careful not to pinch rings during assembly.



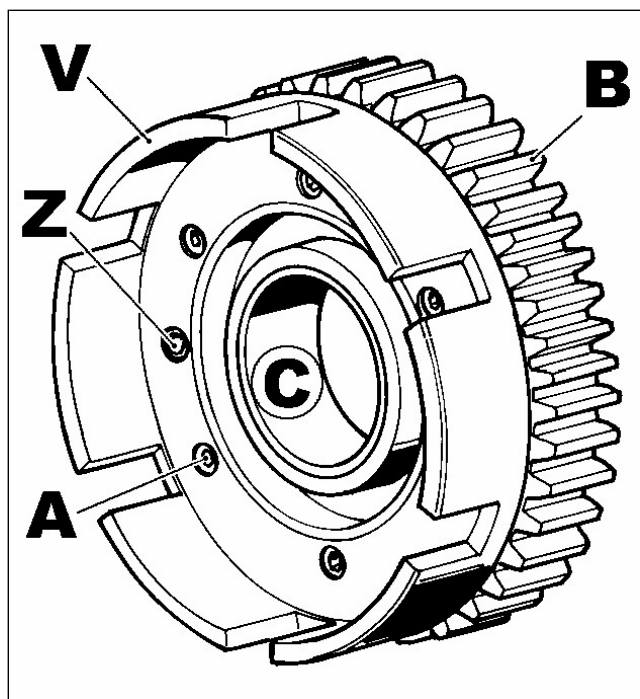
Reassemble the piston inside the drum being careful not to damage the seals. As shown in the overall assembly of fig. 1 cup springs are mounted on opposite sides (two by two) and we must make use of the aid of a press with a load capacity of 500 kg.



Make sure the retaining ring is seated properly before removing the pressure from the press.



In the event it had presented the need to separate the bell clutch V from the gear B, so be careful when reassembling that plugs Z and screws A do not protrude from the surface of the bell on which the last clutch disc should work. The gear B is fastened to the bell on the side that allows the toothed sector to stay moved away from the bell itself.



Verify that the package of disks and clutch plates is not less than 23.3 mm minimum. Check the wearing of the bearing mounted on the gear.



By placing the front wheel drive shaft on the bench, replace the drum completed with cup springs and with carrier bushing.



Position the heat-treated spacers of 1 mm + 1,2 mm, as the baseline.



Replace the clutch pack alternating 6- disc clutch to the 5 fix disc.



Place the aluminum spacers (1,6 mm as the baseline).



Place the splined spacers with the chamfered up whereas the spacer code 07002765 and the ring nut with the chamfered down.



Bringing the pressure to 42 bar using a hydraulic pump, check by means of a feeler gauge the free play between the clutch discs and the springs pack, hold the gear by hand, which must be $0,8 \div 1,4$ mm. If the free play does not come within the given measurement, it is necessary to vary the heat-treated spacers of $1 \text{ mm} + 1,2 \text{ mm}$ mounted above.

Verify that the group begins to open at a pressure of 32 bar. If the unit is not open to the given pressure it is necessary to vary the aluminum spacers (by increasing the thickness the unit opens at a lower pressure than the previous one).



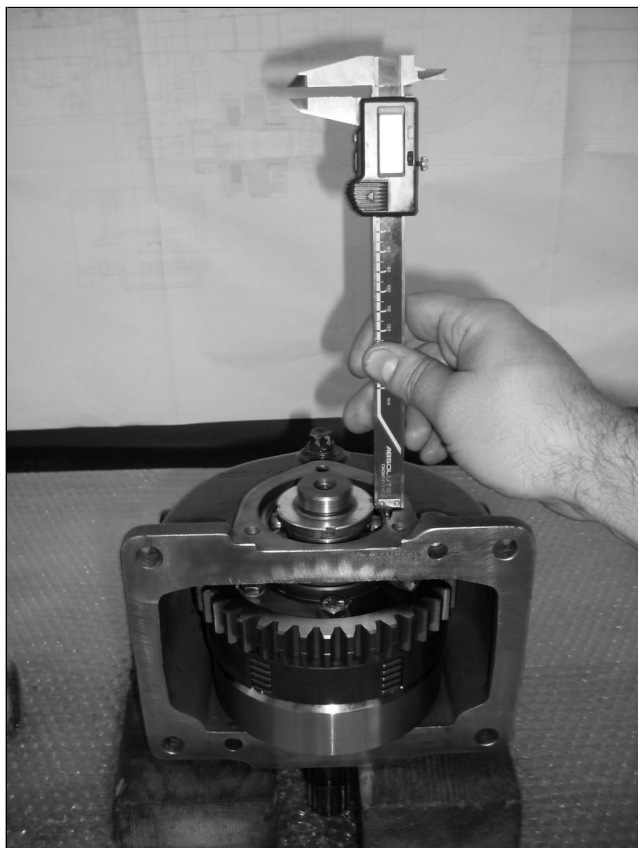
Bringing the pressure to 42 bar, check with a feeler gauge the free play between the gear and the washer which must be of $0,3 \div 0,5$ mm.



Now reassemble the unit previously tried at the bench inside the wheel-drive box, by replacing the test spacer with the bearing provided



Once tightened the locknut to 22 Kgm, it is needed to punch it to avoid it unscrew.



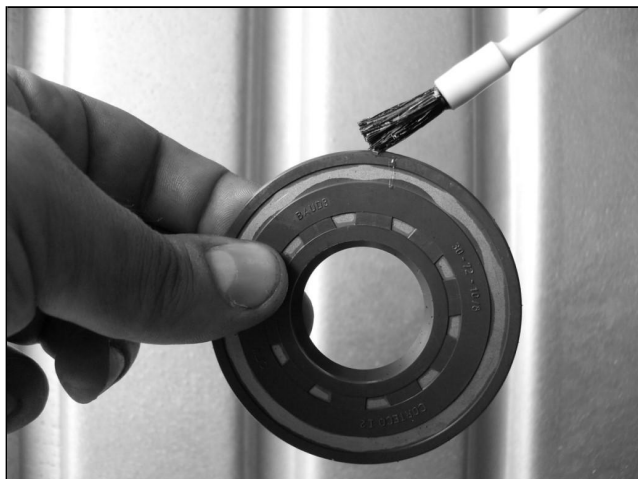
Before replacing the cover it is necessary to determine the correct thickness of the bearing, side gear, to delete the free play within the unit.



Measuring the extent of the cover, as shown in the picture, if the measurement previously made is greater than the cover, insert one or more spacers to clear the free play.



Replace the retaining ring inside the back cover, paying attention to the fact that the seal does not twist and remains in place. Replace the back cover using silicone which must be thoroughly cleaned, tighten the screws at 3,5 Kgm



Replace the outer seal applying some gasket putty adhesive.

At this point you can apply the four-wheel drive transmission box to rear differential housing, applying silicone on the surface which must be thoroughly cleaned and tighten the screws that secure it to 8 Kgm

42.A -Tightening torque for four wheel drive unit

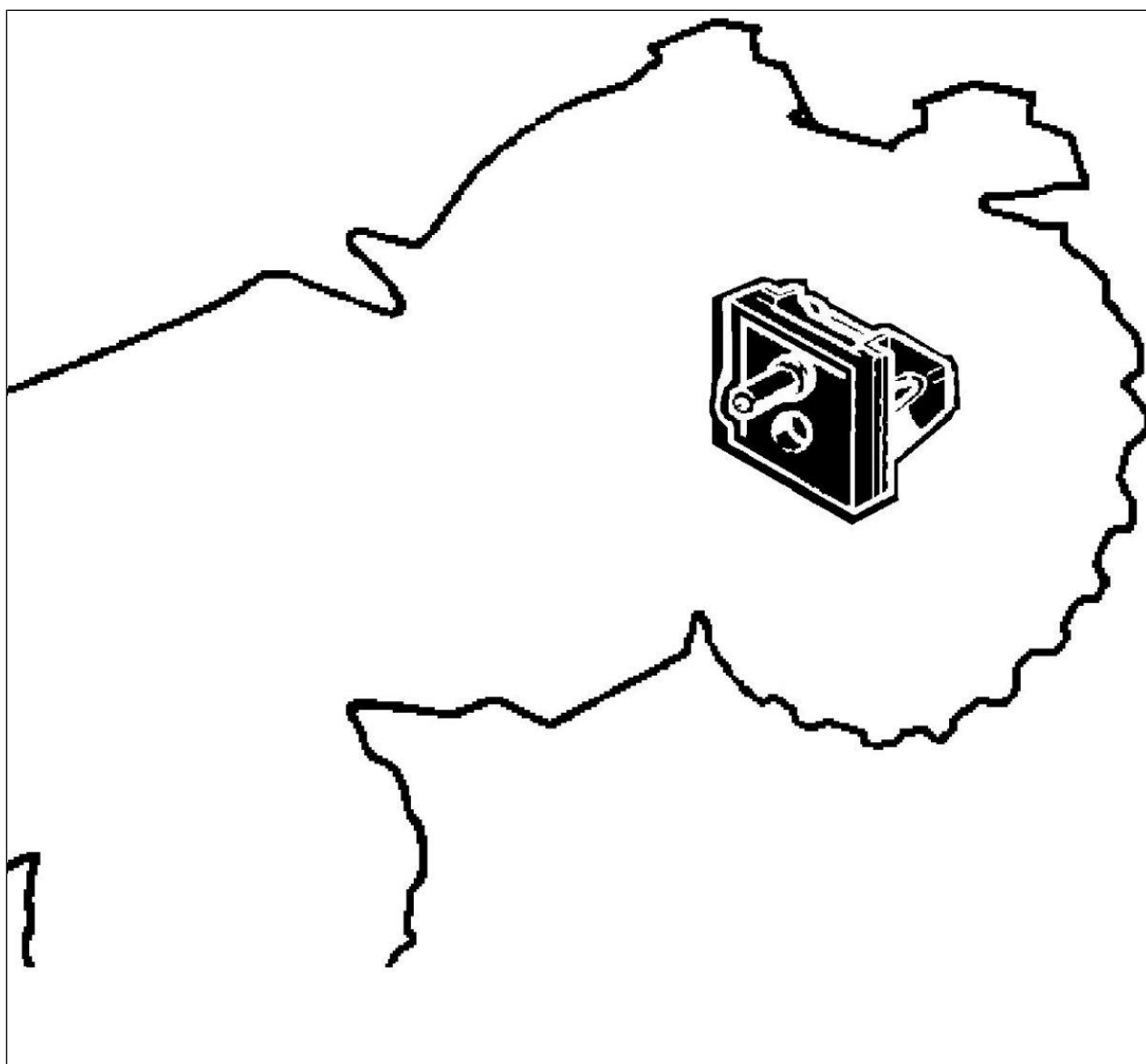
Tightening torque expressed in kgm

Description	Kgm
M 8 screw fixing drive box cover	3.5
M 12 screw fixing drive box cover	8
Ring nut fixing 4WD clutch pack	22
1/4" nipple feeding clutch pack	3

42.B - Needed tools for four wheel drive transmission

CODE	DESCRIPTION	QUANTITY
07002766	BEARING ASSEMBLY SPACER	1
07006128	RING NUT KEY	1
07006208	BEARING ASSEMBLY BUFFER	1
07006209	BEARING ASSEMBLY BUFFER	1
07006210	BUFFER SPRING PACKAGE INSERT FLANGE	1
07006211	SUPPORTO FOUR-WHEEL DRIVE BOX	1

45 - REAR PTO

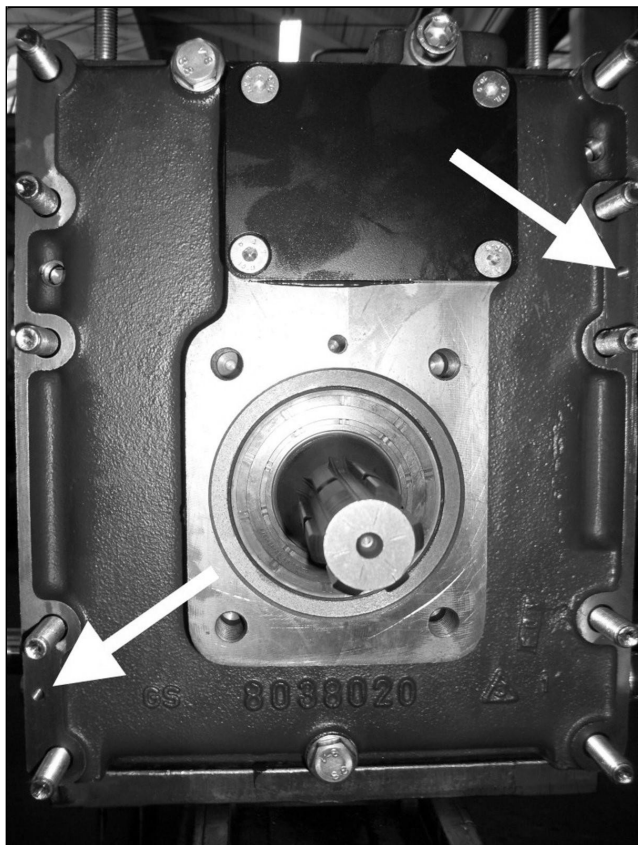


ADJUSTMENT TO REAR PTO

45.10 - SERVICE PTO



To revise or replace the rear PTO unit, you must perform the following tasks: remove the tow hook complete, the PTO protection and the stiffening blades of the slides.



Insert two M6 bolts through holes to extract the cover of the PTO.

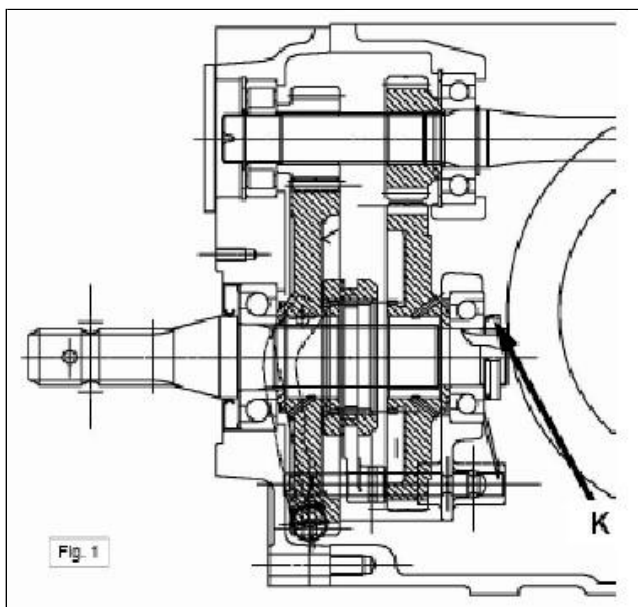
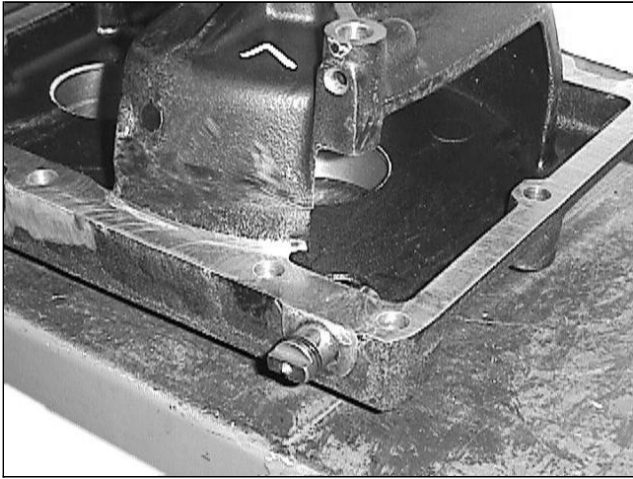
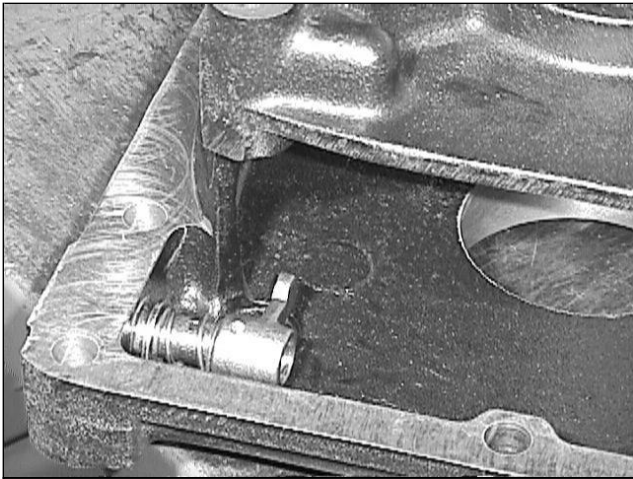


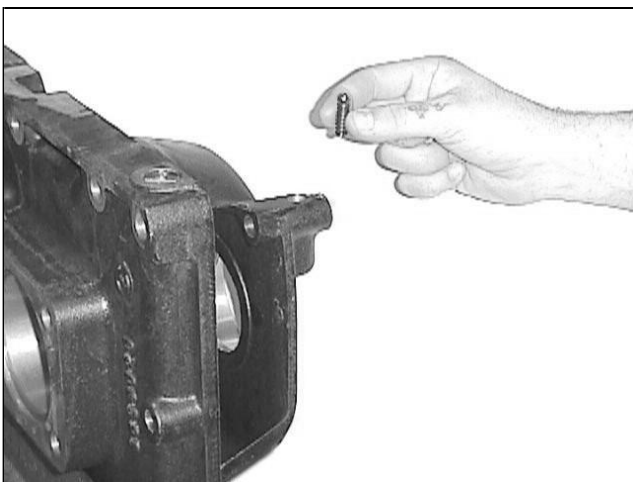
Fig. 1 shows the overall assembly of the rear PTO with the selection for the two-speeds rear.



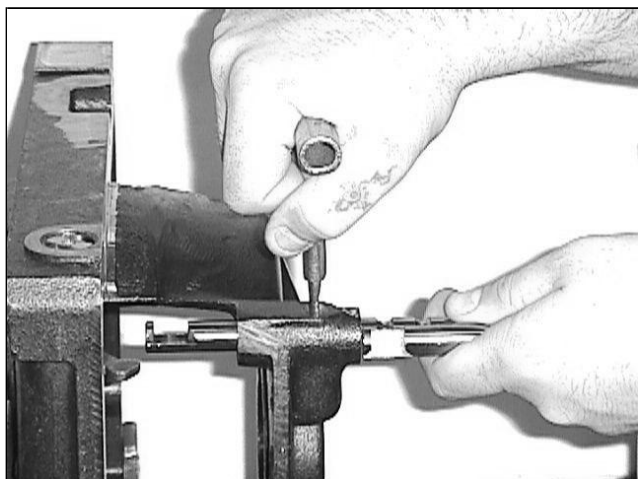
In the next sequence, it shows the mounting of the PTO unit. Before starting installation of gears, you need to position within the PTO back cover, the elements that make up the change of speed of the PTO that are on the right rear side of the tractor. Place the O-ring on the selection pin and throw it on its own home on the cover.



In the inner part fit the spring, the select lever and then pin it.



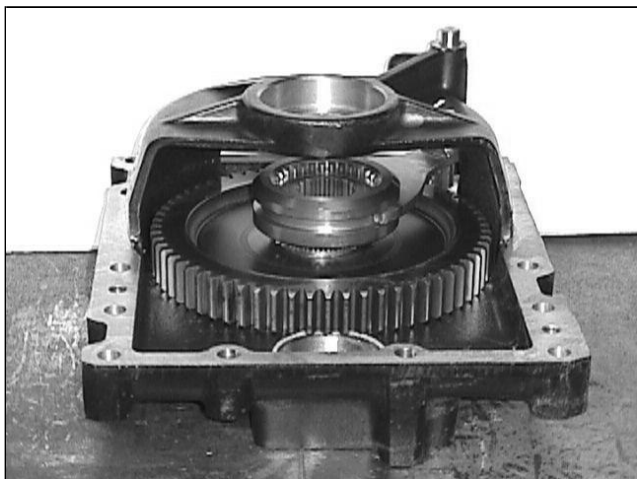
Inside the box, place the spring and the ball for the selection rod.



Using a punch, load the ball and the spring and position the control rod fork of the PTO and mount the bracket on the selection rod.



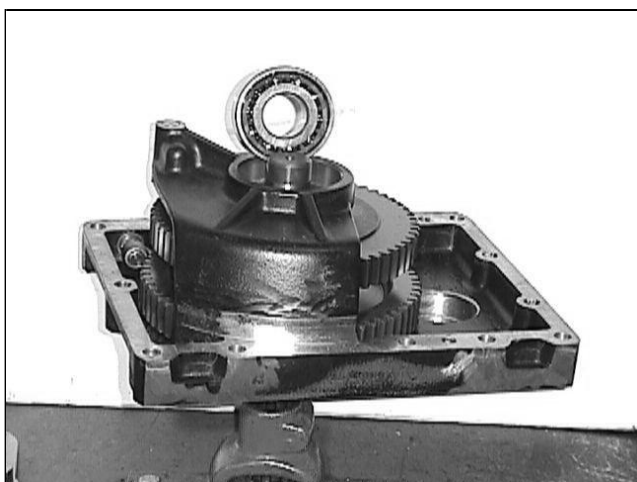
Place the PTO shaft on a support and pre-assemble the bearing, the spacer and the gear bushing. The bearing is a special one, pay attention to the orientation.



At the bench, place the driver gear of the PTO 540 g/1', the bushing and the sliding sleeve inside the box, taking particular care to position the sliding sleeve inside the fork. Then place the other PTO gear 750 or 1000 g/1' within which is located the gear bushing and the spacer bearing.



Assemble the PTO box unit preassembled onto the bench on the PTO shaft and insert the spacer bearing.



Install the bearing into place. The bearing is special, pay attention to the orientation.



Install the ring nut with Loctite thread locker.



Especially important is the tightness of the lower shaft fixing ring of the PTO. Make a first tightening with a torque key to 2.5 Kgm, then make a mark on the ring nut . Now make a second tightening with a torque key to 20.00 Kgm.



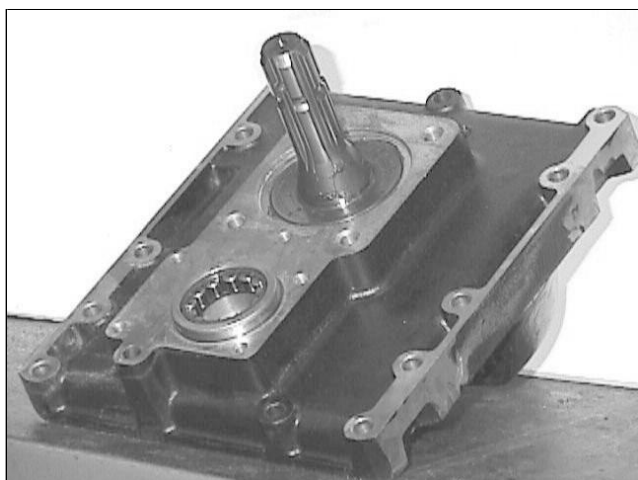
If the reference mark has performed a rotation of less than 45°, proceed to the next step, otherwise you need to add a spacer of 0,2 mm between the heat-treated spacer and the bearing.



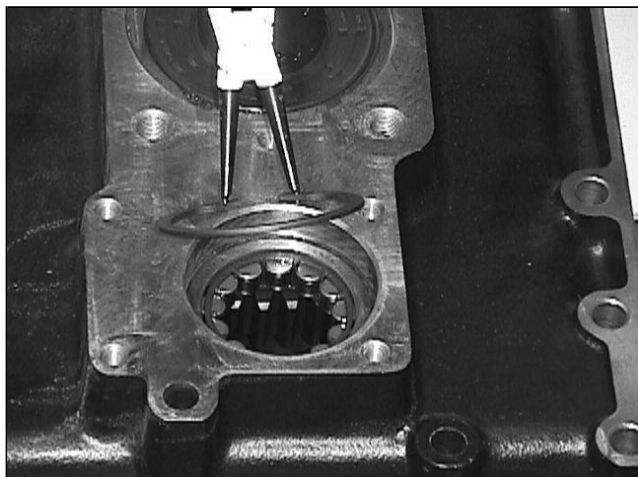
Then, the ring nut must be riveted on the appropriate seat of the PTO shaft to prevent accidental loosening.



Grease the seat on the PTO cover and the ones on the PTO shaft and fit the oil seal.



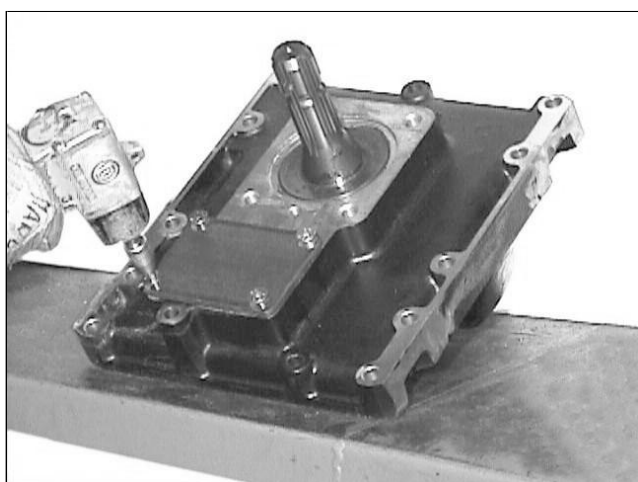
Install the bearing to the stop.



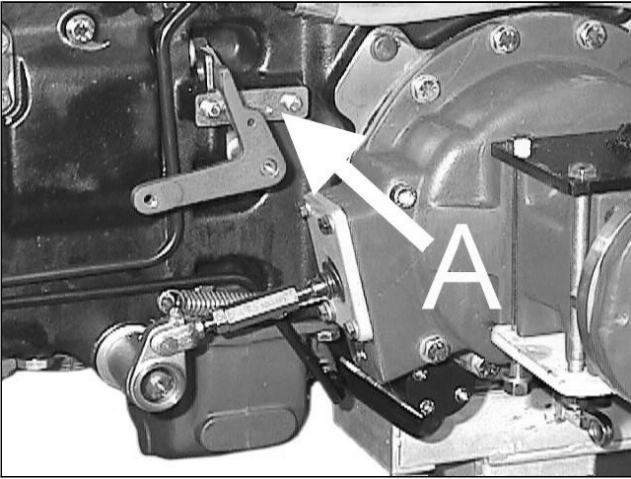
Install the snap ring retainer.



Apply the silicon on the surface, which must be well cleaned.



Mount the cover and secure it with four screws.



Pay particular attention, once the assembly of the PTO cover on the rear differential unit is made, to the recording of the PTO selection. Before mounting the lift on the rear differential housing, adjust the selection PTO plate and control the inner race.

Place the plate so that the selection is made in neutral, or of the synchronized PTO or of independent PTO without the fork is forced on the gears in order that the selection is correct. The following figure depicts the kinematics of the PTO selection control.

With the external lever at the bottom you can insert the independent PTO, when the lever is in horizontal position you are in neutral, and when at the top you can select the synchronized.



In the photo above the components of the PTO selection are highlighted. The item marked with the A is the PTO selection plate whose proper adjusting determines the insertion of the entire range employment of the PTO. The item B shows the final element of the gear scrolling selection schematically shown in the previous page.

45.A - Tightening torque to rear PTO

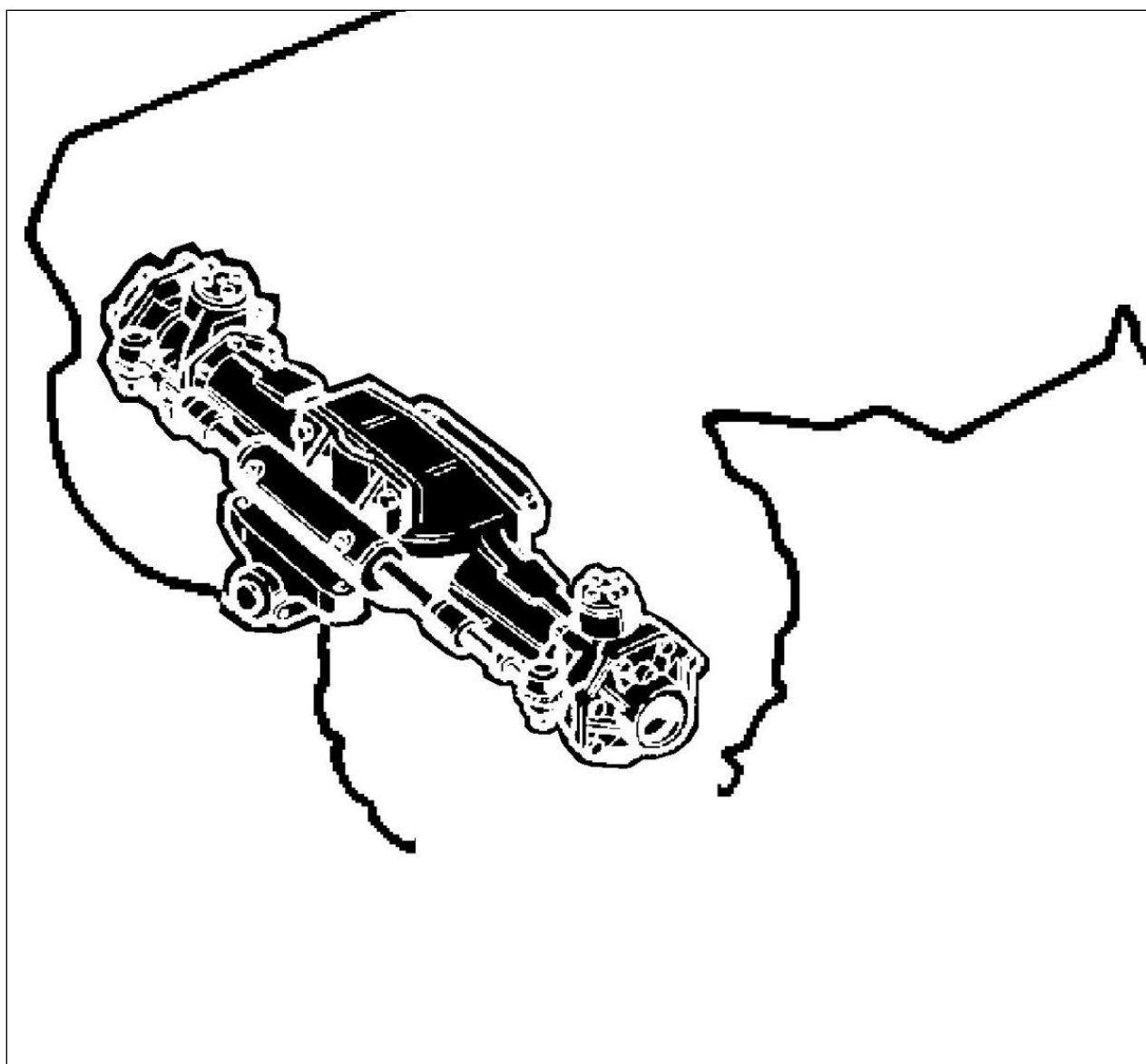
Tightening torque expressed in kgm

Description	Kgm
M 35x1.5 ring nut that fixes the rear PTO shaft	20
M 12 nut that fixes the rear PTO assembly	8
M 12x30 screw that fixes the cover of the upper compartment of the PTO	4.9
M 12x35 screw that fixes the transmission unit	4.9
M 8x20 screw that fixes the rear PTO cover	2.4

45.B - Nedeed Tools for Rear PTO

CODE	DESCRIPTION	QUANTITY
07006128	RING NUT KEY 06340257	1

54 - FRONT AXLE



FRONT AXLE ADJUSTMENT

54.10 - Removing the complete axle

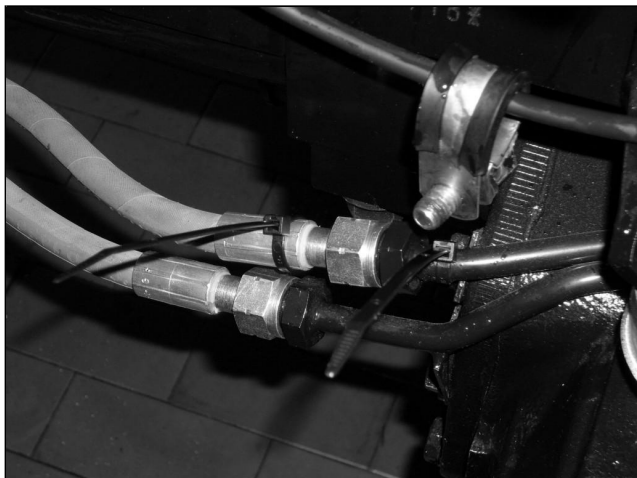


Fig.1

In the event you need to replace the axle complete, proceed as follows: disconnect the two hydraulic hoses of the steering cylinder. Before disconnecting the hoses, mark them to avoid changing the direction.



Fig.2

Disconnect the cable connecting the sensor speed. Remove the protection of the drive shaft, remove the snap ring retainer and move the sleeve on the drive shaft.

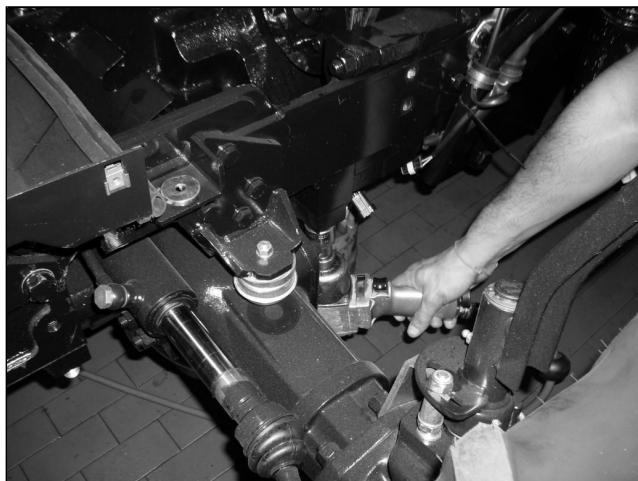


Fig.3

Remove the front and rear axle support.



Fig.4

Lift the front part of the machine and remove the front axle.

54.20 - Removal of a reduction complete hub



Fig.5

If it is necessary to replace or revise the side reduction gear, proceed as follows: remove the oil from the hub reduction gear, lift the part concerned and with the support code 07000215 secure the axle and then remove the rim



Fig.6

Unscrew the lock nut of the ball joint from the joint flange and remove it from seat. Unscrew the six nuts of the joint flange to the axle and remove the complete unit.

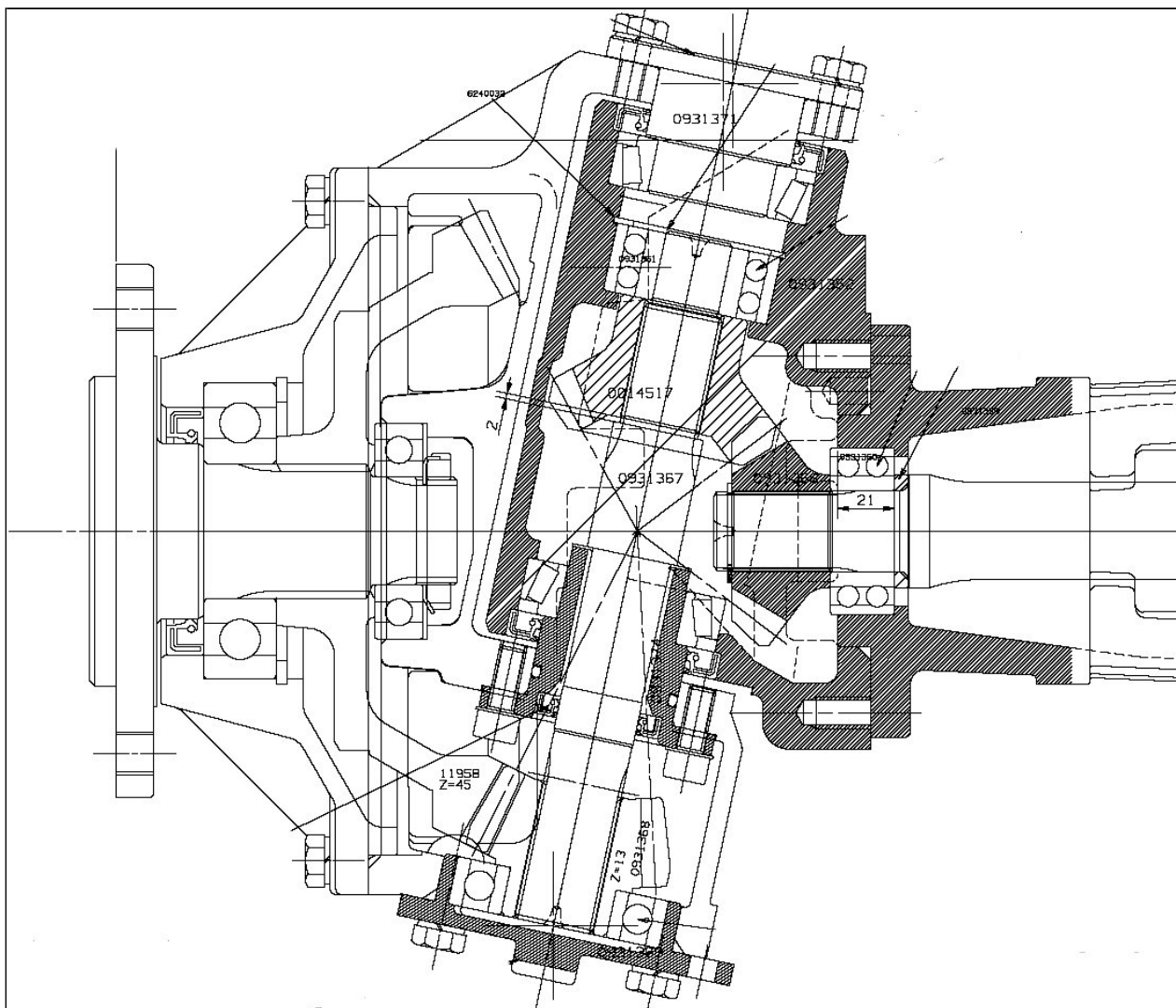


Fig.7 LOW-PROFILE

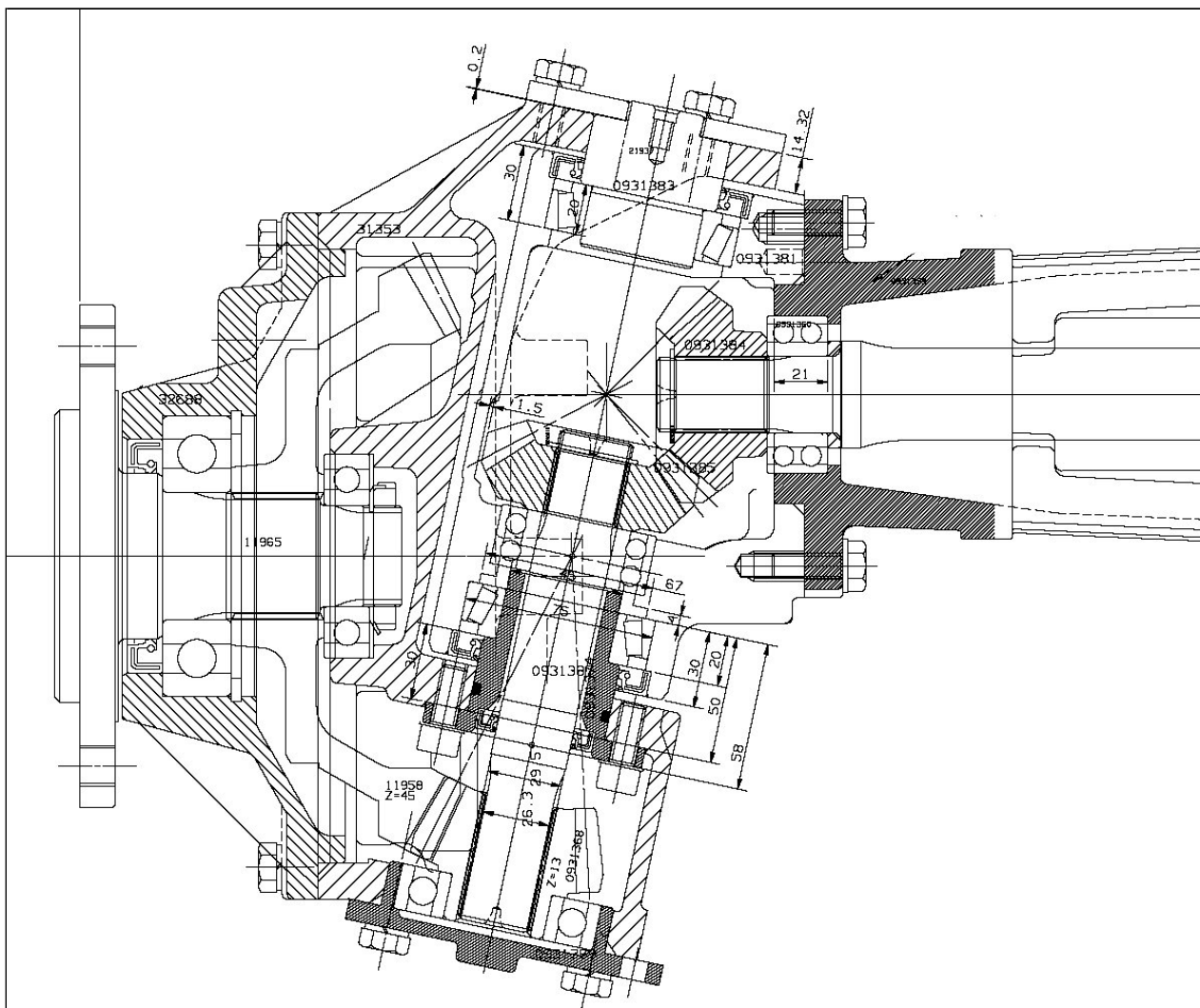


Fig.8 HIGH-PROFILE

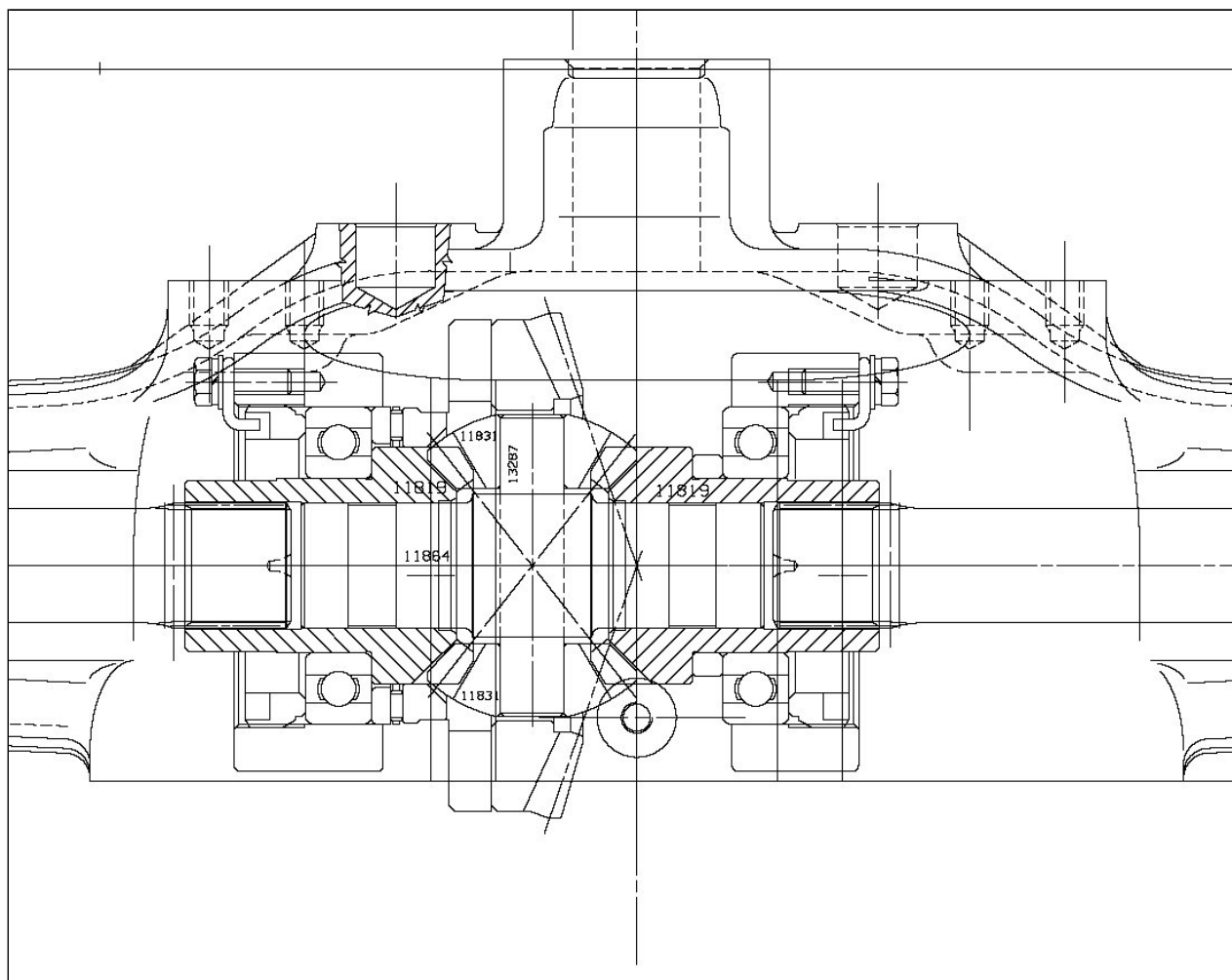
54.30 - Differential (Standard)

Fig.9

In the series S90 and S100, in addition to the front differential NO SPIN (application on demand) the front axle is available in the LOW PROFILE (Fig. 7) or HIGH PROFILE (Fig. 8) versions depending on the type of the tires chosen.

