FiatTrattori

FIAT

805 C

WORKSHOP MANUAL

DIREZIONE SVILUPPO POST - VENDITA

Reprinted

Fiat Trattori

FIAT

805 C

WORKSHOP MANUAL

QUICK REFERENCE INDEX

DIREZIONE SVILUPPO POST - VENDITA

FOREWORD

- *The manual is divided into separately numbered sections.*
- *Two-digit sections contain:*
  - *— Tractor specification (00)*
  - *— Tractor subassembly specification and data (10 - Engine, 20 - Drive train, etc.)*
- *A contents list is provided to facilitate retrieval of desired information.*
- *Each sheet carries the print number of the manual and the date of issue in the bottom right corner of the front page.*
- *Revised sheets will carry the same print number followed by a capital letter (e.g. 1st revision 603.54.173/A, 2nd revision 603.54.173/B, etc.) and new issue date. Revised sheets will be accompanied by updated contents sheet.*
- *Wear limits recommended for some parts are not binding, being given for guidance only.*

PRINTED IN ITALY

FIAT TRATTORI S.p.A. - Viale delle Nazioni, 55 - S. Matteo - 41100 MODENA - Italia

Print No. **603.54.173/A** - II-1978 - 500 - SAN - Torino

CONTENTS

IDENTIFICATION DATA

Engineering code	607.700
Engine type	CO 3/75 V. 50

PERFORMANCE AND WEIGHT

Output at flywheel	80 metric hp	
Operating weight (full ballast)	5,150 kg	11,356 lb

Speeds

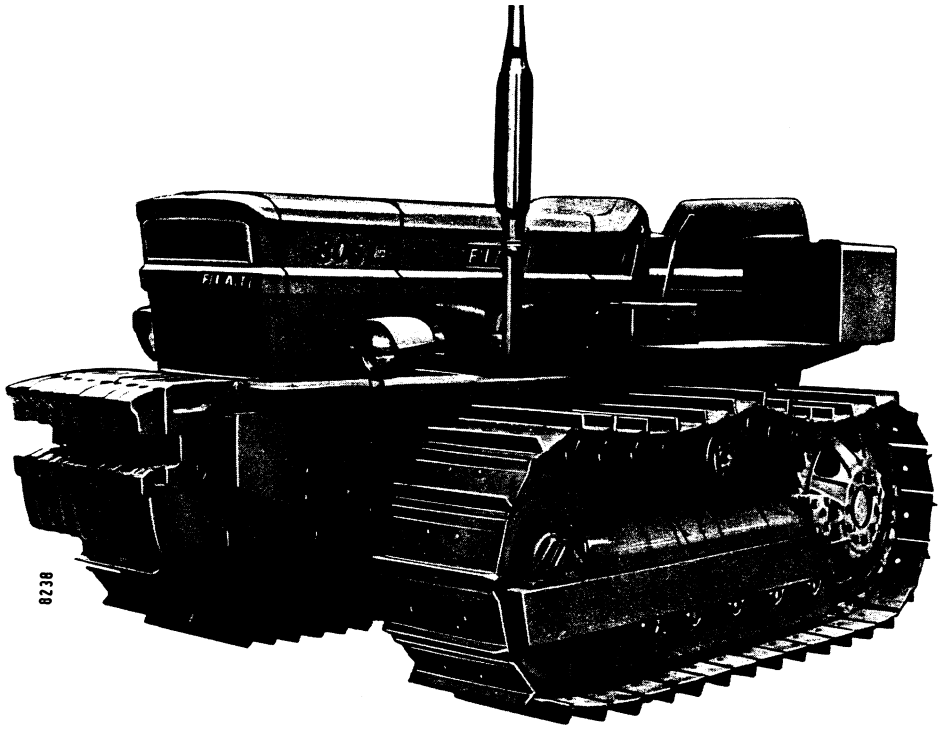
	km/h	mph
1st	2.5	1.55
2nd	3.6	2.24
3rd	4.5	2.80
4th	5.5	3.42
5th	7.9	4.91
6th	10.1	6.28
Reverse, low	2.9	1.80
Reverse, normal	6.5	4.03

ENGINE

Type	4 stroke diesel, direct injection
No. of cylinders	4
Bore and stroke	110x120 mm (4.33x4.72 in)
Total displacement	4,562 cm³ (278.4 in³)
Compression ratio	17 to 1
Engine speed, full load	2,100
No. of main bearings	5
Dynamic balancer	Flyweight

Valve gear

Valves	OH, push rod operated	
Intake opens	10° B.T.D.C.	
Intake closes	54° A.B.D.C.	
Exhaust opens	54° B.B.D.C.	
Exhaust closes	10° A.T.D.C.	
Valve clearance (for timing check)	.25 mm	(.010 in)
Valve clearance, normal (hot or cold):		
— Intake	.25 mm	(.010 in)
— Exhaust	.30 mm	(.012 in)



SPECIFICATION

Fuel system

Air cleaner	Oil bath
Pre-cleaner	Centrifugal
Supply pump	Double diaphragm, cam operated
Injection pump	CAV, distributor
Governor	Mechanical, pump mounted
Advance device	Automatic, pump mounted
CAV pump type:	
— AM	DPA 3342 F 030
— PM	DPA 3342 F 400
Injection pump inlet pressure	.2 kg/cm² (2.84 psi)
Fuel filters:	
— Supply pump	Gauze
— Injection pump	Two, side by side, cartridge
Water separator	Integral with injection pump upstream filter
Pump timing	14° B.T.D.C.
Firing order	1-3-4-2
Injector popping pressure	195 to 205 kg/cm² (2,770 to 2,915 psi)

Lubrication system

Type	Forced feed
Pump	Gear
Filters:	
— Suction	Gauze
— Delivery	Full flow, cartridge, with by-pass valve (1 to 1.2 kg/cm², 14.2 to 17 psi)
Relief valve	Filter mounted
Lubrication system pressure at governed speed	4.5 to 5 kg/cm² (64 to 71 psi)
Oil pump drive ratio	1.454 to 1
Low lube oil pressure indicator	Dash mounted

Cooling system

Type	Water
Pump	Centrifugal
Radiator	Vertical tube
Fan	Suction
Thermostat	Wax
— Opening temperature	83° C ± 2°
— Fully open at	94° C
Water temperature gauge	Dash mounted

Tractor meter

Type	Mechanical, valve timing gear driven
— Drive ratio	2 to 1
— Hourmeter activation speed	1,800 rpm

DRIVE TRAIN

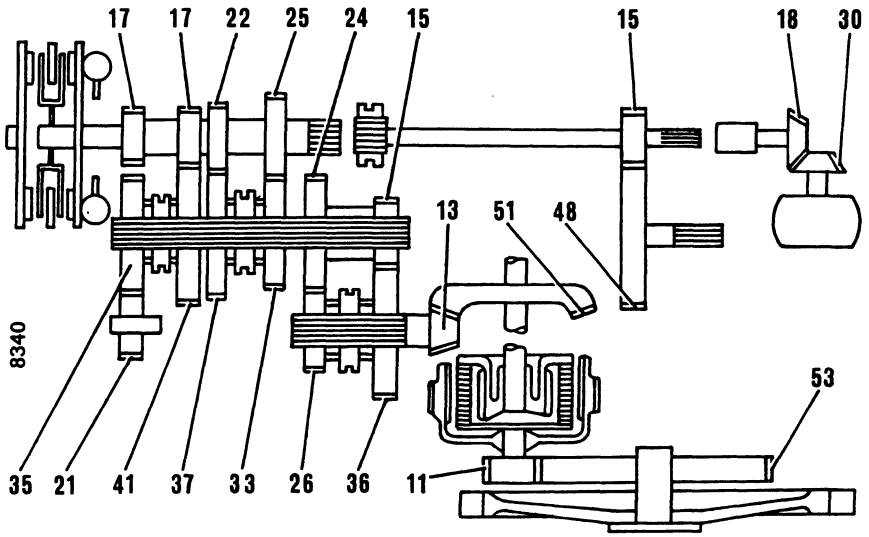
Clutch

Type	12 in, twin plate, oil bath, overcentre
Control	Manual lever

Transmission

Type	Manual
Gears	Helical, constant mesh
Speeds	Three plus reverse
Splitter	Integral with transmission
Transmission control	Gear lever
Splitter control	Separate lever
Transmission lube oil pump	In transmission casing
Power take-off	In transmission casing
Bevel gear	Central
Final drives	Single reductions, spur

Drive train schematics



Steering clutches

Type	Multiple plate, dry
Control	Mechanical, separate levers

Brakes

Service	
Type	Band
Control	Separate pedals
Parking	Hand operated

Overall transmission ratio

	Gears			
	First	Second	Third	Reverse
Low range	109.410 to 1	76.269 to 1	59.882 to 1	99.399 to 1
Normal range	49.386 to 1	34.439 to 1	27.030 to 1	45.159 to 1

UNDERCARRIAGE - SUSPENSIONS

Track frames	5 track rollers and 1 carrier roller
Track idlers	Lubricated for life
Track rollers	Lubricated for life
Carrier rollers	Lubricated for life
No. of shoes per chain	36
Track shoe width	400-500 mm (15.75-19.68 in)
Track area:	
— 400 mm shoes	14,240 cm^2 (2,202 in^2)
— 500 mm shoes	18,300 cm^2 (2,831 in^2)
Ground pressure:	
— 400 mm shoes	.35 kg/cm^2 (5 psi)
— 500 mm shoes	.29 kg/cm^2 (4 psi)
Track release	Mechanical

Rear suspension

— Cross bar	Track frame mounted
— Track frame bushings	Lubricated for life

Front suspension

— Leaf spring	Transverse mounted

BELT PULLEY DRIVE

Rotation (from rear)	Counter clockwise
Speed	Same as engine
Control	Manual lever

POWER TAKE-OFF (540 rpm)

Rotation	Clockwise
Speed (at 1,728 engine rpm)	540 rpm
Speed (2,100 engine rpm)	656 rpm
Spline size:	
— Diameter	$1\ ^3/_8''$
— No. of splines	6
Control	Manual lever (same as belt pulley drive)

BELT PULLEY

Pulley diameter	280 or 320 mm	(11 or 12.6 in)
Pulley width	175 mm	(6.9 in)
Speed (at 2,100 engine rpm)	1,260 rpm	
Surface speed:		
— 280 mm diameter	18.5 m/s	(61 ft/s)
— 320 mm diameter	21.1 m/s	(69 ft/s)

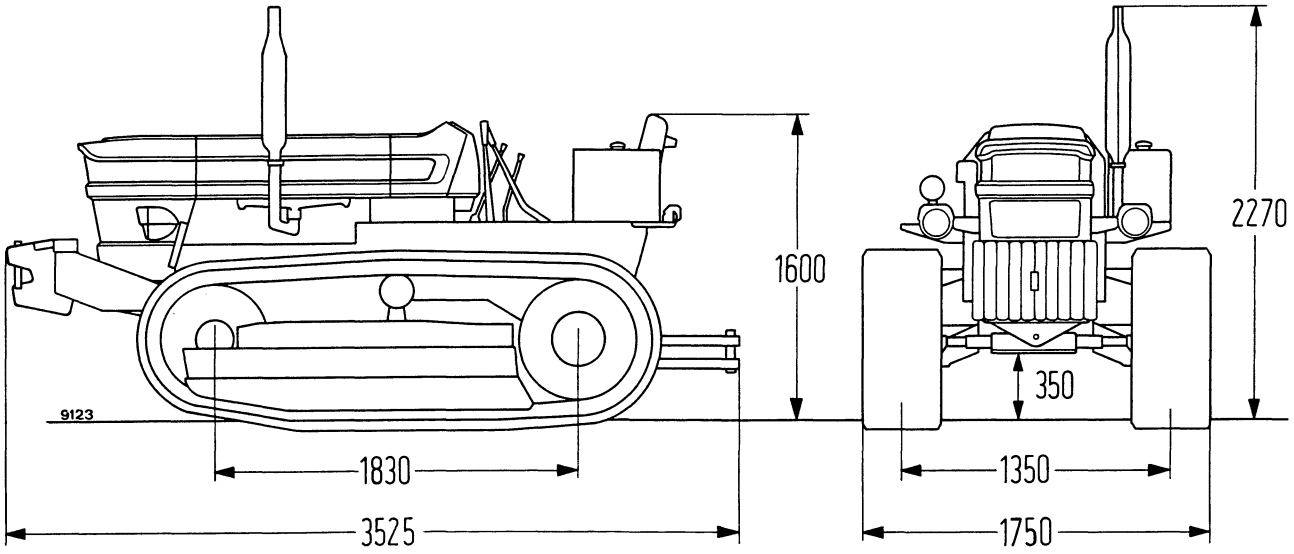
LIFT

Type	Hydraulic
Cylinder	Single acting
Operation	Position control
Pump type	Plessey A 25 X, gear
Pump drive	Engine valve timing gear
Hydraulics	Separate
3-point linkage	Category 2 and 3
Design lift and capacity	See pages 2, 3 and 4, section 40
Maximum lift stroke	See pages 2, 3 and 4, section 40
Lift arm capacity	See pages 2, 3 and 4, section 40

ELECTRICS (12 volt)

Alternator type	A 12 M 124/12/42 X
— Output	32 Amp
Voltage regulator:	
— AM	FIAT RC 2/12 B
— PM	MARELLI RTT 110 B
Starter:	
— Type	Marelli MT 62 BA
— Output	4 metric hp
Battery:	
— Type	Marelli 6 ATM 25-A or Scaini 64072
— Voltage	12 V
— Capacity:	
- Marelli	132 Ah
- Scaini	140 Ah
Headlamps	130 mm, 45/40 Watt
Floodlamp	35 Watt, integral switch
Fuses	Six 8 A
Panel lamp	5 Watt
Charge indicator lamp	5 Watt
Charge indicator relay	Fused
Master switch	6-function
Starter switch	Push type
or pre-heat/starter switch	4-function
Unprotected	Starter, alternator and pre-heat plugs

SPECIFICATION



CAPACITIES

DESCRIPTION	LUBRICANT				
	FIAT designation	Capacity			International designation
		kg	liters	Imp. units	
Engine oil (sump, filter and lines)	**oliofiat AMBRA 20 W/40** above 0°C	14	15.6		Multigrade detergent mineral oil, MIL-L-2104 B. EP characteristics
Engine oil (sump and filter)		12.1	13.5	3 Gall	
Engine oil (sump only)		11.5	12.8	2.8 Gall	
Air cleaner oil (*)		.75	.9	1 1/2 Pint	
Master clutch oil	**oliofiat AMBRA 10 W/30** below 0°C	8	8.9	2 Gall	
Lift oil		8.2	9.1	2 Gall	
Remote control oil		16.5	18.3	4 Gall	
Front idlers and roller oil	**oliofiat AMBRA 20 W/40**	2	2.2	1/2 Gall	
Axle oil	**oliofiat AW 90/M**	21	22.6	5 Gall	MIL-L-2105 B oil (SAE 80W/90-EP)
Final drive oil (each)		4	4.3	1 Gall	
Belt pulley oil		.9	1	1 3/4 Pint	
Lubricator grease	**grassofiat G 9**	—	—	—	NLG12
Coolant (water and FIAT PARAFLU 11) (°)		—	16.5	3.6 Gall	
Fuel (diesel oil, syphoned and filtered):					
— Main tank		—	80	17 1/2 Gall	
— Auxiliary tank		—	48	10 1/2 Gall	

(*) Change cleaner oil when sediment is 10 mm or 1/2" deep.
(°) Antifreeze incorporating oxidation, corrosion, foam and scale control properties. Mixture strengths of 20°, 30°, 40° and 50° give protection down to —8°C, —15°C, —25°C and —35°C respectively. Coolant effective for a period of two years or 1600 hours.

VALVE GEAR

	mm	in
Valve head diameter:		
— Intake	42.700 to 43.000	1.6811 to 1.6929
— Exhaust	36.200 to 36.500	1.4252 to 1.4370
Valve face angle	$45° 10' {}^{-0}_{+10'}$	
Maximum valve eccentricity over one revolution with stylus on valve face	.04	.0015
Cam lift (intake and exhaust)	7.300	.2874
Valve lift (intake and exhaust)	12.512	.4925
Valve fitted depth	See page 1	
Valve spring length:		
— Free	49.3	1.940
— Under 22.5 to 24.9 kg or 50 to 55 lb	42	1.653
— Under 61.1 to 67.5 kg or 134 to 150 lb	29.5	1.161

LUBRICATION - COOLING

Oil pump		
Type	FIAT, gear	
Drive	Crankshaft	
Pump drive ratio	1.454 to 1	
Warm oil pressure on full throttle	4.8 to 5.2 kg/cm²	68 to 74 psi
Valve crack off setting	5 kg/cm²	71 psi
Relief valve spring length:		
— Free	69.7 to 71.3 mm	2.74 to 2.80 in
— Under 11 kg or 24.2 lb	48.5 mm	1.91 in
Water pump		
Type	Centrifugal, vane	
Front drive ratio	1.573 to 1	
Impellor clearance relative to body (1)	.2 to .8 mm	.008 to .032 in
Thermostat		
Type	Behr-Thomson	
Opening temperature	83 ± 2°C	
Fully open at	94°C	
Valve travel when fully open	7.5 mm	.2953 in

(1) AM version

CALIBRATION DATA - C.A.V. INJECTION PUMP TYPE DPA 3342 F 030 - 770997 (AM)

Procedure A

Bosch test machine with WSF 2044/4 X injector springs and EFEP 182 nozzles.

Robotti test machine with graduated lock ring injectors, FIAT 656829 injector spring and EFEP 182 nozzles.

Injector popping pressure 175 kg/cm² (2489 psi)
Piping . . . . . 2 x 6 x 865 mm

Procedure B

Test machine incorporating production injectors (KP 70 S 1 F 10 nozzle holders and DLL 145 S 60 F nozzles).

Injector popping pressure 195 to 205 kg/cm² (2775 to 2915 psi)
Piping . . . . . 1.5 x 6 x 700 mm

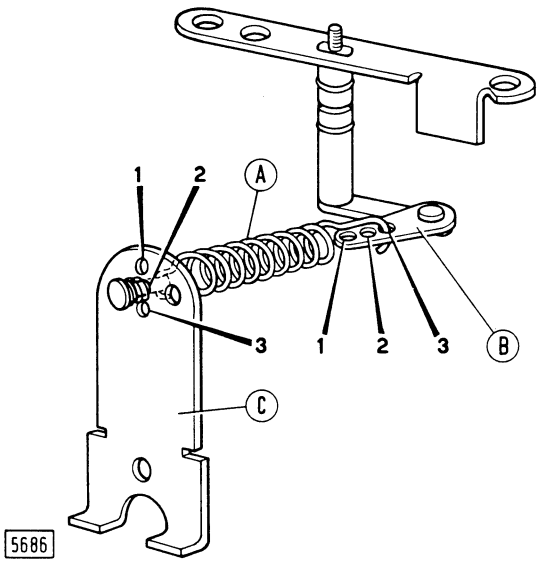
Calibration fluid . . . . . FIAT CFB
Calibration fluid temperat. 30° + 5° C
Fuel supply pressure . . .2 kg/cm² (2.8 psi)
Direction of rotation (as seen from drive end) . Clockwise
Firing order 1-3-4-2

Assembly data

Governor control stud to metering valve lever pin 53 to 54 mm (2.08 to 2.13 in)
Governor spring attachment position . . . . See diagram
Roller spacing . . . . . 49.93 mm (1.9657 in)

Test No.	Lever position L_1 = throttle L_2 = shutt-off	Speed rpm	Transfer pressure kg/cm²	Advance degrees	PROCEDURE A		PROCEDURE B
					Injector delivery cm³/1000 shots	Back leak cm³/100 shots	Injector delivery cm³/1000 shots
1-2	—	100	⩾ 1	—	—	—	—
3	—	500	—	6.5 to 7.5	—	—	—
4	—	1050	—	8 to 8.5	—	—	—
5	—	180 max	—	1.8 to 2.5	—	—	—
6 (1)	—	300	—	0	—	—	—
7 (2)	—	—	—	—	—	—	—
8-9-10 (3)	L_1 = full L_2 = out	1050^{+0}_{-20}	4.6 to 5.6	—	60.5 to 62.5(•)	⩾ 14	66.5 to 68.5(•)
11-12		500 ± 5	3 to 4	—	59.5 to 62.5(•)	—	66 to 69 (•)
13 (1)		100	—	—	⩾ 57	—	—
14	L_1 = full L_2 = in	200	—	—	⩽ 4	—	—
15 (3)	L_1 = idle L_2 = out	200	—	—	⩽ 5	—	—
16 (4)	L_1 = full	1150	—	—	⩽ 3	—	—
17 (5)	L_2 = out	1050^{+0}_{-20}	—	—	60.5 to 62.5	—	—

(•) Maximum spread: 2 cm³/1000 shots
(1) Manual start-retard activated
(2) 3-cylinder engine only
(3) Back-off throttle lever adjusting screws fully
(4) Governor cut-in. Adjust maximum speed screw.
(5) Recheck fuelling.



Governor spring attachment points.

A. Governor spring - **B.** Throttle link - **C.** Governor control arm.

ON-BENCH PERFORMANCE DATA

(AM fuel pump)

TEST PLAN

Engine on bench with fan, air cleaner and exhaust silencer removed.
Barometric pressure: 740 ± 5 mm Hg at 239 metres (785 ft) above sea level.
Ambient temperature: 20 ± 3° C.
Relative humidity, 70 % ± 5.
Fuel density, 830 ± 10 g/liter.
Pump timing, 14° ± 1° B.T.D.C.

Throttle	Engine rpm	Power output of engine run-in for a total of				Time to burn 250 cm³ (15 in³) of fuel (seconds)
		2-hour		50-hour		
		Metric HP	kW	Metric HP	kW	
Maximum, full load	2100	⩾ 74	⩾ 54.5	⩾ 76	⩾ 55.9	55 to 58
Maximum	1000	⩾ 35.5	⩾ 26.1	⩾ 36.5	⩾ 26.9	115.4 to 121.8
Maximum, no load	2300 ± 20	—	—	—	—	—
Minimum, no load	600 to 650	—	—	—	—	—

ENGINE: Data

TORQUE DATA

DESCRIPTION	Thread size	Position	Torque	
			kgm	ft lb
Capscrew, clutch to bell housing	M 12 x 1.25	—	10.5	76
Capscrew, bell housing to sump	M 10 x 1.25	—	6	43
Nut, engine to bell housing	M 12 x 1.25	—	10.5	76
Capscrew, engine side support	M 14 x 1.5	—	16.5	119
Nut, cylinder head	M 16 x 1.5	C_1, page 11	23.5	170
Capscrew, rocker shaft bracket	M 10 x 1.25	—	5	36
Capscrew, injection pump shaft gear	M 8 x 1.25	—	2.5	18
Capscrew, intermediate gear jack shaft	M 8 x 1.25	C_2, page 11	3	22
Capscrew, drive pulley to crankshaft	M 18 x 1.5	C_3, page 11	30	217
Capscrew, main bearing cap	M 16 x 1.5	C_4, page 11	14.5	105
Capscrew, connecting rod cap	M 13 x 1	C_5, page 11	13	94
Capscrew, dynamic balancer flyweight carrier	M 10 x 1.25	—	5	36
Capscrew, flyweight carrier to block	M 10 x 1.25	—	5	36
Capscrew, flywheel	M 12 x 1.5	C_6, page 11	9.5	69
Nut, fuel pump shaft drive bush	9/16"-18 UNF	—	8.3	60
Capscrew, fuel pump to support	M 8 x 1.25	—	2.5	18

CALIBRATION DATA - C.A.V. INJECTION PUMP TYPE DPA 3342 F 400 - 771392 (PM)

Procedure A

Bosch test machine with WSF 2044/4 X injector springs and EFEP 182 nozzles.

Robotti test machine with graduated lock ring injectors, FIAT 656829 injector spring and EFEP 182 nozzles.

Injector popping pressure 175 kg/cm² (2,489 psi)

Piping . . . . . 2 x 6 x 845 mm

Procedure B

Test machine incorporating production injectors (KP 70 S 1 F 10 nozzle holders and DLL 145 S 60 F nozzles).