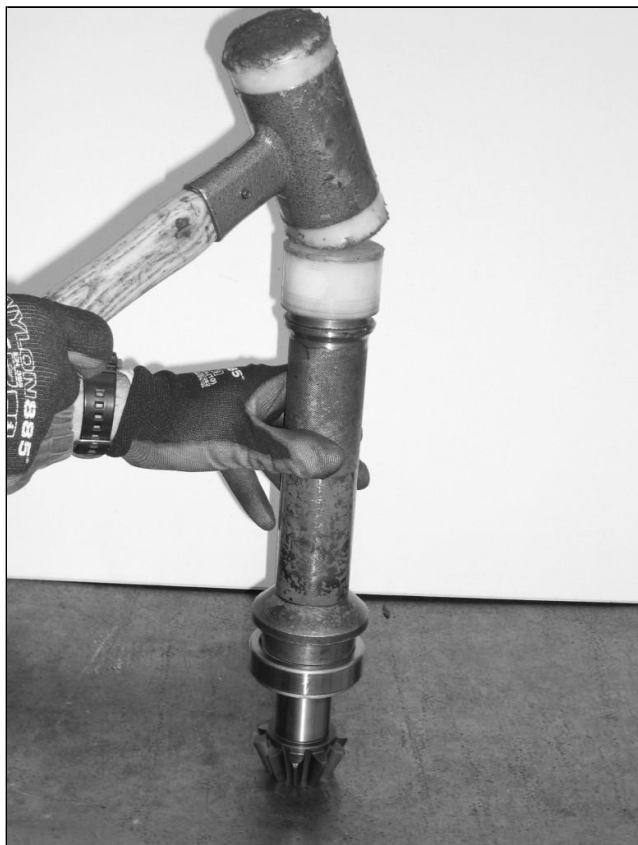


Fig.10

At the bench, perform the assembly of the conic bearing on the pinion using the specific buffer. Attention to the direction of the bearing.

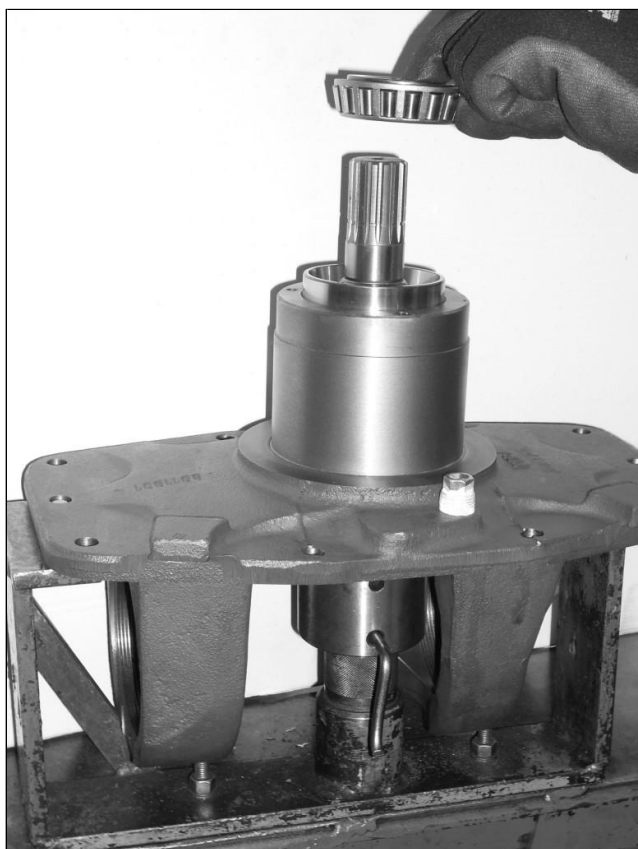


Fig.11

Install the pinion inside the differential box. Turn the box and mount the other conic bearing.

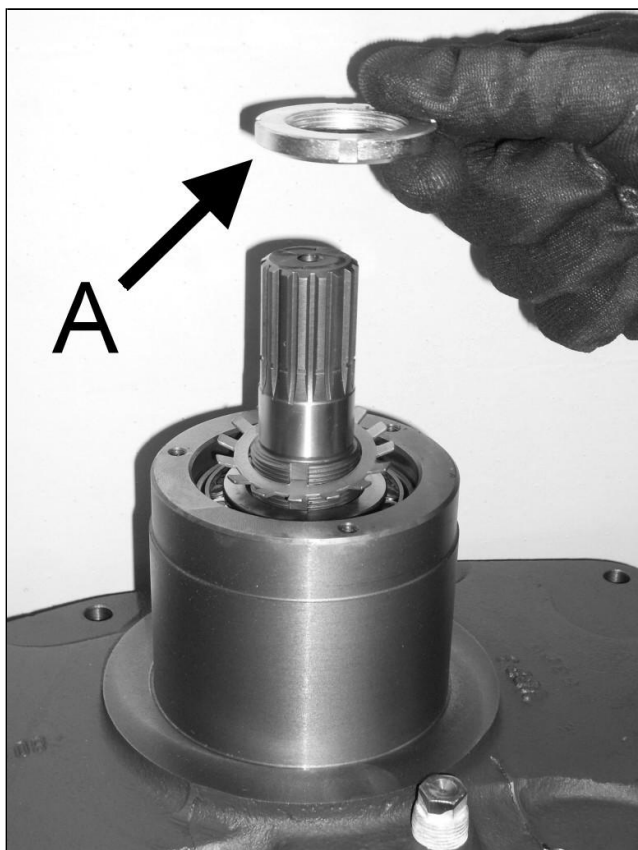


Fig.12

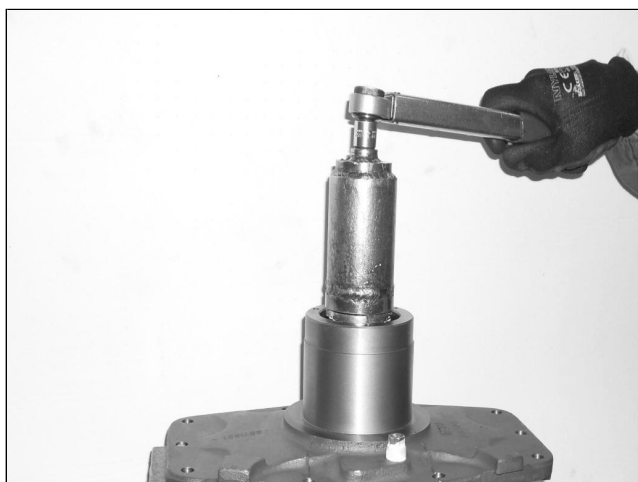


Fig.13

Install the washer and the ring nut. After having tightened the ring nut A and beaten with a plastic hammer on the bearings to better settlement, unscrew the ring nut again and re-tighten the ring nut A to 4 kgm and punch mark it to prevent loosening. For each disassembly take care of replacing this ring nut. Try the rotation of the pinion which must be pursued regularly (not too locked).



Fig.14

Fit the oil seal on the cover and secure it to the differential box. The screw should be tightened to 1.5 kgm.



Fig.15

Place the gear for the speed sensor on the bevel pinion and secure it with the screw shown in Fig. 15, mount the speed sensor and the snap ring retainer.

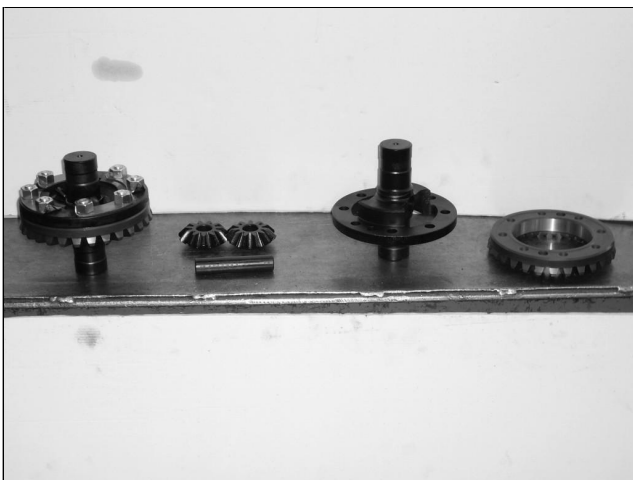


Fig.16

The next step is to perform the pre-assembly of the ring gear, as shown in Fig. 16.



Fig.17

At the bench, assemble the studs on the ring bevel gear.



Fig.18

Fit the pin and the two planetary gears on the central differential shaft before mounting the ring gear. Insert the safety pins in their seats so that the security plates keep them in place, tighten the nuts of the ring gear to the central differential shaft to 8.5 kgm and retrace the plates around the screws to prevent loosening.



Fig.19

Insert the assembled within the differential housing.



Fig.20

At the bench, make the pre-fitting of the crown wheels with their spacers, the needle cage and bearing.



Fig.21

Assemble the two crown wheels inside the box.

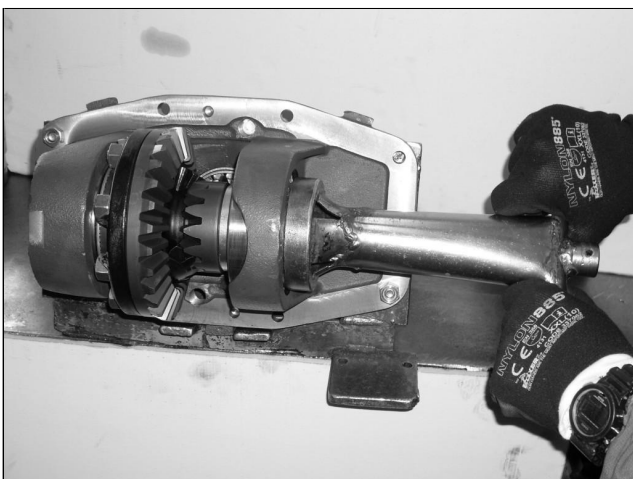


Fig.22

Carry out the fitting of the ring nuts and tighten them with a pre-load on the differential of 1.9 kgm, using the appropriate tool code 07000237.

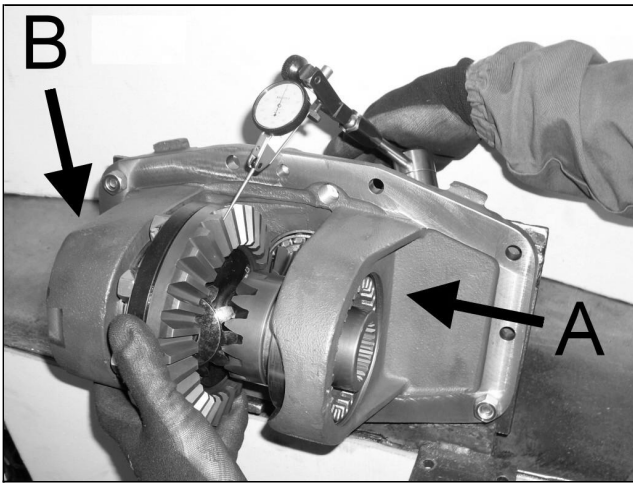


Fig.23

To register the mating /connection pinion-ring gear act, in the same manner, on the ring nuts, maintaining the pre-load mentioned above. The control of the play between the pinion and the ring bevel gear must be performed on the entire circumference and the play must be in the range of $0,10 \div 0,18$ mm.

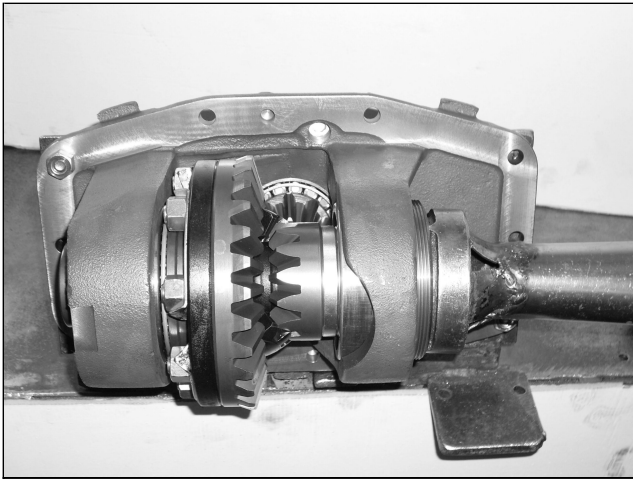


Fig.24

After the registration of the pinion and of the ring gear, it is necessary to adjust the differential. Act on the ring nut A in Fig. 23 unscrewing it for about 5 notches, by removing the pre-load in that way you should obtain a play between the crown wheel and the planetary gear

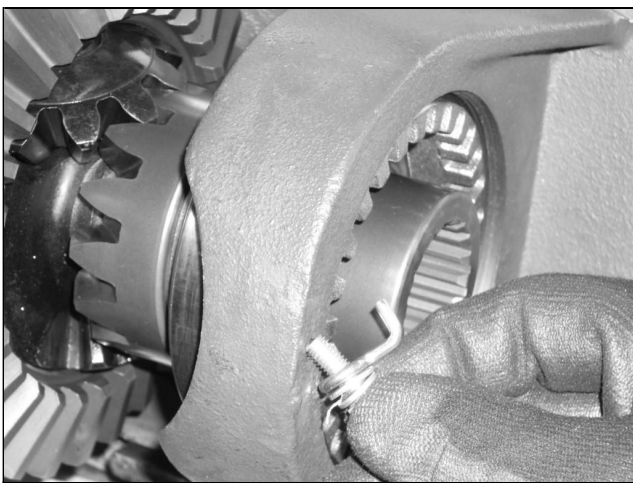


Fig.25

After the adjustment, tighten the ring nuts with the safety locks, ensuring the free rotation of the differential.

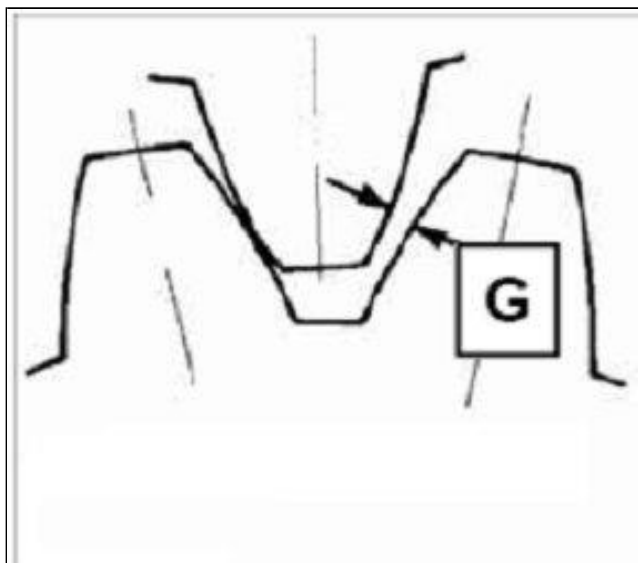


Fig.26

For a good mating the play G (Fig. 26) between pinion and ring gear must be between 0,10÷0,18 mm.

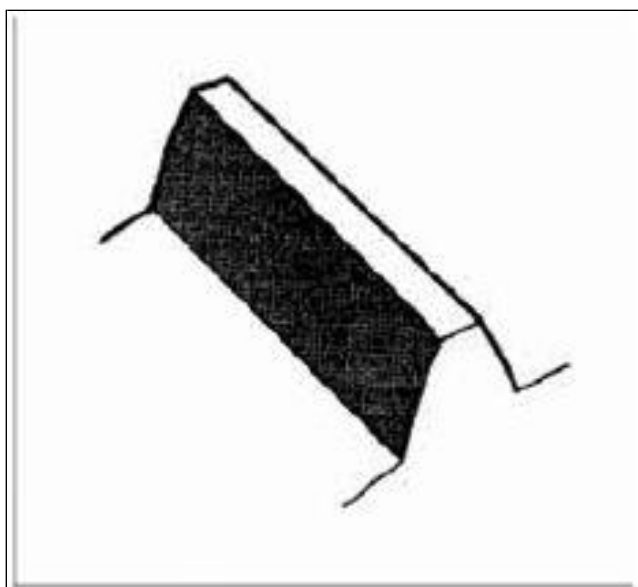


Fig.27

Fig.27 – Correct registration: the contact between the teeth is even over its entire length.

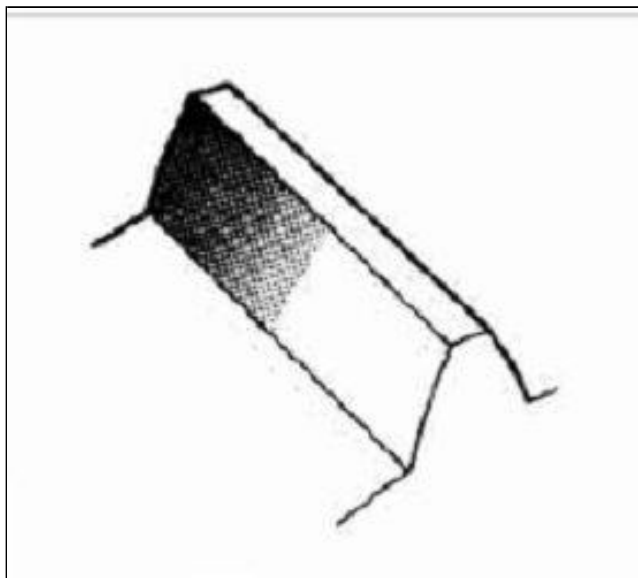


Fig.28

Fig. 28- The pinion is too far forward and works on the basis of the tooth: it is therefore necessary to replace the bevel gear pair.

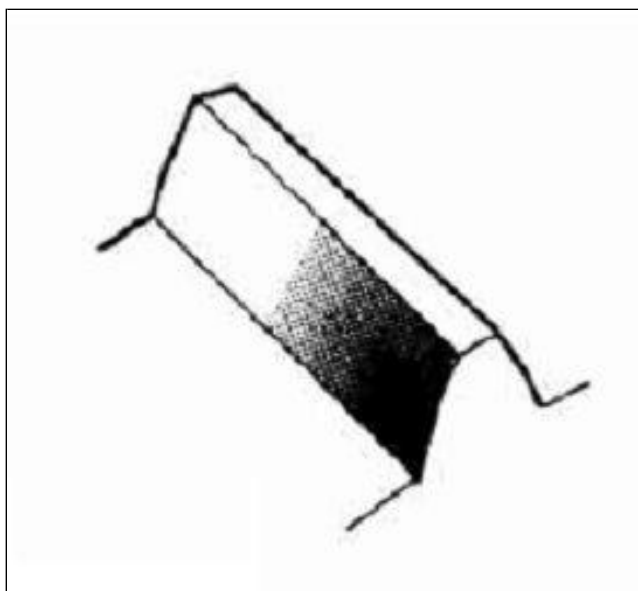


Fig.29

Fig.29 – The pinion is too far back and works hard on the head of the tooth, so it is necessary to add thickness of 0.2 mm. between the bearing and the housing.

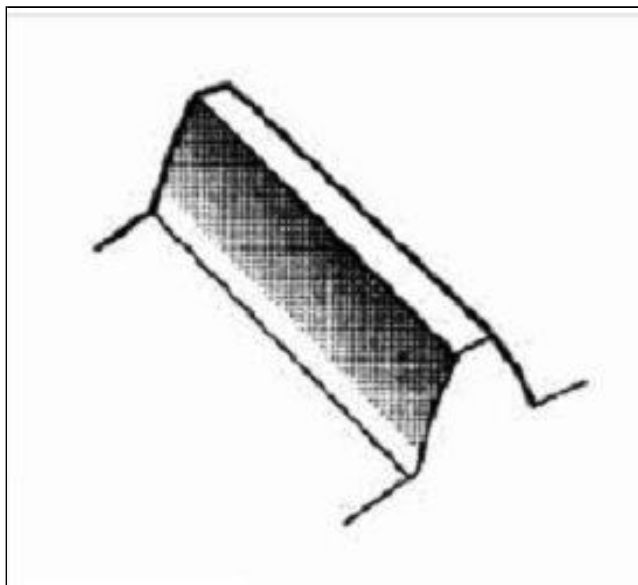


Fig.30

Fig.30 – The ring is too far from the pinion and works on top of the tooth, so it is necessary to unscrew the ring nut A of Fig. 23 and screw in the same manner the ring nut B.

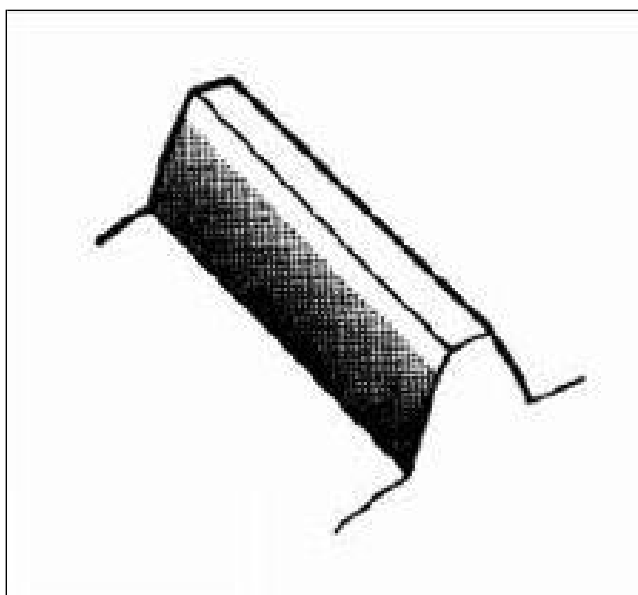
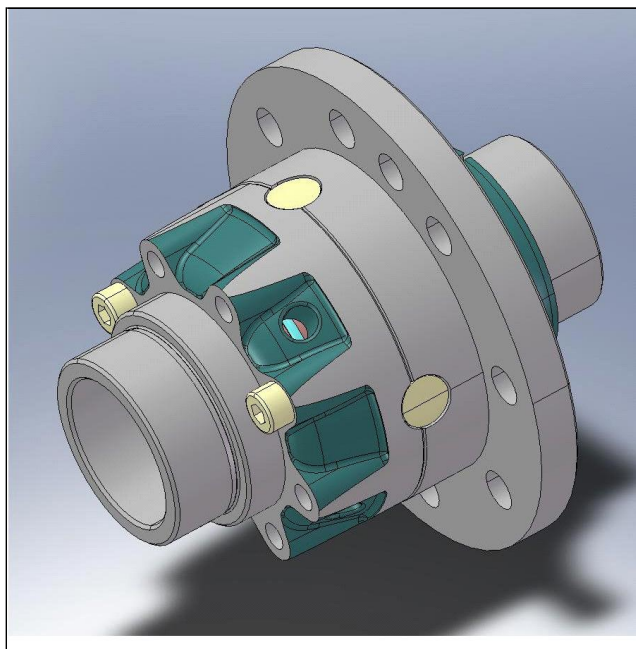


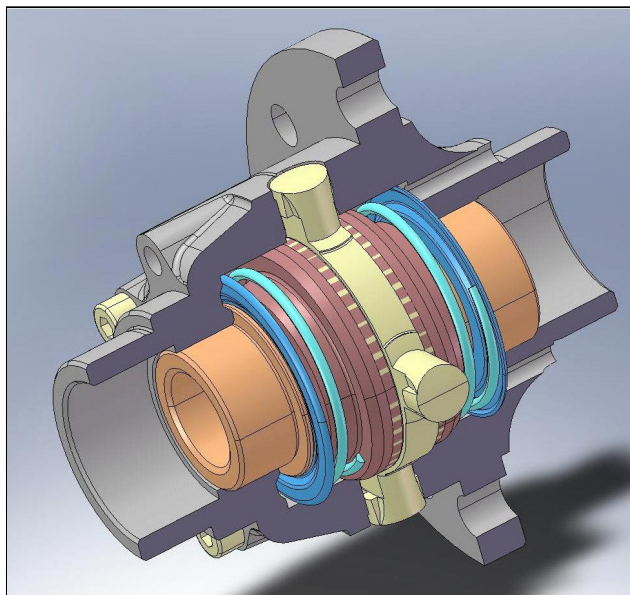
Fig.31

Fig.31 – The ring gear is too close to the pinion and works on the base of the works, so it is necessary to unscrew the ring nut B of the Fig. 23 and screw in equal measure the ring nut A.

54.40 - Differential with NOSPIN



nospin



Cutaway drawing



Fig.32

Fig.32 represents the differential group with the NOSPIN. The nospin device is provided with a inner stopper which must be removed once it has been assembled inside the nospin differential housing, see Fig.45. The two outer parts and the central cross-shaped part have got workings not interchangeable; therefore do not disassemble the overall assembly. As spare parts, the item is available as a complete unit, and single parts do not exist.

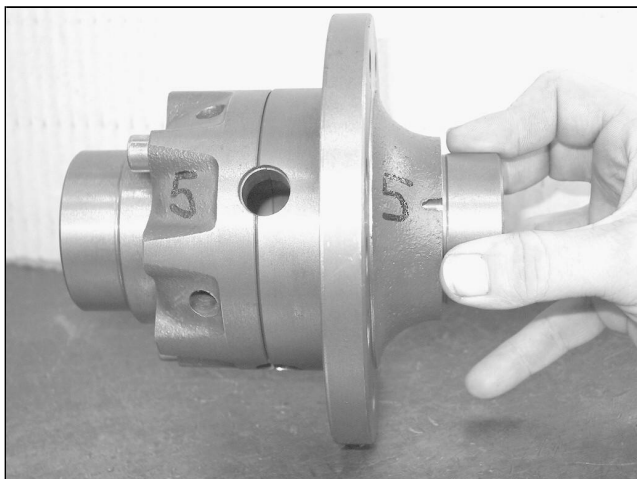


Fig.33

Before dismantling the NOSPIN differential box, mark the two half-housings of the box so that to refit it in the same position.



Fig.34

The pre-assembly phases of the bevel pinion on the differential box, are the same of the standard differential explained before. Compared to the standard version it changes the number of the teeth of the ring bevel gear; the reason why is to give much front wheels ratio which enable the functioning of the device.

At the bench, assemble the studs on the ring bevel gear.

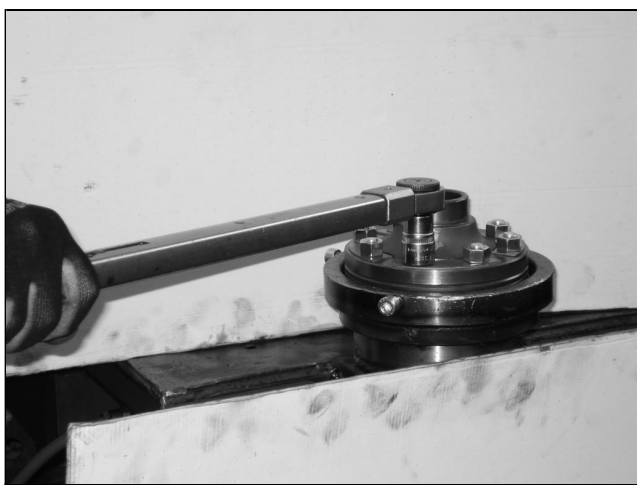


Fig.35

Mount the external differential nospin box on the ring gear, taking care to assemble the two safety pins in their seats so that the security plates keep in position. Tighten the nuts with a torque key to 8.5 kgm.



Fig.36

Reaffirm the plates around the nuts to prevent loosening.

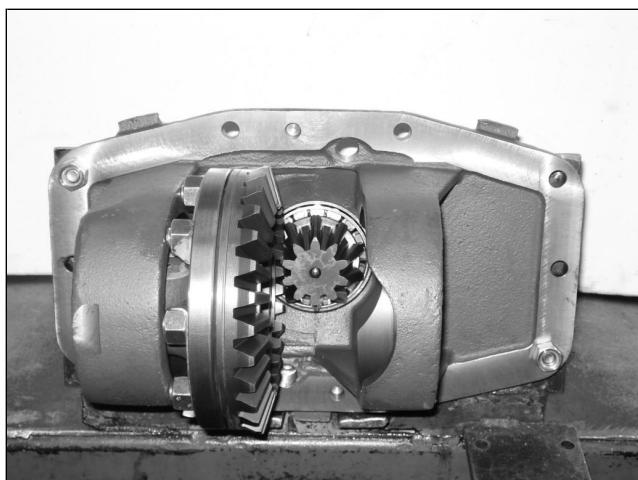


Fig.37

Mount the pre-assembled ring gear within the differential box.

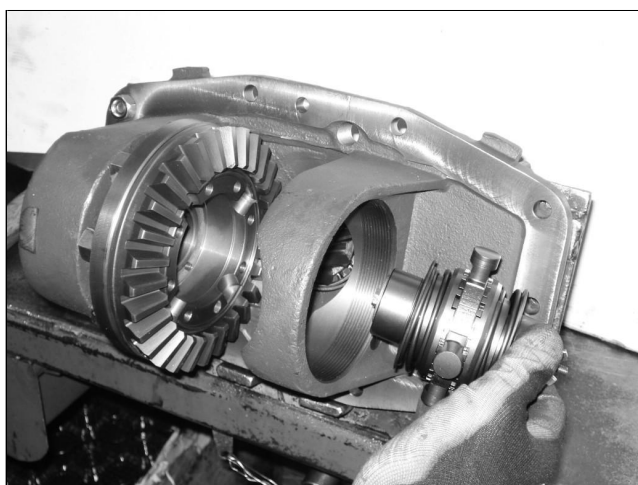


Fig.38

Enter the nospin inside the nospin differential box.



Fig.39

Install the internal Nospin differential box on the ring gear and tighten the screws to 5 kgm.

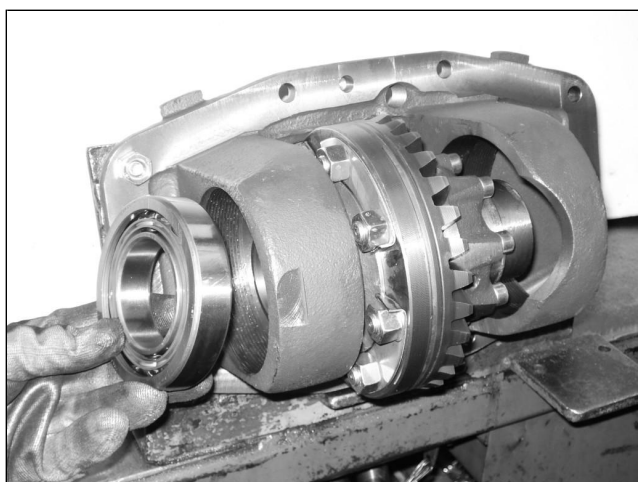


Fig.40

Install the bearings on both sides. The bearings are conical, pay attention to their orientation.

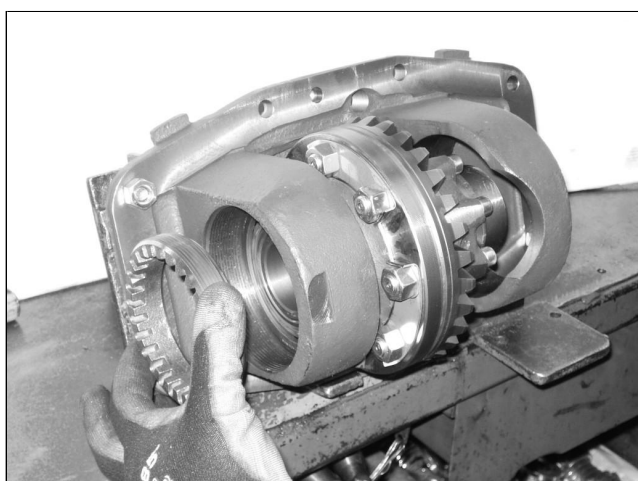


Fig.41

Install the ring nuts on both sides and see the smoothness of the conical bearing.



Fig.42

The smaller ring nut (M102x2) is close to the bottom then unscrew it of 3 notches. The opposite ring nut (M112x2) is also close to the end and tightened with a torque key to 4 kgm.

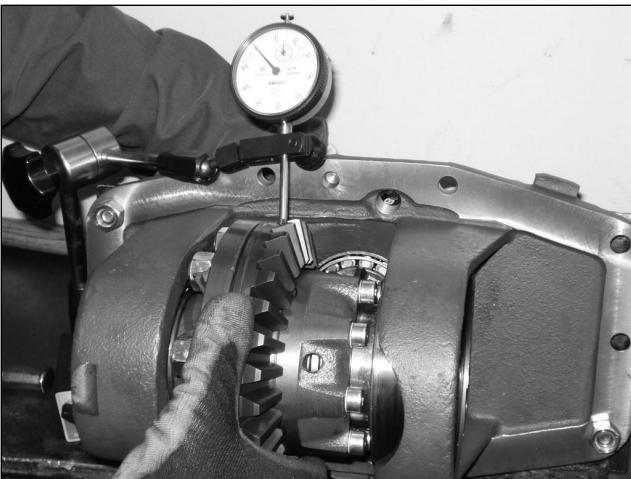


Fig.43

To register the mating pinion – ring gear act on the ring nuts in equal measure. The control of the play between the pinion and the ring bevel gear should be performed on the entire circumference and the play must be in the range of 0,10÷0,18 mm.

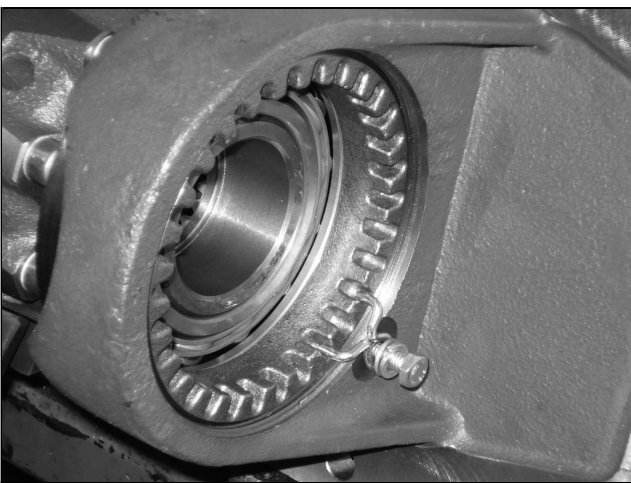


Fig.44

After the adjustment, tighten the ring nuts with the safety locks, ensuring the free rotation of the differential.

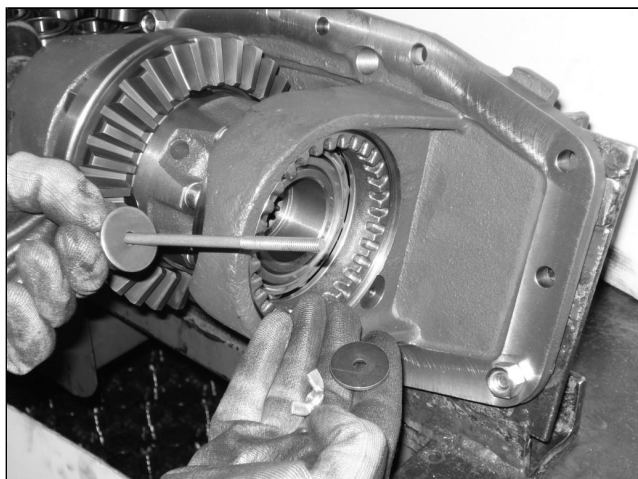


Fig.45

Remove the inner stopper of the nospin.



Fig.46

Once the assembly complete, the functioning of the device is tested with the help of two levers as shown in Fig. 46. When the two axle shaft to the differential rotate at the same speed (straight stretch) the differential block is engaged. When the two axle shafts rotate at different speed (a turn) the differential lock is disengaged and the wheel is free from the other.

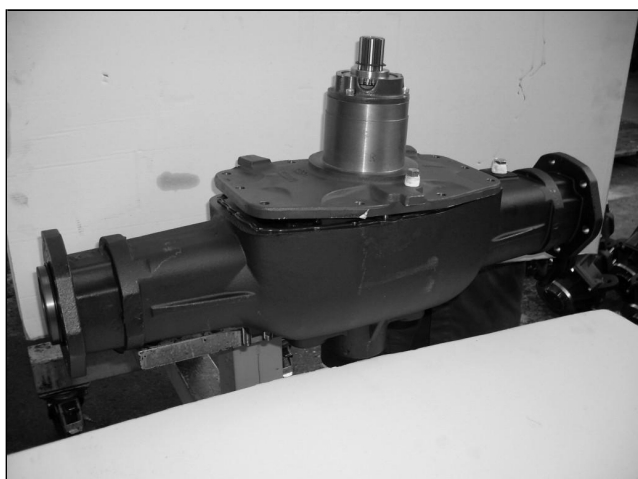
54.50 - Pre-assembly central front axle

Fig.47

Apply silicon on the contact surface with the axle that needs to be clean. Assemble the differential box unit pre-mounted on the axle.



Fig.48

On the bench, pre assemble the two internal axle-shaft with the bearing, the conical gear and the snap ring retainer.



Fig.49

Install the two axle shaft pre-fitted inside the axle. As shown in Fig. 49, the two inner axle shafts are different lengths, so pay attention to the mounting face.

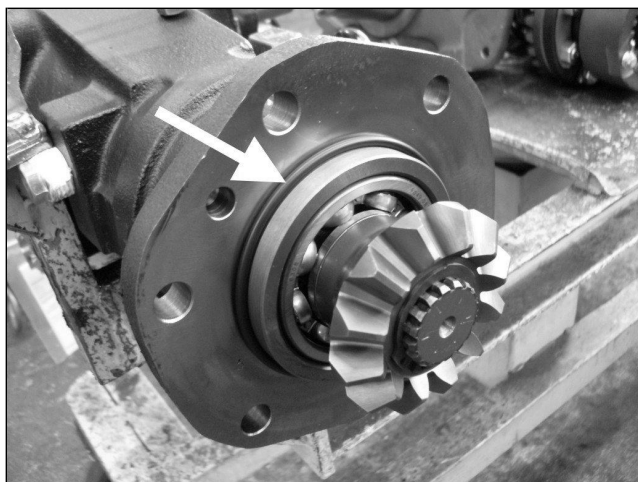


Fig.49 B

Install the O- ring acting as seal between the axle and the two final drives.

56.60 - Pre-assembly final drive cover

Fig.50

Install the bearing inside the final drive cover.



Fig.51

Install the snap ring retaining the bearing.



Fig.52

Turn the lid and fit the oil seal out.



Fig.53

Install the lid on the axle shaft and the O-ring that will seal between the cover and the final drive box.



Fig.54

Mount the final drive gear on the axle shaft and the inner bearing.

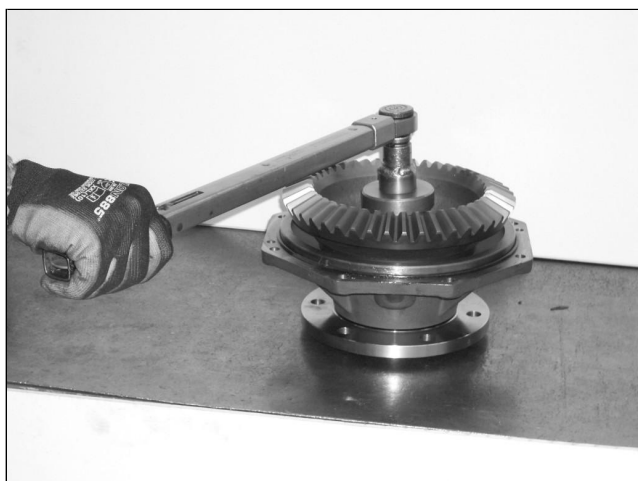


Fig.55

Install the washer and the ring nut which must be tightened to 15 kgm.



Fig.56

Now fold a washer wing and make a punching mark of the ring nut.

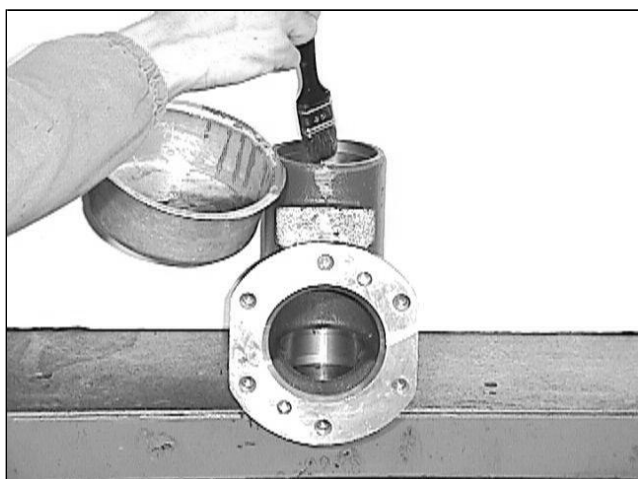
54.70 - Pre-assembly articulation flange - LOW VERSION

Fig.57

Lubricate the bearing housings and seals on both sides.



Fig.58

Install the inner bearing and the snap ring retainer.

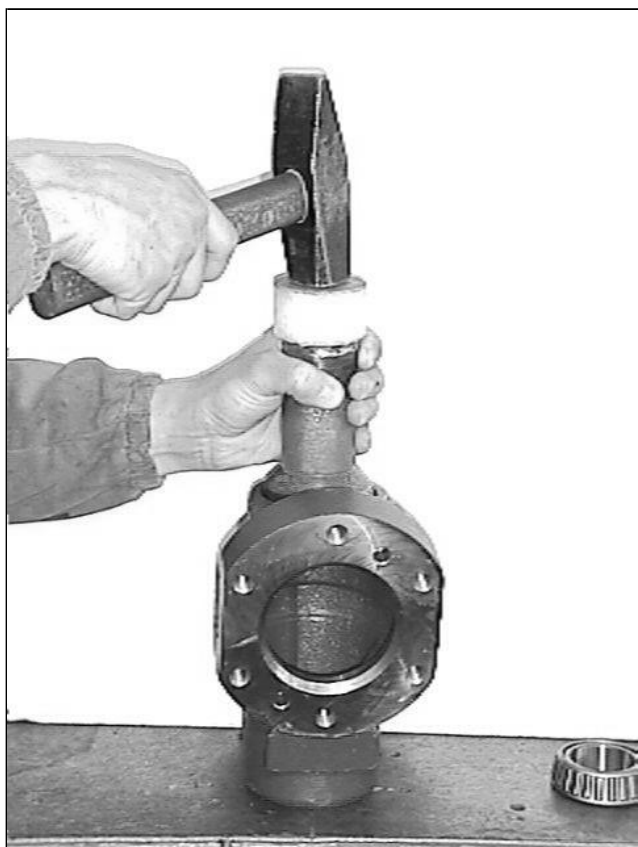


Fig.59

Install the conical bearing in both ends.

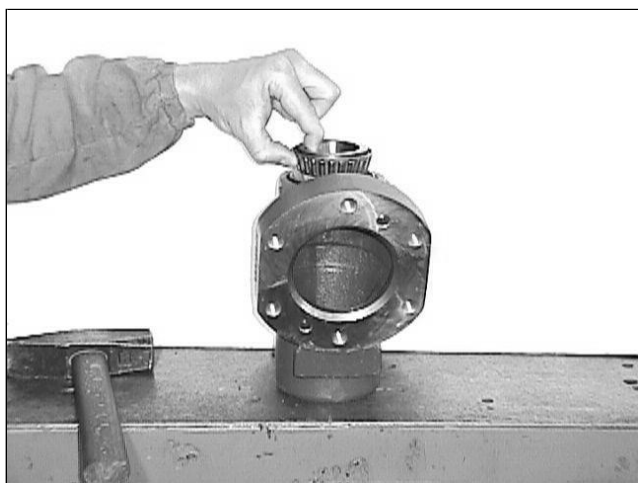


Fig.60

Pay attention to the orientation.



Fig.61

Install the outer oil seal on both sides.

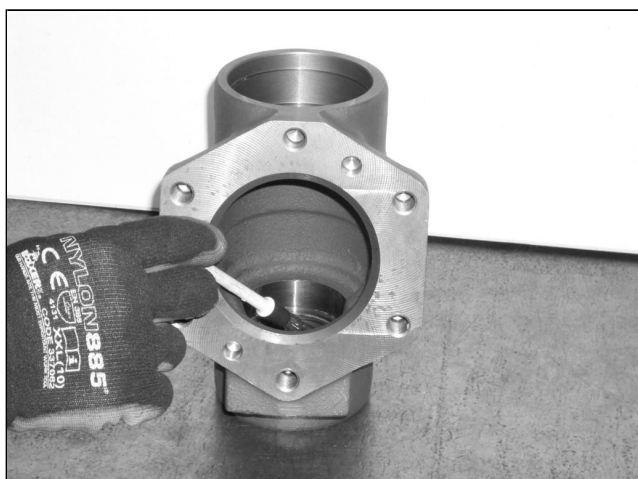
54.80 - Pre-assembly articulation flange - VERSIONE ALTA

Fig.62

Lubricate the bearing housings and seals on both sides.

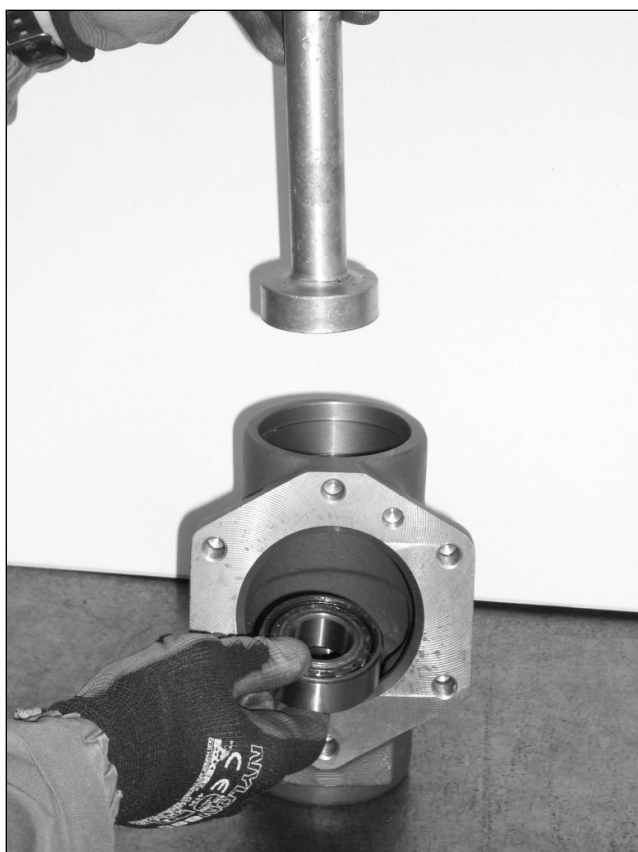


Fig.63

Install the inner bearing.



Fig.64

Install the conical bearing at both ends.



Fig.65

Pay attention to the orientation. Install the outer oil seal on both sides.

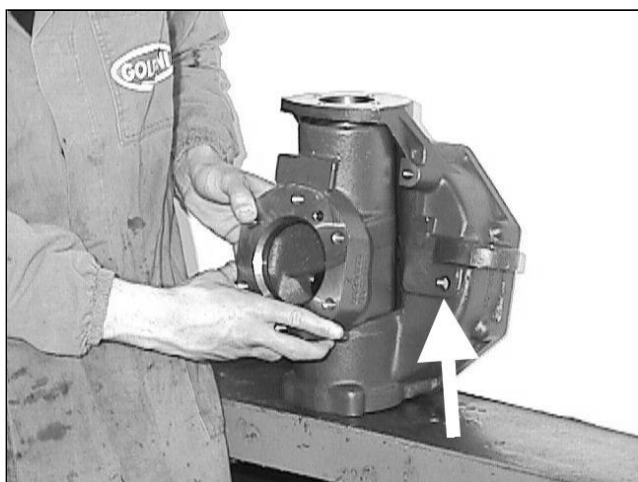
54.90 - Pre-assembly final drive box- LOW VERSION

Fig.66

Place the articulation flange inside the final drive box. In Fig. 66 you can see the oil dipstick on the final drive which should best be wrapped with Teflon to prevent leakage.

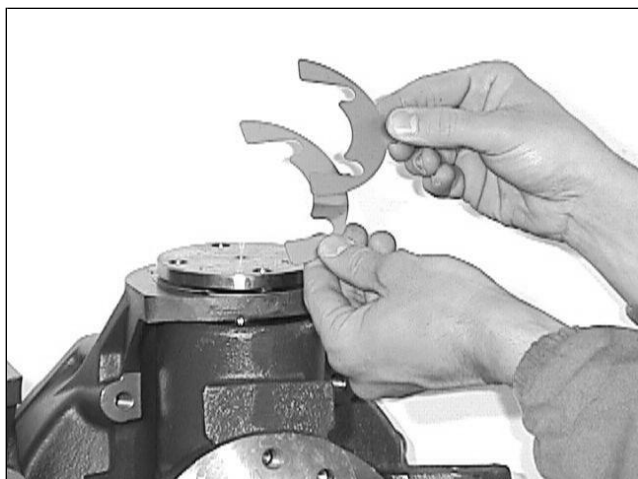


Fig.67

Mount the articulation pin of the final drive and make the shimming with the spacers, see Fig. 67. Then fasten the pin to the flange, the screws must be tighten to 5 kgm. After tightening the screws verify that the articulation flange has no play and that is not too hard.



Fig.68

Install the final drive shaft and the bevel gear inside the final drive.



Fig.69

In Fig. 69 the spacer is shown (see detail of Fig. 7) which is mounted on the final drive shaft before the final drive shaft flange.



Fig.70

On the bench, mount the O-ring on the final drive shaft flange and lubricate the seat and the O-ring.



Fig.71

Mount the final drive shaft flange inside the final drive box and by means of a hunting pins align the holes. The screws that secure the flange must be tightened to 5 kgm.



Fig.72

Assemble the final drive lid pre-mounted on the box of the final drive housing. For proper tightening of the screws of the cover, tighten the opposite screws to ensure a proper distribution around the entire perimeter of the final drive cover and avoiding pinching the O-ring seal. The tightening of the screws should be made to 6 kgm.



Fig.73

On the bench, mount the bearing on the lower final drive cap.



Fig.74

Fit the final drive pinion on the lid, place the O-ring seal to be lubricated.

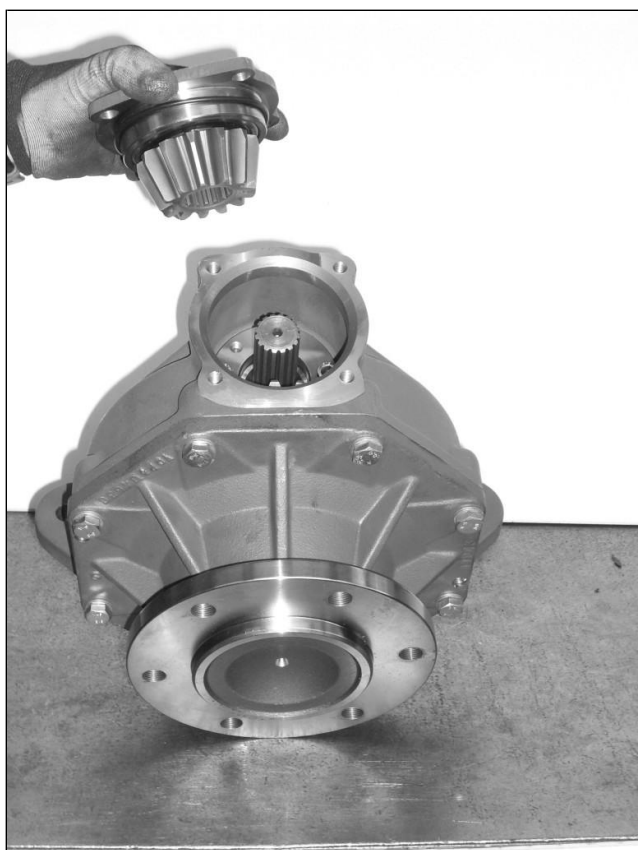


Fig.75

Mount the pre-assembled cover on the final drive housing and tighten the screws to 5 kgm.

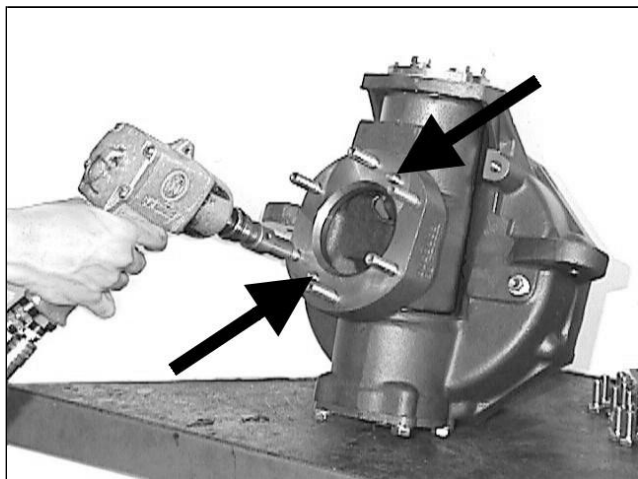


Fig.76

Place the two centring pin. Apply Loctite thread locker on studs that will be tightened to 6 kgm. On the final drive assemble the adjusting screws of the stop limit of the steering, which can then be registered on the tractor after assembly according to the type of tire fitted to the machine.

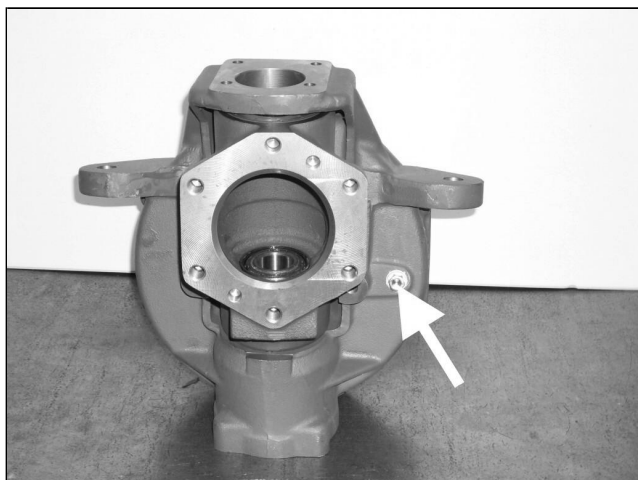
54.100 - Pre-assembly final drive housing - HIGH VERSION

Fig.77

Place the articulation flange inside the final drive housing. In Fig. 77 you can see the oil dipstick on the final drive which should be wrapped with Teflon to prevent leakage.

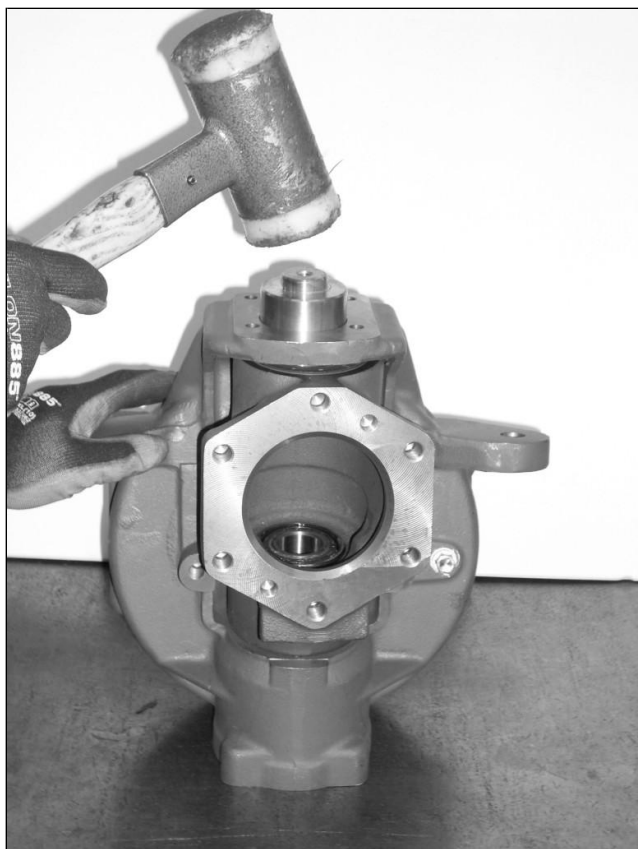


Fig.78

Mount the final drive articulation pin within the articulation flange.

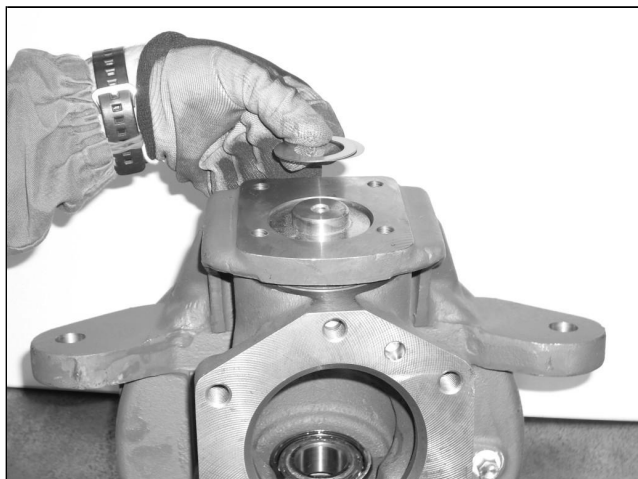


Fig.79

Position the spacers for the thickness of the outer flange.

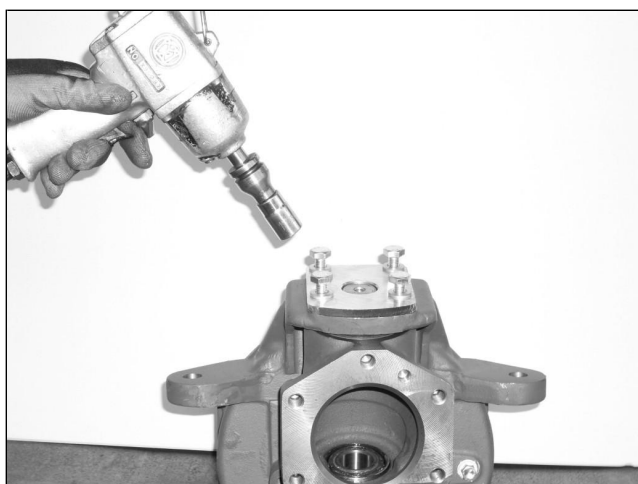


Fig.80

Install the outer flange and tighten the screws to 5 kgm. After tightening the screws make sure the articulation flange has no play and that is not too hard.

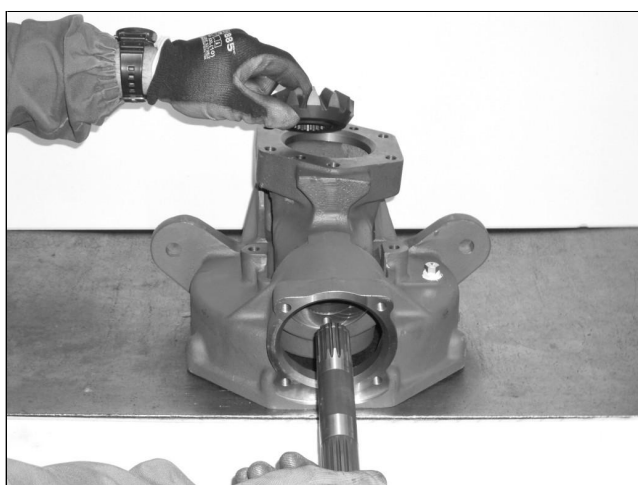


Fig.81

Mount the drive gear on the final drive shaft.

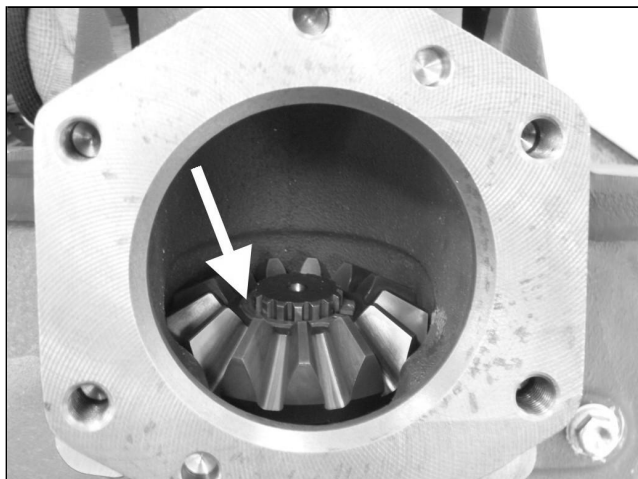


Fig.82

Install the snap ring retainer on the final drive shaft.



Fig.83

On the bench, mount the O-ring on the final drive shaft flange and lubricate the seat and the O-ring.



Fig.84

Mount the final drive shaft flange inside the final drive box and by means of a hunting pins align the holes. The screws that secure the flange must be tightened to 5 kgm.



Fig.85

Assemble the final drive lid pre-mounted on the box of the final drive housing. For proper tightening of the screws of the cover, tighten the opposite screws to ensure a proper distribution around the entire perimeter of the final drive cover and avoiding pinching the O-ring seal. The tightening of the screws should be made to 6 kgm.



Fig.86

On the bench, mount the bearing on the lower final drive cap.



Fig.87

Fit the final drive pinion on the lid, place the O-ring seal to be lubricated.

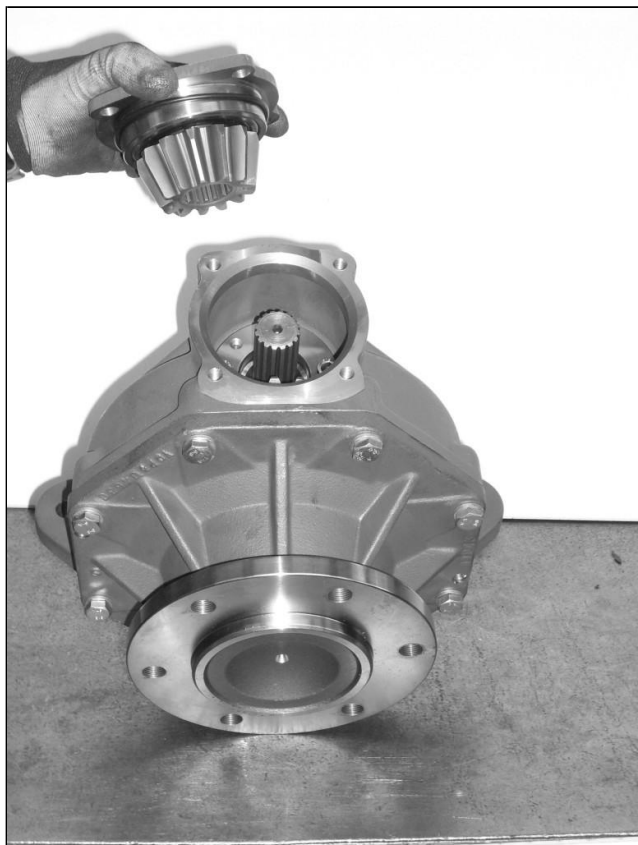


Fig.88

Mount the pre-assembled cover on the final drive housing and tighten the screws to 5 kgm.

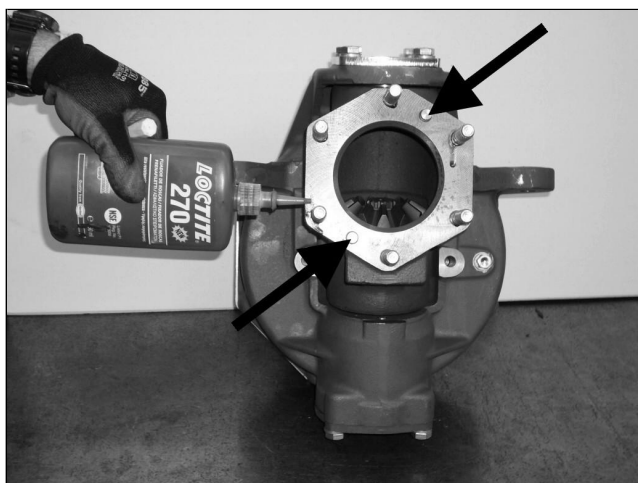


Fig.89

Place the two centring pin. Apply Loctite thread locker on studs that will be tightened to 6 kgm.

54.110 - Assembly of the final drives on the axle

Fig.90

Do not forget the pre-assembly of the spacer shown in Fig. 90.

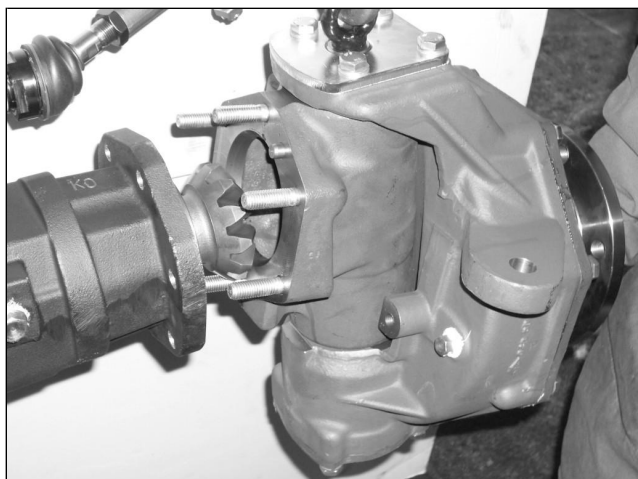


Fig.91

Mount the final drive group on the axle.



Fig.92

Tighten the nuts that secure the front final drive unit with a torque key to 8 kgm.

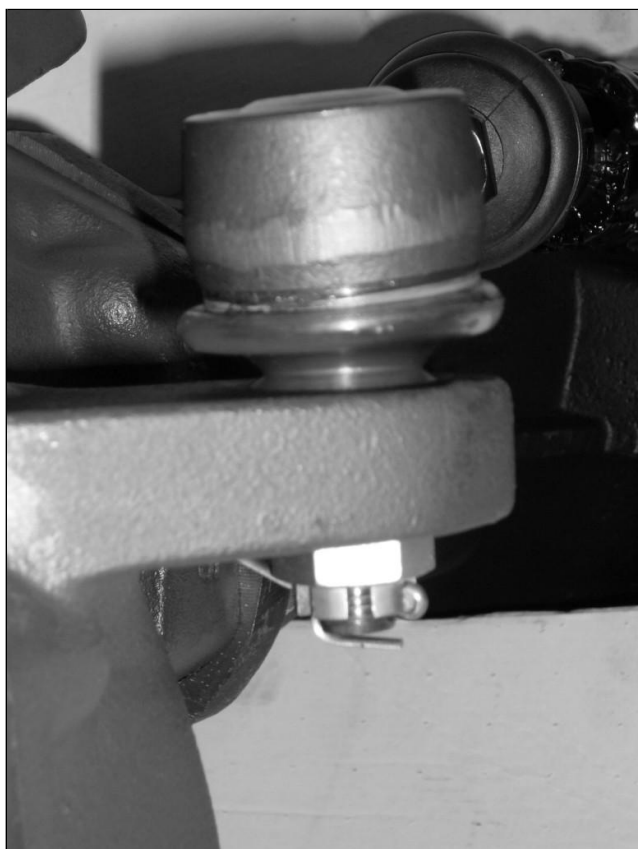


Fig.93

After mounting the ball joint on the articulation flange, tighten the nut, install the split pin that must be opened to prevent the nut from unscrewing.

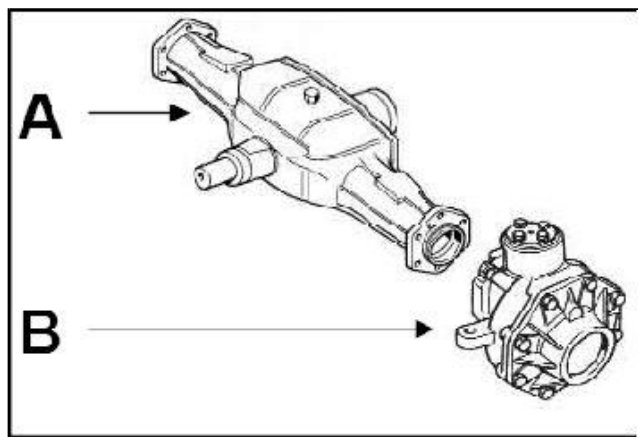


Fig.94

Complete the axle by covering the axle support (A) with about 6 liters of oil and about 1 liter of oil each final drive (B).

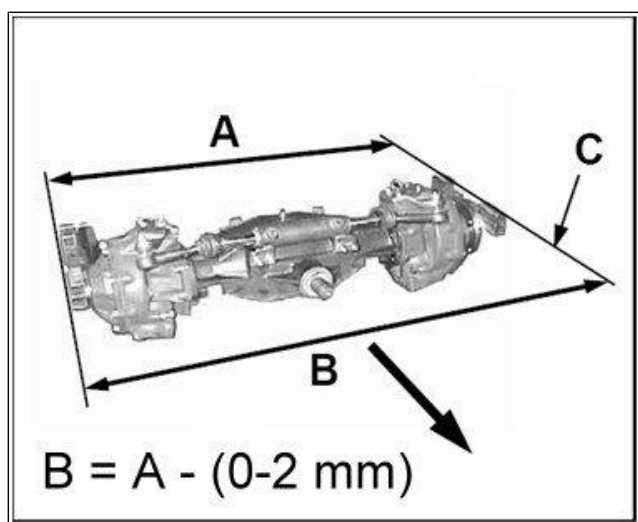


Fig.95

To ensure proper tire wear and proper setting of the steering, register the wheels toe-in as shown in Fig. 95 taking care to correspond with the data. The two rods C are 80 cm long.



Fig.96

To obtain the correct toe-in, act on the adjustment of the steering ball joints.



Fig.97

After making the adjustment, tighten the ring nuts to 8 kgm.



Fig.98

In the Fig.98 the breather on top of the axle is shown that must be fitted with a 2 kgm of torque with inserted a copper washer.

54.A - Tightening torque front axle

Tightening torque expressed in kgm

Cover fixing screw final drive M 10x30 - 6

Ring nut fixing bevel pinion M 35x1,5 - 4

Fixing screw differential support to front axle M 10x30 - 6

Screw and nut fixing the ring bevel gear M 12 - 8

Fixing screw final drive front axle M 10x30 - 6

Fixing screw bevel pinion lid M 6x16 - 1,5

Fixing screw 2 half-housing NO – SPIN - 5

Ring nut fixing ring gear - 15

Ring nut M 112x2 – 4

Wheel to the axle shaft mounting screw 16x1,5 - 22

54.B- Nedeed tools group front axle

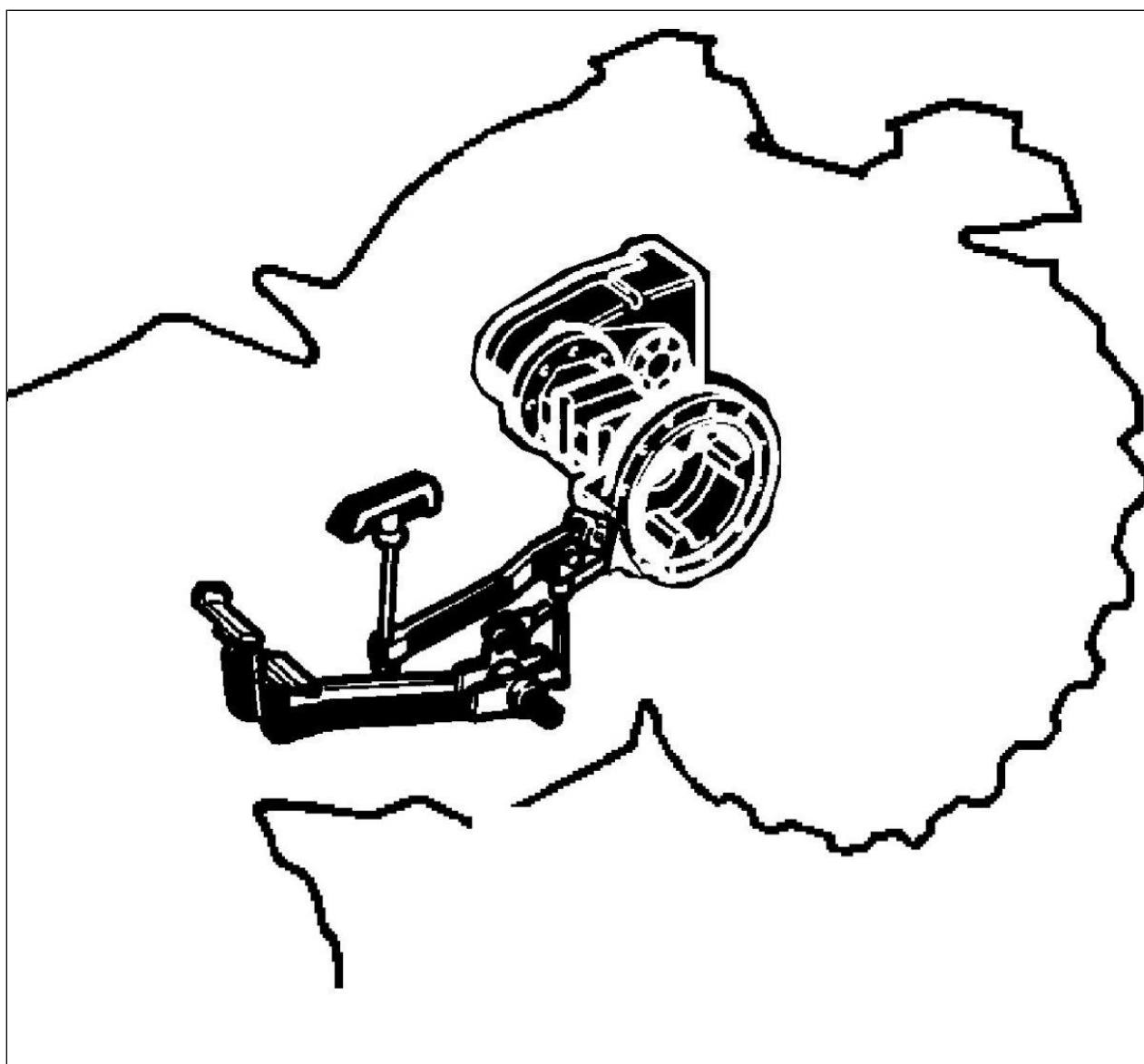
CODE	DESCRIPTION	QUANTITY
07000215	TRANSMISSION SUPPORT	1
07000237	RING NUT KEY	1
07000243	KEY FOR NOSPIN RING NUT	1

54.C - Lubricants

Oil ARBOR TRW90 (SAE 80W-90)

Use lubricants and fluids: PETRONAS LUBRICANTS

57 - BRAKES



BRAKES ADJUSTMENT

57.10 - Braking devices (Execution 1)

• SERVICES

1. Mechanical braking of the rear axle through mechanical transmission which acts on discs in oil bath.
2. Electro-hydraulic inserting of the four-wheel drive with multi-plate clutch in oil bath

• PARKING

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

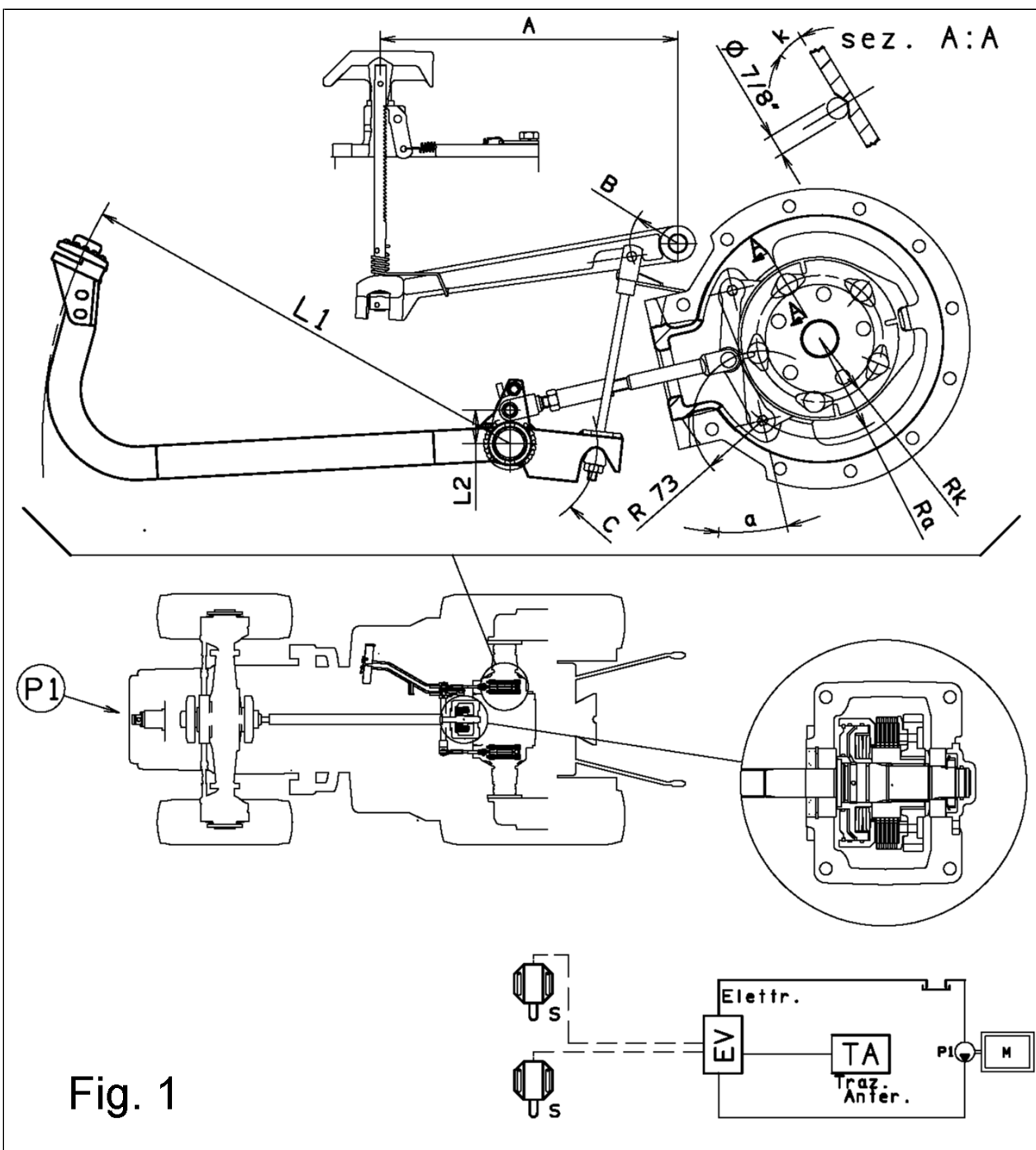


Fig. 1

SERVICE BRAKE		
<i>Service brake pedal</i>		
Lenght of active lever (L1)	mm	465
Lenght of resisting lever (L2)	mm	35
<i>Brake pumps (P1)</i>		
Displacement	cc / rpm	11
Pressure	Bar (MAX)	210

SERVICE AND PARKING BRAKE		
Service brake pedal A		310 mm
Lenght of resisting lever B		50 mm
Length brake pedal C		92 mm

BRAKING SURFACES	
Axle	Rear
N° Disc for each wheel	6
Total braking surfaces	2684,8 cm ²
Employed material	N 611

REAR AXLE BRAKE	
Service brake pedal (Rα)	105 mm
Lenght of resisting lever (Rk)	66,5 mm
Aplication angle active lever (α)	26°
Application angle resisting (K)	19°
External disc diameter (De)	165,22 mm
Internal disc diameter (Di)	112 mm

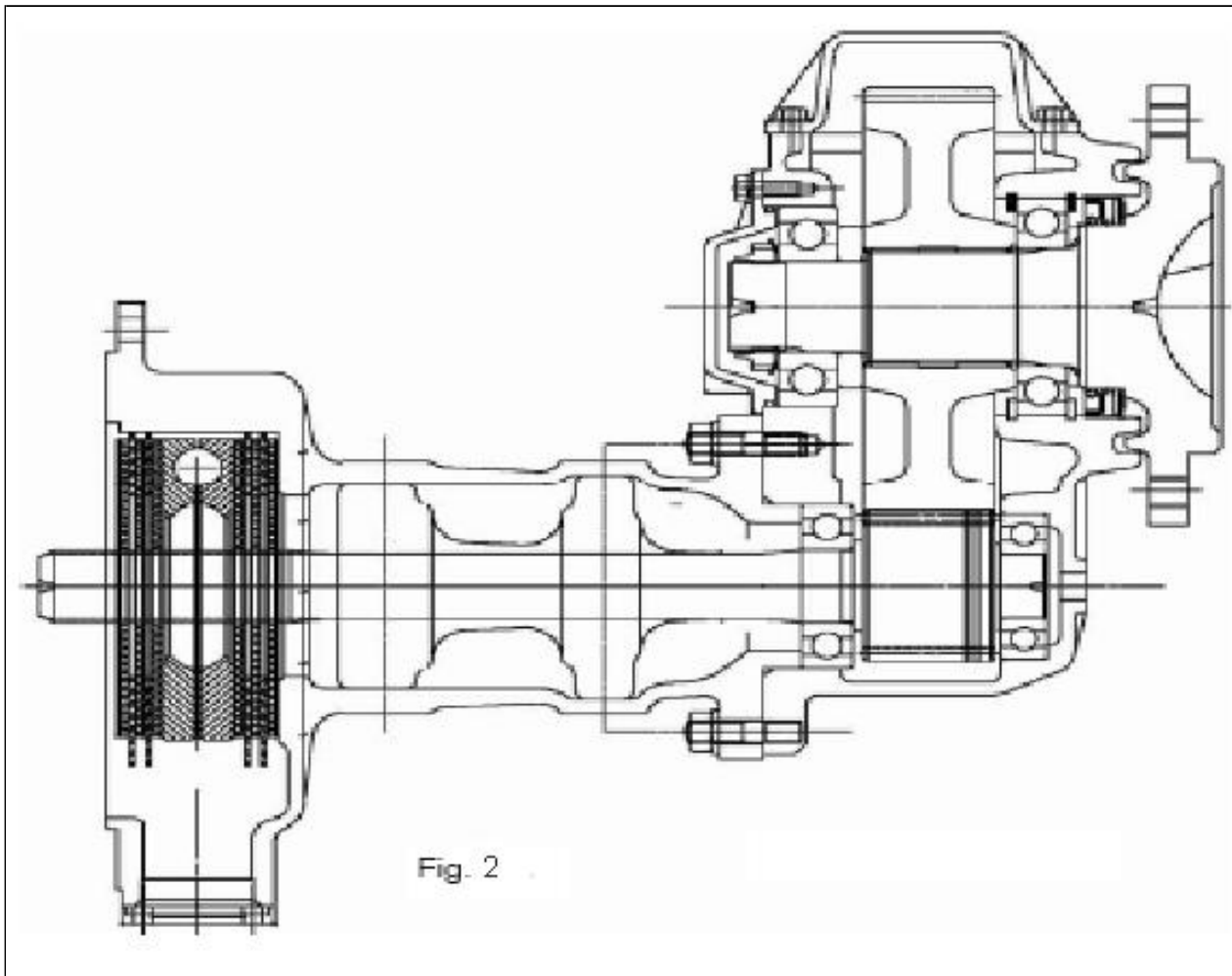


Figure 2 illustrates the constructive scheme of the left rear hub including the braking body made of brake discs in oil bath. The friction discs are six, while the steel ones are four. The braking bodies are two on the rear axle, whereas the front axle is made integral, and then slowed down from the rear one, by inserting the driving gear during braking. The type of brake is expanding: two discs run on two discs ball rolling on a cutting with varying thickness and shall match, using two brake hangers, the pull acting on the rod activates a rotation and then a boost on the friction discs. The rod, when braking, extends about 2 mm and this through the brake pedal lever ration corresponds to a lowering of the platform of the pedal of about 35 mm.



After removing the complete wheel, unscrew the screws securing the rear platform to the rear support

driving form.



Remove the tie rod stabilizer.

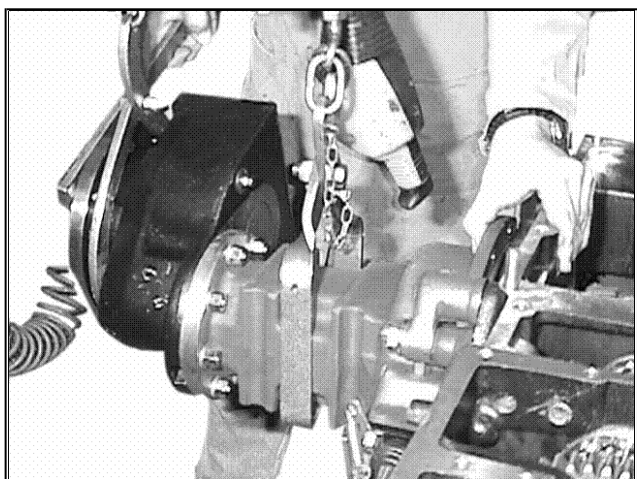


Remove the tie rod connecting the brake transmission lever to the rod of the braking body plus the recovery spring.

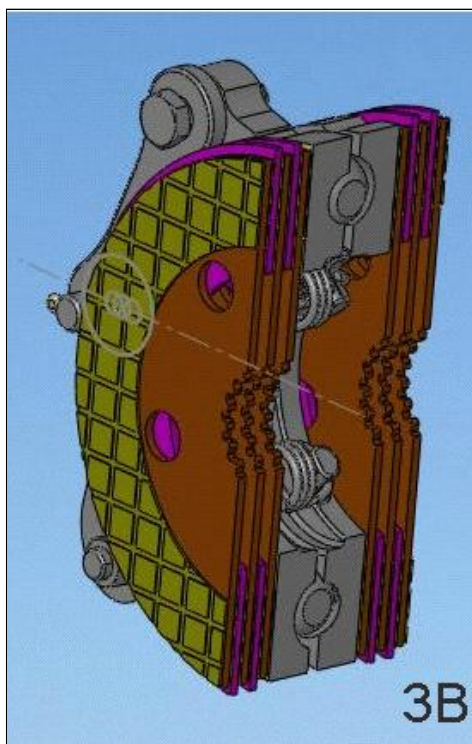
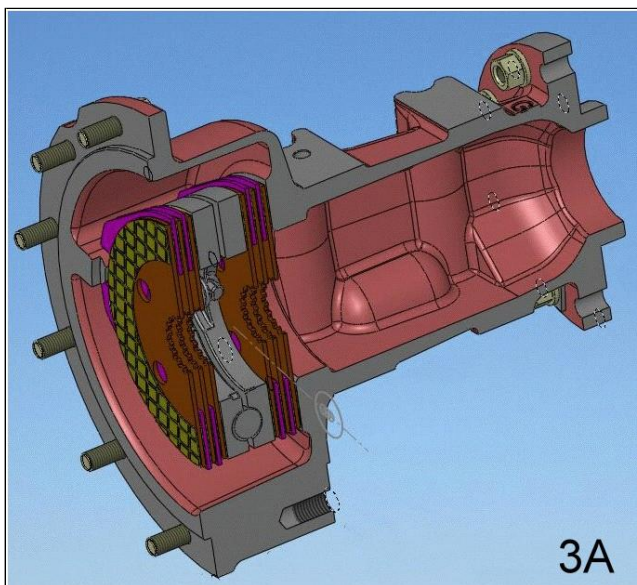


Remove the rear cross support plate, the rear cross mudguards and lift the tank slightly by inserting a

thickness between the tank and the lift housing.



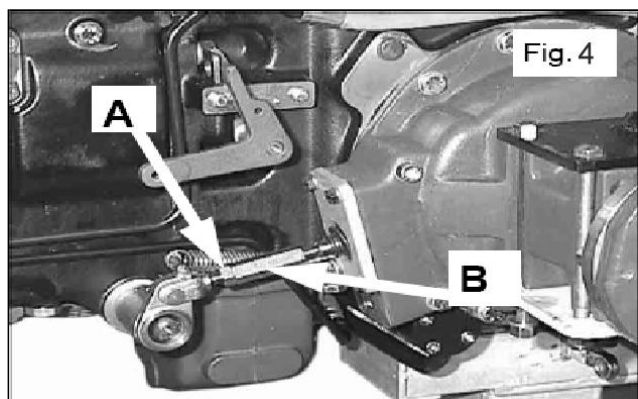
Unscrew the bolts of the hub to the rear differential housing and using the appropriate tool, remove the complete unit (hub + reduction gear).



The thickness of the friction material of the brake discs must never be less than 3.8 mm. When replacing brake discs, you must keep them in oil for at least 12 hours before installation. When replacing the brake discs and the brake body on the hub, pay special attention to the sequence to be as in picture Fig. 3A and 3B; four brake discs on the left side of the braking body and two brake discs on the right side of the braking body, clearly alternating them to the fixed discs (valid for the left hub). Verify that the brake rod of the braking body be centred with the hub hole.

At this point you can replace the whole unit (hub + reduction gear) to the rear differential housing, applying silicon on the surface, previously well cleaned, and tighten the screws that secure it to 8 kgm.

57.20 - Adjusting service brake



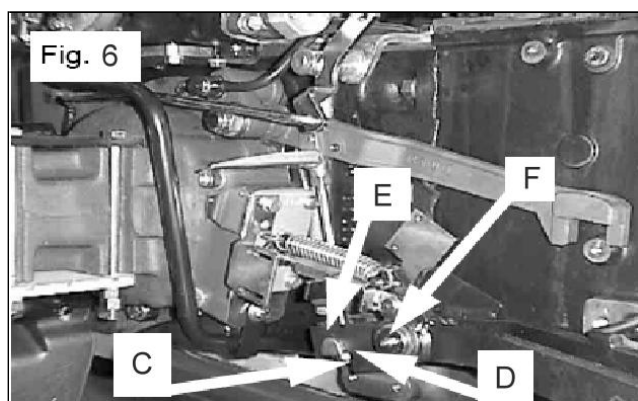
A properly functioning of the service brake provides the braking action begins after a free run of the pedal about 35-40 mm. To register you need to :

- Loosen the nut **A** in figure 4;
- act on the rod **B**;
- after the adjustment, tighten nut **A**.

Check the simultaneous braking on two wheels and take action, if necessary, on the wheel that locks in advance by loosening the tie rod. After having registered, you should grease the inner bushings supporting the brake pedal, through the greasers **F** in picture 6.



In figure 5 are represented the service brake pedals at rest. Their height from the platform is about 15 cm. When the adjusting is excellent, the pedal, from this distance, drops to 30-35 mm. to start braking.