Injector popping pressure 195 to 205 kg/cm² (2,775 to 2,915 psi)

Piping . . . . . 1.5 x 6 x 700 mm

Calibration fluid . . . . . FIAT CFB

Calibration fluid temperat. 30° + 5° C

Fuel supply pressure . . .2 kg/cm² (2.8 psi)

Direction of rotation (as seen from drive end) . Clockwise

Firing order 1-3-4-2

Assembly data

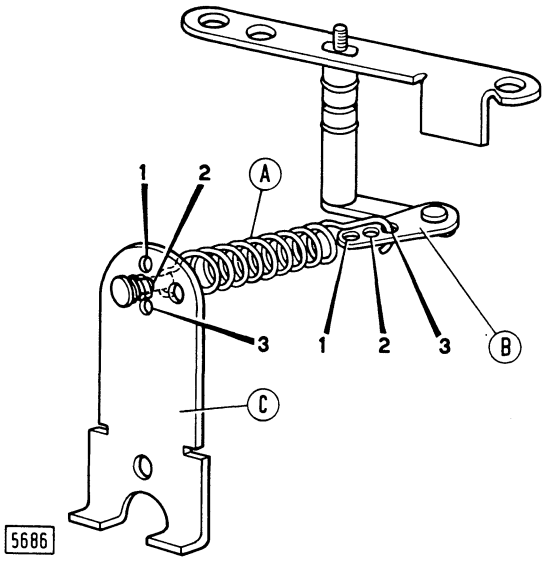
Governor control stud to metering valve lever pin 53.3 to 54.3 mm (2.09 to 2.14 in)

Governor spring attachment position . . . . See diagram

Roller spacing . . . . . 49.97 mm (1.9660 in)

Test No.	Lever position L_1 = throttle L_2 = shutt-off	Speed rpm	Transfer pressure kg/cm²	Advance degrees	PROCEDURE A		PROCEDURE B
					Injector delivery cm³/1000 shots	Back leak cm³/100 shots	Injector delivery cm³/1000 shots
1-2	—	100	⩾ 1	—	—	—	—
3	—	700	—	2.5 to 3.5	—	—	—
4	—	1050	—	6,5 to 7	—	—	—
5	—	180 max	—	1.5 to 1,8	—	—	—
6 (1)	—	300	—	0	—	—	—
7 (2)	—	—	—	—	—	—	—
8-9-10 (3)	L_1 = full L_2 = out	$1050 \pm^{0}_{20}$	4.5 to 5.5	—	61 to 63 (•)	⩾ 14	65 to 67 (•)
11-12		700 ± 5	3.5 to 4.5	—	54 to 57 (•)	—	64 to 67 (•)
13 (1)		100	—	—	⩾ 51	—	—
14	L_1 = full L_2 = in	200	—	—	⩽ 4	—	—
15 (3)	L_1 = idle L_2 = out	200	—	—	⩽ 5	—	—
16 (4)	L_1 = full L_2 = out	1225	—	—	⩽ 4	—	—
17 (5)		$1050 \pm^{0}_{20}$	—	—	61 to 63	—	—

(•) Maximum spread: 2 cm³/1000 shots
(1) Manual start-retard activated
(2) 3-cylinder engine only
(3) Back-off throttle lever adjusting screws fully
(4) Governor cut-in. Adjust maximum speed screw.
(5) Recheck fuelling.



Governor spring attachment points.

A. Governor spring - **B.** Throttle link - **C.** Governor control arm.

ON-BENCH PERFORMANCE DATA

(PM fuel pump)

TEST PLAN

Engine on bench with fan, air cleaner and exhaust silencer removed.
Barometric pressure: 740 ± 5 mm Hg at 239 metres (785 ft) above sea level.
Ambient temperature: 20 ± 3° C.
Relative humidity, 70 % ± 5.
Fuel density, 830 ± 10 g/liter.
Pump timing, 14° ± 1° B.T.D.C.

Throttle	Engine rpm	Power output of engine run-in for a total of				Time to burn 250 cm³ (15 in³) of fuel (seconds)
		2-hour		50-hour		
		Metric HP	kW	Metric HP	kW	
Maximum, full load	2100	⩾ 74	⩾ 54.5	⩾ 76	⩾ 55.9	≥ 55
Maximum, full torque . . .	1400	⩾ 53.2	⩾ 39.1	⩾ 55	⩾ 40.5	≥ 72
Maximum, no load	2300 ± 20	—	—	—	—	—
Minimum, no load	600 to 650	—	—	—	—	—

HYDRAULIC PUMP

Type	Gear, drawing from lift body	
Model	A 25 X	
Make	FIAT (Plessey licence)	
Drive	Engine valve timing train	
Rotation (from drive end)	Clockwise	
Drive ratio	1.156 to 1	
Maximum rated speed (at 2100 engine rpm)	2,428 rpm	
Maximum rated output	27.6 l/min (6 Gall/min)	
Output at 1445 rpm and 145 to 155 kg/cm² (2,059 to 2,201 psi):		
— New or reconditioned pump	15.3 l/min (3.4 Gall/min)	
— Used pump	11 l/min (2.4 Gall/min)	
Test oil temperature	55° to 65°C	
Test oil grade	SAE 20 W	
	mm	in
Pump gear journal diameter	17.400 to 17.424	.6850 to .6860
Journal housing bore diameter bearings	17.450 to 17.470	.6870 to .6877
Journal clearance in bearing	.026 to .070	.0010 to .0027
— Maximum wear clearance	.1	.0040
Bearing housing diameter in pump body	37.270 to 37.294	1.4673 to 1.4683
Gear clearance in pump body:		
— AM	.120 to .064	.0047 to .0025
— PM	.020 to .064	.0008 to .0025
Maximum pump body wear on suction side	.1	.0040
Bearing width	19.796 to 19.812	.7793 to .7799
Gear flank width	18.323 to 18.348	.7213 to .7223
Gear and bearing housing width in sump body	58.072 to 58.122	2.2862 to 2.2882
Gear and bearing end float (applicable to new and reconditioned pump)	.100 to .207	.0040 to .0081

LIFT HYDRAULICS: Data

LIFT (up to frame 661666)

Type	Position control, single acting cylinder	
Bore and stroke	95 x 137 mm	3.74 x 5.39 in
Total displacement	971 cm^3	59.25 cu.in
Overload valve crack off setting	200 to 210 kg/cm^2	2845 to 2987 psi
Relief valve crack off setting	145 to 155 kg/cm^2	2062 to 2204 psi
Design lift capacity	1456 kgm	3210 lb
3-point linkage	Suitable for cat. 2 and 3 implements	
Maximum lift capacity on lower links:		
— Lifting rods coupled to front mounting holes	1520 kg	3350 lb
— Lifting rods coupled to rear mounting holes	1800 kg	3968 lb
Lower link travel:		
— Lift rods coupled to front mounting holes	720 mm	28.34 in
— Lift rods coupled to rear mounting holes	600 mm	23.72 in
	mm	in
Lift cylinder piston diameter	94.980 to 95.000	3.7393 to 3.7401
Lift cylinder bore diameter	95.036 to 95.071	3.7415 to 3.7429
Lift piston clearance in bore	.036 to .091	.0014 to .0036
Cross shaft journal diameter:		
— Right	59.970 to 60.000	2.3610 to 2.3622
— Left	64.970 to 65.000	2.5578 to 2.5590
Bushing fitted I.D. in lift body:		
— Right	60.100 to 60.170 (1)	2.3661 to 2.3688 (1)
— Left	65.100 to 65.170 (1)	2.5629 to 2.5657 (1)
Cross shaft working clearance in bushings	.100 to .200	.0040 to .0080
Bushing interference fit in housing	.020 to .102	.0008 to .0041
Lift arm stroke adjusting screw washer thickness	.45 to .55	.0177 to .0216
Lift arm end float shim thickness range	5.4-5.5-5.6-5.7-5.8-5.9	.212-.216-.220-.224-.228-.232
Lift arm end float	.1 to .3	.004 to .012
Lift valve spool clearance in body (matched and honed together on assembly)	.025 to .035	.0009 to .0013
Unload valve spring length:		
— Free	22	.87
— Under 2.3 to 2.6 kg (5 to 6 lb)	10	.39
Lift valve spring length:		
— Free	46	1.81
— Under 1.8 to 2.2 kg (4 to 5 lb)	20	.79
Lift adjustments	See page 7	

(1) After fitting and reaming

LIFT (as from frame 661667)

Type	Position control	
Control	Manual lever next to operator	
Response adjustment	Outer control valve mounted lever	
Single acting cylinder:		
— Bore and stroke	95 x 133 mm (3.74 to 5.23 in)	
— Displacement	942 cm^3 (57.5 in^3)	
Relief valve crack off setting	190 to 195 kg/cm^2 or 2,702 to 2,773 psi (186 to 191 bar *)	
Safetly valve crack off setting	230 to 240 kg/cm^2 or 3,271 to 3,342 psi (225 to 235 bar *)	
Design lift capacity	1,790 kgm or 12,947 ft.lb (17,554 N · m *)	
	mm	in
Lift piston diameter	94.980 to 95.000	3.7393 to 3.7401
Cylinder bore diameter	95.036 to 95.071	3.7415 to 3.7429
Piston clearance in cylinder	.036 to .091	.0014 to .0036
Cross shaft journal diameter:		
— Right	54.970 to 55.000	2.1642 to 2.1653
— Left	62.670 to 62.700	2.4673 to 2.4685
Bushing fitted I.D. in lift body:		
— Right	55.100 to 55.170 (°)	2.1693 to 2.1720 (°)
— Left	62.800 to 62.870 (°)	2.4724 to 2.4751 (°)
Cross shaft working clearance in bushings	.100 to .200	.0040 to .0080
Right bushing interference fit in housing	.096 to .152	.0038 to .0060
Left bushing interference fit in housing	.126 to .182	.0050 to .0072
Cross shaft end float with lift arms in position	.1 to 1.0	.0040 to .0400

(°) Not reamed
(*) S.I. Unit.

LIFT HYDRAULICS: Data

LIFT (as from frame 661667)

Continued

	mm	in
Position control shaft diameter	23.967 to 24.000	.9436 to .9449
Shaft housing bore diameter in lift body	24.020 to 24.072	.9457 to .9477
Shaft clearance in housing	.020 to .105	.0008 to .0041
Spool clearance in control valve body	.025 to .035 (1)	.0010 to .0014 (1)
Valve clearance in lift body	.025 to .035	.0010 to .0014
Inlet valve return spring length:		
— Free	13	.512
— Under .17 to .23 kg (1.7 to 2.3 N or .4 to .5 lb)	9.8	.3858
Unload valve spring length:		
— Free	31	1.2205
— Under 4.1 to 4.5 kg (40.2 to 44.1 N or 9 to 10 lb)	21	.8268
Governor valve spring length:		
— Free	46	1.8110
— Under 1.8 to 2.2 kg (17.6 to 21.6 N or 4 to 5 lb)	20	.7874
Lift clutch spring length:		
— Free	42	1.6535
— Under 54 to 66 kg (530 to 647 N or 119 to 145 lb)	20.5	.8071

(1) Matched and honed together on assembly

IMPLEMENT ATTACHMENT (as from frame 661667)

Type	Three point	
Category	2 and 3	
Maximum lift capacity on lower links starting from horizontal:		
— Lift rods coupled to front mounting holes	1,950 kg	4,300 lb
- Lift travel	580 mm	22.8 in
— Lift rods coupled to rear mounting holes	2,340 kg	5,160 lb
- Lift travel	500 mm	19.7 in
Maximum lift capacity with lift rods coupled to front mounting holes starting from horizontal:		
— Centre of gravity 600 mm (23.6 in) from lower link joints	1,490 kg	3,285 lb
- Lift travel	705 mm	27.7 in
— Centre of gravity 1200 mm (47.2 in) from lower link joints	1,160 kg	2,558 lb
- Lift travel	860 mm	33.8 in

AUXILIARY CONTROL VALVE

Type	Suitable for external single acting or double acting cylinder
Control	Separate manual lever
Spool clearance in control valve body (matched and honed on assembly)	.015 to .020 mm (.0005 to .0007 in)
Relief valve	Existing valve in standard control valve cover