57.30 - Record of emergency and parking brake

A proper functioning of the emergency brake requires that the control lever has a run of 6-7 shots.

To register you must:

- position the control lever as mentioned above.
- act on the nut **C** in Figure 6 to bring the block **D** in light contact with the lever **E**.

57.40 - Replacement protective cover



If you need to replace the protective cover on the left hub, take off the tie rod connecting the brake transmission lever to the rod of the braking body, the recover spring and the coupling flange cover. At this point you can replace the protective cover, make sure that the split pin of the pin on the tie rod of the braking body does not interfere on the cover.



If you need the protective cover on the right hub, take off the tie rod connecting the lever of the brake transmission lever to the rod of the braking body, the recover spring, the support of the brake switch and the coupling flange cover.

At this point you can replace the protective cover, make sure that the split pin of the pin on the tie rod of the braking body does not interfere on the cover.

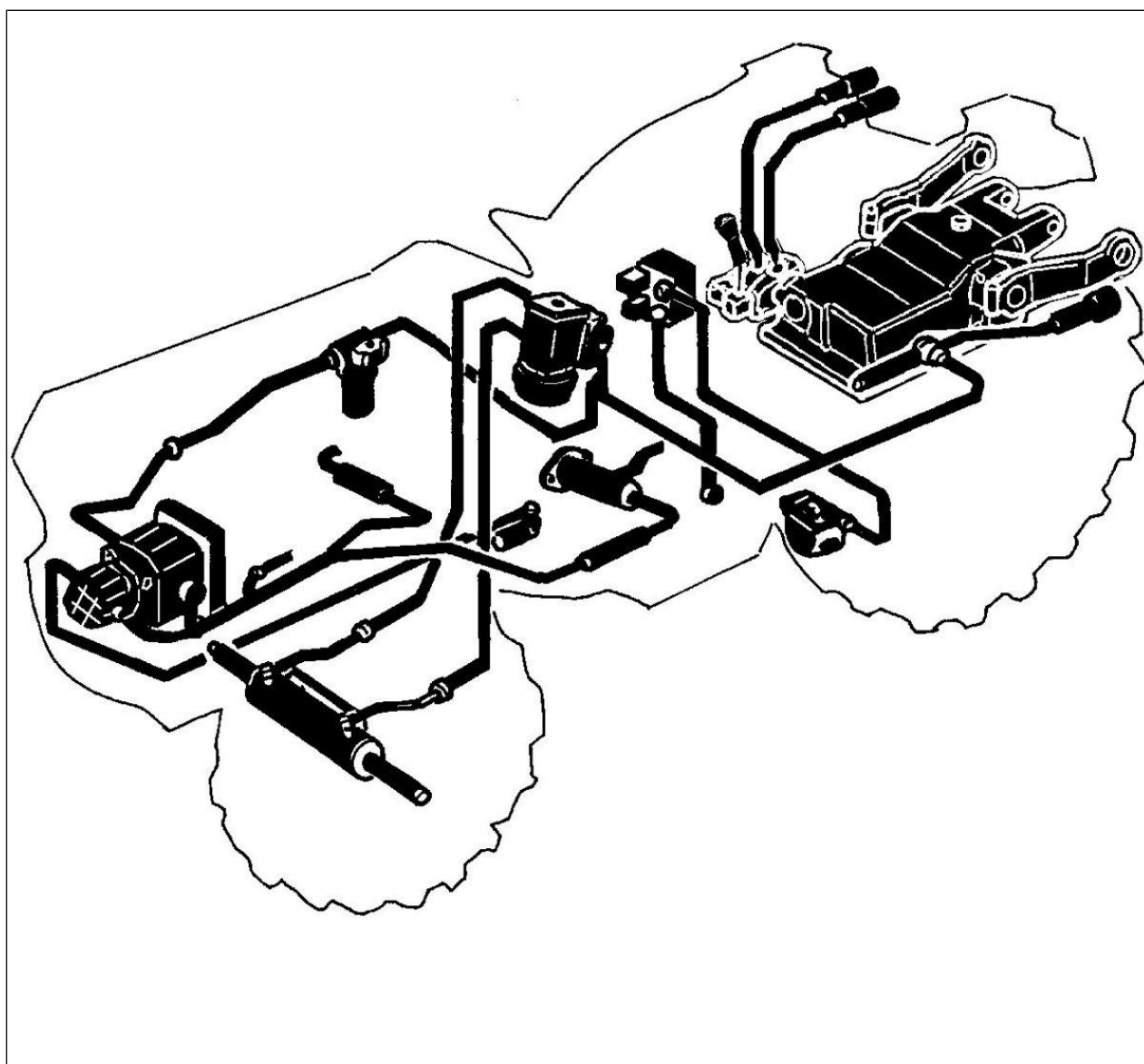
57.A - Tightening torque assembly brakes

Tightening torque expressed in kgm

Screw support fixing the gear reduction axle shaft to the differential housing 8

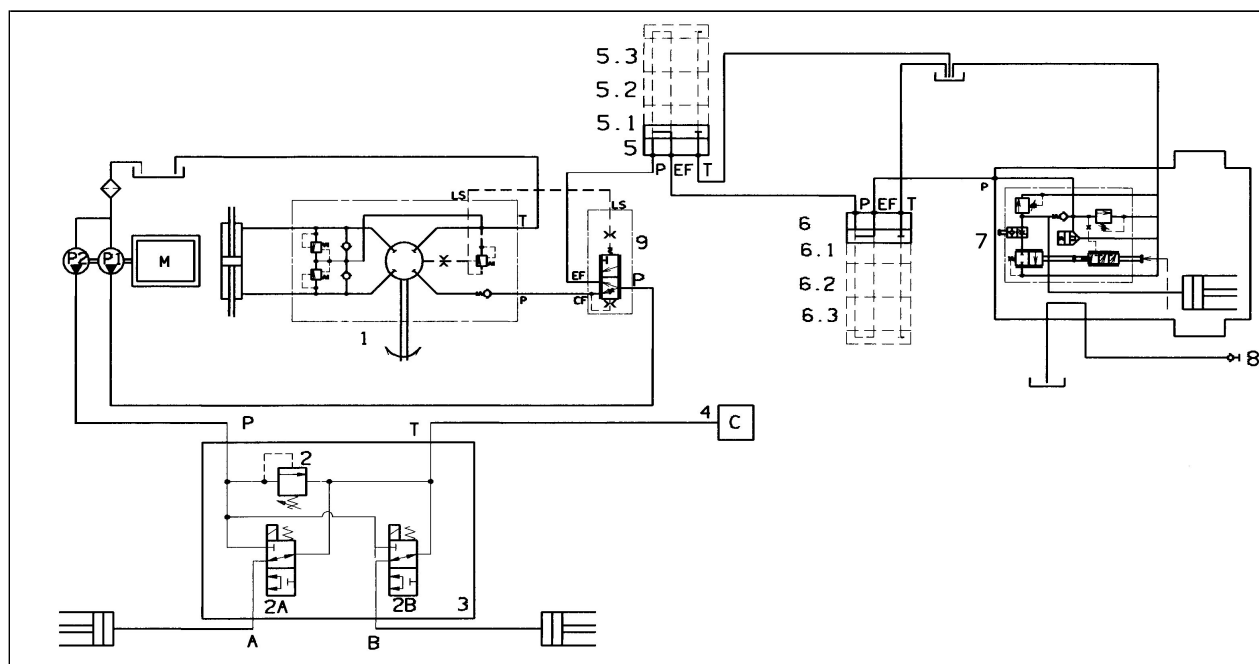
Cover fixing screw oil seal M 8 x 25 3

60 - HYDRAULIC SYSTEM



HYDRAULIC SYSTEM ADJUSTMENT

60.10 hidraulic system specifications



1	Hydraulic drive system
2	Maximum pressure valve for the services.
3	Solenoid valves to control front wheel drive and differential lock engagement
4	Forced lubrication valve of the gearbox
5	Flange of front hydraulic auxiliary control valves (optional)
5.1	Front hydraulic auxiliary control valves (optional)
6	Flange of rear hydraulic auxiliary control valves
6.1	Rear hydraulic auxiliary control valves
7	Rear power lift
8	Direct discharge external auxiliary
9	"LS" valve for steering



Warning: None of the components downstream will receive oil when a control valve is operating.
E.g.: The rear control valve of the lifting circuit will not receive oil if the front control valve is operating.

60.20 - Hydraulic pump



Fig.1

The tractor is equipped with a double pump, the first supplies power to the steering, distributor valves and the lift, the second feeds the four-wheel drive, the differential lock and the lubrication of the gear. The hydraulic pump is located on the right side of the machine. To test it you should mount a pressure gauge with full scale of at least 250 bar on the rear quick couplings and check the pressure to be 180÷190 bar. This procedure should be done either hot or cold machine. If the pressure change, from hot to cold, is high, it is a sign of pump wear.



Fig.2

If the pressure observed is not that given, replace the pump. To do this remove the lens assembly of the indicator with its support and the right side hood.

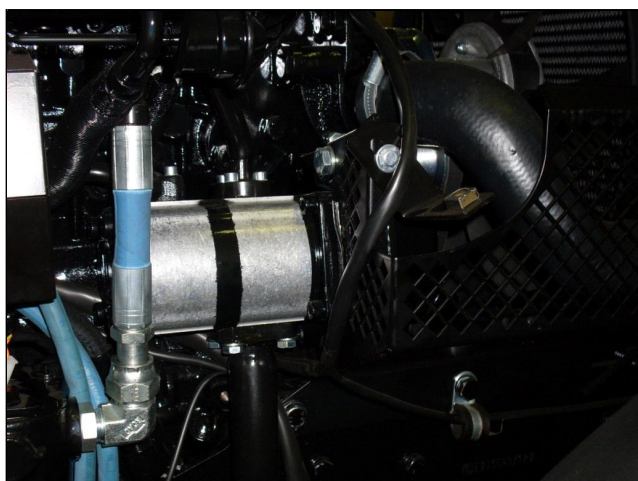


Fig.3

Then unscrew the hydraulic hoses and replace the pump.

60.30 - Steering unit

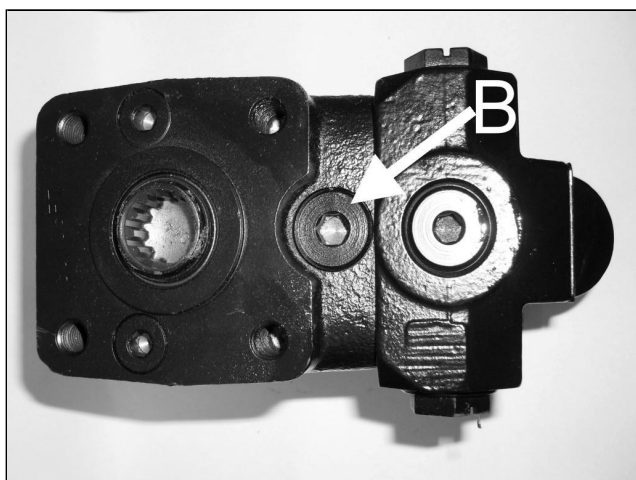


Fig.4

The relief valve of the steering unit is set at 130 bar.

The cap **B** in Fig.4, gives access to the valve setting maximum of the steering unit.



Fig.5

The calibration/setting of the relief valve can be verified by inserting on the delivery pipe steering unit-steering cylinder the pressure gauge CODE 07000122 and bringing the steering cylinder to its limit stop on the right or on the left.

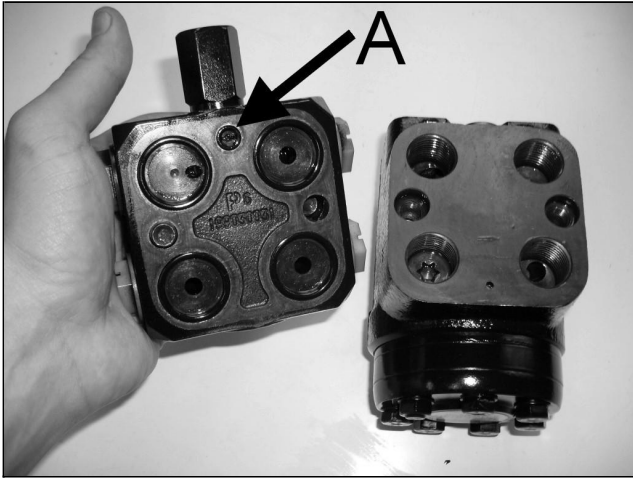


Fig.6

Fig. 6 shows the detail **A** of the branch of the load-sensing of the steering unit, which is used for piloting the valve by the steering unit. When we act on the steering wheel a small amount of oil pass through the passage and goes to operate the load-sensing valve that picks up from the hydraulic system the oil required to operate the steering.

Malfunctions to the steering unit can be caused by contamination that clog the hole **A** or the valve spool, thus hindering the proper functioning of the unit.



Fig.7

To clean the valve, the steering unit must be removed as follows:
remove the steering wheel by using the proper puller code 07006212, the hand throttle lever and the shuttle reverse lever.

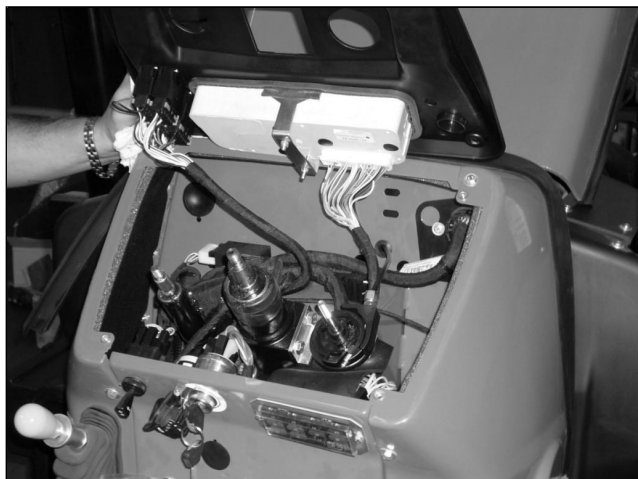


Fig.8

Remove the dashboard and connect cables from the instrument.



Fig.9

Remove the gearbox cover after having removed the handle of the hand brake, the lever 12+8 8+8 and the handle of the PTO engagement.

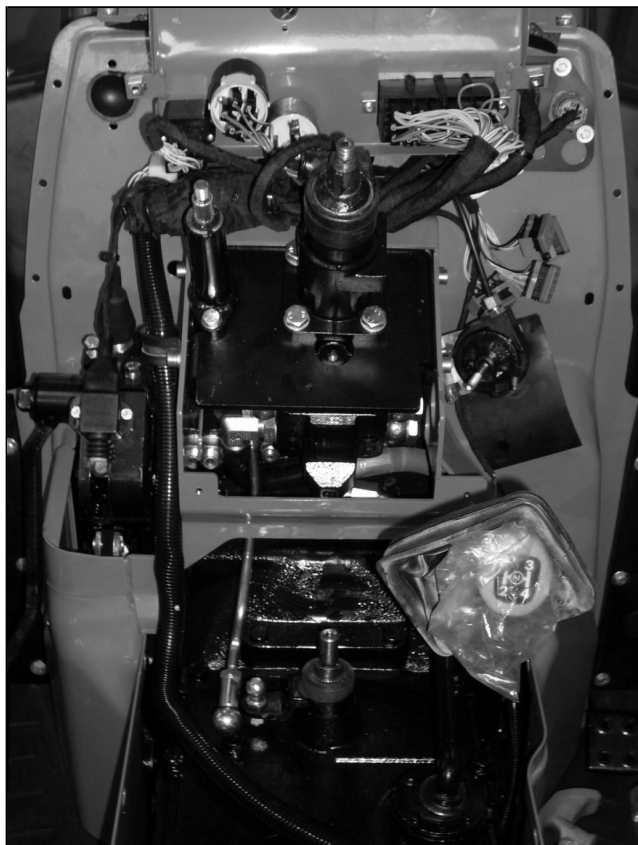


Fig.10

Remove all the cover panels to have access to the steering unit support.

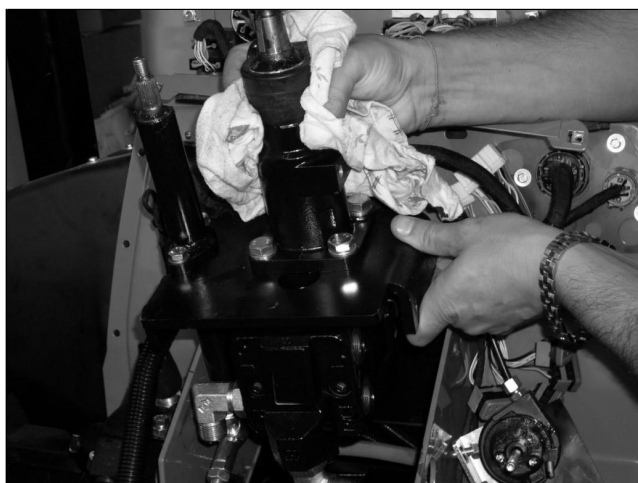


Fig.11

After removing the tie rod of the shuttle reverse lever and the hydraulic hoses from the steering unit, proceed with the removal of the complete support and steering unit.

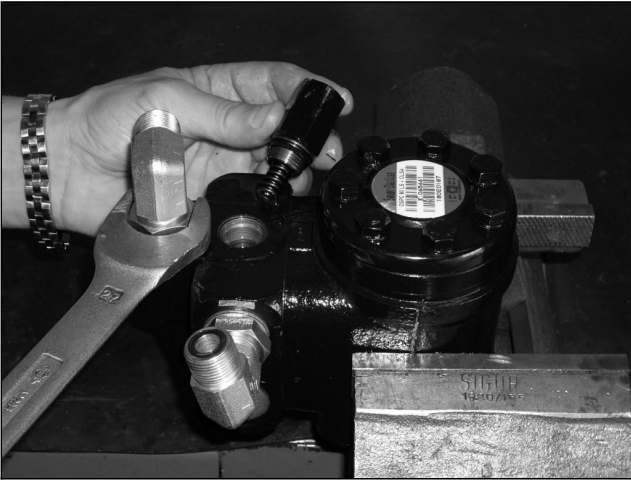


Fig.12

After removing the steering unit from its support, proceed with the removal of the hexagonal stud.

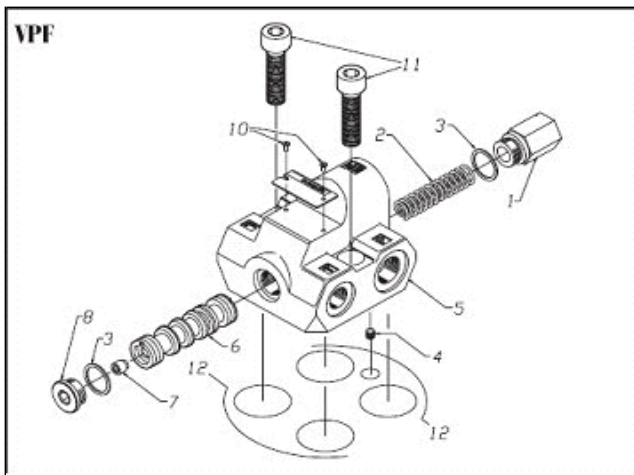


Fig.13

Proceed to clean the inside of the priority valve, taking care to reassemble the components in the right order, see Fig 13. If you need more details of the activities, please refer to the Use and Owner's manual of the manufacturer.

60.40 - Front hydraulic auxiliary control valves



Fig.14

In the event that the tractor is equipped with front distributors, the block valves are located as in Fig 14. On the front distributors support flange, there is also a relief valve that operates on the maximum pressure available for the circuit.

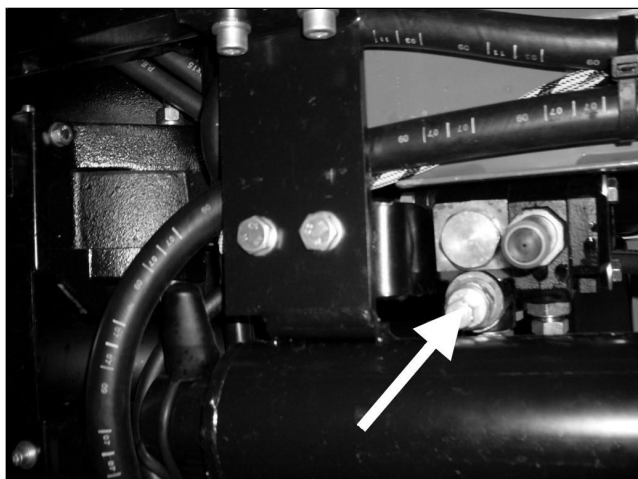


Fig.15

This valve is externally identical to the rear valve distributors in Fig 15. If this setting is under 180-190 bar, this value becomes what determines the maximum pressure of the entire circuit.

60.50 - Rear hydraulic auxiliary control valves

Fig.16

The rear distributors are 3 in a single block, in the figure it is highlighted the relief valve of the main hydraulic circuit, which determines the maximum operating pressure of the rear distributors (180-190 bar) and it is located after the steering unit on the support plate of the rear distributors. To access the relief valve disassemble the upper crosspiece of the fender and the protection plate of the distributors levers.

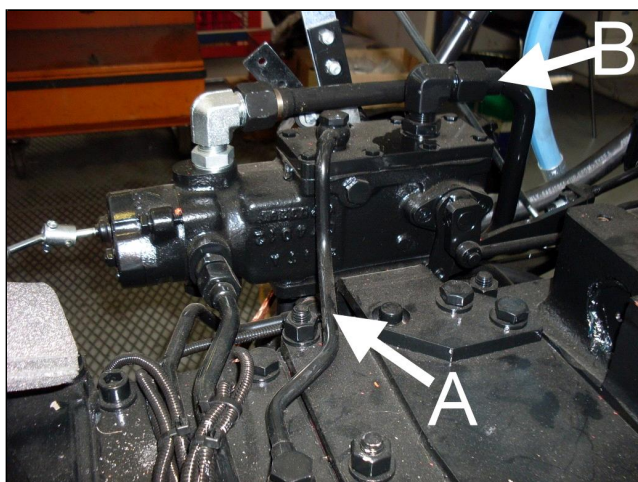
60.60 - Complete lift valve

Fig.17

From the lift distributor, two pipes come out, in Fig 17 the letter **A** indicates the exhaust pipe, which serves for lubricating the upper bearing of the PTO shaft, so that the lubrication is assured even when the machine is parked for several hours without moving.



Fig.18

The one marked with the letter **B** is the main exhaust, directly connected with the rear differential.

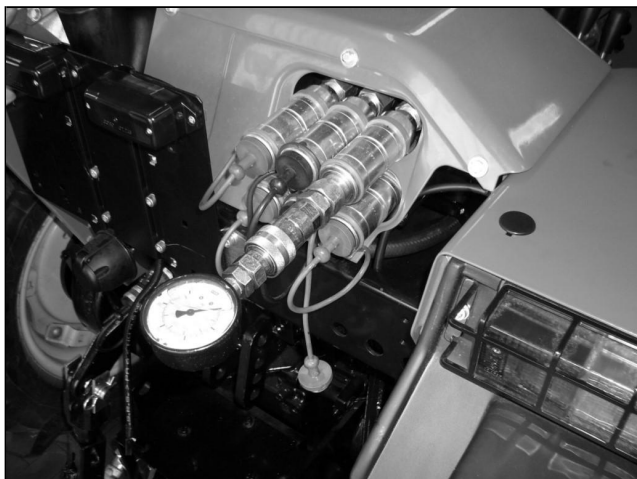


Fig.19

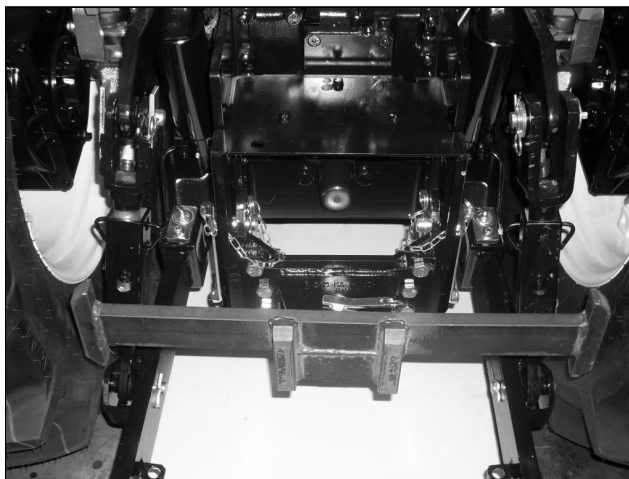


Fig.20

In case there are problems with the rear lift, you must deliver pressure in the lift, lock the arms of the lift with a special tool code **07006220** related to the tow hook and check the setting of the relief valve of the distributor lift which must be 180-190 bar.



Fig.21

In case where the pressure is not that expected, proceed to dismantle the distributor casing from the complete valve distributor. To do this remove the handle of the lift down control, the protection of the platform, remove the two screws and remove the distributor from its housing.

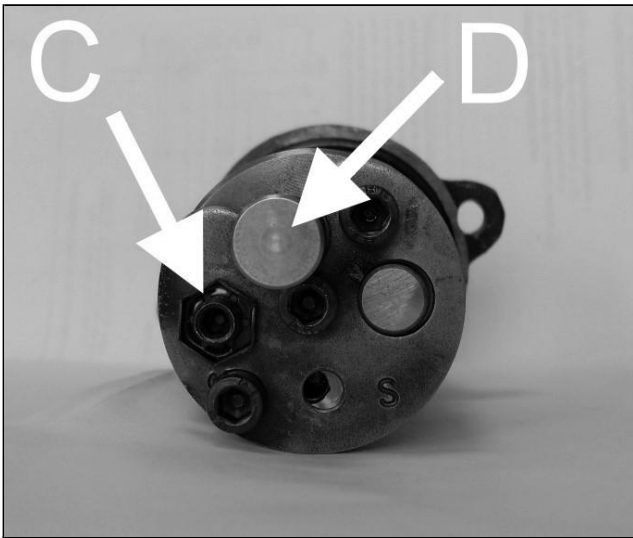


Fig.22

In Fig 22 is shown the valve **C**, which is the relief valve of the distributor. The relief valve must be higher of 30 bar pressure than that of the relief valve of the rear auxiliary distributors (180-190 bar). To increase the pressure turn the screw **C**, locking the adjustment with the locknut.

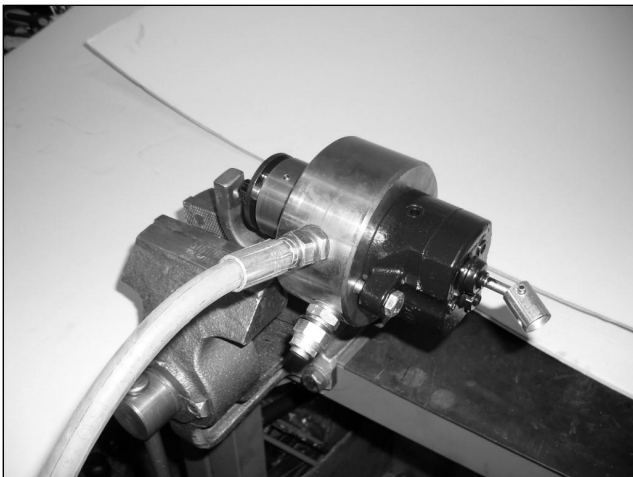


Fig.23

To verify the adequate setting and, if necessary, adjust the pressure of the relief valve **C**, you must use the appropriate tool code 07000241. To perform the check, you should deliver pressure in the distributor, holding the slider **D**, once the inlet pressure has stabilized, it corresponds to the setting of the valve. Release the slider **D** to relief the distributor.

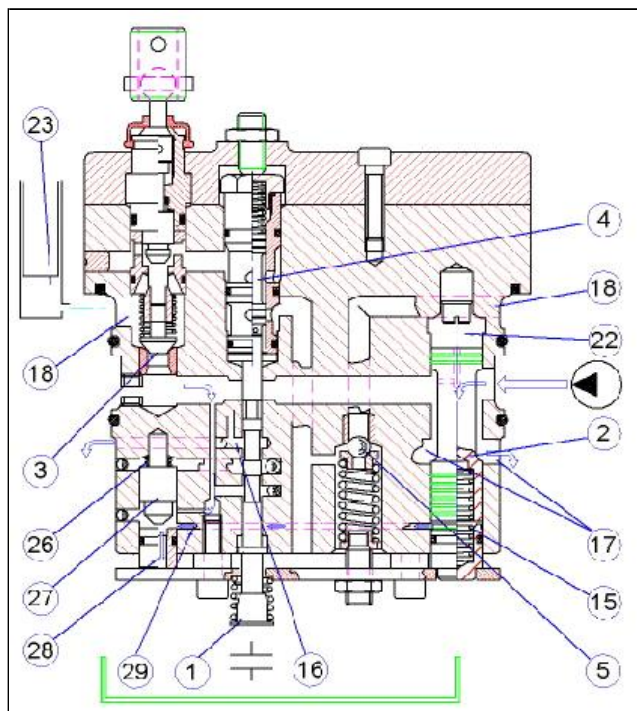


Fig.24

Fig 24 shows the overall scheme of the distributor and its components. Here are the tasks required to perform the maintenance or revision of the distributor.

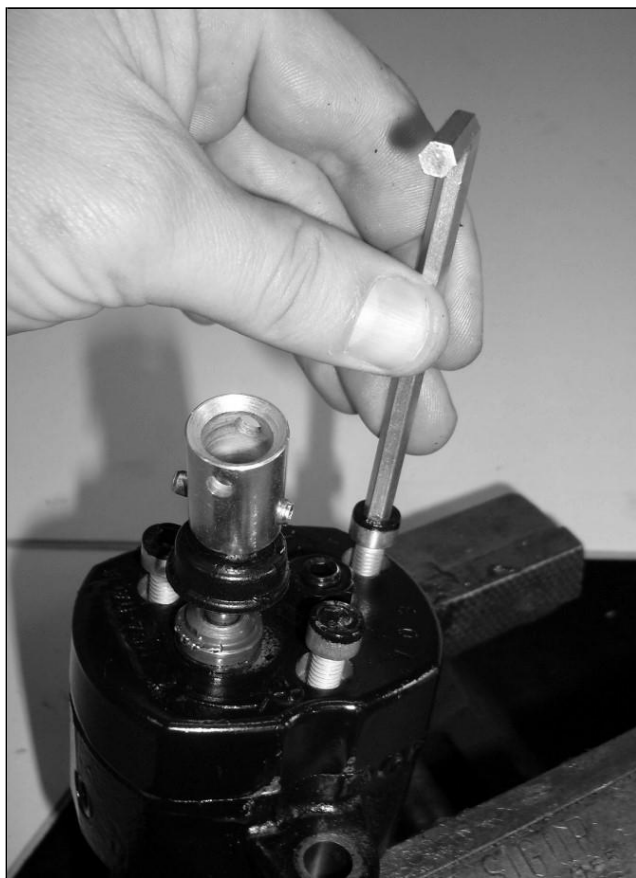
60.70 - Lift valve - front side

Fig.25

Loosen the three screws and remove the cover. At this point you can remove the internal components of the two valves.



Fig.26



Fig.27

In Fig 27 the internal components of the distributor are highlighted, broken down by class usage.

60.80 - Lift valve - rear side

Fig.28



Fig.29

Loosen the three screws and remove the retaining plate and the slider.



Fig.30



Fig.31
Remove the spring, the ball and the two spacers.

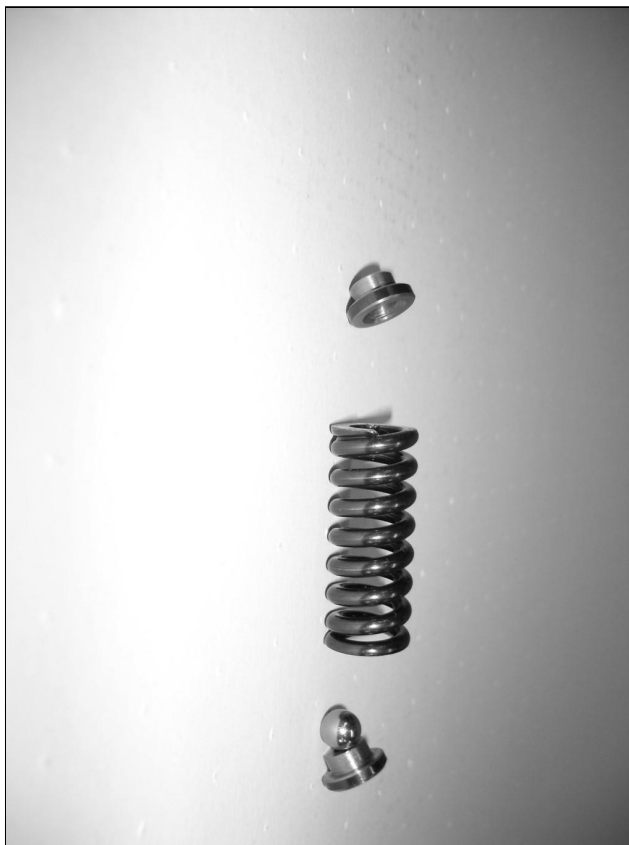


Fig.32



Fig.33



Fig.34

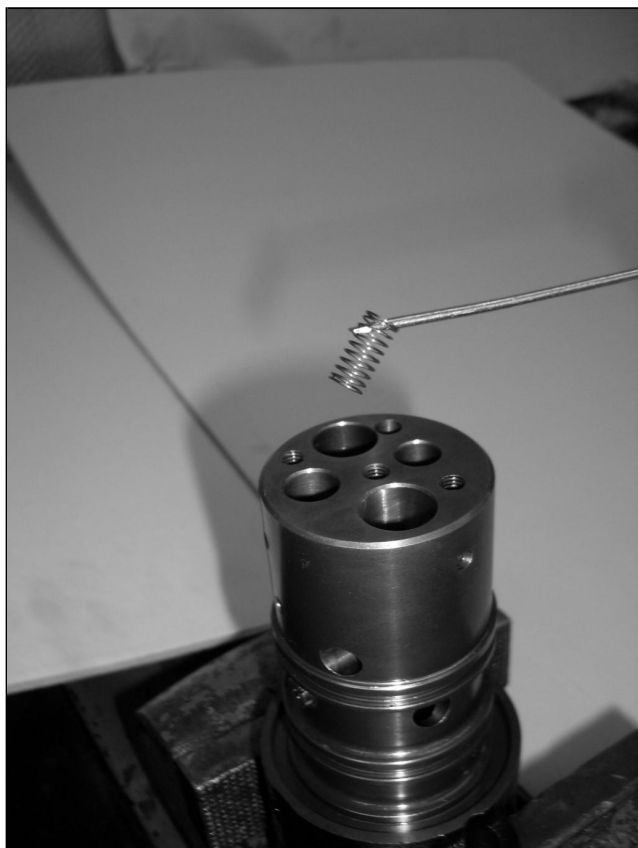


Fig.35

Remove the valve seat, the valve and its spring.



Fig.36

Remove the cap of the spring, the spring and the valve seat.



Fig.37

In Fig 37 the internal components of the distributor are highlighted, broken down by class usage



Fig.38

In Fig 38 the retaining plate, the three fixing screws with their spacers, the inner slider with its spring are highlighted.



Fig.39

When reassembling the distributor, check that all the O-rings of Fig 39 are in perfect condition and have not been pinched, also be lubricated by grease.

This is to avoid having failures, which would force to a further intervention on the assembly unit.

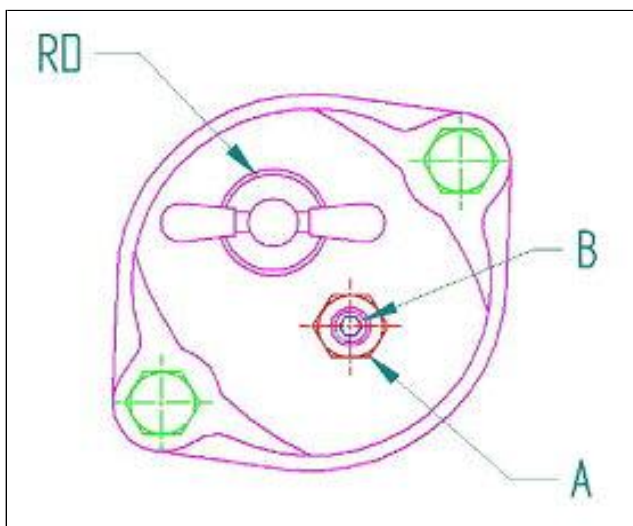


Fig.40

If you apply a weight to the lift, the latter jolts, you can adjust the sensibility through the screw B. Place the arms of the lift about half of their run, in this position the control valve will be in neutral phase.

After loosening the locknut, loosen the security dowel until the lift stops bouncing. At this point, unscrew the dowel a further half turn and lock the locknut.

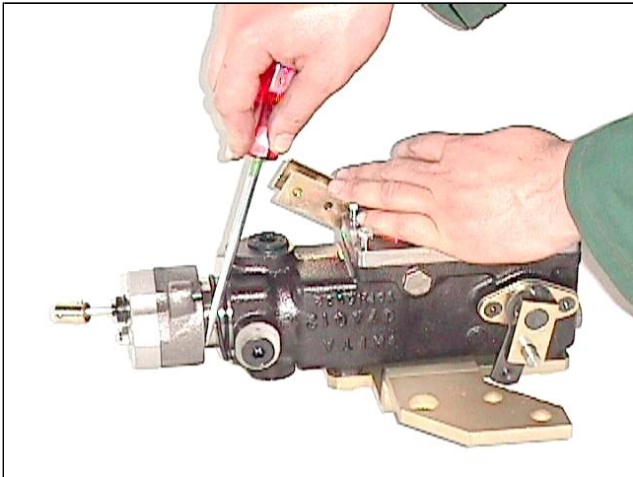
60.90 - Assembly sequence internal leverage - Rear lift distributor

Fig.41

The sequence illustrates the mounting of the levers, internal and external of the lift. This simply wants to be a notice on the main constituents of the levers of the rear lift.

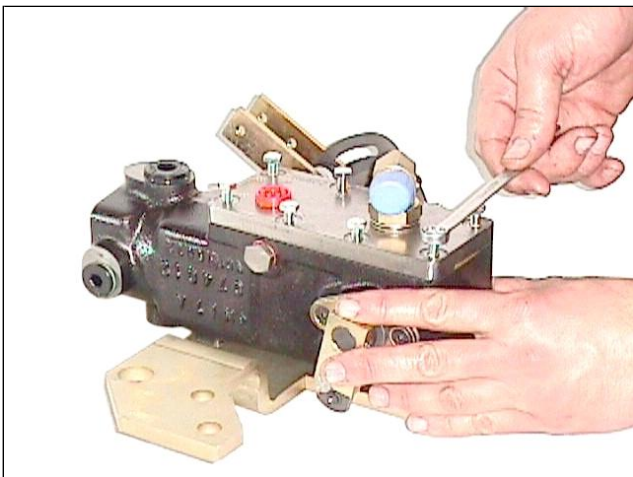


Fig.42

All the constituents of the lift linkage are available at our Spare parts Service, but the probability of faults of these elements is extremaly low and installation is extremely simple, an overview of photos is given, without going into detail.

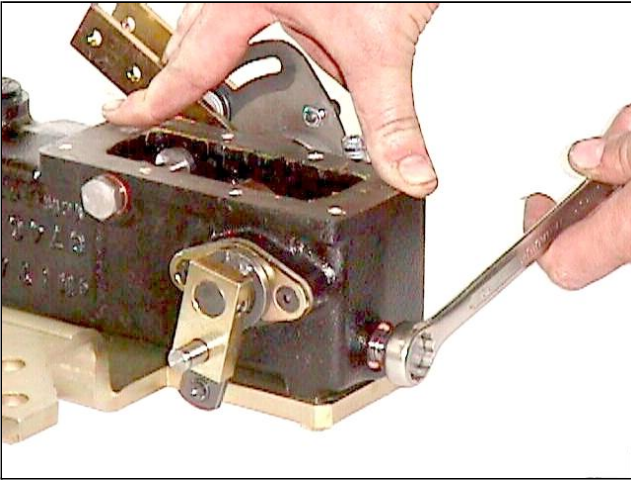


Fig.43

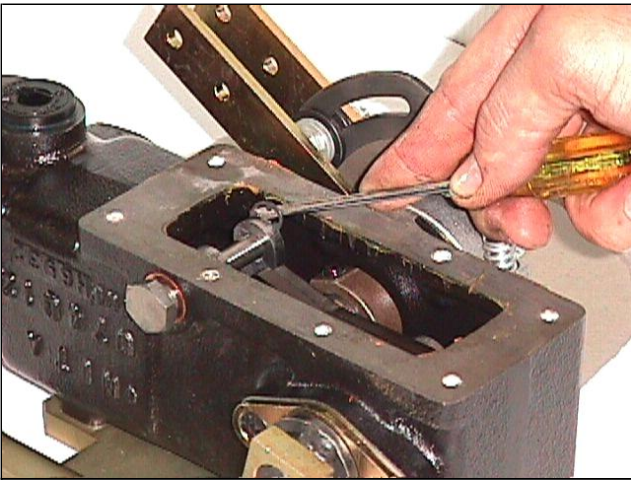


Fig.44

This page shows the preliminary steps to get to dismantle the internal leverage, position and effort control.

The most important will be the analysis of the components that constitute the internal kinematics and the core leverage of all the gears it contains.

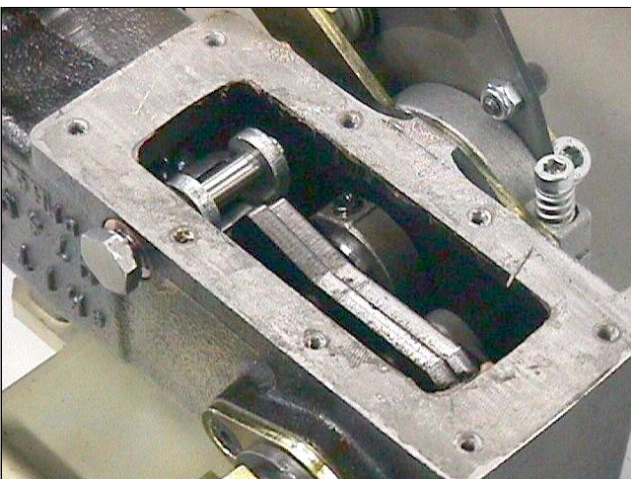


Fig.45

In the images shown is the sequence of disassembly of the two cams to control the position and effort. Unlike other distributors that control the lifts, many records and positions are fixed.

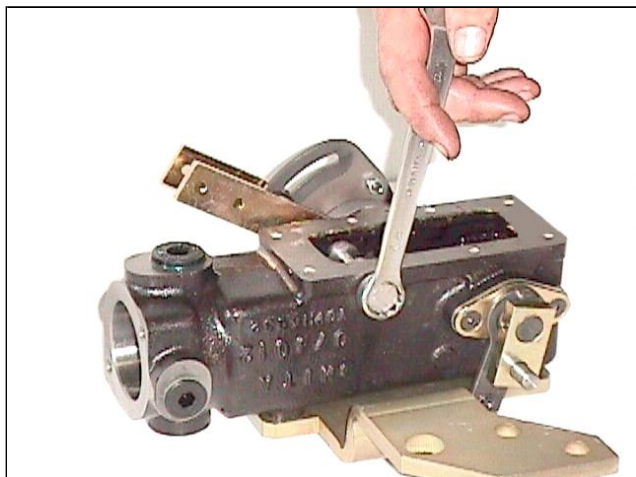


Fig.46

Here below are represented the further stages of disassembly of the external leverages of position and effort control.

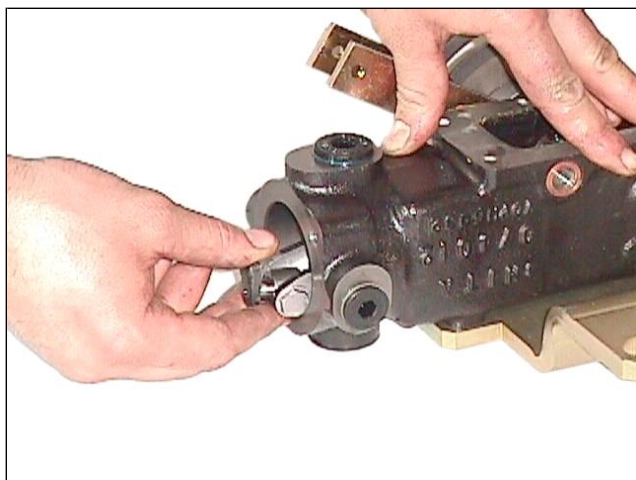


Fig.47



Fig.48



Fig.49

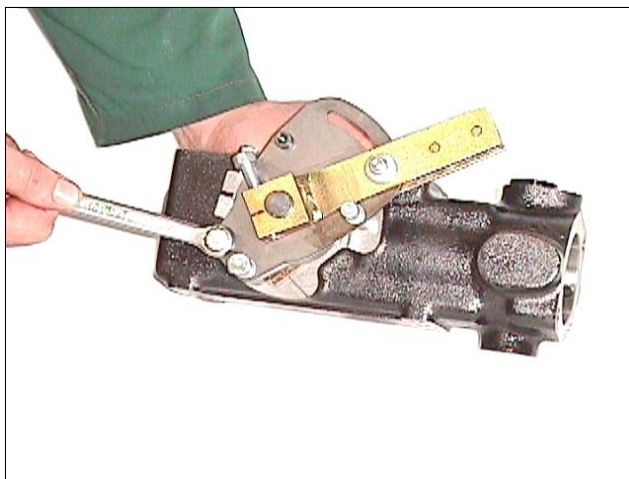


Fig.50

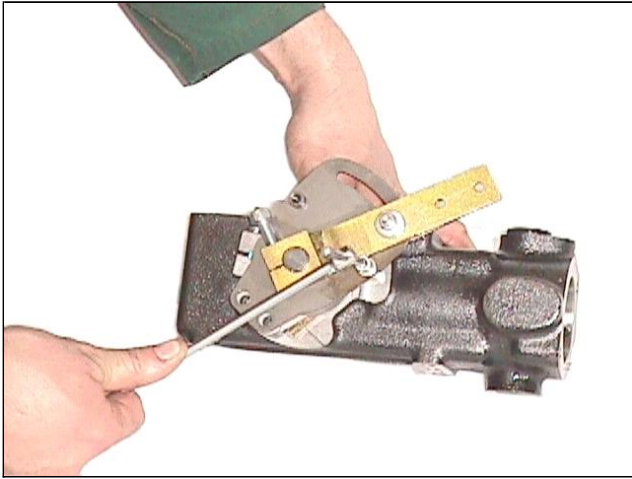


Fig.51

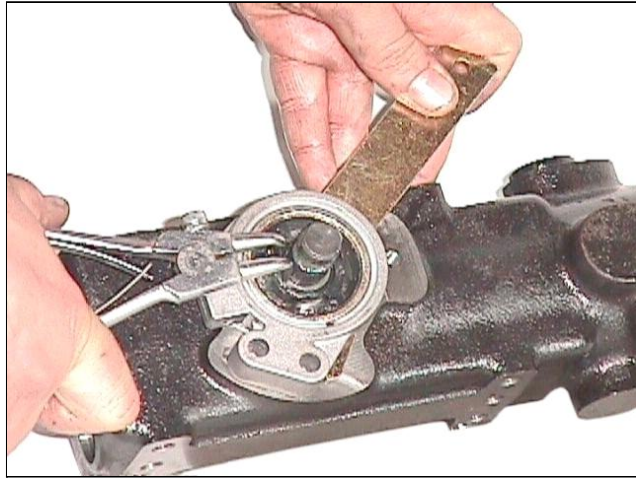


Fig.52



Fig.53

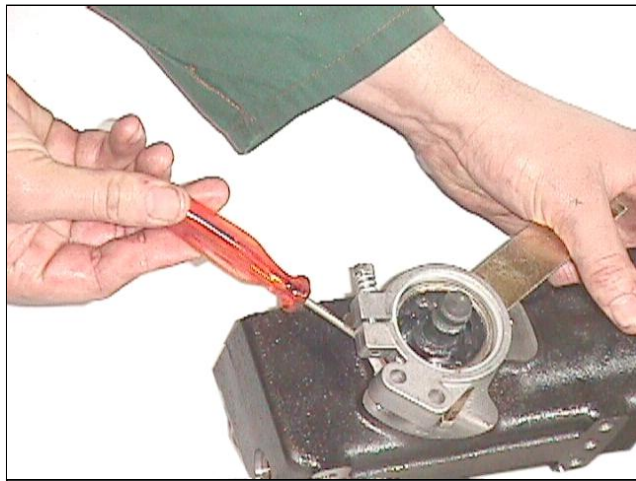


Fig.54

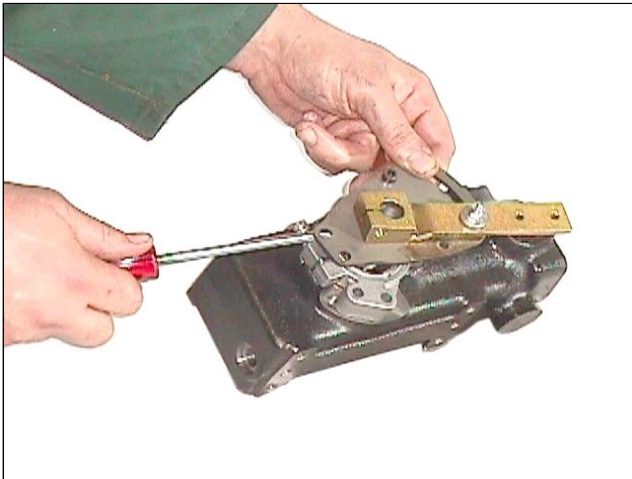


Fig.55

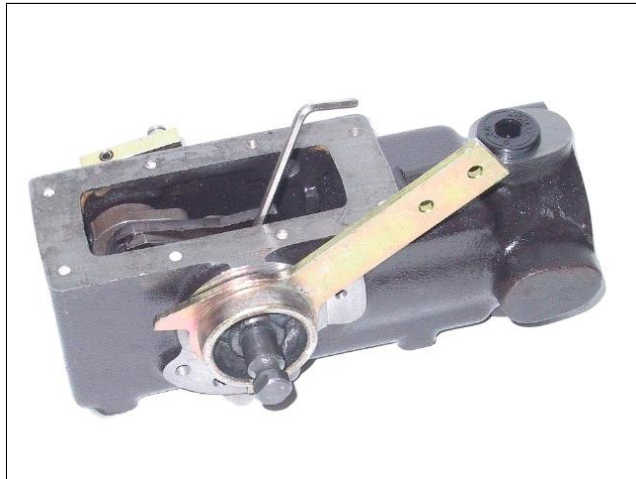


Fig.56

All sequences of this page are related to the assembly of the core of the position and control levers. It gives the sequence of disassembly to check for cracks inside the unit. It shows the order of operations, as there are no specific adjustments to be made, the assembly being univocal.



Fig.57

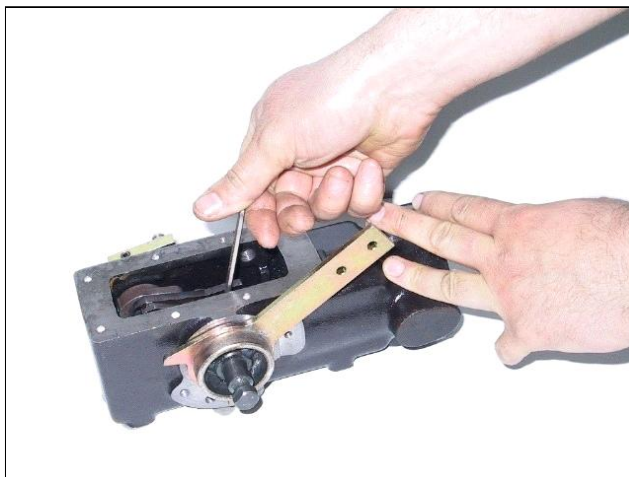


Fig.58

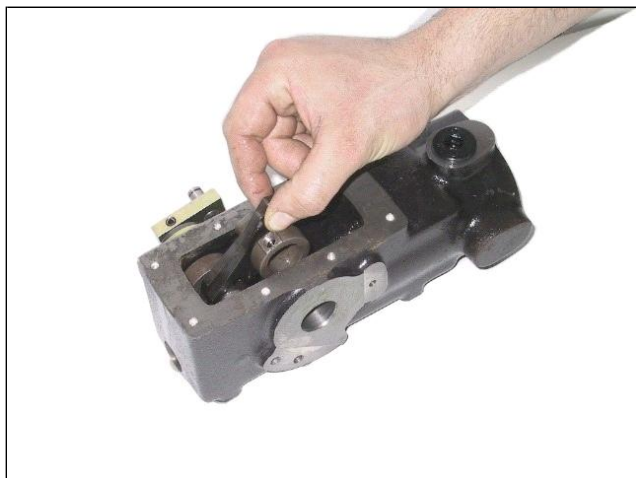


Fig.59

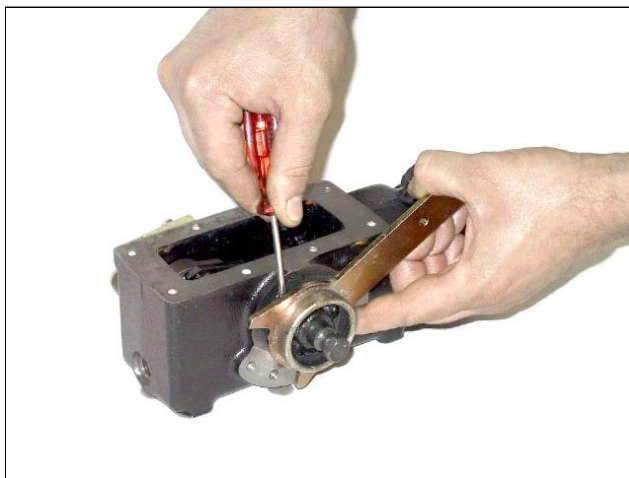


Fig.60

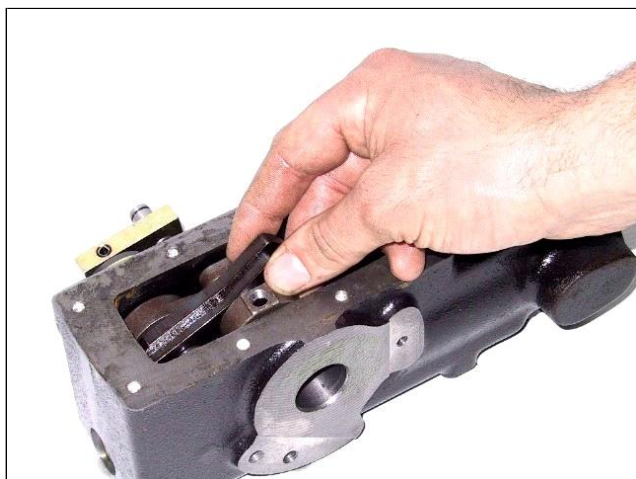


Fig.61

As last operation, dismantle the double fork that drives the position and effort of the lift.

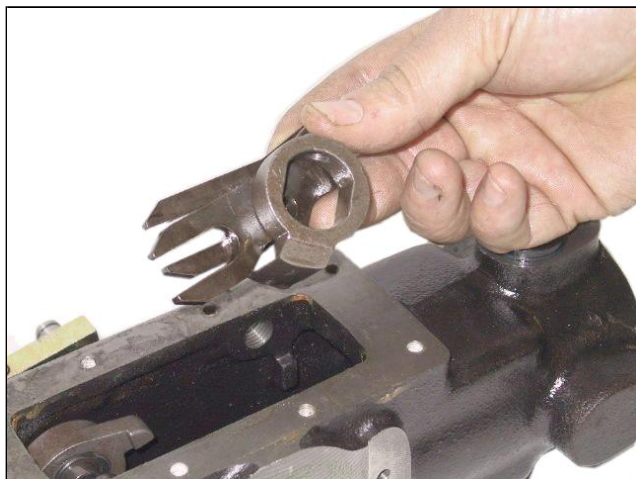


Fig.62



Fig.63



Fig.64

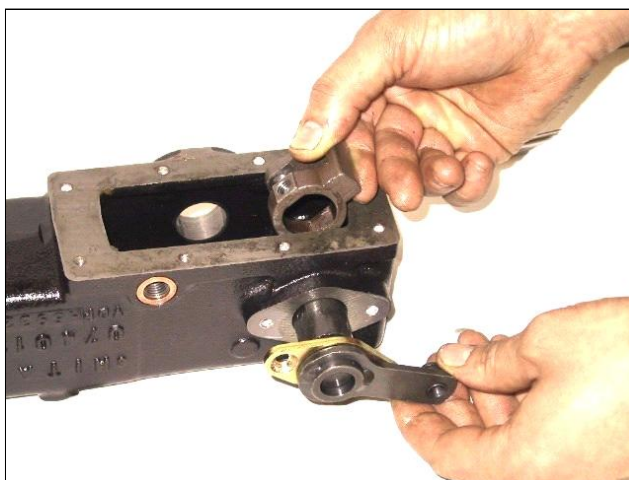


Fig.65

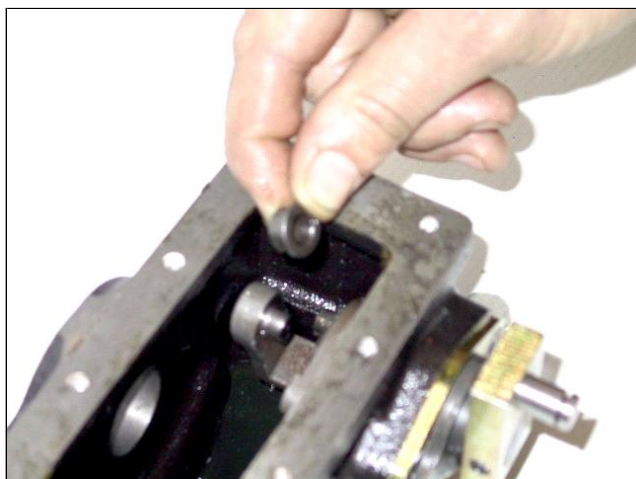


Fig.66



Fig.67

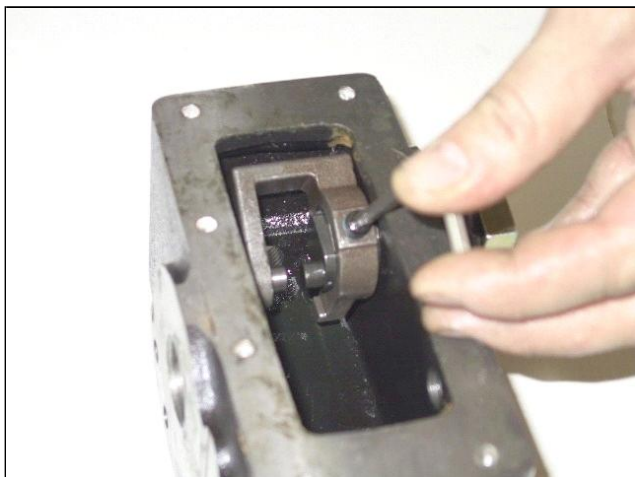


Fig.68



Fig.69



Fig.70



Fig.71



Fig.72

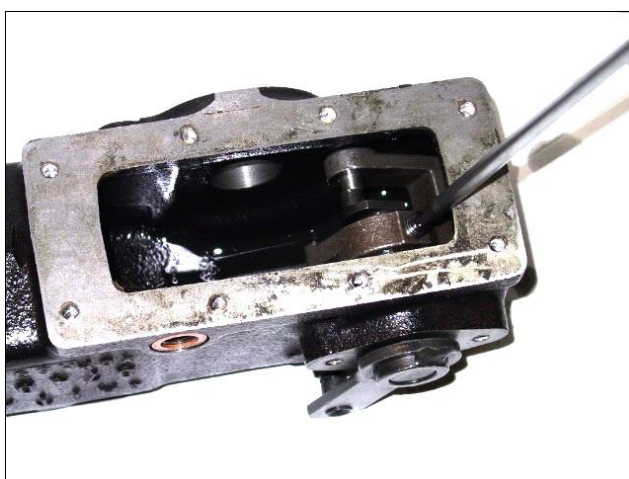


Fig.73

To ensure that on the tractor the position and effort control rods are adjusted properly, check the following:

- with no implement applied to the lift and position lever at the top check that bringing the effort lever to PMI, at about 3/4 of its run, the arms starts to rise. If not, adjust the rod of the effort, until to achieve this condition.

60.100 - Registration three point hitch

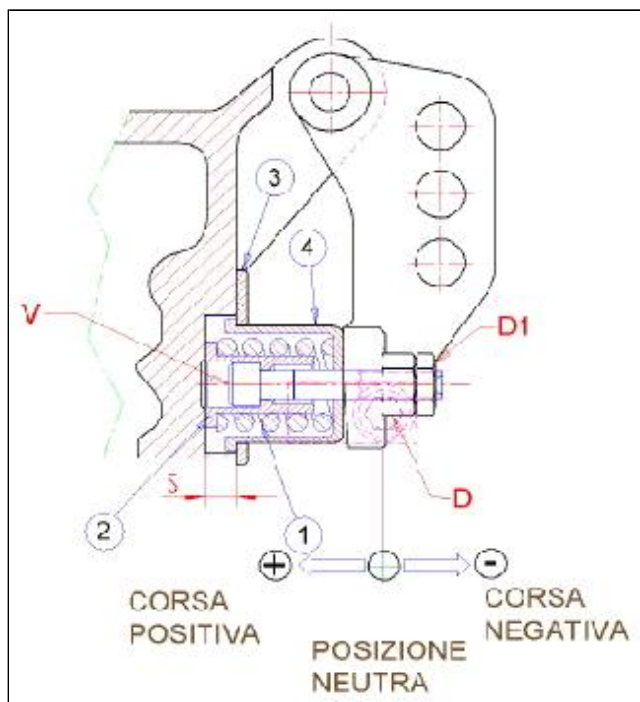


Fig.74

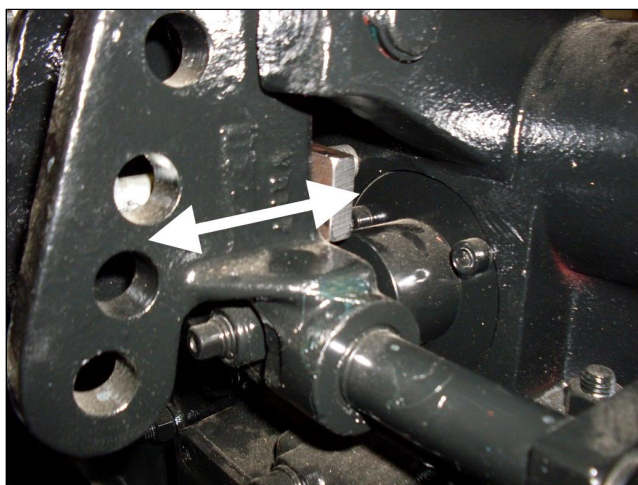


Fig.75

The three point hitch should have no axial play. If not, you must remove the third point, verify the integrity of the internal spring and adjustment.

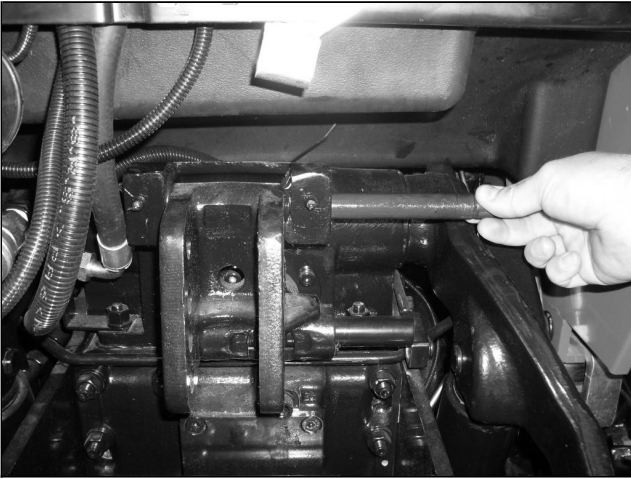


Fig.76

Remove the snap ring retainer and pull out the pin of the three point hitch.

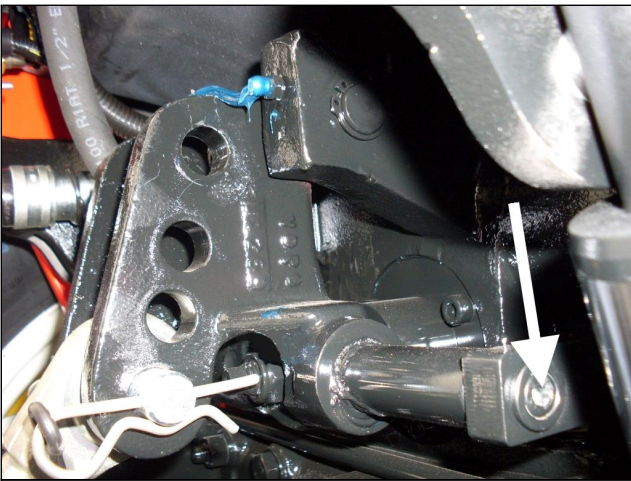


Fig.77

Remove the screw securing the bushing to the blade of the draft control.



Fig.78

Remove the three screws of the sensibility sleeve cover and pull out the block.



Fig.79

With the block on the bench, loosen the locknut of the screw.



Fig.80

If you need to replace the spring, remove the entire block, as shown in the figure.



Fig.81

After installing the components on the screw, turn in the spacer spring adjustment to eliminate the axial play of the spring. Be careful not to compress the spring in vain. Apply to the spring a preload less than 1 mm.



Fig.82

After you replace the cover sleeve and the three point hitch support, apply Loctite thread locker on the screw and replace the nut.



Fig.83

When tightening the nut, the spacer spring must be kept in place with another key, in order to avoid changes of setting on the spring.
The nut must be tightened to 15 kgm.

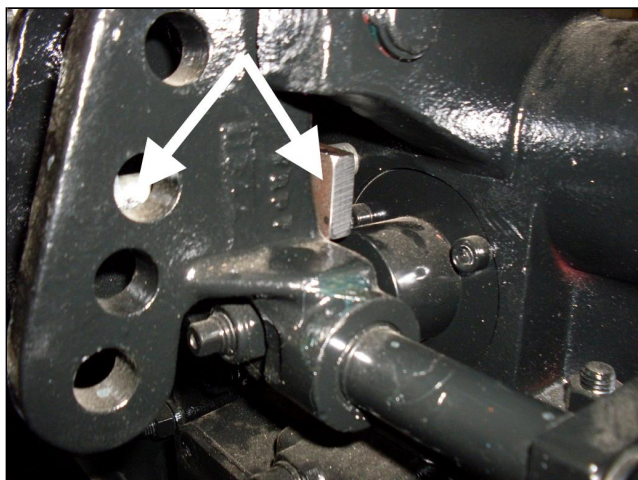
60.110 - Draft control adjustment

Fig.84

To make a proper adjustment of the draft control you have to pull backward the three point hitch using the specific tool code 07000249 (first always check that the three point hitch has no play).



Fig.85

Place the lever position bottom down and the one for the draft control on the high, at this point the lift will rise.



Fig.86

Lower the lever of 5-6 notches.

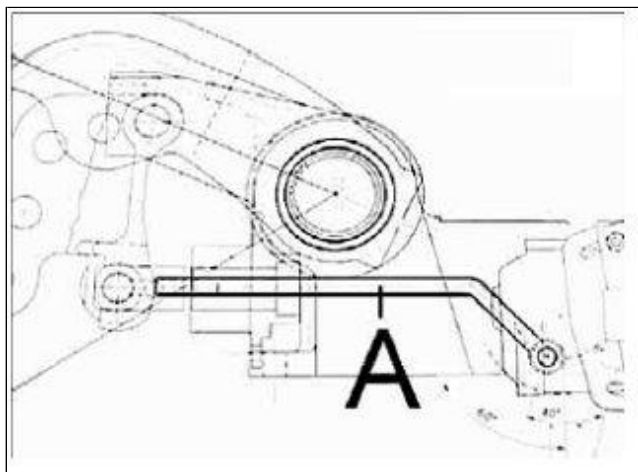


Fig.87

Adjust the rod **A** of Fig. 87 on the three point hitch so that the lift starts to go down. At this point block the locknut.

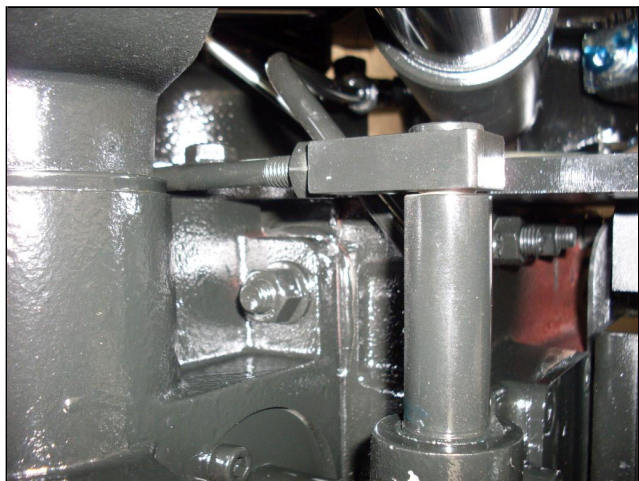


Fig.88

Loosen the locknut and the Allen screw M8 and turn the block of the draft control. After the adjustment, screw the whole.

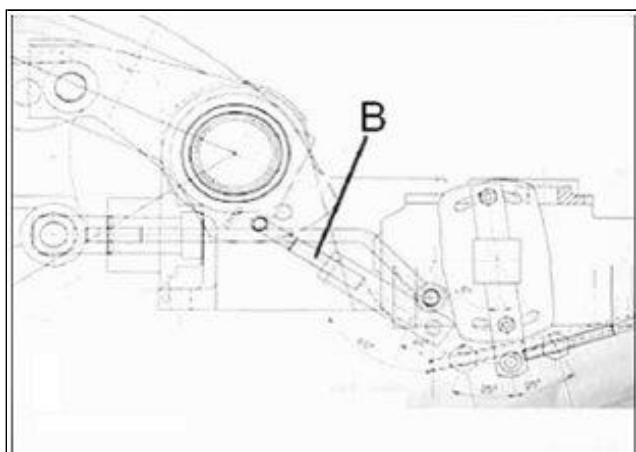
60.120 - Adjustment of raising lift

Fig.89

By means of the tie rod **B** in Fig. 89 you can record the maximum lift of the lift. Recall that on the arms of the lift in the position of maximum lift, the free play should be 2-3 cm, in order to avoid the pump remains under pressure.

60.130 - Adjustment lift control lever position on distributor

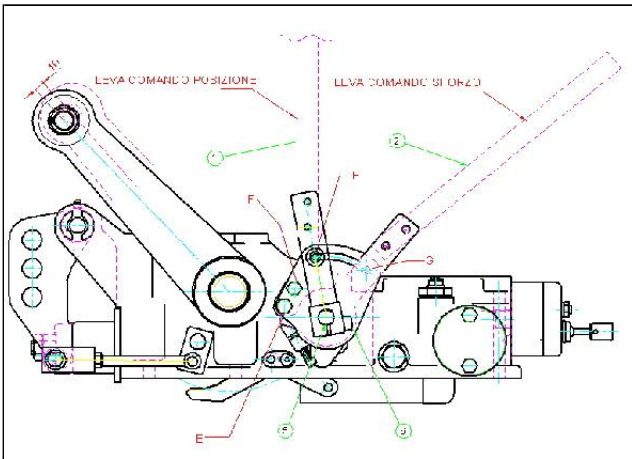


Fig.90

Place the lift arms down and with a light load.

The adjustment is performed to determine the position of maximum lift of the lifting arms.

Loosen the locking screw **6** so as to free the lever of control position **1** from the shaft **5**. With the effort control lever **2** placed at the bottom against the clamp **G**, turn the control position lever **1** up against the clamp **H** without rotating the shaft **5**.

Hold the levers **1** and **2**, with the help of a key **13**, slowly rotate counter clockwise the shaft **5** by lifting the arms until they stop at maximum lift for the intervention of the internal hydraulic limit.

Since in the functioning of the controlled position the hydraulic limit does not occur, it is necessary to ensure a safety lifting run of the arms of about 10÷15 mm. To do this, you must slowly rotate clockwise the shaft **5**, by lowering the arms of the security space.

At this point keeping in position the shaft **5**, and with the lever **1** against the clamp **H**, block the lever with the shaft by tightening the screw **6**.

Then check the adjustment just made, by up and down of the arms with the control lever position **1** and verify that the arms stop in the same position.

60.140 - Rear lift cylinder

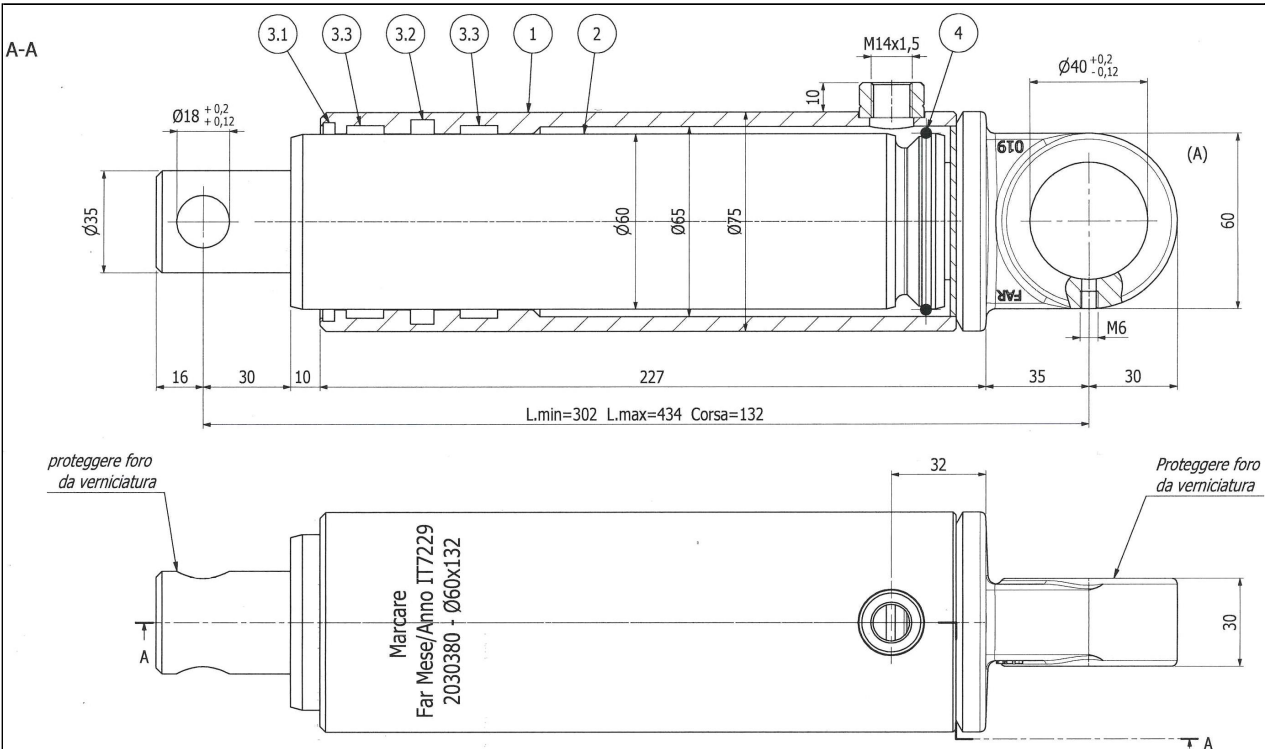


Fig.91

4	Anello Seeger A55 UNI7433 "RW"	1
3.3	Anello Guida Diam. Int. 60	2
3.2	Guarniz.stelo 60/70/8	1
3.1	Raschiatore D. 60 C/scalino	1
3	KIT PL. 60 INTEGRALE	1
2	Stelo tuffante D.60x132	1
1	Canna tuffante D.60x132	1
POS	DESCRIZIONE	QTÀ

Fig.91 B

In case of leakage and/or oil leakage on the lift cylinder, whose overall assembly is shown in Fig. 91, you can proceed with the replacement of internal seals with a special "seal kit", which includes all gaskets and seals necessary for the review.

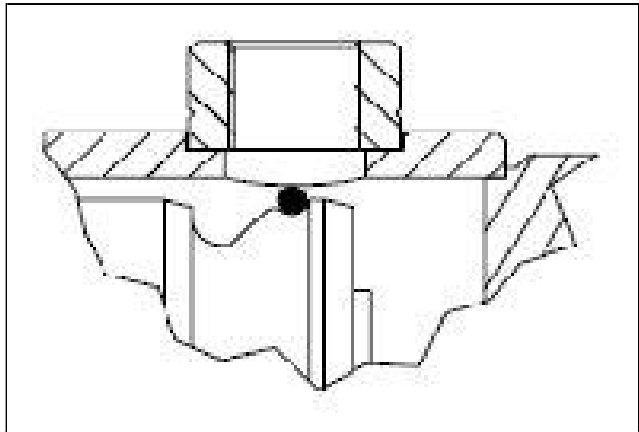


Fig.92

Place the stem until from the boss you see the ring.

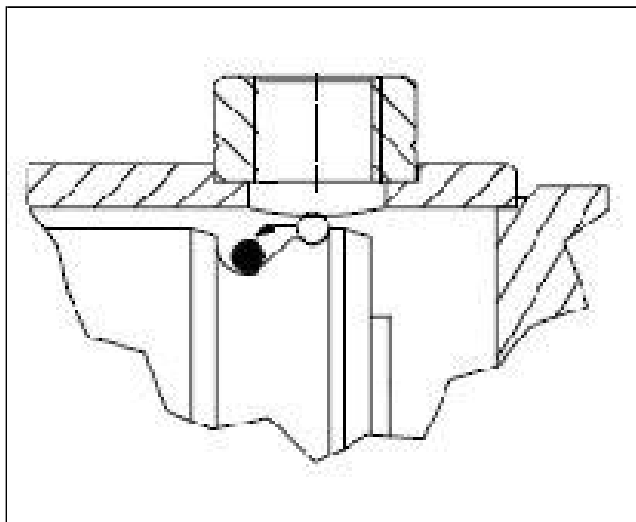


Fig.93

Use a screwdriver to force the ring retainer to push it deeper into the cavity. Remove the stem from the cylinder and proceed with the replacement of gaskets and seals. Reassemble everything by reversing the operations described above.

60.150 - Steering cylinder

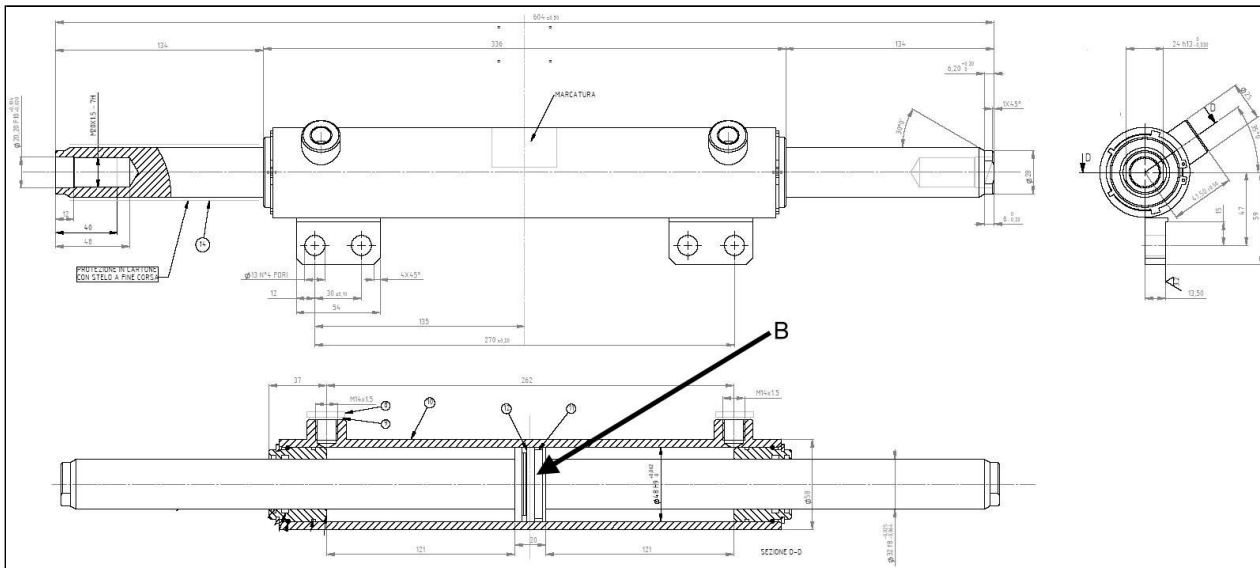


Fig.94

In case leakage or oil leakage is observed on the steering cylinder, whose aggregate is shown in Fig. 94, you can proceed with the replacement of the internal seals with a special "seal kit", which includes all gaskets and seals necessary for the review.

To replace the seals of the steering cylinder, you must do the following:

- the snap-ring off, move into the cylinder head end remove the retainer ring of the cylinder head by using a pair of pliers (see Fig. 95 item **A**);
- remove the cylinder head and pull the entire internal piston being careful not to damage the plating of the stem;
- replace the seals on the piston and reassemble by reversing the operations described above.

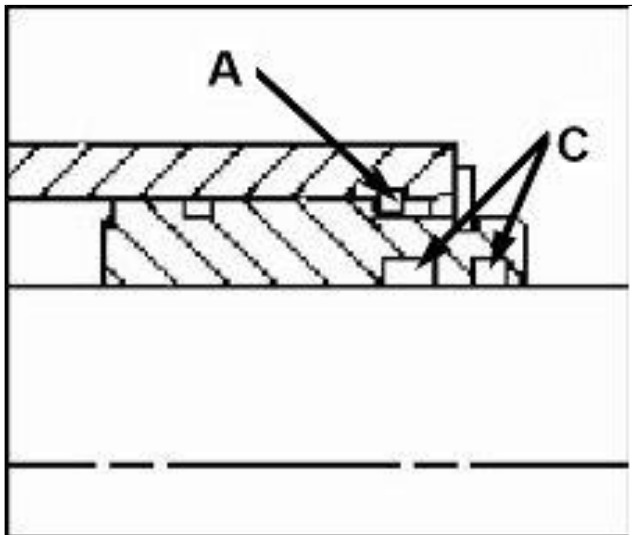


Fig.95

Inb case of problems on the direction of the cylinder, replace the seals **B** of Fig. 94, while in case there are oil leaks outside of the cylinder or on the stem, replace the seals **C** Fig. 95

60.160 - Solenoid valve



Fig.96

The solenoid that controls the engagement of the four-wheel drive (DT) and rear locking differential (BD), is located on the engine group under the left side hood.



Fig.97

To gain access remove the optical unit of the indicator with its support and the hood right side.

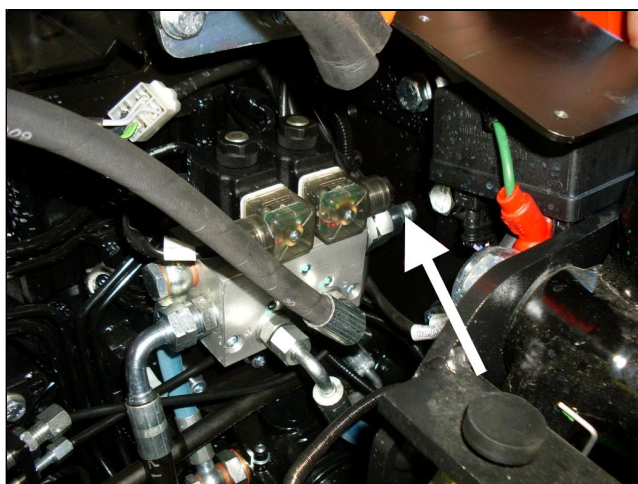


Fig.98

Through the relief valve shown in Fig. you adjust the pressure for the engagement of the four-wheel drive

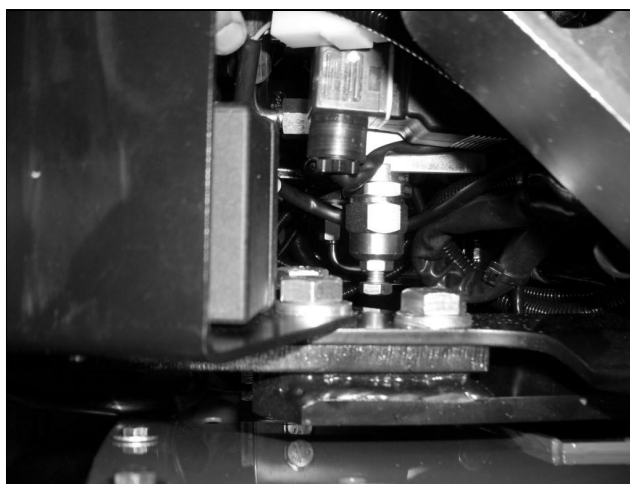


Fig.99

and differential lock.

The value of this pressure is 42 bar 0+3, and can be controlled by applying a pressure gauge on the delivery of the valve to the DT group.

The exhaust of this solenoid provides power for the lubrication of the transmission of the tractor.

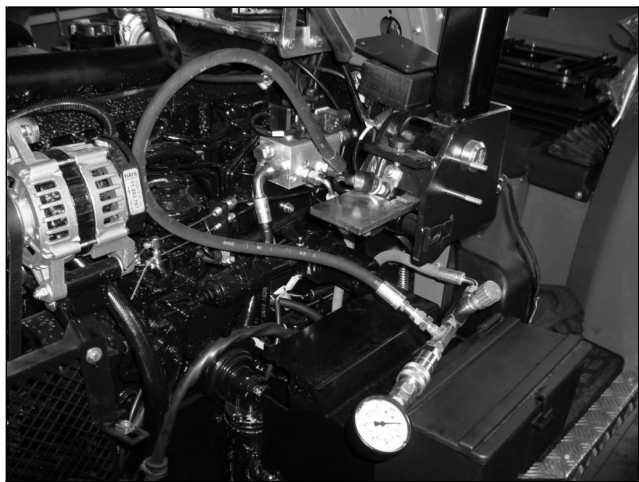
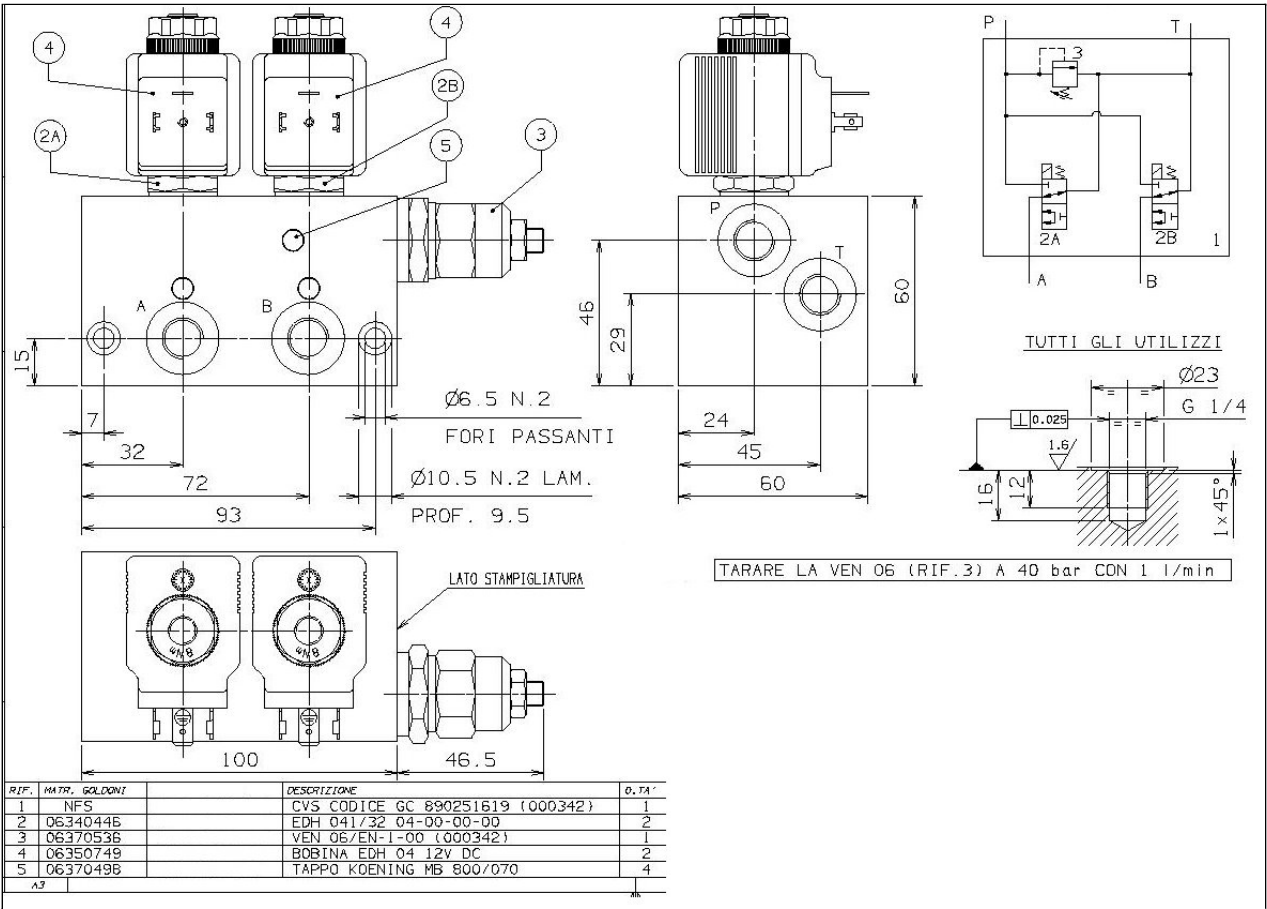


Fig.100

To make a correct diagnosis of the DT circuit, you should mount a pressure gauge with a cock, so you can close the delivery to the DT assembly and verify the output pressure by the solenoid. After checking that the pressure is correct, you should open the cock and check that there are no pressure drops which would be indication of leakage within the DT assembly.