TORQUE DATA

DESCRIPTION	Thread size	Torque		
		kgm	N · m (*)	ft lb
Hydraulic pump				
Capscrew, pump to timing cover	M 6 x 1	.8	8	6
Nut, pump	$^3/_8$" - 24 UNF	4.2	41	30
Nut, pump drive shaft sleeve	$^7/_{16}$" - 20 UNF	2.8	27	20
Lift (up to frame 661666)				
Capscrew, lift support to tractor	M 10 x 1.25	6.3	62	45
	M 14 x 1.5	18	176	130
	M 16 x 1.5	25.5 (°)	250	184
	M 16 x 1.5	23.5 (*)	230	170
Nut, lift support to tractor frame	M 16 x 1.5	23	225	166
Capscrew, lift body to support	M 14 x 1.5	16.5	162	119
Nut, lift body to support	M 14 x 1.5	16.5	162	119
Nut, control valve to lift body	M 10 x 1.25	6	59	43
	M 14 x 1.5	16	157	116
Nut, rear cover to lift body	M 12 x 1.5	14	137	101
Safety valve	M 24 x 1.5	6	59	43
Plug, unload valve	M 24 x 1.5	6.5	64	47
Nut, lift arm to shaft	M 14 x 1.5	16	157	116
Capscrew, top link support	M 16 x 1.5	23	225	166

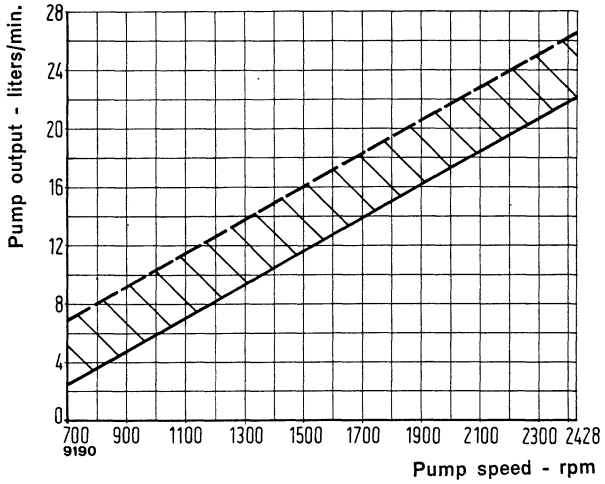
(°) Material specification R100 - (*) Material specification R80 - (*) SI Unit.

TORQUE DATA

Continued

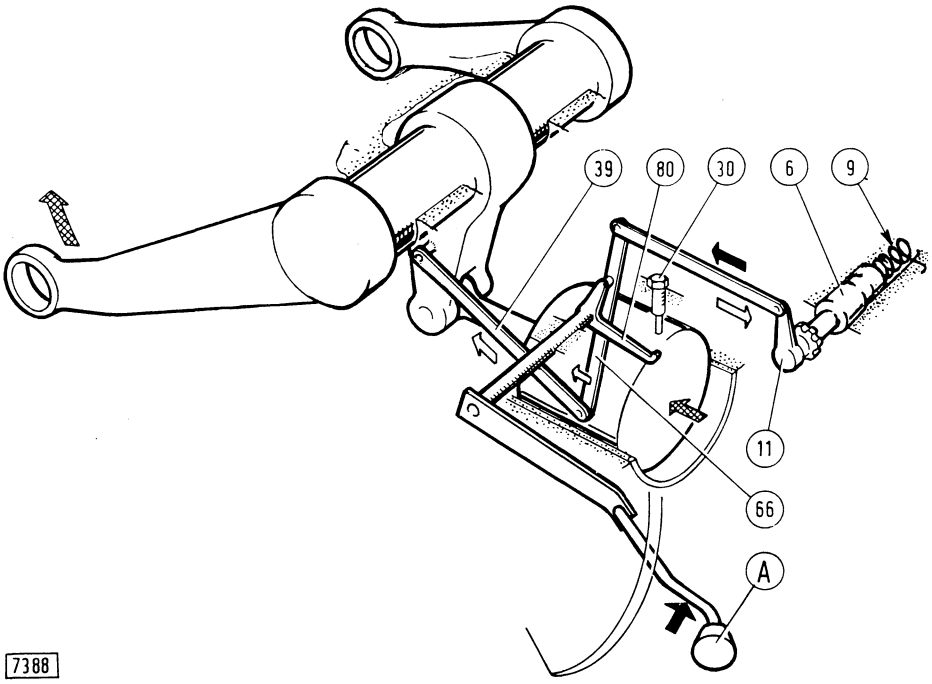
DESCRIPTION	Thread size	Torque		
		kgm	N · m (*)	ft lb
Lift (as from frame 661667)				
Capscrew, lever to spool	M 10 x 1.25	3.5	34	25
Nut, control valve body	M 10 x 1.25 M 14 x 1.25	6 15	59 147	43 108
Capscrew, lift support to tractor	M 10 x 1.25 M 14 x 1.5 M 16 x 1.5	6.3 18 25	62 176 245	43 130 181
Nut, lift support to tractor	M 16 x 1.5	23	226	166
Capscrew, lift body to support	M 14 x 1.5	16.5	162	119
Capscrew, top lift cover	M 8 x 1.25	2.6	25	19
Capscrew, control valve cover	M 10 x 1.25	6	59	43
Capscrew, lift rear cover	M 12 x 1.25	10	98	72
Relief valve	M 28 x 1.5	12	118	87
Cylinder safety valve	M 24 x 1.5	6	59	43
Capscrew, lift arm plate	M 14 x 1.25	15	147	108
Capscrew, inner arm	M 10 x 1.25	6.2	60	45
Capscrew, top link support	M 16 x 1.5	23	226	166

(*) SI Unit.



Speed-output chart - Lift pump A 25 X.

Test pressure 170 kg/cm² (166 bar - 2,418 psi) - Oil temperature 55° to 65°C - Pump drive ratio 1.156 to 1.



OPERATION

When control lever **A** is moved upward, linkage causes spool **6** to turn as shown until it takes up the delivery position.

As soon as spool rotates link **39** connected to crank lever actuates rocking lever **66** to return spool to neutral. This will in fact happen when lift levers reach position selected on quadrant through control lever **A**.

SPOOL CONTROL LINKAGE OPERATION DIAGRAM
(Lift up to frame 661666)

Note: For arm lowering, sequence is reversed.

A. Lift control lever - **6.** Spool - **9.** Spool return spring - **11.** Spool actuating lever - **30.** Maximum lift adjusting screw **39.** Link - **66.** Rocking lever - **80.** Relay lever (discontinues raising phase upon abutting maximum lift adjusting screw)

ADJUSTMENT (up to frame 661666)

Maximum lift arm travel (figs. a, b)

Apply a 50 kg or 110 lb load to lift levers.

Start engine and run at part throttle.

Move control lever **A** fully up to raise lift levers completely.

Apply reference marks (S_1 and S_2) across right lift lever and lift body.

Slowly back off screw **10** until valve cracks off.

Stop engine and check that overtravel of levers is 4 to 5 mm (.16 to .20 in), measured as distance separating reference marks (S_1 and S_2) previously applied.

To increase overtravel subtract washers **N**; to reduce, add shims as necessary.

Spool response (Fig. c)

Apply 50 kg (110 lb) load to lift levers.

Start engine and run at part throttle.

Move response lever **18** horizontal facing forward.

Starting from the top of the quadrant, move lift lever to midway position in one single stroke.

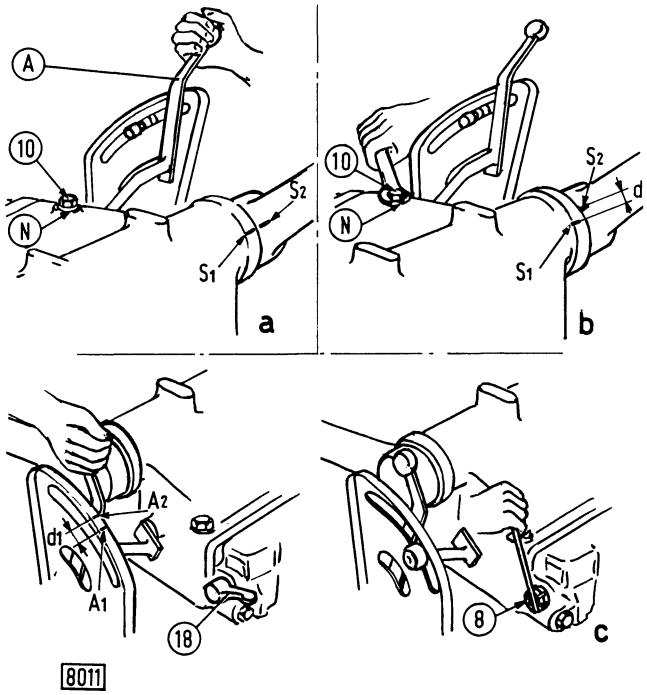
Apply reference mark A_1 to mark lever position relative to quadrant.

Inch lever up until lift arms begin to raise.

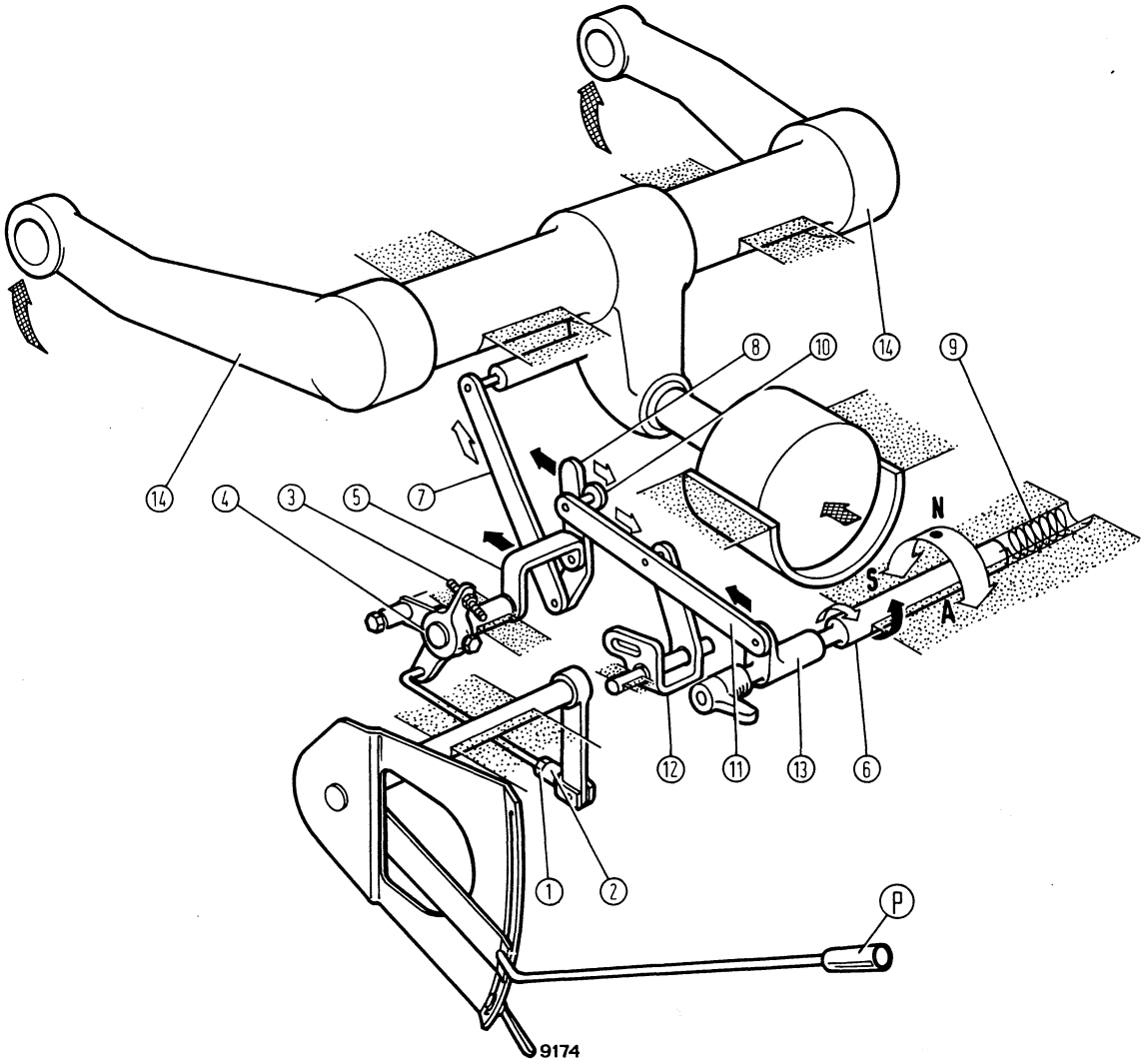
Apply a second reference mark A_2.

Distance D_1 between reference marks should be 7 to 10 mm (.28 to .40 in).