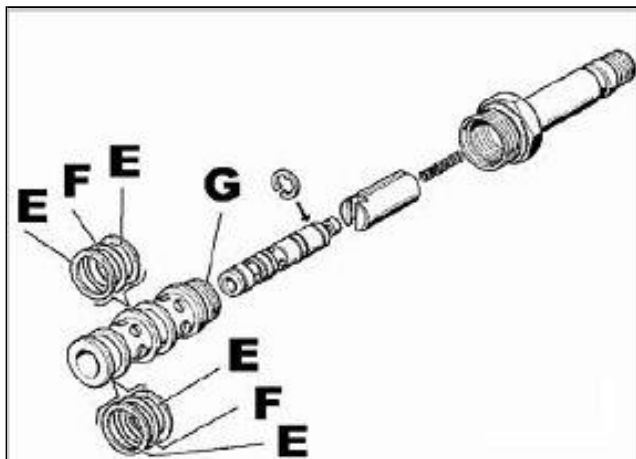


Fig.101

In the event of malfunction due to hydraulic component, to carry out the cleaning of the internal components, proceed as follows: in Fig. 101 it is represented the component break-down of the internal spool of the control solenoid for the DT and BD engagement.

Remove the coil from the above solenoid valve. Unscrew and remove the solenoid valve body. Wash, blow and oil, with oil of the same type of the circuit, the components in Fig. 101.

Reassemble using Loctite thread-locker to assemble the components of the solenoid.

While making the replacement, check all seals and replace if necessary. Replace coil on the solenoid, connect the wiring harness to the head coil and after you have powered wiring, trying to brake on the tractor, visually check the functioning of the solenoid.

If everything works correctly, do the assembly of the solenoid on the aluminium valves block.

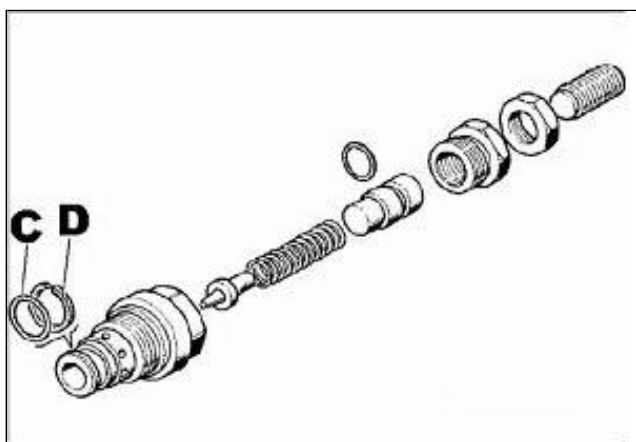


Fig.102

The working pressure of the DT and BD solenoid valves is determined by the relief valve whose parts break-down is shown in Fig. 102. the valve is physically present on the BD and DT aluminium valves block.

As already indicated, to adjust the maximum pressure of the auxiliary services, it is necessary to tighten the dowel on the valve.

If by acting on the dowel, you do not see any increase in the pressure, turn the machine off and clean the valve. Unscrew the valve from the solenoid and remove it as shown in Fig. 102. Check the integrity of the seal rings **C - D** and replace them if necessary.

Wash and blow all components with clean oil to remove any dirt.

Reassemble the whole, oiling with oil of the same type as that used in the circuit.

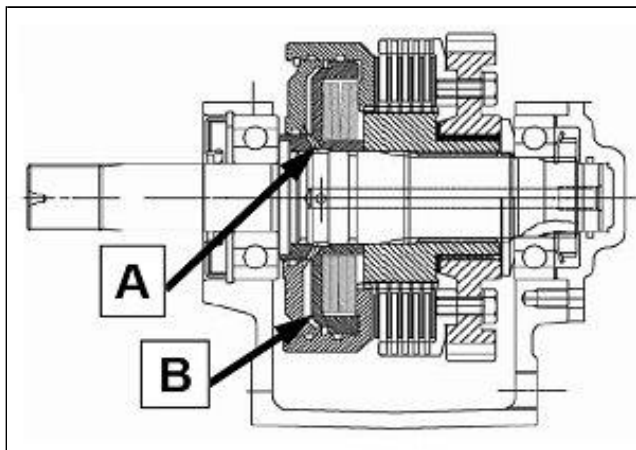


Fig.103

In Fig. 103 is represented the internal circuitry of the four-wheel drive input clutch (DT).

The oil reaches the pressure of 42 bar dispatched by the solenoid valves described in the previous pages through the hole **A** of Fig. 103 in the chamber **B**.

Here the pressure overcomes the reaction of the Belleville washers and disengages the four-wheel drive.

It is therefore a negative control, which in case of malfunction of the electrical or hydraulic system, ensure the engagement of the DT.

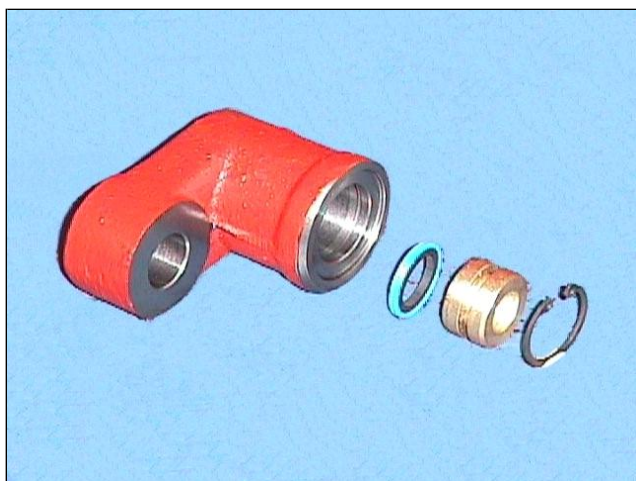


Fig.104

As regards the BD engagement, it is rather a positive control: only when you press the button near the lift levers, the solenoid valves dispatch oil to **the actuator cylinder**, which fits the lock.

Releasing the button, the lock is disengaged.

Fig. 104 shows the actuator cylinder that inserts the fork of the BD.

Care must be taken not to pinch the seal during assembly on the piston in brass.

Even during the fitting in of the piston in the cylinder, lubricate the seal in order to facilitate the sliding inside the part.

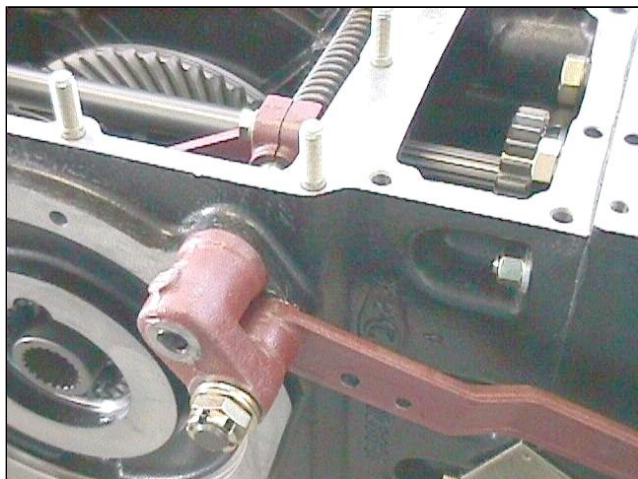


Fig.105

In Fig. 105 it is represented the positioning of the cylinder (which operates the fork of the rear locking differential) on the tractor. To allow the cylinder orientation, the assembly takes place using a pin and the cylinder is held in position by a **notches nut** with a SPIROL plug that prevents loosening.

60.A - Tightening torque assembly hydraulic circuit

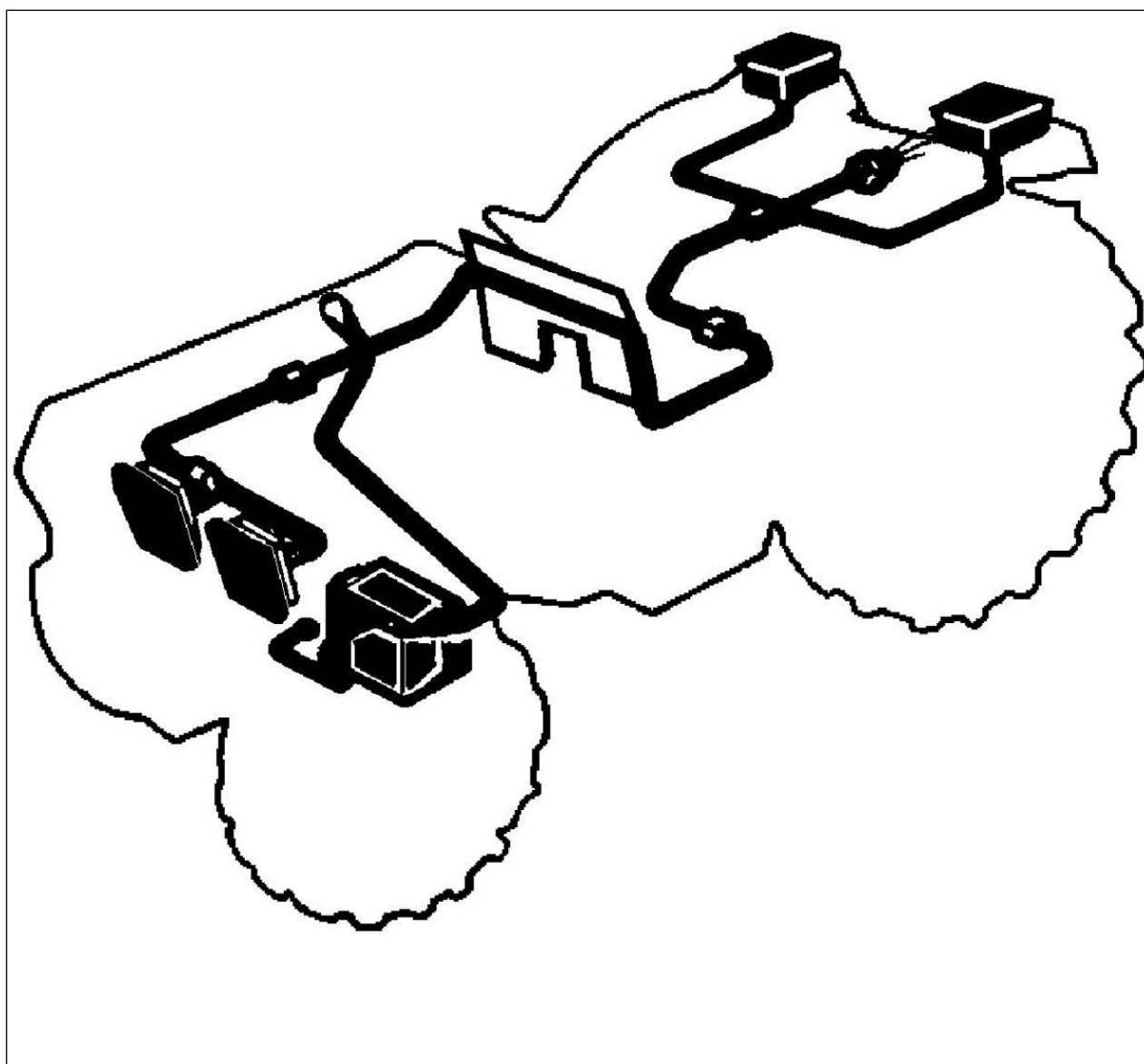
Tightening torque expressed in kgm

M 8 screw fixing drive box cover

60.B - Needed tools group hydraulic circuit

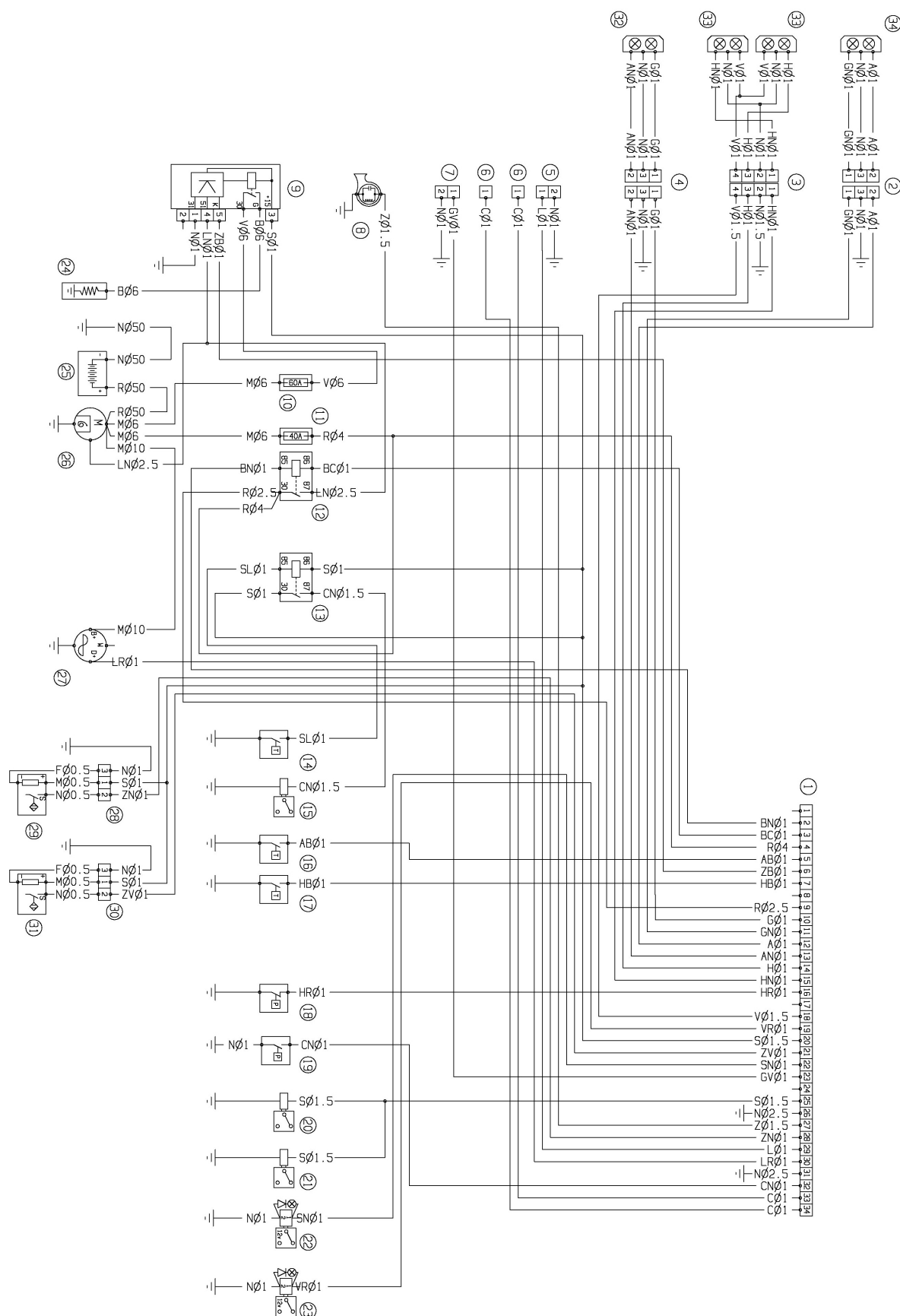
CODE	DESCRIPTION	QUANTITY
07000122	HYDRAULIC GAUGE	1
07000241	DISTR. VALVE TEST TOOL 1363	1
07000249	TOOL SETTING LIFT EFFORT	1
07006212	STEERING WHEEL PULLER	1
07006220	TOOL STOPS ARMS	2

63 - ELECTRICAL SYSTEM



ELECTRICAL SYSTEM, ENGINE, PLATFORM

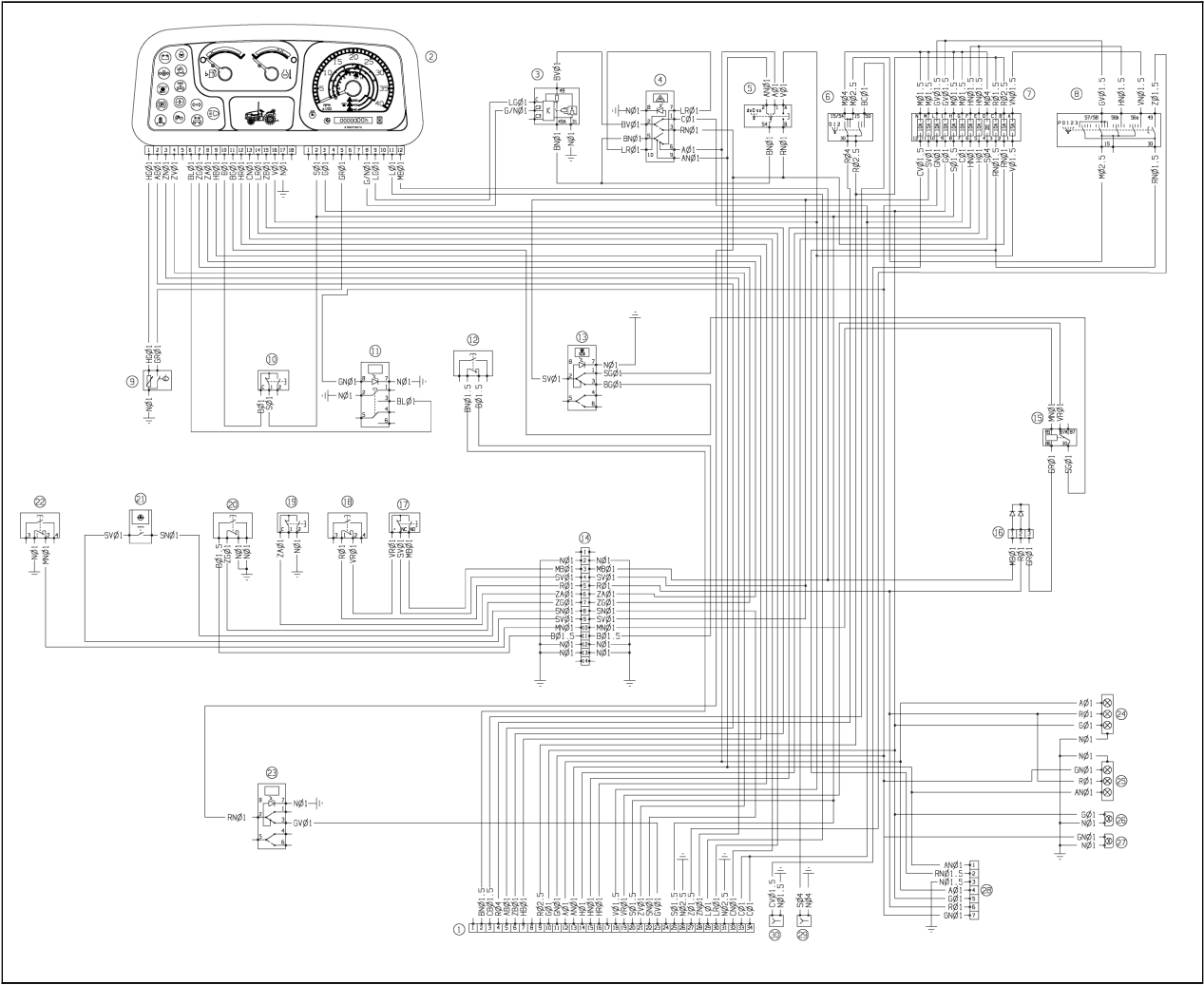
63.10 - Wiring diagram engine line



ELECTRICAL SYSTEM

1. 34-pole connector engine circuit - dashboard
2. Extension connector right light and turn indicator
3. 4-pole connector engine circuit - front lights
4. Extension connector left light and turn indicator
5. Roll bar limit
6. Cab power supply
7. Connection rotating beacon
8. Horn.
9. Glow plug unit
10. Maxifuse protection glow plugs
11. Maxifuse protection circuit
12. Security starter relay
13. Cold starting relay
14. Advance sensor drive.
15. Advance solenoid drive
16. Drive temperature sensor - (supplied separately)
17. Hydraulic oil pressure sensor
18. Engine oil pressure sensor
19. Air filter clogging sensor
20. Fuel filter solenoid valve
21. Engine stop solenoid valve
22. Differential lock solenoid valve
23. 4WD solenoid valve
24. Glow starter
25. Battery
26. Starter
27. Alternator
28. 3-pole connector connection engine rate sensor
29. Engine rate sensor.
30. 3-pole connector connection speed sensor
31. Speed sensor
32. Left light and turn indicator
33. Headlight in dipped/driving positions.
34. Right light and turn indicator

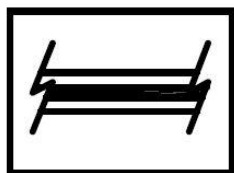
63.20 - Wiring diagrams platform line



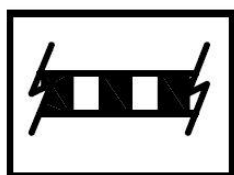
ELECTRICAL SYSTEM

- 1.** 34-pole connector engine circuit - dashboard
- 2.** Multifunction digital instrument
- 3.** Turn indicator blinking function
- 4.** Rocker switch for emergency lights
- 5.** Light switch
- 6.** Ignition switch
- 7.** Fuse box
- 8.** Light selector
- 9.** Fuel level sensor
- 10.** PTO clutch switch
- 11.** Button to change display / reset.
- 12.** Security start on clutch
- 13.** Rocker switch for 4WD
- 14.** Fourteen-pole connector dashboard circuit - stop and park circuit
- 15.** 4WD relay
- 16.** 4WD relay diode connector
- 17.** Parking brake switch
- 18.** Stop switch
- 19.** Slow fast PTO switch
- 20.** PTO switch.
- 21.** Differential lock switch
- 22.** 4WD switch.
- 23.** Revolving beacon switch
- 24.** Right rear light.
- 25.** Left rear light.
- 26.** Right license plate light.
- 27.** Left license plate light.
- 28.** 7-pin socket.
- 29.** 1-pin socket 12V (+30)
- 30.** socket 12V (+15)

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



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



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

63.30 - Fuses

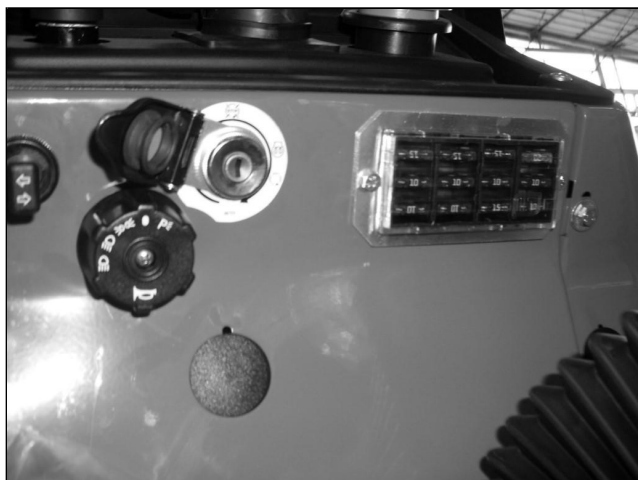


Fig.4



Fig.3

In Fig. 3 we can see the following components:

- Maxi fuses 60A plugs;
- Maxi fuses 40A general system;
- Starting relay
- KSB relay

These components are located on the blade support bonnet.

Fig. 4 clearly shows the location of the fuses box on the tractor.

The previous page, following the electric pattern and caption, shows the diagram of the fuse box and the combination of the fuses with the functions of the tractor.

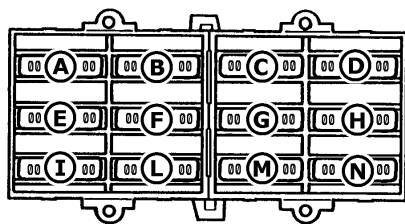
When replacing a fuse, after having removed what caused the interruption, always replace it with one of equal rating.



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

Replace the burnt-out fuses with others possessing the same technical characteristics (see indications on the actual fuse itself).

Consult specialized personnel if in doubt.

FUSE FUNCTIONS:

D0047-0

(A) 15A

Left driving beam.
Right driving beam.

(B) 15A

Flashing headlights.
Emergency lights switch
Revolving beacon switch

(C) 15A

Light switch powering.
Horn.
7-pin socket.

(D) 20A

1-pin socket power supply.
Rear

(E) 10A

Left dipped beam.

(F) 10A

Right dipped beam.

(G) 10A

Light switch
Cab power supply

(H) 10A

PTO switch.
Preheater plant energizing.
Alternator energizing.
Power supply of engine stop solenoid.
Engine rate sensor.
Speed sensor
Lead variator

(I) 10A

Multifunction digital instrument
Left license plate light.

7-pin socket.

Left front side light.

Right rear side lights.

(L) 10A

Right license plate light.

7-pin socket.

Right front side light.

Left rear side lights.

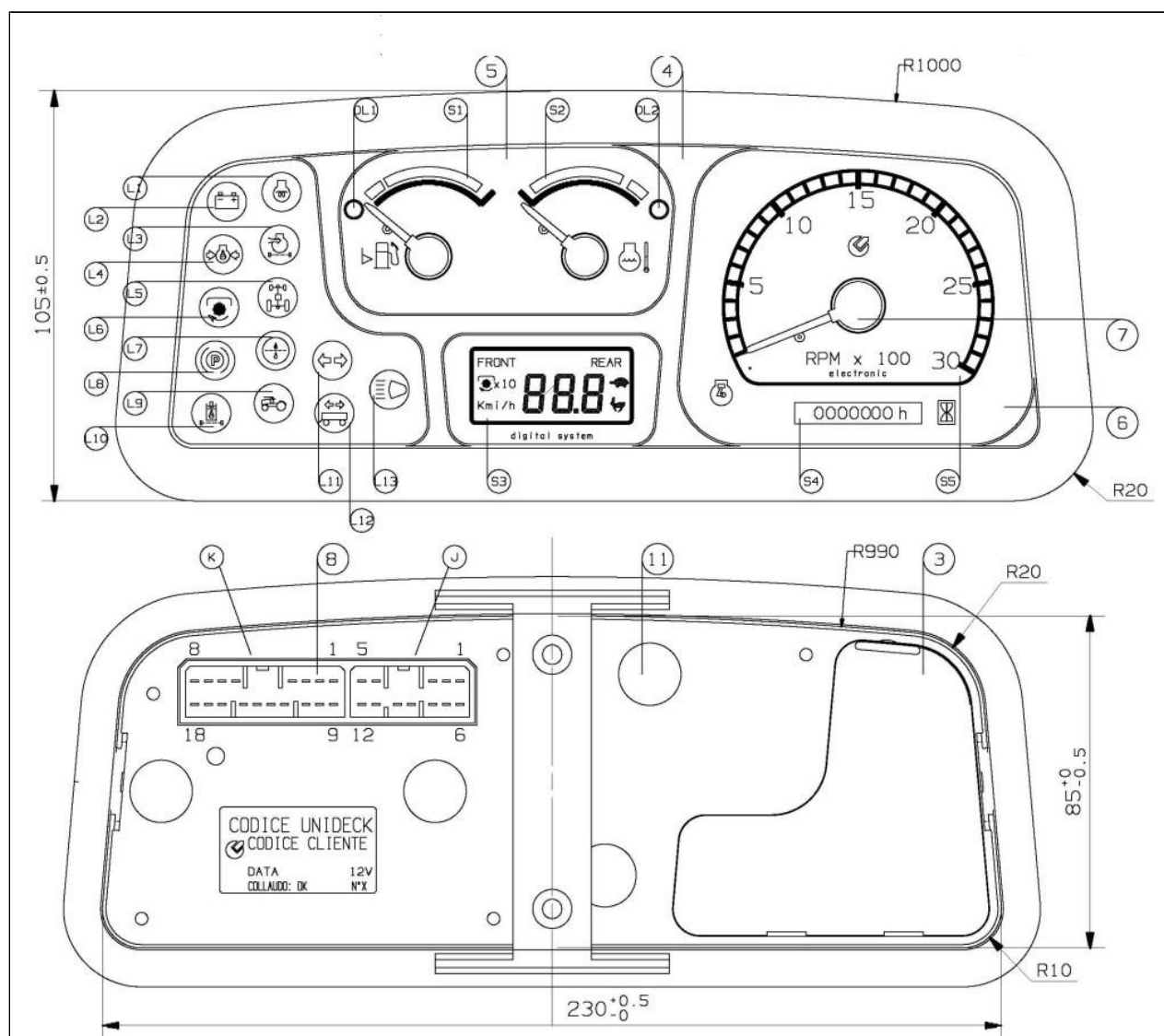
(M) 15A

4WD switch.
Parking brake
Brake lights.
Differential lock

(N) 10A

1-pin socket power supply.
Front

63.40 - Dashboard



POS	PIN	FUNCTIONS:	SIGNAL	POS	PIN	FUNCTIONS:	SIGNAL
+24V	J1	(+) positive		S3	K4	Digital speed indicator	Hz
+12V	J2	(+) positive		S3	K5	Engaged front PTO	C.A. / -
+L	J3	Night lighting (+)	+ ligh	S3	K6	Digital functions selection	C.A. / -
DL2	J4	LED indicating high water temperature	-	S3	K7	Engaged rear PTO	+ / C.A.
DL1	J5	LED indicating low fuel warning light	-	S3	K8	Slow fast rear PTO selection	C.A. / -
	J6	Not installed		L7	K9	Filter clogging warning light circuit lifter	
	J7	Not installed		L6	K10	PTO clutch engaged indicator - red.	+
L12	J8	Trailer direction indicators - green.	+	L5	K11	Front drive engaged indicator yellow.	+
L11	J9	Tractor direction indicators - green.	+	L4	K12	Engine oil pressure indicator.	-
L10	J10	Clogged oil filter indicator - red.	-	L3	K13	Clogged engine air filter indicator - red.	-
L9	J11	Safety frame lowered indicator - red.	-	L2	K14	Generator indicator.	-
L8	J12	Hand brake engaged indicator - red.	+	L1	K15	Engine warm-up indicator - yellow.	+
S1	K1	Fuel level indicator instrument.	ohm	L13	K16	Driving beam indicator - blue.	+
S2	K2	Coolant temperature indicator instrument.	ohm	GND	K17	Ground.	
S5	K3	Engine RPM indicator	Hz		K18	Not installed	

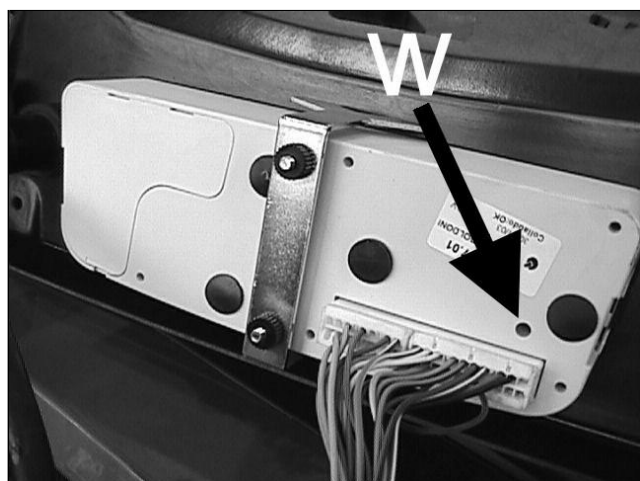


Fig.21

As shown in Fig. 21, on multifunction instrument of the dashboard, marked with the letter **W**, is the point on which to intervene with the help of a small screwdriver to adjust the rpm of the engine. Considering that the ratio between the rpm of the engine and the one of the PTO (to 540 in independent) is 4, it is possible, noting the speed of the PTO with a speedometer, to match the indication of the hour meter with that of the speedometer just acting on the adjustment screw of Fig. 21.

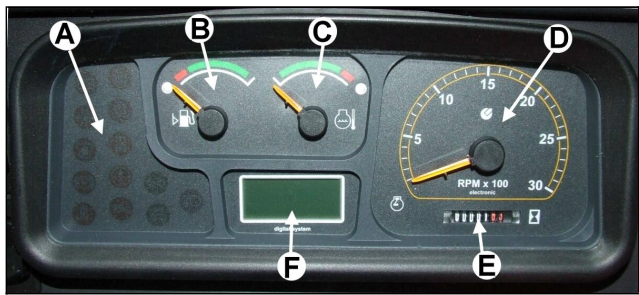


Fig.19

Digital dashboard calibration

At every starting of the machine, the code of adjustment appears for several seconds. Disconnecting the battery cables, the adjustment code is set to zero. For proper functioning, it is necessary to adjust the digital dashboard using a code given in the table. The code varies depending on the type of tire and PTO applied to the machine.

This operation is necessary when the hourmeter, the battery or the alternator are replaced.

Proceed as described in the following points to calibrate:

1. Keep button **4** depressed and turn the ignition key until the dashboard lights up. The word **SET** will appear when button **4** is released.
2. Press button **4** again until the first of the three values given starts to flash.
3. Press button **4** again to scroll the first value required.
4. Keep button **4** depressed to memorize and go on to the next value.
5. Repeat points 3 and 4 to memorize the second and third value also.
6. After having memorized the three values, press button **4** until the **kph (1)** or **mi/h (2)** indication appears.
7. Release and then press button **4** again until the word **OFF** appear. Calibration is now terminated.

Table of digital instrument regulation		
PTO 540/540E		
Tyres	Low version	High version
320/70-R24"	157	
360/70-R24"	158	
380/70-R24"	159	159
420/70-R24"		160

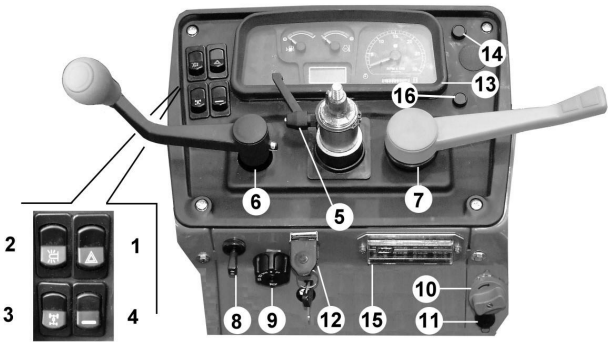


Fig.20

63.50 - Electrical system, platform maintenance, engine, fuses

Fig.26

In version S100, the battery is located on the left side of the engine under the lid that supports the toolbox



Fig.27

In the S90 version, the battery is located in front part of the engine under the air filter.

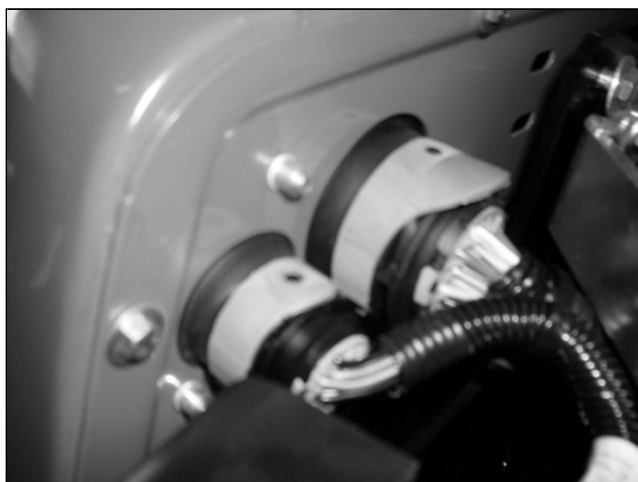
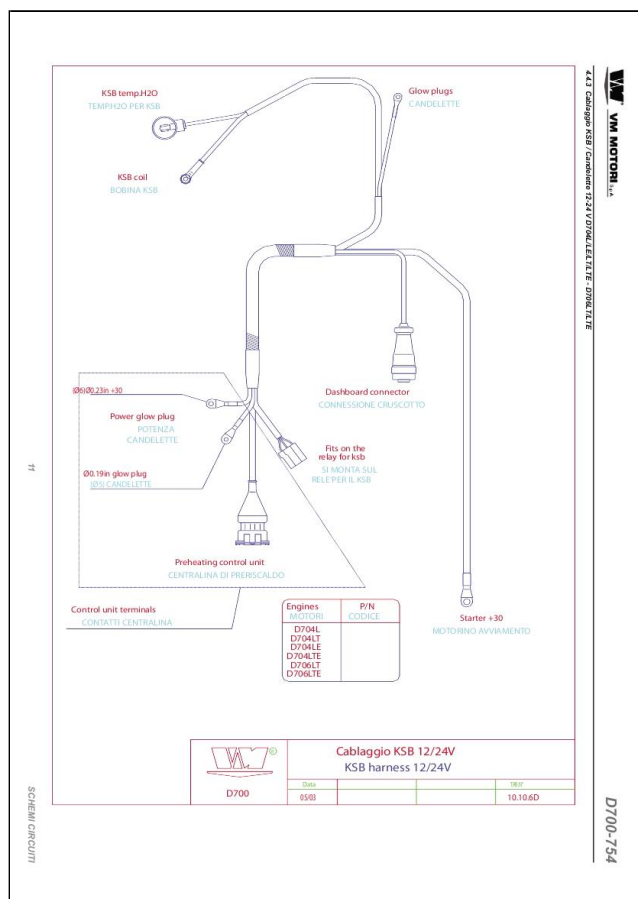


Fig.1



Fig.2

Fig. 1 and 2 highlight the connections between the engine and the platform. Since the series S90 and S100 have the driver platform completely mounted on silent-block, it was necessary to power the same platform by two seal connectors that are visible in the photos.



The figure illustrates the wiring diagram provided by VM for the operation of KSB.

Operating principle of KSB:

when the water temperature reaches 60 degrees, measured from the bulb, (shown in Fig. 5 with the letter **A**), the sensor close the ground circuit of the relay (shown in Fig. 3) and this last feeds through the no. 15 of the ignition switch the coil on the injection pump which turns off the KSB.

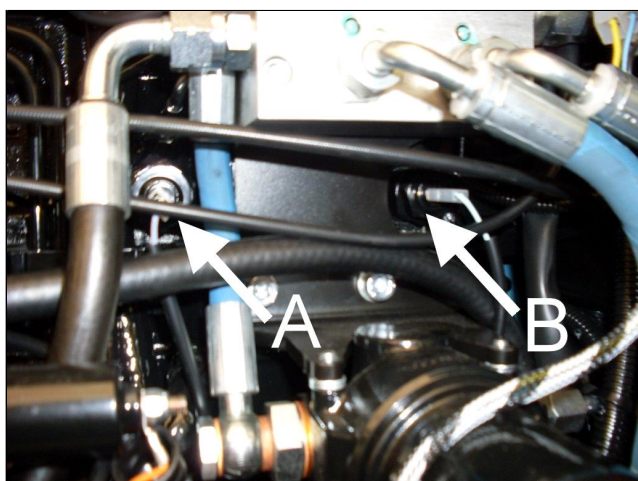


Fig.5

The other bulb, (indicated by the letter **B**) located on the engine near the solenoid 4WD and DL, is detecting the temperature of the water and sends the signal to the instrument on the dashboard.

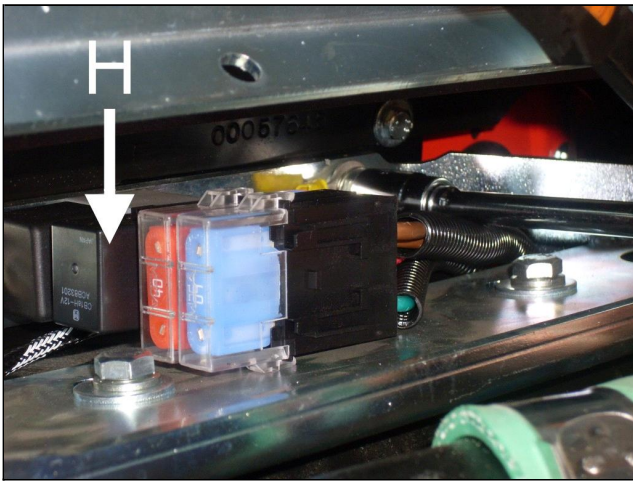


Fig.6

The other relay shown in Fig. 6 (close to that of KSB) is giving the consent to start. After receiving the consent of all the switches that control that the necessary safety conditions to start the engine are present (clutch pedal depressed, PTO disengaged), the relay marked with the letter **H** gives power to the starter motor.

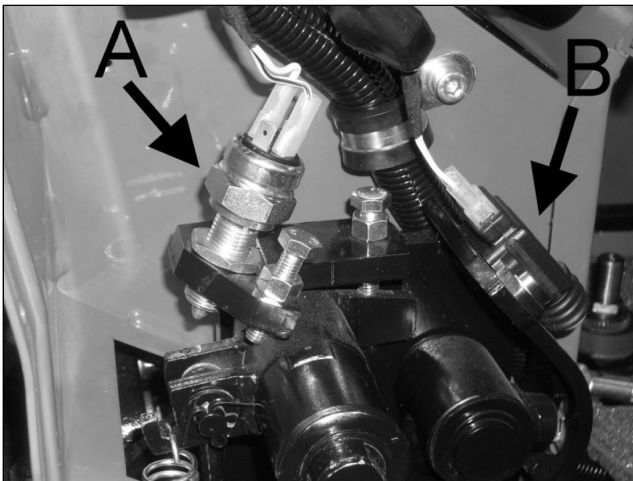


Fig.7

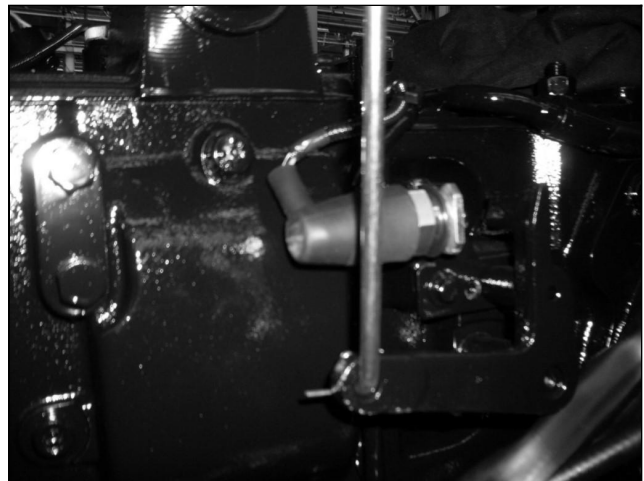


Fig.8

The tractor is equipped with two switches to enable starting, one is located on the clutch pedal (Fig. 7 letter **A**) that allows you to start the engine only with the clutch pedal down, the other is positioned on the lever insertion of the rear PTO (Fig. 8) that allows you to start the engine only with the PTO in the idle position.

In Fig. 7 with letter **B** it is visible, on the clutch PTO lever, the switch that turns on the light when the PTO is engaged.

Remember to disengage the PTO lever every time you do not need to prevent wear of the thrust bearing.

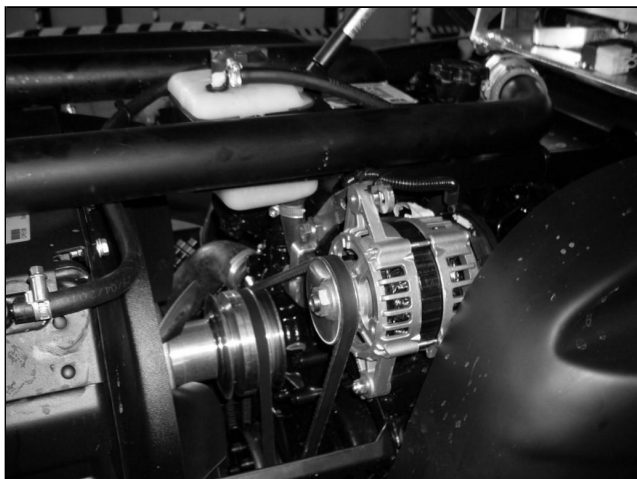


Fig.12



Fig.13

On models STAR 90 and STAR 100 the alternator is situated on the left side and changes position depending on the execution of the tractor if equipped with air conditioned or not. In the version with air conditioned the place of the alternator is occupied by the compressor and the alternator moves to the right side of the engine.



Fig.14

Fig. 14 shows the assembly of the compressor. The cab type GL11 mounted on this series is the same regardless of the engine that equips the tractor.

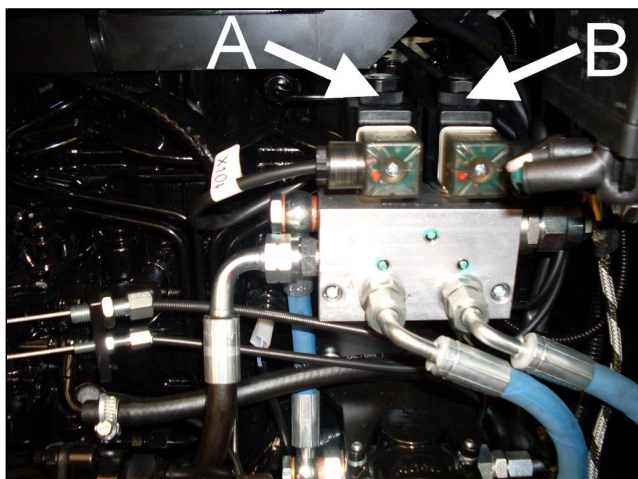


Fig.15

The control solenoid valve for the 4WD and the DL is located on the motor unit under the hood left side of the tractor. On the heads of the solenoid is been included a LED that shows the proper functioning of the individual heads. Please note that the solenoid of 4WD is always energized (LED on) when the 4WD is not inserted and the parking brake is not activated (indicated by letter **B**). Conversely, the differential lock solenoid (DL) is on only when the lock is on (indicated by letter **A**). To verify the integrity of the windings of the solenoid valve for the 4WD engagement and of differential lock, take the following values: coil resistance of 4WD and DL: 7.6 ohm - (both measured with a Tester). Remember that the values close to - **0** - indicate a short circuit, while the lack of measurement points out circuit interrupted.



Fig.16

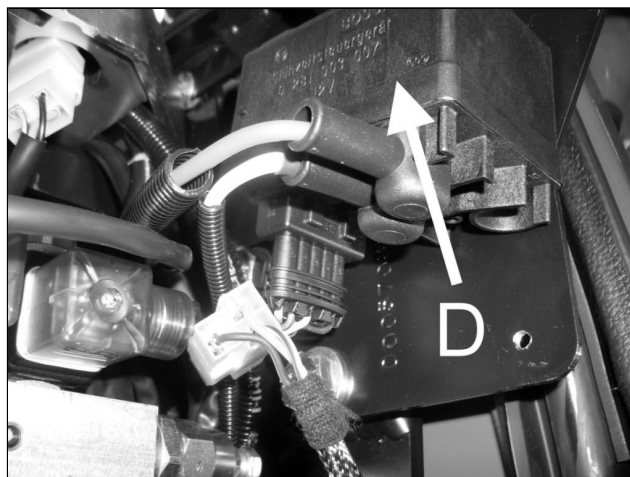
Inside the dashboard is positioned the control relay for the 4WD. It is activated both during braking and with the switch located near the instrument panel. While pushing the two brake pedals, with ignition key inserted, you hear the clicking of the relay so as to reveal the correct operation. Next to the relay control of the 4WD, there are two diodes that are used to avoid a return of current.



Fig.28

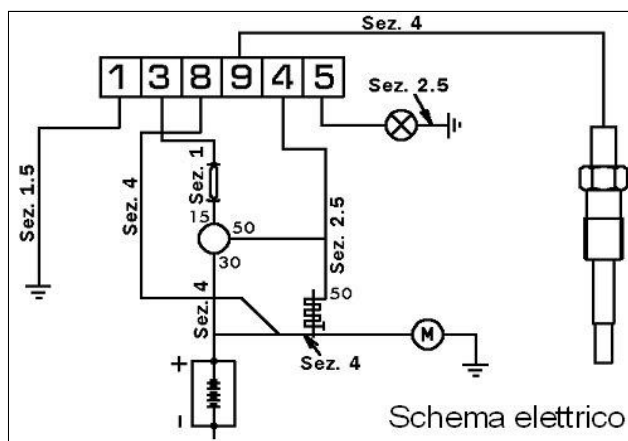
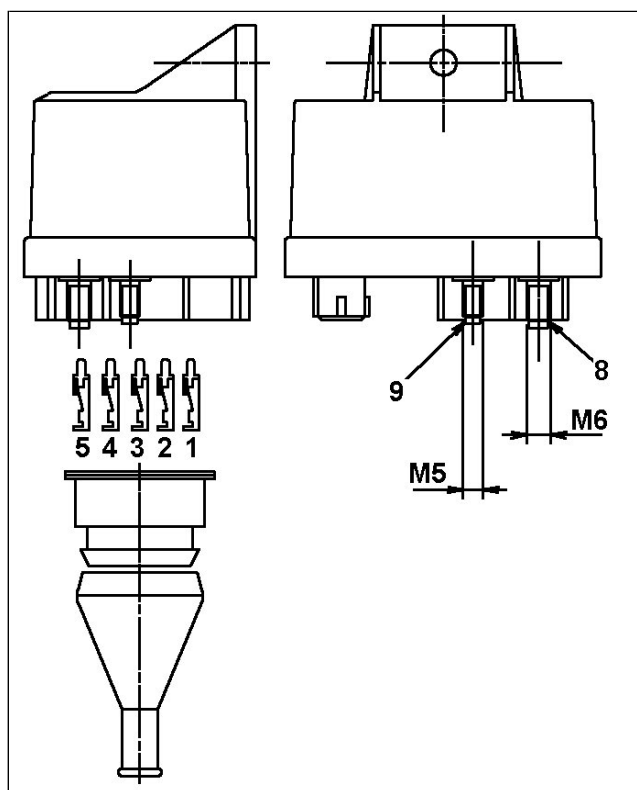
Since this family of tractors is made entirely on a platform mounted on silent-block full, you need the copper braiding visible in figure for transmitting power from the mass carriage unit to the platform. It is important to verify that this contact is guaranteed to prevent malfunction of the elements mounted on the platform.

63.60 - Preheating unit



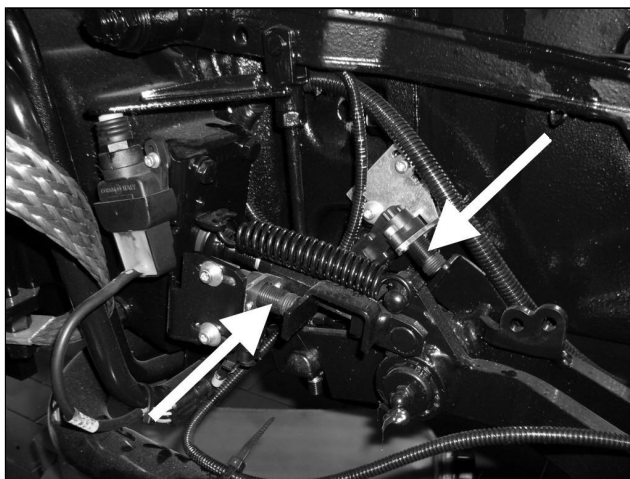
The figure shows the preheating unit (**D**), which is a device to protect against the present pollution on approved VM engines to reduce emissions at start.

It is reported separately the connection diagram of the controller, if it becomes necessary to change it. Being this a direct-injection engine, with very cold climates, the presence of this controller makes it easy to start. The preheating time varies depending on outside temperature.

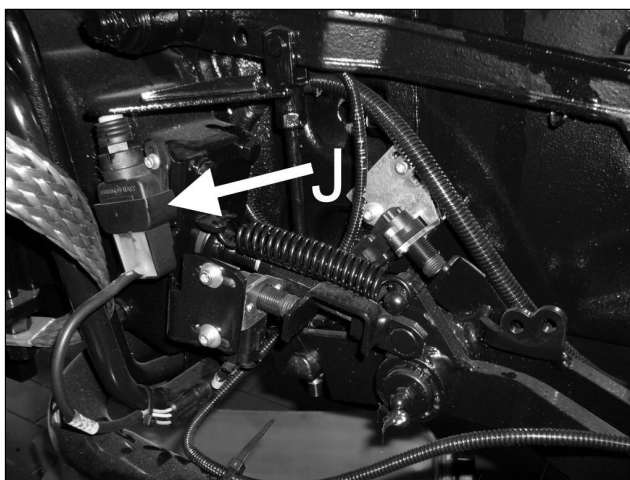


Complete device for preheater glows plugs for engine VM ; ref. VM: 18642001F

Specifications voltage **12V** plugs inrush **10A**

63.70 - Brake switches

the figure shows the two switches on their brake pedals and the switch of the hand brake (emergency and parking). Remember that it is very important the proper adjustment of the two switches on the two brake pedals. The switches work in extension so with pedals at rest, they should be compressed. The contacts to be used on the switches are marked by numbers 1 and 2. The switch on the right brake pedal controls the brake lights, while the one on the left pedal controls the engagement of 4WD.



Even the parking brake switch (item **J**), with the hand brake at rest, must be compressed and must not turn the light on the dashboard that indicates the parking. This switch too controls the 4WD engagement, with the handbrake on the 4WD is always engaged.

63.80 - Sensor bulbs

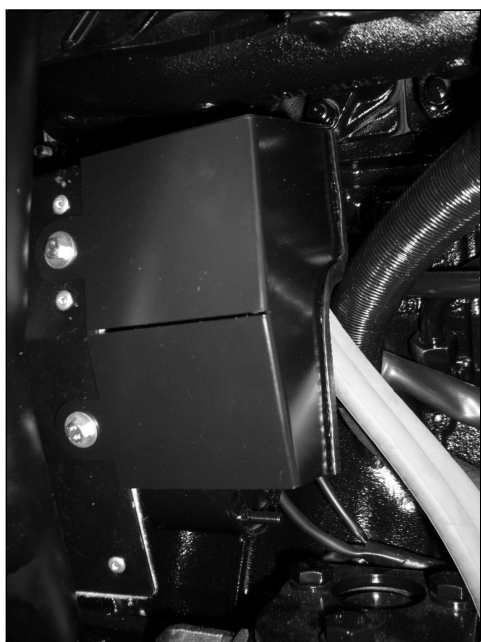


Fig.A

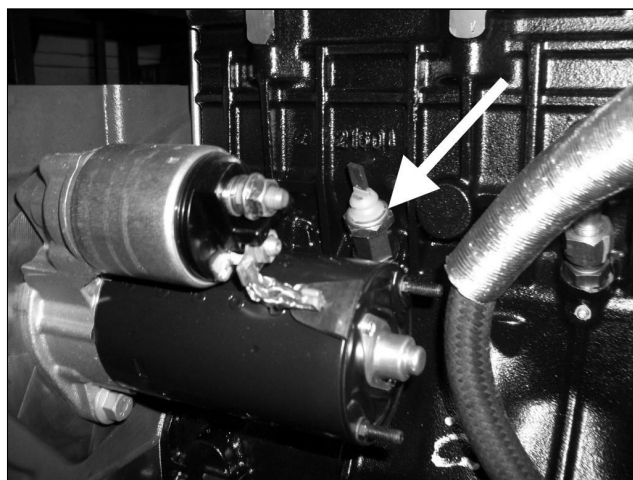


Fig.B

The bulb of the engine oil is located near the starter, to access it remove the protection of the motor. The bulb is connected with a negative wire; if the indicator light stays lit on the dashboard, even with the engine oil pressure, first unplug the wire from the bulb and see if there a short circuit on the wire causing ignition (the light should switch off) then replace the bulb shown in Fig. B.

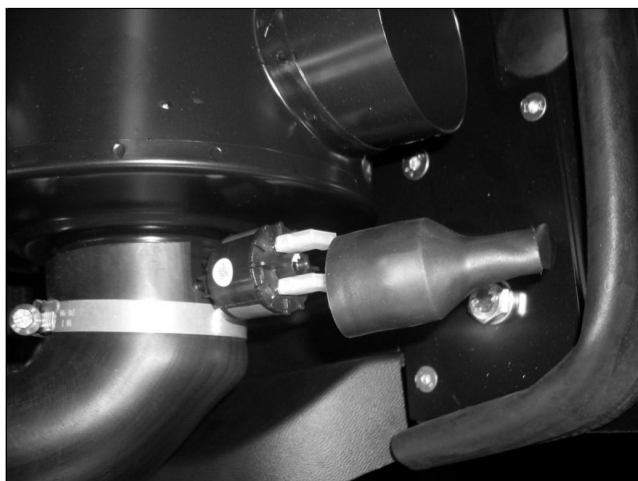
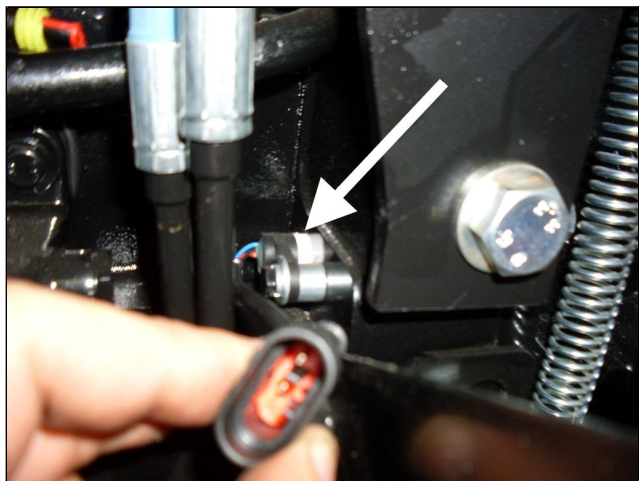
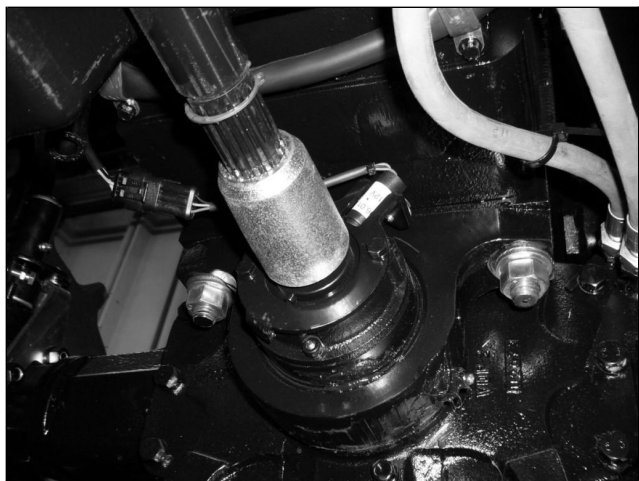


Fig.1

Fig. 1 shows the bulb that indicates the clogged air filter; in the case that even with clean air filter the corresponding indicator light stays lit on the dashboard, first try to disconnect the wires from the bulb and check if it's a short circuit on the wire causing ignition (the light should turn off), then replace the bulb shown in the picture.



The figure shows the sensor of the engine RPM. Please note that the sensor must be adjusted at a distance of 0.5 to 2 mm from the **phonic wheel**.



The figure shows the speed sensor. Please note that the sensor must be adjusted at a distance of 0.5 to 2 mm from the phonic wheel. We remind that the signal transmitted from the sensor is in Hertz.

Link	Wire color	PIN
(+) positive	red	1
Signal	Blue	2
(-) negative	black	3

Remember that the signal transmitted from the sensor is in Hertz.

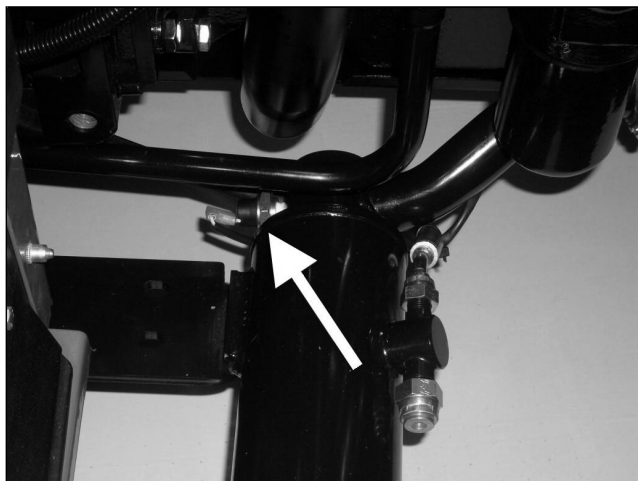
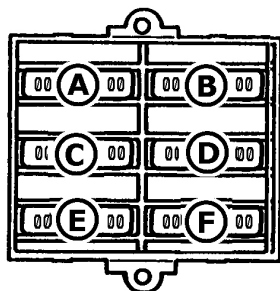


Fig.25

The figure shows the bulb that indicates the clogged oil filter on the intake side that is connected with a negative wire, in the case that even with the oil filter clean the corresponding indicator light stays lit on the dashboard, first unplug the wire from the bulb and check if it's a short circuit on the wire causing ignition (the light should turn off) then replace the bulb shown in the picture.

CAB ELECTRICAL SYSTEM

63.90 - Cab wiring diagram

63.100 - Cab fuses**(A) 7.5A**

Windscreen wiper and window washer

(B) 20A

Fan switch
Ceiling light

(C) 15A

Working beams

(D) 25A

The fan / heat exchanger compartment.

(E) 10A

Rear lights

(F) 20A

Revolving beacon

63.110 - Cab maintenance



Fig.29

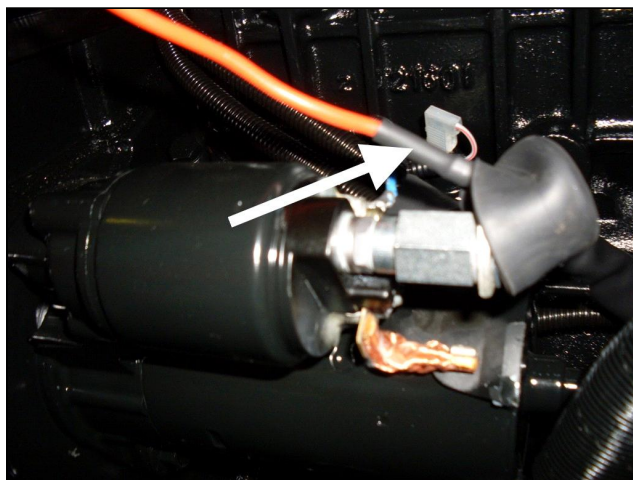


Fig.30

The line of the cabin has a 40A (Fig. 29), the ground wire (Fig. 37) and a red wire with eyelet to be connected under the clamp of the starter motor (Fig. 30).

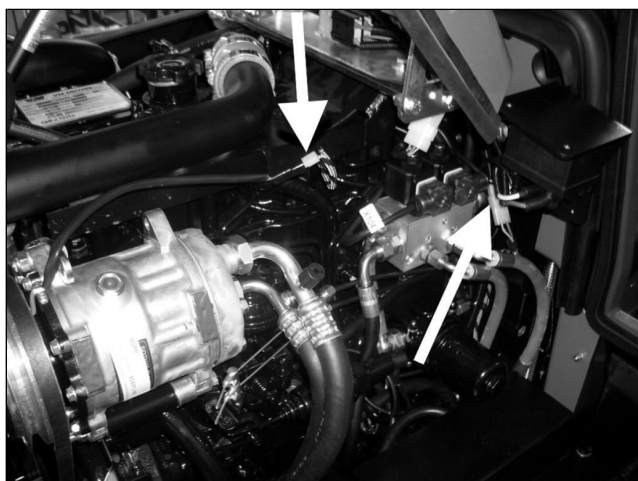


Fig.31

Fig. 31 displays the connection wiring between the GL11 cab and the tractor. The connections are the same whether it is Star 90 or 100. The picture shows the connection wiring of the line for the indicator/parking light, left side and power to the compressor (cable with tight block).

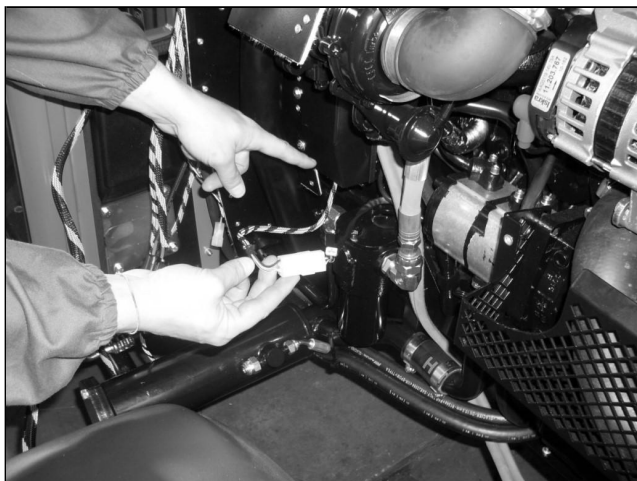


Fig.32

Fig. 32 displays the connection wiring of the line for the indicator/parking light of the cabin right side

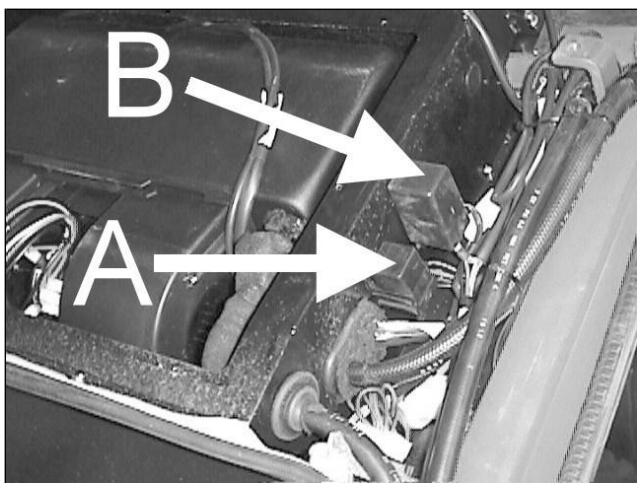


Fig.33

The relay **A** of Fig. 33 is the one sorting the 15 to all cabin sub-key uses, received current from the ignition switch (15) through the orange wire from the tractor. The red wire (30) comes directly from the tractor to the fuses box of the cab. The relay **B** of Fig. 33 is the one starting the rear cooling fan located in the back side of the cab roof, once received the signal from the fan assembly and from the thermostat located inside the condensing unit.

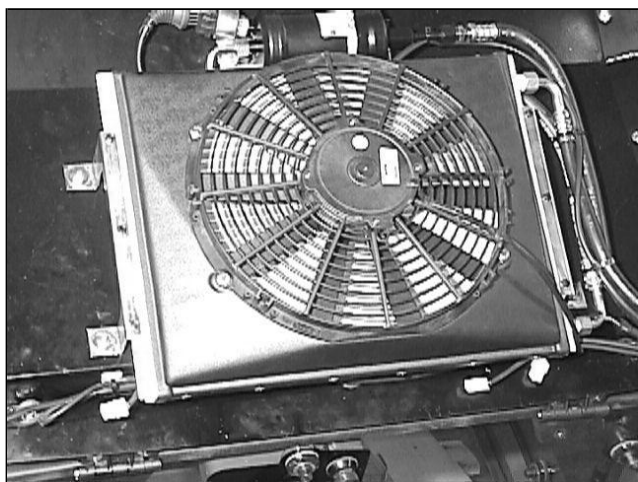


Fig.34

When you operate the air conditioning, after switching on the interior cabin fans unit, if the rear fan of Fig. 34 does not start within a minute, turn off the system and check the fuses of Fig. 35. The non functioning of the rear fan is causing an increase in gas pressure within the conditioner circuit which may lead to the operation of the relief valve of the circuit.

Please note that if the system is not charged of gas (R 134 a) in quantities of 0.8 kg, the compressor does not fit and you can not test it. The switch that turns on the air conditioning and controls the engagement of the compressor, receives a signal from the pressure switch on the circuit.



Fig.35

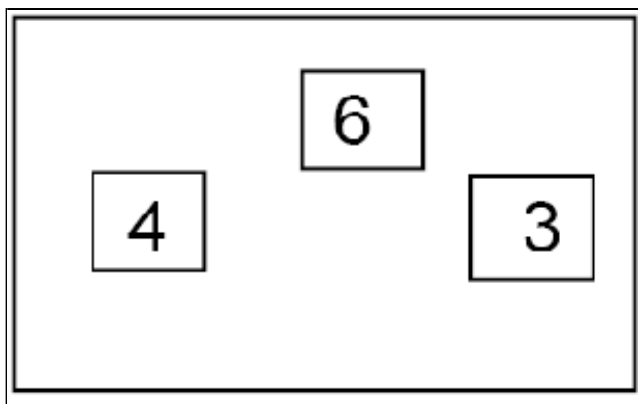


Fig.36

Regarding the thermostat, Fig. 36 shows the wiring diagram (to be observed in the case of replacement of the part):

- 4 : yellow - green,
- 6 : blue cable,
- 3 : green wire.



Fig.37

Pay attention to the fact that it is ensured a good contact with the mass (eyelet fixed on the bennet support blade). An unsafe contact mass shall cause a variety of disorders disorders including the failure to start of the cooling fan of the conditioning circuit.

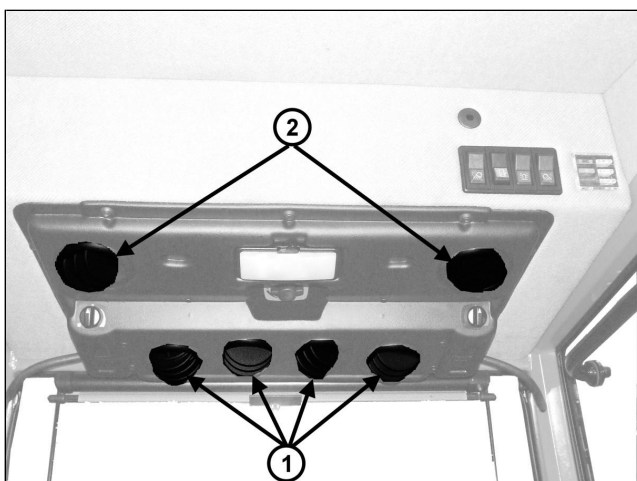


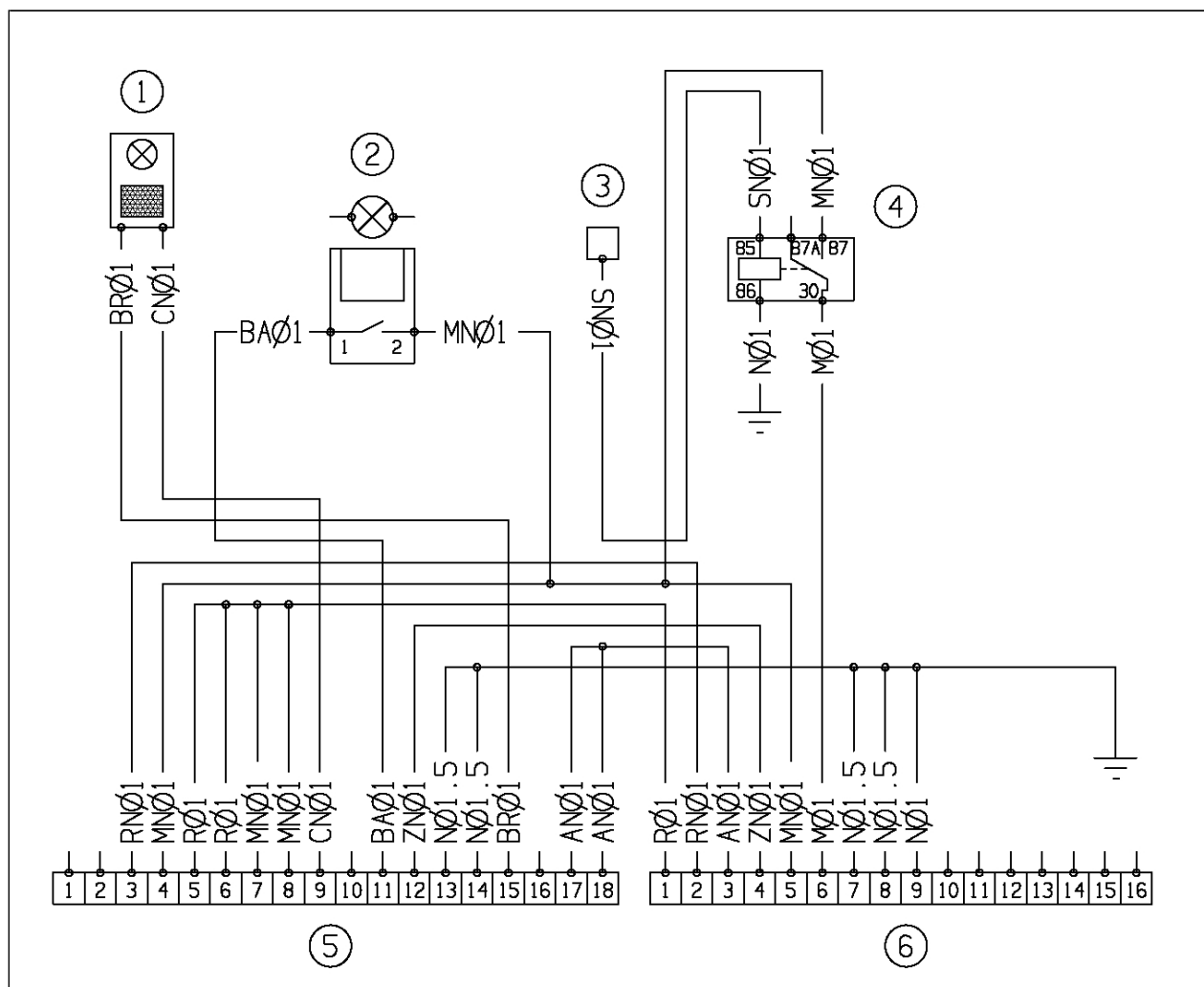
Fig.38

Inside the cabin, the two outlets located towards the operator (Fig. 38 items 2), should be opened only when you want to recycle the air in the cabin: under these conditions the air is sucked from the inside of the cabin rether than from the outside.

This condition can be realized for a quick cooling of the passanger compartment.

PTO ELECTRICAL SYSTEM

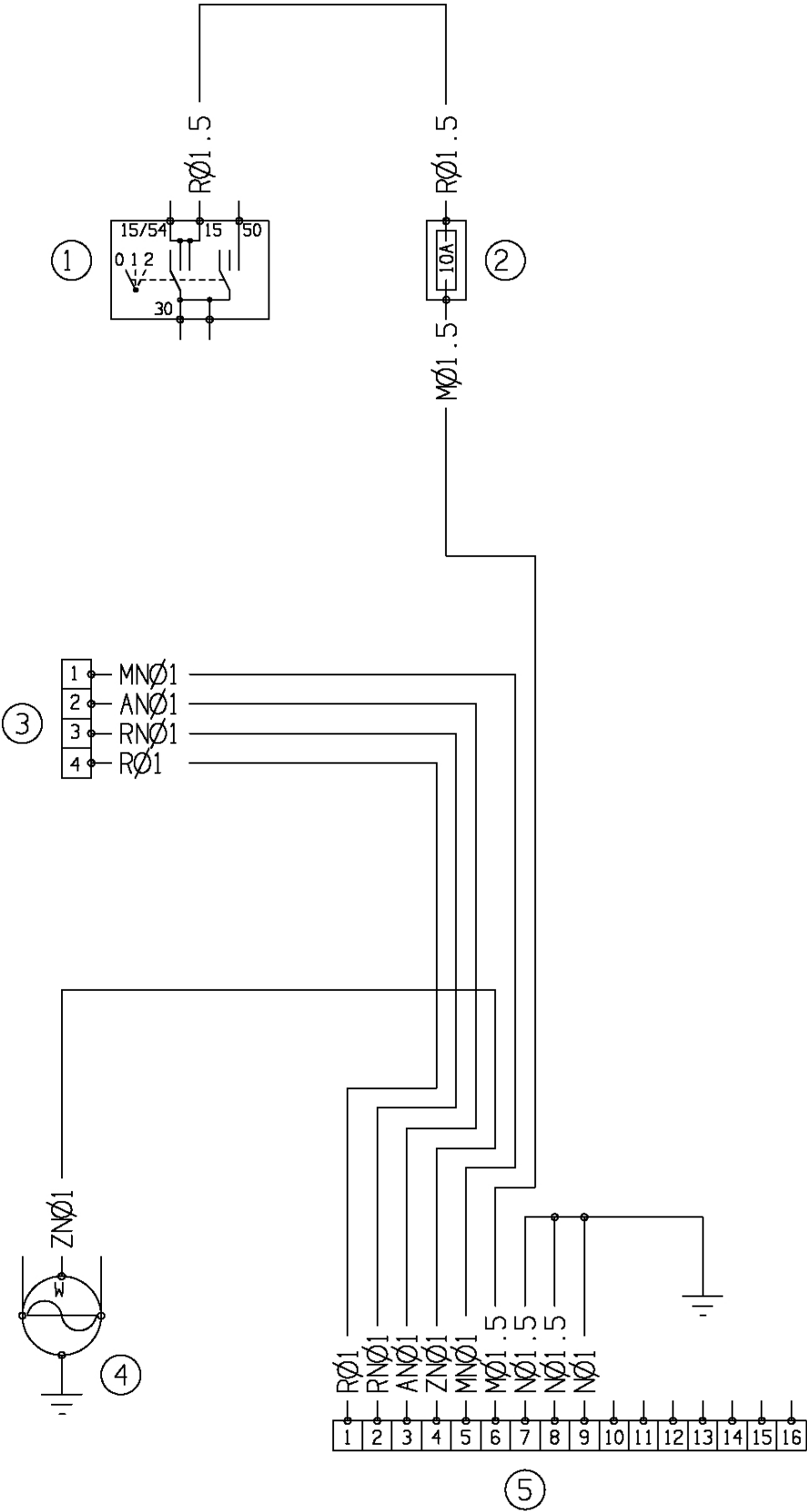
63.120 - PTO wiring diagram - dashboard circuit



ELECTRICAL SYSTEM

1. Red light indicator for engaged PTO clutch
2. PTO switch.
3. Security start from ignition switch
4. Security start relay from ignition switch
5. Connector for front PTO clutch line
6. Connector for engine clutch line

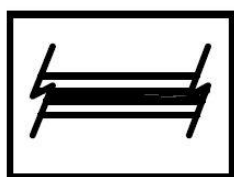
63.130 - PTO wiring diagram - engine circuit



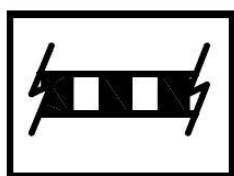
ELECTRICAL SYSTEM

1. Ignition switch
2. 10A fuse
3. Connector electromagnetic clutch
4. Alternator
5. Front clutch control unit connector

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



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



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

63.140 - PTO electrical system

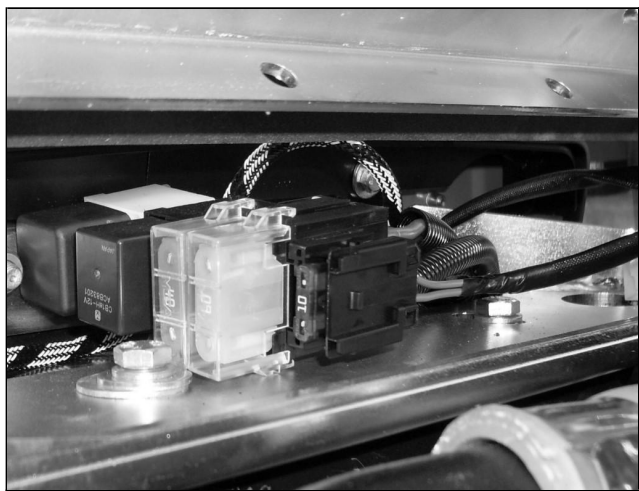


Fig.39

The additional protection fuse of the front PTO line is 10A, and is located on the bonnet support blade, next to the main fuse.

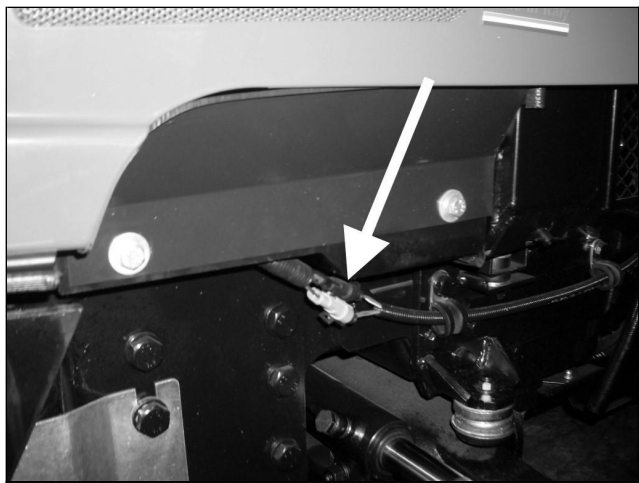


Fig.40

When the electromagnetic clutch line is which controls the engagement of the front PTO is present on the tractor, on the front of the machine the connectors shown in Fig. 40 are connected as follows:

Clutch		Electrical system
Wire color	big black	Light blue - black
	big red	red
	small black	brown - black
	small red	red - black

When the line of the electromagnetic clutch control for front PTO control is present on the tractor, one more relay is under the dashboard.

The function of this relay is to take power directly from the wire coming from the alternator that charges the battery and feed the unit that controls the PTO engagement taking power directly from the battery (and thus eliminate the voltage drop caused by other uses).

It is worth to say a few words on what the functions of the control of the electromagnetic clutch are:

- gradual engagement of the front PTO (soft start), indicated by the flashing and then gradually by the steady light;
- disengagement of the front PTO in case of sudden overload;
- possibility of engaging the front PTO between 1200 and 1800 engine rpm (not at minimum nor at maximum number of engine revolutions).

Since the unit that controls the PTO engagement receives a signal from the alternator, the control is active only when the engine is running, this avoids the PTO engagement with the engine off and consequently start the engine and directly also the equipment, eventually fitted on the front PTO.

In the case of partial engagement of the PTO check that this connection between the W of the the alternator and the central unit is guaranteed.

One last point about the impedance values of the two circuits in the electromagnetic clutch.

The circuit with the smaller connecting wires is the one that reveals the clutch slipping and must have 15.2 to 15.3 ohm impedance.

The primary circuit has an impedance of 2.9 to 3 ohms

ELECTROMAGNETIC CLUTCH UNIT

SIGHT OF CABLES ENTRY SIDE

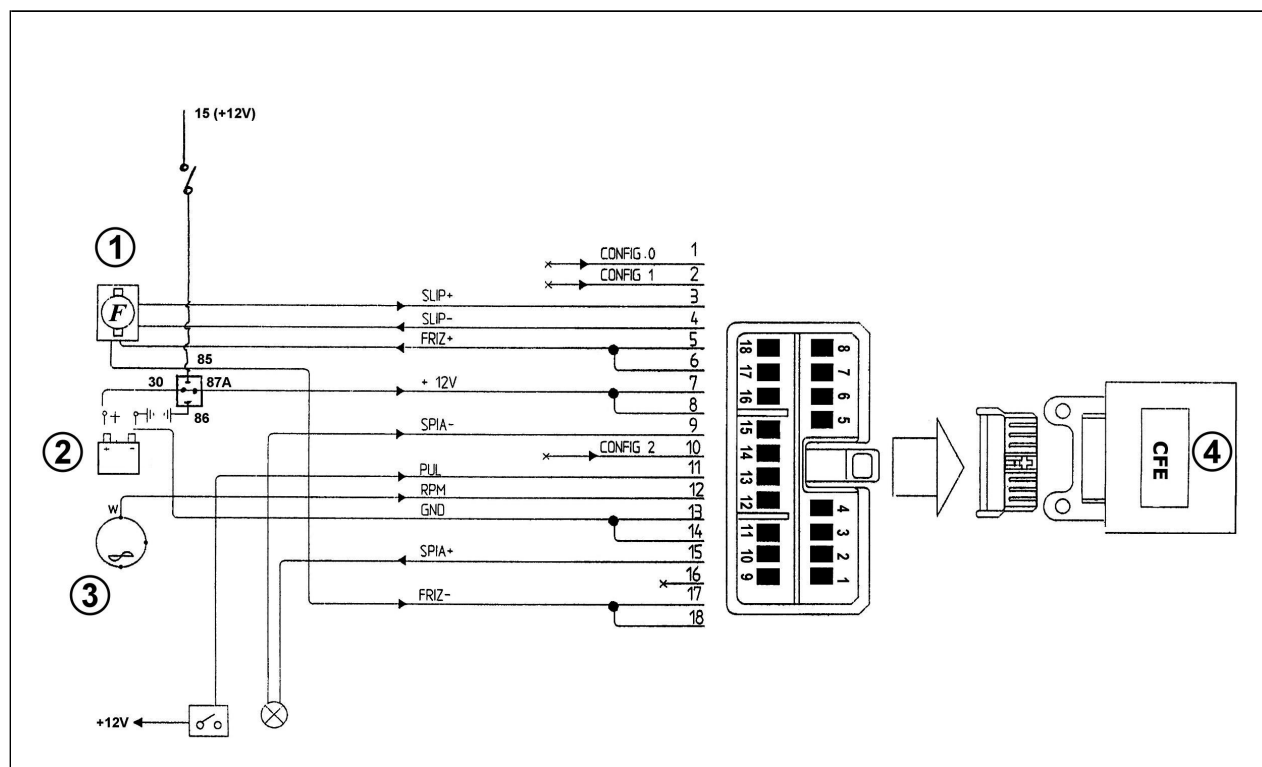


Fig.13a

Connector AMP multilock series 070

Female holder block 18 positions, COD:173853-1

Female contacts for series 070, COD. 345208-1

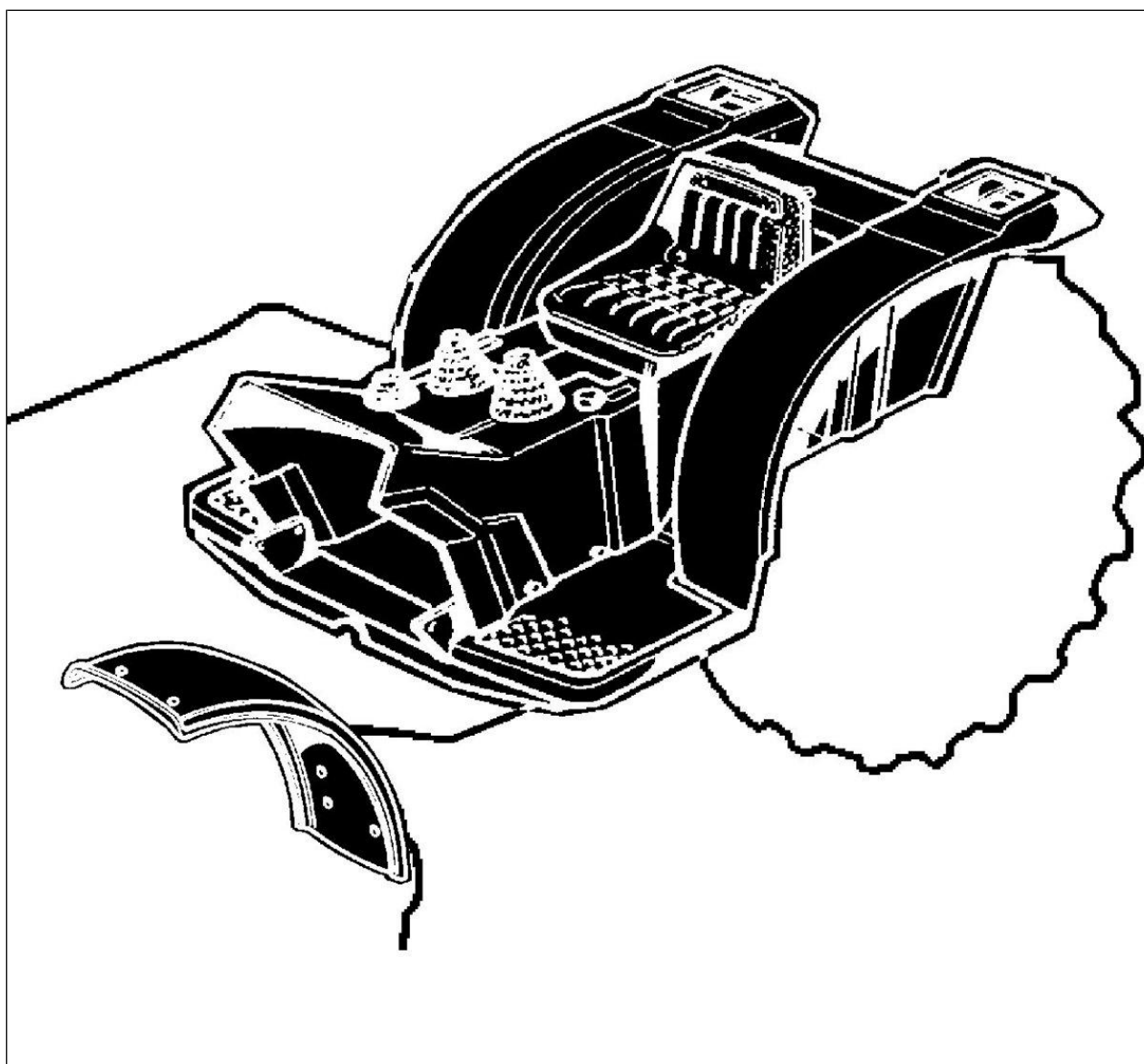
- ① Electromagnetic clutch
- ② Battery
- ③ Alternator
- ④ Connector electromagnetic clutch

The figure shows the wiring diagram of the control unit which controls the engagement and unlock the front PTO.

Slip + and - are terminals of the controller to be connected with the small red and small black wires coming out of the windings of the electromagnetic clutch and control slipping.

When the machine is equipped with the front PTO, there is an additional fuse on the engine line, near the main system fuse, which protects the electrical wiring of the front PTO control.

66 - PLATFORM



ASSEMBLY PLATFORM ADJUSTMENT

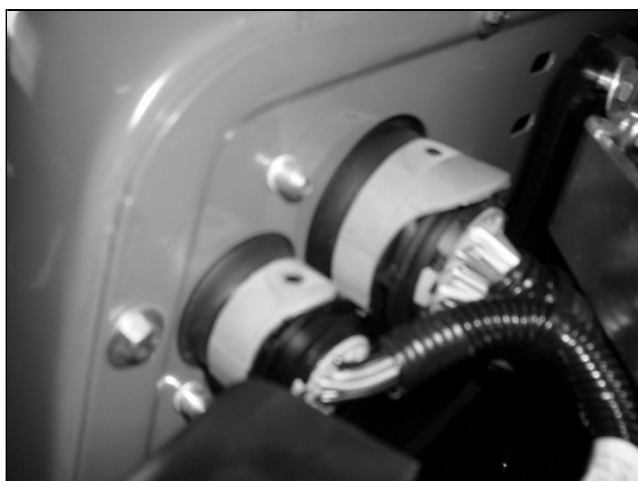
66.10 Platform disassembly



Remove the steering wheel with the appropriate puller 07006212, the throttle lever by hand, the reverse lever, the lever height adjustment wheel and finally the instrument panel.