Screw in adjuster **8** to reduce the distance, and back off to increase.



On completion of adjustment, install response lever ensuring that it is positioned as near as possible to the horizontal.



SPOOL LINKAGE SCHEMATICS FOR LIFT ARM RAISING

(Lift as from frame 661667)

Note: For lowering, direction of movements is reversed.

A. Lower - **N.** Neutral - **P.** Lift lever - **S.** Raise - **1.** Locknut - **2.** Fork - **3.** Maximum lift adjusting screw - **4.** Lift lever hub - **5.** Lift lever and shaft - **6.** Spool - **7.** Lever - **8.** Rocker - **9.** Return spring - **10.** Roller - **11.** Spool link - **12.** Fork lever - **13.** Spool lever - **14.** Lift arm.

OPERATION

Upon moving lever **P** up on the quadrant to raise lift arms, the linkage reacts as indicated by solid arrows:

— Fork lever **5** separates rocker **8** from roller **10** which causes spring **9** to move spool **6** to raise position **S**, thereby restoring contact between roller and spool as shown by solid arrows.

— With arms in raise position, link **7** moves links **8, 10, 11** and **13** as indicated by open arrows to return spool to neutral **N** and bring lift arms to rest.

Position taken by arms **14** is equivalent to the position of lever **P** on quadrant as imparted by operator.

LIFT ADJUSTMENTS (as from frame 661667)

Lift lever link

Set response lever to minimum response position. Move manual lever fully forward.

In these conditions, lift arms should stroke down fully; to adjust, back off lock nut (1, page 8) and unscrew fork (2) as necessary.

If lift arms stroke down fully before manual lever covers its full stroke on the quadrant, screw in the fork.

Stroke lift arms up and down several times to check that adjustment is correct.

Control valve response

To check response proceed as follows:

— Apply a 200 kg (440 lb) minimum weight to lower links.

— Bring system oil temperature to 50°-60° C.

— Run the engine at 1,000 to 1,200 rpm.

— Set response lever to the horizontal facing forward (medium response position).

— Operate control lever to stroke lift arms up and down several times.

— Starting from bottom of stroke position, bring lift control lever to midway position on quadrant in one stroke, ensuring that load does not rest on ground.

— Take off response lever retaining screw and withdraw response lever.

— Screw in adjusting plug until lift surge occurs.

Note: Lift surge is an anomalous operating condition whereby the lift arms raise intermittently at intervals of less than two minutes.

— Back off adjusting plug until lift surge ceases.

— Back off plug through a further half a turn.

— Refit lever in horizontal position.

Maximum lift arm travel

Lift levers should stop in maximum lift position (spool return to neutral) before mechanical stop is activated (crank lever contacts rear lift cover and relief valve cracks off).

The procedure is identical with that described for control valve response adjustment above.

Move response lever fully back (minimum response position).

Raise lift arms by moving control lever fully back.

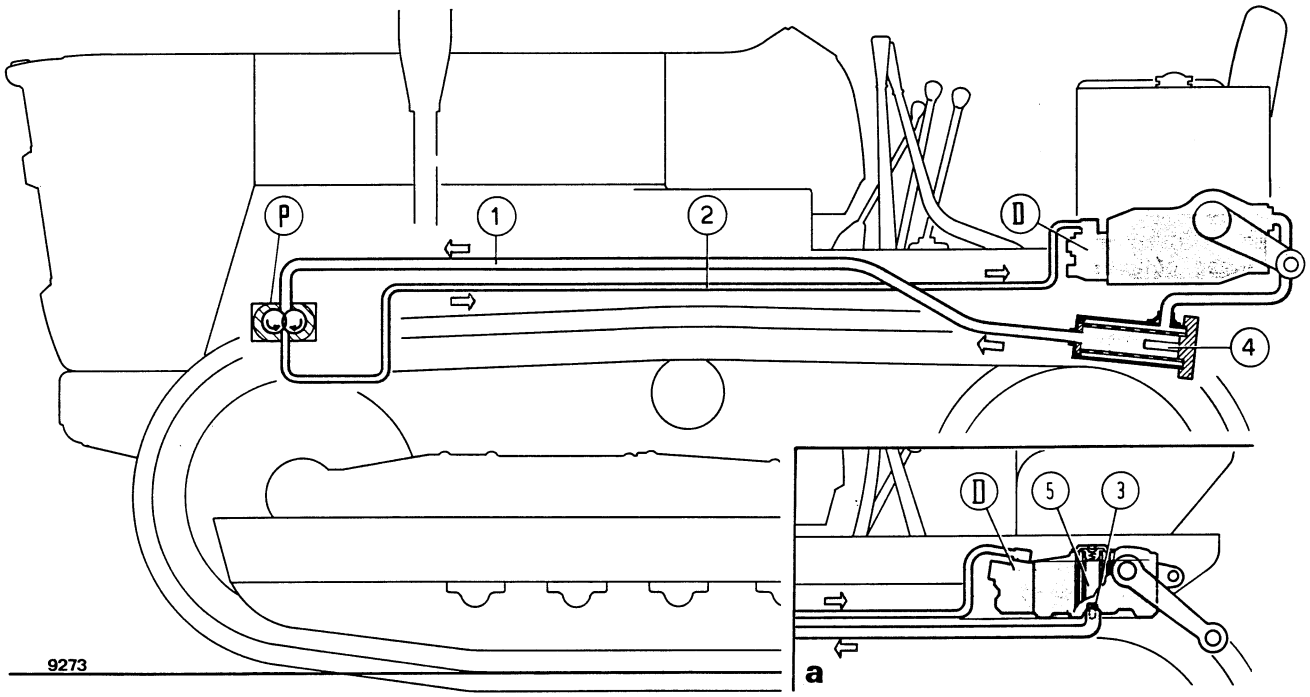
Slacken lock nut and back off adjusting screw until relief valve cracks off (mechanical stop).

Apply a reference mark on both lift body and lift arm.

Screw in adjusting screw until distance between reference marks is 2 to 3 mm or .08 to .12 in.

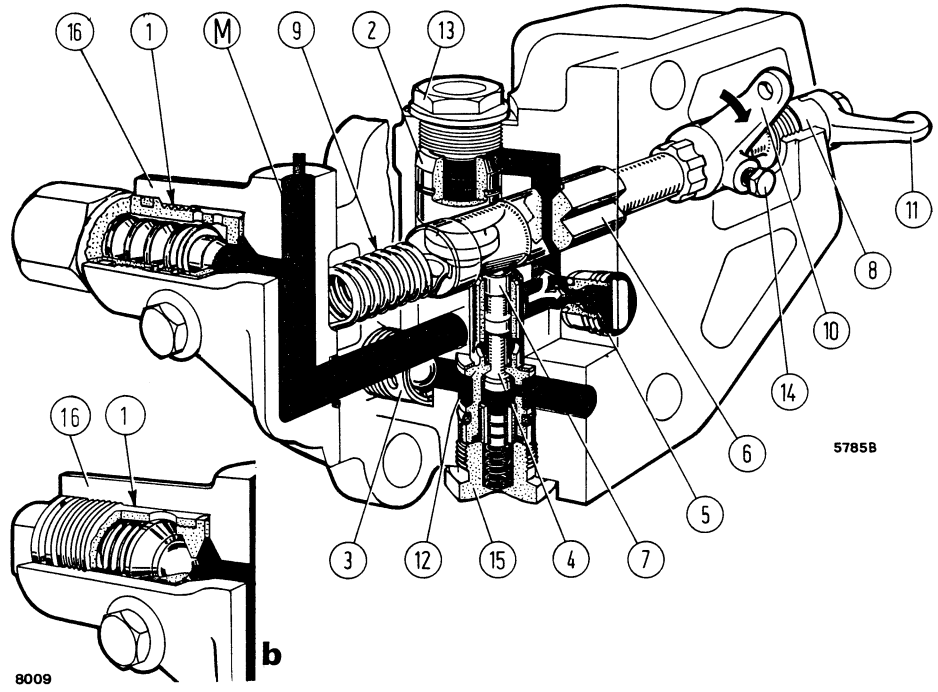
Raise lift arm several times to check that adjustmen is consistent.

LIFT HYDRAULICS: Data



HYDRAULIC LIFT SYSTEM DIAGRAM (as from frame 661667)

a. AM lift solution - **D.** Control valve - **P.** Hydraulic pump - **1.** Pump inlet line - **2.** Pump outlet line - **3.** Magnetic plug (AM) - **4.** Metal wool cartridge oil filter with magnetic rod - **5.** Metal gauze cartridge filter (AM).

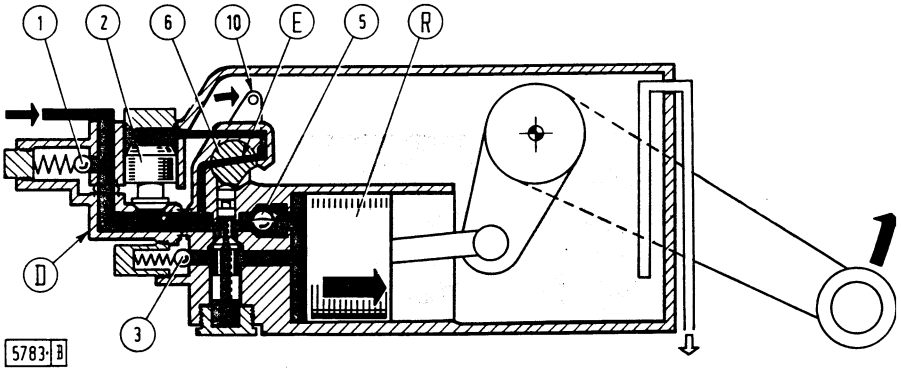


CUT-AWAY OF VALVE BLOCK

(Black arrow indicates twist on lever **10** by spring **9.** Indicated oil flow applies to raising)

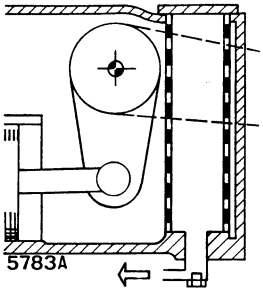
b. AM relief valve - **M.** Oil pressure inlet from pump - **1.** Relief valve - **2.** Governor valve - **3.** Safety valve - **4.** Unloader valve - **5.** Cylinder inlet valve - **6.** Spool - **7.** Unload valve plunger (contacting actuating cam on spool) - **8.** Response adjustment plug - **9.** Spool return spring - **10.** Spool lever - **11.** Response adjusting lever - **12.** Unload valve seat - **13.** Governor valve plug - **14.** Spool lever capscrew - **15.** Unload valve plug - **16.** Valve carrying cover.

Pump pressure oil
Inlet and exhaust oil
Trapped oil

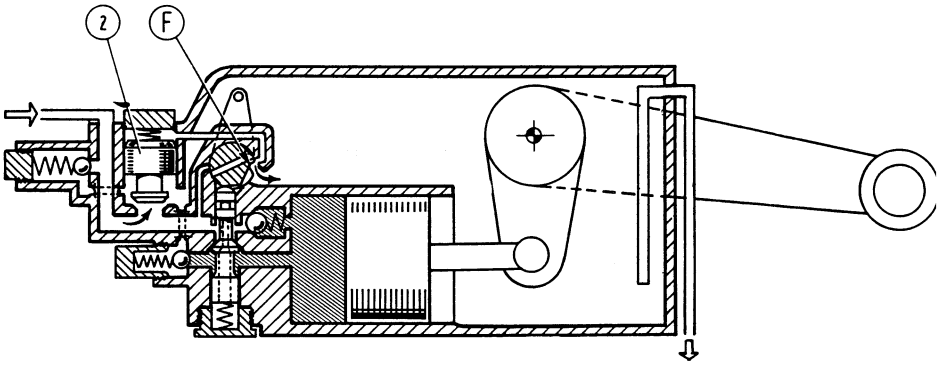


S. Oil flow when raising

On turning spool (6), incoming oil is directed to upper chamber of governor valve (2) through crossed drilling (E). As upper area of governor valve is larger than lower end, valve is kept closed. Oil pressure is thus directed to cylinder through valve (5).

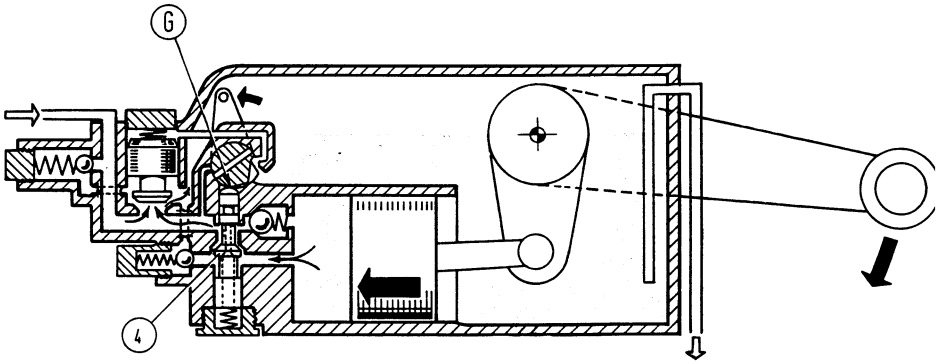


AM filter



N. Oil flow in neutral

Spool position is such that oil pressure from governor valve (2) is exhausted through slot (F). Thus, pump oil pressure displaces governor valve upward and oil is exhausted to tank.



A. Oil flow when lowering

Spool cam (G) causes valve (4) to open, thereby allowing cylinder oil to be exhausted.

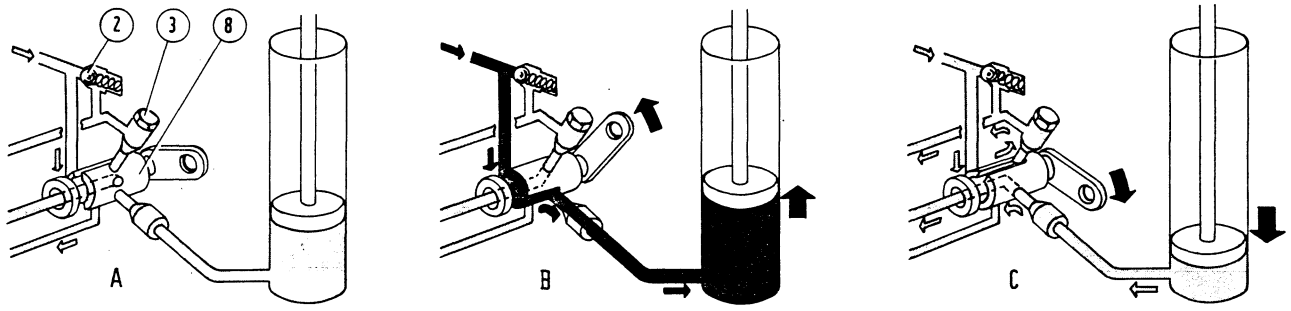
LIFT SYSTEM OPERATION DIAGRAM

D. Control valve - E. Spool cross drilling - F. Spool slot - G. Spool cam - R. Lift piston - 1. Relief valve - 2. Governor valve - 3. Cylinder safety valve - 4. Unload valve - 5. Cylinder inlet valve - 6. Spool - 10. Spool actuating lever.

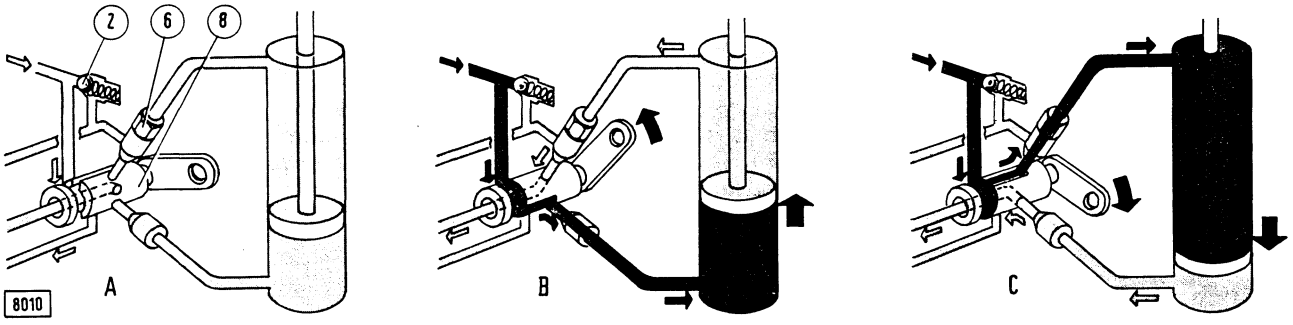
LIFT HYDRAULICS: Data

Pump pressure oil

Inlet and exhaust oil



Single acting cylinder operation diagram



Double acting cylinder operation diagram

REMOTE CONTROL VALVE OPERATION DIAGRAM

A. Neutral - **B.** Raise - **C.** Lower - **2.** Relief valve - **3.** Double-acting cylinder connecting port plug - **6.** Double-acting cylinder connection (in replacement of plug 3) - **8.** Spool.

Note: Remote control valve is fitted in replacement of cover **16** on left of lift body (see illustration, page 10), taking care to remove relief valve **1** from cover and install on remote control valve body.

CHARGING SYSTEM

Alternator	
Type	FIAT A 12 M 124/12/42 X, Three-phase, self-rectifying
Rated voltage	12 V
Rotation (see from pulley side)	Clockwise
Cut-in speed at 12 V and 90°C	950 to 1,050 rpm
Output at 14 V and 5000 rpm across battery after warm-up (°°)	42 A minimum
Maximum rated output (°°)	53 A approx.
Rotor winding resistence at 20°C:	
— Across slip rings	4.1 to 4.5 Ohm
— Across terminal 67 and ground at 500 rpm	4.5 to 4.8 Ohm
Stator phase resistance (each)	.11 ± .005 Ohm
On-tractor alternator speed (at governed speed)	4,446 rpm
Drive ratio	2.117 to 1
Voltage regulator	
Type:	
— AM (electromechanical)	FIAT RC 2/12 B
— PM (electronic)	MARELLI RTT 110 B
Alternator test speed:	
— AM	5,000 rpm (1)
— PM	4,000 rpm (2)
Battery capacity (20 hour rate)	40 to 50 Ah
Warm-up current	7 A (1)
Stage two test current	2 to 12 A (1)
Stage two regulating voltage	13.9 to 14.5 V (1)
Stage one test current	25 to 35 A (1)
Stage one regulating voltage	.2 to .7 V lower than stage two (1)
Regulating voltage	14 to 14.4 V (2)
Resistance across terminal 15 and ground at 15° to 35°C	26 to 30 Ohm
Open contact resistance across terminals 15 and 67	5.35 to 5.95 Ohm (1)
Armature-core gap	1.45 to 1.55 mm (.057 to .061 in) (1)
Stage two contact gap	.35 to .55 mm (.014 to .022 in) (1)
Battery charge relay	
Type	SIPEA
Coil resistance	27 to 31 Ohm
Contact opening voltage	5.3 to 5.7 V

(°°) Applicable to fully bedded-in brushes.
(1) AM voltage regulator.
(2) PM voltage regulator.

ELECTRICAL SYSTEM: Data

STARTER

Type	Marelli MT 62 BA	
Rated voltage	12 V	
Rated output	4 metric hp	
Rotation (pinion end)	Clockwise	
No. of poles	Four	
Field winding	Compound	
Engagement	Sliding armature and clutch	
Control	Electromagnetic	
	mm	in
Pole shoe I.D.	83.25 to 83.35 83.65 to 83.85	3.277 to 3.282 3.293 to 3.301
Armature O.D.	82.346 to 82.400 82.946 to 83.000	3.242 to 3.244 3.266 to 3.268
Pinion to ring gear ratio	9/130	
Test bench data		
Running torque at 20°C:		
— Current	950 A max.	
— Speed	1,300 to 1,900 rpm	
— Voltage	8.5 V	
— Torque	2.3 kgm (17 ft lb)	
Lock torque at 20°C:		
— Current	1,900 A max.	
— Voltage	7 V	
— Torque	5 kgm (36 ft lb)	
Light running torque at 20°C:		
— Current	140 A max.	
— Voltage	12 V	
— Speed	700 to 1,400 rpm	
Mechanical data		
Brush spring load (used brushes)	.8 to 1 kg (1.8 to 2.4 lb)	
Mica undercut depth	1 mm (.040 in)	
Clutch slip torque	12 to 16 kgm (87 to 115 ft lb)	
Commutator diameter	47.36 to 48.16 mm (1.8645 to 1.8960 in)	
Maximum commutator out-of-round	.03 mm (.0012 in)	
Solenoid		
Resistance at 20°C	.825 to 1.025 Ohm	
Current consumption at 12 V	14.6 A max	
Minimum activation voltage	8 V	
Lubrication (for overhaul)		
Starter drive helical splines	grassofiat MR 3	
Drive end bushing	grassofiat MR 3	

(1) Series and parallel auxiliary windings only.

BATTERY

Type	MARELLI 6 ATM 25 - A SCAINI 64072
Rated voltage	12 V
Capacity (20 hour discharge):	
— MARELLI	132 Ah
— SCAINI	140 Ah
Size (length by width by height)	508 x 174 x 205 mm (20 x 6.8 x 8 in)
Weight (including electrolyte)	40.5 kg (89 lb)

FUSES

Six 8 A fuses in box plus one 8 A in-line fuse for AM version.

FUSE	PROTECTED CIRCUITS
1	Spare (AM) - Voltage regulator (PM).
2	Fuel gauge - Water temperature gauge - Low engine oil pressure indicator - Charge indicator relay - Low clutch oil pressure indicator.
3	Front right parking light - Rear left parking light - Parking and panel light indicator - Number plate light.
4	Front left parking light - Rear right parking light - Floodlight.
5	Left and right low beam.
6	Left and right high beam.
7	Voltage regulator (AM).

Unprotected circuits: Starter, alternator and pre-heat plugs (optional).

LIGHTING AND SIGNALLING

Headlamps/front parking lamps	45/40 W - 5 W
Floodlamp	35 W
Rear parking lamps	5 W
Number plate lamp	5 W
Panel lamp and parking light indicator	5 W
Battery charge indicator lamp	5 W
Low engine oil pressure indicator lamp	5 W
Low clutch oil pressure indicator lamp	5 W

LIGHTING/STARTER SWITCH

SIPEA, six-position, 60 A	
Switch positions	Circuits completed
Position 0 (°) 30 30/1	Off.
Position I 30-51 30/1	Starter button - Charge indicator - Voltage regulator - Fuel tank unit - Engine oil pressure switch - Engine water temperature sending unit - Clutch pressure sending unit.
Position II 30-51 30/1-58	Starter button - Charge indicator - Voltage regulator - Fuel tank unit - Engine oil pressure sending unit - Engine water temperature sending unit - Front and rear parking indicator - Number plate lamp - Parking light and panel light indicator - Floodlight - Clutch oil pressure sending unit.
Position III 30-51 30/1-58-56b	Starter button - Battery charge indicator - Voltage regulator - Fuel tank unit - Engine oil pressure sending unit - Engine water temperature sending unit - Front and rear parking lights - Number plate light - Parking light and panel light indicator - Flood light - Low beam - Clutch oil pressure sending unit.
Position IV 30-51 30/1-58-56a	Starter button - Battery charge indicator - Voltage regulator - Fuel tank unit - Engine oil pressure sending unit - Engine water temperature sending unit - Front and rear parking lights - Number plate light - Parking light and panel light indicator - Floodlight - High beam - Clutch oil pressure sending unit.
Position V (°) 30 30/1-58	Front and rear parking lights - Number plate light - Parking light and panel light indicator - Flood light.

(°) Key removable.