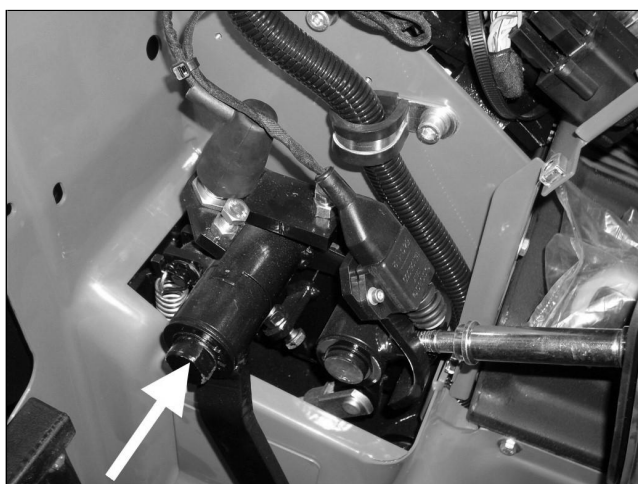
Remove the seal support frame, support hood.



Raise the safety and disconnect electrical connections.



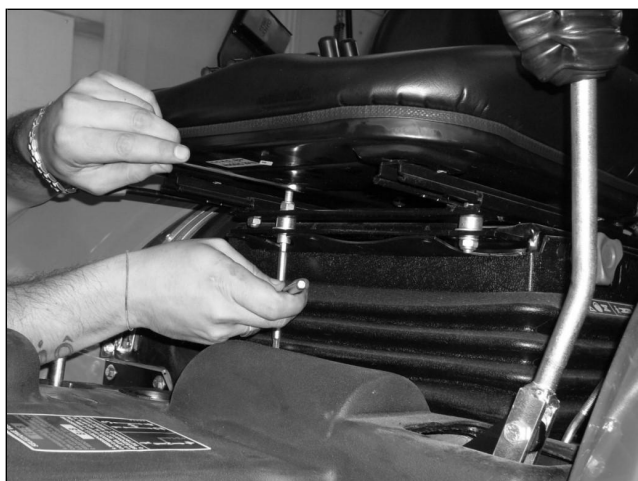
Remove PTO clutch lever, the fixed bonnet left and right.



Loosen the pin of the clutch pedal and remove the clutch pedal.



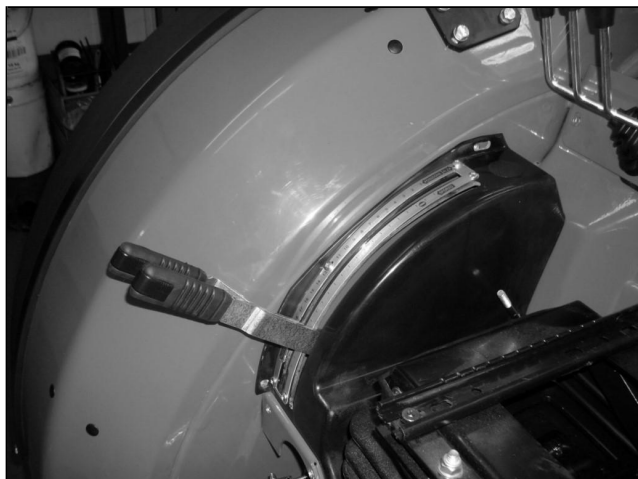
Remove the brake pedal, the rubber protection, the differential lock pedal and the throttle pedal.



Remove the cradle seat and leave the spring on the platform.



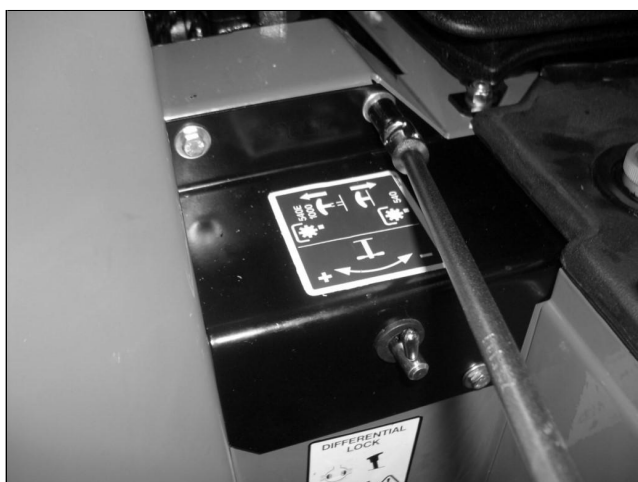
Remove the spring pin of the handle parking brake.



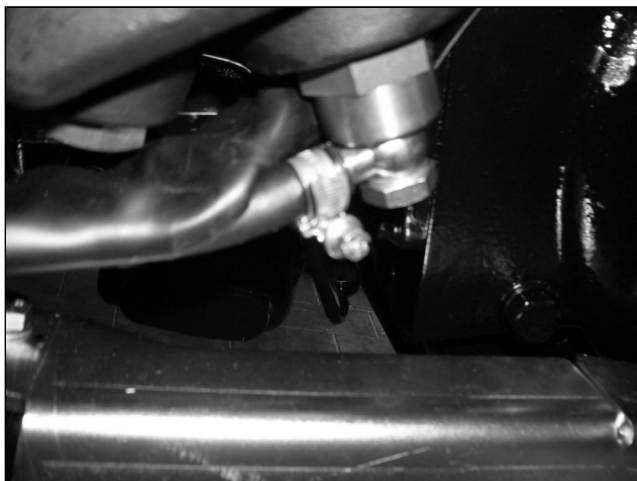
Remove the control handles and levers lift protections of the central tunnel.



Remove the lift control levers and hydraulic hose distributors auxiliary supply to the distributor of the lift.



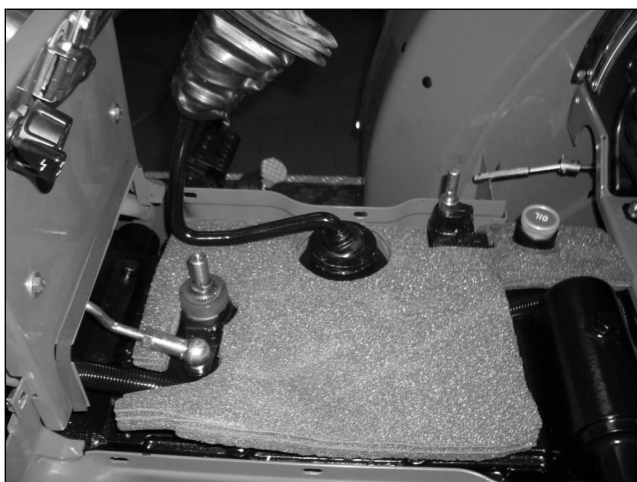
Remove the handle down control lift, and the protective cover of the valve distributor lift.



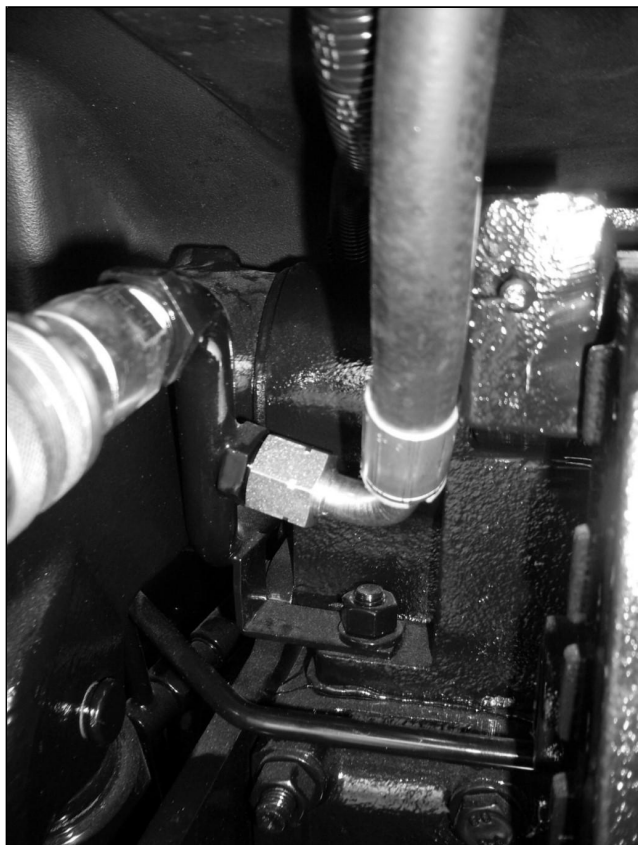
Download the diesel through the suitable tank cap.



Remove the control lever of the reduction gear.



Remove the retainer on the reverse joint lever and the covering soundproofing.



Remove the exhaust pipe of the auxiliary valves.



Unscrew the delivery hose of the auxiliary valves.



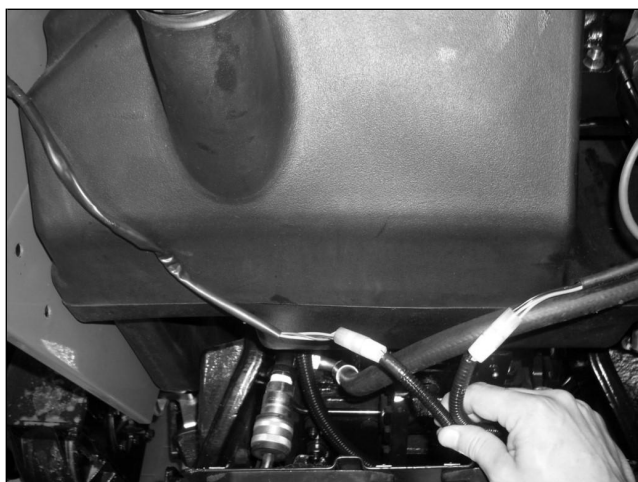
Disconnect the ground wire and unscrew the fixing screw of the platform.



Remove the blade support plate, the upper crossbar connecting mudguards with its lid.



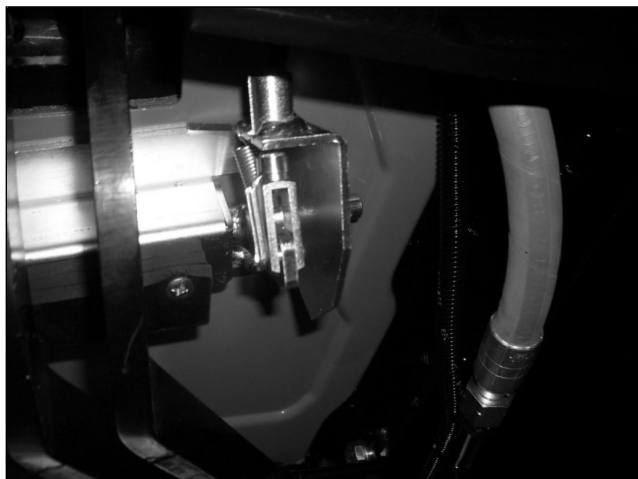
disconnect the fuel level detector and remove the fuel hose.



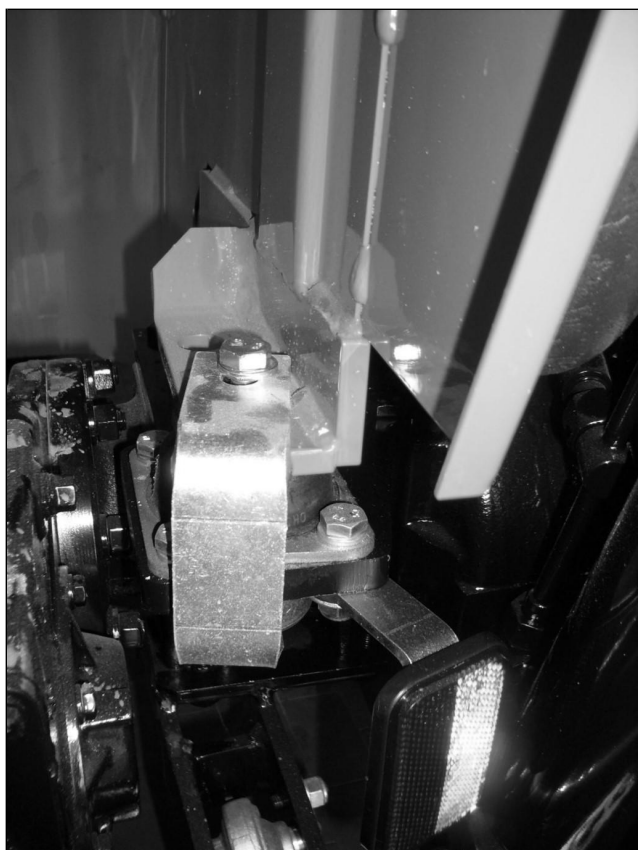
Disconnect the cable of the rear lights.



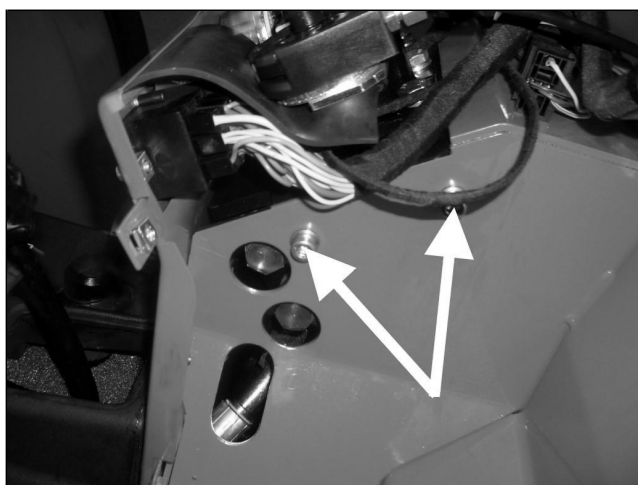
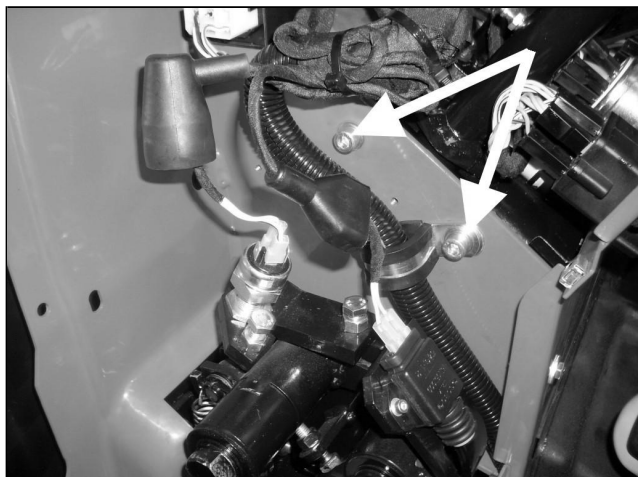
Unscrew the screw fastening the front of the platform in front support driving module.



Remove the locking pin of the fork kalvas on the transmission of the accelerator pedal, fitted under the platform on the right.



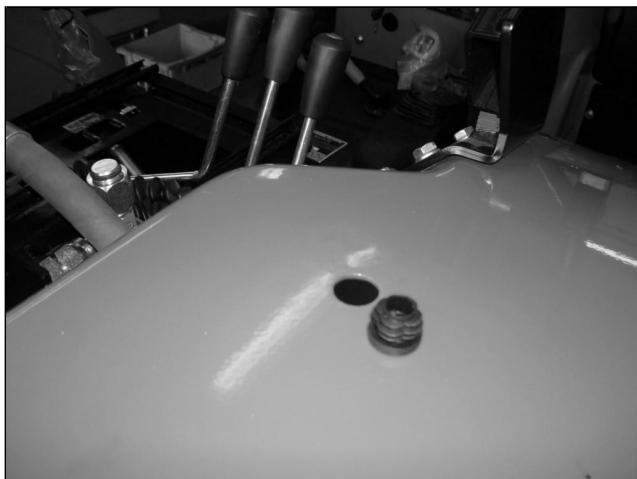
Unscrew the rear screw securing the platform to the rear support driving module.



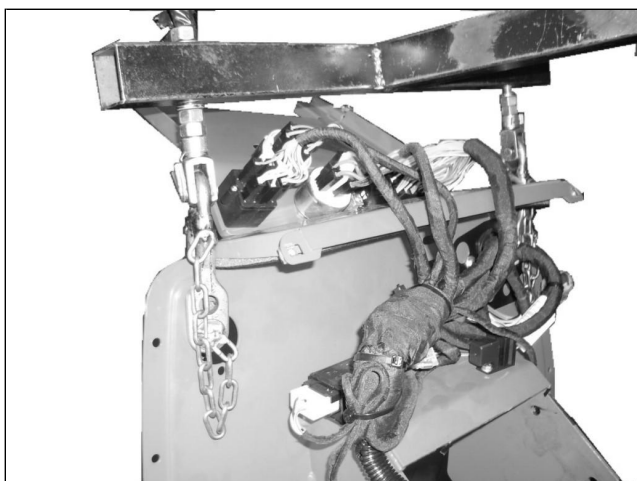
Remove the four screws of the power steering support and unplug the cables on the start switch and switch light of the hand clutch lever.



Remove the support of the control hand throttle.



Remove the two protection caps on the rear fenders.

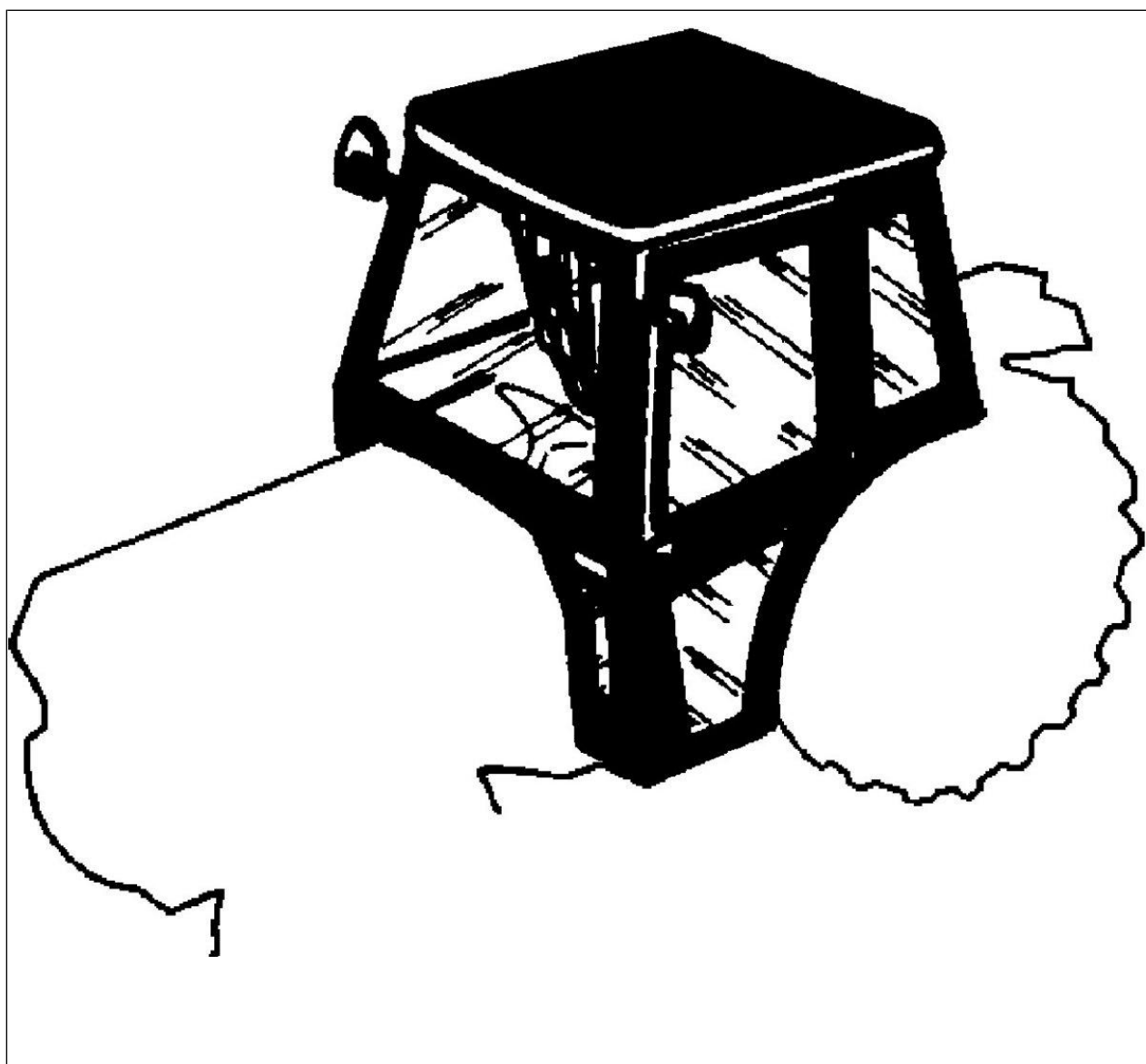


Secure the frame for the disassembly of the platform in the two holes on the front panel and into the two holes of the rear fenders, and finally remove the platform.

66.B - Needed tools group platform

CODE	DESCRIPTION	QUANTITY
07006212	Steering wheel puller	1

87 - CABIN

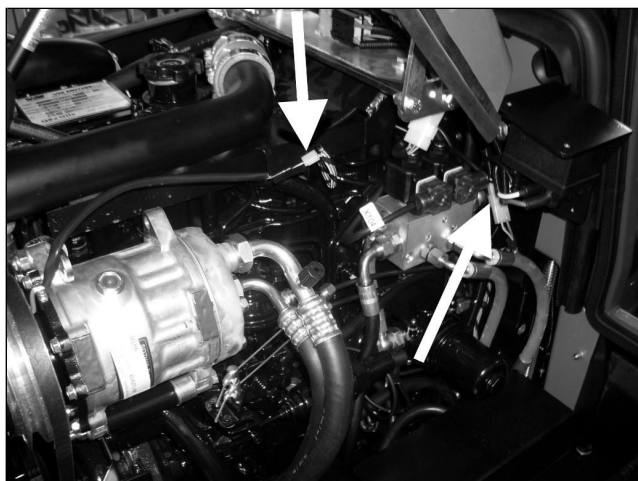


CAB ASSEMBLY ADJUSTMENT

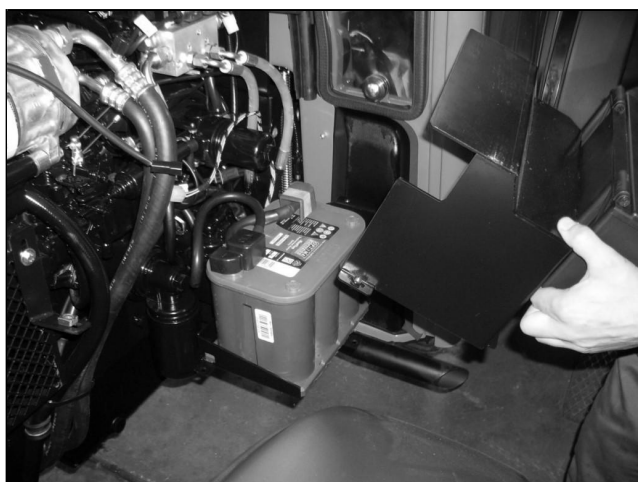
87.10 - Cabin



Remove the hood left side



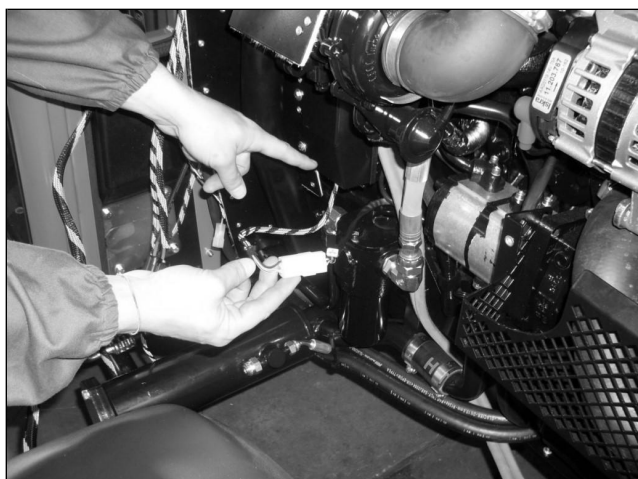
Disconnect the wires of the blower and indicators line / cabin position left side.



Remove the battery cover and disconnect the cables.



Remove the hood right side.



Disconnect the wires of the indicators line / position of the cabin the right side.



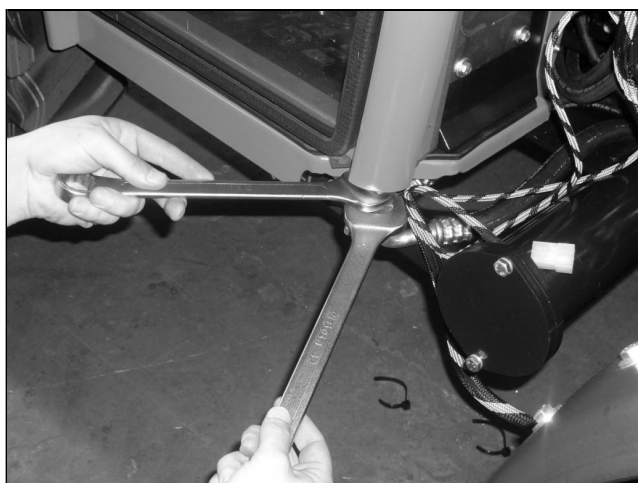
Disconnect the connector of the maxi fuse acting on the **impedimento**



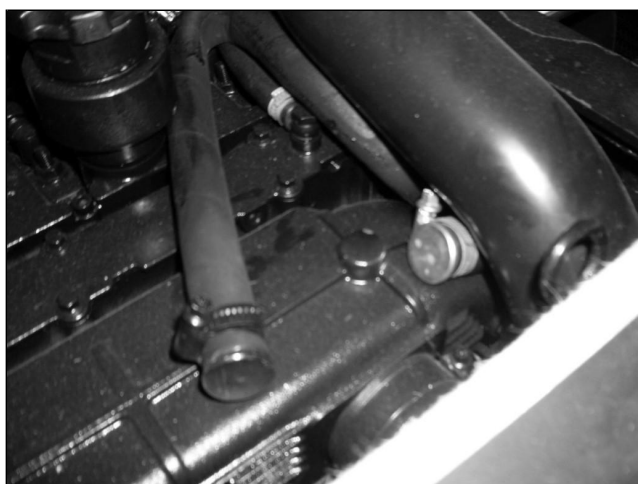
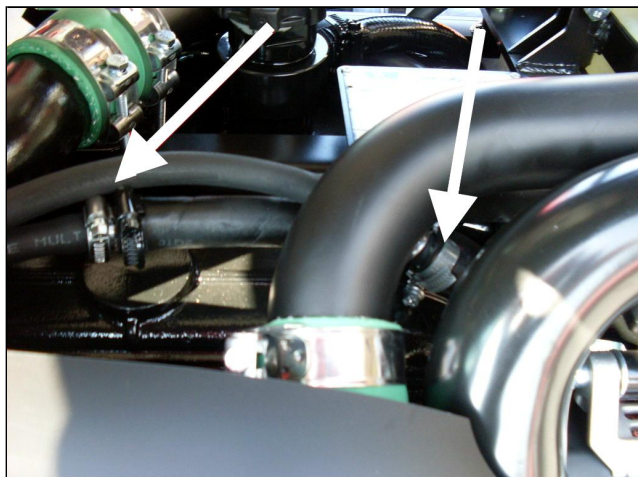
Disconnect the grounded cable fixed on the blade hood support.



Through a special machine (automatic vacuum unit and charge the refrigerant from the A/C) vent the air conditioning system, by connecting to the appropriate fittings on the pipes connecting to the compressor.



Disconnect the hose of the air conditioned from the cabin



Disconnect the heating pipes and cap.



Unscrew the screw fastening the front of the cabin to the front support driving module.



Loosen the screw holding the cabin to the rear fenders.



Remove the four screw fixing the roof of the cab and fix the four eyebolts for lifting the cab.



Raise the car hooking the four eyebolts mounted above.



Reassemble the cabin by repeating the operations in reverse order.
When replacing the cabin you should pay particular attention to the seals on the tubes of air conditioning.
Through the appropriate machine (automatic vacuum unit and charge the refrigerant from the A/C) recharge the air conditioning system, by connecting to the appropriate fittings on the pipes to the compressor using R134a gas type in the targeted amount of 0,8 kg.

87.B - Needed tools group cabin

CODE	DESCRIPTION	QUANTITY
07511444	M 10 eyebolt	4
00041258	Cap d.16	2

90 - LUBRICANT



RECOMMENDED LUBRICANTS AND FLUIDS

90.10 - Original lubricants

GROUP	LUBRICANT	CAPACITY L
Engine oil	ARBOR ALFATECH SYNT 10W-40 oil • Viscosity at 100° C (mm²/s) 14 • Index of viscosity 158 • Flash point V.A. (°C) 200 • Pour point (°C) -33 • Mass Volume at 15 °C (kg/l) 0.875	Star 90 4.8 / 5.8 Star 100 6 / 7.5
Front differential housing	ARBOR TRW 90 oil • Viscosity at 40° C (mm²/s) 135 • Viscosity at 100° C (mm²/s) 14.3 • Viscosity at -26° C (mPa.s) 108000 • Index of viscosity 104 • Flash point V.A. (°C) 220 • Pour point (°C) -27 • Mass Volume at 15 °C (kg/l) 0.895	8
Gearbox housing	ARBOR UNIVERSAL 15W-40 oil • Viscosity at 40° C (mm²/s) 110 • Viscosity at 100° C (mm²/s) 14 • Viscosity at -15° C (mPa.s) 3450 • Index of viscosity 135 • Flash point V.A. (°C) 220 • Pour point (°C) -36 • Mass Volume at 15 °C (kg/l) 0.886	Low version 37 High version 41
Front reducers.	ARBOR TRW 90 oil • Viscosity at 40° C (mm²/s) 135 • Viscosity at 100° C (mm²/s) 14.3 • Viscosity at -26° C (mPa.s) 108000 • Index of viscosity 104 • Flash point V.A. (°C) 220 • Pour point (°C) -27 • Mass Volume at 15 °C (kg/l) 0.895	1
Radiator.	PARAFLU 11 antifreeze fluid • Density at 15°C (g/cc) 1.135 • pH (dil. 50%) 7,7 • Alkaline reserve (ml HCl 0.1 N) 16 • Boiling point (dil. 50%) (°C) 108 • Graining point (dil. 50%) (°C) -38 • Foam at 88°C (cc) 50	14

99 - PROBLEMS AND SOLUTIONS



TECHNICAL HITCHES - CAUSES - REMEDIES

ENGINE

Technical hitches	Possible causes	Remedies
The engine has low power.	1. Clogged fuel filter. 2. Refusal injector partially blocked. 3. Suction of air in the circuit. 4. Injectors not calibrated. 5. Clogged air filter.	1. Replace the filter. 2. Remove the obstruction. 3. Make the circuit waterproof. 4. Revise or replace the injectors. 5. Clean the filter and, if necessary, replace the cartridge.
The engine has a bad start.	1. injection pump not calibrated. 2. Injectors not calibrated. 3. Fuel pump does not work properly.	1. Revise or replace the pump. 2. Revise or replace the injectors. 3. Replace the pump.
The engine does not start.	1. Damaged electrostop. 2. blown fuse.	1. Replace the electrostop. 2. Check the fuses box, remove any cause that caused the short circuit of the fuse and replace.
The engine does not stop.	1. Electrostop with powder.	1. Clean the electrostop.

DIRECTION REVERSER

Technical hitches	Possible causes	Remedies
Reverser scratches.	1. Synchronizers are worn.	1. Demount the frontal group and replace the synchronizer.
The reverser is difficult to engage.	1. Check lubrication on levers.	1. Grease the levers.
The reverser does not engage.	1. The clutch does not detach.	1. Adjust the clutch as required.

CLUTCH - TRANSMISSION

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

GEARBOX

Technical hitches	Possible causes	Remedies
Gearbox scratches.	1. Synchronizers are worn.	1. Demount the gearbox and replace the synchronizers.
Gearbox is noisy during his functioning.	1. Insufficient oil level. 2. Bearings are worn.	1. Check oil level. 2. Replace the bearings.
The gears disengage.	1. Synchronizer stack and speed selection gears have excessive adjustment play. 2. Incorrect synchronization between speed selection rod and sliding sleeve engagement. 3. Sliding sleeve speed engagement and gearbox selector with worn teeth due to malfunction of the synchronizer.	1. Restore the adjustment play required. 2. Restore the drive transmission, deleting all clearance and replacing, if necessary, rod, spring and selection sphere. 3. Replace the complete synchronizer and selecting gears.
The gears do not engage.	1. The clutch does not detach. 2. Synchronizer with ring brake is wavy or undulated. 3. Synchronizer with excessively forceful brake preloading springs 4. Synchronizer stack and speed selection gears with little axial play.	1. Adjust the clutch as required. 2. Replace the ring brakes. 3. Replace the springs and chamfer the parts that contact them on the sliding sleeve 4. Restore the adjustment play required.
The final drive - reverse shuttle disengages	1. Incorrect synchronization between the final drive selector rod and sliding gear. 2. Reverse gear with bush that creates an axial thrust	1. Restore the drive transmission, deleting all clearance and replacing, if necessary, rod, spring and selection sphere. 2. Replace the gear and bush assembly
The final drive - reverse shuttle fails to engage	1. The clutch does not detach. 2. Ratio separator badly adjusted	1. Adjust the clutch as required. 2. Reset the instrument.

REAR DIFFERENTIAL LOCK.

Technical hitches	Possible causes	Remedies
Noisy axle.	1. Differential lock disengagement command not adjusted. 2. Differential lock disengagement internal lever not adjusted. 3. Bevel gear not adjusted.	1. Adjust the command. 2. Adjust the levers. 3. Adjust the bevel gear.
The differential lock fails to engage	1. External control blocked 2. Differential lock disengagement internal lever not adjusted. 3. Sliding locking ring with impediment on crown wheel	1. Release and adjust the control 2. Adjust the levers. 3. Make the ring slide correctly on the crown wheel
The differential lock fails to disengage	1. External control blocked 2. Differential lock disengagement internal lever not adjusted. 3. Sliding locking ring with impediment on crown wheel	1. Release and adjust the control 2. Adjust the levers. 3. Make the ring slide correctly on the crown wheel

REAR REDUCERS.

Technical hitches	Possible causes	Remedies
Noisy wheels.	1. Screws fixing flange and rims are slow. 2. Axial adjustment play on the axle shafts. 3. Noisy bearings	1. Tighten the screws to torque. 2. Eliminate the adjustment play as described. 3. Replace the bearings.

DRIVE TRANSMISSION

Technical hitches	Possible causes	Remedies
The drive disengages	1. Faulty solenoid valve unit 2. Faulty electrical system 3. Faulty drive engaging unit	1. Check the solenoid valve unit as described 2. Check drive engagement switches, check the relay under the fixed bonnet 3. After having made the above inspections, overhaul the drive engaging unit
The drive fails to engage	1. Pressure too low 2. Leaking cylinder seal 3. Faulty mechanics in the drive unit 4. The electrical system or solenoid valve unit fail to function 5. 4WD solenoid valve out of service 6. Check the pressure of accumulator	1. Adjust the pressure to the correct value 2. Replace the seals. 3. Overhaul the unit 4. Check the fuses, check the power supplied to the value unit, check the components of the electrical system (4WD switch, relay, etc...) using the diagram as a reference 5. Replace the solenoid valve 6. Check the solenoid valve work
Noisy drive	1. Wrong tyre pairing 2. Irregular tyre pressure 3. Worn transmission sleeve.	1. Pair the tyres correctly 2. Adjust the tyre pressure correctly 3. Replace the sleeves

POWER TAKE-OFF

Technical hitches	Possible causes	Remedies
The PTO disengages.	1. PTO engine or selection command not adjusted. 2. 540-540E-1000 rpm selection control not adjusted 3. Broken selector pad	1. Adjust the selection as required. 2. Replace the selection control 3. Replace the pad.
The PTO does not engage.	1. The clutch does not detach. 2. PTO engine or selection command not adjusted. 3. Broken selector pad	1. Adjust the clutch as required. 2. Adjust the selection as required. 3. Replace the pad.
The PTO is noisy.	1. With the equipment application that requires little effort and with an uneven rotation. 2. Selection of the 540-750-1000 rpm ratio not proportional to that of the implement 3. Adjustment play on the PTO shaft.	1. There is no remedy to a problem concerning an inconveniency on the equipment. 2. Select an appropriate ratio 3. Adjust the shaft as explained and control the fluency of the cardan joints connected.

FRONT AXLE

Technical hitches	Possible causes	Remedies
Noisy axle.	1. Axle bearing bushes with too much clearance. 2. Worn transmission sleeve. 3. Bevel gear not adjusted. 4. Differential lock not adjusted.	1. Replace the bushes of the support and the sleeve of the transmission 2. Replace the bushes of the support and the sleeve of the transmission 3. Adjust the pinion - ring gear assembly correctly 4. Adjust the differential lock correctly

FRONT REDUCERS.

Technical hitches	Possible causes	Remedies
Noisy wheels.	1. Screws fixing flange and rims are slow. 2. Axial adjustment play on the axle shafts. 3. Noisy bearings	1. Tighten the screws to torque. 2. Eliminate the adjustment play as described. 3. Replace the bearings.

BRAKES

Technical hitches	Possible causes	Remedies
The machine does not brake.	1. Brakes not adjusted. 2. Worn brake disks.	1. Adjust emergency and parking brakes. 2. Replace disks.
The machine remains braked.	1. Brakes not adjusted. 2. Broken return springs. 3. Hardened commands due to insufficient lubrication.	1. Adjust emergency and parking brakes. 2. Replace springs. 3. Restore fluency.
Uneven braking.	1. Brakes not adjusted.	1. Adjust the service brakes taking into consideration its simultaneous adjustability.

HYDRAULIC CIRCUIT

Technical hitches	Possible causes	Remedies
overheating pump.	1. Excessive pressure. 2. Cavitation. 3. Excessive back-pressure owing to incorrect hydraulic elements having been applied 4. Control valves connected	1. Reduce the pressure to the normal values. 2. Clean the suction stuff; check the fittings. 3. Fit correct hydraulic elements 4. Disconnect
None pressure pump.	1. Breaking of the pump shaft. 2. Sleeve spline ruined	1. Replace the pump. 2. Replace the sleeve
Noisy pump.	1. Cavitation. 2. Imperfect seal on shaft pump. 3. body pump not waterproof.	1. Clean the suction stuff; check the fittings. 2. Replace the oil seals. 3. Tighten the screws of the pump housing and replace the sealing rings.
The oil in the circuit becomes foamy and increase in volume in an anomalous way.	1. Suction of air in the circuit. 2. Pump cavitation.	1. Verify the oil level and eliminate any suction of air. 2. Clean the suction stuff; check the fittings.

STEERING

Technical hitches	Possible causes	Remedies
Loss of control in driving the machine.	1. Steering cylinder with worn retention rings 2. Hydraulic steering with antishock valves not correctly calibrated. 3. Suction of air in the circuit.	1. Replace the cylinder retention rings 2. Check after careful cleaning of the valves, if you have the prescribed pressure levels, if you don't reach those levels change the hydraulic steering 3. Check all the clamps and the unions of the oil inlet circuit
Loss of oil from the hydraulic steering.	1. Loose fittings. 2. Worn sealing rings. 3. Closed hydraulic steering discharge.	1. Tighten fittings. 2. Restore the hydraulic steering sealing. 3. Check the status of the exhaust pipe and the operation of lifting distributor.
Difficult steering.	1. Hydraulic steering with low pressure. 2. Presence of air on the circuit. 3. Priority LS valve badly adjusted 4. Poor performance of the gear pump. 5. Steering column rusted 6. Excessive load on front axle	1. Check and restore the maximum pressure of the circuit 2. Clean carefully the suction circuit and check the tightness. 3. Clean and carefully reassemble the valve, control the wear and the sliding. 4. Update it or replace it. 5. disassemble and lubricate the steering column 6. Check the load on the front axle

ELECTRICAL SYSTEM

Technical hitches	Possible causes	Remedies
The starter doesn't work.	1. The battery is low or damaged 2. The starter is defective. 3. The start switch is defective. 4. Battery cables oxidized or broken to the terminal. 5. Start release switch on the machine is not registered. 6. Independent PTO engaged	1. Provide for recharging the battery, if it does not stay, replace it. 2. Revise or replace the starter. 3. Replace the switch. 4. Replace or clean terminals oxidized. 5. Set the switches or replace if necessary. 6. Disengage the PTO
The generator's light still on also with a high number of engine revolution.	1. Regulator inefficient 2. The alternator is not charging enough.	1. Replace the regulator 2. The alternator is not charging enough.
The battery is deformed.	1. The battery is too charged.	1. Revise or replace the alternator. 2. Advise customers who work for many consecutive hours to turn on the headlights during work in order to lower the battery charge
the battery liquid become black.	1. Damaged element.	1. Replace the battery.
The rev counter doesn't work.	1. Does not reach the feed pulse. 2. Wrong calibration of the instrument. 3. Damaged instrument.	1. Reset the circuit. 2. Reset the instrument. 3. Replace it.
The solenoid valves of the differential lock or 4WD fail to magnetize	1. Control switches broken 2. Solenoid valve coils broken 3. Electrical system broken in some point	1. Replace the switch. 2. Replace the coils 3. Repair the electrical system

PLATFORM

Technical hitches	Possible causes	Remedies
Vibrations on the platform	1. The bodywork and chassis are touching each other 2. The bodywork and power lift are touching each other	1. Eliminate the contact 2. Insert spacers between the bodywork and its supports
Vibrations on the bonnet	1. Precarious contact between bonnet and dashboard 2. Contact between bonnet and fixed parts of the engine	1. Adjust the front supports of the bonnet 2. Adjust the front supports of the bonnet

POWER LIFT

Technical hitches	Possible causes	Remedies
The lift raises to jerks.	1. Clogged intake filter hydraulic pump. 2. Air on intake pipe of the hydraulic pump.	1. Clean the filter, change it if necessary 2. Tighten the fittings of the suction circuit and look out the leaks.
The power lift fails to operate or does not lift enough	1. Jammed pilot valve	1. Remove the valve system and release the pilot valve
The power lift starts to lift but stops as soon as it senses the load, without the overpressure valve operating	1. Draft rod badly adjusted	1. Draft rod badly adjusted
The power lift fails to fully lower	1. Position control lever badly adjusted	1. Adjust the position control lever
The power lift fails to lower	1. Hydraulic lock tap close	1. Open the tap close
The lift does not reach the prescribed lifting capacity.	1. Worn retention rings on the valve gear 2. Safety and overpressure valves badly adjusted 3. Poor performance of the gear pump. 4. Worn springs and other mechanical components	1. Remove the valve gear and replace the external retention rings 2. Adjust the valves 3. Overhaul the pump 4. Overhaul the valve gear
The power lift has difficulty to holding the load: there is a rhythmical swing when the engine is running while the load lowers when the engine is at a standstill	1. Worn piston seal 2. Cylinder overpressure valve badly adjusted 3. Check valve badly adjusted 4. Valve gear with dirty valves	1. Replace the cylinder retention rings 2. Remove the casing gear and adjust the valve 3. Remove the casing gear and adjust the valve 4. Remove the valve gear and clean the valve
Rhythmic swinging occurs with the links in the end of upward travel position and the engine running. The load fails to lower when the engine is at a standstill	1. Incorrect adjustment of the position control lever's limit switch	1. Adjust the position control function by limiting the upward travel of the links

The draft control function fails to operate: the power lift only lifts and lowers by means of the position control lever	1. Badly adjusted draft control lever 2. 3rd point hitch with clearance	1. Adjusted the draft control lever 2. Eliminate the clearance and adjust the lever + link correctly
The position control function fails to operate: the power lift only lifts and lowers by means of the draft control lever	1. Position control lever not adjusted 2. Faulty internal linkages	1. Adjust the position control lever 2. Overhaul the internal linkages

TOOLS LIST

TOOLS LIST

GROUP	CODE	DESCRIPTION	QUANTITY
87	00041258	CAP D.16	2
-	00061157	CAP 1/2 GAS X 16 T2H WITH GRIP 1/4 GAS	1
60	07000122	HYDRAULIC GAUGE	1
54	07000215	TRANSMISSION SUPPORT	1
27	07000226	CLUTCH CENTERING PIN 1616	1
39	07000227	RING NUT KEY 06340270	1
54	07000237	RING NUT KEY	1
60	07000241	DISTR. VALVE TEST TOOL 1363	1
54	07000243	RING NUT KEY	1
27	07000245	TRACTOR SEPARATION SUPPORT	1
60	07000249	TOOL SETTING LIFT EFFORT	1
42	07002766	DT BOX SPACER	1
42	07006128	RING NUT KEY 06340257	1
42	07006208	BEARING BUFFER INSERTION, RING NUT SIDE	1
42	07006209	BEARING BUFFER INSERTION, SHAFT SIDE	1
42	07006210	BUFFER SPRING PACKAGE INSERT FLANGE	1
42	07006211	SUPPORTO FOUR-WHEEL DRIVE BOX	1
45	07006128	RING NUT KEY 06340257	1
60	07006212	STEERING WHEEL PULLER	1
60	07006220	TOOL STOPS ARMS	1
36	07006221	BUFFER FOR MULTIPLE PUNCH MARK OF THE PINION RING NUT	1
36	07006222	PLANETARY BEARING ASSEMBLY BUFFER	1
36	07006223	CONICAL BEARING DIFFERENTIAL ASSEMBLY BUFFER	1
36	07006224	PINION CONICAL BEARING ASSEMBLY BUFFER	1
36	07006225	CONICAL PINION STOP TOOL	1
36	07006226	DIFFERENTIAL PLANETARY BEARING ASSEMBLY BUFFER	1
876	07511444	M 10 EYEBOLT	4