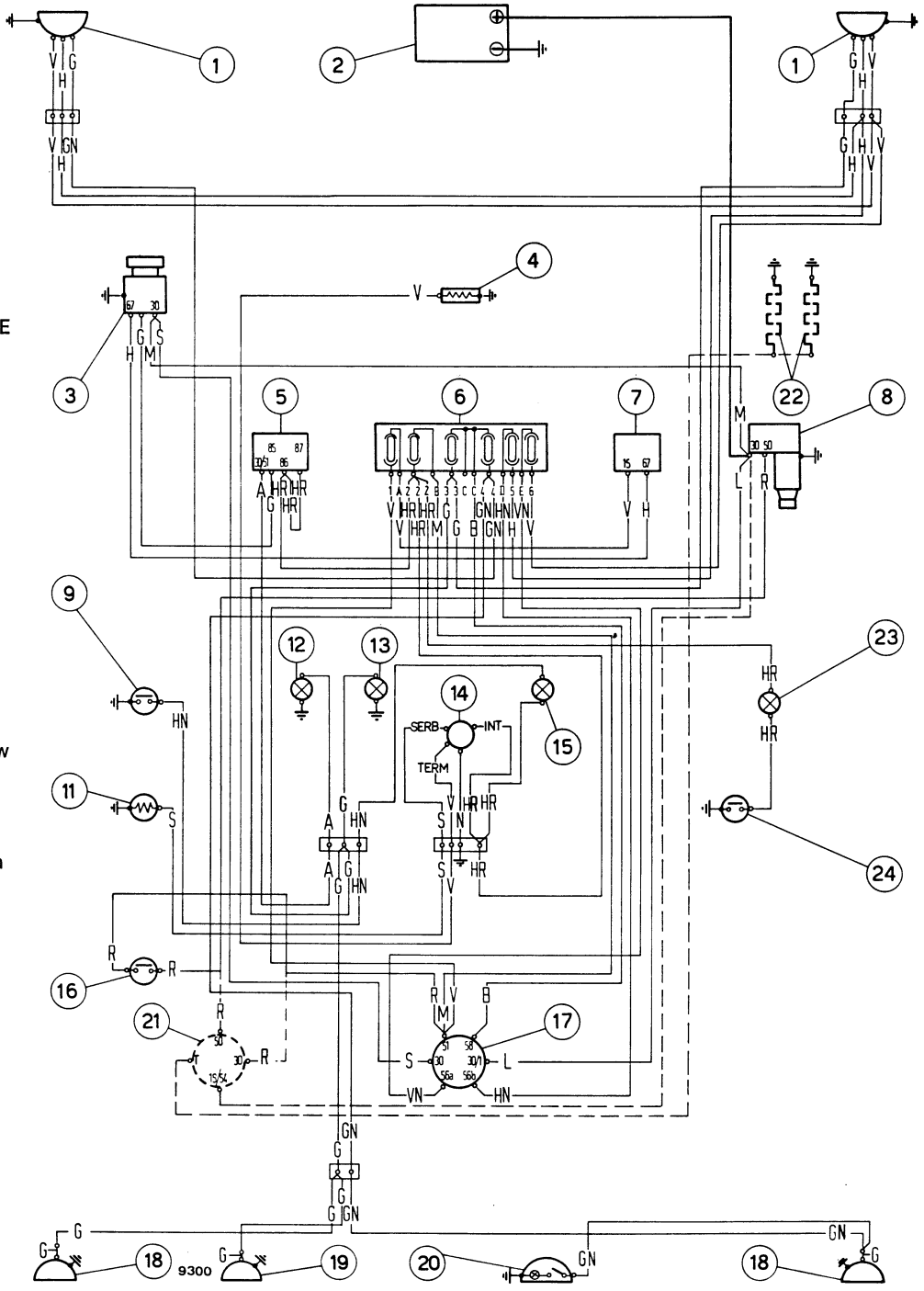
HEATER AND STARTER SWITCH

SIPEA, four-position, 60 A	
Switch position	Circuits completed (*)
Position 0 30 15/54	Off.
Position I 30 15/54-T	Heater plugs.
Position II 30-50 15/54-T	Heater plugs and starter.
Position III 30-50 15/54	Starter.

(*) Heater/starter switch operation is under lighting and starter switch control.

CABLE COLOUR CODE

A = Light blue
B = White
G = Yellow
H = Grey
L = Dark blue
M = Brown
N = Black
R = Red
S = Pink
V = Green
GN = Black and yellow
HN = Black and grey
HR = Red and grey
VN = Black and green



Note: Optional heater plugs **22** and control switch **21** in replacement of starter button **16** shown by dotted line.

1. Headlamps and parking lamps - **2.** Battery - **3.** Alternator - **4.** Engine water temperature sending unit - **5.** Battery charge indicator relay - **6.** Fuses - **7.** Voltage regulator - **8.** Starter - **9.** Low engine lube oil pressure indicator sending unit - **11.** Fuel tank unit - **12.** Battery charge indicator - **13.** Parking light indicator - **14.** Fuel gauge and engine water temperature indicator - **15.** Low engine lube oil pressure indicator - **16.** Starter button - **17.** Master switch - **18.** Rear parking lights - **19.** Number plate light - **20.** Floodlight and switch - **21.** Starter switch and heater switch (optional) - **22.** Heater plugs (optional) - **23.** Low clutch oil pressure indicator - **24.** Low clutch oil pressure indicator sending unit.

ELECTRICAL SYSTEM

HYDRAULIC OIL RESERVOIR - OIL FILTER

Reservoir	
Construction	Welded sheet metal
Location	Right tractor fender
Reservoir capacity	16.5 liters (3 ½ Gall)
Type of oil	See page 4, Section 00
Oil filter	
Location	Inside reservoir
Type	Metal cartridge on inlet from control valve

HYDRAULIC PUMP

Type	Gear	
Model	3 PA 33/S	
Make	SALAMI	
Drive	U-jointed shaft from crankshaft	
Rotation (from front)	Clockwise	
Drive ratio	1 to 1	
Maximum rated speed (at governor speed)	2,100 rpm	
Maximum rated output	64 liters/min. (14 Imp Gall/min)	
Output on bench	See diagram, page 4	
Test oil temperature	55° to 65°C	
Test oil grade	SAE 20	
	mm	in
Pump gear journal diameter	25.387 to 25.400	.9995 to 1.0000
Bushing fitted I.D.	25.465 to 25.478	1.0025 to 1.0031
Journal clearance in bushing	.065 to .091	.0025 to .0036
Maximum wear allowance	.1	.004
Gear and bearing housing bore diameter in pump body	53.000 to 53.019	2.0866 to 2.0874
Maximum pump body wear on suction side	.100	.004
Bearing width (each)	32.935 to 32.943	1.2966 to 1.2970
Gear flank width	25.979 to 26.000	1.0230 to 1.0236
Minimum gear width	25.820	1.0165
Total width of bearings and gears	91.849 to 91.890	3.6161 to 3.6177
Width of gear and bearing housing in pump body	92.000 to 92.030	3.6220 to 3.6232
Gear and bearing end play in pump body (overhaul):		
— Minimum	.080	.0031
— Maximum	.200	.0080

REMOTE CONTROL HYDRAULICS: Data

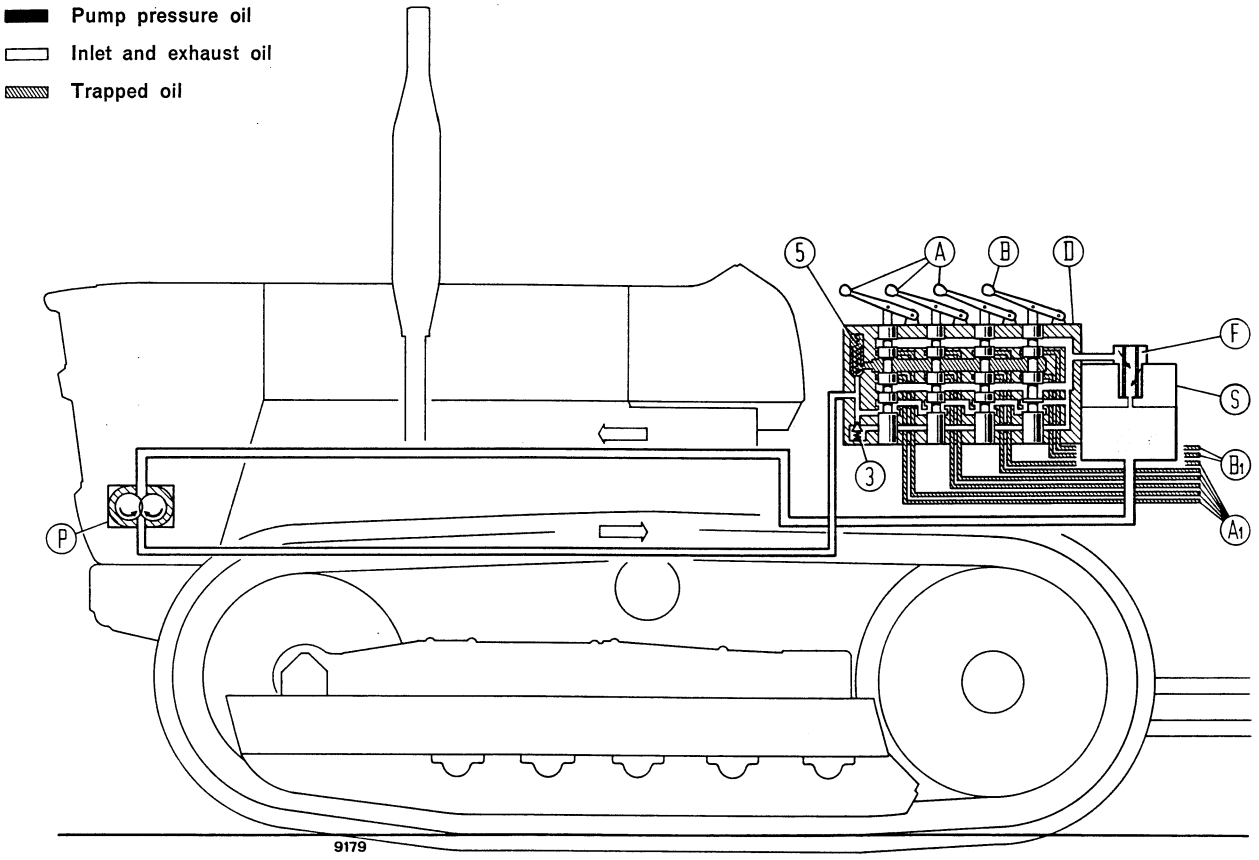
REMOTE CONTROL VALVES

Type	Spool, spring return to neutral	
Make	SALAMI - VD 40	
Location	Banked (up to 4). Attached to right tractor fender together with oil reservoir	
Control	Manual lever	
Relief valve setting	115 kg/cm² or 113 bar (*) (1636 psi)	
	mm	in
Spool clearance in body	.006 to .008	.0002 to .0003
Relief valve spring length:		
— Free	66	2.60
— Under 100 kg or 220 lb	52	2.05
Interlock valve spring length:		
— Free	70	2.75
— Under .16 kg or .35 lb	50	1.97
Spool return spring length:		
— Free	40	1.57
— Under 24.3 kg or 53.5 lb	22	.87
Float return spring length:		
— Free	80	3.15
— Under 24 ± .85 kg or 53 ± 1.9 lb	44.5	1.75
Float detent spring length:		
— Free	32	1.26
— Under 23.5 ± 1.35 kg or 52 ± 3 lb	22	.87

TORQUE DATA

DESCRIPTION	Thread size	Torque		
		kgm	N · m (*)	ft lb
Capscrew, flange and cover to pump body (C_3, page 4)	M 10 x 1.5	5.2	51	38
Nut, control valve body tie bolt (C_1)	M 10 x 1.5	5.2	51	38
Relief valve body (3)	M 26 x 1.5	10.5	103	76
Nut and locknut, relief valve (2)	M 10 x 1.5	5.2	51	38
Plug, non return valve (17)	M 14 x 1.5	7.5	73	54
Capscrew, spool spring cup (C_2)	M 8 x 1.25	3.8	37	27

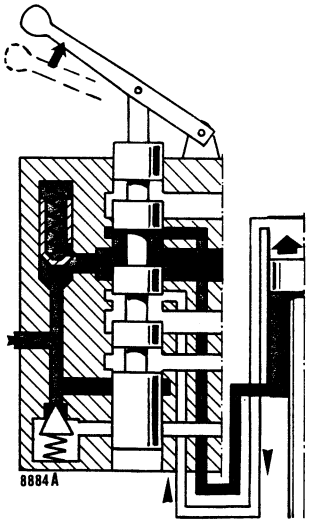
(*) SI Unit.



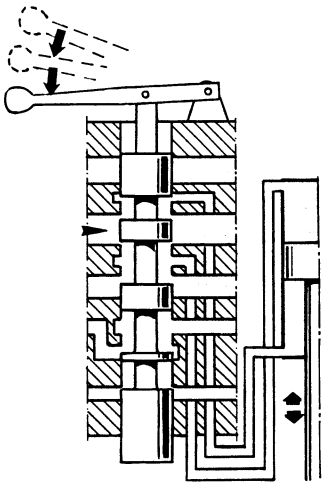
REMOTE CONTROL VALVE HYDRAULIC SYSTEM SCHEMATICS

A. Double acting valve control levers - **B.** Float valve control lever - **A_1.** Double acting cylinder couplings - **B_1.** Float circuit couplings - **D.** Remote control valves - **F.** Oil filter - **P.** Pump - **S.** Reservoir - **3.** Relief valve - **5.** Non-return valve.

Remote control cylinder at rest - With levers **A** and **B** in neutral position, the respective spools take up the position shown to close the effective area of outlet ports to double acting cylinders causing oil from pump to be returned to tank.



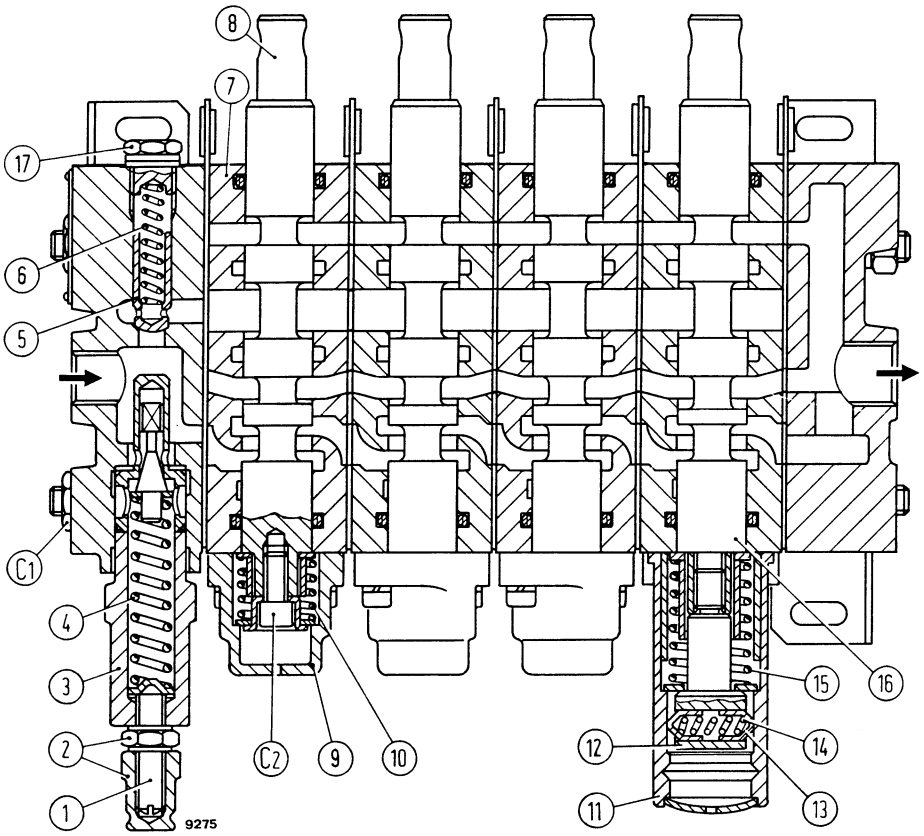
a. Raise and lower - When either lever **A** or **B** is moved to the rear, spool takes position shown in **(a)** to permit communication between exhaust and top cylinder chamber, and between delivery port and lower chamber across check valve **(5)**. Delivery pressure is proportional to cylinder requirement and is checked by relief valve **(3)**. When released, the lever springs back to neutral leaving cylinder in position.
To lower, move lever forward and hold in position throughout. Oil from lower chamber is exhausted, whilst upper chamber is connected to delivery.



b. Float - When lever **B** is moved fully forward beyond lower position, where it is restrained by stop, float spool takes position shown in **(b)** and connects pump delivery and cylinder chambers to exhaust. No pressure exists in cylinder lines, and piston slides freely.

REMOTE CONTROL HYDRAULICS:

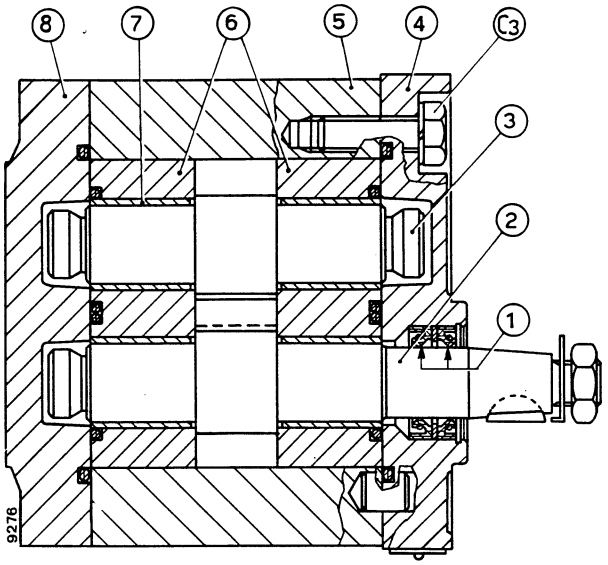
Data



SECTION THROUGH FOUR-SPOOL REMOTE CONTROL VALVE FOR DOUBLE ACTING CYLINDERS

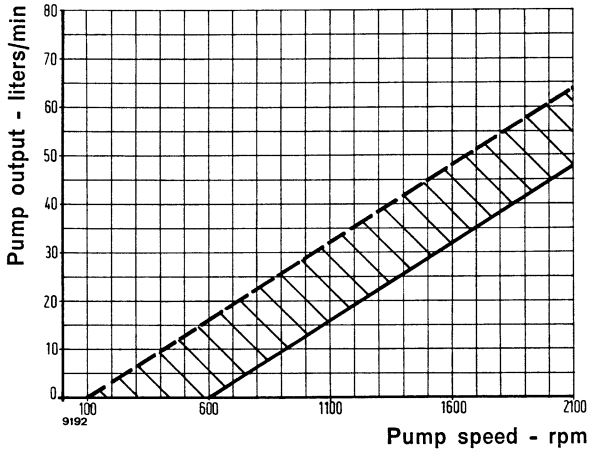
Note: Float position on fourth spool.

C_1. Tie bolt nut - C_2. Spring cup capscrew - **1.** Relief valve adjusting screw - **2.** Locknut - **3.** Relief valve (crack off setting 115 kg/cm² or 113 bar or 1636 psi) - **4.** Relief valve spring - **5.** Check valve - **6.** Check valve spring - **7.** Control valve body - **8.** Spool - **9.** Cap - **10.** Spring - **11.** Sleeve - **12.** Detent housing - **13.** Detent plunger - **14.** Spring - **15.** Spring - **16.** Float spool - **17.** Check valve plug.



SECTION THROUGH HYDRAULIC PUMP 3PA/33S

C_3 Flange and cover capscrew - **1.** Seal - **2.** Drive gear - **3.** Driven gear - **4.** Flange - **5.** Pump body - **6.** Bearings - **7.** Bushings - **8.** Cover.



SPEED-OUTPUT CHART - PUMP TYPE 3PA 33/S

Test pressure . . . . 115 kg/cm² (113 bar or 1,636 psi)
Oil temperature . . . . 55° to 65°C

10 - ENGINE

293002/1	Bracket, universal
290740	Hook, lift
290955/1 **290956**	Spacer, cylinder sleeve
A 60419 **(292913)**	Dresser, universal, valve seat
291467	Cutter, injector sleeve
291350	Installer, injector sleeve
291174	Straightedge
290944	Reamer, valve guide
290947	Puller, tappet
291046	Remover/replacer, valve guide
290950	Wrench, crankshaft
A 90424/1 **(290687)**	Taps, injector sleeve
A 42110 **(290633)**	Puller, injector sleeve
A 60077 **(292190)**	Retainer, connecting rod
291182/1	Puller, water pump impeller
290965	Capscrew, balancer timing
291504	Puller, crankshaft pulley
293183	Guide, engine block rear support seal
293184	Punch, engine block rear support seal

Fuel injectors

293671	Cleaner, nozzle
290898	Remover/replacer

Distributor pump

290760	Adapter, advance
291449	Puller, gear and sleeve
293530	Tester kit
290763	Support, pump
290752	Plate, pump (use with **290239**)
290741	Remover, throttle lever
290742	Installer, throttle and shutoff shaft O-ring
290743	Tester, advance
290744	Remover/replacer, transfer pump rotor (use with torque wrench)
290745	Installer, start-retard O-ring
290746	Installer, advance device plug O-ring
290747	Retainer, distributing rotor flange
290748	Plug, pump leakage test
290749	Adapter, transfer pump delivery pressure check
290750	Adapter, fuel return
290751	Adapter, fuel supply line
290753	Adapter, pump leakage test
290754	Wrench, fuelling screw
290755	Adapter/relief valve, roller stroke
290756	Coupling, drive
290757	Gauge, pump external timing
290758	Wrench, cam advance lever
290759	Installer, governor shaft in pump body
290764	Adapter, drain
290765	Piping, delivery
292298	Piping, delivery, procedure (A)

SERVICE TOOLS

20 - DRIVE TRAIN

290954 Wrench, oil-bath master clutch

291363 Compressor, clutch spring

292265 Hoist, oil bath clutch

290991/1 Positioner, bevel gear

290995 Protector, ring gear shaft seal

291022 Hook, lift, final drive

291029 Stop, final drive gear

291026 Pilot, final drive outer bearing carrier

290997 Compressor, steering clutch spring

290996 Wrench, steering clutch drum nut

291027 Screw, puller, sprocket shaft

291517 Hook, transmission

30 - UNDERCARRIAGE

291006 Gauge, track frame

291572 Tube, track frame gauge

291667 Hook, track roller

291427 Puller screw, track roller support

291417 Support, roller

291430 Punch, roller bush

292447 Wrench, track frame suspension bar outer bushing

293334 Plate, track idler support (use with press **291387**).

291588 Legs, puller, roller support (use with press **291387**).

TRACK CHAINS

291005/1 Remover/replacer, coupling pin

291385 Retainer, track shoe nut

291015 Gauge, link spacing

Equipment for use with hand press 291387

291008 Remover, pin

291010 Plate, pin removal and installation

201007 Remover/replacer, bushing

291012 Spacer, bushing

291011 Support, link

291009 Installer, pin and bushing

Equipment for use with fixed press 292451

292434 Installer, link

292435 Installer, link

292436 Anvil, pin removal

290437 Spacer, coupling bushing

40 - LIFT

Pump

291233 Diesel engine, 85 metric hp, lift pump drive (as alternative to electric motor **291235**)

291235	Electric motor, 2-speed (720 and 1445 rpm), lift pump drive (as alternative to diesel engine **291233**) including the following:
290385	- Coupling, drive
291231	Tester, output, large (as alternative to tester **292574**) including the following:
290418	- Adapter, delivery
290419	- Adapter, inlet
290448	- Adapter, supply piping
290445	- Piping, supply
290447	- Piping, delivery
290434	- Capscrew, delivery adapter
290436	- Capscrews, inlet adapter
292574	Tester, output, small (as alternative to tester **291231**) including the following:
290330	- Adapter, delivery
290331	- Adapter, inlet
290424	- Piping, inlet and delivery
290358	- Capscrews, delivery adapter
290359	- Capscrews, inlet adapter

Lift

293199 **293198/1**	Protector and punch, right cross shaft seal (lift up to frame 661666)
292768 **293198/1**	Protector and punch, left cross shaft seal (lift up to frame 661666)
293384 **293385**	Protector and punch, cross shaft seal (lift up to frame 661667)
293300	Set of pressure gauges and adaptors
292650	Test machine, lift
290284	Pump, hand, valve tester
290824	Adapter, relief valve
290826	Adapter, safety valve
290834/1	Adapter, unload valve
291259	Wrench, cylinder oil inlet check valve plug

50 - ELECTRICAL SYSTEM

Alternator

A 76035 **(290683)**	Retainer, alternator body
A 90340 **(290686)**	Reamer, diode seat (use with **A 76035** and electric drill)
A 76029 **(290681)**	Support, negative diode removal (use with press **290021**)
A 76031 **(290682)**	Support, negative diode assembly (use with press **290021**)
A 76027 **(290679)**	Remover, negative diode (use with press **290021**)
A 76028 **(290680)**	Installer, negative diode (use with press **290021**)
A 76032 **(292195)**	Plate, press

Starter

292307	Adapter, torque wrench, starter clutch
290973	Dresser, commutator

SERVICE TOOLS